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Integrated Quality Model for Flexible Quality Management System

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Abstract

Quality management is a crucial issue for most of the businesses to attain continuous improvement that leads to achieving the organization's mission. There have been many quality management approaches that have been proposed in the literature, however, most of them are slow and have rigid processes when moving from one cycle to another within the management structure to achieve the organization's mission. This paper proposes an efficient and flexible quality management model that integrates a software engineering development model within the Deming's quality model.
The Boehm's software development spiral model is adopted with slight modification, such that within the organization's internal process, the final product or target is achieving the organization's mission. In this model, the process is performed in a spiral fashion, in which, for each cycle the organization gets closer to achieving its mission. The proposed model consists of three quality process levels with the flexibility to add or reduce managemental levels depending on the organization's hierarchy.
A case study of educational quality management system is presented to illustrate the proposed quality model. The case study has shown that, the proposed model can help the organization in managing its processes efficiently and flexibly at different managemental levels to achieve its mission. As most organizations are reluctant in adopting some of the quality models because of their rigidity, the proposed quality management model may help organizations in implementing an efficient and flexible quality management model.

Keywords: *quality management; quality model; quality process improvement; Deming cycle; spiral model; software engineering process.*

1. Introduction

Quality aims at defining, managing, and controlling the business's processes to achieve its goals by meeting the customer requirement and gaining its satisfaction. The term quality has been defined by ISO (ISO, 1994) as "the totality of characteristics of an entity that bear on its ability to satisfy stated and implied needs". In addition, the term process is defined in ISO (ISO, 1994) as a set of inter-related resources and activities which transform inputs into outputs. The focus and concerns on quality has been brought into attention many years ago back to late eighteenth and early nineteenth centuries, where initiatives were undertaken in several companies and more attention was given to scientific management (Bhuiyan and Baghel, 2005). After then, many quality models have been proposed, and different approaches have been investigated to employ new techniques and methods into the business processes to improve the quality and productivity of such companies. Among the earliest proposed quality models is Deming's continuous improvement model (Deming, 1950), which is presented as a quality improvement cycle; plan, do, check, and act, which has been abbreviated as PDCA. Deming has improved this model by expanding the check phase to include analysis, in which he changed the model to plan, do, study, act PDSA (Moen and Norman, 2010). Such model aims at continuing the quality improvement that increases successes and reduce failures (Bhuiyan and Baghel, 2005). The Deming's cycle has evolved through the years and has been used as a base for many quality management models (Bhuiyan and Baghel, 2005). Although the quality models have been, originally, proposed for controlling and managing manufacturing processes, process quality management and improvement have been a focal point at different business's sectors and domains such as management, finance, education, and software development.

This paper proposes an efficient and flexible quality management model that integrates a software engineering quality model (Boehm, 1988) within the Deming's quality cycle model (Deming, 1950). This paper is organized as follows; the related work is presented in the next section, then, the proposed quality model is presented, in the fourth section, a case study of the proposed model is illustrated, finally the conclusions are presented in the fifth section.

2. Related Work

There are many quality assurance and improvement models that have been presented in the literatures (Shewart, 1939; Deming, 1950; Juran, 1951; Ishikawa, 1985; Lillrank and Kano, 1989; Kaplan and Norton, 1996; Raisinghani et al., 2005; ISO, 2008). Total Quality Control (TQC) is considered to be the oldest quality model that was based on the statistical approach introduced by Shewart (Shewart, 1939). This model was further investigated and more quality models were introduced such as (Deming, 1950; Juran, 1951; Ishikawa, 1985), in which most of the later developed quality models are based on these original quality models. The Total Quality Management (TQM) has appeared in which the quality should be managed not only controlled (Martinez-Lorente, Dewhurst, and Dale, 1998). A process-based quality management system approach based on ISO standard is proposed to enhance customer satisfaction by meeting customer requirements, in which the customer's

requirements are taken as an input, which is processed within the quality management system, and the customers' satisfaction is considered as the output (ISO, 1994; ISO, 2008). Another quality management model is the balanced scorecard (BSC) that has been introduced by Robert Kaplan and David Norton as a methodology that translates the objectives of the organization into measures, goals, and initiatives in four different perspectives, namely financial, customer, internal business process, and learning and growth (Kaplan and Norton, 1996). A most recent quality model is Six Sigma that was introduced by the American company Motorola Incorporation, which uses statistical methods to reduce the defects in products and services in the manufacturing companies (Raisinghani et al., 2005). Another quality approach is a Japanese management style, referred to as Kaizen, which means continuous improvement. Kaizen is a process-oriented approach that focuses on small continuous improvements, and was developed to create strategy for competitive success in business by reducing the inferior quality of many manufactured goods. (Raisinghani et al., 2005).

As stated earlier, most of the quality management models are based on the original quality models such as Deming cycle, which has gained popularity for very long period of time. Deming's cycle has been used for quality management and improvement at different domains, for instance, smart grid technology (Apetrei et. al, 2011), healthcare (Gerst, 2013), medication prescription (Montecatine-Alonso et. al, 2016), education (Borys, Milosz, and Plechawska-Wojcik, 2012), and manufacturing (Castillo et. al, 2013). In addition, there has been several quality models that have been proposed based on the integration between Deming's cycle and other models for the purpose of quality management and improvement. In the following paragraph, some of the integrated quality models within Deming's cycle are briefly presented.

In (Lewis and Cooke, 2013) an integration of a lean measurement, which is an improvement process that measures the end customer's perception of value, with the process improvement methods such as Deming's cycle and Six-Sigma Define-Measure-Analyze-Improve-Control (DMAIC) methodologies. The aim of this work is to determine whether lean measurement can be integrated and applied within Deming's cycle measurement systems, with the objective of removing none value added activity to improve the efficiency of a measurement based function. A methodology that aims to eliminate incorrect level (gap) of clearances and gates from the Rear Gate and Rear Body side made during the auto motor vehicle manufacturing has been presented in (Castillo et. al, 2013). The proposed methodology uses several statistical quality control tools such as; Pareto, stratification, pay off matrix, selection matrix, box plot, factor tree analysis, process map, and brainstorm; with Deming's cycle as a systematic approach to problem solving. In (Tepaskoualos and Chountalas, 2017) a quality management system has been proposed based on the integration of two management systems; occupational health and safety OHSAS 18001 and environmental management for ISO 14001 and has been applied on construction company as a pilot study. The aim of such integration is to reduce of the operating costs and administrative complexity. A quality management system, that integrates Six Sigma practices into traditional quality management model, has been proposed in (Uluskan, Godfrey, and Joines, 2017). This proposed work aims to investigate the relationship traditional QM practices and Six Sigma, and the impact of such integration on the organizational performance. In (Fernandes, Sampaio, Sameiro, and Truong, 2017) a conceptual quality management model that integrates quality management and supply chain management approaches by combining their common practices. The proposed model aims to provide new insight that promotes a set of significant organizational benefits such as understanding the companies' performance that helps the company to track its continuous improvement. A self-evaluation approach has been proposed in (Alzamil, 2014) for the purpose of improving quality process, in which internal and external evaluation processes have been presented to help the organization to evaluate their performance to assure and improve the quality. These internal and external evaluation processes are cyclic process, in which an integration of software development spiral model (Boehm, 1988) may be adopted, with slight modification, within the internal evaluation process to be performed in a spiral fashion, in which, for each cycle, the institute gets closer to achieving its mission. In (Azadeh, Gaeini, and Moradi, 2014) an integration of a Deming's continuous improvement cycle with a fuzzy approach has been proposed. A fuzzy data envelopment analysis (FDEA) has been used as a methodology for optimization of factors contributing to the implementation of Health, Safety and Environment (HSE) in maintenance activities. A gas refinery was used as a case study of the proposed approach to measure and improve HSE in maintenance activities.

The major problem of the most quality management models is that, they are very slow and have rigid processes when moving from one cycle to another within the management structure to achieve the organization mission. This paper proposes an integration of a software engineering development model (Boehm, 1988) within the Deming's cycle to develop a quality management model that improves the efficiency of quality management cycles with respect to quality and performance aspects. Such approach is flexible so that a process can start at one cycle level and ends at another cycle level to achieve the organization mission. In addition, such model is top-down and bottom-up approach in which the process initiated from inner process cycle which is the smallest unit within the organization structure in bottom-up fashion, and the feedback comes from the outer process cycle which the higher management unit within the organization structure in top-down fashion.

3. Proposed Integrated Quality Management Model

The cyclic process is essential for any organization to continue its quality improvement as well as achieving its mission. In this proposed model, the software development spiral model (Boehm, 1988) is adopted with slight modification, such that within the organization's internal process, the final product or target is achieving the organization's mission. In this model, the process is performed in a spiral fashion, in which, for each cycle the organization gets closer to achieving its mission. In the following paragraph, the Boehm's spiral model is briefly described.

As in business and management, software quality considerations within software development process were recognized in the early days of software engineering modeling's development (McCall, Richards, and Walters, 1977; Boehm, 1978). Boehm has introduced a software process model which is known in the software engineering literatures as the spiral model (Boehm, 1988). This model aims at improving the software development process and avoiding the drawback of the existing models by managing the software development stages as well as progressing and transition from one stage to another. It consists of cycles in an incremental spiral fashion in which each cycle begins with the identification of the objectives of the portion being developed, alternative means of implementing this portion of the product, and the constraints imposed on the application of the alternatives. Next step is to evaluate the alternatives with respect to the objectives and constraints in which the areas of uncertainty that may impose the possible risks on the project are identified. After that, an evolutionary development is in process in which the portion of the project is developed and the next level of the product is verified. At the end of each cycle, review is conducted and a plan for the next phase is prepared.

In the proposed model, and for the purpose of simplicity and as followed by most organizational hierarchy, three levels of quality analysis are defined that represent quality process

analysis from the most inner level to the most top level of the organization's hierarchy. For the purpose of levels' identification, the levels' naming is obtained from the famous sociology levels of analysis, namely; micro-level (which represents the smallest unit in the organization, like section or department), meso-level (which represents the mid-level unit of the organization, like division), and macro-level (which represents the top level of the organization, like high management) (Blackstone, 2012). In the management processing category, the micro-level represents the individual level processes, the meso level represents the middle management level processes, and the macro level represents the top level management processes. Although, three levels of management (macro, meso, and micro) are defined, the proposed model is flexible and is not limited to a fixed number of managemental levels as the model runs the processes in a spiral fashion. Therefore, and regardless of the naming scheme that have been identified, more managemental levels can be added or some levels may be reduced depending on the organization's structure and hierarchy.

Figure 1 depicts the proposed integrated quality management model, in which it consists of three levels of processes, micro-level process, meso-level process, and macro-level process. Each process runs in an incremental spiral fashion in which, it moves from bottom to top in cycling processes, such as moving from most inner-level (micro) onto the most outer-level (macro). At the same time the feedback goes in opposite direction, from top to bottom such as moving from most outer-level (macro) to the most inner-level (micro). Each process is initiated based on a plan, which goes in cycle then it is performed, and then is analyzed to assure that it runs accordingly, and based on the studied results (evaluation) the action is considered accordingly, in which an action plan is developed. Depending on the process and its action plan, the process may end at the end of the same cycle level, correction may be incorporated within the process to stay at the same level, or the process is moved to upper level, in which a plan is developed accordingly to start another cycle level. In the following paragraph, the four phases with respect to the spiral fashion are described.

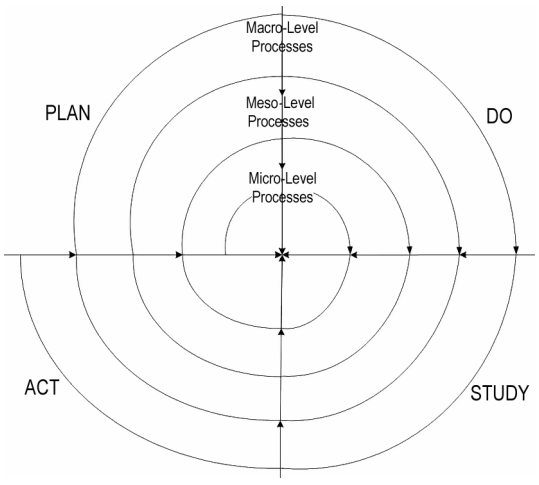

Figure 1. Proposed integrated quality management model

In PLAN phase, the strategies and objectives are identified with respect to problem(s) under consideration. The problem here means the current situation against the desired or intended situation, in which the differences between the current and desired situations is identified to plan the required tasks and/or activities with respect to the identified objectives. In addition, the alternatives and constraints of the desired situation should be identified. The tasks identification is performed at different organizational levels, such as micro-level, meso-level, and macro-level. Problems definition may be approached using one of the two famous techniques, namely; top-down or bottom-up. The process may start from the most inner level (micro) then going upward to the most outer level (macro), in which problem(s) may be defined at the micro-level and are composed, as the process moves up, to form major problem(s) at the organizational level, or may start from the most outer level (macro) then going downward to the most inner level (micro), in which problem(s) are defined at macro-level and are decomposed, as the process moves down, to form smaller problems at the departmental level. When problem(s) are defined at the various organizational level (micro-level, meso-level, and macro-level), objectives are identified to achieve the desired situation within the mission of the organization. The plan is designed based on the identified objectives to resolve problem(s) under consideration. As stated earlier, the plan consists of number of tasks or activities with respect to the identified objectives to be implemented at all levels (micro-level, meso-level, and macro-level). In order to control and manage the movement from one level to another (top-down/bottom-up) within PLAN phase, some type of evaluation must be performed such as inspection and/or review, to assure whether the identified objectives and/or initiatives in planning phase will produce the desired situation. The evaluation should investigate the problem under consideration with respect to its current and desired situations, as well as its alternatives and/or constraints. In addition, the initiatives, tasks, and/or activities should be investigated and analyzed to determine whether it will lead to such intended situation or not. Finally, the applicability and suitability of the suggested measurement and/or KPI tools should be reviewed as well. Such test can be used to approve the movement from one level to another or provide some feedback for another improvement cycle.

In DO phase, designed plan is implemented at all levels simultaneously, in which tasks and activities are performed with respect to its designated level in parallel. In addition, alternatives and constraints of the designated tasks and activities with respect to identified objectives are considered. The movement from one level to another in DO phase should be approved when satisfying certain evaluation criteria, such as checklist, to assure that planned initiatives, tasks, and activities at the level are performed/completed as planned before moving to the upper/lower level (depending on the selected cyclic process approach top-down/bottom-up).

In STUDY phase, the implemented tasks and activities are evaluated and the feedback is collected for the purpose of evaluating the achieved situation against the desired situation with respect to the identified objectives. Based on the evaluation results, the process may end at the end of the same cycle level, and action is considered by moving to the next phase, in which an action or correction may be incorporated within the process to stay at the same level, or the process is moved to upper/down level, in which a plan is developed accordingly to start another cycle level. The movement from one level to another is approved by using similar evaluation criteria to the used criteria in PLAN phase, in which the results are matched with the ones that are expected to be achieved in PLAN phase for testing and validation purposes.

In ACT phase, an actions are considered based on what has been learned and as results of the STUDY phase, in which an action, correction, or further improvement may be incorporated within the process to stay at the same level, or the process is moved to upper/lower level, in which a plan is developed accordingly to start another cycle level. In this phase, the continuous quality improvement can be integrated within the cyclic process in which the identified corrective actions that lead to quality improvement are monitored to assure its incorporation within the next process cycle with respect to objective, tasks, and activities.

The flexibility of the proposed model can be achieved in the systematic movement from one level to another, in which a process can move in two approaches top-down and bottom-up directions. Normally, a process starts from the PLAN phase and ends at the ACT phase, in which the improvement actions determine whether to stay at the same level or move to lower level for additional improvement cycle to address the identified

concerns, or move to upper level in case no concerns are identified. However, the proposed model allows, the process to move from level to another at the end of each phase cycle without the need to reach the end cycle phase like ACT phase. For instance, in case a process at meso-level within the DO phase requires some rollback in which it needs to go to the lower level (micro-level) for the purpose of some implementation concerns, it can move down to the lower level for additional cycle to address such concerns. In addition, and as stated earlier, the proposed model is flexible for adding or reducing managemental levels depending on the organization's hierarchy.

4. Application of the Integrated Quality Management Model in Higher Education

In this section a case study of quality management of business processes at a higher education organization is presented, in which the proposed quality management model has been used to manage the quality of learning and teaching. In such organization, the vision, mission, and objectives should be declared and approved by organization authorized board. The organizational structural hierarchy should be developed based on the organization's objectives to achieve its mission, and approved by the authorized board. In the case study the organizational structure is built according to the three layers (levels): college layer (macro-level), department layer (meso-level), and classroom layer (micro-level).

The tasks and duties for each sub-structure of the college organizational structure is developed, which represent a division of the college organizational structure such as academic department, finance department, and HR department. In addition a job description for each employee is developed by each department based on the tasks and duties of the department that he/she belongs to using the designated form. The tasks, duties, and job description are approved by the authorized board.

In addition, every task/duty is defined with respect to set of processes, and a process is developed by the quality body at department level for each task/duty using a process template form, which includes the key performance indicators for achieving such task/duty as well as any references. The implementation of each process should follow certain procedure, and must maintain certain policy.

All processes, policy, and procedures are documented, in which the policy and procedures for performing each task is developed at department level, and is approved by the authorized board. The improvement process within the quality system in the college is performed in bottom-up fashion, in which the improvement comes from the most inner layer and goes up. Independent verification should be used for the purpose of improving the processes, in which an external body as well as the stakeholders (students, parents, employees, and employers) is involved.

As stated earlier, all processes should go in quality process cycle based on Deming quality cycle PDSA (Plan – Do – Study – Act) Planning – Implementation – Evaluation – Improvement. Such approach is applied for each layer; classroom layer, department layer, and college layer as will be described later. The most inner level (micro-level) is the classroom layer in which the PDSA cycle is defined for classroom level tasks and activities. Table 1 shows the performed activities/tasks within the four phases (PDSA) at the classroom level using the proposed model. For instance, in the PLAN phase at classroom level, the curriculum, materials, and syllabus related to certain course are planned with respect to the program plan coined at the department level, in which they are implemented in the DO phase with adherence to the course specification. In STUDY phase, assessments and evaluations are conducted, and their results are considered in ACT phase for further improvement actions. As the cyclic is in spiral fashion, the defined improvement actions may decide to end the process, stay at the same level for another improvement cycle, or move to a higher level (department level), in which the planned curriculum is identified within PLAN phase at department level with respect to the implemented curriculum (at classroom level). The defined improvement actions determine whether to end the process, stay at the same level for another improvement cycle in which the identified concerns are addressed, or move to higher level for further process management and/or investigation.

Layer	Phase	Activities/Tasks
CLASSROOM	PLAN	Curriculum & Material Course specification development
		Syllabus development
		Teaching methods & Assessment preparation
		Equipment & Facility
	DO	Follow up the syllabus
		Adhere to course specification
		Students' support
		Students' work record keeping
		Course delivery (theory/lab)
	STUDY	Students' assessment (Exams / Quizzes / Project)
		Students' feedback (Exams results, Evaluations)
		Grading Results
		Course evaluation
		Instructors' evaluation
	ACT	Course report / portfolio
		Curriculum development
		Equipment & facility development
		Assessment methods development

Table 1. PDSA's Phases and activities at classroom level

Layer	Phase	Activities/Tasks
DEPARTMENT	PLAN	New program development
		Teaching plan (students study plans, semester schedule, classroom allocations, course distribution)
		Equipment & facility planning
		Staff development plan
		Department's activity plan
		Admission plan
		Curriculum development plan
		Students' services plan
		Assessments' preparation plan
		Students' registration plan
		Staff recruitment plan
		Teaching materials development plan
		Community service plan
		Local & International collaboration plan
		Executive yearly plan
	DO	Learning & teaching delivery
		Staff observation & Evaluation
		Curriculum review
		Student Academic counseling
		Community services programs
		Day-to-day management
		Department committees formation
		Staff participation in department activities
		Labor market needs analysis
	STUDY	Graduates employment analysis
		Student services evaluation
		Internal & external Benchmarking with similar institution
		Course portfolio review
		Student assessments result review
		Graduates evaluation
		Course evaluation review
		Program evaluation review
		Staff evaluation review
		Teaching environment evaluation review
		Program report
	ACT	Curriculum improvement
		Teaching methods development
		Staff development
		Assessment methods improvement
		Equipment & facility development
		Student services improvement

Table 2. PDSA's Phases and activities at department level

The middle level (meso-level) is the department layer, in which the PDSA cycle is defined for department level tasks and activities. Table 2 shows the performed activities/tasks within the four phases (PDSA) at the department level using the proposed model. For instance, in the PLAN phase at department level, new program is developed with respect to the new program development plan at the college level, in which the developed program is implemented at the DO phase. In STUDY phase, program is evaluated, and based on the evaluation results; the improvement actions are coined in ACT phase with the consideration of improvement actions taken at the classroom level. As the cyclic is in spiral fashion, the defined improvement actions may decide to end the process, stay at the same level, or move to a higher/lower level (macro/micro level), in which the developed program is identified within PLAN phase at department level with respect to the implemented curriculum (at classroom level) and with respect to the program development plan (at college level). The defined improvement actions determine whether end the process, go for a higher level (college level) in case there are no concerns to be addressed and for further process management, or stay at the same level (department level) or move to the lower level (classroom level) for another improvement cycle in which the identified concerns are addressed.

The top layer (macro-level) is the college layer, in which the PDSA cycle is defined for college level tasks and activities. Table 3 shows the performed activities/tasks within the four phases (PDSA) at the college level using the proposed model. For instance, new program development plan is created in PLAN phase at college level that satisfies the college strategic objectives; in which the developed program at the department level is managed in DO phase at college level. In STUDY phase, the evaluated programs at the department level is further evaluated at the college level with respect to the aims of the developed program at college level, and based on the evaluation results, improvement actions at college level are considered with respect to the taken actions at department level. As the cyclic is in spiral fashion, the defined improvement actions may decide to end the process, stay at the same level, or move to a lower level (meso/micro level), in which the program development plan may or may not satisfies the college strategic objectives, or the developed program within PLAN phase at department has some concerns with respect to the program development plan (at college level), or with respect to the implemented curriculum (at classroom level). The defined improvement actions determine whether to end the process, in case there are no concerns to be addressed, or stay at the same level (college level) or to move to the lower level (department/classroom level) for another improvement cycle in which the identified concerns are addressed.

The presented case study has been applied at Almaarefa University (UM, 2018) as a higher education institution located in Riyadh, Saudi Arabia, in which such model has been integrated within the UM quality management system. This case study represents a practical and real world problem in which the proposed quality management model is applied to manage the internal business processes for the purpose of quality continuous improvement as well as supporting the achievement of the organization mission. In addition, the outcome of such case study shows that, the integration of software engineering process within the traditional quality management process has contributed to improve the business process with respect to management, control, and continuous improvement.

5. Conclusions

This paper has presented a quality management model that integrates a software engineering process model known as spiral model (Boehm, 1988) within Deming's traditional quality cycle model (Deming, 1950) to produce a quality management model that can manage the business process in form of bottom-up and top-down fashion in a flexible and manageable way. The proposed quality model consists of quality analysis's levels that represent quality process analyses from the most inner level to the most top level, that were presented as micro, meso, and

Layer	Phase	Activities/Tasks
COLLEGE	PLAN	Admission and capacity plan
		College level committees plan
		Curriculum development plan
		New program development plan
		HR management plan
		Learning resources plan
		Financial & budget plan
		Strategic and overall development plan
		ICT development plan
		Stakeholder identification
		Marketing plan
		Competitors definition
		PR plan
		Safety & risk management plan
		Funding & Sponsoring plan
		Local and International partnership and collaboration plan
		TQM development plan
		Administrative plan
		Facility management plan
		Staff development plan
		Students service plan
	DO	Day-to-day management
		Labor market needs analysis
		Curriculum development management
		Fund raising & resource allocation
		Students' assessment result approval
		Partnership & cooperation's management
		Learning resources development
		College level committees formation
		Stakeholder needs analysis
		HR management
		Faculty & Resources management
		Administrative management
		Financial management
		Staff development
		Student support, activities, & counseling
		Marketing & PR management
		Policy & Procedure deployment
		ICT Infrastructure management
		Safety & Risk management
		Community services management
	STUDY	Program evaluation review
		Students assessment results review
		Graduate program evaluation
		Graduate employment analysis
		Cost – Benefit analysis (CBA)
		Learning resources evaluation
		Stakeholder evaluation (student/parent, community, employers)
		Financial auditing
		ICT Infrastructure evaluation
		Staff turnover analysis
		HR services evaluation
		Facility evaluation
		Administrative services evaluation
		Safety & Risk evaluation
		Benchmarking
		Policy procedure review
	ACT	Curriculum Improvement
		New program development
		Financial resources support localization
		ICT services & improvement
		Policy & procedure development
		Facility development
		Staff development
		Students' services development
		Learning resources development
		Marketing & PR development

Table 3. PDSA's Phases and activities at college level

macro levels. The proposed quality business process model has been applied to a higher education institution as a case study to investigate the applicability of the proposed model. Such approach is flexible for processes' movement from one level to another, or from one cycle to another to achieve the organization mission, as well as adding or reducing managemental levels to meet the organization's hierarchical needs.

The author believes that, such integrated quality management model will improve the efficiency and the flexibility of quality management with respect to quality and performance aspects which may help the organization to achieve its mission. Although, the case study has shown practical and encouraging results, the author plans to investigate the proposed model on different types of businesses to demonstrate the applicability of the proposed model as a generic quality approach for various types of businesses.

References

[1] Alzamil Z., (2014). "Quality improvement of technical education in Saudi Arabia: self-evaluation perspective", Quality Assurance in Education, *Emerald*, Vol. 22 Iss: 2, pp. 125-144.

[2] Apetrei D., Neurohr R., Postolache P., Silvas I., Federenciuc D. and Popescu C. (2011). "Considerations on using UMA with Smart Grids" *Proceedings of the 2011 IEEE International Conference on Smart Measurements of Future Grids (SMFG)*, pp. 143-147.

[3] Azadeh A., Gaeini Z., and Moradi B. (2014). "Optimization of HSE in maintenance activities by integration of continuous improvement cycle and fuzzy multivariate approach: A gas refiner", *Journal of Loss Prevention in the Process Industries*, No. 32, pp. 415-427.

[4] Bhuiyan N. and Baghel A. (2005). "An overview of continuous improvement: from the past to the present", *Management Decision*, Vol. 43 No. 5, pp. 761-771.

[5] Blackstone A. (2012). *Principles of Sociological Inquiry: Qualitative and Quantitative Methods*, Flat World Knowledge.

[6] Boehm B. (1978). *Characteristics of Software Quality*, North-Holland.

[7] Boehm B. (1988). "A spiral model of software development and enhancement", *IEEE Computer*, pp. 61-72.

[8] Borys M., Milosz M., and Plechawska-Wojcik M. (2012). "Using Deming cycle for strengthening cooperation between industry and university in IT engineering education program", *15th International Conference on Interactive Collaborative Learning (ICL)*, pp. 1-4.

[9] Castillo S., Abarca J., Cruz-Chávez M., Cruz-Martínez M., And Rangel M. (2013). "Elimination of incorrect level (gap) between RR gate and RR body, based on Deming cycle and statistics tools – case study", *Annals of Faculty Engineering Hunedoara, International Journal of Engineering*, No. 1, pp. 29-38.

[10] Deming W. (1950). *Elementary Principles in the Statistical Control of Quality*, Union of Japanese Scientists and Engineers, Tokyo.

[11] Fernandes A., Sampaio P., Sameiro M., and Truong H. (2017). "Supply chain management and quality management integration: A conceptual model proposal", *International Journal of Quality & Reliability Management*, Vol. 34, Iss: 1, pp. 53-67.

[12] Gerst R. (2013). "Deming's systems thinking and quality of healthcare services: a case study", *Leadership in Health Services*, Vol. 26, Iss: 3, pp. 204-219.

[13] Ishikawa K. (1985). *What is Total Quality Control?*, *The Japanese Way*, Prentice-Hall.

[14] ISO Standards (2008). Quality Management Systems-Requirements, 4th Edition, www.iso.org.

[15] ISO, Australian/New Zealand Standard (1994). "Quality management and quality assurance-vocabulary", AS/NZS ISO 8402.

[16] Juran J.M. (1951). *The Quality Control Handbook*, New York, McGraw-Hill.

[17] Kaplan R. and Norton D. (1996). *The Balanced Scorecard: Translating Strategy into Action*, Harvard Business School Press, Cambridge, MA.

[18] Lewis P. and Cooke G. (2013). "Developing a lean measurement system to enhance process improvement", *International Journal of Metrology and Quality Engineering*, No. 4, pp. 145-151.

[19] Lillrank P. and Kano N. (1989). "*Continuous improvement: quality control circles in Japanese industry*", Center for Japanese Studies, University of Michigan, pp. 23-25.

[20] Martinez-Lorente A., Dewhurst F., and Dale B. (1998). "Total quality management: origins and evolution of the term", *The TQM Magazine*, Vol. 10, No. 5, pp. 378-86.

[21] McCall J., Richards P., and Walters G. (1977). "*Factors in software quality, concept and definitions of software quality*", Rome Air Development Center, NTIS, RADC-TR-77-369, Vol. 1.

[22] Moen R. and Norman C. (2010). "Cycling Back", *Quality Progress*, November 2010, Vol. 43 Issue 11, pp. 22-28.

[23] Montecatine-Alonso E, Villanueva-Bueno C, Santos-Rubio MD, Sierra-Torres MI, Rodriguez-Perez AA, Toscano-Guzman MD, Poyatos-Ruiz LL, Garcia-Avello (2016). "CP-090 Adequacy of omeprazole solution prescription for administration by nasogastric tube applying a continuous improvement system (deming cycle)", *Journal of Hospital Pharmacy, Science and Practice*, suppl. 1, London Vol. 23, A39.

[24] Raisinghani M., Ette H., Pierce R., Cannon G., and Daripaly P. (2005). "Six Sigma: concepts, tools, and applications", *Industrial Management & Data Systems*, Vol. 105, No. 4, pp. 491-505.

[25] Shewart W. (1939). *Statistical Method from the Viewpoint of Quality Control*, the Graduate School, the Department of Agriculture, Washington, DC.

[26] Tepaskoualos F. and Chountalas P. (2017). "Implementing an integrated health, safety, and environmental management system: the case of a construction company", *International Journal for Quality Research*, Vol. 11, No. 4, pp. 733-752.

[27] Uluskan M., Godfrey A., and Joines J., (2017). "Integration of Six Sigma to traditional quality management theory: an empirical study on organizational performance", *Total Quality Management & Business Excellence*, Vol. 28, No. 13, pp. 1526-1543.

[28] UM, Almaarefa University www.um.edu.sa. Accessed July 30 2018.

Mathematical Modeling of the Analysis of Medical Services at the "Prevention" Stage through Quality Indicators

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Abstract

The study has compiled an expanded set of indicators describing the quality of medical services at the "prevention" stage. For the stage of risk optimization, "prevention" of medical services is considered as a factor of reliability and capacity of information describing the loss of usefulness and efficiency of medical services. A correlation criterion has been formulated to improve the relationship among the indicators of the "prevention" stage in the medical service delivery system through the functions of quality and given feedback.

Keywords: *mathematical modeling; indicators of the quality of medical services; prevention; inverse relationship of functional qualities.*

1. Introduction

Provision of medical services of high quality raises many controversial questions today. The current state of the medical services provision does not conform to world standards always and everywhere. Therefore, it is required to review the existing requirements and bring them into line with the principles and standards of developed countries.

Along with the quality improvement, the evaluation of its parameters contributes to the regulation and improvement of accountability mechanisms in the diagnosis of patients and helps personnel define the areas of optimal medical care.

The ability to monitor the quality of medical services is an integral part of their efficiency assessment.

The concept of the "quality of medical services" is very complex. Aside from monitoring compliance with standards, it assesses the compliance of the quality of medical services with expectations and needs of consumers, as well as a continuous update of information on services offered by competitors.

The World Health Organization (WHO) defines the quality of medical care as "the exact (according to standards) implementation of various types of medical intervention that are considered safe and affordable for a given society, and can also have positive impact on mortality, morbidity, disability and improper nutrition" (Quality of medical care, 1999).

As can be seen from the above, the terms of the quality of medical services and medical care are closely related. The quality of medical care is a multidimensional and multifaceted category. In other words, the quality of medical care can be assessed by determining the quality of medical services (Kochkina, Krasilnikova and Shishkin, 2015).

Definition of the medical care quality by the WHO is the most appropriate today. The key words in this definition of the medical care quality are "according to standards." It is clear that standardization in medicine should be of paramount importance for public administration of the quality of the relevant field (Kalinichenko, 2015).

The so-called quality indicators are a separate point in assessing the quality of medical services (care), which allow identifying possible problems and opportunities to improve the quality of patient care or the very treatment (Cleary and McNeil, 1988).

Most indicators are measured as a percentage – a ratio of the number of objects that satisfy certain properties to the total number of objects under consideration (Danko et al., 2016; Tsenina et al., 2016).

There is also a qualitative indicator, the denominator of which is the single object under consideration, which may or may not have a property evaluated through the qualitative indicator. The possible values of the qualitative indicator are "Yes" or "No".

Some indicators have the measured numerical characteristics of objects (for example, the number of days spent in a hospital by patients) rather than the number of objects in the numerator or denominator. The content of such an indicator is the numerical characteristic of a set of objects (for example, the average length of stay of patients in a hospital).

The goal of this work is to improve the system of indicators of the medical services quality at the "prevention" stage, as well as to detail and optimize the interrelations among the quality indicators of this stage.

2. Characteristics of indicators of the medical services quality at the "prevention" stage

Qualitative indicators do not reflect the quantitative evaluation of the quality level but still provide useful information required for the quality management system of the medical institution. These indicators allow identifying possible problems

or so-called critical points that require immediate improvement of the medical services provision (Khubriev, 2006).

There is no doubt that appropriate resources are needed for obtaining reliable information when processing qualitative indicators – namely, medical registers, medical information systems, and accounting of patients and requests for medical services. The introduction of the advanced technologies of systematic collection, analysis, and synthesis of information allows making optimal decisions in favor of the patient.

As such, the main prospects for the development of the system of indicators for the medical services quality are associated with the creation and development of the nationwide databases and information technologies, improvement of automated electronic data processing, and systematic improvement of the quality and completeness of medical information.

The result is seen as the comprehensive coverage of all stages of implementation of the standards of the structure, process and results of medical care through indicators in order to continuously improve the quality of medical care for the population.

The medical service quality at the "prevention" stage at the healthcare facility is suggested to be considered from the positions of the following quality indicators:

1) quality of the material and technical base of the healthcare institution and its personnel – I_1;
2) availability of medical technologies with justified efficiency – I_2;
3) availability of regulated technologies for the provision of medical services – I_3;
4) availability of efficient organizational technologies – I_4;
5) availability of indicators to examine the consumers' health and their evaluation in the treatment and prevention process – I_5;
6) conformity of treatment results to costs – I_6.
7) reserve of undiagnosed diseases – I_7; and
8) indicator of the preventive measures' activity – I_8.

Quality indicators (1)-(8) are also supplemented with social indicators:

9) frequency of visits to doctors at the public and private healthcare facilities that provide medical services of the appropriate profile – I_9;
10) efficiency of clinical examination and follow-up care of patients – I_{10}; and
11) proportion of patients appreciating the provision of medical services – I_{11}.

It is also advisable to take the medical economic indicators into account:

12) percentage of doctors with a qualification category – I_{12};
13) indicator of the provision of the population with laboratories with doctors, laboratory assistants, and paramedical staff – I_{13};
14) level of depreciation of the laboratory equipment and fixed assets – I_{14}; and
15) percentage of the laboratories that conduct surveys in accordance with the methodological recommendations – I_{15}.

The optimization task of improving the system of indicators of the medical services quality is formulated for the analysis of medical services at the "prevention" stage.

3. Modeling the analysis of medical services at the "prevention" stage through quality indicators

Let us formulate the integrated (complex) quality indicator I_z and introduce the system of the corresponding dynamic indices (indicators) k_{ni} for the "prevention" stage:

$$I_z = I_{Z1} + I_{Z2} + I_{Z3} = \frac{1}{8} K_1 \sum_{i=1}^{8} I_i + \frac{1}{3} K_2 \sum_{i=9}^{11} I_i + \frac{1}{4} K_3 \sum_{i=12}^{15} I_i$$

$$k_{ni}(t) = \frac{I_i - I_{in}}{I_{in}} \quad (1)$$

where I_{in} is the normative indicators that can be set on the basis of the database and using the expert method; K_1, K_2, K_3 are the weight factors; and t is the time.

Balance ratios are used for I_i and I_Z:

$$\frac{\partial I_i}{\partial t} + divJ_{qi} = \sigma_{qi}$$
$$\frac{\partial I_Z}{\partial t} + divJ_{Zi} = \sigma_{Zi} \quad (2)$$

where $\partial/\partial t$ is the partial derivative by t; J_{qi}, J_{Zi}, σ_{qi}, σ_{Zi} are the flows (J) and intensities of information sources (σ) that describe dynamic properties of the parameters, respectively; and div(-) is the divergence symbol. Flows J and intensities of information sources (σ) (2) describe the information capacity of the "prevention" system.

Let us introduce ∂J, ∂σ – deviations (uncertainties) of the flows and intensities of the sources:

$$\delta J = \left(J_{Zi} - \sum_{i=1}^{15} J_{qi} \right) / J_{Zi}$$
$$\delta\sigma = \left(\sigma_{Zi} - \sum_{i=1}^{15} \sigma_{qi} \right) / \sigma_{Zi} \quad (3)$$

The following relation is used to improve the efficiency of the set of parameters at the "prevention" stage:

$$E_P = \frac{Fr}{Fz}; E_t = \frac{Fr_t}{Fz_t}; \Delta E_t = E_P - E_t \quad (4)$$

where E_p is the efficiency at the initial instant of time at t=0; E_t is the efficiency at the actual time t; F_z is the target (normative) information flow; F_z is the real information flow for time t; and ΔE_t is the change in efficiency over time.

Criterial relations are formulated to improve the interrelations among the indicators of the "prevention" stage, taking (3) into account through the quality functions Ω and with due consideration for the reverse causality:

$$\Omega(P_k(I_i), FB(I_i, \delta J, \delta\sigma)) = \int_{t_0}^{t_k} f(\bar{y}, \bar{u}, \bar{s}) dt \Rightarrow opt$$
$$\alpha_1 \cdot \delta J + \alpha_2 \cdot \delta\sigma \Rightarrow opt \quad (5)$$

where $\bar{y}$ is the vector of given external effects ($y_j(t)$) are vector components. j=1,2,...,m); $\bar{u}$ is the vector of controls; $\bar{s}$ is the vector of undetermined disturbances; $[t_0, t_k]$ is the time interval where the process is considered (formation of optimal values of information and financial flows $P_k(I_i)$, k=1,2,..., m_k); m_k is the total number of information flows that relate to the appropriate healthcare institutions at the "prevention" stage; $f(\bar{y},\bar{u},\bar{s})$ is the function that displays a quality level; $FB(I_i, \delta J, \delta\sigma)$ is the function that describes the reverse causality between flows P_i and the environment of healthcare institutions; and α_1, α_2 are the weight factors. Symbol opt corresponds to the optimality condition for function Ω here.

Parameter Ψ(R) and the corresponding integral criterion for each component I_{Zi}, (1) and also for I_Z are introduced to implement the risk assessment methodology R for the "prevention" stage of medical care:

$$\Psi(R) = \sqrt{(\delta_Z)^2 + (S_{ZV})^2 + (\delta_{as})^2 + (\delta_{ex})^2} \Rightarrow \min \quad (6)$$

A number of indicators are taken into account here: coefficient of variation δ_Z, the coefficient of semivariation S_{ZV}, the coefficient of variation of asymmetry δ_{as}, and the coefficient of the excess variation δ_{ex}.

Expression (6) is considered as a criterial ratio for risks R, and components $\Psi(R, I_{Z1})$, $\Psi(R, I_{Z2})$, $\Psi(R, I_{Z3})$ are assessed, as well as an integral risk with an extended series of parameters $\Psi(R, I_{Z1}, I_{Z2}, I_{Z3}, \delta J, \delta\sigma)$ following the results of relations (1)-(5).

The following factors are taken into account to optimize the risks of the "prevention" stage of medical care: quality (5) – fq, reliability – fn, information capacity – ij, and a risk factor – fr. Reliability factor μ(x) can be represented as follows in this article:

$$\mu(x) = -\frac{1}{S(x)} \cdot \frac{d(S(x))}{dx}$$
$$S(x) = \exp\left(\int_0^x \mu(t)dt \right) \quad (7)$$

where x is the duration of trouble-free operation of the "prevention" stage of medical care; μ(x) is the intensity function that describes chances of the period x duration and reflects the support of the living condition; S(x) is the probability that the duration of the lifetime will exceed a given value x.

Utility function P_{fq}, P_{fn}, P_{ij}, P_{fr} is denoted for each of these factors. In particular,

$$P_{fr} = P_{r*} - P_r(\overline{X}v, \overline{Y}p) \quad (8)$$

where P_{r^*} is the constant value of the parameter corresponding to the initial conditions $(P_{r*} > P_r(\overline{X}v, \overline{Y}p))$, the vector $\overline{X}_v$ is the initial conditions (set of given input data); and $\overline{Y}_p$ is the set of values describing the accepted decision on optimization of the "prevention" stage.

Integral utility P_{int} is represented as the following expression:

$$P_{int} = k_{v1}P_{fq} + k_{v2}P_{fn} + k_{v3}P_{ij} + k_{v4}P_{fz}$$
$$k_{v1} + k_{v2} + k_{v3} + k_{v4} = 1 \quad (9)$$

where kv1, kv2, kv3, and kv4 are the weight factors found using the expert method.

The extremum condition is set for P_{int}:

$$P_{\text{int}} \Rightarrow \max \quad (10)$$

Efficiency of the "prevention" system is also related to the size of possible losses associated with quality M(Ω), reliability M(μ), efficiency $M(E_p)$, and risks $M(\Psi, R, FB(I_i,\delta J,\delta\sigma))$, which are defined by the characteristics of the reverse causality $FB(I_i, \delta J, \delta\sigma)$.

Sets of parameters $M(E_p)$, M(Ω), $M(\Psi, R, FB(I_i,\delta J,\delta\sigma), \Psi(R, I_{Z1}), \Psi(R, I_{Z1}, I_{Z2}, I_{Z3}, \delta J, \delta\sigma))$, and M(μ) describing the efficiency E_p (4) of medical care, quality Ω (5), risks R (6), and reliability (7) are advisable to systematize and optimize using the multiplicative integral loss ratio:

$$M(\Omega,\mu,E_P) = M(E_P)M(\Omega)M(\mu)\times$$
$$\times M\left(\Psi, R, FB(I_i,\delta J,\delta\sigma)\right) \Rightarrow opt \quad (11)$$

$M(\Omega)$, $M(E_p)$ here are losses describing the worsening in patients' conditions due to low-quality and inefficient medical services.

4. Conclusions

The article defines a set of 15 indicators describing the quality of medical services at the "prevention" stage. The flows and intensities of information sources that describe the information capacity of the specified system are introduced. Factors of quality, reliability, and information capacity are taken into account to optimize the risks of the "prevention" stage of medical services. Usefulness, integral utility, losses, and multiplicative integral loss ratio are introduced for them.

The system of mathematical relationships (model) (1)-(11) is proposed for optimization of the "prevention" stage of medical services. This model is used for optimization and takes into account the factors of quality, efficiency, risk, utility, and reliability.

References

[1] Cleary, P.D. and McNeil, B.J. (1988). Patient Satisfaction as an Indicator of Quality Care. *Inquiry*, 25(1), pp. 25-36.

[2] Danko, T.P., Zarova, E.L., Bragin, L.A., Sekerin, V.D. and Gorohova, A.E. (2016). About the methodology related to indicating sensitivity of regions marketing. *International Review of Management and Marketing*, 6(5), pp. 36-41.

[3] *** (1999). *Kachestvo meditsinskoy pomoshchi. Glossariy. Dostupnost kachestvennoy meditsinskoy pomoshchi [Quality of medical care. Glossary. Affordability of the high-quality medical care]*. Moscow.

[4] Kalinichenko, V.I. (2015). Problemy upravleniya meditsinskoy pomoshchyu i puti ikh resheniya na osnove poryadkov okazaniya meditsinskoy pomoshchi i standartov meditsinskoy pomoshchi [Problems of managing medical care and ways of their solution based on the order of medical care provision and standards]. *Healthcare*, 6, pp. 92-98.

[5] Khubriev, R.U. (2006). Otsenka kachestva meditsinskoy pomoshchi s ispolzovaniyem indikatorov [Assessment of the medical care quality using indicators]. *Chief Physician*, 7, pp. 49-53.

[6] Kochkina, N.N., Krasilnikova, M.D. and Shishkin, S.V. (2015). *Dostupnost i kachestvo meditsinskoy pomoshchi v otsenkakh naseleniya [Affordability and quality of medical care in the assessments by population]*. Moscow: Higher School of Economics.

[7] Tsenina, E.V., Danko, T.P., Ekimova, K.V., Sekerin, V.D. and Gorohova, A.E. (2016). Indication of Competitiveness of the Potential of the Region through Hurwitz and Wald Criteria. *Global Journal of Pure and Applied Mathematics*, 12(1), pp. 325-335.

The Role of Service Quality in Predisposition for Portuguese Online Commerce

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Abstract

The study of the quality of a service represents an area of study of vast interest and knowledge. Many academics have developed studies around quality systems, quality information and quality of service. At the same time, electronic commerce has assumed a strong predominance in the choice of consumers in different sectors of activity. Therefore, it is clear the need of companies operating in this environment, in addition to addressing new business models and taking advantage of the great benefits offered by this new digital age, include in their strategies the needs and expectations of their customers, managing to build a reliable image. The theoretical framework was designed to study the factors that influence trust and predisposition among online consumers, analyzing their buying behavior. Based on the literature, a research model was developed, which one looked for to answer these questions. In specific, we intent to understand the relations between service quality, system quality and quality information; satisfaction and trust. From the analysis of these data, it was concluded that service quality, information, system quality and satisfaction showed a strong relation with trust. In an interdisciplinary perspective, this study contributes to a better theoretical understanding of trust in online commerce and helps to identify the characteristics that make part of its construction by consumers, providing relevant data that can help them to define the best marketing strategies. Implications for future research are also presented.

Keywords: *information quality; relational marketing; online commerce; service quality; trust.*

1. Introduction

Technological change is the major cause of most of the changes that have taken place, from cultural, social, political, economic, personal and even psychological changes, all of them worldwide. With a "*globalized economy that causes successive changes in the market, the places not only need to adopt instruments of reaction and rapid response to these changes but also to adapt to the new ways and styles chosen by their citizens, in order to maintain their vitality and attractiveness*" (Sousa & Rocha, 2019: 190). The environment and the relationships that are built in it ceased to occur only in physical space, happening also in a space without defined location: the virtual space. The development of technology has brought with it many positive aspects: the global communication that is fundamental today; the democratization of knowledge throughout the world, which has become possible through the connections that the information systems have acquired; the medicine that has witnessed great evolutions; the world that has become a small village where everyone is connected, and an endless number of other advantages. This scenario also allowed society itself, on an economic level, to attend to numerous developments as the business community began to take advantage of them, particularly in the commercial sector.

Since the 20th century trade has undergone great changes and faced new challenges, which are reflected in the economy of the country. In a short space of time, commerce in the city has passed from the fairs to the hypermarkets, to the shopping centers, and now it has spread through the digital media, ceasing to belong to a place. This global transformation has forced companies to adapt to this new era and create new strategies so that their communication, dissemination and differentiation translate into benefits for their business, such as customer satisfaction and loyalty and, of course, the growth of sales and prosperity of companies (Atulkar & Kesari, 2017; Ferreira et al., 2018).

It is true that the evolution of technology has brought new business opportunities, but on the other hand also brought about changes in the behavior of society, specifically its consumers, and therefore it becomes imperative to study and understand their behavior so that it can combine strategies that are consistent with these new behaviors.

Although this technological evolution has brought great opportunities, there is a factor that has come to haunt the perception that consumers have about shopping online: the trust. The case of Edward Snowden in 2013, the constant news of "information leaks" and "scams" or the application of the General Data Protection Regulation in 2018, are situations that more or less influence consumer opinion about the digital media and the trust they have about it. A lot of information runs behind the screens without anyone giving in to it, creating a void between the consumer and the seller, out of his control, which in a way makes you think two, three, or even more times before filling your details and click on "make payment". The great objective of the sellers will then be to reduce this time as much as possible, and for this it is important to first understand what factors will influence their trust, which will be related to their predisposition to this type of trade. As Ba and Pavlou (2002) explain, trust can be a development engine for online commerce, but lack of it can lead to its failure.

Online commerce has brought with it the advantage of consumers get in at any time, researching alternatives, compare products and prices (Pallant, Danaher, Sands & Danaher, 2017). According to the Global Online Consumer Report 2017 of

Klynveld Peat Marwick Gesellschaft (KPMG), 65% of respondents admitted using the Internet to compare prices in other stores, 61% to look for information of products or services and 49% to watch reviews. Also interesting are the data that this report publishes in relation to the first product search place, where 52% of consumers cited at least one offline channel and 59% one online channel, which shows that despite the growth of online commerce , both types of commerce still have significant weight in the consumer buying process (KPMG International, 2017). Over the past 15 years, the range of online retail channels for consumer products has increased dramatically as an alternative to traditional stores. Understanding what leads the consumer to choose one channel instead of the other has become increasingly important for the management of these same channels (Black, Lockett, Ennew, Winklhofer, & Mckechnie, 2002). As Tanner and Raymond (2013, 2016) warn, it is not only the large companies that have a duty to do so, these "rules" extend to all, without exception.

2. Literature Review

2.1 Service Quality and Trust in online contexts

According to the Internet report Society "*Global Internet Report 2016*", cybercrime, security, access to personal data and uncertainty about their use and trust, are still some of the problems faced by trade online (Internet Society , 2016). When a consumer makes a purchase on the Internet, his distance from the seller is unknown, no one sees him, provides personal data and makes a payment in advance. Comparing with traditional commerce, and because of the nature of this type of trade, for the seller, becoming a brand or a reliable company becomes a crucial factor (Kim et al., 2008).

Ba and Pavlou (2002) define trust as the "subjective assessment of a party, that another party will perform a particular transaction according to their expectation of trust, in an environment characterized by uncertainty", but Chen and Dhillon (2003) go further and propose in their study that trust, because of its complexity, is composed of three dimensions: competence, integrity and benevolence, which, although independent, are closely related, thus influencing trust in general. Competence, insofar as the consumer believes that the other party is capable of doing what it needs (Suh & Han, 2003). In the case of online commerce, the consumer believes that the seller has the "ability to provide products and / or services in an appropriate and convenient way" (Mcknight & Chervany, 2001). Integrity suggests that the seller acts consistently, reliably and honestly. And finally, benevolence as the seller's ability "to keep consumer interests above their own interests, indicating sincere concern for the well-being of their customers" (Chen & Dhillon, 2003). In this sequence, the influence that these dimensions exert on the trust, will cause it to influence, in turn, the purchase intention (Oliveira et al., 2017).

It is possible to identify in the literature several theories that try to predict the impact of technology and trust in human behavior. The original model of Delone and Mclean (1992) – DeLone and McLean Information Systems success model or "D&M IS Success Model" – included six dimensions, including system quality, service quality, information quality and user satisfaction (Popova, 2018). DeLone and McLean developed this model as a framework to measure and analyze the variables inherent to the study of information systems, integrating technical factors of information systems and transactional factors related to the attitudes of online users (DeLone & McLean, 2004). As Kim and Peterson (2017) describe: the system quality is presented by the technical and functional characteristics of the site , related to its reliability, flexibility, accessibility and speed; the information quality site is measured by its integrity, accuracy and format; Finally, the service quality, which is presented in the general support given to the consumer by those who are providing the service, is evaluated by the quality of the interaction with the website and how it responds to your needs. In interpreting this model, these three factors, as a whole, have a relationship with consumer satisfaction, as well as with their intention to use (Damarwulan et al., 2018; Rakštelienė & Ruževičius, 2018).

Being the trust in online commerce a topic that has caused several discussions and studies in the literature, Wang et al. (2016) developed a model for evaluating the success of websites in online commerce, integrating the D&M model and the Theory of commitment and trust, thus emphasizing the importance of the relationship between commitment and trust. Briefly, this theory presents as a premise the simultaneous adoption of commitment and trust as inseparable factors for the formation and maintenance of relations between consumers and sellers. "Consumers who have a positive relationship with an online marketer tend to develop a long-term commitment and loyalty" (Wang et al., 2016). In the background, the D&M model acts as a theoretical basis, which complements the Theory of commitment and trust, allowing to portray the perceptions of the consumers in relation to their intentions with the online commerce, thus obtaining a transactional vision through a perspective of relational marketing. In other words, the model proposed by Wang, Wang and Liu integrates technical, transactional and relational factors, capturing the antecedents of commitment and trust, which are associated with online business contexts (Wang et al., 2016). The integration of these two models enables an detailed study and analysis of trust in the online environment, as well as helping to understand how the relationship between all these factors influences the attitudes of consumers.

Another perspective on building trust in online commerce is the one proposed by Pavlou (2003). After applying TRA in a technological environment, Pavlou used the TAM variables (perceived usefulness and perceived ease of use), as the main drivers of the acceptance of online commerce, to which he integrated the trust and the perceived risk, thus proposing his model on the acceptance of online commerce by the consumer. Pavlou (2003) aimed to predict the acceptance of online commerce by the consumer, thus proposing a set of key factors for their retention in online purchases. The inclusion of trust and perceived risk was due to the fact that online commerce, due to its technological nature, operates in an environment of doubt and uncertainty. Also Kim et al. (2008) describe the perception of risk as consumer doubt about the outcome of their decisions, and therefore "an important barrier for consumers who are thinking of making an online purchase", making it one of the factors that influence the purchase decision. The authors explain that consumers when buying online products/services are exposed to risks: financial, functional, physical (for example in the purchase of medicines), social, among others. However, Bhatnagar et al. (2000), explain that there are three types of risk that stand out when we talk about online commerce, being financial risk, product risk and information risk (security and privacy). Concerning trust, Pavlou (2003) defines it as "a characteristic of most economic and social interactions in which uncertainty is present", and affirms that it has always been an important and influential element of consumer behavior, thus proving to be of great importance in the context of online commerce. As the author argues, "lack of trust has been pointed out as one of the main reasons why consumers do not get involved with online commerce". In conclusion, Pavlou shows the trust and perceived risk as a direct antecedent of the intention to buy, but also the trust presents itself as an indirect antecedent through perceived risk, perceived usefulness and perceived ease of use, which also have effect in purchase intention. Regarding the dependent variables, purchase intention and current buying behavior, the author has placed them as the main constructs that will determine consumer acceptance through online commerce (Pavlou, 2003). The model suggests that the reduction of uncertainty is a key factor in explaining the acceptance of online commerce, namely the

B2C model, and deserves its due attention.

The development and study of several models and the vast literature on the subject in this context only supports the idea that security issues can be an inhibitor to the development of e-commerce, so it is necessary to find the best ways to that this obstacle is overcome. As already mentioned, security is one of the basic needs of the human being, which makes it easy to see the impact that this has on the level of trust in online commerce, which makes this factor the central point of the research model. Trust has been the key to online trading. If trust is vital then its construction will be even more (Sousa & Magalhães, 2019).

2.1. Consumer Behavior

In addition to studying the role of cultural, social, personal or psychological factors in consumer behavior, several researchers have developed theories about their behavior. Consumer behavior can be defined by the interaction between several variables, making the decision process, by nature, constructive. As Gao (2005) explains, it is a process built between the consumer himself and the context of the environment in which decisions are made. Within this dynamic, a number of theories and models that attempt to explain this behavior have emerged over time, such as the Theory of Rational Action (TRA), the Technological Acceptance Model (TAM) and the Theory of Planned Behavior.

From the studies of Ajzen and Fishbein (1980) TRA was created, which states that the performance of an individual is determined by their behavioral intentions, and these are determined by their attitude and subjective norms (cited by Oliveira et al. 2017). Based on this theory, Davis (1985) presented the TAM, which came to explain the acceptance of information systems. According to the author, TAM seeks to predict and explain the attitude toward its use, which arises "as a function of two great beliefs: perceived usefulness and perceived ease of use", of the technology in question. To the author, individuals make use of a technology to satisfy a need – perceived usefulness – however this usefulness perception may be impaired if it is not easy to use – perceived ease of use – which will later influence their intention of use (Davis, 1989). Given this, it is possible to see that these two TAM variables can be used to predict Internet shopping behavior. Al-maghrabi and Dennis (2012) also point out that perceived usefulness functions as a prerequisite for technology acceptance as it depends on your expectations as to how it can improve and simplify the lives of your users. Finally, TPB enunciates intention as the best indicator of behavior. Ajzen (1991) studied the relationship between intention and behavior from ART, and explains that BMP includes motivational factors, which will influence behavior. Among the various models, TAM is the one that generates greater acceptance, being one of the most used in the literature, with major influences, standing out its strong theoretical base, its focus on technology and, above all, its broad empirical support, as Davis (1985) states and also in terms of Corporate Social Responsibility (CSR) (Casais & Sousa, 2019).

3. Research Design and Methodology

The methodology used tried responding the objectives, trying to better understand the consumer behavior of the phenomenon in the online environment After the bibliographic review previously set out, the research methodology was established that would best be able to answer the research question: 'What factors influence (and in what form) the trust and predisposition of consumers for online commerce?'

In an attempt to explain which factors most influence consumer trust and predisposition, at this stage all the variables to be included in the study were defined, taking into account all the bibliographical analysis performed, and following the research order proposed by Martinez and Ferreira (2010). With the variables defined and objectives outlined, the survey was elaborated. It was developed in order to capture personal opinions and treat assumptions about third parties, related to the respondent himself. In an introductory note, the intention of the survey was explained and the respondent was asked to respond, taking into account his experience with online sales. This request follows the advice that Pavlou (2003) left after his second study, asking his respondents to respond having regard to a website to their free choice.

In the first part, an introductory question was asked which sought to ascertain whether the respondent was shopping online, and a negative answer to this question carried him to the fourth and last part of the survey, and a positive reply made him proceed to the next. In this second part of the survey, all the measuring scales of the research model were included, and in the third and fourth part, the characterization issues of their online behavior and their sociodemographic profile, respectively. All measurement scales were organized in order to obtain clarity and avoid redundancies in the answers, and for each a *Likert* scale was used composed of 6 points, a type of psychometric scale that ranged from 1 = totally disagree, 2 = strongly disagree, 3 = partially disagree, 4 = partially agree, 5 = strongly agree and 6 = totally agree. This type of scale is widely used, among many other situations, in measurements of attitudes, levels of opinion, satisfaction, motivation, and presents as advantages its criteria are precise and easy to work and greater reliability when compared with other types of scales (Chomeya, 2010). As Hill and Hill (2008) refer, opinions and attitudes are presented as bipolar variables, and the use of an odd scale increases the tendency of the respondents to take a conservative response, not running the risk of assuming a negative or positive opinion of subject. The use of a *Likert* scale of 6 points allows favoring the opinion of the respondent, in that it encourages their favorable or unfavorable position on a topic.

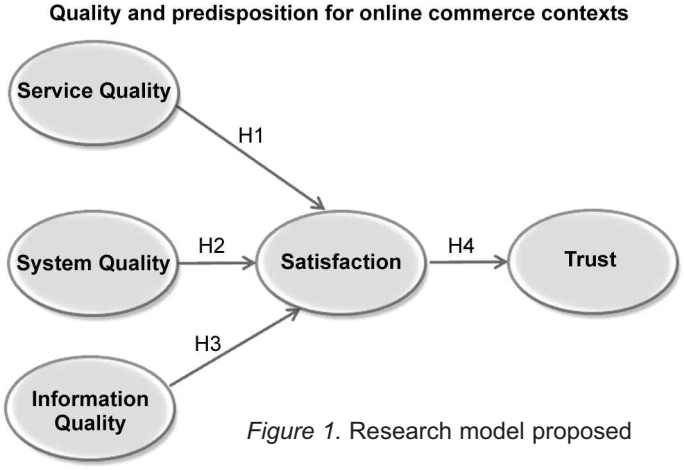

Figure 1. Research model proposed

According to the study by Chomeya (2010), this type of scale is appropriate for this type of measurement, since it tends to give values of reliability superior to the scale of 5 points. Given this, we opted for the exclusion of neutral answers, since they would not add descriptive value to the results. Despite this, the scale continues to meet one of the requirements for an adequate application of a *Likert* scale, since it is symmetric, that is, it contains the same number of negative and positive categories. After the survey, and its correct correction, it was made available to the entire population, and the answers obtained, analyzed by the software Statistical Package for Social Sciences (SPSS), giving useful and collected information to the collected data. The use of this software also allowed to verify the hypotheses and to perceive the relationship between the variables, besides allowing two types of analysis: univariate, for the study related to the data of the profile of the respondents, and bivariate, for the study of the associations between the variables of the proposed research model. In this sense, and taking into account the ordinal nature of the measurement scales, techniques of

descriptive statistics (such as relative frequencies, fads and medians) and correlation (in this case, Spearman's correlation coefficient) were used.

4. Results and Discussion

The variable 'service quality' was measured through a 3-item scale. It was possible to observe that the variable in question presents a positive level of agreement, since the answers focused on point 5 ('strongly agree') with values above 34%. With emphasis on the positive side, there were also values above 25% in point 6 ('totally agree'), as well as in point 4 ('partially agree') above 21%. In all items, it was verified that both mode and median support these facts, since both presented a value of 5. Given these data, it can be concluded that, although distributed, the answers were positive in what service quality of the sites that respondents use or have used.

The 'system quality' was measured on a 3-item scale and, according the results, a positive level of agreement can be verified. There is a tendency for responses to level 6 ('totally agree') with values above 43%, and item 1 presented values above 50%. There were also values above 32% for level 5 ('strongly agree'). With the exception of item 1, which presented the mode and median with level 6, the remaining items registered values of 6 and 5 in their modes and medians, respectively. After this analysis, it can be concluded that the level of agreement for this variable presented, without doubt, very positive values regarding the system quality of the sites that the respondents use or have used.

On the 'information quality', a scale with 3 items was used, and this variable also presented a positive level of agreement, registering relative frequencies above 41% for level 6 ('totally agree') and above 39% for level 5 ('strongly agree'). It should be noted that both mode and median of all the items presented values of scale of 6 and 5, respectively. It is possible to conclude then that respondents, in general, considered values of positive agreement regarding the 'information quality' of the websites that they use or have used.

The 'satisfaction' variable, measured using 3 items, also presented positive agreement levels, with values above 41% for level 6 ('totally agree') and above 40% for level 5 ('strongly agree'). Regarding the mode and median of the first two items, they registered level 5 scale values. The last item presented an exception to this scenario, presenting a scale level 6 for mode and 5 for the median. It was concluded that respondents classified the items of the satisfaction variable as positive, which demonstrates satisfaction with the websites they use or have used, and in turn, in relation to their systems, services and information.

As for the main variable under study, 'trust', unlike the rest, was measured with a scale of 6 items grouped 2 to 2, divided into 3 characteristics: integrity, competence and benevolence. As previously described, in this investigation all constructs were measured and evaluated as first-order constructs, except for trust, since as attitude, it is modeled as a second-order construct, which is measured by these 3 sub-constructs. It can be seen from mode that the most common values in all items attributed by the respondents were 5 and 6. In general, a positive level of agreement is found, with frequency values above 28% for level 5 ('strongly agree') and above 18% for level 6 ('fully agree'). It is important to highlight the level of scale 3 ('partially disagree') for the items in the 'benevolence' category, which presented both higher values when compared to the remaining items of the variable. This may show that although respondents admit some trust in the websites they use or used, yet almost 14% attributed a negative level to item 1 and almost 10.5% a negative level to item 2. Overall, respondents rely on sites on which they responded to this survey, however some disagree in part that they are concerned about their interests, or that they would do nothing to disadvantage them.

After the general analysis of all the correlations, it can be concluded already that all the variables present a positive and statistically significant relation. Given this conclusion one can reject the null hypothesis between all the cases under analysis, checking the hypotheses defined for this investigation, which makes it possible to existence of a relationship between variables. With respect to the values obtained, it is possible to observe that the coefficients varied between 0.552 (lowest value) and 0.734 (highest value), which means that all correlations have a strong intensity.

Regarding the relationship between service quality and satisfaction, it is justified by a $rs = 0.575$, which, accompanied by a value of statistical significance (hereinafter referred to as '*p-value*') ≤ 0.01, demonstrates a positive association relation between these two variables. In other words, it can be said that the quality of service has a positive relationship with satisfaction on the websites that consumers use or have already used. This relationship supports the hypothesis 1 under study: 'Service quality has a positive relation with consumer satisfaction'. This relationship is in accordance with the opinion of Cronin and Taylor (1992), who at that time already affirmed that the quality of the service led to customer satisfaction. Both variables, as Vlachos and Vrechopoulos (2008) explain later, have an effect on future purchase intentions.

With respect to the relation between system quality and satisfaction, it has a *p-value* ≤ 0.01, a $rs = 0.552$ which, although smaller, also allows to affirm that this relation between both is positive and strong, that is, the system quality presented a positive relation with satisfaction, statistically significant, thus verifying hypothesis 2 under study: 'System quality has a positive relation with consumer satisfaction'. As for the relationship between the variables information quality and satisfaction, it was obtained $rs = 0.665$ and a *p-value* ≤ 0.01, and the relation between them can be considered positive, with strong intensity. Through these data it can be said that, the quality of the information has a positive relationship with satisfaction, with the particularity that this relationship was stronger than the variables service quality and system quality. Thus, information quality was one of the factors that most affect satisfaction, a conclusion reached by Park and Kim (2003), whose model explained 39% of the variance. So, and with this correlation being statistically significant, it can be also confirm hypothesis 3 in the study: 'Information quality has a positive relation with consumer satisfaction'.

Regarding these 3 variables (service quality , system quality and information quality), Wang et al. (2016) also concluded, through the application of their model, that all of them had a positive relationship with satisfaction, which explained 64% of the variance.

From the highest correlations, with $rs = 0.718$ and a *p-value* ≤ 0.01, it is the one registered between variables satisfaction and trust, which showed the existence of a positive and strong intensity relationship between consumer satisfaction and the trust they have with the websites they use or have used. Satisfaction, as an attitude, may influence consumers' trust and, as Nisar and Prabhakar (2017) explain, their decrease can be "mainly due to lack of security and privacy". Given this scenario, we can confirm hypothesis 4 in the study: 'Consumer satisfaction has a positive relationship with trust'.

In the background, and after analyzing the collected data and the statistical results, this research model allows to explain the trust building and predisposition that the consumer has in the online environment, being this made from the influence and relation between several factors. First, the quality of the service, the system and the information, such as beliefs and antecedents of satisfaction; and here the model also allows us to realize that satisfaction, as an attitude, has a significant weight in the construction of trust. And last but not least, from the model it is also possible to perceive the influence that this trust has on the final consumer behavior online. At bottom, when interpreting the research model in the scope of this investigation, it can be said

that the trust that exists in an online point of sale is strongly associated with its satisfaction with the information system and with its level of acceptance of online commerce, and all these factors, individually and as a whole, determine the predisposition and behavior of the consumer.

5. Conclusions

The great problem of technology and its evolution is that its advantages and disadvantages are face of the same coin, and although it brings several amenities never before seen, the truth is that the undefined and unknown nature of this virtual space has allowed situations to take place of invasion of information, violation of fundamental rights, fraud, invasion of privacy, among many other illegal activity. Even far from the present reality, George Orwell, in 1949, described in his book entitled "1984", a scenario with a society in permanent invasion of privacy and under the control of technology. On the one hand, if one can easily perceive the potential of all this evolution, on the other there grows a lack of confidence in everything that is behind it. This has become the challenge of companies, especially those that operate in online commerce. To understand, for the Portuguese online consumer, the factors that most influence it, was that of this study. Overall, respondents pointed to price and security as the most important features when making an online purchase. Customer comments and safety certificates, such as the aspects that have the most positive impact, and, on the other hand, the lack of comments and information, as well as the aspects that have the most negative impact when they visit a site. However, even more than 50% of respondents stated their preference for buying in physical stores.

The particularity of the proposed research model is that it includes a simultaneous analysis of several variables and their effects among themselves, which made this investigation more complete. The methodology adopted and the subsequent analysis of the collected data allowed us to evaluate the reliability of all the scales used to measure the variables and confirm the hypotheses defined, thus allowing us to reach the objectives proposed in this investigation. In fact, the quality of information systems had an influence on consumer satisfaction, a situation that reinforces the need to include technical variables in the process of analyzing the customer profile. Among the three variables proposed (quality of service, system and information) that one had a greater weight in satisfaction, was the information quality.

It is important to note that the satisfaction and trust constructs, as proposed in the research model, are clearly distinct and can not be confused, in the sense that, as the satisfaction that consumers have in a given website increases, his trust also evolves, in the same sense, situation that occurred in the data analysis of this study. Also, the field of entrepreneurship, specifically transformational entrepreneurship, is exciting due to its relatively recent emergence and the need to assess the results of innovative behaviour (Sousa, 2019). The success of a company's business will be through the development of strategies that take all of these factors into account at the same time, including understanding its target customer, and implementing the same strategies for its capture.

6. Limitations and Future Research

Although the applied methodology allowed to reach the proposed objectives of this investigation, it is important to reflect on the limitations that were part of it. The main limitation refers to the sample used, since of the 180 respondents, only 143 reported online purchases, so the model was applied on this number. On the other hand, the number of individuals who reported not shopping online was also reduced (N = 37). A higher sample would therefore lead to wider results and a better understanding of them. Another limitation has to do with the restriction on the collection of responses, and is related to the way the survey was made available, since it was only placed online, only individuals with Internet access answered it, which could also explain the low number of people who stated not to shop online. A higher sample, in both situations, could allow a stronger comparison, making research even more interesting. After the final analysis and conclusions, points to improve and suggestions that in the future will complement and add value to scientific knowledge in general are recognized.

In spite of the contribution that the variables included in the proposed model had in this research, as possible suggestions it is considered first, the inclusion of new variables and new antecedents that transform the study of the trust in the online median more complete. Among several hypotheses, there are variables of a cultural nature. Based on the study of Pirumyan and Broeder (2016), which analyzed cultural differences in the online context, the inclusion of variables of this nature will allow a better understanding of online consumer behavior among different cultures. From a comparative point of view, it would be interesting to develop comparative studies among generations of users (e.g. *Baby boomers* vs. *Millennials*). Given the diversity of business models and their complexity, it would also be relevant to apply the proposed model to other business models, in addition to B2C. Based on the theory of the bonus, the motivation information online, satisfaction online and ratings online, as guarantees of predisposition to this kind of trade.

In this context this study intends to understand (in next steps and future research), the importance of attachment in online contexts. We intend to show how these valid questions can be answered by introducing causal modelling and discussing an approach to it, structural equation modelling (SEM), which is a rigorous technique for building and testing such models. It is an advanced statistical methodology that provides models and results that are easy to understand and apply (Ferreira, Sousa & Gonçalves, 2018). We intend to confirm that a causal relationship exists (e.g. attachment theory and behavioral intentions). Finally, in a different optic, it also suggested the application of a qualitative study with focus groups (Focus Group) to consumers online and consumers who do not use this type of trade, which will examine and search the topic.

References

[1] Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, 50(2), 179-211.

[2] Al-maghrabi, T., & Dennis, C. (2012). The driving factors of continuance online shopping: gender differences in behaviour among students – the case of Saudi Arabia. *International Journal of Business Information Systems*, 9(4), 1-21.

[3] Atulkar, S., & Kesari, B. (2017). Satisfaction, loyalty and repatronage intentions: Role of hedonic shopping values. *Journal of Retailing and Consumer Services*, 39, 23-34.

[4] Ba, S., & Pavlou, P. (2002). Evidence of the Effect of Trust Building Technology in Electronic Markets: Price Premiums and Buyer Behavior. *MIS Quarterly*, 26(3), 243-268.

[5] Bhatnagar, A., Misra, S., & Rao, H. (2000). On risk, convenience, and Internet shopping behavior. *Communications of the ACM*, 43(11), 98-105.

[6] Black, N., Lockett, A., Ennew, C., Winklhofer, H., & Mckechnie, S. (2002). Modelling consumer choice of distribution channels: An illustration from financial services. *International Journal of Bank Marketing*, 20(4), 161-173.

[7] Casais, B. & Sousa, B. (2019). 'Portugal, the best destination': the case study of a CSR communication that changed mentalities and increased business performance. *World Review of Entrepreneurship, Management and Sust. Development*, Vol. 15, Nos. 1/2, pp. 29-41. https://doi.org/10.1504/WREMSD.2019.10019893

[8] Chen, J., & Dibb, S. (2010). Consumer trust in the online retail context: Exploring the antecedents and consequences. *Psychology and Marketing*, 27(4), 323-346.

[9] Chen, S., & Dhillon, G. (2003). Interpreting Dimensions of Consumer Trust in E-Commerce. *Information Technology and Management*, 4(2/3), 303-318.
[10] Chomeya, R. (2010). Quality of Psychology Test Between Likert Scale 5 and 6 Points. *Journal of Social Sciences*, 6(3), 399-403.
[11] Damarwulan, L. M., Farida, N., Andriyansah (2018). The Role of Quality of Entrepreneurial Networking and Responsiveness to Global Business Environment in improving the Marketing Performance of Indonesian Exporting SMEs. *Quality-Access to Success*, 19(165), 91-97.
[12] Davis, F. (1985). *A Technology Acceptance Model for Empirically Testing New End-User Information Systems: Theory dnd Results*. (doctoral thesis). Massachusetts Institute of Technology, Massachusetts.
[13] Davis, F. (1989). Perceived usufulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, 13(3), 319-339.
[14] Delone, W., & Mclean, E. (1992). Information Systems Success: The Quest for the Dependent Variable. *Information Systems Research*, 3(1), 60-95.
[15] DeLone, W., & McLean, E. (2004). Measuring e-Commerce Success: Applying the DeLone & McLean Information Systems Success Model. *International Journal of Electronic Commerce*, 9(1), 31-47.
[16] Ferreira, J., Sousa, B. M., & Gonçalves, F. (2018). Encouraging the subsistence artisan entrepreneurship in handicraft and creative contexts. *Journal of Enterprising Communities: People and Places in the Global Economy*. https://doi.org/10.1108/JEC-09-2018-0068
[17] Gao, Y. (2005). *Web systems design and online consumer behavior*. Nova Jersey: Idea Group Publishing.
[18] Hill, M., & Hill, A. (2008). *Investigação por Questionário*. (2a ed). Lisboa: Edições Sílabo.
[19] Jarvenpaa, S., Tractinsky, N., & Saarinen, L. (2000). Consumer Trust in an Internet Store: A Cross-Cultural Validation. *Information Technology and Management*, 1(1/2), 45-71.
[20] Kasiri, L., Cheng, K., Sambasivan, M., & Sidin, S. (2017). Integration of standardization and customization: Impact on service quality, customer satisfaction, and loyalty. *Journal of Retailing and Consumer Services*, 35, 91-97.
[21] Kim, D., Ferrin, D., & Rao, H. (2008). A trust-based consumer decision-making model in electronic commerce: The role of trust, perceived risk, and their antecedents. *Decision Support Systems*, 44(2), 544-564.
[22] Kim, Y., & Peterson, R. (2017). A Meta-analysis of Online Trust Relationships in E-commerce. *Journal of Interactive Marketing*, 38, 44-54.
[23] KPMG International. (2017). *The truth about online consumers. 2017 Global Online Consumer Report*. Suiça: KPMG International Cooperative.
[24] Marôco, J. (2014). *Análise Estatística com o SPSS Statistics*. (6a ed). Report Number.
[25] Martinez, L. & Ferreira, A. (2010). *Análise de Dados com SPSS* - Primeiros Passos. (3ª ed). Lisboa: Escolar Editora.
[26] Mcknight, D., & Chervany, N. (2001). What Trust Means in E-Commerce Customer Relationships: An Interdisciplinary Conceptual Typology. *International Journal of Electronic Commerce*, 6(2),35-59.
[27] McQuivey, J. (2013). *Digital Disruption: Unleashing the Next Wave Of Innovation*. Las Vegas: Amazon Publishing.
[28] Nisar, T., & Prabhakar, G. (2017). What factors determine e-satisfaction and consumer spending in e-commerce retailing? *Journal of Retailing and Consumer Services*, 39, 135-144.
[29] Oliveira, T., Alhinho, M., Rita, P., & Dhillon, G. (2017). Modelling and testing consumer trust dimensions in e-commerce. *Computers in Human Behavior*, 71, 153-164.
[30] Oliver, R. (1980). A Cognitive Model of the Antecedents and Consequences of Satisfaction Decisions. *Journal of Marketing Research*, 17(4), 460-469.
[31] Pallant, J., Danaher, P., Sands, S. & Danaher, T. (2017). An empirical analysis of factors that influence retail website visit types. *Journal of Retailing and Consumer Services*, 39, 62-70.
[32] Pavlou, P. (2003). Consumer Acceptance of Electronic Commerce: Integrating Trust and Risk with the Technology Acceptance Model. *International Journal of Electronic Commerce*, 7(3), 69-103.
[33] Pirumyan, T., & Broeder, P. (2016). Cultural Face of E-commerce: Armenian and Dutch Online Consumers. *Marketing - from Information to Decision*, 9(2), 34-48.
[34] Popova, L. F. (2018). The evaluation of the quality management system effectiveness. *Quality-Access to Success*, 19(165), 51-55.
[35] Rakštelienė, A., & Ruževičius, J. (2018). Performance Quality: Influence of Work Environment Factors for Informal Training Transfer. *Quality-Access to Success*, 19(165), 114-121.
[36] Sousa, B. (2019). Book review: Transformational entrepreneurship. *International Small Business Journal*. https://doi.org/10.1177/0266242619828014
[37] Sousa, B. & Rocha, A. T. (2019). The role of attachment in public management and place marketing contexts: a case study applied to Vila de Montalegre (Portugal). *International Journal of Public Sector Performance Management*, Vol. 5, N. 2, pp. 189-205 https://doi.org/10.1504/IJPSPM.2019.099094
[38] Sousa, B. B., & Magalhães, F. C. (2019). An Approach on Attachment in Public Marketing and Higher Education Management Contexts. In C. Machado, & J. Davim (Eds.), Higher Education and the Evolution of Management, Applied Sciences, and Engineering Curricula (pp. 151-171). Hershey, PA: *IGI Global*. doi:10.4018/978-1-5225-7259-6.ch006
[39] Suh, B., & Han, I. (2003). The Impact of Customer Trust and Perception of Security Control on the Acceptance of Electronic Commerce. *International Journal of Electronic Commerce*, 7(3), 135-161.
[40] Swensen, K., & Singh, N. (2017). *The road to 2025 - Retail , Reimagined*. Disponível em: https://cogniz.at/2EcqfQn.
[41] Tan, S. (1999). Strategies for reducing consumers' risk aversion in Internet shopping. *Journal of Consumer Marketing*, 16(2), 163-180.
[42] Tanner, J., & Raymond, M. (2013). *Principles of Marketing*. (2a ed). Boston: Flatworld.
[43] Tanner, J., & Raymond, M. (2016). *Principles of Marketing*. (3a ed). Boston: Flatworld.
[44] Tran, L., Pham, L., & Le, L. (2018). E-satisfaction and continuance intention: The moderator role of online ratings. *International Journal of Hospitality Management*. https://doi.org/10.1016/j.ijhm.2018.07.011.
[45] Vlachos, P., & Vrechopoulos, A. (2008). Determinants of behavioral intentions in the mobile Internet services market. *Journal of Services Marketing*, 22(4), 280-291.
[46] Wang, W., Wang, Y., & Liu, E. (2016). The stickiness intention of group-buying websites: The integration of the commitment–trust theory and e-commerce success model. *Information and Management*, 53(5), 625-642.
[47] Yousafzai, S., Pallister, J., & Foxall, G. (2003). A proposed model of e-trust for electronic banking. *Technovation*, 23(11), 847-860.

Determination of the Quality of Rubber Composites Based on their Testing

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Abstract

Subject of this work is testing the quality of composite materials. Experiments were focused on functional properties – hardness, resistance to abrasion and the influence of thermal aging. The object of the research is rubber composites, specifically rubber-textile conveyor belts, which are an essential element of a belt conveyor. Quality requirements for conveyor belts are affected by conditions of their use. Besides functional properties of the entire conveyor belt, it is also necessary to know the functional properties of its basic rubber component i.e. the covering layer.

Keywords: *conveyor belt; quality; testing; abrasion; hardness.*

1. Introduction

Quality and ecology are key issues and a global motto of manufacturing businesses within the various initiatives of the Continental Conveyor Belt Group and the Goodyear Tire & Rubber, Dunlop, which produce rubber composites (tires, conveyor belts, technical rubber products, etc.). This implies that contribution aimed at testing the product quality of rubber composites in terms of their abrasion and hardness. The object of the research is rubber composites, specifically rubber conveyor belts with textile carcass. The conveyor belt is the most important part of the belt conveyor and therefore it is important to reduce its production and maintenance costs (Grinčová, Marasová, 2014). Reduction of these costs can be achieved by increasing the functional properties of the conveyor belt (Grinčová, Berežný, Marasová, 2009). Demands placed on conveyor belts depend on the way they are used, so it is necessary to test the functional properties of the conveyor belt as a whole or its components (especially covering layers). Testing of conveyor belts can be divided into three groups according to (Hardygora, 2002): standard tests, certification tests and nonstandard tests. The first group includes tests of physical-mechanical properties for their conformity with valid standards. The basic instrument facilities for performing experimental laboratory testing are shown in Table 1. The second group includes certification examinations of conveyor belts that are necessary for their operation in deep mines. The third group includes nonstandard tests – specialized tests performed on special test devices, standards do not usually apply to them, but concern parameters important to belt operation. Nonstandard tests include, for example, determining the resistance of the conveyor belt to the disruption. The method of testing for resistance to disruption is described in detail by the authors (Grinčová, Hlúbiková, Krešák, 2008) and the determination of resistance to collusion based on experimental measurements, while the authors (Andrejiová, Grinčová, Marasová, 2016), (Grinčová, Andrejiová, Marasová, 2015), describe the evaluation of the results by regression analysis and using the DOE (Design of Experiment) method (Andrejiová et al., 2012), (Grujič et al., 2013), (Andrejiová, Grinčová, 2016), (Marasová, Ambriško, 2017).

2. Determination of Quality of Rubber Composites According to Abrasion Resistance

The composite, i.e. conveyor belt, consists of various materials – a covering layer resistant to abrasion, carcass which provides tensile strength, an adhesive layer for adhesion between the rubber, carcass and bottom cover layer to provide sufficient friction between the conveyor belt and the propellant drum (Röthemeyer, Sommer, 2006). The conveyor belts of textile and steel ropes relate the same covering material of covering parts with respect to the construction. Rubber cover layers protect the carcass and provide the necessary resistance to impact that affect the conveyor belt. The top cover layer is in direct contact with the transported material which harms it during operation. The greatest abrasion of cover layers in terms of type of transported material occurs due to its tribological interaction on the surface of the belt. Knowledge of the mechanical properties of conveyor belts is one many important prerequisites for trouble-free operation of conveyors (Valentova, 2011).

The subject of experimental research is the conveyor belt. In this case, a non-rotational test object was selected for experiments. The test object is attached to the holder and abrasion occurs. Abrasion takes place with the help of abrasive cloth, which is attached to the surface of the rotating drum. Subsequently, the test object is held against it and performs transverse movement. The weight loss of the test body is

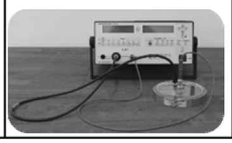
Devices for Sample Preparation		**Hydraulic Press Atom SE 25** for specimens preparation using punching knifes
		**Splitting Machine Fortuna AB 320 G** for splitting the covering layers of conveyor belts; max. splitting thickness: 20 mm
		**Miscellaneous Handtools** for preparation samples, testing specimens and machines – instruments, tools, gauges, knifes,…
Device for Sample Conditioning		**Aging Oven Air Circulation HERA therm OMH 100** for the accelerated heat aging of covering layers and conveyor belts up to 330°C
Devices for Sample Testing		**Zwick ProLine 30kN Test Machine** With non-contact extensometer and pneumatically operated grips, used to measure the strength and ductility of covering layers, tensile strength *(max. up to 1000 N/mm)* across the thickness of the conveyor belts and for testing the adhesion of structural elements of conveyor belts
		**Hardness Tester Bareiss HPE II** for rubber hardness determination by Shore method A according to ISO 868
		**Balance SECURA 224-1S** for measuring the density of rubber according to ISO 2781
		**Abrasion Tester Bareiss AB 6347** to measure the resistance of rubber abrasion according to ISO 4649
		**Device WAZAU** for flame resistance tests of conveyor belts
		**Electrical Conductivity Device Tera Ohmmeter TO 3** for electrical conductivity of conveyor belts according to ISO 284

Table 1. Instrumentation equipment for testing the quality of rubber composites

determined. The abrasion resistance testing is performed on the Abaresion Tester Bareiss AB 6347 shown in Figure 1. The loss of cover layer was tested according to ISO 4649. The essential part of this international standard is the calibration of the abrasive device and the preparation of the abrasive fabric prior to the experiment itself with the non-rotating test body of the standard reference compound (STN ISO 4649, 2013).

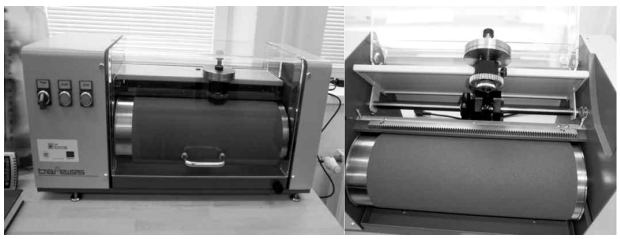


Figure 1. Testing device for determination of abrasion resistance

The experimental rubber textile conveyor belt (CB) type P 2000/4 was used for the experiments. Two types of a given belt were compared:

- a new CB without a bumper – sample A,
- a new CB with a bumper – sample B.

Three test pieces with diameter 16.2 mm were cut from each CB. In Figure 2 is shown type A test bodies.

Figure 2. A type CB test bodies prepared for testing

The procedure and devices for the type A sample of CB experiment were the same as those for the standard reference compound and the same procedure was used for type B samples:

Step 1: Weighing of test bodies. The test bodies were weighed before abrasion on SECURA 224-1S balance.

Step 2: Subsequently, the bodies are fastened to the stand of abrasion tester (Figure 1), where they are abraded for the specified time.

Step 3: Determination of weight loss of test bodies in Table 2. After abrasion, their weight was determined and the difference between the weight before and after abrasion was determined. The body weight loss from the standard reference mixture was in all cases within the interval specified by ISO 4649 at an interval of 180-220 mg.

Sample	Weight before abrasion [mg]	Weight after abrasion [mg]	Density [g.cm^{-3}]	Weight loss [mg]
A 1	1348	1222	0.8	126
A 2	1422	1288	0.8	134
A 3	1436	1318	0.8	118

Table 2. Measured average values for A type CB test bodies

Step 4: Density determination. In the same way as for standard reference compounds, density was determined for used samples of CB.

Step 5: Determination of relative volume loss. The relative volume loss in mm^3 is given by the relation (1):

$$\Delta V_{rel} = (\Delta m_t \times \Delta m_{const}) / (\rho_t \times \Delta m_r) = \frac{126 * 200}{0.8 * 208} = 151.44 \text{ mm}^3 \quad (1)$$

where:
Δm_t is the mean weight loss of the test rubber body in mg;
Δm_{const} is the defined value of the weight loss of the test piece from the reference compound in mg, defined as 200 mg for a method with a non-rotating body with use of a standard compound;
ρ_t is the density of the test mixture in mg/mm^3;
Δm_r is the weight loss of the test body of reference compound in mg.

The evaluation of the results of experimental research. The aim of the experiment was to determine the abrasion of the upper cover layer of CB based on testing. For sample A, the relative volume loss was 151.44 mm^3 based on abrasion. For sample B, a relative volume loss of 144.97 mm^3 was measured. Weight losses for sample B are shown in Figure 3.

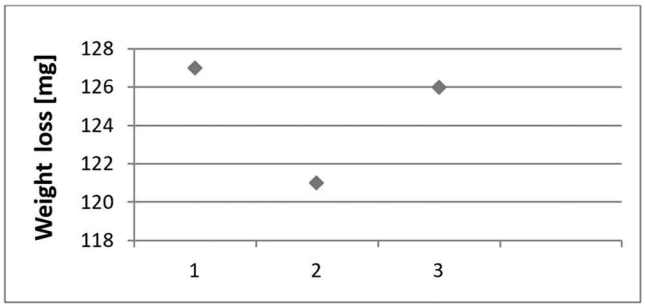


Figure 3. Weight loss of upper cover layer of CB for sample B

The difference of the measured loss values is:

$$\Delta V_{relA} - \Delta V_{relB} = 151.44 - 144.97 = 6.47 \text{ mm}^3 \quad (2)$$

Thus, sample A is subject of abrasion in greater extent than sample B, by 6.47 mm^3. In percentage terms, sample B is 4.5% stronger than sample A.

3. Determination of Quality of Rubber Composites According to Hardness

The aim of experimental research is to determine the effect of thermal aging on the density and hardness of the conveyor belts of different constructions. Three types of samples were used for research (Figure 4):

- sample A – fabric conveyor belt without bumper,
- sample B – fabric conveyor belt with bumper,
- sample C – fabric conveyor belt without bumper after aging, this is a new conveyor belt that was not used but was stored for 2 years in the warehouse at an ambient temperature of 20 ± 5°C.

Figure 4. Cut out samples of cover layers

The hardness test was performed according to STN EN ISO 868. Before the measurement, the calibration of the hardness tester BAREISS HPE II Shore A (Figure 5) was performed using a SHORE 40 calibrated hardness ring. The first measured value was 39.5 SHORE, which meet the standard requirement.

The density determination was according to STN EN ISO 1183-1. Before measuring, the SECURA 224-1S balance (Figure 5) was calibrated with subtraction of air and humidity temperatures. The calibration of the weights was verified by etalon (5 mg weight of the E2 precision class).

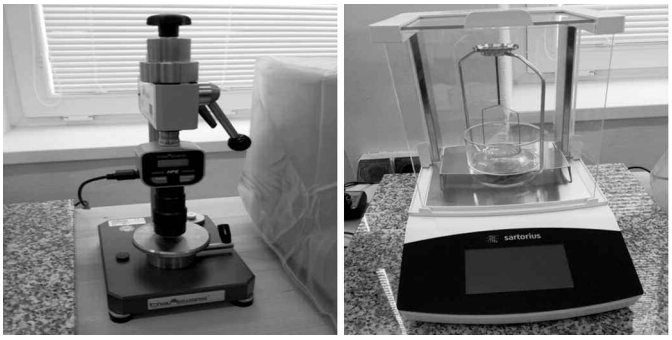


Figure 5. Hardness tester BAREISS HPE II and balance SECURA 224-1S

In tests of Shore method A of the rubber covering layers of given types of CB, 5 punctures were made, each puncture lasted 15 seconds. There was a minimum of 6 mm between the punctures and a margin of at least 9 mm from the edge. The tested sample was 4 x 4 cm (21.2°C and 53% humidity). The hardness values of the examined samples are shown in Table 3.

	SHORE		
	Sample A	**Sample B**	**Sample C**
1	62.5	62.7	66.5
2	61.2	61.9	66.3
3	63.1	62.8	64.6
4	60.2	61.8	64.4
5	61.2	63.4	66.2
Average hardness	A/15: 61.64	A/15: 62.52	A/15: 65.6

Table 3. Measured values of Shore hardness for examined samples

Prior to determining the density of the rubber cover layers of CB, control liquid density measurements were performed using distilled water. Subsequently, the weight of the samples was determined. The sample density was measured in liquid (distilled water). The weight of the samples was measured in air.

Before each measurement, the density of the liquid was set at the laboratory temperature according to the precise steps. The measured weight and density results are shown in Figure 6.

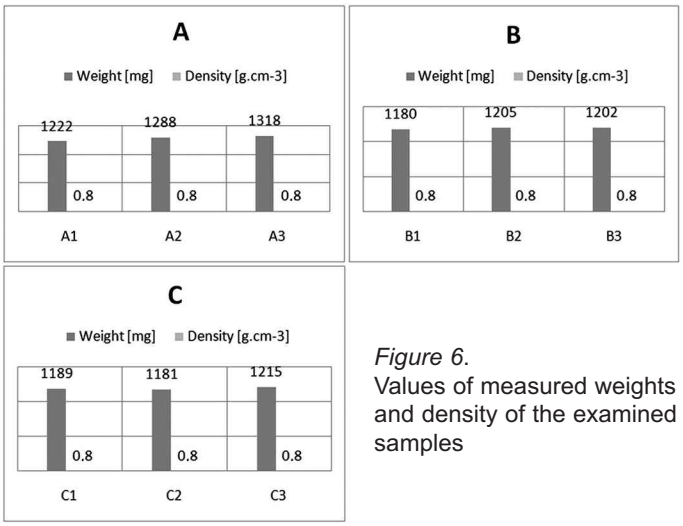


Figure 6. Values of measured weights and density of the examined samples

4. Conclusion

The work presents the results of the experimental research on resistance of rubber to abrasion (Figure 7). For the limited extent of the contribution it is not possible to state the results of testing the quality of the other functional features of the conveyor belts. The results of this experimental research show how the quality of the conveyor belts is tested in laboratory conditions.

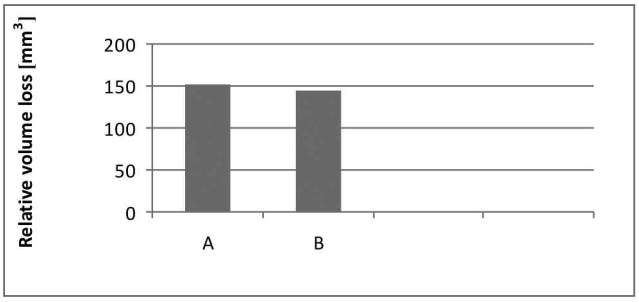


Figure 7. Comparison of relative volume loss of the examined cover layers

The results of the experimental study of cover layers density have shown that the density has not changed over time and the results of the experimental hardness testing have confirmed that aging affects the hardness of the rubber covering layers of the conveyor belt. Further research needs to be focused on determining the effect of aging on other belt properties such as disruption resistance, tensile strength, and suchlike.

Acknowledgement

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References

[1] Andrejiová, M., Grinčová, A. (2016). The experimental research of the conveyor belts damage used in mining industry. *Acta Montanistica Slovaca*, Vol. 21, No. 3, p. 180-190.

[2] Andrejiová, M., Grinčová, A., Marasová, D. (2016). Measurement and simulation of impact wear damage to industrial conveyor belts. *Wear*, Vol. 368, p. 400-407.

[3] Andrejiová, M., Pavlisková, A., Marasová, jr. D, Husáková N. (2012). The design an experiment the stress of the conveyer belts. *Transport and Logistics: The International Journal*, No. 10, p. 242-248.

[4] Grinčová, A., Andrejiová, M., Marasová, D. (2015). Measuring and comparative analysis of the interaction between the dynamic impact loading of the conveyor belt and the supporting system. *Measurement*, Vol. 59, p. 184-191.

[5] Grinčová, A., Berežný, Š., Marasová, D. (2009). Regression model creation based on experimental tests of conveyor belts against belt rips resistance. *Acta Montanistica Slovaca*, Vol. 14, No. 1, p. 113-120.

[6] Grinčová, A., Hlúbiková, A., Krešák, J. (2008). Methodology of testing the conveyor belts by breakdown (in Slovak). *Transport and Logistics: The International Journal*, No. 5, p. 209-213.

[7] Grinčová, A., Marasová, D. (2014). Experimental research and mathematical modelling as an effective tool of assessing failure of conveyor belts. *Eksploatacja i Niezawodnosc - Mainteneance and Reliability*, Vol. 16, No. 2, p. 229-235.

[8] Grujic, M., Andrejiova, M., Marasova, D., Grendel, P. (2013). Using the DOE method by experimental research of conveyor belts quality. *TTEM Journal: Technics Technologies Education Management*, Vol. 8, No. 2, p. 558-564.

[9] Hardygora M. (2002). Trends in conveyor belt research. *Transport and Logistics: The International Journal*, Vol. 3, p. 1-12.

[10] Marasová, D., Ambriško, Ľ. (2017). Evaluation the quality of rubber composites using the DOE method. *Quality - Access to Success*, Vol. 18, No. 158, p. 60-63.

[11] Röthemeyer, F., Sommer, F. (2006). *Kautschuk Technologie*, 2nd ed., Carl Hanser Verlag, München Wien.

[12] STN ISO 4649 (2013). Rubber, vulcanized or thermoplastic. Determination of abrasion resistance using a rotating cylindrical drum device.

[13] Valentova, H., Skrbek, B., Neubert, M., Hana, P., Nedbal, J. (2011). Mechanical and ultrasound properties of conveyor belt rubbers. *SGEM 2011 Conference Proceedings*, Bulgaria, p. 839-844.

Identification of Mass Event Customers and Factors Exerting Influence upon their Satisfaction with Participation in an Event

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Abstract

This paper is devoted to the issues connected with the role of quality in the process of logistic customer service of a mass event customer. In it, the original division into internal and external mass event customers, together with the description of their tasks and needs, prior to the event, in the course of it and afterwards, is presented. In the paper, the authoress, upon the basis of the review of the literature, and also her own experience connected with having organised mass events for a few years, presents her own observations concerning the most important aspects connected with the quality of the events of this type and the factors which determine it. The information contained in this paper will make it possible for the organisers of mass events to create the quality of such events in a more informed and conscious manner.

Keywords: *quality of services; mass events; logistic customer service.*

1. Introduction

Nowadays, a popularity of mass events is being observed all over the world.

Consumer society is constantly looking for new ways to spend spare time actively. Participation in a mass artistic, entertainment or sporting event turns out to be an ideal solution (Woźniak & Fill, 2018).

Participants in the mass event are not only the most numerous but also the most important element of the event. They co-create the atmosphere of the place, and their behaviour can contribute to dangerous situations (Drengner, Jahn & Gaus, 2010) to a large extent. Most participants in mass events expect the organisers to ensure the highest quality standards in every sphere of the project. Particular attention is paid to the nature and program of the event, then to the prices and quality of the products, as well as to the appropriate security that can be guaranteed by the organiser (Vinnicombe & Sou, 2017).

When searching for a prescription for the development of service quality standards, the organisers are obliged to comply with the rules contained in the law in force in a particular country (Dróżdż, 2015). The regulations of the facility (site) and the rules of the event should also be taken under consideration; these rules are closely related to the law and contain additional information about the entry and behaviour of participants in specific places. The procedures and the entire customer service policy (Fill, 2016) are established on the basis of these documents.

However, it is necessary to remember that customer service is not only strict adherence to the rules contained in the law, but it also has to meet the individual expectations of service recipients (Zimon 2017; Chiou, Droge & Hanvanich, 2002). Event organisers, in order to achieve success, should recognise potential participants, identify their needs and guarantee a show at the appropriate artistic, entertainment or sports level.

The literature on the subject extensively addresses issues related to clients, their satisfaction and loyalty (Ahrholdt, Gudergan & Ringle, 2017). The author, however, draws attention to the fact that there is still a lack of research related to the quality and the satisfaction of participants in mass events. The proper implementation of mass events is an extremely labour-consuming process and requires a comprehensive knowledge of customer tastes and expectations, as well as flexibility and ability to respond to undesired situations (Yürük, Akyol & Şimşek, 2017). Therefore, the organisers must constantly focus on raising the quality standards of the services offered and carry out customer satisfaction surveys (Santouridis & Veraki, 2017). They will allow recognising and eliminating factors that the participants feel do not meet their requirements (Chen, Reilly & Lynn, 2012; Zimon, 2017).

In connection with the above, the main purpose of the articles is to identify all participants in mass events, with their division into internal and external customers, as well as an attempt to verify their tasks and needs both before, during and after the event. The author hopes that this work will partially fill the gap in the analysed area and will be an impulse for a broader discussion on aspects related to the organisation of mass events and the satisfaction of their participants.

2. Logistic customer service of mass events

It is commonly known that logistics plays a key role in building professional customer service. This fact is aptly illustrated by the 7W principle which consists in bringing and offering the right buyer the right products at the right time and place, quantity, quality and at optimal costs (Mentzer, Flint & Hult, 2001).

Analysing the role which quality plays in the process of customer service of mass events, first of all it is necessary to identify the service recipients and the process of service providing.

In the literature of the subject, the authors present the

definition of the customer in a different way. Under the term customer can be understood a person who receives ordered or delivered services. As a customer, an organisational or legal entity which uses the services offered on the market is also accepted. Another definition indicates a customer as a person or institution to which the seller directs their offer and who commences the purchase and sale of goods and services (McLaughlin, 2009; Fonseca *et al*., 2018).

When speaking about logistic customer service, a definition was used which defines it as an ability to meet customer requirements and expectations, mainly regarding the time and the place of ordered deliveries, using all available forms of logistic activity, such as: transport, storage, stock, packaging and information management (Kempny, 2008).

Logistic customer service of mass events is a widely understood form of custom service.

According to the author, logistic customer service of a mass event can be defined as *the ability or skill of an organisation's logistics system to meet the requirements and expectations of service recipients and guarantee their safety at every stage of the event, and provide an appropriate work environment for event organisers*. It is necessary to remember that for the event organiser, the customer is each participant who takes part in the show. The ISO 9000 standard draws attention to the fact that the buyer can be considered both internally and externally in relation to the given organisation (PN – EN ISO 9000:2015). As an internal customer one should understand all persons participating in the preparation of the event, including: ticket office service, information and order service, police, medical assistance, fire protection, volunteers, entertainers or announcers, catering services, cleaning staff, technical unit and other operational members. In turn, the external buyers of services are people who came to the event area in order to participate in an organised show (sports, cultural, entertainment). These include: viewers, special guests, the community, the media and local authorities.

The organiser of the mass event must take into account the interests of all of the above groups and take all actions to ensure their satisfaction at every stage of the event (Jung & Yoo, 2017).

2.1. Profile of internal customers

The internal customer of the organisation preparing a mass event is every employee who participates in the creation of this event (Figure 1).

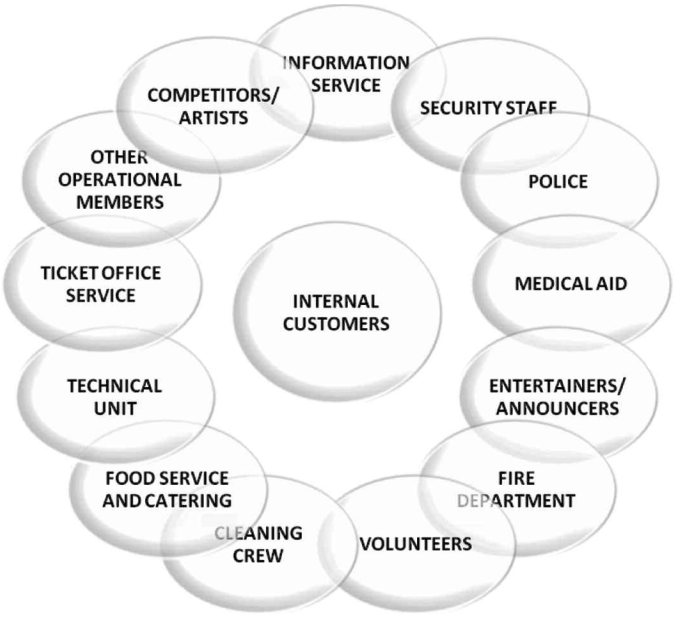

Figure 1. Internal customers of the organisation preparing a mass event
Source: Own elaboration

In the case when a mass event involves payment, the first contact with the participants in the event is made by **ticket office service**. The ticket office service is both a commercial and information point. During the transaction, the customer has a chance to get all necessary information about the event and receive leaflets or brochures about it. It is obvious that in recent years online ticket distribution has become increasingly popular. In addition, most people use Internet sources to obtain information about the event (Tiance, Chenxi & Xu 2017). However, this does not affect the fact that the organiser should provide customers with access to the necessary information, such as the regulations of the facility (area) and the program of the event, which should be located on the premises of the event. The ticket sales office is a very important place, because there the customer makes the final decision on the contract with the organiser and accepts all its terms and conditions.

Another, undoubtedly one of the most important employees who have direct contact with the final service recipients are **members of the information service and security staff**. Their work is supervised by **a safety manager**. These services should be properly trained and have an in-depth knowledge of: the location of emergency exits, places of medical, sanitary and refreshment facilities as well as the requirements of the organisers of the event. Security staff and information services have the most frequent contact with the participants in the event. They should inspire trust and a sense of security (Zomer *et al*., 2015). In addition, the promptness of the response is very important, which is reflected in the tendency and involvement in providing help, or in dealing with the requests and complaints of participants in the event.

The entertainers or sports speakers are responsible for the communication with participants in mass events. These people are accountable for the smooth running of the event and the transmission of both organisational and order announcements. They have direct contact with the audience and have a significant impact on their behaviour. The person performing the function of an entertainer / announcer should have detailed knowledge of the event scenario and have an ability to manage the crowd. Their behaviour and actions directed to the public can significantly contribute to the level of security of the event (Parszowski & Kruczyński, 2015).

Another service that watches over the peaceful course of mass events is the Police. The most serious threats that can occur during mass events include: violence, aggression and acts of hooliganism, thefts, terrorist attacks, construction disasters and fire hazards. In such a case, efficient and professional actions of the Police can affect the reduction of negative effects.

When organising mass events, pyrotechnic protection is also very important. The use of pyrotechnics in places of large gatherings of people may pose a threat to human health and life. Sapper and pyrotechnic inspection usually takes place shortly before the inauguration of the event, and only authorised personnel may participate in it.

Medical coverage is another condition that needs to be met with concern for the health and life of the participants in the event. Mass events require the preparation of medical coverage functioning independently of the local emergency medical system. In accordance with Polish law, this coverage should at least include: mobile medical teams, rescue patrols and medical help points in the place and time of the event (Act on Mass Event Security of 20th March, 2009). Providing the right amount and placement of medical help at the venue of the event gives the possibility of rapid intervention at the time of occurrence of a threat to the life and health of participants (Brinsfield & Mitchell, 2015).

For each mass event, it is necessary to prepare appropriate **fire protection**. The organiser of the event should pay attention to such aspects as:

- evacuation conditions for the participants in the event;
- interior finish (easily flammable materials should not be used);

- efficient functioning of fire-fighting devices and providing access to them;
- marking and accessibility of escape routes and other strategic places in accordance with applicable standards;
- putting in the visible places lists of emergency telephones and instructions in the case of a fire;
- knowledge of the rules of conduct in the case of a fire by the organisers and personnel;
- proper selection, execution and efficiency of electrical installations.

During the event, these services should pay attention to: supervision over the course of the event, behaviour of participants, prohibition of using open fire and smoking in forbidden places, maintaining the permeability of escape routes, the efficiency of lighting and sounding devices, or maintaining safety while using special effects.

Volunteers are other people who have an impact on the quality of service for participants in mass events. The activity of volunteers during mass events usually concerns such spheres as: information service, order and technical service, medical care, guest service, marketing, logistics and other generally understood organisational assistance. Participation of volunteers in a mass event is an advantage not only for the organiser, but also for the interested parties themselves. In return for help, these people have the opportunity to participate in the event free of charge, acquire new contacts and acquaintances, and gain valuable experience.

Food service is another thing influencing the satisfaction of participants in mass events. The offer of snack bars is dictated by many factors. These include: time, place and type of event, customer needs and weather conditions. For example, during mass artistic and entertainment events, the sale of food products stretches over time, while during sports events and football matches the highest demand for this type of services can be observed about an hour before the start of the show and during regular breaks (Parszowski & Kruczyński, 2015). During mass events, snack bars usually offer the following: alcoholic and non-alcoholic beverages, hot dishes (mainly grilled), as well as other snacks.

In turn, **catering** deals with the service in VIP and SVIP zones. Guests in these zones require higher service standards and a food offer. Usually, this work is done by external companies that specialise in this type of activity and in a more professional manner so that they can meet the expectations of invited guests.

The work of the **cleaning crew** provides not only the convenience, but also the safety of people participating in the event. Their main duty is to constantly control the area of the event in terms of pollution. For example, a spilled drink on a smooth surface can cause a fall, which in turn will cause harm to the participant. In addition, it is also worth paying attention to pro-ecological activities that are becoming more and more popular over the years. Society requires the organisation to act to protect the environment, which is why the issue related to waste segregation and disposal is so important. It is significant to allocate an appropriate number of containers and rubbish bins and to guarantee their current emptying.

In the case of **technical team and electricians**, their direct contact with external customers is very limited, but their actions and work undoubtedly affect the level of satisfaction and meet the expectations of the participants in the event. The duty of the technical team is to control the technical condition of the facility along with the entire infrastructure. In addition, their task is to monitor the system, prevent or combat the resulting failures and faults, as well as to ensure reliable operation and synchronization of technical and communication devices. The continuity and efficiency of communication systems on the premises of the event has a significant impact on the safety of all participants in the event.

The main 'actors' of the event constitute a specific group of internal customers. These can be, for example: athletes, singers or other artists. They often require special conditions and the highest quality of service. Usually, in such cases, event organisers use the offers of external companies that specialise in this type of services. The zone of this group is separated from the rest of the area, so that none of unauthorised people had access there.

Events such as concerts or matches attract a lot of fans, whose behaviour can lead to dangerous situations. Thus, ensuring the safety of players / artists is another duty for which the organiser of the event is responsible. In the case of artists, they often have personal security. In such a situation, in order to avoid misunderstandings, it is necessary to clarify the scope of duties of information and order services in advance. In this way you can avoid unnecessary disagreements resulting from interfering with the competences of other people.

2.2. Profile of external customers

An organiser of a mass event must be prepared to receive thousands of spectators. These events are organised for them and their requirements should be met. External customers include: **audience that arrive to the event, community, local authorities, media, sponsors / partners, or special guests** (Figure 2).

Figure 2. External customers of the organisation preparing a mass event
Source: Own elaboration

The most numerous group of external customers are the **spectators** who came to the event. The greater the number of participants in the event, the more diverse their expectations will be. Of course, much also depends on the type of the event. Different needs will have spectators of football matches, other needs will have concert participants, and yet other needs will have people taking part in religious gatherings. It is also worth mentioning about providing some facilities for people with disabilities. In addition, the age of the participants, their social status and, in some cases, gender are also important. Undoubtedly, the expectations of this group will be related to: organisation and quality of transport and the place of the event, price level, availability of parking spaces, broadly understood safety, convenience in moving around the premises, medical security, service quality, food offer, sanitary facilities, level of additional attractions and quality of the show itself (event schedule, possible observation places, sound system).

The **community** and **local authorities** can be included in the specific group of viewers. Their expectations as to the event itself, compared to the other participants, do not differ too much.

The author, however, would like to draw attention to additional difficulties that this group experiences in connection with the implementation of shows. On the one hand, the organisation of a mass event creates a positive image for the city and its surroundings. On the other hand, it is a huge challenge not only for the organisers, but also for residents and local authorities who have to deal with numerous restrictions and difficulties. These problems may be related to: communication (e.g. traffic jams), problems with fans / other participants (aggression, fights, vulgar behaviour, etc.), noise (coming from the place of the event), or lack of order (pollution of the area where events take place). In the case of concerts or other artistic events, these types of problems may bother the residents for hours or even days. In this situation, the cooperation and collaboration of the organisers with local authorities and relevant services is crucial, because the involvement of all interested parties allows to develop a strategy that will help eliminate the negative effects associated with the organisation of the event.

In order to ensure the satisfaction of all customers taking part in the event, the most important information should be presented in advance. This includes, for example, the event schedule, the organisation of parking spaces, sanitary facilities, accommodation, where and when the tickets can be purchased, the level of prices of particular services, prohibited items, additional attractions or information for persons with disabilities. From the organiser's point of view, cooperation with the **media** may be the most important element of the information policy. Event participants expect from the media to present current news, to cover the event and to fulfil the integration or entertainment function. In turn, the media expect the organisers to give them more freedom to move around the area, such as the area close to the stage, or other places not available for an average participant in the event. The media influence the shaping of attitudes and behaviour of recipients. To a large extent, they create the image of the entire organisation and are regarded as an effective tool for the promotion of the event.

Another group of external customers are **special guests** and **sponsors**, or **business partners**. With their comfort in mind, the organisers prepare special VIP and SVIP zones. These are areas separated from the rest of the facility, they differ in the level and priority of the services offered. In these places there may be members of the government and specially invited guests. Unlike other participants in the event, these people are not always interested in the event itself. It happens that they appear there for social and / or business purposes. In such cases, catering service is extremely crucial. Hot dishes, appetizers, drinks and other elements are meant to make the participants in this zone more attracted to the event. It is also worth mentioning that the Government Protection Bureau provides the protection of the official members of the government. In this situation, security and information services play a less significant role.

3. Conclusions

According to the author, each mass event is an immense logistic undertaking that involves many aspects of planning, implementing, controlling and improving processes. The role that quality plays in this whole process has a huge impact on the success of the executed project. The ultimate goal of the organisers of the mass event is to achieve satisfaction of its participants in terms of service and security. Achieving this goal is possible only due to appropriate integration of all entities involved in the mass event, from the organiser by the local authorities to the security service.

In order to achieve the satisfaction of service recipients, organisations must meet the expectations of both external and internal customers. To this end, a number of activities are applied that concern both material and immaterial spheres. Well-developed customer service is a complex and multi-stage process and it takes under consideration the interests of each party.

For the employer, meeting the requirements of internal customers may turn out to be a considerable logistical challenge. The organisation of mass events means a lot of hours of work of the people employed. Ensuring an appropriate work environment testifies to the employer's care for the staff and its professionalism as an organiser. In the case of difficult working conditions, the employer is obliged to provide their staff with free meals and drinks whose temperature should be adapted to the conditions in which they are carried out. Another issue is to provide the right dress, for example: members of the security service and information service are obliged to have a uniform outfit, which will enable them to be easily recognised. In addition, they should have an ID card given by the organiser. An important issue is also their equipment. Depending on the event, anticipated threats and performed activities, the services should have: wireless communication means, flashlights, metal detectors, first aid materials, ticket models, notepads, pens and other necessary equipment.

When the working environment, infrastructure as well as competencies and needs of employees are ensured at an appropriate level, the organisation can fully focus on servicing external customers.

The specificity of mass events means that the safety and quality of logistic customer service depends on many people. Each person participating in the organisation of the event has the obligation to supervise and control the course of the event. In addition, operational members should be aware that their appearance and behaviour affect the image of the entire organisation. If the client encounters unsatisfactory standard of service, they will not give a negative assessment only to the main service provider. A negative opinion will fall on all members of a given service, which in turn will affect the perception of the whole event. The organisers of mass events have another task: to raise employees' responsibility for the workplace and to inform them about the role they play for the organisation. In this way, the staff will have greater mobilization to operate, and thus can improve the quality and service standards of the participants in the event.

To sum up, it is worth paying attention to the fact that a big simplification in meeting the expectations of service recipients is their acquaintanceship with the regulations of the event, the facility (site) and applicable legal provisions. Lack of awareness of participants about specific orders and restrictions often creates an 'unpleasant atmosphere' of the event, which affects the satisfaction of all interested parties. The organisers of the mass event should make the regulations available in such a way that each participant, before the event, can make themselves acquainted with them and thanks to that they were aware of the rights and obligations that are incumbent on them. The audience's knowledge of the regulations in force during the event not only facilitates the work of the staff, but also reduces the risk of dangerous situations.

References

[1] Act on Mass Event Security of 20th March (2009). *Journal of Laws* of 2015, item 2139.

[2] Ahrholdt, D.C., Gudergan, S.P., & Ringle, C.M. (2017). Enhancing service loyalty: the roles of delight, satisfaction, and service quality. *Journal of Travel Research*, 56(4), 436-450.

[3] Brinsfield, K.H., & Mitchell Jr, E. (2015). The Department of Homeland Security's role in enhancing and implementing the response to active shooter and intentional mass casualty events. *Bulletin of the American College of Surgeons*, 100(1), 24-26.

[4] Chen, J., Reilly, R.R., & Lynn, G.S. (2012). New product development speed: too much of a good thing? *Journal of Product Innovation Management*, 29(2), 288-303.

[5] Chiou, J.S., Droge, C., & Hanvanich, S. (2002). Does customer knowledge affect how loyalty is formed? *Journal of Service Research*, 5(2), 113-124.

[6] Drengner, J., Jahn, S., & Gaus, H. (2010). Events and loyalty formation: the role of satisfaction, felt community, emotional experience, and frequency of use. *Stand und Perspektiven der Eventforschung*, Wiesbaden, 151-165.
[7] Drożdż Marcin. (2015). *Ustawa o bezpieczeństwie imprez masowych. Komentarz*. Warszawa: C.H. Beck.
[8] Fill K. (2016). Faza przygotowania i realizacji imprezy masowej na przykładzie organizacji Juwenaliów Rzeszowskich. The paper delivered at the *Conference: Security at Higher Education Establishments. Organization of Mass Events*. Instytut PWN, Centrum Konferencyjne Zielna, Warszawa.
[9] Fonseca, L.M., Domingues, J.P., Pereira, M.T., Martins, F.F. and Zimon, D. (2018), Assessment of Circular Economy within Portuguese Organizations. *Sustainability*, 10, 2521
[10] Jung, J.H., & Yoo, J.J. (2017). Customer-to-customer interactions on customer citizenship behavior. *Service Business*, 11(1), 117-139.
[11] Kempny D. (2008). *Obsługa logistyczna*, Wydawnictwo Akademii Ekonomicznej w Katowicach, p.11.
[12] McLaughlin H. (2009). What's in a Name: 'Client', 'Patient', 'Customer', 'Consumer', 'Expert by Experience', 'Service User' – What's Next? *British Journal of Social Work*, 39, 1101-1117.
[13] Mentzer J.T., Flint D.J., Hult G.T.M. (2001). Logistics service quality as a segment-customized process, *Journal of Marketing*, 65 (4), 82-104.
[14] PN – EN ISO 9000:2015. System zarządzania jakością. Podstawy i terminologia.
[15] Santouridis, I., & Veraki, A. (2017). Customer relationship management and customer satisfaction: the mediating role of relationship quality. *Total Quality Management & Business Excellence*, 1-12.
[16] Tiance, D., Chenxi, L., Xu, H. (2017). Social media and internet public events, *Telematics and Informatics*, Vol. 34, Issue 3, pp. 691- 820.
[17] Vinnicombe, T., & Sou, P.U.J. (2017). Socialization or genre appreciation: the motives of music festival participants. *International Journal of Event and Festival Management*, 8(3), 274-291.
[18] Woźniak J., Fill K. (2018). Logistic organization of mass events in the light of SWOT analysis- case study, *TEM Journal*, 7(1), 105-111.
[19] Zimon D. (2017) The Impact of Implementation of the Requirements of the ISO 14001 Standard for Creating Sustainable Supply Chains, *Quality- Access to Success*, 18(156), 52-56.
[20] Zimon D. (2017). The impact of TQM philosophy for the improvement of logistics processes in the supply chain, *International Journal for Quality Research*, 11(1), 3-16
[21] Zomer, L.B., Winnie, D., Meijer, S., Hoogendoorn, S.P. (2015). Managing Crowds: The Possibilities and Limitations of Crowd Information During Urban Mass Events, Geertman, S., et al. In: *Planning Support Systems and Smart Cities*, Switzerland: Springer International Publishing, 77-97.

Binary Logistic Regression as a Method of Predicting Customer Dissatisfaction in Resolving Complaints: The Case of Bosnia and Herzegovina, Serbia and Former Yugoslav Republic of Macedonia

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Abstract

The paper presents the results of customer satisfaction survey in the car spare parts industry through the presented analyses conducted in period from 2015 to 2018 on a sample of 3269 professional (target) customers of a company that operates in region of Balkans: Bosnia and Herzegovina (BIH), Serbia (SRB) and Former Yugoslav Republic of Macedonia (FYROM). The Binary Logistic Regression was used as a method of predicting customer dissatisfaction in resolving complaints by combining variables from the survey-questionnaire regarding the relations of employees and customers, customer satisfaction with the assortment, their satisfaction with the expertise of the staff, and the ratio of the value of the product in relation to its price. The study identifies that the ratio of employees, satisfaction with the assortment of goods as well as the quality ratio for the price, are statistically significant in the prediction model whether the customers will be dissatisfied with the resolution of complaints. For customers who estimate the ratio of employees to be competent, the probability is 3,367 times higher that they will be satisfied with the resolution of complaints, compared to those who considered the attitude of the staff as unsatisfactory. For customers who are satisfied with the assortment of goods, the likelihood is 4,435 times more likely to be satisfied with the resolution of complaints, compared to those who rated the goods assortment as unsatisfactory (not fully). For customers who consider the price and quality ratio to be satisfactory, the probability is 2,564 times higher that they will be satisfied with the resolution of the complaints, compared to those who consider this ratio to be unsatisfactory.

Keywords: *logistic regression; predicting; complaints; Bosnia and Herzegovina (BIH); Former Yugoslav Republic of Macedonia (FYROM); Serbia (SRB).*

1. Introduction

Cases from practice have shown that a customer complaint can become very profitable when you can resolve their problem. Complaints should be considered an indicator of organizational performance assessment, signaling some problems or failures in internal processes that need quick recovery in order to avoid migration of profitable customers (Filip, A., 2013). Therefore, more and more companies use the complaint analysis to track, categorize and handle customer complaints.

Also, there are many reasons why companies decide to measure customer or clients' satisfaction, but the most fundamental account for their retention (loyalty) is detecting areas of the business which need to be improved and upgraded, listening to customers' reactions to the introduction of a new product or service in their assortment, measuring the level of customer satisfaction with a certain product or service, etc. The key thing is to understand what customers want better than the competition and then make customers loyal. In marketing terms, this two rules are translated into customer acquisition and customer retention (Giese, J.L. and Cote, J.A., 2000; Shirin, A. and Puth, G., 2011; Robinson, S. and Etherington, L., 2006). Consequently, regarding customer loyalty, customer satisfaction is more important than image for both satisfied and dissatisfied customers. Numerous studies have shown that customer satisfaction is a crucial factor for ensuring customer loyalty and it is positively related to loyalty (Barsky, J.D., 1992; Smith, A.K. and Bolton, R.N., 1998; Grønholdt, L., Martensen, A. and Kristensen, K., 2000).

The key to competitive advantage in the market is responding to end-customers better than competition (Harrison A., Van Hoek R., 2011). A lot of empirical studies have indicated that service quality and customer satisfaction lead to the profitability of a firm (Fornell, C., 1992; Anderson, E.W. and Sullivan, M. 1993; Anderson, E.W., Fornell, C. and Lehmann, D.R., 1994; Eklof J.A., Hackl, P. and Westlund, A.,1999; Zeithaml 2000). So, it's easy to conclude that delivering superior customer value and satisfaction is crucial to firm competitiveness, regardless of the service activity it deals with. (Weitz, B.A. and Jap, S.D., 1995; Kotler, P. and Armstrong, G., 1997; Deng, W.J, Yeh, M.L. and Sung, M.L., 2013).

Quality includes meeting or exceeding customer expectations meaning that a product or a service satisfies customer needs. Quality has to be defined in the same way customers do and if not, all that the business has done for building their service can turn out to be a bad investment (Grönroos, C., 2015). Also, Goetsch and Davis (2006) point out that quality is a dynamic state associated with products, services, people, processes, and environments that meets or exceed expectations. Quality management should be integrated into the strategy of an organization because its activities lead to achieving the company's mission and objectives. Also, communication between customers and

suppliers is the key to total quality performance (Oakland, J., 2014).

The sample used in this study consists of 3269 professional (target) customers. It was conducted in the period from 2015 to 2018 on the territory of BIH (1692), FYROM (800), Serbia (777). The data were collected via questionnaire, and the respondents were professional customers AM Group company clients (car mechanics and car repairers), who participated in annual Home Fair manifestations in the mentioned countries. Organization of the Home Fairs, which are primarily oriented to professional target customers is a sort of a must activity of improving sales in the last ten years for family business. Gathering useful information from the customers directly companies gain a different knowledge on the current competitive tactics of getting customer's loyalty (Milovanovic, M., 2014). Customers who make complaints are providing an organization with the opportunity to solve certain operational malfunctions, to learn from negative situations and consequently to re-establish their satisfaction and trust (Filip, A., 2013). Receiving complaints and handling them properly and effectively is a powerful tool in the hand of compnanies to use the feedback to improve customer confidence in order to gain their loyalty, and also to find the causes of dissatisfaction and improve all of the organization processes. (Clemes, M.D., Gan, C., Ren, M., 2011; Ramsey, R.D., 2003; Johnston, R., 2001). On the other side customer satisfaction research and service quality have consistently emphasized the value of complaints for improving service quality, loyalty and customer satisfaction and retention (Marimon et al., 2010; Snellman, K., Vihtkari, T., 2003; Boshoff, C., 2007). Customer expectations are not to be regarded as permanent and stable category. On the contrary, expectations are variable before the purchasing process, during this process and also during the use of products or services due to different influences (changes in market circumstances, competition efforts, etc.). Fornel, Rust and Dekimpe (2010) suggest that a change in customer satisfaction which has lagged behind and which contributes to future demand has a significant impact on consumption growth.

The fondation of an predictive model is laid with intuition and deep knowledge of the problem context, which are entirely vital for driving decisions about model development. The proccess begins with relevant data another key ingredient (Kuhn, M., Johnson, K., 2013). Regression models are developed in business and economic applications to increase understanding of the system and process being studied. Statistical theory provides link between the underlying process and the data observed from the process (Newbold, P., Carlson, W.T., Thorne, B.M., 2010). Van der Kooij and Meulman (2006) point out that categorical regression quantifies categorical data by assigning numerical values to the categories, resulting in an optimal linear regression equation for the transformed variables. Also, the logistic regression model has been become commonly used to study the association between a binary response variable; it is widespread application rests on its easy application and interpretation. The subject of assessment of goodness-of-fit in logistic regression model has attracted the attention of many scientists and researchers (Badi, N.H.S., 2017). It is used to explain the relationship between the dependent variable and the independent variables, when the dependent variable is observed into two or more categories. The effects of independent variables the dependent variable is defined as probabilities (Greenacre, Z., Terlemez, L., Sentürk, S., 2014; Agresti, A., 1996).

2. Methodology and research

For the purposes of this paper, only questions that are directly related to sales improvement were statistically processed. The variables are presented through Chi-Square Tests firstly regarding RQ1 (relations of employees and customers), RQ2 (customer satisfaction with the assortment), RQ3 (customer satisfaction with the expertise of the staff) and RQ4 (the ratio of the value of the product in relation to its price). The data were processed in software package SPSS. The variables are presented through predictive statistics – to a large extent predict customer dissatisfaction in handling complaints.

Following the hypotheses based on the research are stated in the work:

H1: The relation of employees and customers directly participates in customer dissatisfaction with resolving complaints.

H2: Customer satisfaction with the assortment directly participates in customer dissatisfaction with resolving complaints.

H3: Customer satisfaction with the expertise of the staff directly participates in customer dissatisfaction with resolving complaints.

H4: The ratio of the value of the product in relation to its price directly participates in customer dissatisfaction with resolving complaints.

Predictive variables in the regression model were (also research questions):

RQ1: What is the relation of our employees towards you? – Three-level ordinal variable from "not satisfactory" to "very business-like and competent".

RQ2: Are you satisfied with the assortment of our goods? – Nominal variable, two categories "I am satisfied" and "not completely".

RQ3: What do you think about the ratio of product value to price? – Nominal variable, two categories "satisfactory" and "unsatisfactory".

RQ4: Professionalism of working staff? – Nominal variable, two categories "professional enough" and "not professional enough".

			Resolving complaints		Total
			"Fast and with quality" and "I did not have any complaints"	"Unsatisfactory"	
What is the relation of our employees towards you?	very business-like and competent	N	2667	29	2696
		%	83.0%	50.9%	82.5%
	satisfactory	N	533	22	555
		%	16.6%	38.6%	17.0%
	not satisfactory	N	12	6	18
		%	0.4%	10.5%	0.6%
Total		N	3212	57	3269
		%	100.0%	100.0%	100.0%

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	127.835[a]	2	.000
N of Valid Cases	3269		
a. 1 cells (16.7%) have expected N less than 5. The minimum expected N is .31.			

Table 1. What is the relation of our employees towards you? *Resolving complaints
Source: The authors, according to the research

From Table 1, it could be seen that there is a statistical significance at the level p <0.01 in the level of satisfaction with the attitude of employees towards buyers, who were satisfied with the resolution of complaints or did not have them, compared to those dissatisfied with resolving complaints, X^2 (2, N = 3269) = 127.835, p = 0.000. Customers, who were not satisfied with the resolution of complaints, in a significantly higher percentage, rated the attitude of employees towards them as "unsatisfactory", but also "satisfactory" in relation to those who have had a positive experience in resolving complaints.

			Resolving complaints		Total
			"Fast and with quality" and "I did not have any complaints"	"Unsatisfactory"	
Are you satisfied with the assortment of our goods?	I am satisfied	N	3010	38	3048
		%	93.7%	66.7%	93.2%
	not completely	N	202	19	221
		%	6.3%	33.3%	6.8%
Total		N	3212	57	3269
		%	100.0%	100.0%	100.0%

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	64.985[a]	1	.000
N of Valid Cases	3269		

Table 2. Are you satisfied with the assortment of our goods? *Resolving complaints
Source: The authors, according to the research

There is a statistical significance at the level of p <0.01 at the level of satisfaction with the assortment of goods with customers who were satisfied with resolving complaints or did not have them in relation to those dissatisfied with the resolution of complaints, X^2 (1, N = 3269) = 64.985, p = 0.000. Customers who were not satisfied with the resolution of the complaints in significantly more were not satisfied with the range of goods being offered (Table 2).

			Resolving complaints		Total
			"Fast and with quality" and "I did not have any complaints"	"Unsatisfactory"	
Professionalism of working staff?	sales staff is expert and offers solutions in the short term	N	3168	51	3219
		%	98.6%	89.5%	98.5%
	not professional enough	N	44	6	50
		%	1.4%	10.5%	1.5%
Total		N	3212	57	3269
		%	100.0%	100.0%	100.0%

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	31.177[a]	1	.000
N of Valid Cases	3269		
a. 1 cells (25.0%) have expected N less than 5. The minimum expected N is .87.			
b. Computed only for a 2x2 table			

Table 3. Professionalism of working staff? *Resolving complaints
Source: The authors, according to the research

From Table 3, it can be seen that there is a statistical significance at the level p <0.01 in the level of satisfaction with the relationship between the professionalism of employees towards buyers who were satisfied with the resolution of complaints or did not have them in relation to those who are dissatisfied with resolving complaints, X^2 (1, N = 3269) = 31.177, p = 0.000. Customers who were not satisfied with the resolution of reclamations considerably increased the professionalism of the employees as insufficient compared to those who had a positive experience in resolving the complaints.

			Resolving complaints		Total
			"Fast and with quality" and "I did not have any complaints"	"Unsatisfactory"	
What do you think about the ratio of product value to price?	satisfactory	N	3098	47	3145
		%	96.5%	82.5%	96.2%
	unsatisfactory	N	114	10	124
		%	3.5%	17.5%	3.8%
Total		N	3212	57	3269
		%	100.0%	100.0%	100.0%

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	30.057[a]	1	.000
N of Valid Cases	3269		
a. 1 cells (25.0%) have expected N less than 5. The minimum expected N is 2.16.			
b. Computed only for a 2x2 table			

Table 4. What do you think about the ratio of product value to price?*Resolving complaints
Source: The authors, according to the research

There is statistical significance at the level of p <0.01 in the level of satisfaction with the ratio of the value of the product in relation to the price of the customers who were satisfied with solving the complaints or did not have them in relation to those dissatisfied with the resolution of the complaints, X^2 (1, N = 3269) = 30.057, p = 0.000. Customers who were unhappy with the resolution of reclamations considerably appreciate that the price and quality ratio is unsatisfactory (Table 4).

BINARY Logistic Regression

Binary logistic regression was used to determine the effect of satisfaction with employee attitudes, employee skills, product assortment and quality relationships for the price of customer dissatisfaction in resolving complaints (Table 5).

The logistic regression model is statistically significant X^2 (1) = 72.507, p < 0.001.

Block 1: Method = Enter		Chi-square	df	Sig.
Step 1	Step	72.507	4	.000
	Block	72.507	4	.000
	Model	72.507	4	.000

Model Summary			
Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	502.100[a]	.022	.136
a. Estimation terminated at iteration number 7 because parameter estimates changed by less than .001.			

Table 5. Omnibus Tests of Model Coefficients
Source: The authors, according to the research

The model explains 13.6% (Nagelkerke R^2) variance of dissatisfaction by resolving objections and correctly classifies 98.2% of cases (Table 5).

Observed			Predicted		
			Resolving complaints		
			"Fast and with quality" and "I did not have any complaints"	"Unsatisfactory"	% Correct
Step 1	Resolving complaints	"Fast and with quality" and "I did not have any complaints"	3209	3	99.9
		"Unsatisfactory"	56	1	1.8
	Overall Percentage				98.2
a. The cut value is .500					

Variables in the Equation							
		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	What is the relation of our employees towards you?	1.214	.253	23.038	1	.000	3.367
	Are you satisfied with the assortment of our goods?	1.489	.324	21.106	1	.000	4.435
	Professionalism of working staff?	.471	.578	.663	1	.415	1.602
	What do you think about the ratio of product value to price	.941	.410	5.265	1	.022	2.564
	Constant	-8.901	.729	149.035	1	.000	.000
a. Variable(s) entered on step 1: RQ1, RQ2, RQ3, RQ4							

Table 6. Classification Table[a]
Source: The authors, according to the research

From the Table 6, it can be seen that the ratio of employees (p = 0.000), satisfaction with the assortment of goods (p = 0.000) as well as the quality ratio for the price (p = 0.022), are statistically significant in the prediction model. With this it can be concluded that Hypothesis 1 is true, and also confirms Hypothesis 2 and Hypothesis 4. Staff expertise does not participate statistically in the model (p = 0.415), whereby Hypothesis 3 is not confirmed.

For customers who estimate the ratio of employees to be competent, the probability is 3.367 times higher that they will be satisfied with the resolution of complaints, compared to those who considered the attitude of the staff as unsatisfactory. For customers who are satisfied with the assortment of goods, the likelihood is 4.435 times more likely to be satisfied with the resolution of complaints, compared to those who rated the goods assortment as unsatisfactory (not fully). For customers who consider the price and quality ratio to be satisfactory, the probability is 2.564 times higher that they will be satisfied with the resolution of the complaints, compared to those who consider this ratio to be unsatisfactory.

3. Conclusions

The survey showed that customers, who were not satisfied with the resolution of complaints, in a significantly higher percentage rated the attitude of employees towards them as "unsatisfactory", but also "satisfactory" in relation to those who have had a positive experience in resolving complaints. Also, customers who were not satisfied with the resolution of the complaints in a significantly higher percentage were not satisfied with the assortment of goods. They also believe that the price and quality ratio is not satisfactory, in a significantly higher percentage.

Furthermore, customers who judge the employees' attitudes towards them as competent, are likely to be 3.367 times more likely to be satisfied with the resolution of complaints, compared to those customers, who considered the attitude of the staff towards them as unsatisfactory.

This supports the fact that well-trained staff can influence the very process of resolving complaints.

The fact is that AMgroup has premium and high quality brands of car parts, service equipment and related equipment in its assortment, which have a long-term warranty. Customers, who are satisfied with the assortment of goods, are likely to be 4.435 times more likely to be satisfied with the resolution of complaints, than those who rated the goods as unsatisfactory. For customers, who consider the price and quality ratio as satisfactory probability, it is 2.564 times more likely to be satisfied with the resolution of complaints than those who consider this ratio to be unsatisfactory.

This is confirmed by the fact that AMgroup has established a

good price policy towards professional customers, as well as the policy of doing business with them, giving them certain benefits.

From binary logistic regression it can be seen that the ratio of employees, satisfaction with the assortment of goods, as well as the quality ratio for the price, are statistically significant in the prediction model. Staff expertise does not participate statistically in the model.

The results of this research have been directly used to improve the sales promotion of the mentioned company and its operations in these countries. The Authors hope that the study will provide benefits both for researchers and practitioners in this field.

References

[1] Agresti, A. (1996). *An Introduction to Categorical Data Analysis*. John Wiley and Sons, New York.

[2] Anderson, E.W., Fornell, C. and Lehmann, D.R. (1994). Customer satisfaction, market share, and profitability: findings from Sweden. *Journal of Marketing*, 58(3), 53-66.

[3] Anderson, E.W. and Sullivan, M. (1993). The antecedents and consequences of customer satisfaction for firms. *Marketing Science*, 12, 125-143.

[4] Badi, N.H.S. (2017). Asymptomatic Distribution of Goodness-of Fit Tests in Logistic Regression Model. *Open Journal of Statistics*, 7, 434-445.

[5] Barsky, J.D. (1992). Customer satisfaction in the hotel industry: meaning and measurement. *Hospitality Research Journal*, 16(1), 51-73.

[6] Boshoff, C. (2007). A psychometric assessment of E-S-QUAL: a scale to measure electronic service quality. *Journal of Electronic Commerce Research*, 8(1), 101-14.

[7] Clemes, M.D., Gan, C., and Ren, M. (2011). Synthesizing the Effects of Service Quality, Value, and Customer Satisfaction on Behavioral Intentions in the Motel Industry: An Empirical Analysis. *Journal of Hospitality & Tourism Research*, 34(4), 530-568.

[8] Deng W.J., Yeh, M.L. and Sung, M.L. (2013). A customer satisfaction index model for international tourist hotels: integrating consumption emotions into the American customer satisfaction index. *International Journal of Hospitality Management*, 35, 133-140.

[9] Eklof, J.A., Hackl, P. and Westlund, A. (1999). On measuring interactions between customer satisfaction and financial results. *Total Quality Management*, 10(4–5), 514-522.

[10] Filip, A. (2013). Complaint management: A customer satisfaction learning process. *Procedia – Social and Behavioral Sciences*, 93, 271-275.

[11] Fornell, C. (1992). A National Customer Satisfaction Barometer: The Swedish Experience. J*ournal of Marketing*, 56(1), 6-21.

[12] Fornell, C., Rust R. T. and Dekimpe M. G. (2010). The Effect of Customer Satisfaction on Consumer Spending Growth. *Journal of Marketing Research*, 47(1), 28-35.

[13] Giese, J. L. and Cote, J. A. (2000). Defining Consumer Satisfaction. *Academy of Marketing Science Review*, 1, 1-24.

[14] Goetsch D. and Davis S. (2006). *Quality Management. Introduction to Total Quality Management for Production, Processing, and Services*. 5th Edition. New Jersey: Pearson Education.

[15] Greenacre, Z., Terlemez, L. and Sentürk, S. (2014). Usage as Complementary Correspondence Analysis and Logistic Regression in a Scientific Survey on Self Healing Methods. *Open Journal of Statistics*, 4, 912-920.

[16] Grönroos, C. (2015). *Service management a marketing. Managing the service profit logic*. 4th Edition. West Sussex: Wiley.

[17] Grønholdt, L., Martensen, A. and Kristensen, K. (2000). The relationship between customer satisfaction and loyalty: cross-industry differences. *Total Quality Management & Business Excellence*, 11(4–6), 509-514.

[18] Harrison A. and Van Hoek R. (2011). *Logistics Management & Strategy, Competing Through the Supply Chain*. 4th Edition. Edinburgh Gate: Pearson Education Limited.

[19] Johnston, R. (2001). Linking complaint management to profit. *International Journal of Service Industry Management*, 12(1), 60-69.

[20] Kotler, P. and Armstrong, G. (1997). *Marketing: an introduction*. New York: Prentice Hall.

[21] Kuhn, M. and Johnson, K. (2016). *Applied Predictive Modeling*. New York: Springer.

[22] Marimon, F., Vidgen, R., Barnes, S. and Cristobal, E. (2010). Purchasing behaviour in an online supermarket: the applicability of E-S-QUAL. *International Journal of Market Research*, 52(1), 111-29.

[23] Milovanovic, M. (2014). Importance of the Home Fair for Family Business. *International scientific and Expert conference: Social entrepreneurship – a model For self – employment in the future*. Bosnia and Herzegovina, Banja Luka (Book of papers), 121-141.

[24] Newbold P., Carlson, W.L. and Thorne B.M. (2013). *Statistics for Business and Economics*. New Jersey: Pearson Education.

[25] Oakland J. (2014). *Total Quality Management and Operational Excellence*. 4th Edition. New York: Routledge.

[26] Ramsey, R.D. (2003). How to handle customer complaints. *The American Salesman*, 48(10), 15-20.

[27] Robinson, S. and Etherington, L. (2006). *What do customers want?* In: *Customer Loyalty*. London: Palgrave Macmillan.

[28] Shirin, A. and Puth, G. (2011). Customer satisfaction, brand trust and variety seeking as determinants of brand loyalty. *African Journal of Business Management*, 5(30), 11899-11915.

[29] Smith, A.K. and Bolton, R.N. (1998). An experimental investigation of customer reactions to service failure and recovery encounters paradox or peril? *Journal of Service Research*, 1(1), 65-81.

[30] Snellman, K., and Vihtkari, T. (2003). Customer complaining behaviour in technology-based service encounters. *International Journal of Service Industry Management*, 14(2), 217-231.

[31] Van der Kooij, A. J. and Meulman, J. J. (2006). Prediction Accuracy of Regression with Optimal Scaling Transformations: The .632 Bootstrap with CATREG. https://openaccess.leidenuniv.nl/bitstream/handle/1887/12096/03.pdf?sequence=19, accessed on 25th of June 2019.

[32] Weitz, B.A. and Jap, S.D. (1995). Relationship marketing and distribution channels. *Journal of the Academy of Marketing Science*, 23, 305-320.

[33] Zeithaml, V.A. (2000). Service quality, profitability, and the economic worth of customers: what we know and what we need to learn. *Journal of the Academy of Marketing Science*, 28(1), 67-85.

Model of Port Management to improve the Service Quality for Passengers

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Abstract

This research aims are to analyze the demand for service quality by analyzing the relationship among actors in the port and the port management model to create excellent service for passengers. This research was conducted in Tanjung Emas Port in Semarang, one of the biggest seaports in Indonesia. The actors involved in the port management consist of port management, port filed officer, entrepreneur, ticket agent and passengers. The method used is the sequential mixed method, which combines qualitative and quantitative methods in sequence. Furthermore, the data analysis was done by using the software of atlas.ti, combined with stakeholder analysis and triangle analysis with in-depth interview and Focus Group Discussion (FGD). The results show that the some aspects obtain more concern from respondents about improving port quality such as port eligibility, facilities and comfortability, accessibility, and port security.

Keywords: *port management; stakeholder analysis; service quality.*

1. Introduction

Indonesia is a maritime country, consisting of approximately 16,000 islands with 12 seas and 47 straits. Data from the Central Bureau of Statistics of June 2016 shows that the total population of Indonesia reached 257,912,349 spread in almost 2,342 islands, so Indonesia needs a means of transportation that connects the islands. There are several types of transportation that can be used. First, land transportation with inter-island bridge. An example for this is the Suramadu bridge, connecting the islands of Java and Madura. The advantages of this transportation mode are faster travel times, less influenced by weather factors, and more goods transported. However, this mode requires costly infrastructure and maintenance, and the construction of a bridge is strongly influenced by the distance between islands and the depth of the sea or strait. The second mode is air transport. The advantages of this mode are fast travel times, but some of the disadvantages are expensive travel expenses, expensive infrastructure development, and limited number of goods and people that can be transported. Due to the weaknesses of both modes, sea transport can be the main choice for Indonesia.

However, sea transportation in Indonesia has many obstacles. First, the number of ports is relatively low (1,241 ports) compared with the number of the islands, which means that one port serves 14 islands (14.1 islands/ports) with an average area of 1.548 km2/harbor. This figure is relatively low compared to other island countries in Asia, such as Japan with 3.6 islands / ports and 340 km2 / port and Philippines with 10.1 islands / ports and 460 km2 / ports. Secondly, the increasing role of sea transport accounts for only 4% of all Indonesian transport, a very small number for an island nation. Third, the rank of Indonesia's marine transport infrastructure at international level is still low, at 77, below Malaysia at number 19 and Thailand at number 54; (4) (Bappenas, 2017). The data shows that over the last ten years, the number of sea transport passengers reached 39,283,040 per year, or 15.5% of the total population of Indonesia (Ministry of Transportation Republic Indonesia, 2017). The data illustrates that the number of sea transport passengers continues to grow despite a relatively slow rate. This slow growth is due to the low quality of service provided by public sea transport providers (Andiri, 2015). This issue needs to be addressed with the right governance policies so that this mode can grow efficiently and is able to compete with foreign shipping and logistics distribution (Mitreva et al., 2016; Radu, 2017). Marine governance is a process of interaction between the public sector and the private sector to provide solutions to marine issues.

Research on 20 major European passenger ports identifies and classifies the various services provided at passenger ports and private and public benefits generated from the provision of services in all passenger ports. With Analytical Hierarchy Process (AHP), this study found that: 1) if the port is commercially managed, the port will move toward new model changes; 2) the adoption of market value will encourage private operators to be more active in service strategies; 3) the number of professionally managed and profit-oriented ports is increasing; 4) this specialization of services by the private sector enhances business and industry activities; 5) the assumption remains that ports must be public infrastructure and administered by the government (Vaggelas & Pallis, 2010; Estima et al., 2017). This research aims to find the best management model for seaport in order to improve service quality for passenger. By using a case study in Tanjung Emas Port, Semarang, the purposes of this study are (1) to analyze the demand for service quality, (2) to analyze the role of stakeholders in efficient port management, and (3) to formulate a port management model to create excellent service.

2. Literature Review

Customer satisfaction is an important part in the development of sustainable transportation. Research conducted by Liu (2015) shows that today's society tends to use mass transportation. Factors considered important by the society are accessibility, comfort, security, and most importantly timeliness. The development of sustainable transportation policy also requires community participation (Liu & Liddawi, 2015). Research on service quality (servqual) assessment on ports in Europe classifies the quality of service into five main categories:

a. Size of tangibles: port industry infrastructure referring to number of berths, size of terminal area, number of tow vessels, crane quality, availability of intermodal transport, quality of information systems and readiness of port management. Passenger ports have more complete tangibles including length of pier, parking lot, passenger terminal, waiting lounge, and information center;
b. Reliability: efficiency and speed of port services. Timeliness is the basic indicator;
c. Responsiveness: ports ability to meet user needs;
d. Reputation: ports guarantees on the prevention of cargo damage;
e. Empathy: ports ability to immediately provide information to customers against any problems (Pantouvakis, Chlomoudis, & Dimas, 2008).

To improve comfort, the environment becomes an important factor. Liam (2014) shows that green environment is one of the criteria for assessment of port comfort. Research results on ports in Asia and Europe (Singapore, Shanghai, Antwerp and Rotterdam) show that green environment management in Europe is better than that in Asia. In addition, port authorities have the greatest influence on environmental management (Lam & Notteboom, 2014). Acciaro (2014) found that environmental sustainability in the port industry began to be a concern of port authorities, policy makers, port users and local communities, requiring innovation and a specific policy framework. Other research on the efficiency of the management of fish found that important inputs in the fish industry began to concern the management of fish authority, policymakers, and local communities (Suharno et al, 2017a; Suharno et al, 2017b). Meanwhile, in managing the field of fisheries should also be specific to the problems that occur to examine cases per case in depth (Suharno et al, 2016, Suharno et al, 2017b).

Another study conducted in China on the role of stakeholders in port management shows that local governments are institutionally coordinating with port companies to develop a decentralized port management system (Wu, Li, Shi, & Yang, 2016). Research conducted on port governance in Europe and several other ports shows that there is a difference between conservatively managed and commercially managed ports (Verhoeven, 2010). The elements involved in the successful management of ports to improve services include regulators, operators, passengers, and other related elements such as agents, shop owners at ports, and passenger escorts (usually families or relatives). Collaboration between internal and external parties has a positive impact on the performance of sustainable management (Lu, Shang, & Lin, 2016).

3. Research Method

This research was conducted at Tanjung Emas Port, Semarang, Central Java, Indonesia. The method used is the sequential mixed method, which combines qualitative and quantitative methods in sequence. The qualitative method with atlas.ti analysis tool was used to answer the first objective, namely to analyze the demand for service quality. In-depth interviews were conducted on 15 respondents consisting of 8 passengers, 5 ticket agents, and 3 business owners at the port. Indicators used to assess port satisfaction are port eligibility, facilities and comfortability, accessibility, security and orderliness.

Stakeholder analysis is performed to answer the second objective. Actors in this study are port management, field officers, ticket agents, passengers, and business owners at the port. The five actors will be linked to 10 goals: timeliness, availability of public facilities, access to ports, access to ships, security, comfort, cleanliness, dining facilities, costs and prices, and tidal flooding. The actors and the objectives will be processed by MACTOR on a matrix basis.

The third objective, the port management model to create excellent service for passengers, will be formulated with triangle analysis with in-depth interview and Focus Group Discussion (FGD). Respondents in in-depth interviews and FGDs are actors in stakeholder analysis.

4. Results and Discussion

Atlas.ti quantifies the results of interviews with coding assistance to. Results of field research and processing with atlas.ti found the following:

(1) Port eligibility: (a) clean toilets and public facilities (b) safe from tidal flooding; (2) Facilities and comfortability: (a) free toilets; (b) availability of seats and rest areas; (c) availability of prayers' place; (d) availability of stalls and kiosks with affordable prices; (e) clean waiting lounge; (3) Accessibility: (a) ease of access from outside the port; (b) ease of access for boarding; (4) Port security and orderliness. In detail, the assessment of each component is shown in Table 1 below:

Port Facilities	27
a. Eligibility	5
(i) toilet and public facility cleanliness	3
(ii) safe from tidal flooding	2
b. Facility and comfortability	13
(i) Mosque	2
(ii) Free of charge toilet	4
(iii) Seats/rest areas	1
(iv) Stalls/kiosks	2
(v) Spacious hall	1
(vi) Clean waiting lounge	3
c. Accessibility	4
(i) Ease of access from outside the port	2
(ii) Ease of access to board the ships	2
d. Security and orderliness	5

Table 1. Needs for excellent service at the port

Sources: Primary data is processed 2017

The above results are arranged in the network from figure 1.

Table 1 and Figure 1 show that the type of service desired by port users can be classified into four main elements: facilities and comfortability that refer to customer needs while in port; eligibility that refers to the availability of public facilities and safety from tidal flooding; ease of reaching ports and access to and from ships; and security while in port. Achieving service excellence depends on the role of the actors who become port stakeholders. In this study, there are five actors and ten goals. The role and relationship of the actors will be analyzed with MACTOR. The result shows that in the influence and dependency analysis, the business actor is in quadrant one which has low dependency and high influence, as the business actor strongly influences the running of the port economic activities. Passengers and all elements in the port need business actors to meet their needs, especially in the port of Tanjung Emas which is located far from the city center. Port management is in the second quadrant which has a high level of influence and a relatively high degree of dependency, because as the decision maker, port management must still consider customer needs and related elements at the port. In addition, the current policy determination tends to be bottom-up. Passengers, field officers

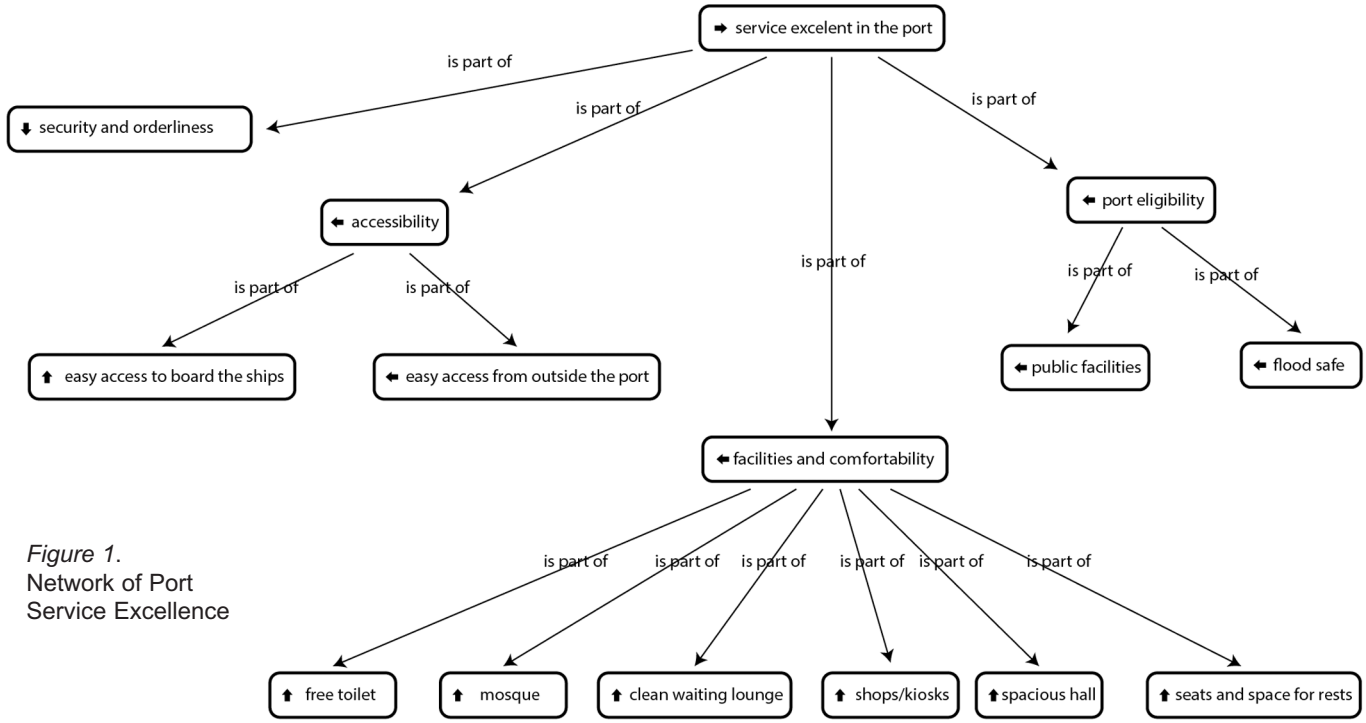

Figure 1. Network of Port Service Excellence

and ticket agents have low dependence and influence. Such dependency and influence analysis creates the following actors' competitiveness:

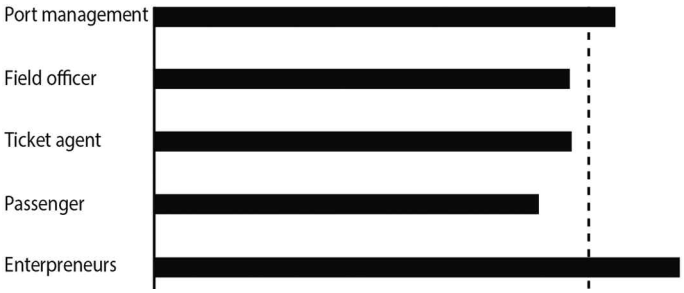

Figure 2. Histogram of competitiveness

Business actors have the highest competitiveness followed by port management, ticket agents, and field officers while passengers have the lowest competitiveness. This dependence causes passengers to be the most in need of service. The relationship between the actors and the goals to be reached at Tanjung Emas port is shown in Figure 3.

Figure 3 shows that on timeliness, it is found that more actors claim that this goal has not been achieved because the waiting period of ship docking and boarding is still relatively long. Similarly, the cost and prices at the port are still relatively expensive because the competitiveness of business actors in the port is very high. Security and cleanliness are the best aspects of Tanjung Emas port. Port management provides significant attention to both of these to improve customer convenience, especially passengers. However, since tidal floods are still frequent, comfortability has not yet gained maximum value.

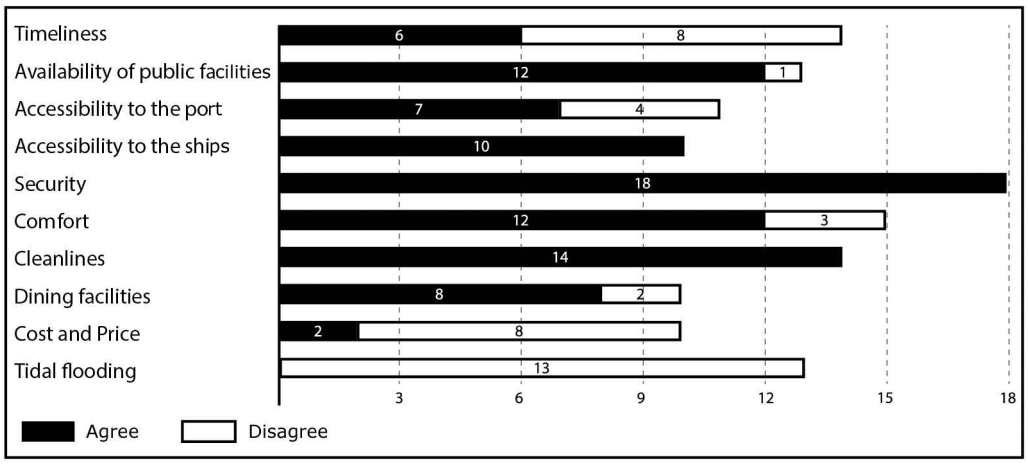

Figure 3. The actor's implications on each objective

Stakeholder roles are demonstrated by convergence and divergence that result in three things: the relationship between actors without the involvement of goals, the goals between actors in the same objectives, and the relationships between actors that have been collaborated with the goals. Convergence between actors by collaborating the goals is shown in Figure 4.

Figure 4 shows that the strongest convergence relationship is between port management and business actors and between port management and field officers. The relationship of port management with field officers is coordinative whereas with business actors is mutual need. Port management is concerned to improve service excellence through the provision of shopping and dining facilities, while business actors need to run and improve their business. The relationship between the ticketing agent and the field officer and port management is moderate as most ticket agencies have off-ports branches so they are not significantly affected by the policies applicable within the port. The relationship between field officers and business actors is complementary. The relationship between passengers and all other actors shows weak convergences, since they are target

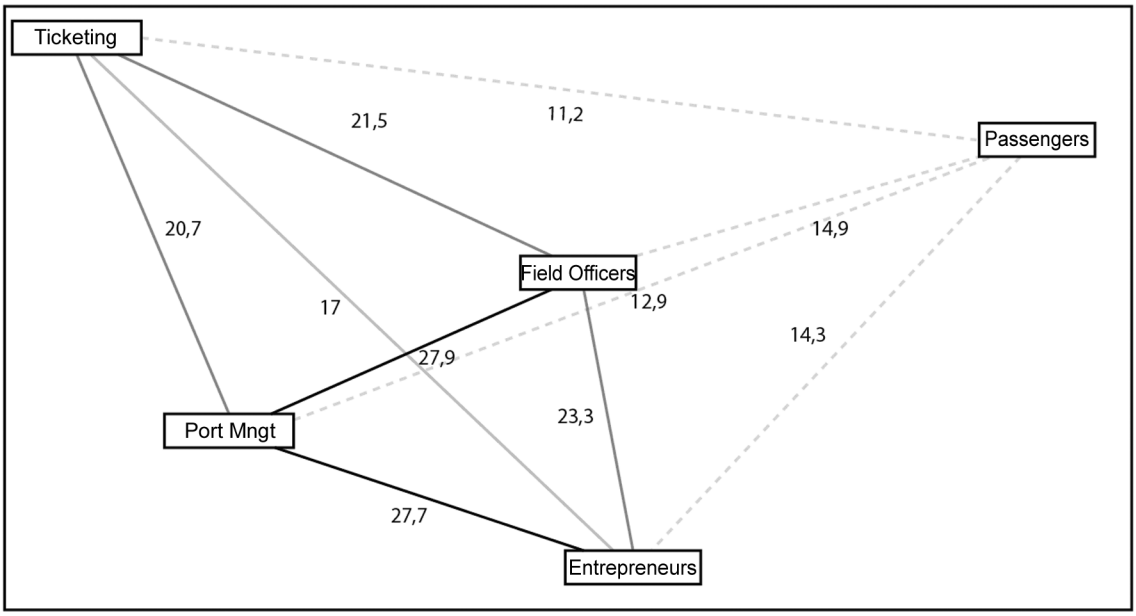

Figure 4. Convergence between actors by collaborating the goals

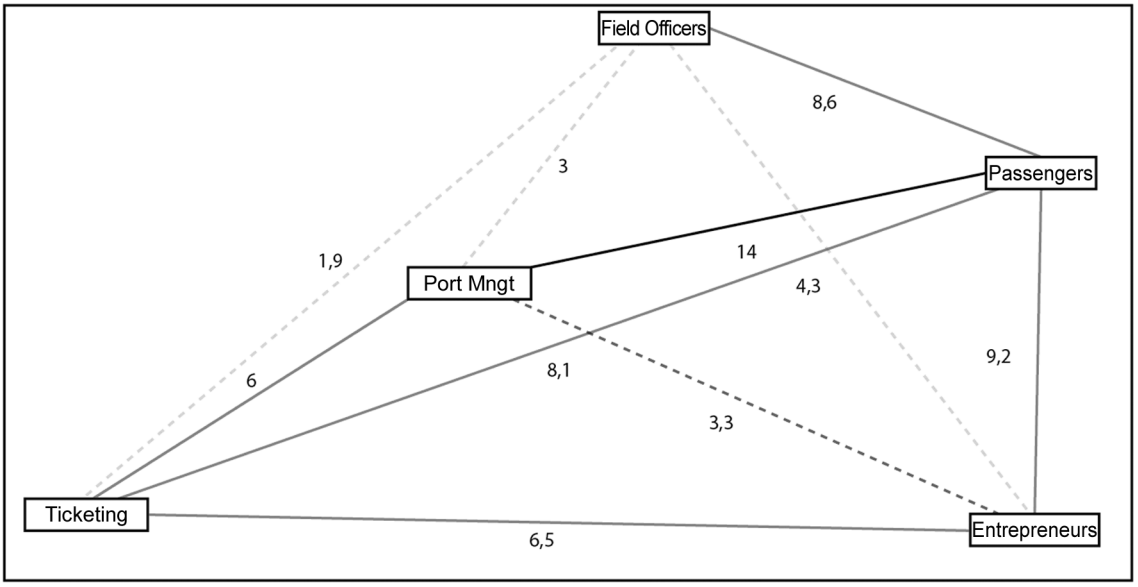

Figure 5. Divergence relationship among actors

variables or end users that depend on all the existing stakeholders. The divergence relationships among stakeholders in the three divergences, which have incorporated collaboration with objectives, are shown in figure 5.

Figure 5 shows that the relationship between port management and passengers shows very strong divergences, since they are not directly connected. Port management, ticket agents, field officers, and business actors have a weak divergence, because basically the four actors are connected. Passengers have a strong divergence with business actors and field officers because during the waiting, they will be in constant contact so that it is possible that there is a crossing of interests between them. Meanwhile, passenger relations with ticket agents show moderate divergences as they relate only once during each trip, when purchasing a ticket.

The first and second objective analyses will be used as a baseline to formulate a port management model. Both analytical tools are equipped with FGD and in-depth interview. In-depth interviews were conducted on key figures involving stakeholders. The formulation involves university academics who will provide input based on the results of their research. The in-depth interview results are formulated into a model, which will be discussed through FGDs to obtain input and justification on the model. The Port management model based on empirical study in Tanjung Emas Semarang is shown in Figure 6.

Figure 6 is a port management model obtained from the research results. Based on this model, the regulator shall consist of the Ministry of Transport and the port authority responsible for the determination, implementation and monitoring of regulations. If there is a problem in the implementation, it is recommended that the applicable laws and regulations be revised. Regulators are also authorized in

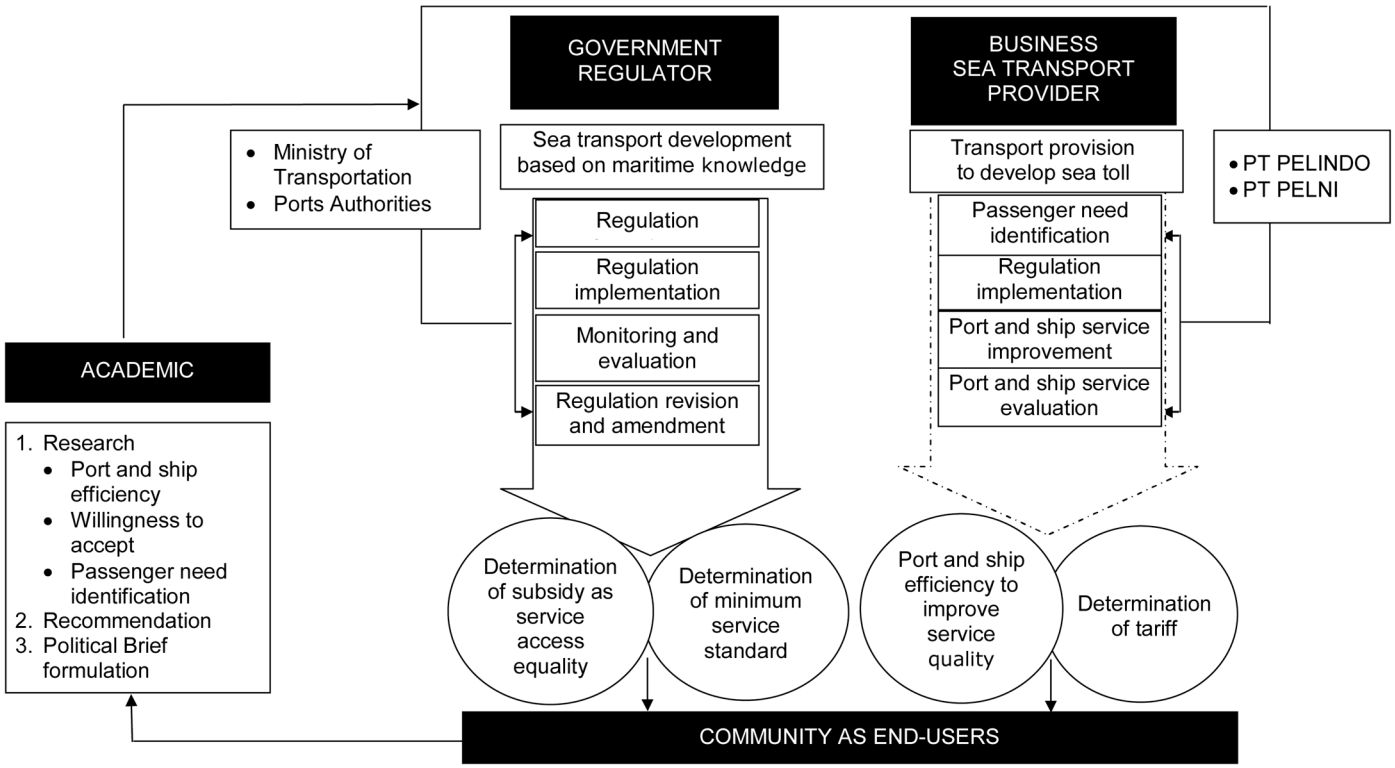

Figure 6. Port Management Model to improve Service Quality for Passengers

determining ticket prices and setting minimum service standards. Regulators are supported by business actors to improve the efficiency of port services to achieve service excellence. Academics have the duty to provide input to regulators and executors through research conducted in the form of academic texts for policy determination.

5. Conclusions

The type of service excellence required in the port of passenger ships is identified based on the needs and interests of all stakeholders, especially passengers. Service excellence is determined by four main components, i,e security, eligibility, facility and comfortability, and accessibility. The main players in improving service excellence are business actors, port management, field officers, ticket agents, and passengers. Passengers are the most dependent variables so that they do not have a strong convergence relationship with all other actors. The main actors in improving service excellence at the port are port management and business owners.

This research recommends a port management model that involves all stakeholders with the regulator as its central figure. Service excellence will be achieved when the regulator can involve all supporting actors, namely business actors and field officers.

References

[1] Acciaro, M., Vanelslander, T., Sys, C., Ferrari, C., Roumboutsos, A., Giuliano, G., & Kapros, S. (2014). Environmental sustainability in seaports: a framework for successful innovation. *Maritime Policy & Management*, 41(5), 480-500.

[2] Andiri, S. A. (2015). Quality of public transport service (descriptive study about quality of passenger ship service Gresik route-Bawean port Gresik). *Policy and Public Management* 3, 1-7.

[3] Bappenas (2017). *The Direction of maritime development in Indonesia*. Jakarta: National Development Planning Agency.

[4] Estima, A., Manso, J., Nunes, C.S. (2017). Service quality in marketing LAC – A suggested tool for evaluation and continuous improvement. *Quality-Access to Success* 18(159), 35-38.

[5] Lam, J. S. L., & Notteboom, T. (2014). The greening of ports: a comparison of port management tools used by leading ports in Asia and Europe. *Transport Reviews*, 34(2), 169-189.

[6] Liu, Q., & Liddawi, S. (2015). *Key factors of public attitude towards sustainable transport policies: A case study in four cities in Sweden*. Blekinge Institute of Technology Karlskrona, Sweden.

[7] Lu, C.S., Shang, K.C., & Lin, C.C. (2016). Examining sustainability performance at ports: port managers' perspectives on developing sustainable supply chains. *Maritime Policy and Management*, 43 (8): 909-927.

[8] Ministry of Transportation Republic Indonesia (2017). *Transportation statistics 2016*. Jakarta: Ministry of Transportation Republic Indonesia.

[9] Mitreva, E., Nikolova, B., & Nikolov, E. (2016). Application of Total Quality Management (TQM) in the Macedonian Railways Transport in the Republic of Macedonia. *Quality-Access to Success* 17(151), 55-59.

[10] Pantouvakis, A., Chlomoudis, C., & Dimas, A. (2008). Testing the SERVQUAL scale in the passenger port industry: a confirmatory study. *Maritime Policy and Management*, 35 (5): 449-467.

[11] Radu, L. (2017). The national gas transportation system – analysis of semester I of 2016. *Quality-Access to Success*, Vol. 18, S2, pp. 355-358.

[12] Suharno, Susilowati I., Anggoro S., Gunanto E.Y.A. (2016). The fisheries management for small-scaler of shrimp fishers in cilacap using bionomics model. *International Journal of Applied Business and Economic Research* 14 (10): 6915-6920.

[13] Suharno, Susilowati I., Anggoro S., Gunanto E.Y.A. (2017b). Typical analysis for fisheries management: the case for small-scaler of shrimp fishers. *Advanced Science Letters* 23 (8): 7096-7099.

[14] Suharno, Susilowati I., Firmansyah (2017a). Management of the traditional milkfish culture in Indonesia: an approach using technical efficiency of the stochastic frontier production. *AACL Bioflux* 10(3): 578-586.

[15] Vaggelas, G.K., & Pallis, A.A. (2010). Passenger ports: services provision and their benefits. *Maritime Policy and Management*, 37 (1): 73-89.

[16] Verhoeven, P. (2010). A review of port authority functions: towards a renaissance? *Maritime Policy and Management*, 37 (3): 247-270.

[17] Wu, S., Li, K.X., Shi, W., & Yang, Z. (2016). Influence of local government on port investment: implications of China's decentralized port governance system. Maritime Policy and Management, 43 (7): 777-797.

How does Good Corporate Governance create Customer Trust? The Role of Service Quality and Corporate Image

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Abstract

This study aims to build a model and investigate the influence of good corporate governance (GCG) on the formation of public trust in using public services in Indonesia mediated by the role of service quality and corporate image. Public services provided by the government's institutions at this time have become a strategic issue, because the level of quality of public service performance is very influential on the good and bad services provided to the public as a determinant of the image of the government's institutions. This study stems from the problem that there are many studies that have been done and published on the topic of corporate governance but still a bit of them talking about the influence on the quality of service that is provided to create confidence in the public/customers. The data collection was carried out using a survey method through a structured questionnaire with a ten-point Likert scale. Total respondents in this study were 200 community users of health public service facilities in several major cities in Indonesia, which were then analyzed using structural equation models (SEM). The results showed that the implementation of GCG can build public trust strengthened by the role of providing quality services and good corporate image.

Keywords: *corporate governance; service quality; corporate image; customer trust.*

1. Introduction

The era of globalization and intense competition has given fundamental consequences to current business practices. Some scandals involving large companies in both developed and developing countries are real facts of neglect of governance and business ethics. Aggarwal (2013) emphasizes good corporate governance (GCG) as an initiative to encourage transparency and accountability in meeting the expectations of stakeholders. Corporate governance is a concept that emerges as an effort to improve company performance through monitoring management performance and ensuring management accountability to stakeholders based on the regulatory framework (Berardino, 2016; Grossi, Papenfuß, & Tremblay, 2015). Therefore, when this concept is applied well, the economic growth is expected to increase continuously in line with performance which is supported by the transparency of better corporate management and later it will benefit many parties.

Service to the community has become a major destination from governmental management of a country. The implementation of public services in Indonesia and other developing countries becomes an increasingly strategic policy issue because the improvement of public services tends to run in place, while the impact is very broad because it touches the entire space public including economic, social, political, cultural life and others (Basri, Ulfah, & Majid, 2017). The phenomenon of public services provided by the government bureaucracy in comes with the problems of complicated service procedures, including the uncertainty of the time and price given so that the service is difficult to reach by the community (Khalid, Alam, & Said, 2016; Mulyadi, Anwar, & Ikbal, 2012). This leads to distrust in the government bureaucracy as the service provider so the public seek alternatives to obtain services through the way outside the applicable regulations. The service received by the public service today is they are positioned as clients who need help, so they should obey the bureaucracy and the official. The culture that develops in the bureaucracy so far is not a service culture, but rather a culture of power (Grossi et al., 2015). By seeing these conditions, it is necessary to make efforts to improve the quality of the implementation of sustainable public services to realize excellent public services, because public service is the main function of the government that is best provided by public officials. One of the government's efforts to deal with the problem of public service is by implementing the principles of good governance, because the realization of high-quality public services is one characteristic of good governance that is expected to restore public trust in the government (Ekpe, 2016).

The role of government in providing public service is getting important, because public demand on public services continues to increase in terms of quality and quantity (Khalid et al., 2016). Public service is not just an administrative problem but it is also related to satisfy the desires of the public as the users of public service (Grossi et al., 2015). Good Corporate Governance (GCG) is an integrated system starts from the inputs, processes, up to output through a set of rules that govern the relationship between the various parties (stakeholders) (Yaacob & Basiuni, 2014). GCG is included to regulate the relationships of various stakeholders and prevent the occurrence of significant errors in the company's strategy and to ensure that errors can be corrected immediately. This study starts from the phenomenon that most of the previous studies on corporate governance is still focused on its effect on the financial position of the company, and no studies have investigated the relationship between corporate governance with customers (Al-Qudah, 2012). Therefore,

the aim of this research is to build a new model and measure the influence of good corporate governance on the level of public trust.

2. Literature Review and Hypothesis Development

2.1. Good Corporate Governance (GCG) and Service Quality

In this global era, with the increasing range of services needed by public and increased competition, every organization must find the most effective and efficient system to improving the quality of service. To provide good quality of service for public, it is time for the companies to implement GCG in its management (Ljubojević & Ljubojević, 2011; Mitchell & Wee, 2004). Bureaucracy in the public sector comes with the main goal of providing services to the community. Government bureaucracy as a public service provider has different characteristics from business organizations, but in the mission, goals and programs it still attaches to the principles of an organization including the efficiency, effectiveness, and puts the public as stakeholders which must be serviced optimally (Ljubojević & Ljubojević, 2011).

Good governance is a prominent issue in the management of public administration (Marvel, 2015). The government's demand to operate government is in line with the progress of the level of knowledge and influence of globalization. The old pattern in administering government is no longer in line with the changing society's order, so in a change towards good governance, it should have received a positive response from the government. In this case, the mechanism of public bureaucracy management must be done properly and accurately so the unit can perform right vision, mission and purpose. GCG is a good management system implementing the principles of transparency, accountability, responsibility, independency, and fairness (Grossi et al., 2015; Yaacob & Basiuni, 2014). The implementation is not only to increase the image of government bureaucracy but also to give the best service to public as what is mandated so public can have trust in every agent of government service.

Public service is a right of public which basically contains the principle: simple, clarity, certainty of time, accuracy, security, responsibility, completeness of facilities, infrastructure, ease of access, discipline, politeness, friendliness and comfort (Khalid et al., 2016). Service quality is an important measure of how effective an organization is, and is very important in government. GCG focuses on organizational goals and outcomes for the community and service users. There are also general objectives that are fundamental to GCG, including providing good quality of services. Ljubojević and Ljubojević (2011) in their research explain how to improve the quality of service by implementing GCG in accordance with the demands and interests of stakeholders. As well with Tuan (2014) in the research explained that the implementation of GCG can create a company that has good service quality. From some researches, it can be concluded that by implementing good corporate, governance can improve the quality of service.

H1: The higher the quality of good corporate governance, the higher service quality

2.2. Service Quality and Trust

The good quality of service will avoid customers from disappointment related to costs spent to get the service, but feel happy and comfortable to use the service. Parasuraman, Zeithaml, and Berry (1985); Zameer, Tara, Kausar, and Mohsin (2015) explains that the consistency of the quality of a service can provide a long-term benefit of the company, namely creating a positive perception of the customer towards the company and generating satisfaction. Customers who are satisfied with the service received will make the customer believe in the company and there is hope that they will reuse the service in the future. Kassim and Abdullah (2010) states that customers' trust is the perception of reliability of the customer's point of view on the basis of experiences or sequences of transactions or interactions that is characterized by the fulfillment of expectation on performance and satisfaction. Kaur and Soch (2013) assert that there are many benefits received by the company by achieving high customer satisfaction, one of which is customer loyalty.

According to research of Chang, Chen, and Lan (2013) there is a significant influence between service qualities on customer trust. This study is strengthened by the results of an empirical study from Lien, Wu, Chen, and Wang (2014) which states that trust can arise from the quality of services provided by a company. Trust is related to *emotional bonding* which is a person's ability to entrust a company or a brand to perform or run a function (Chu, Lee, & Chao, 2012). The customer's trust is the customer's response to the evaluation of the non-conformity between the expectations and the actual performance of the product. Customer trust is an after-sale evaluation where the selected alternatives are at least equal to or exceed customer expectations (Kassim & Abdullah, 2010).

Customer is the main focus of business, since without the customers; a business cannot get profit to run their business. Therefore, the main thing to do is to provide good-quality services to create trust to get customers who are loyal. Chang et al. (2013) define trust as the willingness of someone to hang himself on the other side with a certain risk. The results of Zameer et al. (2015) study also show that there is a positive relationship between the quality of service providers and consumer confidence. Thus consumers who trust the company will depend on him because of the guarantee of good service quality, otherwise consumers who do not trust the company will not depend on him because there is no guarantee of good service quality.

H2: The higher the service quality provided , the higher the customer trust

2.3. Service Quality and Corporate Image

Service is a form of strategy where professional service can provide great benefits for the company and will gain the trust of customers. According to Tjiptono, Arli, and Bucic (2014), basically, the quality of services is focused on meeting customer needs and desires as well as the accuracy of delivery to keep up with customer expectations. By providing good service quality, it will give an encouragement to customers to establish strong ties with the company. If the quality of service is getting better, shown by reliable service, responsiveness, guaranteed service and empathy, then consumers will get satisfied. Good service can only be realized if there is a service system in the service organization that prioritizes the interests of customers, especially users of service and human resources oriented to the interests of customers. Focusing on customer interests is an absolute thing to be done by each service unit, because the existence of the service unit depends on whether or not there are customers who need services.

Customer's satisfaction is caused by good quality of service; this will also increase the image of the company for customers. This statement is supported by Arokiasamy and Abdullah (2013) stating that other dimensions of service quality; empathy, responsiveness, assurance, tangibles and reliability, have positive effects on customer's satisfaction. Good service quality happens when a company is able to provide services according to consumer's demand, listen to forms of consumers' complaints, and give a positive reaction to consumer complaints to avoid a perception of the quality of services provided.

Image plays an important role in establishing a partnership relationship between a company and its customers. The image becomes the basis of judgment in determining whether a company is worthy or not to be a cooperation partner (Ljubojevic &

Ljubojevic, 2008). The results of research conducted by Ganesan (1994) found a positive influence between image and trust which ultimately will lead to the creation of long-term relationships between companies and customers. Meanwhile, the results of Saxton (1997) and Flavián, Guinalíu, and Torres (2005) research shows that the image is positively related to trust. Companies with GCG will affect the improvement of image (Ljubojevic & Ljubojevic, 2008; Mohan & Marimuthu, 2015). A company with good image will affect the sale which finally leads to the increase of profit or company's performance. H. C. Wu (2013) found that in restaurant industry, there is a significant correlation between service quality and company's image. As well as research done by Kandampully and Suhartanto (2000) on hotel service quality that shows significant correlation between those two.

H3: The higher service the quality provided, the higher the corporate image

2.4. Corporate Image and Trust

Trust is the belief that someone will find what they want in an exchange partner. Trust involves the willingness of someone to behave in a certain way because of the belief that the partner will give him what he hopes for and a hope that someone has that the word promise or statement of another person can be trusted (Chang et al., 2013). High consumer trust will also make consumers determine whether they will be loyal to the services used or move to the others that offer more or have better image. Warren, Sulaiman, and Jaafar (2014) say trust involves someone's willingness to behave in certain ways because he believes that its partners in the transaction will give him what he expected. This shows that if one party trusts the other, it will be possible to form positive behavior and good intentions. Therefore, when consumers have trust in a particular product or service, the consumer has the intention to buy the product or service.

Flavián and Guinalíu (2007), states trust is formed from three things, namely: (a) Honesty. Honesty is to believe the words of others, believing that they will keep their promises and be sincere to us. (b) Virtue. Virtue is an act that prioritizes the public interest rather than personal interests. (c) Competence. Competence is the perception of knowledge, the ability to solve problems, and the ability to meet the needs of other parties owned by a party.

H4: The higher the corporate image, the higher the customer trust

Based on the literature review above, we propose the research model that indicates the influence of GCG on customer trust which is mediated by service quality and corporate image. The hypotheses are summarized into the research model as seen in Figure 1:

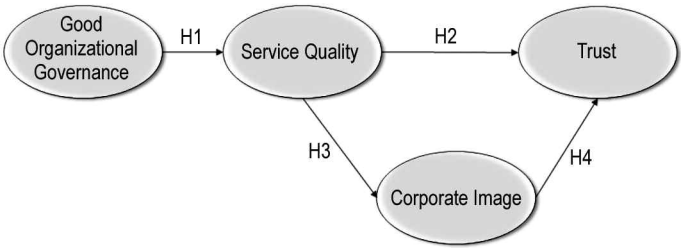

Figure 1. Development Model of Good Corporate Governance on Trust

3. Research Method

3.1. Population and Sample

This research was conducted at Government-owned Hospital in 5 major cities in Indonesia, so that most of them used primary data obtained in the field. The population of this research is all people who use health services from the Government-owned Hospital. The sampling method was done by non-probability sampling with a purposive sampling technique where the respondents were selected based on certain specified criteria; 1) Public service users at Government-owned Hospital who have used the service at least twice 2) Hospital service users aged over 17 years.

The instrument of analysis in this study used Structural Equation Modeling (SEM) requiring the fulfillment of some criteria of the research sample, which is at least five times the number of indicator variables used (Hair, J.F., W.C., & Anderson, 2010). The number of indicator variables used in this study were 16 so that the minimum number of samples that must be met in order to meet the assumption of a sample adequacy of at least 100 samples. Based on these considerations, the samples used in this study were 200 respondents that said already meet the minimum sample size.

3.2. Research Instruments and Measurement

The primary data collection method in this study used a survey method, which aims to collect information from respondents using a questionnaire containing a list of closed and open statements answered by the respondent. A closed statement requires the respondent's answer to give scores ranges from 1-10 in Likert scale, where score 1= strongly disagree until score 10 = strongly agree while open questions are brief and clear descriptions to explore more information that supports the closed statement.

In this study, validity and reliability tests were conducted to test research instruments. The data quality testing is a stage that must be passed by a research model before reaching the effect test or correlation test. In general, data validity describes the suitability of each indicator to its variables whereas data reliability shows the reliability of research data. The validity of SEM is known through the estimate value. Ghozali (2013) explains that the indicator of variable is called valid if the value of estimation > 0.05. Furthermore, to test the reliability of the data, an indicator based on the *Variance Extracted* (AVE) and *Construct Reliability* (CR) formulas was used. Ghozali (2013) explains that the indicator of the variable is called reliable if the AVE value ≥ 0.05 and CR ≥ 0.07. Here is a summary analysis validity and reliability tests. The value of the validity and reliability of the results of all items used in this study is presented in Table 1.

4. Research Result

4.1. Respondents Profile

Respondents in this study were 200 users of Government-owned Hospital as public services from several major cities in Indonesia. After the distribution of questionnaires to the respondents, the number of questionnaires returned, fully completed and deserved to be treated were as many as 163 questionnaires, consisting of 97 male respondents (59.51%) and 66 (40.49%) female respondents. In terms of age, 2 respondents (1.23%) were under 20 years old, 8 respondents (4.91%) were aged 20-30 years old, 52 respondents (31.90%) were between 31-40 years old; 76 respondents (46.63%) aged 41-50 years old; 19 respondents (11.66%) were over 6 years old. Regarding the occupations, 7 respondents (4.29 %) were students, 38 respondents (23.31%) were private employees, 41 respondents (25.15%) were civil servants, 72 respondents (44.17%) were entrepreneurs, and 5 respondents (3.07 %) were represented by other jobs. We also recorded respondent categories based on education level; 67 respondents (41.10%) were with high school education or equal, 95 respondents (58.28%) were with undergraduate education, and 1 respondent (0.61%) was with postgraduate education. Next is the category of respondents based on the length of time of using health services at the Government-owned Hospital; 23 respondents (14.11%) had been customers for less than 3 years; 76 respondents (46.63%) had been customers for 3.1 to 5 years; and 64 respondents (39.26%) have been customers for over 5 years.

Variable	Indicator		Standard Loading (loading Factor)	Standard Loading ²	Measurement Error (1-Std Loading²)	Construct Reliability	Variance Extracted
Good Corporate Governance	GCG1	Transparency	0.796	0.634	0.366	0.821	0.535
	GCG2	Accountability	0.726	0.527	0.473		
	GCG3	Responsibility	0.674	0.454	0.546		
	GCG4	Fairness	0.724	0.524	0.476		
Service Quality	SQ1	Reliability	0.884	0.781	0.219	0.943	0.806
	SQ2	Responsiveness	0.922	0.850	0.150		
	SQ3	Assurance	0.915	0.837	0.163		
	SQ4	Empathy	0.870	0.757	0.243		
Customer Trust	CT1	Integrity	0.844	0.712	0.288	0.926	0.759
	CT2	Benevolence	0.942	0.887	0.113		
	CT3	Competence	0.885	0.783	0.217		
	CT4	Commitment	0.808	0.653	0.347		
Corporate Image	CI1	Service Image	0.938	0.880	0.120	0.935	0.783
	CI2	Product Quality Image	0.898	0.806	0.194		
	CI3	Organizational Culture Image	0.817	0.667	0.333		
	CI4	Employee Behavior Image	0.882	0.778	0.222		

Table 1. Validity and Reliability Testing Results

Item	Description	Frequency N=163	Percentage (%)
Gender	Male	97	59.51%
	Female	66	40.49%
Age	Under 20 years	2	1.23%
	20 – 30 years	8	4.91%
	31 – 40 years	52	31.90%
	41 - 50 years	76	46.63%
	51 - 60 years	19	11.66%
	above 60 years	6	3.68%
Profession	Student	7	4.29%
	Private Employees	38	23.31%
	Civil Servant	41	25.15%
	Entrepreneur	72	44.17%
	Other	5	3.07%
Education Level	High School	67	41.10%
	Under graduate	95	58.28%
	Post graduate	1	0.61%
Length of Membership	0 – 3 years	23	14.11%
	3.1 – 5 years	76	46.63%
	.> 5 years	64	39.26%

Table 2. Respondents Profile

4.2. Data Analysis Results by SEM

The research data that has been collected were then analyzed using Structural Equation Model (SEM) assisted with AMOS 24 software. In addition, we used maximum likelihood estimation (MLE) method in the model SEM, and used goodness of fit index test to test data normality in connection with four construction and 16 indicator items. There was no proof to refuse data normality in this study. The results of the full analysis of structural equation models are presented in Figure 2

Based on the results of the test model, in the graphic of the full analysis of the structural model can be shown that the model meets the criteria of fit, it can be seen with the value of the calculation meets the eligibility criteria of the full model. The calculation results of several good indices to evaluate the goodness of mode thoroughly that was used was GFI index (GFI) = 0.895; the adjusted GFI index (AGFI) = 0.857; Tucker-Lewis Index (TLI) = 0.970; and the root mean square of approximation (RMSEA) = 0.057. Processing results show that each indicator or dimension measuring each latent variable gives good results, proven by value of the critical ratio (CR) above 2.58. The hypotheses test results are presented in table 3, with all hypotheses accepted.

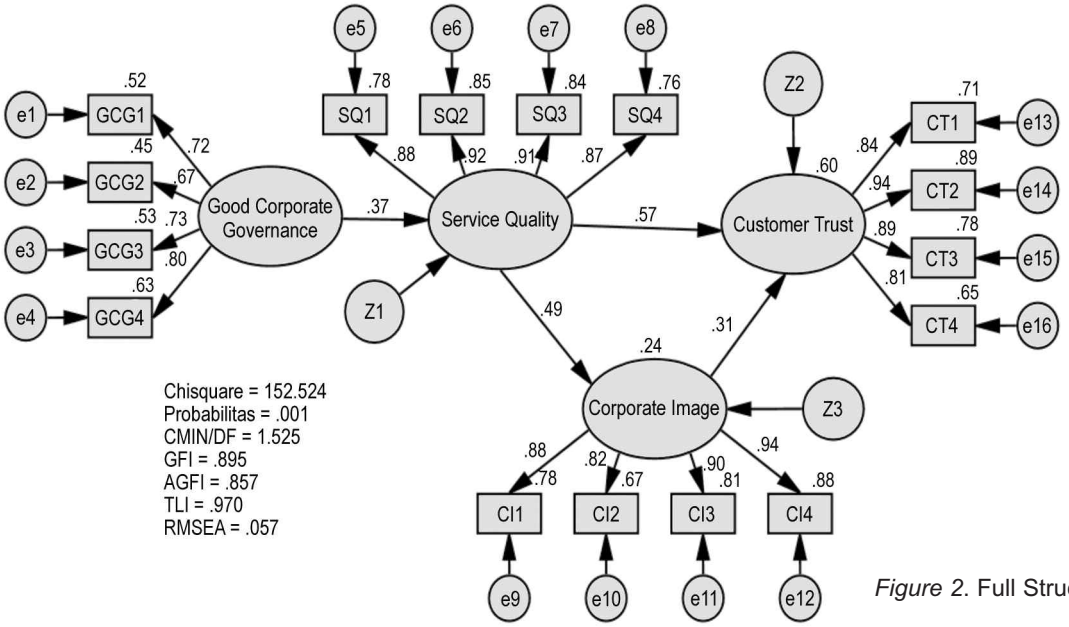

Figure 2. Full Structural Model

	Hypothesis			Estimate	S.E.	C.R.	Hypotheses
H1 :	Service_Quality	<---	Good_Corporate_Governance	.584	.139	4.188	Supported
H2 :	Corporate_Image	<---	Service_Quality	.441	.068	6.452	Supported
H3 :	Customer_Trust	<---	Service_Quality	.468	.061	7.616	Supported
H4 :	Customer_Trust	<---	Corporate_Image	.289	.063	4.598	Supported

Table 3.
Hypotheses Test Results

5. Discussion

The main objective of this research is to test empirically the effect of good corporate governance (GCG) implementation in increasing customer trust which is mediated by improved service quality and corporate image. The study empirically tested the four hypotheses of the study, and produced some very interesting findings. Hypothesis 1 (H1) states that the higher the level of implementation of GCG, the higher the service quality is produced, and the results are supported in this study. This study confirms that bureaucratic public service providers applying GCG will produce a good level of service quality. The results of this study are supported by previous research which states that the corporate governance function is not only limited to the board and CEO, but is a way for the CEO to give responsibility and authority and create synergies among stakeholders to achieve company goals. The company's goal can be achieved with the implementation of the quality of corporate governance that aims to increase the level of satisfaction of stakeholders and fix source of data for service improvement in order to achieve the perfect service (Ljubojević & Ljubojević, 2011) and the implementation of good corporate governance, improve service quality (Basri et al., 2017).

Hypothesis 2 (H2) states that the higher the service quality, the higher the customer trust, and the test results are supported in this study. This study confirms that the government bureaucracy that provides public services that are able to improve service quality in accordance with the expectations and desires of its customers will increase high customer confidence. This study reinforces previous research that the higher the level of service quality provided, the higher the trust received by consumers in a company (Wang & Shieh, 2006) and increase customer satisfaction and loyalty (Singh & Sirdeshmukh, 2002).

Hypothesis 3 (H3) proposes that the higher the service quality provided, the better the corporate image, and the results of hypothesis test are supported in this study. This study found that providing excellent service quality at the Government-owned Hospital as a public bureaucracy will improve the corporate image of public service providers in the customers perception. The results of this study are supported by several previous studies (Lien et al., 2014; Ljubojevic & Ljubojevic, 2008; H.-C. Wu, 2014) which emphasize that service quality has positive and significant influence in creating a corporate image. The findings of this study are also consistent with the research of Gronroos (1983) state that service quality is considered as the most important determinant of corporate image.

Hypothesis 4 (H4) proposes the higher the corporate image, the higher the level of customer trust, and test results support the hypothesis. This study found that the corporate image affects customer trust significantly. The results of this study are in line with the opinions of previous researchers who state that companies that build their image well will increase customer trust is using the company's products and services (Flavián et al., 2005; Kandampully & Suhartanto, 2000; H.-C. Wu, 2014; Zameer et al., 2015). Loyalty will be achieved if the company has a good quality service and maintain consumer trust in the product or service being offered. Trust is future oriented and builds hope in uncertain circumstances (Michie & Oughton, 2001; Morgan & Hunt, 1994; Singh & Sirdeshmukh, 2002).

6. Conclusion, Managerial Implication, Limitation and Future Research

6.1. Conclusion

GCG aims to create a control and balance system to prevent misuse of company resources but still encourage the growth of the company. The point of company management policies is to make sure those who run the management can understand and work as functions according to rights and responsibilities. The parties involved include shareholders, board of commissioners, committees, directors, unit leaders and employees. Liberali, Urban, and Hauser (2013) suggests that the trust on a brand is caused by the influence of satisfaction and dissatisfaction on the brand that is accumulated continuously besides the perception on the quality of the products. The ability of a company to give service to customers is one of factors determining the level of success and quality of a company (Michie & Oughton, 2001). The understanding on service quality gives important role in realizing the excellent service. Service quality is the ability of a company to give service to customers.

According to Flavián et al. (2005), image is created through a network of all experiences, impressions, beliefs, feelings and knowledge that people have about a company. The image of the company is then inevitably created through one type of contact itself. The results of research conducted by Ganesan (1994) found a positive influence between images with trust which will ultimately lead to the creation of a long-term partnership relationship between the company/organization and its customers. Image plays an important role in establishing partnership relations between the Government-owned Hospital as public service bureaucracy and customers. The image becomes the basis of judgment in determining whether a company is worthy or not to be a cooperation partner. The results of Saxton (1997) research show that the image is positively related to trust while the trust becomes one of the important factors in developing partnerships between public organizations with public services users. Without trust, a cooperative relationship is unlikely to last a long time. Trust arises as a result of partner reliability and integrity which is demonstrated through various attitudes such as consistency, competency, fairness, responsibility, help and care. Morgan and Hunt (1994) also add that the high level of trust will have an effect on the decline of the possibility of moving to other companies. Therefore, it is proven that the implementation of good corporate governance has a significant effect on the image and trust of customers in the public service bureaucracy.

6.2. Managerial Implication

The findings of this study can be recommended several implications for the implementation of GCG in the formation of public trust in the use of public services from the government through the provision of quality services. Here are described some alternative strategic suggestions those are; First, the improvement of needs and public demand on excellent public service so there is needs of public service management which is not giving below-standard service but trustable, transparent, and accountable. Therefore, the implementation of GCG in the public service government bureaucracy is an unavoidable demand in the development of the global world today. GCG is a system and a structure formed in order to give trust to all interested parties which have four main components needed: transparency, accountability, responsibility, and fairness which are important components in the application of GCG principles that are consistently proven to improve the quality of service (Basri et al., 2017). Companies that implement GCG can provide good quality service and will certainly increase customer trust. Second, customers trust is very important for the Government-owned Hospital in order to be able to run the activities of the service properly. Customers' trust can be formed through a good corporate image, so that ultimately creates

customer trust. A good corporate image can be formed by Government-owned Hospital by providing satisfying services for the customers. GCG implementation can also encourage companies to maintain mutually beneficial relationships between customers and companies that will shape public opinion and become a corporate image.

6.3. Limitation and Future Research

This research still has some limitations. First, the samples used in this study are still limited to one of the public service bureaucracies of Government-owned Hospital operating in large cities. For further research, the samples can be expanded with the bureaucracy of public service on the outskirts of the city with the customers from the surrounding location. Second, the variables in this study are still very limited in exploring service quality models and corporate image. For similar research in the future, it is recommended for researchers to insert variables of the culture of public organizations and knowledge management to explore the correlation between the implementation of corporate governance and the quality provision of bureaucracy service of public services.

References

[1] Aggarwal, P. (2013). Impact of Corporate Governance on Corporate Financial Performance. I*OSR Journal of Business and Management*, 13(3), 1-5.

[2] Al-Qudah, M. Y. (2012). *The Effect of Corporate Governance on Customer Relationship Quality and Marketing Performance.* Middle East University.

[3] Arokiasamy, A. R., & Abdullah, A. G. K. b. (2013). Service Quality and Customer Satisfaction In The Cellular Telecommunication Service Provider In Malaysia. *Researchers World*, 4(2), 1-9.

[4] Basri, H., Ulfah, A. K., & Majid, M. S. A. (2017). The Implementation of Good Corporate Governance (GCG) to Improve Service Quality: The Case of State-Owned Electricity Company in Indonesia. *Journal of Accounting, Finance, and Auditing Studies*, 3(2), 44-63.

[5] Berardino, D. D. (2016). Corporate Governance and Firm Performance in New Technology Ventures. *Procedia Economics and Finance*, 39, 412-421. doi: 10.1016/s2212-5671(16)30342-2

[6] Chang, C.-S., Chen, S.-Y., & Lan, Y.-T. (2013). Service quality, trust, and patient satisfaction in interpersonal-based medical service encounters. *BMC Health Services Research*, 13(22).

[7] Chu, P.-Y., Lee, G.-Y., & Chao, Y. (2012). Service Quality, Customer Satisfaction, Customer Trust, And Loyalty In An E-Banking. *Social Behavior and Personality*, 40(8), 1271-1283.

[8] Ekpe, E. O. (2016). Impact of Corporate Governance and Perceived Trust in Pension Management in Nigeria. *Management and Administrative Sciences Review*, 5(2), 98-107.

[9] Flavián, C., & Guinalíu, M. (2007). Measure on web usability Websites. *Journal of Computer Information Systems*, 48(1), 17-23.

[10] Flavián, C., Guinalíu, M., & Torres, E. (2005). The influence of corporate image on consumer trust: A comparative analysis in traditional versus internet banking. *Internet Research*, 15(4), 447-470. doi: 10.1108/10662240510615191

[11] Ganesan, S. (1994). Determinants of Long-Term Orientation in Buyer-Seller Relationships. *Journal of Marketing*, 58(2), 1.

[12] Ghozali, I. (2013). *Aplikasi Analisis Multivariat dengan Program IBM SPSS 21*. Semarang: Penerbit Universitas Diponegoro.

[13] Gronroos, C. (1983). *Strategic Management and Marketing in the Service Sector*: Marketing Science Institute, Cambridge, MA.

[14] Grossi, G., Papenfuß, U., & Tremblay, M.-S. (2015). Corporate governance and accountability of state-owned enterprises: Relevance for science and society and interdisciplinary research perspectives. *International Journal of Public Sector Management*, 28(4/5), 274-285. doi: 10.1108/IJPSM-09-2015-0166

[15] Hair, J., J.F., B., W.C., B., & Anderson, R. E. (2010). *Multivariate Data Analysis: A Global Perspective*: Pearson Education Upper Saddle River.

[16] Kandampully, J., & Suhartanto, D. (2000). Customer loyalty in the hotel industry: the role of customer satisfaction and image. *International Journal of Contemporary Hospitality Management*, 12(6), 346-351.

[17] Kassim, N., & Abdullah, N. A. (2010). The effect of perceived service quality dimensions on customer satisfaction, trust, and loyalty in e-commerce settings: A cross cultural analysis. *Asia Pacific Journal of Marketing and Logistics*, 22(3), 351-371. doi: 10.1108/13555851011062269

[18] Kaur, H., & Soch, H. (2013). Mediating roles of commitment and corporate image in the formation of customer loyalty. *Journal of Indian Business Research*, 5(1), 33-51. doi: 10.1108/17554191311303376

[19] Khalid, M. A., Alam, M. M., & Said, J. (2016). Empirical Assessment of Good Governance in the Public Sector of Malaysia. *Economics & Sociology*, 9(4), 289-304. doi: 10.14254/2071-789x.2016/9-4/18

[20] Liberali, G., Urban, G. L., & Hauser, J. R. (2013). Competitive information, trust, brand consideration and sales: Two field experiments. *International Journal of Research in Marketing*, 30(2), 101-113. doi: 10.1016/j.ijresmar.2012.07.002

[21] Lien, C.-h., Wu, J.-J., Chen, Y.-H., & Wang, C.-J. (2014). Trust transfer and the effect of service quality on trust in the healthcare industry. *Managing Service Quality*, 24(4), 399-416. doi: 10.1108/MSQ-11-2013-0255

[22] Ljubojevic, C., & Ljubojevic, G. (2008). Building Corporate Reputation through Corporate Governance. *Management*, 3(3), 221-233.

[23] Ljubojević, Č., & Ljubojević, G. (2011). Improving Rhe Stakeholder Satisfaction By Corporate Governance Quality. *Škola biznisa*, 1, 22-35.

[24] Marvel, J. D. (2015). Unconscious Bias in Citizens' Evaluations of Public Sector Performance. *Journal of Public Administration Research and Theory*. doi: 10.1093/jopart/muu053

[25] Michie, J., & Oughton, C. (2001). Employee share-ownership trusts and corporate governance. Corporate Governance: *The international journal of business in society*, 1(3), 4-8. doi: 10.1108/14720700110397738

[26] Mitchell, A. M., & Wee, C. (2004). Corporate Governance in Asia Today and Tomorrow. *The International Lawyer*, 38(1), 1-13.

[27] Mohan, G. M., & Marimuthu. (2015). A Study on The Impact of Corporate Governance on Financial Performance. *ICTACT Journal on Management Studies*, 1(1).

[28] Morgan, R. M., & Hunt, S. D. (1994). The Commitment –Trust Theory of Relationship Marketing. *The Journal of Marketing*, 58(3), 20-38.

[29] Mulyadi, M. S., Anwar, Y., & Ikbal, M. (2012). The importance of corporate governance in public sector. *Global Business and Economics Research Journal*, 1(1), 25-31.

[30] Parasuraman, Zeithaml, V. A., & Berry, L. (1985). A Conceptual Model of Service Quality and Its Implication for Future Research. *Journal of Marketing*, 49, 41-50.

[31] Saxton, T. (1997). The Effects of Partner and Relationship Characteristics on Alliance Outcomes. *The Academy of Management Journal*, 40(2).

[32] Singh, J., & Sirdeshmukh, D. (2002). Agency and Trust Mechanisms in Consumer Satisfaction and Loyalty Judgments. *Journal of the Academy of Marketing Science*, 28(1), 150.

[33] Tjiptono, F., Arli, D., & Bucic, T. (2014). Consumer confusion proneness: insights from a developing economy. *Marketing Intelligence & Planning*, 32(6), 722-734.

[34] Tuan, L. T. (2014). Clinical governance, corporate social responsibility, health service quality, and brand equity. *Clinical Governance: An International Journal*, 19(3), 215-234. doi: 10.1108/CGIJ-02-2014-0007

[35] Wang, I.-M., & Shieh, C.-J. (2006). The Relationship between Service Quality and Customer Satisfaction: The Example of CJCU Library. *Journal of Information and Optimization Sciences*, 27(1), 193-209.

[36] Warren, A. M., Sulaiman, A., & Jaafar, N. I. (2014). Social media effects on fostering online civic engagement and building citizen trust and trust in institutions. *Government Information Quarterly*, 31(2), 291-301. doi: 10.1016/j.giq.2013.11.007

[37] Wu, H.-C. (2014). The effects of customer satisfaction, perceived value, corporate image and service quality on behavioral intentions in gaming establishments. *Asia Pacific Journal of Marketing and Logistics*, 26(4), 540-565. doi: 10.1108/APJML-03-2014-0049

[38] Wu, H. C. (2013). An empirical study of the effects of service quality, perceived value, corporate image and customer satisfaction on behavioral intentions in the Taiwan quick service restaurant industry. *Journal of Quality Assurance in Hospitality & Tourism*, 14(4), 364-390.

[39] Yaacob, H., & Basiuni, J. (2014). Corporate governance model of a state-owned enterprise-evidence from an Asian emerging market. *Corporate Governance*, 14(4), 504-514. doi: 10.1108/CG-12-2012-0097

[40] Zameer, H., Tara, A., Kausar, U., & Mohsin, A. (2015). Impact of service quality, corporate image and customer satisfaction towards customers' perceived value in the banking sector in Pakistan. *International Journal of Bank Marketing*, 33(4), 442-456. doi: 10.1108/IJBM-01-2014-0015

Supply Chain Performance: The Study on Bamboo Craft SMEs in Special Region of Yogyakarta

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Abstract

The aim of this study is examine the relationship between variable commitment, Consumer Relationship (CR), trust, Supply Chain Integration (SCI) and Supply Chain Performance (SCP) in a model. This study has 280 respondents from suppliers, and 280 respondents from SME managers. The sampling technique uses census. This study uses the setting of bamboo craft in Special Region of Yogyakarta (DIY). Data analysis technique uses a two step approach to SEM. The results shows that the SCP model proposed in this study could be accepted and indicated by the Goodness of fit index value which mostly shows good results. There is an effect of commitment and trust on SCI and the effect of SCI on SCP. On the other hand, the effect of CR on SCI is not significant.

Keywords: *commitment; Consumer Relationship (CR); trust; Supply Chain Integration (SCI); Supply Chain Performance (SCP).*

1. Introduction

State revenue is a reflection of the economic performance that has been achieved by the government. Hard efforts to continue improve this performance will be a report of the government's success. One of the efforts made by the government is increasing its export, because export is one of the driving factors to increase state revenue or economic growth (Bong et al., 2015). Special Region of Yogyakarta (DIY) is one of the provinces in Indonesia that has become a contributor to national export, especially handicraft export which made from bamboo, silver, wood, paper, leather, clay, and natural stones. The export growth of Special Region of Yogyakarta (DIY) in 2013 was 4.223 billion IDR, became 5.465 billion IDR in 2014, raised to 6.266 billion IDR in 2015, and raised again to 6.495 billion IDR in 2016.

Bamboo craft is one of the important handicraft export products from Special Region of Yogyakarta (DIY). In 2016, it produced an export value of 1.04 million US $ (0.42% Special Region of Yogyakarta (DIY) Export), followed by clay craft exports of 0.89 million US $ (0, 36%), silver craft of 0.69 million US $ (0.27%), and the lowest was leather craft export of 0.01 million US $ (0.001%). Nevertheless, the export value of bamboo crafts is still below the export value of wooden craft export (in 2016 is 7.15 million US $ (2.87%)), paper craft of 4.81 million US $ (1.94%), or stone craft of 3.97 million US $ (1.60%) (Statistic of Special Region of Yogyakarta, 2017). Therefore, increasing the export value of bamboo craft has become one of the policies of the Special Region of Yogyakarta (DIY) provincial government to further increase its contribution to national export or the GRDP (Gross Regional Domestic Product) of Special Region of Yogyakarta. The GRDP increase is the goal of the DIY government (Feriyanto, 2016)

The improvements of the bamboo craft industry's management will continue to be done so that the productivity of bamboo craft can be improved. Adequate supply of raw materials and efficient production will greatly assist in improving production management and sales in the form of bamboo craft export to the consumer. Through this research, the study of Supply Chain Integration and Supply Chain Performance in the bamboo craft industry in the Special Region of Yogyakarta (DIY) is very important to do.

A new era of supply chain development has transformed supply chain management to be more reactive or proactive. Christopher and Holweg (2011) states that when turbulence in the supply chain happens, two main supply chain strategies that can be used to overcome this are changes in the events that cause deviations in status quo and reactive or proactive strategies. Each of these strategies is proven to reduce vulnerability (Wieland and Wallenburg, 2012). At this time, there will be a delay to adjust the company's operations (Feitzinger and Lee, 1997; Sugandini et al., 2018). Information flow is needed by all supply chain members. At this level, key management process within and between supply chains must be clearly defined. The business and collaborative goals must also be clear. Beside that, Interdependence, commitment, and trust between the members of the supply chain are needed at this level. Long-term relationships between members of the supply chain are should be set. The high relationship of trust in the supply chain, supply chain integration, and customer relationship (CR) results in motivation for open communication and willingness to take risks among partner companies in buyer-supplier relationships. Thus, there will be inter-function coordination, collaboration and cooperation among all chain members which will ultimately improve the company's performance. This study aim to examine the supply chain performance (SCP) model that explores supply chain integration (SCI), commitment, customer relationship (CR) and trust relationships.

Research on SCP is important to study because there are inconsistent findings from the relationship between SCI and SPC (Devaraj et al., 2007; Germain and Iyer, 2006; Das et al., 2006; Stank et al., 2001). Thus, this study emphasizes on re-examining how SCI affects SCM. In addition, this study is also

important because in the supply chain literature, the performance of the supply chain is still not well defined. Srinivasan et al. (2011) defines supply chain performance for a company as the performance of various processes included in the company's supply chain function. Some indicators used to assess SCP are maximization of sales and profit (Hammel and Laura, 1993; Christopher and Holweg, 2011), buyer-supplier relationship maximization (Christy and Grout, 1994), customer satisfaction (Christopher and Holweg, 2011), efficiency inventory costs, the amount of on time delivery, product availability and customer response time (Lee and Billington, 1993; Beamon, 1999). This study seeks to strengthen the justification of SCP size that is right for SMEs, so that it can be used as a basis for further research on SCP.

Contributions that can be given in this study are:

a. This study shows that SCP indicators or measures that could be appropriate for SMEs are cost efficiency, coordination between departments, coordination with suppliers, coordination with customers and customer satisfaction;
b. This study uses respondents in pairs between suppliers and managers of SMEs. It is expected that by pair them, the data results more comprehensive. This study is different from previous studies that only measure SCP from the side of the company manager (Rajaguru and Matanda, 2012; Özalp et al., 2011; Sundram et al., 2016);
c. The results of this study can show that CR does not affect SCI. In the case of SMEs, it has not yet been discovered how SMEs can connect between suppliers and their customers. The SMEs which being analyzed are SMEs who have small business scale, so they do not have technological innovations that can connect suppliers-SMEs-consumers. The results of this study differ from previous studies which show that CR is able to affect SCI (Goswami, Engel and Krcmar, 2012); Vickery et al., 2003; Rajaguru and Matanda, 2012; Sundram et al., 2016).

2. Literature Review

2.1. Commitment and SCI

Commitment is a belief between related parties who want a continuous relationship, and is considered important in order to maintain the relationship. The company's commitment is at the core of the supply chain. Commitment can be obtained by making customers a top priority, long term, and based on mutually beneficial relationships (Morgan and Hunt, 1994; Ndubisi, 2007).

H1: Commitment affects Supply Chain Integration

2.2. Customer relationship and Supply Chain Integration

Gronroos (2006), in the context of relationship marketing, states that maintaining and building mutually beneficial relationships with customers is an important thing that needs to be understood in keeping customers loyal. Li et al., (2006) state that customer relations is the whole of practices used for the purpose of managing customer complaints, building long-term relationships with customers, and increasing customer satisfaction (Rajaguru and Matanda, 2012). Customer relationships consist of a whole set of practices used for the purpose of managing customer complaints, building long-term relationships with customers, and increasing customer satisfaction (Claycomb, Droge and Germain, 1999; Tan et al., 1998). Vickery et al. (2003) emphasize the importance of building close customer relationships as a key supply chain integration practice to enable organizations to respond more quickly to customers. Goswami, Engel and Krcmar, (2012) state that good relation with supply chain members, including customers, is needed for the successful implementation of the SCM program.

H2: Customer relationship affects SCI

2.3. Trust and SCI

Morgan and Hunt (1994) define trust as entrusting someone or something to safeguard their interests. Companies need to create more stable conditions, predict each other's behavior easily so that consumers become reluctant to change product providers. Bennet and Gabriel (2001; 2003) state that in the business world, buyer-seller trust helps in determining indicators related to performance such as range of information exchange, problems solving together, satisfaction with the results of activities that have been conducted and greater motivation in the implementation of decision outcomes. The existence of trust will create a sense of security and credibility and reduce the perception of risk in exchange (Selnes, 1993; Bennet and Gabriel, 2003; Sugandini et al, 2017). Trust is very important in every relationship, and will affect the level of integration in supply chain collaboration. Özalp et al. (2011) state that trust increases supply chain integration and collaboration. However, trust, an important concept for positive company performance and collaboration-integration, is not an easy task. Trust is the relationship between individuals and organizations, and it changes over time influenced by the integration of supplier and company behavior (Mayer, Davis and Schoorman, 1995)

H3: Trust affects supply chain integration

2.4. Supply Chain Integration (SCI) and Supply Chain Performance (SCP)

Supply chain is a business process and information that provide products and services from suppliers through the process of making and distributing to consumers (Schroender, 2007). Supply chain is a network of companies that are integrated and work together to create and deliver a product to customers. SCP is defined as a systematic process for measuring the effectiveness and efficiency of supply chain operations (Anand and Grover, 2015; Sundram et al., 2016).SCP measurement also promotes collaborative integration among members of the supply chain (Garengo and Bititci, 2007). An effective SCP measurement process is very important to ensure continuous improvement in the supply chain process, and the biggest challenges associated with SCP measurement relate to people who manage SCP success measurements, not their individual relationships in the chain. SCI is defined as the extent to which all activities in an organization and activities of suppliers, customers and other supply chain members are integrated (Flynn et al., 2010; Narasimhan and Kim, 2002; Rai et al., 2006; Stonebraker and Liao, 2006; Sundram et al., 2016).SCI connects companies with customers, suppliers and other channel members by integrating their relationships, activities, functions, processes and locations (Kim and Narasimhan, 2002; Naslund and Hulthen, 2012; Sundram et al., 2016). SCI has two stages: internal integration between functions and external integration with trading partners. Internal integration establishes a close relationship between functions such as shipping and inventory or purchasing and managing raw materials (Trkman and Groznik, 2015; Sundram et al., 2016). While external integration has two directions: forward integration for physical delivery flow between suppliers, producers and customers and coordination of information technology and data flows from customers, manufacturers, to suppliers (Frohlich and Westbrook, 2001; Schoenherra and Swink, 2012; Sundram et al., 2016).

H4: Supply Chain Integration affects Supply Chain Performance

3. Research Method

This study uses a questionnaire survey which is distributes to 560 respondents. The sample is paired between the SME manager and the supplier which is consist of 280 respondents

are procurement staff (including executives) in bamboo crafts SMEs and 280 respondents are suppliers of each bamboo SMEs. This study uses census samples. Eighteen items are assessed using a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree), indicating a good level of validity and reliability. Measurement items are modified to fit the bamboo craft context. This study adopts the CR instrument recommended by Rajaguru and Matanda (2012) and Tan and Trang (2017). Commitment is adopted from Morgan and Hunt, (1994). Trusts from Terawatanavong, Whitwell and Widing (2007). SCI is recommended by Sundram et al., (2016) and SCP is adapted from Anand and Grover (2015). Data analysis uses a two step approach to SEM.

4. Result

4.1. Description of respondents

The description of respondents is based on how long the SMEsruns their business and the amount of labor they have. SMEs that have been operating for 8-12 years are 61.5%, 13-17 years is18%, and 18-22 years is 20.5%. The number of workers 2-4 persons is 33.3%, 5-7 persons is 42.2%, and 8-10 persons is 20.5%. Descriptions of respondents from suppliers based on the length of time being a supplier in SMEs, 62% have partnered 1-3years, 28% have partnered 4-5 years, 5% have partnered 7-9 years, and 5% have been partnered > 9 years.

4.2. Data Analysis Results

The data analysis result shows that the SCP model which is affected by SCI, commitment, trust and CR can be accepted, with the value of GFI = 0.90; AGFI = 0.95; TLI = 0.975; CFI = 0.910; RMSEA = 0.057; p-ratio 0.00 and Cmin / DF = 7.96. The structural model can be seen in figure 1. The results of hypothesis test show that not all variables are significant. CR has no effect on SCI. Commitment has a positive effect on SCI of 66.0%, trust has an effect on SCI of 26.8% and SCI has a positive effect on SCP of 14.3%.

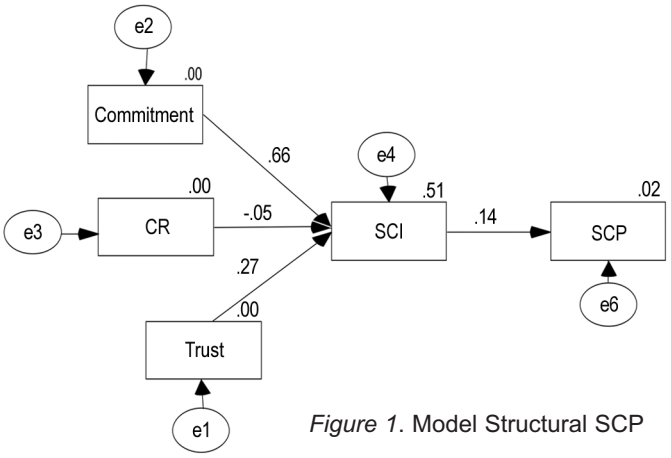

Figure 1. Model Structural SCP

5. Discussion

The results of this study indicate that the trust perceived by suppliers can improve supply chain integration as expected. The results of data analysis show that the effect of trust on SCI is significant. This means that the higher the trust, the better the SCI will be. The results of this study support the research of Bennet and Gabriel, 2001 which state that company need to create more stable conditions, predict each other's behavior easily so that consumers become reluctant to change product providers. The results of the study also support Bennet and Gabriel, (2003) which say that trust will create a sense of security and credibility and reduce partner perceptions of exchange risk. The trust given by bamboo SMEs to its partners includes promises to maintain the success of the partner business, give positive promises to partners, think about supplier welfare, trust that SMEs continue to have good intentions with suppliers, so the partners feel there is no need to be careful with SMEs. Atrust from its supplierswill impact on the ease of managing information systems, marketing participation and expansion of the supply chain with its suppliers.

The effect of the company's commitment to SCI shows good results, meaning that the higher the supplier's commitment, the better the SCI will be. The results of this study also support research conducted by Morgan and Hunt, 1994; Ndubisi, 2007 which state that corporate commitment can be aimed at continuously learning to provide customer needs and service quality so it will increase customer satisfaction, which in turn will bring the company to the creation of close relationships with its customers. Commitments given by bamboo SMEs are, among others, a commitment not to seek other partners, a commitment to keep doing business regularly and the commitment of SMEs to solve the problems of its partners. This commitment is able to facilitate SMEs in expanding their customer networks and supply chains.

CR has no significant impact on SCI because most consumers do not have technological innovations that can be a link between the flow of information from consumers to suppliers. The information obtained from consumers can only be conveyed to SMEs, and the SMEs will continue to the supplier. This is where the interference emerge which means that the information provided by consumers is sometimes not conveyed well by the supplier. Therefore, to integrate the consumer chain from the consumer side becomes difficult. The results of this study cannot support the findings of research conducted by Claycomb, Droge and Germain, (1999); Tan and Trang (2017) and Vickery et al. (2003).

The effect of SCI on SCP is positive. This shows that the better integration made by SMEs towards suppliers and customers is able to improve the performance of its supply chain. Bamboo SMEs show that the better communication links with suppliers and the wider the supply chain, have an impact on accuracy in determining costs, facilitating coordination between departments and with suppliers and increasing sales. The results of this study support the findings of research conducted by Garengo and Bititci, 2007; Naslund and Hulthen, 2012; Anand and Grover, 2015; Sundram et al., 2016

6. Limitation and Future Research Directions

The results of this study indicate that the SCP model that is constructed with variable Trust, CR, commitment and SCI relationships can be accepted; it can be seen in the findings of CR which have no effect on SCI. In general, the Fit test model is accepted. This means that this model deserves to be applied for further research. This study has several limitations: (1) The government can use the study's results as a guideline for coaching patterns for the handicraft industry, especially handicrafts for export purposes, so it will increase productivity and export value. Increasing the exports value will greatly determine the government's performance, especially in revenue indicators or economic growth. (2) The setting of this study only Bamboo craft SMEs, to increase the generalization of the study, research should be conduct in other creative industries, such as wood crafts, weaving crafts, leather crafts, batik crafts and other crafts that can still be explored in Yogyakarta. (3) Study locations only in DIY, for future research, it is better to expand by comparing SMEs in urban areas and / or large companies in an industry, so they can compare how supply chain is implemented to SMEs and large companies. (4) This study only explores the variables of trust, CR, commitment and SCI in relation to SCP. The further research can review the effect of CR on SCI which in this study had no significant effect on SCP. In addition, further research can add variables Innovativeness, Risk taking propensity, Competitive aggressiveness, Employee empowerment, Proactive-

ness, Perceived pressure from external social networks, Perceived pressure from consumers and community (Namagembe, Sridharan and Ryan, 2016). Other variables that can be considered to predict SCP are Information Availability, Communications and Rewards (Defee, Stank and Esper (2010). (4) Respondents in this study are only suppliers and managers of SMEs, it is recommended to use additional respondents from consumers, because the basis of supply chain management philosophy is the integration of information from suppliers, managers and consumers, so that they can produce more comprehensive research findings.

References

[1] Anand, N., and Grover, N. (2015). "Measuring retail supply chain performance: Theoretical model using key performance indicators (KPIs). Benchmarking". *An International Journal*, vol. 22, no. 1, pp. 135-166.

[2] Beamon, B. (1999). "Measuring supply chain performance", *International Journal of Operations and Production Management*, vol 19 (3), pp. 275-292.

[3] Bonga, W. G., Shenje, T. E., & Sithole, R. (2015). Export Sector Contribution to Economic Growth in Zimbabwe: A Causality Analysis. *The International Journal of Business & Management*, Vol. 3, Issue 10, pp. 452-464.

[4] Bennet R. and Gabriel H. (2001). Reputation, Trust and Supplier Commitment: The Case of Shipping Company/Seaport Relations, *The Journal of Business & Industrial Marketing*, 16, 6/7, pp. 424-438.

[5] Bennet, R., and Gabriel, H. (2003). "Image and reputational characteristics of UK charitable organizations: An empirical study", *Corporate Reputation Review*, vol. 6, no. 3, pp. 276-289.

[6] Christopher, M and Holweg, M. (2011). "Supply chain 2.0": Managing supply chains in the era of turbulence". *International Journal of Physical Distribution & Logistics Management*. Vol. 41, No. 1, pp. 63-82.

[7] Christopher, M. (1994). Logistics and supply chain management, Richard D. Irwin. *Financial Times*, New York, NY.

[8] Christy, D.P and Grout, J.R. (1994). "Safeguarding supply chain relationships", *International Journal of Production Economics*, Vol. 36, pp. 233-242.

[9] Claycomb, C., Droge, C. and Germain, R. (1999). "The effect of just-in-time with customers on organizational design and performance", *International Journal of Logistics management*. Vol. 10, No. 1, pp. 37-58.

[10] Das, A., Narasimhan, R, and Talluri, S. (2006). "Supplier integration – finding an optimal configuration", *Journal of Operations Management*. Vol. 24 (5), pp. 563-582.

[11] Defee, C. Clifford, Stank, Theodore P. (Ted) and Esper, Terry (2010). "Performance implications of transformational supply chain leadership and followership". *International Journal of Physical Distribution & Logistics Management*. Vol. 40, No. 10, pp. 763-791.

[12] Devaraj, S., Krajewski, L., Wei, J.C. (2007). "Impact of e-business technologies on operational performance: the role of production information in the supply chain", *Journal of Operations Management*. Vol. 25 (6), pp. 1199-1216.

[13] Feitzinger, E. and Lee, H. (1997). "Mass customization at Hewlett-Packard: the power of postponement", *Harvard Business Review*. Vol. 75, no. 1, pp. 116-121.

[14] Feriyanto, N. (2016)."Imbalance Relationship Between Regional Economic Growth and Income Percapita: An Empirical Analysis in Yogyakarta Special Province", *IJABER*. Vol. 14, No. 10, pp. 6739-6754.

[15] Flynn, Barbara B., Huo, Baofeng and Zhao, Xiande (2010). "The impact of supply chain integration on performance: A contingency and configuration approach". *Journal of Operations Management*. Vol. 28, pp. 58-71.

[16] Frohlich, M.T. and Westbrook, R. (2001). "Arcs of integration: an international study of supply chain strategies", *Journal of Operations Management*. Vol. 19(2), pp. 185-200.

[17] Garengo, P. and Bititci, U. (2007). "Towards a contingency approach to performance measurement: an empirical study in Scottish SMEs". *International Journal of Operations and Production Management*, 27(8), 802-825.

[18] Germain, R., Iyer, K.N.S. (2006). "The interaction of internal and downstream integration and its association with performance". *Journal of Business Logistics*. Vol. 27 (2), pp. 29-53.

[19] Goswami, S., Engel, T. and Krcmar, H. (2013). "A comparative analysis of information visibility in two supply chain management information systems". *Journal of Enterprise Information Management*. Vol. 26, No. 3, pp. 276-294.

[20] Grönroos, Christian (2006). "On defining marketing: finding a new roadmap for marketing", *Marketing Theory*, Vol. 6(4), pp. 395-417.

[21] Hammel, T.R. and Laura, R.K. (1993). "Tightening the supply chain.production and inventory", *Management Journal*, Vol. 34(2), pp. 63-70.

[22] Ishii, K., Takahashi, K. and Muramatsu, R. (1988). "Integrated production, inventory and distribution systems", *International Journal of Production Research*, Vol. 26(3), pp. 473-82.

[23] Kim, S.W. and Narasimhan, R. (2010). "Information system utilization in supply chain integration efforts", *International Journal of Production Research*, Vol. 40 (18), pp. 4585-4609.

[24] Lee, H.L. and Billington, C. (1993). "Material management in decentralized supply chains", *Operations Research*, Vol. 41(5), pp. 835-47.

[25] Li, Suhong, Ragu-Nathanb, B, Ragu-Nathanb, T.S. and Raob, S. Subba (2006). "The impact of supply chain management practices on competitive advantage and organizational performance", *Omega*, Vol. 34, pp. 107-124.

[26] Morgan, R.M. and Hunt, S.D. (1994), "The commitment-trust theory of relationship marketing", *Journal of Marketing*, Vol. 58, No. 3, pp. 20-38.

[27] Namagembe, S., Sridharan, R. and Ryan, S. (2016). "Green supply chain management practice adoption in Ugandan SME manufacturing Firms", *World Journal of Science, Technology and Sustainable Development*, Vol. 13(3), pp. 154-173.

[28] Narasimhan, R. and Kim, S.W. (2002). "Effect of supply chain integration on the relationship between diversification and performance: evidence from Japanese and Korean firms", *Journal of Operations Management*, Vol. 20 (3), pp. 303-323.

[29] Naslund, D. and Hulthen, H. (2012). "Supply chain management integration: a critical analysis". *Benchmarking, an International Journal*. Vol. 19 (4/5), pp. 481-501.

[30] Ndubisi, Nelson Oly (2007). "Relationship quality antecedents: the Malaysian retail banking perspective", *International Journal of Quality & Reliability Management*, Vol. 24, Issue: 8, pp. 829-845.

[31] Özalp, Ö., Zheng, Y., and Chen, K.-Y. (2011). "Trust in forecast information sharing", *Management Science*, Vol. 57, No. 6, pp. 1111-1137.

[32] Rai, A., Bush, A. and Tiwana, A. (2002). "Adaptive planning and optimization for supply chain networks", *White Paper. University Thought Leadership Forum on Adaptive Supply Chain Networks, SAP*. http://www.vendor-showcase. com/Vendors/221 / SAP AdaptPlanning-10-2-02h.pdf

[33] Rajaguru R. and Matanda M.J. (2012). "Effects of inter organizational compatibility on supply chain capabilities", *Industrial Marketing Management Journal*. Vol. 1(2), pp. 220-230.

[34] Roger C. Mayer, Davis, James H. and Schoorman, F. David (1995). "An integrative model of organizational trust", *The Academy of Management Review*, Vol. 20, No. 3, pp. 709-734.

[35] Schoenherr, T. and Swink, M. (2012), "Revisiting the arcs of integration: Cross-validations and extensions", *Journal of Operations Management*, Vol. 30, pp. 99-115.

[36] Schroeder, Roger G. (2007). *Operation Management Contemporary Concept and Cases*. Third Edition McGrawHill Book Company Inc, New York.

[37] Selnes, Fred (1993). "A examination of the effect of product performance on brand reputation, satisfaction and loyalty", *European Journal of Marketing*. Vol. 27, No. 9, pp. 19-35.

[38] Srinivasan, M., Mukherjee, D. and Gaur, A.S. (2011). "Buyer-supplier partnership quality and supply chain performance: Moderating role of risks, and environmental uncertainty", *European Management Journal*, vol. 29, pp. 260-271.

[39] Stank, T.P., Keller, S.B., and Daugherty, P.J. (2001). "Supply chain collaboration and logistical service performance". *Journal of Business Logistics.* Vol 22 (1), pp. 29-48.

[40] Statistic of Special Region of Yogyakarta (2017)
[41] Stonebraker, P.W. and Liao, J. (2006). "Supply chain integration: exploring product and environmental contingencies", *Supply Chain Management: An International Journal*, Vol. 11, Issue: 1, pp. 34-43.
[42] Sugandini, D., Wendry, B. and Muafi (2017). "Influence of Quality relationship and satisfaction on loyalty: Study on supplier in Indonesia. *Journal of Business & Retail Management Research*. Vol. 11, Issue 4, October, pp. 46-51.
[43] Sugandini, D., El Qadri, Z.M., Kustyadji, G. & Muafi (2018). "Employee Engagement in Entrepreneurship Management: SMEs Cases", *Academy of Entrepreneurship Journal.* Volume 24, Issue 2, pp. 1-8.
[44] Sundram, V.P.K., Chandran, V.G.R. and Bhatti, M.A. (2016). "Supply chain practices and performance: The indirect effects of supply chain integration", *Benchmarking: An International Journal*, Vol. 23, pp. 1445-1471.
[45] Tan, Trinh Le and Trang, Dao Thi Dai (2017). "Successful factors of implementation electronic customer relationship management (e-CRM) on e-commerce company", *American Journal of Software Engineering and Applications*, Vol. 6(5), pp. 121-127.
[46] Terawatanavong, C., Whitwell, Gregory J. and Widing, Robert E. (2007), "Buyer satisfaction with relational exchange across the relationship lifecycle", *European Journal of Marketing*, Vol. 41, No. 7/8, pp. 915-938.
[47] Trkman, P., Mertens, W., Viaene, S. and Gemmel, P. (2015), "From business process management to customer process management", *Business Process Management Journal*, Vol. 21, no. 2, pp. 250-262.
[48] Vickery, S.K., Jayaramb, J., Droge, C. and Calantone, R. (2003). "The effects of an integrative supply chain strategy on customer service and financial performance: an analysis of direct versus indirect relationships", *Journal of Operations Management*, Vol. 21, pp. 523-539.
[49] Wieland, A. and Wallenburg, C.M. (2012). "Dealing with supply chain risks: Linking risk management practices and strategies to performance". *International Journal of Physical Distribution and Logistics Management*, Vol. 42(10), pp. 887-905.

Budgetary Participation on Managerial Performance: Commitment Organization, Innovation Perception, and Job Relevant Information as Mediating Variable

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Abstract

This study aims to analyze the Effect of Budgetary Participation on Managerial Performance with Commitment on Organization, Innovation Perception, and Job Relevant Information as intervening variable. The population of this study is representing of the budget compilation team on the Echelon II unit at the Central Office Work Unit of the Ministry of Agriculture which sampling is done by census or total sampling method. The number of samples collected after the specified time limit is 64 units of work. Technical analysis used is Partial Least Square (PLS) with data processing using Smart PLS software Version 3.2.3. The result of hypothesis showed budget participation had positive and significant effect to managerial performance (H1), budget participation had positive and significant effect to commitment on organization (H2), budget participation had positive and significant influence to perception of innovation (H3), Based on the results of the analysis, it can be concluded that budgetary participation has an indirect effect on managerial performance through innovation perception variable.

Keywords: *budgetary participation; managerial performance; organizational commitment; innovation perception; job relevant information.*

1. Introduction

The performance of government agencies has always been in the spotlight, especially since the emergence of a more democratic climate in government, so that in assessing the performance of the organization can be done objectively, we need performance indicators, this is in accordance with the mandate of Law number 17 of 2003 on State finances. The ideal performance indicators should be related to cost efficiency, effectiveness and quality of service (Mardiasmo, 2004). In the central government, the meaning of budgetary participation is the Institution work units in the preparation of the State Budget (APBN), the head of the work unit at the Ministry/ Institution is the power of budget users who are given the opportunity to propose in relation to the implementation of the main duties and functions of the unit the work he leads. Budgetary participation in addition to being judged to have consequences for the attitudes and behaviors of members of the organization, will also affect managerial performance. Furthermore, Mardiasmo, (2004) argues that the budget has a function as a tool of performance appraisal. Performance will be assessed based on the achievement of budget targets and the efficiency of budget execution. The performance of public managers is judged by how much has been achieved in relation to the established budget.

Research on the relationship between budgetary participation on performance to be an interesting theme to be studied, because it is a study that is still much debated. Participation is seen as a managerial approach that can improve performance, but some studies conducted to examine the relationship between budgetary participation and performance are conflicting and debatable (Brownell and McInnes, 1986).

Prior research has been shown the empirical evidence of mixed and inconsistent results, including the following: Hopwood, (1972) finds evidence that budgets negatively affect manager behavior when budgets are used to evaluate performance. According to Milani, (1975) stated that there is no significant influence between budgetary participation and managerial performance. Otley, (1978) who adapted Hopwood, (1972) study, found no evidence of a negative effect of budgetary use on performance, while Mia, (1988) found evidence of a non-significant negative relationship between budgetary use on performance. Brownell and McInnes, 1986; Chenhall and Brownell, (1988) found evidence that there was a positive and significant relationship between participation in budgeting and managerial performance. This shows the relationship between the participation of budgeting with performance both directly and indirectly, still showing inconsistent and conflicting results (Gul, 1995). The inconsistency of the results of the above study is generally due to the researchers using different perspectives in developing the theory of the relationship between budgetary participation and performance.

According to Govindarajan, (1986) states that to overcome inconsistent and contradictory research results a contingency approach is required. This suggests that the relationship between budgetary participation and managerial performance is allegedly influenced by various conditional factors or variables, including Moderating and Intervening variables that are considered to moderate and mediate the relationship between budgetary participation and the performance of Chenhall dan Brownell, (1988); Shields, (1998); Subraniam and Ashkanasy, (2001). This study will use Chenhall and Brownell, (1988) intervening variable view model to test the effect of the intervening variable. This study uses different intervening and respondent setting variables, with the addition of Job Relevant

Information (JRI) variable referring to Maria, (2009), due to Job Relevant Information as a conditional factor that is supposed to improve the relationship both directly and indirectly between the participation of budgeting and managerial performance. This research is designed to know the relationship of budget participation with management performance through commitment to organization, perception of innovation and Job Relevant Information as intervening variable to public sector environment.

2. Literature

The goal setting theory developed Gibson et al., (2012) explains the relationship between a defined goal and work performance. The basic concept of this theory is that someone who understands the purpose (what the organization expects for him) will affect his work behavior. This theory also states that individual behavior is governed by one's ideas and intentions. Goals can be viewed as goals/ levels of performance to be achieved by individuals. If an individual is committed to achieving his goals, then this will affect his actions and affect the consequences of his performance. In this theory it is also explained that challenging goal determination and measurable results will be able to improve work performance, followed by having the ability and job skills.

2.1. Budgetary Participation on Managerial Performance

Setting the goals of each budgeting team is very influential in improving the performance of managers, i.e. when objectives are planned and approved participatively, managers will internalize those goals and they will have personal responsibility to achieve them through engagement in the budget process (Milani, 1975). Participation in the budgeting process is considered by some to be a panacea to meet the need for self-esteem and accepting from members of the organization.

Several research results in this field have shown a positive relationship between participation and performance among others Brownell and McInnes, (1986); Chenhall dan Brownell, (1988) while the research group whose results show participation has a negative relationship with performance is Milani, (1975; Mia, (1988), while the results of Bryan and Locke, (1967) show that these two variables are contradictory or negative.

H1: Budgetary Participation has a positive effect on Managerial Performance

2.2. Commitment Organization on Budgetary Participation and Managerial Performance

Theory goal setting emphasizes the need to focus on setting organizational goals, this is the effect on the work of each employee. This theory is used as an approach in terms of budgeting participation, which states that the higher the participation of employees in terms of budgeting process, will have a commitment in completing the tasks undertaken, this encourages each in carrying out its function, so that each budget compilation team are required to have a commitment organization.

Nor et al., (2008) found evidence that budgetary participation influences organizational commitment. Nouri and Parker, (1998); Dick and Metcalfe, (2001) found that budgetary participation has a positive relationship with commitment organization. Nouri and Parker, (1998) argue that when managers are involved in the budgeting process, it will cause them to be more capable of accepting budget goals and organizational goals, thereby increasing commitment to the organization. Nor et al., (2008) found evidence that commits in the organization have a positive effect on managerial performance. Nouri and Parker, (1998) argue that commitment to organizational and managerial performance has a positive and significant influence. The higher the commitment organization, middle management will feel to have the organization where it works so that making middle management will give better performance. Employees who have understood the purpose of the organizational unit will directly affect the quality of their work, this has been described in the Goal Setting Theory. Employees who are committed organization mean knowing and understanding the purpose of their organizational unit, this will encourage the quality of work so as to improve managerial performance.

According to Locke and Schweiger, (1979) demonstrate that commitment organization can improve managerial performance, while lack of commitment organization leads to confusion and dissatisfaction of the implementers, resulting in a decline in performance. Some studies support the positive effect of commitment on organization to managerial performance (Ivancevich, 1976; Imoisili, 1989). Managers who work without clear goals will be faced with high uncertainty over the achievement of the goals set previously. Based on the above description can be drawn hypothesis as follows:

H2: Budgetary Participation has a positive effect on Commitment Organization

H2a: Commitment Organization has a positive effect on Managerial Performance

H2b: Commitment Organization mediates the relationship between Budgetary Participation on Managerial Performance.

2.3. Perception Innovation on Budgetary Participation and Managerial Performance

Individual involvement in budgeting is a means of contributing ideas, innovations and thoughts for the benefit of the organization. The basic concept of goals-setting theory is that individuals who understand the goals of the organizational unit will influence their work behavior, so that ideas, innovations, and thoughts will continue to grow in line with the individual's understanding of the vision and mission of his organizational unit (Gibson et al., 2011).

Nor et al., (2008) found evidence that budget participation had a positive effect on perceptions of innovation. Subraniam and Ashkanasy, (2001) found evidence that budget participation would foster manager's perceptions of innovation. Managers feel that their creative ideas are valued by the organizations they work in which will foster higher innovation. According to Borins, (2001) revealed that innovation occurs because of organizational cooperation in problem solving. Cooperation is applied in the process of preparing the budget.

Theory goal setting arises when the individual has a clear purpose, then the induvidu has a high motivation (Locke, and Schweiger, 1979). This motivation encourages employees to provide ideas, innovations and ideas to achieve the objectives of their units of organization, thereby improving the quality of the performance of its organizational units.

Williams et al., (1990) argues that innovation argues that innovation is also important in the public sector, such as improving quality, enhancing departmental reputation and organizational performance. Nor et al., (2008) states that managers' perceptions of innovation illustrate the extent to which managers consider themselves to be innovative, so managers with high perceptions of innovation will have better quality of managerial performance.

Borins, (2001) argues that the interaction between budget participation, perception of innovation, and attention to detail will lead to increased managerial performance. The results of this study indicate that managers who have a high perception of innovation will improve performance. Managers who have a high perception of innovation will make it more innovative and creative in slowing down their jobs so that performance will improve. Damanpour, (1989) found evidence that innovation depends on cooperation between organizations when solving problems.

H3: Budgetary Participation has a positive effect on Innovation Perception

H3a: Innovation Perceptions has a positive effect on Managerial Performance

H3b: Innovation Perceptions mediate the relationship between Budgetary Participation on Managerial Performance.

2.4. Budget Participation on Job Relevant Information

According to Gibson et al., (2012) suggests that goal setting is a process involving superiors and subordinates together in the determination or determination of goals or work goals to be implemented. In the context of this research, the employees involved in budgeting will be more committed when together in the determination and determination of the objectives of the work objective, so that they can use the information they have to arrange and implement the budget more quickly and accurately. This is a driving factor in running the organization for achievement of performance.

Candra, (2009) states that budgetary participation will generate motivation in managers to obtain and use the best information to use as a basis for budget decision making, so in this case managers will consider the actions that will be done. In other words, managers will participate to obtain and use more accurate information.

Relevant information in accordance with the work will be obtained when employees have clear and definite objectives, and the means for transferring information from subordinates to superiors through organizational unit objectives are clear and measurable, resulting in better organizational unit performance. This is consistent with the theory of goal setting when the stated goal will produce relevant information if one accepts the goal (Gibson et al., 2012).

Nouri and Parker, (1998) stated that if subordinates participating in the budgeting process can result in the disclosure of private information they have, such information can help to plan and produce a more accurate budget. Candra, (2009) argues that job relevant information will help subordinates improve their actions through better action, resulting in an increase in managerial performance.

Subordinate involvement in the budgeting process will make it possible for them to provide information that is known. In this case it may be that subordinates disclose the information it obtains that can be entered into the determination of the budget. Kren, (1992) uses job-related information variables as intervening variables to explain the relationship between budgetary participation and managerial performance. From these studies found evidence that budgetary participation is not directly related to managerial performance, but participation is positively related to managerial performance through JRI, and with the acquisition of JRI managerial performance will increase.

The research of Vincent and Chong, (2002); Kusnasriyanti and Ghozali (2005), resulted in the finding that job relevant information had a positive effect on managerial performance, in which Vincent and Chong, (2002) research had significant positive effects, but in Kusnasriyanti and Ghozali (2005) positive and insignificant influence. Candra, (2009) argues that job relevant information will help subordinates improve their actions through better action, resulting in an increase in managerial performance. Information generated during the participatory process will increase the ability of subordinate individuals in performing their duties. If relevant information can help subordinates to improve and improve their choice of action more appropriately, then with relevant information will improve performance. With participation in budgeting will create job relevant information, the existence of job relevant information will of course improve managerial performance.

H4: Budgetary Participation has a positive effect on Job Relevant Information

H4a: Job Relevant Information has a positive effect on Managerial Performance

H4b: Job Relevant Information mediates the relationship between Budgetary Participation with Managerial Performance.

Based on the above description, the researcher looks for the direction and significance of the relationship if the manager gets sufficient participation in the budgeting process whether it can improve performance through intermediary commitment organization, innovation perception and job relevant information, which is described as follows:

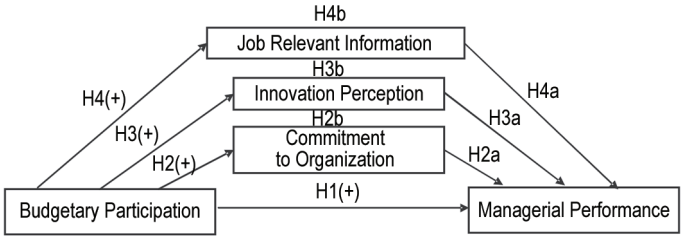

Figure 1. Theoretical Framework

3. Research Method

3.1. Sample and Data Collection

This study is an empirical study with a population of all representatives of the budgeting team in the echelon II unit of the Ministry of Agriculture headquarters, with data collection using the census method, so that the data obtained is a calculation of all elements in the study population (Sekaran, 2006). The tool used in collecting data with questionnaires distributed to the entire population of 64 units of work, with respondents research is one member of the work unit planning team that is directly related to the preparation of budget work unit scope in echelon unit II headquarters of the Ministry of Agriculture which is an official structural, consisting of heads of departments, subdistrict heads, subdirectorate heads or section heads headed by echelon II unit heads at the Ministry of Agriculture.

3.2. Analysis Method

This research uses technical variance-based statistical SEM or Partial Least Square (SEM-PLS) analysis, because it is more powerful, so it can be used to build research model with many variables and indicators, can draw the model in graphical form, is distribution-free and still many more advantages possessed PLS. Hypothesis testing using path analysis structural because of each variable has one dimension of measurement. Testing is done by using analysis tool SmartPLS and assisted with SPSS to test Descriptive Statistics. PLS developed first times by Herman Wold in 1966 as a general method for estimating path models which uses latent constructs with mul tiple indicators (Ghozali, 2006).

3.3. Result and Discussion

The data was collected using questionnaires instrument delivered directly to representatives of budget composition team of work unit of echelon II of head office of Ministry of Agriculture, 64 respondents. The basis of calculating the range of theoretical mean values and the range of actual mean values using the frequency of respondents' answers above, along with the theoretical range, actual range, mean, and standard deviation can be seen in Table 1.

H1 which states that participation has a positive and significant effect on managerial performance is **accepted**. The results of this study are in line with research conducted by Supriyono, (2004); Nor et al., (2008); Ermawati, (2012); Setiadi, and Yuyetta, (2013) which also states that budgetary participation has a positive and significant effect on managerial performance. However, the results of this study are not in line with the research conducted by Candra, (2009) which states that

Variables	Number of Valid Indicators	Theoretical		Actual		
		Range	Mean	Range	Mean	Standard Deviation
Budget Participation	6	6-30	18	11-29	23.25	3.35
Managerial Performance	10	10-50	30	20-49	37.77	6.04
Commitment Organizations	8	8-40	24	31-45	38.05	3.66
Innovation Perception	6	6-30	18	14-30	23.31	3.39
Job Relevant Information	4	4-20	12	11-20	16.80	1.96

Table 1.
Descriptive Statistics of Research Variables

Source:
SPSS 21 output is processed, 2018

Hypothesis	Path Coefficient (β)	Standard Error	T- Statistics	P- Value	Information
PA -> KM	0.335	0.128	2.612	0.009	Accepted
PA -> KO	0.513	0.071	7.212	0.000	Accepted
KO -> KM	0.055	0 .121	0.453	0.650	Rejected
PA -> PI	0.540	0.084	6.415	0.000	Accepted
PI -> KM	0.376	0.117	3.207	0.001	Accepted
PA -> JRI	0.627	0.080	7,790	0.000	Accepted
JRI -> KM	0.194	0.118	1.644	0.101	Rejected

Table 2.
Path Coefficient, t-statistics, and Significance of Hypothesis Testing Indirect Relationship

Source:
SmartPLS Results 3.2.3, 2018

VARIABLES	Path Coefficient (β)		Standard Error (STERR)		The value of Z	Information
	A	B	Sa	Sb		
PA -> KO -> KM	0.513	0.055	0.071	0.121	0.453	Rejected
PA -> PI -> KM	0.540	0.376	0.084	0.117	2.624	Accepted
PA -> JRI -> KM	0.627	0.194	0.080	0.118	1.576	Rejected

Table 3.
Test a sobel

Source:
SmartPLS Results 3.2.3, 2018

budget participation has a negative and insignificant effect on managerial performance. The results of this study mean that the higher budget participation in an organization, the higher it will be understood in the application of management functions to the budgeting team in the organization. Budget participation is built by taking into account organizational goals that have been set. As the theory of goal setting used in this study budget participation is a means to measure the achievement of organizational goals by each manager, so that the higher employee participation in terms of the budget preparation process, will encourage employee motivation to successfully complete the task, obtain awards, responsibility for work, and avoid dissatisfaction in work, so that each employee involved in the preparation of the budget will be more motivated in improving its performance.

H2 which states that participation has a positive and significant effect on managerial performance is **accepted**. The results of this study are in line with research conducted by Nouri and Parker, (1998); Dick and Metcalfe, (2001); Nor et al., (2008) which state that budget participation has a significant positive effect on commitment organization. It can be concluded that the higher the level of participation in the preparation of the work plan and budget by the budgeting team, it will encourage the commitment invested in the organization, on the contrary, the weaker the level of budget participation, the worse the commitment organization. As explained in the theory of goal setting which states that giving emphasis to the focus of setting organizational goals, this is what influences the work of each employee.

H2a which states that the commitment organization has a positive effect on managerial performance is **rejected**. This is caused by the high commitment organization has not been able to provide comprehensive information for managers in completing managerial tasks so as not to achieve management functions. The results of this study are in line with research conducted by Parker and Kyj (2006) which also states that commitment organization does not affect managerial performance. However, the results of this study are not in line with the research conducted by Supriyono, (2004); Nor et al., (2008); Ermawati, (2012); Setiadi, and Yuyetta, (2013) which states that commitment organization has a positive and significant effect on managerial performance. The results of this study cannot be explained through the Goal Setting Theory which states that commitment organization will direct someone to achieve higher performance. The better the commitment organization, the higher the achievement of manager's performance.

H2b which states that the commitment organization mediate partially the effect of budgetary participation on managerial performance is **rejected**. The results of this study are in line with Parker and Kyj, (2006) which also states that commitment organization cannot mediate the relationship between budget participation and managerial performance, but not in line with the research of Nor et al., (2008) found evidence that budgetary participation influences managerial performance through variable commitment organization. Commitment organization is not a mediating variable in the relationship between participation in budgeting and managerial performance, this means that this variable does not affect the participation variables in the preparation of the budget and then affects the managerial performance variables. Based on the previous discussion, it can be interpreted that when the budgeting teams are involved in the preparation of the budget, they will have a high level of commitment organization, but will not affect the performance of the budget preparation team, because it is caused by high commitment organization not yet able provide comprehensive information for managers in completing managerial tasks so that management functions have not been achieved.

H3 which states that the participation of a significant and positive impact on the perception of innovation be **accepted**. The results of this study are in line with research conducted by Subraniam and Ashkanasy, (2001); Nor et al., (2008); Ermawati, (2012) which states that budget participation has a significant positive effect on perceptions of innovation. It can be concluded that the higher the level of participation in the preparation of work plans and budgets by the budgeting team, the higher the possessed perception of innovation. Conversely, the weaker level of budget participation, the lower the perception of innovation. The goals of states that when individuals play a role in an organizational unit will influence their work behavior, so ideas, innovations, and thoughts will continue to evolve in line with individual understanding. of the vision and mission of the organizational unit.

H3a which states that the perception of innovation has a positive and significant effect on managerial performance is **accepted**. The results of this study are not in line with the research conducted by Nor et al., (2008); Ermawati, (2012) which states that the perception of innovation has no effect on managerial performance. The results of this study are in line with the Goal Setting Theory which states that respondents' judgments about high planning team's perceptions of innovation include clarity of goals and processes, so that ideas, innovations, and thoughts will continue to develop which will lead them to achieve higher

H3b which states a perception of innovation partially mediates the effect of budget participation on managerial performance is **accepted**. The results of this study are in line with Borins (2001) which states that budgetary participation influences managerial performance through innovation perception variables, but not in line with the research of Nor et al., (2008) who found evidence that innovation perceptions cannot mediate relationships between budget participation in managerial performance. Perception of innovation as a mediating variable in the relationship between participation in budgeting and managerial performance, means that this variable is influenced by participation variables in budgeting and then influences managerial performance variables. Based on the previous discussion, it can be interpreted that when structural officials are involved in the budget preparation team, they will have a high level of innovation perception, increasing perceptions of innovation will affect the performance of the budget participation team. With involvement in the preparation of the budget, innovative decisions and attitudes that make up the budget will increase, thus affecting their behavior, which tends to be positive as indicated by the increase in knowledge, quick response, new ideas, risk taking, careful take risks, and always provide input in decision making. This positive attitude will help them to give their best efforts in achieving their budget goals and to improve their performance which in turn will have an impact on achieving organizational goals effectively and efficiently in order to improve and add to the activities of the Ministry of Agriculture.

H4 which states that the participation of a significant and positive impact on job relevant information is **accepted**. The results of this study are in line with research conducted by Kusnasriyanti and Ghozali, (2005); Candra, (2009); Maria et al., (2009) which states that budget participation has a significant positive effect on job relevant information. It can be concluded that the higher the level of participation in the preparation of work plans and budgets by the budgeting team, it will encourage the acquisition of relevant workplace information. The results of this study are in line with the theory of goal setting which states that when individuals play a role in the organizational unit it will influence the process of the involvement of superiors and subordinates jointly in determining or setting goals or work objectives to be carried out.

H4a which states that job relevant information have positive and significant effect on managerial performance is **rejected**. The results of this study are in line with research conducted by Kusnasriyanti and Ghozali, (2005); Burney and Widener, (2007) which states that job relevant information has no effect on managerial performance. However, the results of this study are not in line with research conducted by Candra, (2009); Maria et al., (2009) which also states that job relevant information affects managerial performance. The results of this study are not in line with the Goal Setting Theory which states that an individual needs information about where this organization will run in order to estimate the ability to take steps and initiatives. More comprehensive information is obtained from performance measurement tools that include financial and non-financial information. This information must correctly describe performance indicators so as to motivate managers in completing work (Kanter, 1989).

H4b which states that relevant information mediates partially the influence of budgetary participation on managerial performance is **rejected**. The results of this study are in line with Kusnasriyanti and Ghozali, (2005) which also states that job relevant information cannot mediate the relationship between budgetary participation and managerial performance, but is not in line with Candra, (2009); Maria et al., (2009) found evidence that budgetary participation influences managerial performance through job relevant information variables. Job relevant information is not a mediating variable in the relationship between budgetary participation and managerial performance, this means that this variable does not affect the participation variables in the preparation of the budget and then affects the managerial performance variables. Based on the previous discussion, it can be interpreted that when the budgeting teams are involved in preparing the budget, they will have a high level of effectiveness in using job relevant information, but it will not affect the performance of the budget preparation team, because it is caused by the high effectiveness of job use. Relevant information is not able to provide comprehensive information for managers in completing managerial tasks so that management functions have not been achieved.

4. Conclusion

The results of this study indicate that budget participation implemented by the Ministry of Agriculture has been able to provide added value through managerial performance either directly or indirectly, the indirect relationship between the influence in mediation through innovation perceptions of each budget drafting team in echelon unit II office central Ministry of Agriculture in order to achieve the mission, goals, and objectives of the organization. This is in line with the application of goal-setting theory which states that when the individual has a clear purpose, then the individual has a high motivation (Locke and Schweiger, 1979).

Research this has several limitations, including study is done at the ministry of agriculture, but it can not represent the central government, this research only use 3 (three) variable as intervening, which is likely beyond the 3 (three) of these variables are still many other variables, and this study evaluates managerial performance on the basis of self-perceptions of representatives of the budgeting team that may be biased in the results assessment .

Suggestions for future research improvements are expected to extend the scope of the research in order to make a more meaningful contribution in the public sector budget of the organization, to consider investigating other mediating variables such as motivation, budget adequacy and emphasis, and using interview methods in addition to questionnaires to obtain information better and more credible data.

References

[1] Borins, S. (2001). Encouraging innovation in the public sector. *Journal of Intellectual Capital*, 2(3), pp. 310-319.

[2] Brownell, P. and McInnes, M. (1986). Budgetary participation, motivation, and managerial performance. *Accounting Review*, Vol. 61, No. 4, pp. 587-600.

[3] Bryan, J.F. and Locke, E. (1967). Goal setting as a means of increasing motivation. *Journal of Applied psychology*, 51(3), pp. 274.

[4] Burney, L. and Widener, S. (2007). Strategic performance measurement systems, job-relevant information, and managerial behavioral responses role stress and performance. *Behavioral Research in Accounting*, 19(1), pp. 43-69.

[5] Candra Sinuraya (2009). The Effects of Budgetary Participation on Management Performance: The Role of Budget Adequacy and Job Relevant Information (JRI) as an intervening variable. *Journal of Accounting*, 1(1), pp. 17-39.

[6] Chenhall, R., and Brownell, P. (1988). The Effect of participative budgeting on job satisfaction and performance: role ambiguity as an intervening variables. *Accounting Organitation and Society*, 13, pp. 225-234.

[7] Damanpour, F., Szabat, K.A. and Evan, W. (1989). The relationship between types of innovation and organizational performance. *Journal of Management studies*, 26(6), pp. 587-602.

[8] Dick, G. and Metcalfe, B. (2001). Managerial factors and organisational commitment-A comparative study of police officers and civilian staff, *International Journal of Public Sector Management*, 14(2), pp. 111-128.

[9] Ermawati, N. (2012). The Effect of Budget Participation on Managerial Performance: Commitment to Organizations and Perception of Innovation as Intervening Variables (Case Study in

Pati Regency), *Tesis, Diponegoro University*.
[10] Ghozali, I. (2006). *Statistik Non Parametrik*. Semarang: Badan Penerbit UNDIP.
[11] Gibson, J.L., Ivancevich, J.M., Donnelly, Jr., J.H., and Robert Konopaske, R. (2011). *Organizations: Behavior, structure, processes*, 14th ed., Organizations: Behavior, structure, processes. (14th ed.). USA: McGraw-Hill, Irwin.
[12] Gibson, J.L., Ivancevich, J.M. Donelly, Jr., J.H, and R.K. (2012). *Organizations*. 14th Edit. MC Graw Hill Companiec, Inc.
[13] Govindarajan, V. (1986). Impact of participation in budgetary process on managerial attitudes and performance and universalistic and contingency perspectives, *Decision Sciences*, (17), pp. 496-516.
[14] Gul F.A., and Tsui, S.C.C. Fong (1995). Decentralization as a moderating factor in the budgetary Participation-Performance relationship: some Hongkong Evidence, *Accounting and Business Research*, 25, pp. 107-113.
[15] Hopwood, A.G. (1972). An empirical study of the role of accounting data in performance evalution', *Journal of Accounting Research*, 10, pp 156-182.
[16] Imoisili, O. (1989). The role of budget data in the evaluation of managerial performance, *Accounting, Organizations and Society*, 14(4), pp. 325-335.
[17] Ivancevich, J. (1976). Effects of goal setting on performance and job satisfaction, *Journal of Applied Psychology*, 61(5), pp. 605.
[18] Kanter, R. (1989). The new managerial work, *Harvard business review*, 67(6), pp. 85.
[19] Kren, L. (1992). Budgetary Goal Characteristics on Managerial Attitudes and Performance, *The Accounting Review*, 44(4), pp. 707-721.
[20] Kusnasriyanti Yusfaningrum and Imam Ghozali (2005). Analysis of the Effect of Budget Participation on Managerial Performance through Commitment to Budget Objectives and Job Relevant Information as Intervening Variables, *National Accounting Symposium VIII*.
[21] Locke, E.A. and Schweiger, D. (1979). Participation in decision-making: One more look, *Research in organizational behavior*, 1(10), pp. 265-339.
[22] Mardiasmo. (2004). *Public Sector Accounting*. Yogyakarta: ANDI.
[23] Maria A, Leach-López William W, Stammerjohan Kyoo Sang Lee (2009). Budget participation and job performance of South Korean managers mediated by job satisfaction and job relevant information, *Management Research News*, 32(3), pp. 220-238.
[24] Mia, L. (1988). Managerial attitude, motivation and effectiveness of budget participation', *Accounting Organization and Society*, 14, pp. 465-476.
[25] Milani, K. (1975). The relationship of participation in budget setting to indusrial supervisor performance and attitude, *The Accounting Review*, 50, pp 274-284.
[26] Nor Yahya, M., Nazli Nik Ahmad, N. and Hamid Fatima, A., (2008). Budgetary participation and performance: some Malaysian evidence, *International Journal of Public Sector Management*, 21(6), pp. 658-673.
[27] Nouri, H. and Parker, R., (1998). The relationship between budget participation and job performance: the role of budget adequacy and organizational commitment, *Accounting Organization and Society*, 23, pp. 467-483.
[28] Otley, D. (1978). Budget use and managerial performance, *Journal of Accounting Research*, 16, pp. 122-149.
[29] Parker, R.J. and Kyj, L., (2006). Vertical information sharing in the budgeting process', *Accounting, Organizations and Society*, 31, pp. 27-45.
[30] Sekaran, U. (2006). *Research methodology for business*. John Wiley & Sons, Inc.
[31] Setiadi, H. and Yuyetta, E.N. (2013). Effects of Budget Participation on Managerial Performance Through Organizational Commitment and Budget Emphasis as Intervening Variables (Case Study on SKPD Boyolali Regency Government), *Doctoral dissertation, Faculty of Economics and Business Undip*.
[32] Shields, J.F., and M.D.S. (1998). Antecedents of participative budgeting, *Accounting, Organizations and Society*, vol. 23, issue 1, pp. 49-76.
[33] Subraniam, N. and Ashkanasy, N.M. (2001). The Effect of organizational culture ssprecеption between budgetary participation and manajerial job related outcomes, *Australian Journal of Management*, 26, pp. 35-55.
[34] Supriyono, R. (2004). The effect of intervening variables on Budget Adequacy and Organizational Commitment on the Effects Between Budget Participation and Manager Performance, *Journal of Indonesian Economics and Business*, 19(3).
[35] Vincent, Chong K, and C.M. kar. (2002). Budget Goal Commitment and Informational Effect of budget Participation on Performance: A Structural Equitation Modeling Approach, *Behavioral Research in Accounting*, Vol. 14, No. 1, pp. 65-86.
[36] Williams, J.J, Macintosh, N.B., and Moore, I, C. (1990) 'Budget related behaviour in public sector organization: some empirical evidence', *Accounting, Organizational and Society*, 15, pp. 221-243.

The Effect of Geo-Cultural Product Attractiveness on Marketing Performance: A Conceptual Framework

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Abstract

Small-medium Enterprises (SMEs) is one of a contributor to employment opportunity, gross domestic product growth and non-oil and gas export in Indonesia. But most SMEs are not able to go up the class due to various weaknesses. One of the weaknesses of SMEs is marketing ability/performance. This study aims to fill the research gap factor between the ability of product innovation and enrich marketing performance. This study proposed Geo-cultural product attractiveness to bridge the gap between product innovation capabilities in improving marketing performance. Sample data from 250 SMEs in South Sulawesi Province in Indonesia was used to test our model. Data analyzed using descriptive statistics and Structural Equation Modeling. The result confirmed the model that with variables: Innovation, Geo-cultural product attractiveness, Marketing Orientation and Marketing performance, indicated that Geo-cultural product attractiveness holds a strategic role in enhancing marketing performance.

Keywords: *geo-cultural product attractiveness; marketing performance; innovation; marketing orientation.*

1. Introduction

Small Medium Enterprises (SMEs) in the economy has a significant and strategic role. This condition can be seen from various data that support that the existence of SMEs is quite dominant in the Indonesian economy. First, the amount of industry is significant and it's found in every economic sector. Secondly, it's vast potential in absorbing labor, and thirdly, the contribution of SMEs to GDP formation is quite significant, namely 52.33% of total GDP in 2014 (Ministry of Cooperation and SME of Republic of Indonesia, 2018).

Since 2015, Indonesia has faced the challenge of changing the ASEAN Economic Community (AEC). With AEC 2015, ASEAN is expected to have four main pillars, namely: (1) ASEAN as a single and single-production-based market supported by elements of free flow of goods, services, investment, educated labor and more free capital flows; (2) ASEAN as a region with high economic competitiveness, with elements of competition regulations, consumer protection, intellectual property rights, infrastructure development, taxation, and e-commerce; (3) ASEAN as a region with equitable economic growth with elements of small and medium enterprise development, and ASEAN integration initiatives for CMLV (Cambodia, Myanmar, Laos and Vietnam) countries; and (4) ASEAN as a region that is fully integrated with the global economy with elements of coherent approach to economic relations outside the area, enhancing participation in global production networks (ASEAN, 2013).

It is a reality that Small and Medium Enterprises (SMEs) are the most strategic national economic sectors that concern the lives of many people so that they become the backbone of the national economy. SMEs are also the largest group of economic actors in the economy in Indonesia and have proven to be a vital safeguard of the national economy in times of economic crisis and become a disseminator of post-crisis economic growth.

To deal with the complexity of the marketing environment, especially those that use less sophisticated technology in designing and producing products such as SMEs in Indonesia, innovation is something that is very important and is a necessity to create products that compete to market through new products and are seen as growth engines (Torun & Cicekci, 2007). Companies to win the competition must always try to offer innovative products as a strategy to increase the attractiveness of products provided to the market, strengthen product uniqueness or innovation. There is evidence in a study by Shan, Song & Ju (2016) that the speed of innovation is known as one of the strategic drivers for performance.

Various literature shows the effect of innovation on performance such as the study conducted by Molina-Castillo, Jimenez-Jimenez, & Munuera-Aleman, (2011); Rhee, Park, & Lee, (2010); Shan et al., (2016). These studies state that innovation has a positive influence on marketing performance. Studies by Cheng, Chang, and Li (2013) show that the renewal of innovation is a source of marketing success. Although product innovation is considered crucial for marketing performance, studies conducted by García, Sanzo, and Trespalacios (2008) conclude that product innovation does not have a significant influence on marketing performance. Various studies of innovation provide gaps about the inability of product line innovation in influencing company performance such as the findings by Cillo, De Luca, and Troilo (2010) which states that innovation does not have a significant influence on company performance. In a study conducted by Liao and Cheng (2014) the effect of failed innovations such as damage to brand reputation for products that have high brand equity. While in other research conducted by Santos, Basso, Kimura, and Kayo (2014) indicate lack of evidence that innovation in one period has a positive influence on company performance in the next period. Different results of various studies on the effect of innovation on marketing performance offer a research gap on the inability of product innovation to enrich product excellence and marketing performance. For that gap, further research is still needed.

To fill this research gap, the purpose of this study is to build

a conceptual model that becomes a strategic bridge between innovation, market orientation and the marketing performance of Small and Medium Enterprises. To develop our conceptual model, we offer the concept of Geo-cultural Product Attractiveness as a strategic bridge for innovation to maintain and improve marketing performance.

2. Literature review

2.1. Geo-cultural product attractiveness

The study of products and their attributes to attract consumers is one of the primary studies in product strategy. The classic view in marketing strategy so far explains the importance of product design as the primary driver of product success to enter the market still appears in the current marketing literature (Bloch, 1995; Liu & Atuahene-Gima, 2018). A good design for a product is not only crucial for the appearance of the product but also for attracting potential consumers to see and try the product. The product design process starts by understanding consumer needs and sometimes involving consumers in the design process. The findings by Sri Suresh Tulshiram Salunke and Srivastava (2013) states that core products are a basis for creating marketing performance, the product design process is seen as an effort to offer something more attractive to the market to enrich specific interests (Hisarciklilar & Boujut, 2009). Handicraft products that based on local culture are believed to have advantages over imported products from abroad. First, the product evokes a personal bond because it represents the identity of the wearer's cultural roots. This product is felt in fashion products such as traditional Sumatra Songket, Bugis Silk, Jogja batik or other fabrics. Secondly, become the souvenirs domestic and national for travelers as a marker for visiting the area where the craft originated. Thirdly, local cultural handicraft products also become a means of inter-regional solidarity and generate pride in the diversity of the nation. (Ministry of Industry of Republic of Indonesia, 2015). In the product design process, the company tries to create something interesting for its products, which produces various attributes that reflect certain cultures and locations that have the potential to attract consumers to see and buy the product.

In countries with geographic and cultural diversity such as Indonesia, a product can be built with ethnic attributes derived from the interaction between location and culture where it's located. By integrating multi-ethnicity and culture, a company can sort and choose various elements of foreign culture and domestic culture (Celenk, & Van de Vijver, 2011), and combine these attributes to be embedded in their products, produce a product with some attractiveness attributes conceptualized in this study as Geo-cultural product attractiveness.

2.2. Innovation

The most innovative companies are involved in a continuous search for better products, services, and ways of doing things. They try to continue to improve their internal capabilities and other resources. The more innovative the companies of a country, the stronger the competitive advantage of the nation and more productive companies are more efficient in using their resources (Wang and Ahmed, 2004).

According Wu et al. (2008) in Akgün et al. (2010:44) shows that innovation is defined as an idea, a product or process, or a system that is considered new to an individual. Damanpour (1991) explains the concept of innovation as an understanding of equipment, system, legal, products or services, new technology production process, a structure and a new planning program to be adopted in the organization. According to Wang & Ahmed (2004) Organizational innovation as an overall innovative ability of an organization to introduce new products to the market, or open new markets, through combining strategic orientation with creative behavior and processes. Meanwhile, according to Oslo Manual (2005), innovation is the implementation of a new or improved product (good or service), or process, a new marketing method, or a new organizational method in business practices, workplace organization or external relations

From some of the definitions above, innovation is creating something that is new or enhancing from existing (performance or perception of higher value) both for goods and services as a strategic choice of the organization to improve the organization and make it more competitive. Innovation can come in various forms, such as product or process innovation, radical or incremental innovation, administrative or technological innovation, etc. (Zaltman et al., 1973; Utterback, 1994; Cooper, 1998 in Wang & Ahmed, 2004).

2.3. Marketing orientation

Marketing orientation is an organizational culture that leads to the market. Market orientation focuses on understanding the current, and the future customer wants and needs (Kasim, Ekinci, Altinay, & Hussain, 2018). Market orientation can be broadly defined as expanding traditional understanding by combining distribution and environmental orientations. Market orientation is also defined as a set of beliefs and a value system that puts the customer's interests above all else to develop a profitable company in the long run (Hartini, 2008).

Companies with high market orientation prioritize the quality or suitability of the product or service offered with the expectations or specifications set by the customer. Thus, market orientation has a positive impact on product quality, which in turn affects competitive advantage and company performance (Hartini, 2008). It is found that Market orientation has a positive impact on Return on Investment, market share and the success of new products (Matsuno et al. 2002). The higher the market orientation, the product will be in accordance with the development of consumer needs and desires. Thus the new product offered will be widely accepted by consumers, which in turn will expand market share, with increasing market share, the company's revenue will also increase. The increase in company revenue will impact on increasing Return on investment.

2.4. Marketing performance

Marketing performance is a variable that can be used to measure the marketing performance of a business. This meaning is related by Permadi (1998) which states that marketing performance is a concept to measure the market performance of a product. Clark (2000) reports that marketing performance is an essential element of company performance in general because the performance of a company can be seen from its marketing performance.

Voss and Voss (2000) define market performance as an effort to measure the level of performance which includes the number of sales, number of customers, profits and sales growth. Halim et al., (2012) in his research measuring marketing performance through four indicators, namely customer satisfaction, delivery of value, the effectiveness of marketing programs, and the success of new products.

Based on a literature review and previous research, the model of our empirical research in this study can be described as follows:

Figure 1. Empirical Research Model

Figure 1 above shows the empirical research model built in this study. Based on the literature review and picture above, there are four hypotheses formulated in this study as follows:

1. The more Innovation, the higher Geo-cultural product attractiveness.
2. The more Marketing Orientation, the higher Geo-cultural product attractiveness.
3. The more Geo-cultural product attractiveness, the higher Marketing Performance.
4. The more Marketing Orientation, the higher Marketing Performance.

3. Research method

This research is survey research with a quantitative approach. The population in this study is small and medium enterprises engaged in the craft and creative industries. Data were collected from sample data from 250 small and medium enterprises in South Sulawesi Province to test models and hypotheses. Sample selection is based on the proportional sampling technique. The respondents in this study were business owners or managers.

In this study four variables are used as follows; innovation, geo-cultural product attractiveness, marketing orientation and marketing performance. A closed question questionnaire is used to ask the perception of each respondent. Variables and indicators are measured using a 1 to 5 Likert Scale, where scale 1 indicates strongly disagree and scale 5 shows strongly agree. To operationalize the variables in the model, definition, and indicators are shown in the table 1.

Variable	Core Meaning	Indicators
Innovation	Ability to innovate products	1. Ability to make various types of products 2. Special design capabilities 3. Ability to make different brands
Marketing Orientation	An effective and efficient organizational culture in creating behavior that is important for the creation of superior value for consumers and will be an excellent performance for business	1. Customer orientation, 2. Competitor orientation, 3. Coordination between functions
Geo-cultural Product Attractiveness	The level of product attributes as an attraction which is a combination of regional and cultural areas	1. Motif Attractiveness 2. Style Attractiveness 3. Cultural Symbolic Attractiveness
Marketing Performance	The level of marketing achievement in the market	1. Sales Volume 2. Sale Value 3. Customer Growth

Table 1. Variables and Indicators

In this study, reliability is measured by using Construct Reliability (CR) and Variance Extracted (VE) on each latent variable. Usually, the minimum value of Construct reliability is 0.70 (Hair et al., 2010). While the minimum value of VE is 0.50 (Ghozali, 2011 in Ilyas and Munir, 2017). In this study, all variables are considered reliable because each value has passed the required value.

While validity testing uses confirmatory factor analysis (CFA) which will produce the value of the loading factor for each indicator on the latent variable. Value of loading factor which greater than 0.50 is used as a cut-off value of construct indicator validity (Hair et al., 2010). Table 2 shows all the indicator values are calculated at more than 0.50. Therefore, all of the indicators in this study are confirmed as valid.

Data were then analyzed using AMOS 23 statistic software for a full structural equation model.

Variable	Indicators	Standardized Loading Factors	Standard Errors	Reliability	
				CR	VE
Innovation	X11	0.940	0.77	0.79	0.55
	X12	0.845	0.68		
	X13	0.789	0.77		
Marketing Orientation	X21	0.902	0.53	0.72	0.51
	X22	0.888	0.52		
	X23	0.908	0.53		
Geo-cultural product attractiveness	X31	0.953	0.66	0.75	0.53
	X32	0.947	0.60		
	X33	0.924	0.66		
Marketing Performance	X41	0.864	0.79	0.84	0.63
	X42	0.909	0.81		
	X43	0.890	0.79		

Table 2. Validity and Reliability

4. Result and discussions

Our structural model analysis demonstrated good model acceptance level as concluded from several indices such as $\chi^2 = 71.71$; Significance Probability = 0.019; GFI= 0.907; AGFI= 0.852; TLI = 0.976; CFI =0.982; RMSEA = 0.064, therefore our model fit with the expected population. The structural model is presented in the following Figure 2.

The structural coefficient for regression analysis is presented in the following Table 3.

As presented in Table 3, all hypotheses were tested; the significance probability is lower than 5% for every relationship between hypothesized variables, we can conclude that the data of our sample support all hypotheses.

5. Conclusions

As stated at the beginning of this study, that the objective of the study is to fulfill a research gap on the inability of innovation in enhancing marketing performance. A model relation of Innovation, Marketing Orientation, Geo-cultural Product Attractiveness and Marketing Performance is built and tested empirically using a structural equation model. The acceptance of our hypothesized model and relationships demonstrates several ways to enhance marketing performance. Three key findings are described as follows: (1) a company with high Innovation will increase the attractiveness of geo-cultural product leading to marketing performance. This type of Innovation such as the ability to make various kinds of products and to make different brands also

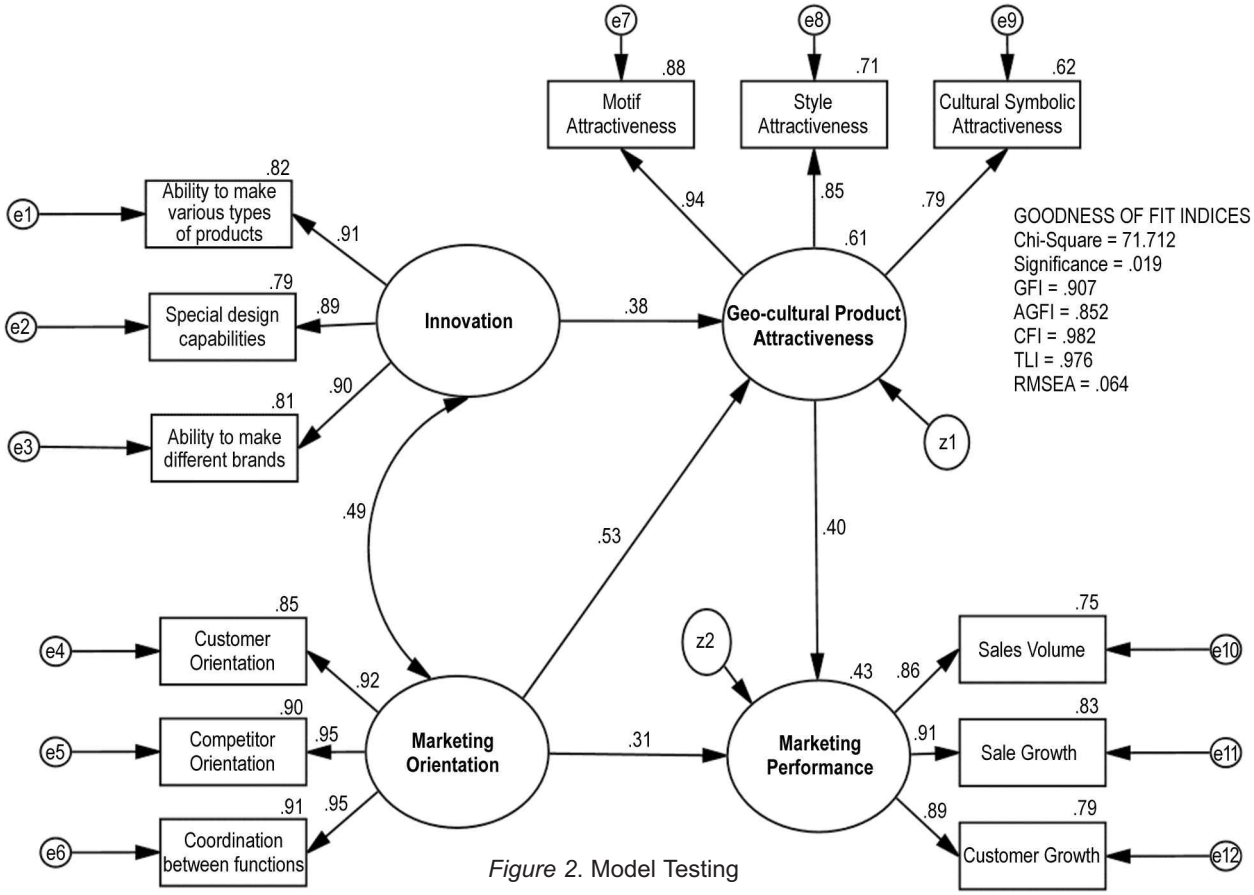

Figure 2. Model Testing

Hypothesis			Standardized Estimates	P
Innovation	→	Geo-cultural Product Attractiveness	0.378	0.000
Marketing Orientation	→	Geo-cultural Product Attractiveness	0.527	0.000
Geo-cultural Product Attractiveness	→	Marketing Performance	0.395	0.001
Marketing Orientation	→	Marketing Performance	0.313	0.009

Table 3. Results of Hypothesis Testing

capabilities to make particular design are expected to be a driver for increasing the attractiveness of geo-cultural product attributes as leverage for enhancing marketing performance, (2) a company with Marketing orientation is expected to strengthen the attractiveness of geo-cultural product as a driver for enhancing marketing performance, (3) thus geo-cultural product attractiveness indeed plays a role as a mediator in the relation between Innovation, Marketing Orientation and marketing performance.

Theoretically, the findings of this study contribute to solving problems of the inconsistent relation of Innovation and market orientation with marketing performance. The new concept of geo-cultural product attractiveness which is offered as mediation in connection with marketing orientation and marketing performance has been tested and plays a vital role in bridging the correlations between the two variables. Then, further research needs to add some variables, the coverage area of research, and types of industries to gain research findings widely.

References

[1] Akgün, Ali Ekber; Koçoglu, Ipek; Keskin, Halit; Ince, Hüseyin; Imamoglu, Salih Zeki (2010). The Relationship between Intellectual Capital, Innovation and Competitive Advantage. *European Conference on Innovation and Entrepreneurship*: 42-XV. Reading: Academic Conferences International Limited.

[2] ASEAN (2013). *ASEAN Community Progress Monitoring System Full Report 2012: Measuring Progress towards The ASEAN Economic Community and the ASEAN Socio-Cultural Community*. Jakarta: ASEAN Secretariat (September)

[3] Bloch, P.H. (1995). Seeking the ideal form: Product design and consumer response. *The Journal of Marketing*, 59(3), pp.16-29.

[4] Celenk, O., & Van de Vijver, F. (2011). Assessment of Acculturation: Issues and Overview of Measures. *Online Readings in Psychology and Culture*, 8(1).

[5] Cheng, C.-F., Chang, M.-L., & Li, C.-S. (2013). Configural Paths to Successful Product Innovation. *Journal of Business Research*, 66(12): 2561-2573.

[6] Cillo, P., De Luca, L. M., & Troilo, G. (2010). Market Information Approaches, Product Innovativeness, and Firm Performance: An Empirical Study in the Fashion Industry. *Research Policy*, 39(9): 1242-1252.

[7] Clark, B. H. (2000). Managerial perceptions of marketing performance: efficiency, adaptability, effectiveness, and satisfaction. *Journal of Strategic Marketing*, 8(1), 3-25.

[8] Damanpour F. (1991), Organizational Innovation: A Meta-Analysis of Effects of Determinants and Moderators, *Academy of Management Journal*, 34(3): 555-590.

[9] García-Villaverde, P. M., Ruiz-Ortega, M. J., & Ignacio Canales, J. (2013), Entrepreneurial Orientation and the Threat of Imitation: The Influence of Upstream and Downstream Capabilities. *European Management Journal*, 31(3): 263-277.

[10] Hair, J.F, Black, W.C, Babin, B.J, and Anderson, R.E. (2010). *Multivariate Data Analysis*, 7th Edition, Prentice Hall Inc: New Jersey, USA.

[11] Halim, Hadiwidjojo D, Solimun, Djumahir. (2012). Marketing Capability as mediating Effect of Marketing Orientation, Learning Orientation and Entrepreneurial Orientation on Marketing Performance (Study on Medium Business in South East Sulawesi). *Jurnal Aplikasi Manajemen*. 10 (3).

[12] Hartini, S. (2008). The Effect of Market Orientation toward Firm's Innovation, Product Quality, Competitive Advantage and Firm's Performance of Small Medium Enterprise in East Java. *Proceeding International Conference Business Research*.
[13] Hisarciklilar, O., & Boujut, J.-F. (2009). A Speech Act Theory-based Information Model to Support Design Communication through Annotations. *Computers in Industry*, 60(7): 510-519.
[14] Kasim, A., Ekinci, Y., Altinay, L., & Hussain, K. (2018). Impact of market orientation, organizational learning and market conditions on small and medium-size hospitality enterprises. *Journal of Hospitality Marketing & Management*, 1-21.
[15] Liao, S., & Cheng, C. C. J. (2014). Brand Equity and The Exacerbating Factors of Product Innovation Failure Evaluations: A Communication Effect Perspective. *Journal of Business Research*, 67(1): 2919-2925.
[16] Liu, W., & Atuahene-Gima, K. (2018). Enhancing product innovation performance in a dysfunctional competitive environment: The roles of competitive strategies and market-based assets. *Industrial Marketing Management*. Vol. 73: 7-20.
[17] Matsuno K., J. T. Mentzer, dan A. Ozsomer, (2002). The Effect of Proclivity and Market Orientation on Business Performance. *Journal of Marketing* Vol. 66: 18-32.
[18] Ministry of Cooperation and SME of Republic of Indonesia (2014). *Development of Small, Medium Enterprises Data*. http://www.depkop.go.id. Accessed on July 2018.
[19] Ministry of Industry of Republic of Indonesia (2015) http://www.kemenperin.go.id/artikel/12064/Tiga-Keunggulan-Produk-Berbasis-Budaya. Accessed on July 2018
[20] Molina-Castillo, F.-J., Jimenez-Jimenez, D., & Munuera-Aleman, J.-L. (2011). Product Competence Exploitation and Exploration Strategies: The Impact on New Product Performance through Quality and Innovativeness. *Industrial Marketing Management*, 40(7): 1172-1182.
[21] Ilyas, G. B., & Munir, A. R. (2017). The Influence of Exotic Service Quality Towards Overall Satisfaction at Hotels in Makassar. *International Journal of Business Research* 15(4), 311-319.
[22] Oslo Manual (2015), *Guidelines for Collecting and Interpreting Innovation Data*, 3rd Edition, OECD.
[23] Permadi, M. (1998). Development of Market Performance. *Jurnal Ekonomi dan Bisnis Indonesia*, 13(2).
[24] Rhee, J., Park, T., & Lee, D. H.(2010). Drivers of Innovativeness and Performance for Innovative SMEs in South Korea: Mediation of Learning Orientation. *Technovation*, 30(1): 65-75.
[25] Santos, D. F. L., Basso, L. F. C., Kimura, H., & Kayo, E. K. (2014). Innovation Efforts and Performances of Brazilian Firms. *Journal of Business Research*, 67(4): 527-535.
[26] Shan, Peng., Song, Michael., & Ju, Xiaofeng. (2016). Entrepreneurial orientation and performance: Is innovation speed a missing link? *Journal of Business Research*, Volume 69, Issue 2: 683-690.
[27] Shri. Suresh Tulshiram Salunke, & Srivastava, R. K. (2013). The impact of Core Product and Core Application on Product Launch and its Success in an Industrial Market. *Basic Research Journal of Education Research and Review*, Vol. 2(1) 16-21.
[28] Tambunan, T. (2008). Development of SME in ASEAN with Reference to Indonesia and Thailand, *Journal of Economics*, Vol. 20 No. 1 pp. 53-83.
[29] Torun, H., & Cicekci, C. (2007). *Innovation: Is the engine for the economic growth*. Ege University.
[30] Utterback, James (1994). *Mastering the Dynamics of Innovation: How Companies Can Seize Opportunities in the Face of Technological Change*. University of Illinois at Urbana-Champaign's Academy for Entrepreneurial Leadership.
[31] Voss, GB & Voss, ZG. (2000), Strategic Orientation and Firm Performance in an Artistic Environment, *Journal of Marketing*, January, pp. 67-83.
[32] Wang, Catherine L. & Ahmed, Pervaiz K. (2004). The Development and Validation of the Organizational Innovativeness Construct Using Confirmatory Factor Analysis. *European Journal of Innovation Management*, Vol. 7, No. 4, pp. 303-313.
[33] Zaltman, G., Duncan, R. and Holbeck, J. (1973). *Innovation and Organizations*. John Wiley, New York.

The Effect of Good Corporate Governance Mechanism on Firm Value of Indonesian Socially Responsible Firms

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Abstract

Firm value is important information in investment decisions. Therefore, it is necessary to investigate further the relationship between firms' corporate governance and corporate social responsibility. This study aims to analyze the effect of Good Corporate Governance mechanism (as proxied by the frequency of joint meetings between boards of commissioners and directors and the frequency of boards of commissioners and directors' meeting attendance) on firm value with Corporate Social Responsibility (CSR) as the intervening variable. We generate our data from the annual reports of firms listed in the SRI-KEHATI Index in 2014-2016. Using Partial Least Square, we show that CSR cannot mediate the relationship between GCG and firm value. Meanwhile, CSR is only affected by joint board meetings. Lastly, board meeting attendance directly affects firm value.

Keywords: *good corporate governance (GCG); corporate social responsibility (CSR); firm value; Sri-Kehati.*

1. Introduction

Firms arguably aim to enhance their values to enable their shareholders to maximize their returns. Thus, firm value determines shareholders' wealth (Handriani and Robiyanto, 2018b, Ernayani et al., 2017). High firm value motivates investors to invest in these firms (Ernayani and Robiyanto, 2016, Panjaitan, 2017). However, agency conflicts or situations when managers' self-interests contradict their firms' objectives often inhibit firms to maximize their values (Handriani and Robiyanto, 2018a). In this context, managers' self-interests refer to their interests to prioritize their wealth and to ignore both short-term and long-term shareholders' interests (Mai, 2010, Mai, 2017). Managers' self-interests will arguably increase (decrease) their firms' costs (profits) that eventually reduce firms' stock prices and values (Jensen and Meckling, 1976). Good Corporate Governance mechanism is therefore important to mitigate the agency problem (Handriani and Robiyanto, 2019).

Good Corporate Governance (GCG) mechanism is a system that regulates and manages the relationship between shareholders, managers, and other stakeholders to balance the rights and obligations of each stakeholder and to enhance firms' transparency in reporting their performance to their stakeholders. GCG facilitates firms to create conducive conditions that support their sustainable growth (Handriani and Robiyanto, 2018b, Handriani and Robiyanto, 2018a). Further, GCG enables firms to monitor their managers to ensure that they make effective decisions in accordance with their objectives and to provide balanced information between managers and other stakeholders (Adefemi et al., 2018).

Board of commissioners and directors are important components of firms. According to Regulation of Financial Services Authority Number: 33/POJK.04/2014 Concerning The Board of Directors and The Board of Commissioners of Issuers of Public Companies, boards of commissioners are in charge of supervising budgets and providing advice to directors. Meanwhile, boards of directors are in charge of achieving firms' objectives. It then can be said that boards of commissioners supervise boards of directors' decisions or actions. Regarding these arguments, our indicators for boards of commissioners' supervisory activities are the frequency of joint meeting between boards of directors and commissioners, and the frequency of boards of commissioners and directors' attendance.

Nowadays firms not only emphasize their shareholders' interests, but increasingly consider the interests of other stakeholders who are affected by firms' economic activities, such as society (Mukhtaruddin et al., 2014). Firms arguably not only seek profits but also enhance social welfare and ensure the sustainability of their employees and the surrounding environment. Firms can achieve these objectives by implementing Corporate Social Responsibility (CSR).

CSR aims at firms' surrounding society and environment that are directly affected by firms' economic activities (Hodinková and Sadovský, 2016). According to Act of the Republic of Indonesia Number 40 of 2007 Concerning Limited-Liability Companies, limited-liability companies (Perseroan Terbatas in Bahasa) that engage in natural resources-related activities have to implement their social and environmental responsibility. Further, Government Regulation No. 47 Year 2012 Concerning Social and Environmental Responsibilities of the Company stipulates that limited-liability companies have to implement their social and environmental responsibilities according to their annual plan and report the implementation in their annual reports. It is expected that the existing regulations suffice to encourage firms to be more aware of the transparent and ethical implementation of their environmental responsibilities to fulfill the legal needs of

their surrounding society. Firms may use disclose their social responsibilities to signal that they outperform their counterparts, to indicate that they have fulfilled societal needs, and to attract investors to invest in them (Fernita et al., 2014, Suteja and Mayasari, 2017, Handayani et al., 2017).

Several studies have investigated the relationship between GCG mechanism, CSR, and firm value. For example, Mai (2017) uses firms listed in the Jakarta Islamic Index as the sample. However, the use of the Jakarta Islamic Index limits the generalizability of the results because the index focuses on Sharia-compliant firms. To our best knowledge, no study uses firms listed in the SRI-KEHATI Index to investigate this research issue. Thus, we use firms listed in the SRI-KEHATI Index as our research objects because this index has implemented several criteria to select CSR-compliant firms.

In this study, the mechanism of Good Corporate Governance is proxied by the frequency of joint meetings of the board of commissioners and directors, and the frequency of attendance of the board of commissioners and directors. In contrast to previous studies which mostly use GCG structures, such as institutional ownership or institutional ownership, independent board or independent board, and board size or board size. Corporate Social Responsibility is measured using the company's CSR costs obtained through the company's annual report. And company value is measured using Price to Book Value because it is widely used in making investment decisions.

This study aims to investigate the effect of GCG on firm value with CSR as the intervening variable. We use firms that are listed in the 2014-2016 SRI-KEHATI Index as our sample. Our study arguably offers several practical implications for various stakeholders, such as managers when making firm value-enhancing decisions, investors when making investment decisions, and societies when assessing the impacts of firms' economic activities on surrounding communities and environment.

2. Research Method

2.1. Research Approach

This study uses the quantitative data of annual reports of firms listed in the SRI-KEHATI Index for years 2014-2016. This research aims to test the causal relationship between the research variables, namely the frequency of boards' joint meetings, the frequency of board meeting attendance, CSR, and firm value.

2.2. Population and Sample

Our population is all firms listed in the SRI-KEHATI Index 2014-2016. We use a purposive sampling method to generate data that suits the objectives of this study. Our sample is 12 firms that were consistently listed in the SRI-KEHATI Index for years 2014-2016. Specifically, we use the following criteria to select our sample: 1. The firm was consistently listed in the SRI-KEHATI Index, 2. The firm consistently published their annual reports in 2014-2016, and 3. The firm published the frequency of their joint meetings between boards of commissioners and directors and the frequency of boards of commissioners and directors' meeting frequency.

No.	Ticker Quote	Stock Name
1.	ADHI	Adhi Karya [Persero] Tbk.
2.	BBCA	Bank Central Asia Tbk.
3.	BDMN	Bank Danamon Indonesia Tbk.
4.	BMRI	Bank Mandiri [Persero] Tbk.
5.	JSMR	Jasa Marga [Persero] Tbk.
6.	KLBF	Kalbe Farma Tbk.
7.	PGAS	Perusahaan Gas Negara [Persero] Tbk.
8.	PJAA	Pembangunan Jaya Ancol Tbk.
9.	TINS	Timah [Persero] Tbk.
10.	TLKM	Telekomunikasi Indonesia [Persero] Tbk.
11.	UNTR	United Tractors Tbk.
12.	WIKA	Wijaya Karya [Persero] Tbk.

Table 1. Samples

Table 1 consists of 12 firms that were consistently listed in the SRI-KEHATI Index years 2014-2016 and meet the research criterias.

2.3. Data Type and Source

We use the panel data of 12 annual reports of firms that were consistently listed in the SRI-KEHATI Index for the periods of 2014-2016. We generate our data from Indonesian Capital Market Directory at the Indonesian Stock Exchange's website (www.idx.co.id). Indicators and proxies used in this study shown in Table 2.

Variable	Proxy	Operationalization
GCG	The frequency of Joint Meetings between Boards of Commissioners and Directors	The number of joint meetings between a firm's board of commissioners and directors in a year.
	The frequency of Boards of Commissioners and Directors' Meeting Attendance	The proportion of commissioners and directors' attendance in joint meetings in a year.
CSR	CSR Costs	The ratio between a firm's total annual CSR cost and annual sales.
PBV	Price to Book Value	The ratio between market value per share with book value per share.

Table 2. Indicators and Variable Measurement

2.4. Technique of Analysis

This study uses Partial Least Square (PLS) that helps explain the presence of the relationships between latent variables. PLS manages to analysis 100 constructs and 1000 indicators. There are two models in PLS, namely the inner and outer models. The structural or inner model explains the relationship between latent variables. It also determines the specification of the relationship between constructs and their indicators. There are two types of constructs, namely the exogenous and endogenous constructs. Exogenous constructs affect endogenous constructs and are not affected by other constructs. Meanwhile, endogenous constructs are explained by exogenous constructs. The second model (the outer model) defines how each indicator is related to its latent variable. Thus, this study uses the structural or inner model. According to the specified hypotheses, we use the inferential statistical tools to analyze our data by using SmartPLS software that starts from the outer model, followed by the inner model and hypothesis testing.

3. Result

3.1. Descriptive Statistics

The descriptive statistics provide a general description of our sample. Specifically, the analysis describes the sample's parameters such as mean, minimum and maximum value and standard deviation. Table 3 displays the descriptive statistics of our sample with the following order. Initially, the table demonstrates the descriptive statistics of our independent variables, namely Freq Meet, Freq Attend, and CSR. The descriptive statistics of the dependent variables and independent variables shown in Table 3.

Variable	Mean	Min	Max	Standard Deviation
Freq Meet	11.250	4.000	23.000	4.740
Freq Attend	0.868	0.690	0.980	0.084
CSR	0.015	0.000	0.205	0.040
PBV	2.863	0.700	9.300	1.737

Table 3. Descriptive Statistics
Source: Processed Secondary Data, 2018

We measure GCG with the frequency of joint meetings between boards of commissioners and directors (Freq Meet) and the frequency of boards of commissioners and directors' joint meeting attendance (Freq Attend). Three firm-year observations (Kalbe Farma – 2014; Pembangunan Jaya Ancol Tbk. – 2015; and United Tractors Tbk. – 2014) exhibit the lowest Freq Meet score (four). Meanwhile, Perusahaan Gas Negara [Persero] Tbk. – 2014 has the highest Freq Meet score (23), suggesting that this firm managed to maximize the frequency of joint meetings between its board of commissioners and directors in 2014. Further, two firm-year observations (Kalbe Farma Tbk. – 2016; Wijaya Karya [Persero] Tbk. – 2016) have the lowest Freq Attend score (6.9) while Bank Danamon Indonesia Tbk. – 2015 exhibits the highest Freq Attend score (98). The figures indicate that Bank Danamon Indonesia Tbk. – 2015 had higher commissioners and directors' participation than other firms and that its board of commissioners and directors jointly committed to managing its economic activities and to overcoming all firm-related problems.

As indicated before, we measure CSR by using the ratio between total annual CSR costs and total annual sales. Four firm-year observations did not spend CSR costs at all, implying that their scores for this variable are zero (Bank Danamon Indonesia Tbk. – 2016, Pembangunan Jaya Ancol Tbk. – 2014, and United Tractors Tbk. – 2014 and – 2015. Meanwhile, Jasa Marga [Persero] Tbk. – 2015 has the highest CSR score (0.205), suggesting that in 2015 the firm allocated greater CSR costs than other firms to fulfill its obligations to society and the environment.

We measure firm value using PBV. The lowest firm value is 0.7 (Timah [Persero] Tbk. – 2015), and the highest CSR value is 9.3 (Kalbe Farma Tbk. – 2014). The figures indicate that in 2014 market has higher confidence in the prospect of Kalbe Farma Tbk. than on other firms.

3.2. R-Square Value

In testing the structural or inner model using PLS, the R-square value is the test of the goodness-fit model for each endogenous latent (independent) variable that indicates the strength of the structural models' prediction. Table 4 below displays R-square values from the PLS analysis.

Variable	R Square
CSR	0.044
PBV	0.384

Table 4. R-Square Values
Source: Processed Secondary Data, 2018

The R-square value of CSR is 0.044, implying that the independent variables (the frequency of joint meetings between boards of commissioners and directors and the frequency of boards' joint meeting attendance) explain 4.4% (0.044) of the variation of CSR with other variables explain the rest of the variation. Further, the R-square value of PBV is 0.384, suggesting that the independent variables explain 38.4% of the variation of CSR while other variables explain the rest.

3.3. Significance Tests

T-statistic value of each latent variable indicates the significance of the effects of GCG (proxied by the frequency of joint meetings and the frequency of boards' meeting attendance) on CSR and firm value and the effect of CSR on firm value. Table 5 (6) below presents the results of the significance tests (total indirect effects).

We compare the p-value of each relationship with the significance level of 5% to determine whether the relationship is statistically significant. Further, we look at the signs of the estimated original sample value (parameter coefficients) to determine the direction of the effects. The results are considered significant if t-statistic is greater than 1.96 or p-value is less than 0.05 (5%). The following are the results of the hypothesis testing, and the interpretation of the results based on SmartPls analysis.

	Original Sample	t Statistics	*p*-Values
CSR → PBV	0.088	0.866	0.387
Freq Attend → CSR	0.031	0.383	0.702
Freq Attend → PBV	-0.616	3.802	0.000
Freq Meet → CSR	0.208	2.121	0.034
Freq Meet → PBV	-0.006	0.027	0.978

Table 5. Significance Tests
Source: Processed secondary data, 2018

	Original Sample	t Statistics	*p*-Value
CSR → PBV			
Freq Attend → CSR			
Freq Attend → PBV	0.003	0.136	0.892
Freq Meet → CSR			
Freq Meet → PBV	0.018	0.426	0.670

Table 6. Total Indirect Effects
Source: Processed secondary data, 2018

H_1: The frequency of joint meetings between boards of commissioners and directors positively affect CSR.

The results suggest that the frequency of joint meetings positively affects CSR (t-statistic = 2.121 > 1.96 dan p-value = 0.034 < 0.05). Thus, our findings demonstrate that there is a positive influence of the frequency of joint meetings between boards of commissioners and directors at α = 5%, implying that the first hypothesis is supported.

H_2: The frequency of boards of commissioners and directors' meeting attendance positively affects CSR.

The results show that the frequency of boards of commissioners and directors' meeting attendance does not significantly affect CSR (t-statistic = 0.383 < 1.96 dan p-value = 0.702 > 0.05). These findings indicate that there is no positive influence of the frequency of board meeting attendance on CSR at α = 5%, suggesting that the second hypothesis is rejected.

H_3: CSR positively affects firm value.

Our results demonstrate that CSR does not significantly affect firm value (t-statistic= 0.866 < 1.96 and p-value = 0.387 > 0.05). It then can be concluded that there is no positive influence of CSR on firm value at α = 5%, implying that the third hypothesis is rejected.

H_4: The frequency of joint meetings between boards of commissioners and directors positively affects firm value.

The findings show that joint meeting frequency does not significantly affect firm value (t-statistic = 0.027 < 1.96 and p-value = 0.978 > 0.05). These findings indicate that there is no positive effect of joint meeting frequency and firm value at α = 5%, implying that the fourth hypothesis is rejected.

H_5: The frequency of boards of commissioners and directors' joint meeting attendance positively affects firm value.

Our empirical results reveal that the frequency of boards' joint meeting attendance positively affects firm value (t-statistic 3.802 > 1.96 and p-value 0.000 < 0.05). These results demonstrate that there is a significant effect of boards' joint meeting attendance on firm value at α = 5%, implying that the fifth hypothesis is supported.

H_6: CSR intervenes the positive effect of the frequency of joint meetings between boards of commissioners and directors on firm value.

The findings show that CSR does not intervene the effect of joint meeting frequency on firm value (t-statistic 0.426 < 1.96 and p-value 0.670 > 0.05). These findings reveal that there is no significant effect of joint meeting frequency on firm value through CSR.

H_7: CSR intervenes the positive effect of the frequency of boards of commissioners and directors' joint meeting attendance on firm value.

Our results demonstrate that CSR cannot intervene the

positive effect of the boards' joint meeting attendance on firm value (t-statistic 0.136 < 1.96 and p-value 0.892 > 0.05). These findings suggest that there is no significant effect of boards' joint meeting attendance on firm value through CSR.

4. Discussion

4.1. The Effect of the Frequency of Joint Meetings between Boards of Commissioners and Directors on CSR

Our empirical results show that the frequency of joint meetings between boards of commissioners and directors positively affects CSR (0.208, t = 2.121). Joint meetings facilitate boards of commissioners in controlling directors' CSR activities. It is then likely that more frequent joint meeting is associated with more frequent managers' CSR reports. Specifically, more frequent joint meetings provide more time for both commissioners and directors to discuss various firm-related issues, including those related to CSR activities. These meetings allow boards to evaluate and monitor firm performance in effectively reporting their social responsibilities. Thus, the findings support Panjaitan (2017) and Aniza et al. (2015)

4.2. The Effect of the Frequency of Boards of Commissioners and Directors' Meeting Attendance on CSR

The findings indicate that the frequency of board meeting attendance does not significantly affect CSR (0.031, t = 0.383). Our results then suggest that the frequency of boards of commissioners and directors' meeting attendance does not affect the amount of information on firms' social responsibilities. Board meetings may not offer sufficient advice for the improvement of the CSR implementation because these meetings arguably discuss various issues and the CSR implementation is only a part of the discussed issues. Thus, more frequent board meeting attendance leads to lower the disclosure of CSR activities. These findings support Handriani and Robiyanto (2019) who demonstrate that there is no effect of the frequency board meeting attendance on CSR.

4.3. The Effect of CSR on Firm Value

Our empirical results show that CSR does not significantly affect firm value (0.088, t = 0.866). The findings imply that firm value does not depend on CSR costs and other factors affect firm value. Besides, the amount of CSR costs does not necessarily provide a positive contribution to firm value, suggesting that the disclosure of CSR activities cannot facilitate the increase in firm value. Meanwhile, investors arguably do not base their investment decisions on firms' CSR, but on other factors, such as capital gain. Thus, these results support Zhu et al. (2016) who suggest that CSR does not affect firm value.

4.4. The Effect of the Frequency of Joint Meetings between Boards of Commissioners and Directors on Firm Value

The findings demonstrate that CSR cannot mediate the relationship between the frequency of joint meetings between boards of commissioners and directors and firm value (-0.006, t = 0.027). Our results indicate that firm value does not depend on the frequency of joint meetings between boards of commissioners and directors and the joint meeting frequency does not exhibit a direct effect on firm value. The results also suggest that the quality of joint meetings is still relatively low because boards emphasize the formality of the meetings by neglecting meaningful discussion of firm-related issues. Meetings that only focus on formality will arguably lead to ineffective decision-making processes and eventually to suboptimal firm performance. In other words, more frequent joint meetings do not necessarily enhance firm value.

4.5. The Effect of the Frequency of Boards of Commissioners and Directors' Meeting Frequency on Firm Value

The results show that the frequency of board attendance positively affects firm value (-0.616, t =3.802). It then can be argued that firm value depends on the number of participating commissioners and directors in joint meetings. A higher number of board members participating in joint meetings arguably have more information to solve firm-related issues that eventually enhance firm performance and value. The presence of board members is important for the decision-making processes, especially those related to the improvement of firm performance. Our results are in line Handayani et al. (2017) with who show the significant effect of GCG mechanism and firm value.

4.6. The Effect of the Frequency of Joint Meetings between Boards of Commissioners and Directors on Firm Value with CSR as the Intervening Variable

Our findings show that CSR cannot mediate the relationship between joint meeting frequency and firm value (0.018, t = 0.426). The findings explain that there is no indirect relationship between joint meeting frequency on firm value with CSR as the intervening variable. The results further imply that an increase in joint meeting frequency will decrease firm value (joint meeting frequency negatively affects firm value).

4.7. The Effect of the Frequency of Boards of Commissioners and Directors' Meeting Attendance on Firm Value with CSR as the Intervening Variable

Our empirical results demonstrate that board meeting attendance does not affect firm value (0.003, t =0.136). Thus, board meeting attendance has no indirect effect on firm value when CSR is the intervening variable. In other words, an increase in board meeting attendance will decrease firm value (board meeting attendance negatively affects firm value).

5. Conclusion

5.1. Conclusion

Our empirical results support two of our seven hypotheses (the first and fifth hypotheses). These findings imply that, firstly, the frequency of joint meeting between boards of commissioners and directors positively affects CSR. Secondly, the frequency of board of commissioners and directors meeting attendance does not significantly affect CSR. Thirdly, CSR does not significantly affect firm value. Fourthly, the frequency of joint meeting between boards of commissioners and directors does not significantly influence firm value. Fifthly, the frequency of board of commissioners and directors meeting attendance positively influences firm value. Sixthly, the frequency of joint meeting between boards of commissioners and directors does not affect firm value when CSR is the intervening variable. And lastly, the frequency of board of commissioners and directors meeting attendance does not affect firm value when CSR is the intervening variable. All in all, CSR cannot act as the intervening variable of the association between GCG (with board joint meeting frequency and board meeting attendance as the proxies) and firm value. CSR is only affected by board joint meeting frequency while firm value is only affected by board meeting attendance.

5.2. Implication

Our study has a managerial implication for investors. Specifically, this study advises investors to base their investment decisions not only on financial data but also on non-financial aspects, such as corporate governance that includes board meeting frequency and attendance. Board meetings arguably offer solutions to enhance firms' future performance.

5.3. Limitations and Suggestion for Future Research

We only limitedly operationalize the independent and intervening variables. Thus, we encourage future studies to use other GCG proxies, such as State Owned Enterprises Scorecard, Corporate Governance Perception Index (CGPI), and ASEAN CG Scorecard. Further, future studies can operationalize CSR using different proxies, such as GRI sustainability reporting that includes economic, environmental, and social aspects and covers labor, human rights, and product responsibility issues.

References

[1] 2007. Act of the Republic of Indonesia Number 40 of 2007 Concerning Limited-Liability Companies. Republic of Indonesia.

[2] 2012. Government Regulation No. 47 Year 2012 Concerning Social and Environmental Responsibilities of the Company. Indonesia.

[3] 2014. Regulation of Financial Services Authority Number: 33/POJK.04/2014 Concerning The Board of Directors and The Board of Commissioners of Issuers of Public Companies. Republic of Indonesia.

[4] Adefemi, F., Hassan, A. & Fletcher, M. (2018). Corporate governance disclosure in Nigerian listed companies. *International Research Journal of Business Studies*, 11, 67-80.

[5] Aniza, N., Aziz, A., Manab, N.A. & Othman, S.N. (2015). Exploring the Perspectives of Corporate Governance and Theories on Sustainability Risk Management (SRM). *Asian Economic and Financial Review* 5, 1148-1158.

[6] Ernayani, R., Oktiviana, S. & Robiyanto, R. (2017). The Effect of Return on Investment, Cash Ratio, and Debt to Total Assets Towards Dividend Payout Ratio (A Study Towards Manufacturing Companies Listed in Indonesia Stock Exchange). *Advanced Science Letters*, 23, 7169-7199.

[7] Ernayani, R. & Robiyanto, R. (2016). The effect of the cash flows, gross profit and company size on Indonesian stock returns (a study on the chemical and basic industry companies during the periods of 2009-2014). *International Journal of Applied Business and Economic Research*, 14.

[8] Fernita, C., Paramita, E.L., Restuti, M.D. & Nugroho, P.I. (2014). Corporate Social Responsibility (CSR) Disclosure in Banking Industry in Indonesia. *The 2nd IBEA – International Conference on Business, Economics and Accounting*. Hong Kong.

[9] Handayani, R., Wahyudi, S. & Suharnomo, S. (2017). The effects of corporate social responsibility on manufacturing industry performance: the mediating role of social collaboration and green innovation. *Business: Theory and Practice*, 18, 152-159.

[10] Handriani, E. & Robiyanto, R. (2018a). Corporate Finance and Firm Value in the Indonesian Manufacturing Companies. *International Research Journal of Business Studies*, 11, 113-127.

[11] Handriani, E. & Robiyanto, R. (2019). Institutional ownership, independent board, board size, and firm performance: evidence from Indonesia. Contaduría y Administración, 64, e118.

[12] Handriani, E. & Robiyanto, R. (2018b). Investment Opportunity and Industrial Growth in Indonesia. *International Journal of Business and Society*, 19, 295-312.

[13] Hodinková, M. & Sadovský, Z. (2016). The benefits of corporate social responsibility introduction in small and medium-sized enterprises: a systematic review of the literature. *Verslas: teorija ir praktika*, 17, 345-352.

[14] Jensen, M.C. & Meckling, W.H. (1976). Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of Financial Economics*, 3, 305-360.

[15] Mai, M.U. (2010). *Impact Of Dividend Policy On Company Value In Manajerial Oportunistic Behavioral Conduct And Corporate Governance Structure Empirical Study on Manufacturing Companies Go Public in Indonesian Capital Market*. Dissertation, Universitas Diponegoro.

[16] Mai, M.U. (2017). Mediation of CSR and Profitability on the Influences of GCG Mechanism to the Firm Value. *Jurnal Keuangan dan Perbankan* 21, 253-264.

[17] Mukhtaruddin, Relasari & Felmania, M. (2014). Good Corporate Governance Mechanism, Corporate Social Responsibility Disclosure on Firm Value: Empirical Study on Listed Company in Indonesia Stock Exchange. *International Journal of Finance and Accounting Studies*, 2, 1-10.

[18] Panjaitan, I. (2017). The Influences of Sustainability Report and Corporate Governance toward Financial and Entity Market Performance with Political Visibility as Moderating Variable. *Binus Business Review*, 8, 61-66.

[19] Suteja, J. & Mayasari, A.N. (2017). Is Investment Policy Value-Enhancing through CSR Disclosure? *Jurnal Keuangan dan Perbankan* 21.

[20] Zhu, Q., Liu, J. & Lai, K.-H. (2016). Corporate social responsibility practices and performance improvement among Chinese national state-owned enterprises. *International Journal of Production Economics*, 171, 417-426.

Empirical Assessment of the Role of Product Innovation in Dynamic Marketing Capabilities and Company Performance

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Abstract

This study was conducted to analyze the mediating effect of product innovation in the relationship between dynamic marketing capabilities (DMC) on company performance. The aspect of product innovation is considered important for marketers and management practitioners in relation to its function which is able to increase the effective role of DMC in the performance of the company. This study was carried out using descriptive quantitative method using simple linear regression analysis with software partner SPSS version 23 and AMOS version 23. Furthermore, testing the measurement model was carried out with Confirmatory Factor Analysis (CFA) and Coefficient Strategy analysis products through a Single Mediation Model. By involving 98 Micro, Small and Medium Enterprises (MSMEs) incorporated in the field of food production or culinary, the results of the research show that product innovation can partially mediate the impact of dynamic marketing capabilities on company performance. Several implications of findings are discussed at the end of the paper.

Keywords: *dynamic marketing capabilities; company performance; product innovation; MSMEs.*

1. Introduction

One of the objectives of establishing a business unit is to maintain business continuity and maximize profits. Companies can survive in business competition by always emphasizing the importance of company performance. Specifically, some interesting concepts in improving company performance are regarding the company's marketing capabilities. This ability involves several dynamic and orientative contexts in managing marketing (Krasnikov & Jayachandran, 2008). In particular, these contexts include Dynamic Marketing capabilities (Bruni & Verona, 2009; Pérez-Cabañero et al., 2014), market orientation (Protcko & Dornberger, 2014; Charles et al., 2012), marketing research (Ayuba & Kazeem, 2015), resilient human resources (Jackling & Johl, 2009) and political connections with business units (Sheng et al., 2011; Pudjiarti & Suharnomo, 2018). A well managed and directed company performance will help the company succeed in gaining competitive advantage (Jennings & Beaver, 1997).

With maximum company performance in various fields, in turn the company will achieve competitive advantage (Riswanto et al., 2018). Excellence in competition will maximize the company's potential to optimize its capacity. Changing dynamics and contemporary business development encourage companies to explore aspects that are considered able to improve company performance. Here, customer analysis is needed in relation to its effectiveness in managing market information, and improving company performance (Zaborek et al., 2015). This illustrates that market analysis and research have an important role in giving thought to policies and decisions that will be made by the company. As a consequence, companies must allocate a number of resources to meet research needs, ranging from facilities, fresh funds and also human resources who have the ability in the field. Other things related to research and factors that influence company performance are related to dynamic marketing abilities (DMC) (Bruni & Verona, 2009; Pérez-Cabañero et al., 2014; Fang & Zou, 2009; Kachouie et al., 2018). Dynamic marketing capability is a measure of the extent to which a company is able to respond to market needs in conditions of uncertainty (Sukdej & Ussahawanitchakit, 2015). This concept is an extension of resource-based theory (Barney, 1986). This capability is considered very important and its existence is considered critical in determining the absorptive capability of a company in dynamic conditions and uncertainty. Barrales-Molina et al. (2017) states that in such conditions accompanied by a competitive environment, organizations need to regularly update their capabilities and resources. Utilization and renewal of resources and knowledge management are two basic aspects needed in DMC (Barrales-Molina et al., 2014).

Furthermore, Xu et al. (2014) emphasize the importance of the innovation process in DMC. Dynamic marketing ability through resource renewal and organizational knowledge management can guide innovation as a crucial point to determine the level of organizational sustainability in times of uncertainty. The existence of differentiation and more value offered in a product will make the organization more likely to be chosen by the market compared to other organizations that are stagnant and less innovative (Xu et al., 2014). By having dynamic marketing capabilities and always seeing the global developments that occur as well as the development of industry that continues to advance, the company will be able to survive in business competition. As a result, performance in all lines and levels of the company has excellent potential to develop the business. This, in a later stage, will have an impact on the success of the company's products. Here, the role of company product innovation is very important to determine the influence of DMC in improving corporate performance. In this context, this study attempts to analyze empirically the mediating effects of product innovation in the relationship between dynamic marketing capabilities (DMC) on the performance of MSMEs.

2. Research Method

This research was conducted to find out whether product innovation can be a moderator in the relationship of dynamic marketing capabilities to company performance. The method used is descriptive quantitative with multiple regression analysis and SPSS version 23. Questionnaires were distributed to 98 respondents of Micro, Small and Medium Enterprises engaged in culinary business in Sukabumi, West Java Province, Indonesia. Assumption Test in this study uses Standard Multiple Regression. Regression equation is carried out simultaneously where all independent variables are entered into the equation. Then, after the model is considered appropriate, data analysis is performed using the Product Coefficient Strategy via the Simple Mediation Model – Normal Theory Approach (Baron, & Kenny, 1986; Preacher & Hayes, 2004).

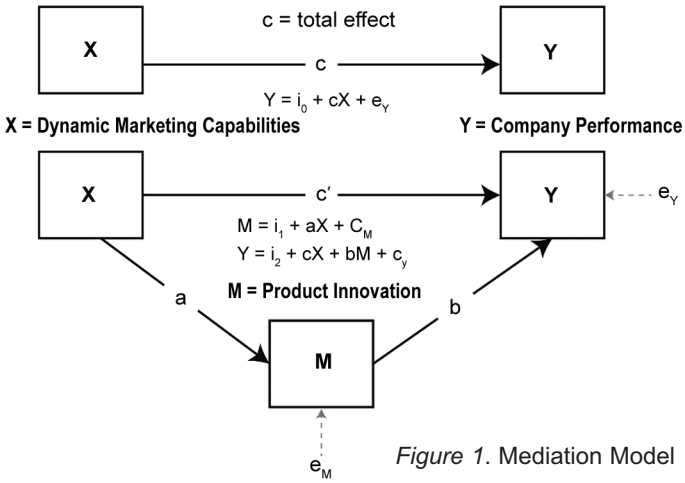


Figure 1. Mediation Model

The criteria for acceptance is following:

- $Y = i_1 + cX \rightarrow c$ must be significant ($p < 0.05$)
- $M = i_2 + aX \rightarrow a$ must be significant ($p < 0.05$)
- $Y = i_3 + bM + c'X \rightarrow b$ must be significant ($p < 0.05$)
- Total effect: X → Y = c.
- Direct effect: X → Y = c'.
- Indirect effect: X → M → Y = ab.
- Total effect: c = c' + ab or (c – c') = ab.
- Ho: ab = 0 → Ha: ab ≠ 0
- Ho is rejected if z_{count} has *p*-value ≤ 0.05.

3. Results

3.1. SME performance in West Java

This research was conducted on micro, small and medium enterprises (MSMEs) in Indonesia. The development of Micro, Small and Medium Enterprises (MSMEs) and large companies in Indonesia in 2013 can be seen in the development of business units in the year amounting to 1,361,227 or 2.41% (from 56,539,560 units developed to 57,900,787 units). The largest increase occurred in Medium Enterprises by 6.35% (from 48,997 units to 52,106 Units). In Big Business, it still increased 1.97% (from 4,968 units to 5,066 units). The development of Micro, Small and Medium Enterprises (MSMEs) and Large Enterprises in Indonesia in 2013 was seen from the number of workers which increased quite high, amounting to 6,873,090 or 6.20% (from 11,808,154 people to 117,681,244 people) As for the increase in the highest number of business people in Small Business by 22.80% (from 4,535,970 people developing to 5,570,231 people). This shows that Indonesia as a developing country, makes it possible to become a country that has a high population of entrepreneurs so that it can reduce the number of unemployed, improve welfare and reduce the number of poor people (Riswanto, 2016b).

Furthermore, West Java Province is one of the provinces that promotes economic growth and growth through the activities of MSMEs, Large Industries in West Java by Regency and City in 2011, the highest in the three highest cities, namely the City of Bandung, Bogor Regency and the City of Bogor. Sukabumi City, even though it is not included in the top three that experience growth in MSME activities, Sukabumi is a city that develops potential in the fields of MSMEs, Trade and Industry. Sukabumi City has a total of 18,310 MSMEs and is involved in industry, formal trade, non-formal trade for street vendors and other service businesses. The focus of the research is on MSMEs engaged in the trade sector, especially culinary that is growing rapidly in the City of Sukabumi.

3.2. Confirmatory Factor Analysis (CFA)

Testing of the measurement model is done by using a Confirmatory Factor Analysis (CFA) to validate the proposed instruments and model.

The results of the analysis of the validity test using CFA and reliability using SPSS version 23 shows that of the 21 research

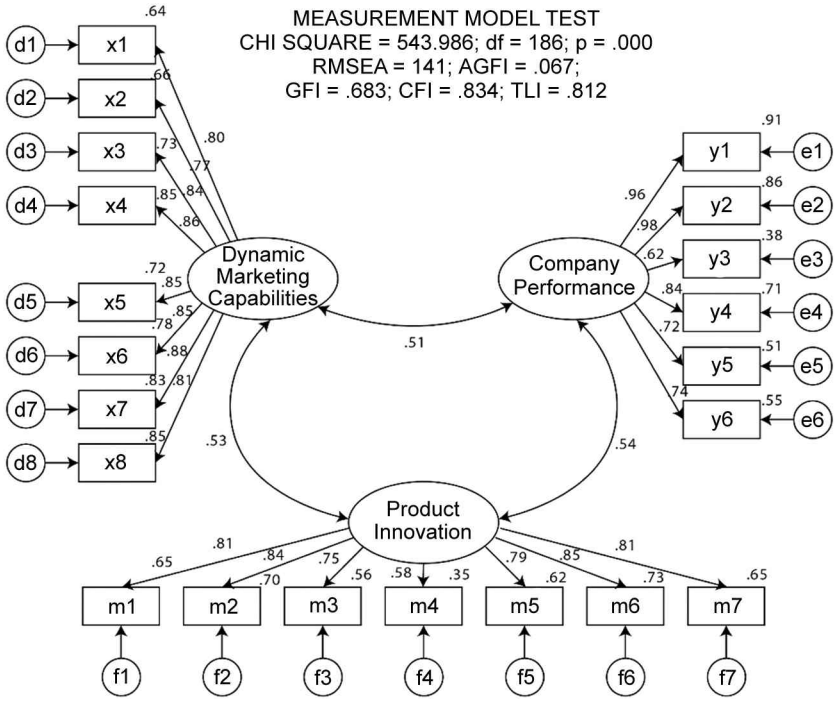
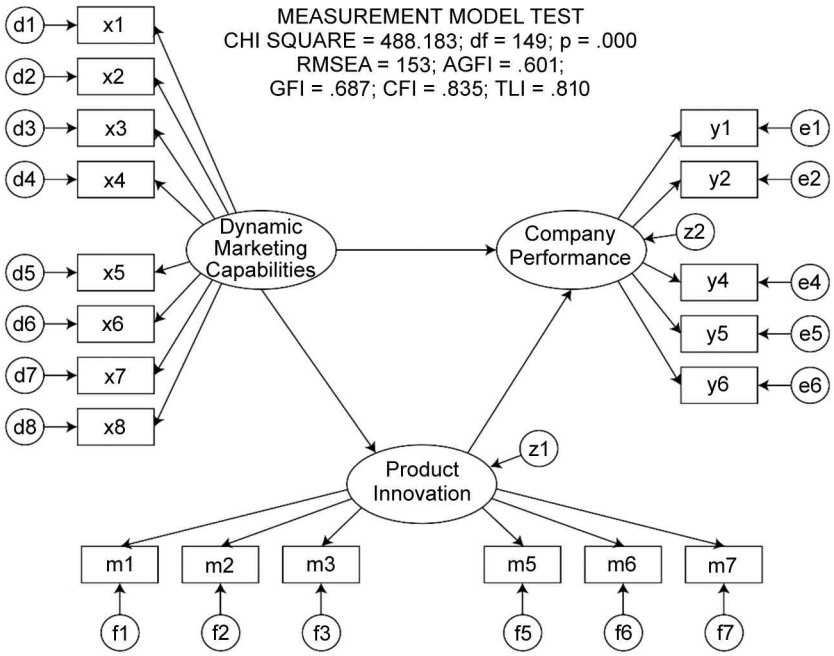


Figure 2. Model Test Measurements (All Items)

instruments, there were two instruments which were declared invalid (item 11 of Product Innovation variable and item 18 of Company Performance variable). The results also show that all variables have high category alpha coefficients.

Variable	Scale	Item Number	Invalid item	Alpha coefficient**
DMC	MO Scale	1-8	-	0.957
PI	DMC Scale	9-14	11	0.922
CP	BP Scale	15-21	18	0.914

Table 1. Validity and Reliability Test Results



3.3. Goodness of Fit

After removing invalid items from data testing, the analysis continued with the model measurement test. The results show the Chi-square value is 488,183, with df = 149 and p-value = 0.000 with the Root Mean Square Error of Approximation (RMSEA) value 153. From the CFA analysis, the Fit Performance Model of the Company is shown in Figure 4.

Index	Result
Chi-square (df=149)	488.18
P	.000
RMSEA	.152
AGFI	.601
GFI	.687
CFI	.835
TLI	.810

Table 2. Goodness of Fit Index

Figure 3.
Test of Measurement
and Goodness of Fit Model

3.4. Hypothesis Testing

Antecedent	Consequent							
	M(PI)				*Y*(CP)			
		Coeff.	S.E	*P*		Coeff.	S.E	*p*
X (DMC)	*A*	0.317	0.050	<.001	*c'*	0.163	0.054	.035
M (PI)		-	-	-	*B*	0.406	0.093	<.001
	i_1	12.570	1.171	<.001	i_2	7.288	1581	<.001
R^2 = 0.293					R^2 = 0.386			
F (1.96) = 39.776, *p*< .001					F (2.95) = 29.883, *p*< .001			

Table 3.
Summary of Statistical
Analysis Results

Table 3 shows that the coefficient c' = 0.163 means that there is a significant influence (p = 0.035 <0.05). Although the value of c is 0.292, the number of indirect effects X (Dynamic Marketing Capabilities) on Y (Company Performance) = ab = (0.317) x (0.406) = 0.1287 is consequential (p <0.001). Furthermore, the results of the analysis that show that c' are significant but the value is below the requirement (c'<c), or the value of c'<ab (indirect effect) indicates the partial mediation effect of the product innovation variable in the relationship between dynamic marketing capability (DMC) on company performance. Thus, product innovation is empirically proven to only partially mediate the impact of the Dynamic Marketing Ability (DMC) on Company Performance (CP).

The results of this study support the previous study which states the influence of marketing capabilities related to performance (Moore & Fairhurst, 2003) and the direct influence of Dynamic Capabilities (DC) with performance (Macher & Mowery, 2009), and also related to performance and dynamic marketing skills (Cabañero et al., 2015; Fang & Zou, 2009; Kachoui et al., 2018). However, some previous studies have only examined the effect of DMC with PI (Bruni & Verona, 2009) and the influence of PI and CP (Verhees & Meulenberg, 2004; Riswanto, 2016a). The findings of this study, which found the impact of DMC on CP which was moderated by PI variable was significant in relation to the importance of aspects of innovation in aspects of dynamic marketing abilities.

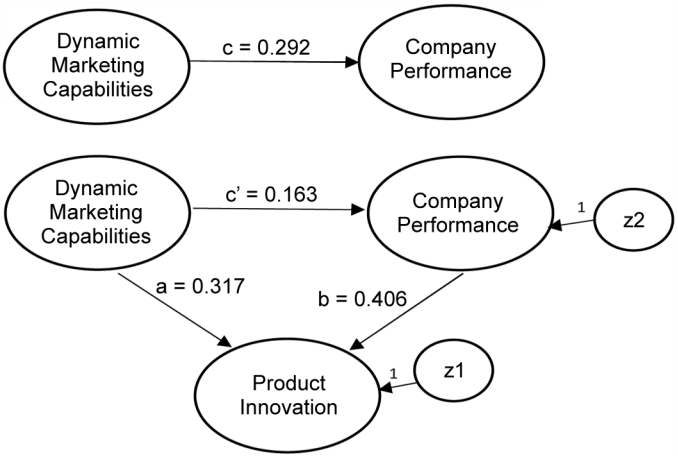


Figure 4. Full Model of Mediation Analysis

4. Conclusion

This study was conducted to analyze the mediating effect of product innovation in the relationship between dynamic marketing capabilities (DMC) on company performance. The aspect of product innovation is considered important for mar-

keters and management practitioners in relation to its function which is able to increase the effective role of DMC in the performance of the company. The results of this study indicate that Dynamic Marketing Capabilities (DMC) has an impact on the Company's Performance and partly mediated by the Product Innovation variable of Micro and Small and Medium Enterprises. In addition, DMC has a beneficial influence on innovation. In addition, innovation also has a positive influence on company performance.

5. Implications

The findings of this study provide further evidence of the role of product innovation variables as mediating variables in the relationship between dynamic marketing capabilities and company performance. Specifically, these results indicate that food and culinary MSMEs in Sukabumi, West Java have developed well and are able to produce and create product creations and innovations desired by consumers, so that they can affect MSME performance.

6. Limitations and Reccomendation

This research has limitations. Thus, further research is expected to examine more deeply about the influence of DMC, product innovation and performance on other business units and other types of business. In addition, further studies need to be conducted on a wider sample and several cities and even a number of cities in different provinces to produce a higher level of generalization. In addition, subsequent research needs to involve more good variables that affect the dynamics of marketing capabilities and that control performance variables. This is done to expand and develop knowledge about marketing management, especially those related to the study of DMC. Another thing is related to the relationship between dynamic marketing abilities and consumer behavior or marketer behavior.

References

[1] Ayuba, B., & Kazeem, O.A. (2015). The Role of Marketing Research on the Performance of Business Organizations. *European Journal of Business and Management*, 7(6), 148-157.

[2] Barney, J.B. (1986). Strategic factor markets: Expectations, luck, and business strategy. *Management science*, 32(10), 1231-1241.

[3] Baron, R.M., & Kenny, D.A. (1986). The moderator–mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of personality and social psychology*, 51(6), 1173.

[4] Barrales-Molina, V., Martínez-López, F.J., & Gázquez-Abad, J.C. (2017). Dynamic Marketing Capabilities: An Integrative Framework Proposal to Absorb and Manage Market Knowledge. In *The Customer is NOT Always Right? Marketing Orientationsin a Dynamic Business World* (pp. 176-176). Springer, Cham.

[5] Barrales-Molina, V., Martínez-López, F. J., & Gázquez-Abad, J.C. (2014). Dynamic marketing capabilities: Toward an integrative framework. *International Journal of Management Reviews*, 16(4), 397-416.

[6] Bruni, D.S., & Verona, G. (2009). Dynamic marketing capabilities in Science-based firms: An exploratory investigation of the pharmaceutical industry. *British Journal of management*, 20, S101-S117.

[7] Charles, L., Joel, C., & Samwel, K.C. (2012). Market orientation and firm performance in the manufacturing sector in Kenya. *European Journal of Business and Management*, 4(10), 20-27.

[8] Fang, E.E., & Zou, S. (2009). Antecedents and consequences of marketing dynamic capabilities in international joint ventures. *Journal of International Business Studies*, 40(5), 742-761.

[9] Jackling, B., & Johl, S. (2009). Board structure and firm performance: Evidence from India's top companies. *Corporate Governance: An International Review*, 17(4), 492-509.

[10] Jennings, P., & Beaver, G. (1997). The performance and competitive advantage of small firms: a management perspective. *International small business journal*, 15(2), 63-75.

[11] Kachouie, R., Mavondo, F., & Sands, S. (2018). Dynamic marketing capabilities view on creating market change. *European Journal of Marketing*, 52(5/6), 1007-1036.

[12] Krasnikov, A., & Jayachandran, S. (2008). The relative impact of marketing, research-and-development, and operations capabilities on firm performance. *Journal of marketing*, 72(4), 1-11.

[13] Macher, J.T., & Mowery, D.C. (2009). Measuring dynamic capabilities: practices and performance in semiconductor manufacturing. *British Journal of Management*, 20, S41-S62.

[14] Moore, M., & Fairhurst, A. (2003). Marketing capabilities and firm performance in fashion retailing. *Journal of Fashion Marketing and Management: An International Journal*, 7(4), 386-397.

[15] Pérez–Cabañero, C., Cruz–Ros, S., & González–Cruz, T. (2014). The contribution of dynamic marketing capabilities to service innovation and performance. *International Journal of Business Environment*, 7(1), 61-78.

[16] Preacher, K. J., & Hayes, A.F. (2004). SPSS and SAS procedures for estimating indirect effects in simple mediation models. *Behavior research methods, instruments, & computers*, 36(4), 717-731.

[17] Protcko, E., & Dornberger, U. (2014). The impact of market orientation on business performance – The case of Tatarstan knowledge-intensive companies (Russia). *Problems and Perspectives in Management*, 12(4), 225-231.

[18] Pudjiarti, E.S., & Suharnomo, S. (2018). Does Institutional Intervention play a Role in Small Business Clustering? An Empirical Evidence from Semarang, Indonesia. *Quality Access to Success*, 19(163), 52-59.

[19] Riswanto, A. (2016a). The Role of the Entrepreneur in Innovation and in *Economic Development*, in *Advances in Economics, Business and Management Research*, Vol. 15. *1st Global Conference on Business, Management and Entreupreuneurship (GCBME-16)*, 2016.

[20] Riswanto, A. (2016b). Poverty: Causes And Troubleshooting Analysis. *Jurnal Sosial Humaniora* 7(1), 59-72.

[21] Sheng, S., Zhou, K.Z., & Li, J.J. (2011). The effects of business and political ties on firm performance: Evidence from China. *Journal of Marketing*, 75(1), 1-15.

[22] Sukdej, S., & Ussahawanitchakit, P. (2015). Dynamic marketing capability and marketing survival: evidence from auto parts businesses in Thailand. *The Business & Management Review*, 7(1), 177.

[23] Verhees, F.J., & Meulenberg, M.T. (2004). Market orientation, innovativeness, product innovation, and performance in small firms. *Journal of small business management*, 42(2), 134-154.

[24] Xu, H., Guo, H., Zhang, J., & Dang, A. (2018). Facilitating dynamic marketing capabilities development for domestic and foreign firms in an emerging economy. *Journal of Business Research*, 86, 141-152.

[25] Zaborek, P., Tomczyk, P., & Doligalski, T. (2015). Customer Analysis And Firm Performance: Empirical Evidence From The Polish Insurance Market. The paper was presented at the *6th EMAC Regional Conference in Vienna*, September 1618, 2015.

[26] Riswanto, A., Saribanon, E., & Gaffar, V. (2018). The importance of the cultural and gender outlook on consumer behavior studies: An Indonesian perspective. *Arthatama Journal of Business Management and Accounting*, 2(1).

Optimizing Capabilities in Utilizing Resources Flexibility to improve the Performance of Hospitality Small and Medium-sized Enterprises

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Abstract

This study attempts to examine the effect of entrepreneurial orientation variables, organizational learning and marketing resource flexibility on company performance in the small-scale hospitality industry in Bali, Indonesia. By using a sample of 121 respondents who acted as owners and managers of the SMEs hotel, the data was processed with multiple linear regression models which was then analyzed by the SPSS program. Statistical test results show that the variable flexibility of resources plays an important role and contributes positively and significantly to company performance. Similarly, the variable of organizational learning was empirically proven to have a positive and significant influence on company performance. However, the entrepreneurial orientation variable does not have a significant effect on company performance. The implication of this finding is the need for hospitality organizations to emphasize the flexibility of resources as an organizational advantage in creating opportunities, as well as sustainable efforts in competition in hospitality industries. The originality of this research lies in empirical efforts in testing the flexibility of marketing resources in small and medium scale hotels.

Keywords: *entrepreneurial orientation; flexibility of marketing resources; organizational learning; company performance; hospitality SMEs.*

1. Introduction

Small and medium enterprises (SMEs) have a strategic role in the economic development of a nation. SMEs play a role in economic progress, through the ability of innovation, opening new businesses so as to create employment opportunities (Li, 2009). The strategic role of SMEs has been widely recognized both in developing countries and in developed countries. Sugiarto (2009) states that SMEs in Indonesia have a very important role for the economy because with limited capital can create employment opportunities for the community. Most SMEs in Indonesia (83.15%) use their own capital (Sugiarto, 2009). Li's (2009) and Sugiarto's (2009) opinions are in line with Bhasin and Venkataramany (2010) which examines the development of SMEs in Indonesia, stating that SMEs are the key engine of economic growth in developing countries in Southeast and South Asia including Indonesia. Further said Indonesian SMEs, able to absorb 90% of the workforce. Thus, SMEs can be a source of increasing public and government revenues. The important role of SMEs in job creation and income generation is also recognized in other countries. Alsaaty (2011) argues that the economy of the United States (USA) is increasingly based on the SME sector. Furthermore, Alsaaty (2011) stated that the contribution of SMEs to the creation of employment opportunities and national output is very impressive. Fourie (2008) argues that entrepreneurship triggers the establishment of SMEs. SMEs are driving economic growth and development such as in the United States and Malaysia.

The hospitality industry is one of the main supporters of the tourism industry. On the island of Bali, one of the world's major tourist destinations, the hospitality industry has long been thriving where many players come from small and medium-scale budget hotels. Table 1 shows the contribution of each business sector to the Gross Regional Domestic Product of Bali Province and its development from 2006 to 2011.

Table 1 shows that the role of the Trade sector, hotels and restaurants is very large for the Balinese economy. The contribution of this sector is dominated by the tourism sector (Hotels

No.	Sector	Year					
		2006	2007	2008	2009	2010	2011
1	Agriculture	7.930.061,4	8.711.065,9	9.884.823,2	11.326.122,9	12.097.348,4	12.743.484,8
2	Mining and excavation	252.635,2	278.602,0	345.115,9	387.916,9	466.486,7	539.564,4
3	Manufacture	3.518.324,3	40.93.976,2	4.941.639,4	5.588.427,5	6.120.473,7	6.572.988,8
4	Electricity, Gas and Clean Water	755.298,9	875.926,9	1.059.089,0	1.163.778,9	1.263.308,8	1.429.611,4
5	Construction	1.665.774,5	1.953.657,3	2.557.714,1	2.760.100,1	3,033,986,7	3.440.423,5
6	Trade, Hotels and Restaurants	10.964.357,6	12.517.789,2	14.712.079,1	17.868.607,6	20.016.062,1	22.499.946,9
7	Transportation and Communication	3.806.930,8	5.431.629,9	6.681.590,4	8.194.713,7	9.628.024,2	10.626.582,3
8	Finance, Real Estate and Corporate Services	2.878.320,6	3.213.354,2	3.892.258,6	4.234.063,1	4.548.558,1	4.946.582,6
9	Services	6.270.768,4	6.927.377,7	7.841.860,3	8.768.508,1	9.516.349,0	10.678.976,6
Total		38.851.074,6	44.003.379,6	51.916.170,3	60.292.239,3	66.690.598,1	73.478.161,8

Table 1. Sectoral contribution to the GRDP of Bali Province (in million rupiah)

and Restaurants). Thus, the tourism sector is still a mainstay sector of the region's original source of income in the economy of Bali. Table 2 shows the contribution of hotels and restaurants to the tourism sector (2005 - 2011) in Bali, as well as the hotel and restaurant contribution to regional GRDP and contributions growth of hospitality industries.

No.	Contribution	Year						
		2005	2006	2007	2008	2009	2010	2011
1	Hotel and Restaurant Contribution to Sector No 6; Trade, Hotels and restaurants	-	0.61	0.63	0.64	0.64	0.62	0.61
2	Hotel and Restaurant Contribution to Bali GRDP	-	0.17	0.18	0.18	0.19	0.19	0.19
3	Hotel Contributions Growth	15.69	4.90	15.70	16.99	17.46	6.78	9.05

Table 2.
Contribution of hotels and restaurants to the tourism sector (in percent)

Table 2 shows that the contribution of the hotel and restaurant sector to Bali's gross regional domestic product and the trade, hotels and restaurants sector has fluctuated year on year. Fluctuating tourism contribution growth and high hotel failure rates are the background of this research. Moreover, as an industry that survives in proportion to the growth of the tourism industry, the hotel industry in Bali is mostly run by an entrepreneur independently and does not become a branch of an international network hotel. Some of these entrepreneurs have hotels on a small and medium scale. In this context, this research is interested in examining the level of entrepreneurship of hotels in this class. In addition, the ability of owners and managers to optimize the use of resources needs to be a particular concern, because this optimization ability relates to how much resources will be used to improve hotel performance. The greater the possible resources can affect performance. However, in this type of SME industry, they will face the challenges of financing and resource acquisition, which ultimately limits the level of resource allocation only to items that are perceived to be the most effective, can improve performance efficiently. In the same context, this study also attempts to test the capabilities of SME hotel owners and managers in configuring organizational processes in creating value that is reflected by organizational learning variables. This construct can reflect how and how large small and medium scale organizations are in the implementation of new ideas, joint search processes that link individual and organizational learning, and participation in decisions. The results of this study are expected to be practical and theoretical benefits for the small and medium scale hospitality industry in the process of optimizing marketing resources, exploring organizational learning and exploiting entrepreneurial orientation.

2. Literature review and hypothesis

2.1. Entrepreneurship orientation and company performance

Entrepreneurial orientation becomes a general concept in entrepreneurship, management and strategic management. Entrepreneurial orientation is known as the construct of behavior of the company (Covin and Lumpkin, 2011) involved in the activities of innovativeness, pro-activeness and risk-taking (Miller, 1983) plus autonomy and competitive agressiveness proposed by Lumpkin and Dess (1996). Entrepreneurial orientation is the reflection of high performance for small businesses.

Wiklund (1999) investigated the relationship of entrepreneurial orientation with company performance using small business data. The results of the study (Wiklund, 1999) indicate that there is a positive influence between entrepreneurial orientation and KP. The relationship entrepreneurial orientation with company performance is not temporary but all the time, which means that the influence of entrepreneurial orientation has a long-term impact. The results of the study (Wiklund, 1999) show that investment in entrepreneurial orientation can be useful for improving the performance of small businesses. Su et al. (2011) reported a positive direct relationship between entrepreneurial orientation and company performance.

H1. Entrepreneurial orientation has a positive effect on company performance

2.2. Flexibility of marketing resources and company performance

Resources require a transformation process so that they can become goods and services that are of super value to customers (Nuryakin & Priyo, 2018). Resources management requires exploitative and explorative capabilities (March, 1991), and transformative capabilities so that resources become valuable products and services. A process of transforming resources into a valuable product will run effectively if resources have additional properties, namely flexible. The more alternative the use of resources is the more flexible resources. Vairaktarakis (2003) states that in one condition of resources can be used in several purposes where the working time is very limited, the flexibility of resources determines success.

Ketkar and Sett (2010) argue that strategic field researchers in human resource management state that the flexibility of resources is very important in achieving corporate performance, what's more in a very dynamic environment. Empirical research on the relationship between resources flexibility and company performance is still relatively rare (Ketkar and Sett, 2010). On the grounds of the scarcity of empirical research regarding the relationship of resources motivational flexibility (Guo and Cao, 2014; Ketkar and Sett, 2010) to examine empirically the relationship of resources flexibility with firm performance and research results indicate that resources flexibility mediates environmental dynamics and company performance.

H2. Flexibility of marketing resources has a positive effect on company performance.

2.3. Organizational learning and company performance

In a dynamic environment, organizational learning is the only primary resource in achieving competitive advantage. The capacity to learn faster than competitors is the only sustainable competitive advantage (Lopez et al., 2005). Unger and Homburg (2006) stated that knowledge as an organizational learning result helps entrepreneurs in detecting new opportunities. Knowledge and learning increasingly play a role because of the rapidly changing environment. In order to quickly explore and scan the business environment, companies must have adequate learning intensity (Rhee et al., 2010). The accumulation of knowledge from learning becomes a useful portfolio of knowledge in scanning the business environment.

Zhao et al. (2011) argued that organizational learning can improve the organization's ability to manage uncertainty, improve the discovery of new opportunities. The company can increase its value through continuous intensive learning. The ability to explore, recognize, take advantage of opportunities, anticipate change depends largely on the intensity of learning. The quantity and quality of information, knowledge and methods / practices that can be obtained are used as a proxy for learning intensity. Through tacit and explicit knowledge (Nonaka and Krogh, 2009), companies can develop new combinations and exploit knowledge that can be useful to anticipate future changes in market tastes.

H3. Organizational learning has a positive effect on company performance.

3. Method

This research was conducted on budget class hotels on the island of Bali, Indonesia, which has become one of the world's major tourist destinations. Because the hotel budget population is relatively large, so that it has the opportunity to get a representative sample, the sample is chosen proportionally, combined with convenience sampling technique. A total of 121 final samples were obtained from respondents. Respondents in this study are owners and managers of SMEs hotels. Data collection was carried out from as many as 384 copies of questionnaires delivered by enumerators for each city / district. After the codification process, the remaining data to be processed came from 121 respondents.

The entrepreneurial orientation variable refers to Miller (1983) as a configurational approach in knowing the factors that determine a company's entrepreneurial level, with items adopted from Miller (2011) and Lumpkin and Dess (1996) which include innovative, proactive and risk-taking and autonomy. Organizational learning refers to the foundation in developing organizational capabilities so that capabilities can complete the organizational process of creating value (Wang, 2008), with items adopted from Mesa and Vidal (2013) which include experimentation of new ideas, risk-taking, interaction, dialogue and decision participation. Variable resource flexibility is operationally defined as scanning capability, environmental forecasting to anticipate customer value, with items adopted from various previous studies (Day and Schoemaker, 2005; Flint et al., 2008). Finally, the company performance variable refers to Wiklund (1999) with several measures of growth both sales, market share, cash and employee that are very important for small businesses.

Data analysis in this study uses a multiple linear regression model approach that uses the SPSS program. Hypothesis testing is done by testing the coefficient of determination, and ANOVA test.

4. Results

4.1. Descriptive analysis

Descriptive analysis in this study is an analysis conducted to assess the characteristics of a minimum, maximum, mean and standard deviation of the four variables studied.

	N	Minimum	Maximum	Mean	Std. Deviation
entrepreneurial_orientation	121	20.00	34.00	28.3372	3.03417
resource_flexibility	121	30.00	52.00	41.5992	4.65867
organizational_learning	121	31.00	50.00	40.8504	4.37062
marketing_performance	121	18.00	36.00	29.1612	3.48021
Valid N (listwise)	121				

Table 3. Descriptive statistics

Descriptive statistical test results with the SPSS program showed the minimum value for the entrepreneurial orientation variable was 20, with a maximum value of 34, and an average value of 28.34 with a standard deviation of 3.03. Furthermore, the minimum value for the resource flexibility variable is 30 with a maximum value of 52, with an average value of 41.6 with a standard deviation of 4.65. For organizational learning variables, the minimum value obtained is 31, and the maximum value is 50 with an average value of 40.85 with a standard deviation of 4.37. For variable company performance, minimum and maximum values are 18 and 36, with an average value of 29.16 and a standard deviation of 3.48.

4.2. Determination Coefficient Test

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.417[a]	.174	.153	3.20312
a. Predictors: (Constant), organizational_learning, entrepreneurial_orientation, resource_flexibility				

Table 4. Model Summary of Determination Coefficient Test

R square test or also called the coefficient of determination is a test to predict how much influence the independent variable (X) contributes to the dependent variable (Y) with the condition that the F test results in regression analysis are significant. Based on the results of statistical tests, it was obtained the R square value of 17.4 or 17.4%. This means that the dependent variables of organizational learning, entrepreneurial orientation, and resources flexibility contribute 17.4% to the independent variables of company performance.

4.3. Hypothesis testing

The first hypothesis states that entrepreneurial orientation has a positive effect on company performance. Statistical test results show that the entrepreneurial orientation variable has a Beta (Standardized Coefficients) value of 0.063 with a significance level of 0.479 or above the required level of 0.05 with a 95% confidence level. This means that the variable entrepreneurial orientation does not have a significant effect on company performance. Thus, the first hypothesis which emphasizes the positive and significant influence of entrepreneurial orientation on company performance is rejected.

The next test examines the assumption that the flexibility of marketing resources has a positive effect on company performance. Statistical test results show that the coefficient value obtained is 0.176 with a significance level of 0.071 or below 0.05 at a 95% confidence level. These results indicate that the second hypothesis which states that the flexibility of marketing resources has a positive effect on the company's performance is accepted. So, the higher the flexibility of resources, the higher the company performance.

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	12.224	3.763		3.249	.002
	entrepreneurial_orientation	.072	.101	.063	.710	.479
	resource_flexibility	.131	.072	.176	1.821	.071
	organizational_learning	.231	.074	.290	3.132	.002
a. Dependent Variable: company_performance						

Table 5. Coefficients

The third hypothesis states that organizational learning has a positive effect on company performance. Statistical test results show that the coefficient of organizational learning variable is 0.290 with a significance level of 0.002 or below 0.05 at a 95% confidence level. These results indicate a positive and significant influence on organizational learning variables on company performance, which means that higher organizational learning will improve company performance.

4.4. Simultaneous effect test through analysis of variance

Analysis of Variance (ANOVA) test is to test whether all independent variables from organizational learning, entrepreneurial orientation, resource flexibility can influence simultaneously on the dependent variable of company performance. The test results show a significance value of 0.00 or below 0.05. Thus, the three

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	253.007	3	84.336	8.220	.000[a]
	Residual	1200.421	117	10.260		
	Total	1453.427	120			
a. Predictors: (Constant), organizational_learning, entrepreneurial_orientation, resource_flexibility						
b. Dependent Variable: company_performance						

Table 6. ANOVA

independent variables proved to be able to simultaneously influence the dependent variable of company performance.

5. Conclusion

Statistical test results show that the variable flexibility of resources plays an important role and contributes positively and significantly to company performance. Similarly, the variable of organizational learning was empirically proven to have a positive and significant influence on company performance. However, the entrepreneurial orientation variable does not have a significant effect on company performance. The implication of this finding is the need for hospitality organizations to emphasize the flexibility of resources as an organizational advantage in creating opportunities, as well as sustainable efforts in competition in hospitality industries. The originality of this research lies in empirical efforts in testing the flexibility of marketing resources in small and medium scale hotels.

These findings emphasize the importance of small and medium scale hospitality organizations in Bali to maintain and improve company performance through optimizing the use of marketing resources efficiently and effectively. This is in line with the view that flexibility was initially used widely among strategic management researchers to demonstrate the ability of a company in responding to various demands from a dynamic competitive environment. In line with findings, resource flexibility is the company's ability to respond continuously to changes that are not anticipated and adjust to unexpected consequences of unpredictable changes. Flexibility can also be interpreted as the company's ability to reallocate resources quickly and smoothly in response to changes. In winning the competition, the small and medium scale hospitality industry in Bali must be able to respond to various demands from a dynamic competition environment, by flexible in the allocation and adoption of marketing resources, such as marketing funds, cost allocation and scope of promotions, salespeople and supervisors.

References

[1] Alsaaty, F. M. (2011). A Model for Building Innovation Capabilities in Small Entrepreneurial Firms. *Academy of Entrepreneurship Journal*, 17(1): 1-22.

[2] Bhasin, B. B., & Venkataramany, S. (2010). Globalization Of Entrepreneurship: Policy Considerations For SME Development In Indonesia. *Internal Business & Economic Research Journal*, 9(4): 95-103.

[3] Covin, J. G., & Lumpkin, G. T. (2011). Entrepreneurial Orientation Theory and Research: Reflections on a Needed Construct. *Entrepreneurship Theory and Practice*, September: 855-872.

[4] Day, G. S., & Schoemaker, P. J. H. (2005). Scaning The Pherphery. *Harvard Business Review*, November: 135-148.

[5] Flint, D. J., Blocker, C. P., & Boutin, P. (2008). Customer Value Anticipation as an Operant resource Driving Customer Satisfaction and Loyalty, *Otago Forun* 2 (2008): 81-108.

[6] Guo, H., & Cao, Z. (2014). Strategic flexibility and SME performance in an emerging economy: A contingency perspective. *Journal of Organizational Change Management*, 27(2): 273-298.

[7] Ketkar, S., & Sett, P. K. (2010). Environmental dynamism, human resource flexibility, and firm performance: analysis of a multi-level causal model. *The International Journal of Human Resource Management*, 21(8): 1173-1206.

[8] Li, X. (2009). *Entrepreneurial Competencies as Entrepreneurial Distinctive: An Examination of Competency Approach in Defining Entrepreneurs*. Dissertations and Theses Collection. Available at: https://ink.library.smu.edu.sg/etd_coll/14

[9] Lopez, S. P., Peon, J. M. M., & Ordas, C. J. V. (2005). Organizations Learning as Determining Factor for Business Performance. *The Learning Organizations*, 12(3): 227-245.

[10] Lumpkin, G. T., & Dess, G. G. (1996). Clarrfying The Entrepreneurial Orientation Construct and Lingking It To Performance. *Academy of Management Review*, 21(1): 135-172.

[11] March, J. G. (1991). Exploration and Exploitation in Organizational Learning. *Organization Science*, 2(1): 71-87.

[12] Mesa, A. F., &Vidal, J. A. (2013). Linking EO and Export Intencity: How Organizational Learning Capability and Innovation Performance Affect this Relationship. Paper presented at the *2013 EU-SPRI Forum Conference Management of Innovation Policies*, Madrid

[13] Miller, D. (2011). Miller (1983) Revisited A Reflection on EO Research and Some Suggestion for Future. *Entrepreneurship Theory and Practice* (September): 873-894.

[14] Nonaka, I., & Krogh, G. V. (2009). Tacit Knowledge and Knowledge Conversion: Controversy and Advancement in Organizational. *Organization Science*, 20(3 May-June): 635-652.

[15] Nuryakin, & Priyo, J. S. (2018). Service Quality, Trust and Customer Loyalty: The Role of Customer Satisfaction at the Hotel Services Industry in Indonesia. *Quality-Access to Success* 19(166): 50-55.

[16] Rhee, J., Park, T., & Lee, D. H. (2010). Drivers of Innovativeness and Performance for Innovative SMEs In Shout Korea: Mediation of Learning Orientation. *Technovation*, 30: 65-75.

[17] Su, Z., Xie, E., & Li, Y. (2011). Entrepreneurial Orientation and Firm Performance in New Ventures and Established Firms. *Journal of Small Business Management* 49(4): 558-577.

[18] Sugiarto, P. H. Y. (2009). *Peran Orientasi Kewiraswastaan Pemilik/ Manajer Dalam Membangun Aset Strategik dan Keunggulan Kompetitif UKM untuk Meningkatkan Kinerja Bisnis*. Universitas Diponegoro, Semarang.

[19] Unger, J. M., & Homburg, B. (2006). *Entrepreneurial Success The Role of Human Capital and Learning*. Universität Gießen.

[20] Vairaktarakis, G. L. (2003). The Value of Resource Flexibility in the Resource-Constrained Job Assignment Problem. *Management Science*, 49(6): 718-732.

[21] Wang, C. L. 2008. Entrepreneurial Orientation, Learning Orientation and Firm Performance. *Entrepreneurship Theory and Practice*, 32(4): 635-656.

[22] Wiklund, J. (1999). The Sustainability of Entrepreneurial Orientation – Performace Relationship. *Entrepreneurship Theory and Practice* (Fall): 37.

[23] Zhao, Y., Li, Y., Lee, S. H., & Chen, L. B. (2011). Entrepreneurial Orientation, Organizational Learning and Performance: Evidence from China. E*ntrepreneurship Theory and Practice*, March: 293-317.

Improving Quality in Service Management through Critical Key Performance Indicators in Maintenance Process: A Systematic Literature Review

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Abstract

Good quality of maintenance process will improve the quality of service management. Key performance indicator (KPI) in the maintenance processes are defined and applied as maintenance process' measurement. The purpose of this research is to define the critical KPI of maintenance process to improve the quality of service management. In this research, a Systematic Literature Review (SLR) is implemented from the previous studies (33 papers) related to the selection of KPI in the maintenance processes. This paper found that the most important KPI in maintenance is Availability that also becomes a leading indicator. Besides availability, there also some of KPI of maintenance such as Mean Time Between Stoppages (MTBS), Mean Time to Repair (MTTR), Overall Equipment Effectiveness (OEE), Maintainability, Safety, Mean Time Between Failure (MTBF), Reliability, Performance Rate, Quality Rate, Maintenance Time, etc. The popular method to find KPI in maintenance is based on the theories from the existing literature, AHP (Analytical Hierarchy Process), and interview the subject matter expertise in some companies.

Keywords: *key performance indicator (KPI); maintenance process; quality; service management.*

1. Introduction

Maintenance in service management is a tangible action from the service provider directly to customer's possession (Fitzsimmons, 2010). Good maintenance quality is needed for the customer because it is related to the availability of their equipment. Besides that, doing good quality maintenance have a purpose to keep the equipment in the effective and safety so it can achieve the production target with the expected time and optimum cost. To improve the quality of service management related to the maintenance process, the service provider needs to do equipment management. Equipment management is creating the effective maintenance to support the availability and reliability from modern equipment, the strategy is to synergize all department to make sure the reliability and benefit of the operation. (Tomlingson, 2010).

Continuous improvement in equipment management is performed by creating an action plan from the Key Performance Indicator (KPI) that did not achieve the target in the maintenance process. KPIs provide information to the service provider about what to do to improve the performance (Badawy, 2016). But this gives question on "what are the critical KPI in the maintenance process?" Based on that question, this research aims to perform the Systematic Literature Review (SLR) from the previous studies related to the selection of KPI in the maintenance process. The purpose of this research is to define the critical KPI of maintenance process to improve the quality of service management.

2. Literature Review

2.1. Maintenance

Maintenance is defined as a series of various maintenance interventions, which can be classified into four categories: breakdown or corrective maintenance, scheduled maintenance, preventive maintenance, and condition or predictive-based maintenance. Corrective maintenance performs the repair after the equipment already failed and cannot do the normal function. Scheduled maintenance occurred when equipment needs to overhaul, change oil, inspection and other activities that have scheduled interval (for example: change oil every 250 hours). Preventive maintenance is maintenance to prevent the equipment from breakdown by doing minor repair or inspection to the weak spot of the equipment. The condition or predictive-based maintenance is maintenance or repair depending on the condition of the equipment. (Yan, 2014).

Some principles of maintenance required to create a good maintenance process are: program (definition of the program must be able to be understood by all employees), work load (must be clear on the type, what to do and the expected duration), terminology (common terminology should be defined to make sure there is no confusion among the employees), organization (the organization structure to do the maintenance should be defined and communicated to all the involved parties), labor control, productivity, preventive maintenance, planning criteria (the resources utilization, quality work, and timely completion should be designed carefully), standards, scheduling work (should be aligned with the schedule of operations), priority-setting (which work and which equipment must do based on the priority), information (the system to get the same information for all personnel), material control (to make sure the material available when doing the maintenance), non-maintenance (should be assessed before being assigned to maintenance), the last but not least is evaluation (should evaluate the factors that influence its performance using Key Performance Indicator and perform continuous improvement based on the result). (Tomlingson, 2010).

2.2. KPI (Key Performance Indicator)

There are four types of performance measures: key result indicators (KRIs) (how to achieve critical success factor), result indicators (RIs) (what you have done), performance indicators (PIs) (what you must do), KPIs (what to do to highly increase performance). Based on that type, measuring KPI is important to improve the process. The type of KPI can be divided into leading indicator (measures activities that have an effect on future performance), lagging indicator (measures the past performance) and diagnostic measure (signal the health of process) (Badawy, 2016).

3. Methodology

This study using the SLR approach that proposed by Taha et al (2013) and Weerakkody et al (2013). This approach is divided into defining the research question that already explained in the introduction, determining the research source of literature, accomplishing the process using the keyword, after that do the extracting data and analyzing the result to answer the research question.

The source for this research SLR are:

- Science Direct (www.sciencedirect.com)
- IEEEXplore Digital Library (http:/ieeexplore.ieee.org)
- Wiley Online Library (onlinelibrary.wiley.com)
- Inderscience Publishers (www.inderscience.com)
- Emerald Insight (www.emeraldinsight.com)
- Springer Link (link.springer.com)

Apart from the database above, the search also used google for papers that are not available in the database mentioned above. Based on the research question discussed earlier, it was determined that the keywords to be able to answer the research question were: (maintenance) AND (key performance indicator)

After entering the keyword into the database, the paper related to the specified keywords and a summary of the total of all these papers is shown as 'studies found'. Next is reading the title of the paper. If the title cannot be used, whether it is related to the research question or not, then proceed with reading the abstract. If it is appropriate, this paper will be downloaded for further investigation. The number of papers downloaded is called 'candidate studies'. All the results of the 'candidate studies' paper will be read thoroughly to find answers to research questions. The paper that will be used in the study as 'selected studies'.

To ensure that the paper is still up to date, the paper used as the ‘study is selected’ is a 10-year paper or a paper published at least in 2009.

Using the method described earlier, there were 1105 studies found. By reading the title and abstract, there are 55 related papers as candidate studies. All of the papers are read and then selected in accordance with the research question in which there are 33 papers for the selected studies.

Source	Studies found	Candidate studies	Selected studies
ScienceDirect	48	16	12
Ieeexplore	25	7	6
Wiley	268	5	0
Inderscience	32	2	1
Emeraldinsight	65	6	6
Springer	562	3	1
Other	105	16	7
Total	**1105**	**55**	**33**

Table 3.1. Number selected studies from the sources

4. Result and Discussion

4.1. Source of publication

Based on the source of the publication, the most papers were published in “Journal of Quality in Maintenance Engineering”.

Journal / Conference	Name of Journal / Conference	#	%
Journal	Journal of Quality in Maintenance Engineering	3	9.09%
Journal	IFAC Proceedings Volumes (IFAC-PapersOnline)	2	6.06%
Journal	International Journal of Innovation in Enterprise System	2	6.06%
Journal	Procedia CIRP	2	6.06%
Journal	Procedia Manufacturing	2	6.06%
Conference	2015 IEEE International Conference on Big Data (Big Data)	1	3.03%
Conference	2015 International Conference on Industrial Instrumentation and Control, ICIC 2015	1	3.03%
Conference	2017 2nd International Conference on System Reliability and Safety, ICSRS 2017	1	3.03%
Journal	Advances in Manufacturing	1	3.03%
Journal	Advances in Production …	1	3.03%
Journal	Automation in Construction	1	3.03%
Journal	Benchmarking: An International Journal	1	3.03%
Journal	CIRP Annals - Manufacturing Technology	1	3.03%
Journal	Electric Power Systems Research	1	3.03%
Journal	Energy	1	3.03%
Journal	Energy Procedia	1	3.03%
Conference	First International Conference on Advanced Business and Social Sciences	1	3.03%
Journal	IEEE Industry Applications Magazine	1	3.03%
Conference	IEEE International Conference on Industrial Engineering and Engineering Management	1	3.03%
Journal	Information Resources Management Journal	1	3.03%
Journal	Int. J. Internet Manufacturing and Services	1	3.03%
Journal	International Journal of Management Science and Engineering Management	1	3.03%
Journal	International Journal of Quality and Reliability Management	1	3.03%
Journal	Journal of Cleaner Production	1	3.03%
Journal	Journal of Loss Prevention in the Process Industries	1	3.03%
Journal	Procedia Technology	1	3.03%
Conference	Proceedings of the IEEE Power Engineering Society Transmission and Distribution Conference	1	3.03%
Total		**33**	**100.0**

Table 4.1. Source of publication

4.2. Author

The number of authors is more than the number of papers because the paper is not always created alone. So there are 111 authors, of whom the most active in making papers related to this research are 3 people namely Rodseth, Harald., Schjolberg, Per., and Supratman, N.A.

Author	#	%
Rodseth, Harald	2	1.80%
Schjolberg, Per	2	1.80%
Supratman, NA	2	1.80%
Agarwal, Ankur Mohan	1	0.90%
Ahmed, Qadeer	1	0.90%
Ahonen, T	1	0.90%
Ahren, Thomas	1	0.90%
Alhilman, Judi	1	0.90%
Ambad, P.M.	1	0.90%
Authors, For	1	0.90%
Baguley, P	1	0.90%
Bhosle, S.P	1	0.90%
Bo, Chen	1	0.90%
Chen, Haomin	1	0.90%
Deleryd, Mats	1	0.90%
Dias, Jose Antonio Mendonca	1	0.90%
Dornfeld, D	1	0.90%

Author	#	%
Duenckel, John R	1	0.90%
Gaikwad, R.A	1	0.90%
Gonzalez, Elena	1	0.90%
Gonzalves, Cesar Duarte Freitas	1	0.90%
Goyal, Praveen	1	0.90%
Gradiannisa, Yuki	1	0.90%
Guo, Xiaobin	1	0.90%
Hao, Yao	1	0.90%
Heikilla, J	1	0.90%
Horst, John A	1	0.90%
Ijumba, Nelson	1	0.90%
Iung, Benoit	1	0.90%
Jardine, Andrew	1	0.90%
Jiangfeng, Yang	1	0.90%
Jing, Jiajia	1	0.90%
Judi, Alhilman	1	0.90%
Kang, Ningzian	1	0.90%
Kayrbekova, Dina	1	0.90%
Khan, Faisal I	1	0.90%
Kirkwood, L	1	0.90%
Kizim, A.V	1	0.90%
Komonen, K	1	0.90%
Kunttu, S	1	0.90%
La Fata, Concetta Manuela	1	0.90%
Labib, Ashraf	1	0.90%
Lanza, G	1	0.90%
Lee, C.KM	1	0.90%
Levrat, Eric	1	0.90%
Li, Jingshan	1	0.90%
Liu, Qingyou	1	0.90%
Lomte, R.U.	1	0.90%
Lopes, Isabel	1	0.90%
Machado, V.A.C	1	0.90%
Maria, Galante Giacomo	1	0.90%
Markeset, Tore	1	0.90%
Medina-Oliva, Gabriela	1	0.90%
Meech, John	1	0.90%
Melero, Julio J.	1	0.90%
Micali, M.	1	0.90%
Mkandawire, Burnet O. Brien	1	0.90%
Muskulus, Michael	1	0.90%
Nainggolan, Devi Julietta	1	0.90%
Nanos, Emmanouil M.	1	0.90%
Ng, K.K.H.	1	0.90%
Nobili, Lorenzo	1	0.90%
Oliveira, Narcelo	1	0.90%
Pandey, Ajeet Kumar	1	0.90%
Panesar, S.S.	1	0.90%
Parida, Aditya	1	0.90%
Parreira, Juliana	1	0.90%
Peng, Li	1	0.90%
Peng, Xiangang	1	0.90%
Pittman, Jerry D.	1	0.90%
Purba, Martua F.	1	0.90%
Qingbin, Yuan	1	0.90%
Qingfeng, Wang	1	0.90%
Ravnestad, Guro	1	0.90%
Raza, Syed A.	1	0.90%
Regikumar, V.	1	0.90%
Rodrigues, Cristina	1	0.90%
S., Ni Made Yunita	1	0.90%
Saha, Akshay	1	0.90%
Salonen, Antti	1	0.90%
Saputra, Muhammad Tamami Dwi	1	0.90%
Seecharan, Turunan	1	0.90%
Senechal, Olivier	1	0.90%
Seyr, Helene	1	0.90%
Shehab, E.	1	0.90%
Shohet, Igal	1	0.90%
Skarlo, Terje	1	0.90%
Smolka, Ursula	1	0.90%
Soileau, Robert	1	0.90%
Starr, A.	1	0.90%
Stricker, N.	1	0.90%
Tang, M.H.M.	1	0.90%
Tang, Yang	1	0.90%
Valkokari, P.	1	0.90%
Valldecabres, Laura	1	0.90%
Vishnu, C.R.	1	0.90%
Weber Philippe	1	0.90%
Wei, Xi	1	0.90%
Wenbin, Liu	1	0.90%
Wibisono, Dermawan	1	0.90%
Xin, Zhong	1	0.90%
Xu, Aidong	1	0.90%
Yang, Yan	1	0.90%
Yi, Liu	1	0.90%
Yuniawan, Dani	1	0.90%
Yurusen, Nurseda Y.	1	0.90%
Zhao, Cong	1	0.90%
Zou, Zhengwei	1	0.90%
Total	**111**	**100.00%**

Table 4.2. Author

4.3. Institution

The number of institutions is also more than the number of papers because the authors of the paper do not always come from the same university. So there are 45 universities, of which the most active in making papers related to this research is Southwest Petroleum University, followed by Memorial University and Telkom University.

University Name	#	%
Southwest Petroleum University	3	6.67%
Memorial University	2	4.44%
Telkom University	2	4.44%
Beijing University of Chemical Technology	1	2.22%
Ben-Gurion University	1	2.22%
CIRCE-Universidad de Zaragoza	1	2.22%
College of Engineering Trivandrum	1	2.22%
Cranfield University	1	2.22%
Guangdong University of Technology	1	2.22%
Institute Technology of Bandung	1	2.22%
Karlsruhe Institute of Technology	1	2.22%
Lorraine University	1	2.22%
Lulea University of Technology	1	2.22%
Maharashtra Institute of Technology	1	2.22%
Malardalen University	1	2.22%
National Institute of Standard and Technology	1	2.22%
National Institute of Technology Calicut	1	2.22%
Norwegian University of Science and Technology	1	2.22%
Qatar University	1	2.22%
SEQS Testing Research Institute	1	2.22%
Shanghai University	1	2.22%
The Hong Kong Polytechnic University	1	2.22%
The University of British Columbia	1	2.22%
Universidade do Algarve	1	2.22%
Universidade Nova de Lisboa	1	2.22%
Università degli Studi di Palermo Palermo,	1	2.22%
Universitat Munchen	1	2.22%
Universite Lille Nord de France	1	2.22%
Universiti Teknikal Malaysia Melaka (UTeM), Malaysia	1	2.22%
Universitie de Valenciennes et du Hainaut-Cambresis	1	2.22%
University of California	1	2.22%
University of KwaZulu-Natal	1	2.22%
University of Merdeka Malang (UNMER)	1	2.22%
University of Minho	1	2.22%

University Name	#	%
University of Oldenburg	3	2.22%
University of Rwanda	2	2.22%
University of Stavanger	2	2.22%
University of Tokushima	1	2.22%
University of Wisconsin	1	2.22%
Volgograd State Technical University	1	2.22%
Xi Hua University	1	2.22%
Total	**45**	**100.00%**

Table 4.3. University Name

4.4. Academic Background

Based on the academic background of the authors, at most 8 people are Engineering Science, following the 6 people from industrial engineering.

Academic	#	%
Engineering Science	8	24.24%
Industrial Engineering	6	18.18%
Mechanical Engineering	4	12.12%
Electrical Engineering	3	9.09%
Manufacture Engineering	2	6.06%
Business	1	3.03%
Civil Engineering	1	3.03%
Computer Science	1	3.03%
Design Engineering	1	3.03%
Digital Industry	1	3.03%
Maintenance Engineering	1	3.03%
Mechatronic Engineering	1	3.03%
Mining Engineering	1	3.03%
Production Science	1	3.03%
Safety Engineering	1	3.03%
Total	**33**	**100.00%**

Table 4.4. Academic Background

4.5. Publication Trend

Based on the year of publication of the paper, 2015, 2016 and 2017 are the highest with the number of each of the 5 papers.

Year	#	%
2017	5	15.15%
2016	5	15.15%
2015	5	15.15%
2014	3	9.09%
2018	2	6.06%
2017	2	6.06%
2016	2	6.06%
2013	2	6.06%
2012	2	6.06%
2011	2	6.06%
2014	1	3.03%
2010	1	3.03%
2009	1	3.03%
Total	**33**	**100.00%**

Table 4.5. Year

4.6. Origin Country

Based on the country of origin of the university, China is very dominating with the number 9 papers, then there are Indonesia and Germany which showed in number 4 papers.

Country	#	%
China	9	20.00%
Indonesia	4	8.89%
Jerman	4	8.89%
Canada	3	6.67%
India	3	6.67%
US	3	6.67%
Norwegia	2	4.44%
Portugal	2	4.44%
Prancis	2	4.44%
Swedia	2	4.44%
Afrika Selatan	1	2.22%
Inggris	1	2.22%
Israel	1	2.22%
Italia	1	2.22%
Jepang	1	2.22%
Lisbon	1	2.22%
Malaysia	1	2.22%
Qatar	1	2.22%
Rusia	1	2.22%
Rwanda	1	2.22%
Spanyol	1	2.22%
Total	**45**	**100.00%**

Table 4.6. Country

4.7. Industry

Most of the paper from manufacturing industries and the second is from oil and gas.

Industry	#	%
Manufacturing	7	21.21%
oil and gas	6	18.18%
not available	5	15.15%
Electrical	3	9.09%
Railway	2	6.06%
Aircraft	1	3.03%
Airport	1	3.03%
Clinic	1	3.03%
Energy	1	3.03%
mass rapid transit	1	3.03%
Mining	1	3.03%
Newspaper	1	3.03%
Petrochemical	1	3.03%
Telecommunication	1	3.03%
Textile	1	3.03%
Total	**33**	**100%**

Table 4.7. Industry

4.8. Method to define the KPI

To get a KPI for the maintenance process, there are several ways that can be done according to the studies that have been previously selected. The following is a summary of the method.

Method used	#	%
Previous Literature	24	64.86%
AHP (Analytical Hierarchy Process)	4	10.81%
Interview and questionnaire to Subject Matter Expert	3	8.11%
IPMS (Integrated Performance Measurement System)	1	2.70%
Documenting preventive maintenance report	1	2.70%
Risk analysis	1	2.70%
Regression Analysis	1	2.70%
PRM (Probabilistic Relational Model	1	2.70%
MCDM (Multi Criteria Decision Methodology)	1	2.70%
Total	**37**	**100.00%**

Table 4.8. Mapping Method to define KPI

The total number in the table above is greater than the number of studies chosen because in one paper there are more than one method to determine KPIs from maintenance. A more detailed description of each method and the paper that discusses it are as follows:

A. Previous literature

Most of the paper analyzed, determine maintenance KPIs based on pre-existing theories as follow:

a. RAMS (Reliability, Availability, Maintainability, Safety) – (Ahmed, K & Raza, 2014; Gonzales et al., 2017; Lomte et al., 2018; Pandey et al., 2015; Saputra et al., 2017; Qingfeng et al., 2011)

b. OEE (Overall Equipment Effectiveness) – (Komonen et al., 2010; Rodseth et al., 2015, 2017); Saputra et al., 2017; Stricker et al., 2017; Yuniawan, 2014)

c. O & M (Operation and Maintenance) – (Kizim, 2016; Meech & Parreira, 2013; Ng et al., 2015; Peng et al., 2016)

d. COUR (Cost of Unreliability) – (Nainggolan et al., 2017)

e. IEEE standard 500 (Institute of Electrical and Electronics Engineers) on the theory of how to measure reliability – (Duenckel, Soileau & Pittman, 2017)

f. ISO 22400 – (Kang et al., 2015)

g. NPV (Net Present Value) – (Kirkwood et al., 2015)

h. Condition Based Maintenance – (Ravnestad et al., 2012; Senechal, 2016)

i. COPQ (Cost of non-Performance Quality) – (Salonen & Deleryd, 2011)

j. Jack-knife diagram – (Seecharan et al., 2016)

B. AHP (Analytical Hierarchy Process)

Using the questionnaire, Gradiannisa, S, Purba, and Wibisono (2016) rank the KPIs that had been obtained previously using the AHP (Analytical Hierarchy Process) method by distributing questionnaires to company management. AHP itself is a simplification of complex and unstructured problems into certain parts or variables arranged in a hierarchical arrangement. AHP aims to determine the choice of the management regarding which KPI is considered the most important and most influencing the process so that it will affect the output of the process. In their paper, the criteria used to determine the most influential KPI are the nature of an indicator that must be specific, achievable, measurable and related.

Maria and La Fata (2018) use 5 criteria to create hierarchies of maintenance processes, namely: technical, economic, organizational, security, storage.

The basic theory used by Tang and Lee (2016) is RCM (reliability-centered maintenance). To determine maintenance significant items (MSI), the RCM method can be divided into three phases, namely the identification of MSI, the establishment of PM duties that are effective and effective for MSI and the implementation and renewal of PM tasks. Then an analysis of the level of importance of MSI is used using AHP.

Similar to the paper made by Tang, Vishnu et al. (2016) also focuses on KPI based on RCM. By using AHP, from the existing KPI historical data, Vishnu can determine what components need to be maintained more effectively.

C. Interview and questionnaire to Subject Matter Expert

Ahren and Parida (2009) conducted a case study on a railroad company to determine KPI maintenance. Interviews were carried out to two different companies to determine indicators of the process.

Questionnaires distributed by Oliveira et al. (2016) studied maintenance KPIs in 72 companies in Brazil. From these study, several KPI in the maintenance process often used in various types of companies is described. The study applied standard deviation statistical calculations to know the impact of the performance indicator.

Shohet and Nabili (2016) also used questionnaires in the clinic area to determine maintenance KPIs that were suitable for the field. The first phase that was carried out was profiling the clinic until finally the expected KPI was found and the second phase was the implementation of improvement and validation strategies.

D. IPMS (Integrated Performance Measurement System)

Based on case studies in a company using IPMS (Integrated Performance Measurement System), Gradiannisa, S, Purba, and Wibisono (2016) as the beginning of the KPIs to be discovered. IPMS itself consists of three perspectives namely the output of the organization, internal processes, and capabilities of resources. Based on this perspective, it will be detailed into aspects, and from that aspect, indicators will be created.

E. Documenting preventive maintenance report

While what was done by Duenckel, Soileau, and Pittman (2017) to find KPIs is to use data that already exists in a company from preventive maintenance report. By using the basic IEEE standard 500 to calculate the reliability of electrical systems in the company. This strategy improves mechanical availability by reducing the cost of doing preventive maintenance.

F. Risk analysis

Case studies are carried out on three levels based on the RCM (Reliability-centered Maintenance) theory to develop a risk assessment model (Mkandawire et al., 2015). The first thing is to analyze the relationship between MTTFF and the costs that arise, then using statistical data using the theory of FMECA (Failure Mode and Effect Cost Analysis) and finally using Markov Analysis to determine the probability of failure of the components maintained.

G. Regression Analysis

To find out KPIs that have a close relationship, then Gradiannisa, S, Purba, and Wibisono (2016) used a regression analysis from KPI that had been found previously based on historical data from the company. By doing this, it can be known what KPI will affect other KPIs. So if you want to improve a KPI, then other KPIs that have a strong relationship with the KPI must also be corrected.

H. PRM (Probabilistic Relational Model)

Iung et al. (2012) using existing maintenance data integrated with other systems so that it can create a model with a method called PRM.

I. MCDM (Multi Criteria Decision Methodology)

Goncalves, Dias, and Machado (2015) focus on one of the MCDM methods namely ELECTRE (Elimination Et Choix Traduisant la REalite / Ellimination and Choice Expressing Reality) introduced by Bernard Roy in 1960. The purpose of this method is to help decision makers to rank the problem by evaluating several alternatives of conflict that occur based on various criteria.

4.9. Mapping KPI based on SLR

From the various methods that have been carried out in the previous explanation, KPI found that the maintenance process can be summarized in Table 4.9.

The amount is also more than the number of studies chosen because in one paper can mention more than one type of KPI maintenance. Hereby the author's name from paper number on table above: 1: (Ahmed, K & Raza, 2014), 2: (Ahren & Parida, 2009), 3: (Seecharan et al., 2016), 4: (Duenckel, Soileau & Pittman, 2017), 5: (Goncalves, Dias, & Machado, 2015), 6: (Gonzales et al, 2017), 7: (Gradiannisa, S, Purba, & Wibisono, 2016), 8: (Iung et al, 2012), 9: (Kang et al., 2015), 10: (Kirkwood et al., 2015), 11: (Kizim, 2016), 12: (Komonen et al., 2010), 13: (Lomte et al., 2018), 14: (Maria & La Fata, 2018), 15: (Meech & Parreira, 2013), 16: (Mkandawire et al., 2015), 17: (Devi, 2017), 18: (Tang & Lee, 2016), 19: (Oliveira et al., 2016), 20: (Pandey et al., 2015), 21: (Peng et al., 2016), 22: (Qingfeng et al., 2011), 23: (Rodseth et al., 2015), 24: (Ravnestad et al., 2012), 25: (Rodseth et al., 2017), 26: (Salonen & Deleryd, 2011), 27: (Saputra et al., 2017), 28: (Senechal, 2016), 29: (Shohet & Nabili, 2016), 30: (Stricker et al., 2017), 31: (Tang et al., 2017), 32: (Vishnu et al., 2016) and 33: (Yuniawan, 2014). An explanation of the definition of the KPI and the paper that discusses it is as follows:

A. Availability

Availability is KPI which is the result of the maintenance process. It is a possibility that a system can function as its function within a certain period of time in a predetermined operating condition (Devi, 2017; Oliveira et al., 2016). Availability calculation can be seen from two sides, the first is seen from the relationship between MTTR (Mean Time to Repair) and MTBF (Mean Time Between Failure) KPIs and the second is from downtime with uptime (Ahmed, K & Raza, 2014; Devi, 2017; Goncalves, Dias, & Machado, 2015).

Paper Number	Key Performance Indicator (KPI)																							
	Availability	OEE (overall Equipment Effectiveness)	Maintainability	Safety	MTTR (Mean Time to Repair)	MTBF (Mean Time between Failure)	Reliability	Performance Rate	Quality Rate	Maintenance Time	MDET (Mean Delay Time) / MWT (Mean Waiting Time)	NAME (Normalized Annual Maintenance Expenditure)	Percentage of work orders in backlog	COPM (Cost of poor maintenance)	COUR (Cost of Unreliability)	Frequency of Injuries	Learning	MEI (Maintenance Efficiency Indicator)	MSET (Mean Setup Time)	MSR (Maintenance Source Ratio)	NPV (Net Present Value)	Overtime Jobs	Response Time	Service Repair Cycle Time
1	X		X																					
2		X																						
3					X																			
4						X																		
5	X				X								X											
6										X		X	X									X	X	
7																								X
8	X																							
9						X					X								X					
10																					X			
11		X																						
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27		X																						
28										X														
29												X						X		X				
30		X																						
31																	X							
32					X																			
33		X						X	X															
Total	**7**	**7**	**4**	**3**	**3**	**3**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**

Table 4.9. Mapping KPI

Inherent Availability = MTBF / (MTBF + MTTR)

Operational Availability = Uptime / (Uptime + Downtime) = (Calender Hour-Maintenance Hour) / (Calendar Hour)

Based on these equations, if you want high availability, it is necessary to make as much time as possible when the unit does not experience problems and as quickly as possible in solving an existing problem (Qingfeng et al., 2011). So the purpose of calculating availability is if a problem arises, then how quickly the problem can be solved (Pandey et al., 2015). Iung et al. (2012) mentions availability as Mean Up Time.

B. OEE (Overall Equipment Effectiveness)

Overall Equipment Effectiveness (OEE) is used as a key performance indicator so that an industry can find new ways to reduce six problems: waiting time, engine failure or preparation time, small stoppage, reduced speed, quality defects, and rework (Stricker et al., 2017; Rodseth et al., 2017; Saputra et al., 2017). So that it can operate more efficiently, and to achieve greater capacity (Ahren & Parida, 2009; Komonen 2010). The three elements of OEE are: availability rate, performance rate and quality rate, which will help determine the impact of performance (Yuniawan, 2014).

OEE = A x P x Q

TEEP (Total Effective Equipment Performance) will measure OEE based on an hour calendar (Kizim, 2016).

C. Maintainability

Is the ability of a unit to return to its original condition (Pandey et al., 2015). Whereas the calculation is influenced by MTTR KPI (Ahmed, K & Raza, 2014; Devi, 2017; Qingfeng et al., 2011). The lower the MTTR value means the higher the value of maintainability.

D. Safety

Indicators of safety during activities from maintenance (Meech

& Parreira, 2013; Peng et al., 2016). Security requirements affect equipment facilities, systems and performance and become a necessity in maintenance (Ravnestad et al., 2012).

E. MTTR (Mean Time to Repair)

In accordance with the previous explanation, MTTR is a KPI that will affect Availability and also Maintainability. MTTR is the average of solving a problem (including delay and response time) which has hours (Goncalves, Dias, & Machado, 2015; Seecharan et al., 2016; Vishnu et al., 2016).

MTTR = Total downtime / Total damage

F. MTBF (Mean Time Between Failure)

This MTBF KPI influences Availability and Reliability. Defined as the actual time in which the machine is able to produce, starting from the completion of repairs and ending in new failures (Kang et al., 2015). MTBF is the average operating time compared to the amount of damage, also has an hourly unit (Duenckel, Soileau & Pittman, 2017).

MTBF = Total operating time / Total damage

Mkandawire et al. (2015) provides a different term for this KPI, the author uses MTTFF (Mean Time to First Failure).

G. Reliability

Reliability, a probabilistic measure of failure-free operation, is the possibility of equipment functioning without failure for a specified period of time under certain conditions. Reliability is related to availability, because if a unit has reliability, then the unit will also be available for use (Qingfeng et al., 2011). With reliability, it will also affect work safety (Lomte et al., 2018).

H. Performance Rate

It is part of OEE where the measurement is the comparison between ideal conditions and the reality as a result of temporary cessation and slowing down of production capacity (Rodseth et al., 2015; Yuniawan, 2014).

Performance Rate = ((ideal cycle time) / (actual cycle time)) x ((actual cycle time x output) / (output time))

I. Quality Rate

Also part of OEE where the calculation is the ratio between the volume of production received (as expected) and the volume of products produced (Rodseth et al., 2015; Yuniawan, 2014).

J. Maintenance Time

In accordance with the maintenance division described earlier, maintenance time is also divided into corrective maintenance time and preventive maintenance time (Gonzales et al, 2017). Senechal (2016) also discussed the same thing but called it a Planned Maintenance Task.

K. MDET (Mean Delay Time) / MWT (Mean Waiting Time)

Is the average of delays that occur during maintenance activities (Kang et al., 2015; Oliviera, 2016).

L. NAME (Normalized Annual Maintenance Expenditure)

All costs incurred annually to carry out maintenance activities (Shohet & Nabili, 2016). Similarly, Gonzales et al (2017) also defines KPIs as related to costs, namely: Total annual maintenance costs versus annual maintenance budgets (%).

M. Percentage of work orders in backlog

How much work is planned through a backlog. (Goncalves, Dias, & Machado, 2015). Similar to the explanation, Gonzales et al. (2017) define this as a% Schedule Compliance.

N. COPM (Cost of poor maintenance.)

Using the basis of COPQ (Cost of Poor Quality), Salonen (2011), making an indicator called COPM, which consists of: costs for irreplaceable corrective maintenance, costs for valid preventive maintenance, unacceptable costs for corrective maintenance, and costs for poor preventive maintenance.

O. COUR (Cost of Unreliability)

Cost of Unreliability (COUR) is an effort that can be used to evaluate and minimize system failure costs. There are three main steps to calculating COUR. First, calculate the engine failure rate based on failure data, calculate lost time caused by active repair and downtime from the engine and then calculate the lost money caused by unreliable machines (Devi, 2017).

P. Frequency of Injuries

How often do accidents cause injury to employees when doing maintenance activities (Maria & La Fata, 2018).

Q. Learning

Measuring the results of training and development of employees who carry out maintenance activities (Tang & Lee, 2016).

R. MEI (Maintenance Efficiency Indicator)

This indicator states investment in maintenance in relation to the performance of the kite provider which reflects the cost-effectiveness of maintenance activities (Shohet & Nabili, 2016).

S. MSET (Mean Setup Time)

Average time to prepare before doing maintenance (Kang et al., 2015).

T. MSR (Maintenance Source Ratio)

This KPI states the percentage of maintenance resources that are outsourced compared to the total labor resources used for facility maintenance (Shohet & Nabili, 2016).

U. NPV (Net Present Value)

By performing maintenance, especially on the condition monitoring process, it will affect the NPV KPI. NPV itself is defined as how quickly an investment will experience a break-even (Kirkwood et al., 2015).

V. Overtime Jobs

How often a maintenance work is carried out beyond the pre-planned time limit (Gonzales et al, 2017).

W. Response Time

Defined as the time between failure and maintenance intervention, because it is often difficult to detect when a failure starts, it can be redefined as the time between failure detection and intervention (Gonzales et al, 2017).

X. Service Repair Cycle Time

Percentage of time to make improvements during the project (Gradiannisa, S, Purba, & Wibisono, 2016).

5. Conclusions

Based on the review that have been carried out on the 33 papers, the most important KPI in maintenance is Availability. Besides being the most frequently discussed KPI, availability is also a major part of several theories in most papers (OEE and RAMS). There also some KPIs of maintenance such as Mean Time Between Stoppages (MTBS), Mean Time to Repair (MTTR), Overall Equipment Effectiveness (OEE), Maintainability, Safety, Mean Time Between Failure (MTBF), Reliability, Performance Rate, Quality Rate, Maintenance Time, etc. It also can be concluded that there are several methods that can be performed to determine important KPIs in the maintenance process. The method that is used most often to find KPI in maintenance is based on the theories from the existing literature such as RAMS theory (Reliability, Availability, Maintainability, and Safety), OEE (Overall Equipment Effectiveness), O & M (Operation and Maintenance), etc. The second method, to rank the available KPI choices based on certain criteria, AHP (Analytical Hierarchy Process) is the most commonly used method and also easy to implement in the selection process. The third one, by interviewing and using questionnaire to subject matter expertise in some companies.

6. Implications

From the SLR results, this study has implications for theory and practice. By finding the correct KPIs for maintenance and apply them to measure the process, the KPIs will become the guidance on the goals that should be met by the maintenance workers and we can get information about the performance indicator(s) that are still not achieved and need to be improved. By achieving these KPIs, a good maintenance performance will be reached, and it will improve the quality of service management. By defining the method this paper provides awareness

of how to choose KPIs to measure performance in the maintenance process.

References

[1] Ahmed, Q., Khan, F. I., & Raza, S. A. (2014). 'A risk-based availability estimation using Markov method'. *International Journal of Quality and Reliability Management*, 31(2), pp. 106-128. https://doi.org/10.1108/IJQRM-04-2012-0056

[2] Åhrén, T., & Parida, A. (2009). 'Maintenance performance indicators (MPIs) for benchmarking the railway infrastructure'. *Benchmarking: An International Journal*, 16(2), pp. 247-258. https://doi.org/10.1108/14635770910948240

[3] Dhillon, B.S. (2008). '*Mining Equipment Reliability, Maintainability and Safety*'. UK, London: Springer

[4] Duenckel, J. R., Soileau, R., & Pittman, J. D. (2017). 'Preventive Maintenance for Electrical Reliability: A Proposed Metric Using Mean Time between Failures Plus Finds'. *IEEE Industry Applications Magazine*, 23(4), pp. 45-56. https://doi.org/10.1109/MIAS.2016.2600695

[5] Gonçalves, C.D.F., Dias, J.A.M., & Machado, V.A.C. (2015). 'Multi-criteria decision methodology for selecting maintenance key performance indicators'. *International Journal of Management Science and Engineering Management*, 10(3), pp. 215-223. https://doi.org/10.1080/17509653.2014.954280

[6] Gonzalez, E., Nanos, E.M., Seyr, H., Valldecabres, L., Yürüşen, N.Y., Smolka, U., … Melero, J.J. (2017). 'Key Performance Indicators for Wind Farm Operation and Maintenance'. *Energy Procedia*, 137, pp. 559-570. https://doi.org/10.1016/j.egypro.2017.10.385

[7] Gradiannisa, Y., S, N.M.Y., Purba, M.F., & Wibisono, D. (2016). 'Analysis of integrated performance measurement system in pt. x'. *First International Conference on Advanced Business and Social Sciences*, pp 109-119.

[8] Iung, B., Medina-Oliva, G., Weber, P., & Levrat, E. (2012). 'Using probabilistic relational models for knowledge representation of production systems: A new approach to assessing maintenance strategies'. *CIRP Annals - Manufacturing Technology*, 61(1), pp. 419-422. https://doi.org/10.1016/j.cirp.2012.03.059

[9] Kang, N., Zhao, C., Li, J., & Horst, J.A. (2015). '1-Analysis of Key Operation Performance Data in Manufacturing Systems'. 2015 *IEEE International Conference on Big Data (Big Data)*, pp. 2767-2770. https://doi.org/10.1109/BigData.2015.7364078

[10] Kirkwood, L., Shehab, E., Baguley, P., & Starr, A. (2015). 'Uncertainty of Net Present Value Calculations and the Impact on Applying Integrated Maintenance Approaches to the UK Rail Industry'. *Procedia CIRP*, 38, pp. 245-249. https://doi.org/10.1016/j.procir.2015.07.056

[11] Kizim, A.V. (2016). 'The Developing of the Maintenance and Repair Body of Knowledge to Increasing Equipment Maintenance and Repair Organization Efficiency'. *Information Resources Management Journal*, 29(4), pp. 49-64. https://doi.org/10.4018/IRMJ.2016100104

[12] Komonen, K., Kunttu, S., Ahonen, T., Heikkilä, J., & Valkokari, P. (2010). 'In search of best practices in industrial maintenance: Some underlying factors'. *IFAC Proceedings Volumes (IFAC-PapersOnline)*, 1(PART 1), pp. 68-73. https://doi.org/http://dx.doi.org/10.3182/20100701-2-PT-4012.00013

[13] Lomte, R.U., Bhosle, S.P., Ambad, P.M., & Gaikwad, R.A. (2018). 'Reliability Improvement for TSR Machine of Banburry Mixer using Plant Optimization Process'. *Procedia Manufacturing*, 20, pp. 440-445. https://doi.org/10.1016/j.promfg.2018.02.064

[14] Maria, G.G., & La Fata, C.M. (2018). 'Combined fuzzy TOPSIS and AHP-based methodology for the prioritization of maintenance key performance indicators: Application to an oil refinery plant'. *2017 2nd International Conference on System Reliability and Safety, ICSRS* 2017, 2018–Janua(D Iid), pp. 337-342. https://doi.org/10.1109/ICSRS.2017.8272845

[15] Meech, J., & Parreira, J. (2013). 'Predicting wear and temperature of autonomous haulage truck tires'. *IFAC Proceedings Volumes (IFAC-PapersOnline)* (Vol. 15). IFAC. https://doi.org/10.3182/20130825-4-US-2038.00078

[16] Mkandawire, B.O.B., Ijumba, N., & Saha, A. (2015). 'Transformer risk modelling by stochastic augmentation of reliability-centred maintenance'. *Electric Power Systems Research*, 119, pp. 471-477. https://doi.org/10.1016/j.epsr.2014.11.005

[17] Nainggolan, D.J., Alhilman, J., & Supratman, N.A. (2017). 'Analisis Performansi Kerja Berbasis Reliability Pada Mesin Weaving M251 Menggunakan Metode Reliability , Availability & Maintainability (Ram) Dan Cost of Unreliability (Cour) (Studi Kasus: Pt Buana Intan Gemilang) Performance Assessment Based on Re'. *International Journal of Innovation in Enterprise System*, 01(01), pp. 13-18.

[18] Ng, K.K.H., Tang, M.H.M., & Lee, C.K.M. (2016). 'Design and development of a performance evaluation system for the aircraft maintenance industry'. *IEEE International Conference on Industrial Engineering and Engineering Management*, 2016–Janua, pp. 564-568. https://doi.org/10.1109/IEEM.2015.7385710

[19] Oliveira, M., Lopes, I., & Rodrigues, C. (2016). 'Use of Maintenance Performance Indicators by Companies of the Industrial Hub of Manaus'. *Procedia CIRP*, 52, pp. 157-160. https://doi.org/10.1016/j.procir.2016.07.071

[20] Pandey, A. K., Goyal, P., & Agarwal, A.M. (2015). 'RAM apportionment model for Mass Rapid Transit Systems'. 2015 *International Conference on Industrial Instrumentation and Control, ICIC 2015*, (Icic), pp. 6-11. https://doi.org/10.1109/IIC.2015.7150582

[21] Peng, L., Xu, A., Guo, X., Bo, C., Chen, H., Wei, X., Yi, L. (2016). 'Architecture design and implementation of substation dashboard oriented to O&M center'. *Proceedings of the IEEE Power Engineering Society Transmission and Distribution Conference*. https://doi.org/10.1109/TDC.2016.7519903

[22] Qingfeng, W., Wenbin, L., Xin, Z., Jianfeng, Y., & Qingbin, Y. (2011). 'Development and application of equipment maintenance and safety integrity management system'. *Journal of Loss Prevention in the Process Industries*, 24(4), pp. 321-332. https://doi.org/10.1016/j.jlp.2011.01.008

[23] Ravnestad, G., Panesar, S.S., Kayrbekova, D., & Markeset, T. (2012). 'Improving Periodic Preventive Maintenance Strategies Using Condition Monitoring Data'. *Advances in Production*, pp. 260-267. https://doi.org/10.1007/978-3-642-33980-6_30

[24] Rødseth, H., & Schjølberg, P. (2017). 'Maintenance backlog for improving integrated planning'. *Journal of Quality in Maintenance Engineering*, 23(2), pp. 195-225. https://doi.org/10.1108/JQME-01-2016-0002

[25] Rødseth, H., Schjølberg, P., & Skarlo, T. (2015). 'Profit loss indicator: a novel maintenance indicator applied for integrated planning'. *Advances in Manufacturing*, 3(2), pp. 139-150. https://doi.org/10.1007/s40436-015-0113-6

[26] Saaty, T.L. (2008). 'Decision Making with the Analytic Hierarchy Process'. *International Journal Service Science*. 1 (1), pp. 83-98.

[27] Salonen, A., & Deleryd, M. (2011). 'Cost of poor maintenance: A concept for maintenance performance improvement'. *Journal of Quality in Maintenance Engineering*, 17(1), pp. 63-73. https://doi.org/10.1108/13552511111116259

[28] Saputra, M.T.D., Judi, A., & Supratman, N.A. (2016). 'Maintenance Policy Suggestion on Printing Machine GOSS Universal Using Reliability Availability Maintainability (RAM) Analysis And Overall Equipment Effectiveness (OEE)'. *International Journal of Innovation in Enterprise System*, 1(1), pp. 38-44.

[29] Turuna Seecharan, Ashraf Labib, Andrew Jardine, (2018) "Maintenance strategies: Decision Making Grid vs Jack-Knife Diagram", *Journal of Quality in Maintenance Engineering*, Vol. 24 Issue: 1, pp.61-78, https://doi.org/10.1108/JQME-06-2016-0023

[30] Sénéchal, O. (2017). 'Research directions for integrating the triple bottom line in maintenance dashboards'. *Journal of Cleaner Production*, 142, pp. 331-342. https://doi.org/10.1016/j.jclepro.2016.07.132

[31] Shohet, I., & Nobili, L. (2016). 'Enterprise resource planning system for performance-based-maintenance of clinics'. *Automation in Construction*, 65, pp. 33-41. https://doi.org/10.1016/j.autcon.2016.01.008

[32] Stricker, N., Micali, M., Dornfeld, D., & Lanza, G. (2017). 'Considering Interdependencies of KPIs – Possible Resource Efficiency and Effectiveness Improvements'. *Procedia Manufacturing*, 8(October 2016), pp. 300-307. https://doi.org/10.1016/j.promfg.2017.02.038

[33] Tang, Y., Liu, Q., Jing, J., Yang, Y., & Zou, Z. (2017). 'A framework for identification of maintenance significant items in reliability centered maintenance'. *Energy*, 118, pp. 1295-1303. https://doi.org/10.1016/j.energy.2016.11.011

[34] Tomlingson, P.D.(2010). '*Equipment Management (Key to Equipment Reliability and Productivity in Mining)*'. USA, Colorado: Society of Mining, Metallurgy, and Exploration, Inc.

[35] Vishnu, C. R., & Regikumar, V. (2016). 'Reliability Based Maintenance Strategy Selection in Process Plants: A Case Study'. *Procedia Technology*, 25(Raerest), pp. 1080-1087. https://doi.org/10.1016/j.protcy.2016.08.211

[36] Yan, J. (2015). '*Machinery Prognostics and Prognosis Oriented Maintenance Management*'. Singapore: John Wiley & Sons

[37] Yuniawan, D. (2014). 'Overall equipment effectiveness estimation for priority improvement in the production line Teruaki Ito Effendi Bin Mohamad'. *Int. J. Internet Manufacturing and Services*, 3(4), pp. 279-299.

Ranking of Priority Key Performance Indicators Internal Business Processes Cocoa Industry of SMEs Scale in South Sulawesi

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Abstract

The Performance of SME Processing Industry in South Sulawesi scale is still not measured, making it difficult to conduct the process of measuring and improving performance. Pursuant to that matter hence research aim to identify and set priority Key Performance Indicators (KPIs) on internal business process aspect at cocoa processing industry of SMEs scale. This research method is a combination of descriptive statistics and the Analytical Hierarchy Process (AHP). The findings of this study were to establish 15 Key Performance Indicators (KPIs) required in the measurement and improvement of performance on the aspects of Internal Business Process (IBP). KPIs that are the top priority at three levels are the realization of products that meet the quality standard with the weight of 0.144, the second priority is the percentage of defective products with the weight of 0.125, the third priority is the percentage improvement of resource utilization efficiency with the weight of 0.107. The impact of priority KPIs weighting values can be the basis of performance appraisal on internal business process aspects.

Keywords: *key performance; cocoa; industry; SMEs.*

1. Introduction

Based on data from the Central Bureau of Statistics of the Republic of Indonesia, one of the largest cocoa producing regions in Indonesia is South Sulawesi (BPS, 2014). Cocoa as a plantation commodity is one of the factors driving cocoa industry development. Most of the cocoa produced in South Sulawesi is sold in the form of cocoa beans for export needs. This is a factor causing the added value of cocoa is very low. This fact prompted the development of cocoa processing industry of Small and Medium Scale Enterprises (SMEs) in cocoa-producing regions in South Sulawesi. The focus of attention on the SME's cocoa processing industry is the internal business process aspect. This is very important for achieving the business objectives of the small-scale cocoa processing industry, as it relates to quality improvement, operational improvement, efficiency improvement and new product development (Turuduoglu, et al., 2014). The internal business process perspective is one of the factors to fulfill customer desires and can play an important role in creating business performance excellence (Alzoubi and Khafajy, 2015).

One of the problems cocoa industry of SMEs scale in South Sulawesi is product quality, product innovation, efficiency, technology adoption, and operational sustainability. These issues are related to internal business process aspects. Based on the existing problems then required the existence of performance measurement instruments to measure the internal aspects of the process. In this regard, the approach used is the Balanced Scorecard concept (BSC) which examines performance based on four perspectives including internal business process perspective (Kaplan and Norton, 1992). This study specifically identifies and establishes the priority weight required key performance indicators for measuring the performance of the industry from the perspective of Internal Business Processes (IBP) at SME scale cocoa processing industry. The rationale uses the AHP method approach and the BSC concept approach as it can help the process of performance measurement analysis (Gomes and Lirio, 2014; Lamatinulu and Dahlan, 2016).

2. Materials and methods

The location of this research is Palopo and Masamba city of South Sulawesi. The research instrument used two types of questionnaires. Approach method of analysis used in this research is descriptive statistic method and Analytical Hierarchy Process / AHP (Saaty, 1993). The location of this research is Palopo and Masamba city of South Sulawesi. The research instrument used two types of questionnaires. Approach method of analysis used in this research is descriptive statistic method and Analytical Hierarchy Process / AHP (Saaty, 1993). Descriptive statistical methods (Thompson, 2009) were used to identify key performance indicators (KPIs) on the internal business process perspective, while the AHP method was used to analyze the priority weight of KPIs required for measuring internal business perspective performance in the SMEs cocoa processing industry. The AHP method can be applied in determining the priority weighting of key performance indicators with a BSC perspective approach (Lamatinulu, et al., 2018). In this study involved expert respondents who understand the cocoa processing industry.

The summary of research stages can be described as follows:

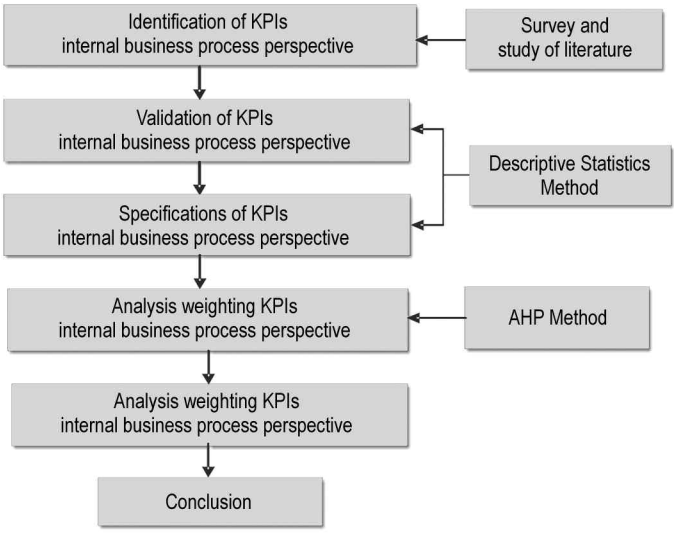

Figure 1. Research stages

3. Results and discussion

Internal business process perspective is an important factor in the improvement of industry performance because this aspect includes product innovation, operational continuation and after-sales service (Kaplan and Norton, 1992). Based on these considerations, it is necessary to identify the KPIs needed to assess the performance of the Internal Business Process (IBP) aspect of the SMEs scale cocoa industry.

IBP includes innovation which is a very important aspect of industry performance because innovation is a key factor in the success of industrial organizations (Tohidi and Jabbari, 2012). Aspects of IBP also play an important role as a real activity step to meet customer desires and satisfaction. To optimize the performance of the SME processing industry, need to establish the needs of KPIs in the IBP perspective as a basis for measuring and improving performance. The results of the survey and data analysis determined some of the proposed needs of KPIs for performance measurement on the IBP aspects of cocoa processing industry of SMEs scale as shown in Table 1.

The proposal needs KPIs on internal business process perspective	Code
Percentage of product defect or not according to the quality standard	KPI_{P1}
Realization of production capacity	KPI_{P2}
Percentage of product demand that is not met	KPI_{P3}
The Frequency of maintenance of machinery and equipment	KPI_{P4}
Percentage of machine and equipment damage	KPI_{P5}
Comparison of productive and non-productive time of machinery and equipment	KPI_{P6}
The Accuracy of diversification and specification of processed cocoa products	KPI_{P7}
The selling price of production that can compete	KPI_{P8}
Percentage increase in resource utilization efficiency	KPI_{P9}
Number of new technology adoption	KPI_{P10}
Availability of database related to type, specification and product quality	KPI_{P11}
The unique taste of cocoa processed products	KPI_{P12}
Realization of products that meet quality standards	KPI_{P13}
The uniqueness of brand design and packaging of processed cocoa products	KPI_{P14}
Level of availability of raw material of fermented cocoa beans	KPI_{P15}

Table 1. Description of KPI
on Internal Business Process perspective (IBP)

Based on the validation of KPIs requirement from the IBP perspective, it is determined that all KPIs in Table 1 are acceptable because based on the results of the expert respondents' assessment using questionnaires with the score of 1-5, it is found that the average assessment of the needs of KPIs > 4 (Figure 1). This shows the meaning that all the identification of KPIs are needed and can serve as an indicator of the performance of the SME cocoa processing industry in the perspective of IBP.

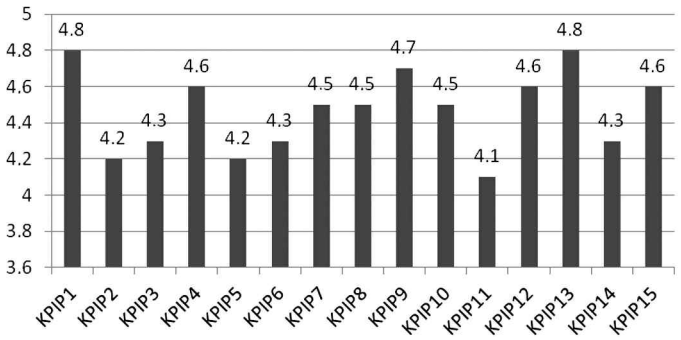

Figure 2. The average level of needs assessment KPIs of IBP perspective

The results in Tables 1 and Figure 2, followed by an analysis of the priority weighting of key performance indicators on the IBP aspect. The results of the assessment of expert respondents through paired comparison questionnaires then compiled the matrix values used as the basis for performing the AHP analysis as shown in Table 2.

Referring to the value of the matrix element in Table 2, then proceed with the normalization analysis of the values of the matrix elements used as the basis for determining the value of the vector eigen weight or priority matrix (Table 3). Indicators acceptance criteria pairwise comparison matrix assessment results received based on the value of Consistency Index (CI) and the Consistency Ratio (CR). The value of the eigenvalue (λmax) becomes the basis of the CI value. The value of CI obtained is 0.029. In the first analysis set, the value of Random Index (RI) is equal to 1.59. CR value of 0.018 was obtained through comparison of CI value with RI. The result of determining the priority weight of KPIs on the IBP aspect with the AHP method in Table 3 is all acceptable because of the CR value <0.1 (Saaty, 1993).

Table 3 shows that KPIs that have the highest priority weighted value is the realization of processed cocoa products that meet the quality standard (KPI_{P13}) with a weight of 0.144. The results of this analysis indicate that the product quality is the key factor in improving the performance of SMEs scale cocoa industry. This is particularly important because the quality of food industry products is a key factor in improving customer satisfaction as a key to success in improving performance and competitiveness (Suchanek, et al., 2017; Lamatinulu, et al., 2017). Achieving quality of processed cocoa products is closely related to the application of production process stages involving human resources, raw materials, machinery, methods and good equipment. The availability of adequate resources can encourage the steps of product innovation based on quality standards on an ongoing basis. This matter becomes the focus of attention so that the performance of IBP aspects can be improved.

Second priority KPIs are the percentage of defective products (KPI_{P1}). Defective product factors are important to get attention because they are related to product safety. Defective product means the product that is not in accordance with product standardization that should be produced. The increasing number of defective products is a form of waste that can have an impact on performance and productivity (ElMekkawy, et al., 2006). Therefore defective products should be eliminated as this is at the heart of obligations, product responsibility and related to product safety (Xiulia, et al., 2012). Minimization of defective products is an important factor for improving quality, reducing production costs and processing cycle time so as to increase productivity (ElMekkawy, et al., 2006; Uddin and Rahman, 2014).

	KPI_{P1}	KPI_{P2}	KPI_{P3}	KPI_{P4}	KPI_{P5}	KPI_{P6}	KPI_{P7}	KPI_{P8}	KPI_{P9}	KPI_{P10}	KPI_{P11}	KPI_{P12}	KPI_{P13}	KPI_{P14}	KPI_{P15}
KPI_{P1}	1	3	3	2	3	3	2	2	2	2	4	2	1	3	2
KPI_{P2}	0.333	1	0.5	0.3	1	0.5	0.5	0.5	0.333	0.5	2	0.333	0.25	0.5	0.333
KPI_{P3}	0.333	2	1	0.3	2	1	0.5	0.5	0.333	0.5	2	0.333	0.25	1	0.333
KPI_{P4}	0.5	3	3	1	3	3	2	2	0.5	2	3	1	0.5	2	1
KPI_{P5}	0.333	1	0.5	0.333	1	0.5	0.5	0.5	0.333	0.5	2	0.333	0.25	0.5	0.333
KPI_{P6}	0.333	2	1	0.333	2	1	0.5	0.5	0.333	0.5	2	0.333	0.25	1	0.333
KPI_{P7}	0.5	2	2	0.5	2	2	1	1	0.5	1	3	0.5	0.3	2	0.5
KPI_{P8}	0.5	2	2	0.5	2	2	1	1	0.5	1	3	0.5	0.3	2	0.5
KPI_{P9}	0.5	3	3	2	3	3	2	2	1	2	3	2	0.5	3	2
KPI_{P10}	0.5	2	2	0.5	2	2	1	1	0.5	1	3	0.5	0.3	2	0.5
KPI_{P11}	0.25	0.5	0.5	0.333	0.5	0.5	0.33	0.333	0.333	0.333	1	0.333	0.25	0.5	0.333
KPI_{P12}	0.5	3	3	1	3	3	2	2	0.5	2	3	1	0.5	2	1
KPI_{P13}	1	4	4	2	4	4	3	3	2	3	4	2	1	3	2
KPI_{P14}	0.333	2	1	0.5	2	1	0.5	0.5	0.333	0.5	2	0.5	0.333	1	0.333
KPI_{P15}	0.5	3	3	1	3	3	2	2	0.5	2	3	1	0.5	3	1

Table 2.
Value of matrix elements based on pair wise questionnaires

No	KPIs	Priority weight	Ranking
1	KPI_{P1}	0.125	2
2	KPI_{P2}	0.029	9
3	KPI_{P3}	0.037	8
4	KPI_{P4}	0.086	5
5	KPI_{P5}	0.029	9
6	KPI_{P6}	0.037	8
7	KPI_{P7}	0.057	6
8	KPI_{P8}	0.057	6
9	KPI_{P9}	0.107	3
10	KPI_{P10}	0.057	6
11	KPI_{P11}	0.023	10
12	KPI_{P12}	0.086	4
13	KPI_{P13}	0.144	1
14	KPI_{P14}	0.039	7
15	KPI_{P15}	0.088	4

Table 3.
Weight and priority ranking KPIs internal business process perspective

The third priority KPIs are the efficiency of resource utilization in the SME cocoa processing industry. Resource efficiency is an important effort to reduce waste and internal business process costs. Resource efficiency is a limited and sustainable effort to utilize resources to minimize adverse impacts or a ratio between the resource benefits of a processor system (Sfez, et al., 2017). To improve the performance of the cocoa industry in the IBP perspective, technological innovation is needed to realize the efficiency of resources. This is critical because resource efficiency can serve as a core strategy for an industry in performance improvement (Delmas and Pekovic, 2015).

The fourth priority KPIs is the unique taste of cocoa processing products (KPI_{P12}) and the availability of fermented cocoa beans (KPI_{P15}). The unique factor of the taste of cocoa processed products is one of the factors of consumer attractiveness because the sensation of the uniqueness of taste towards food products is the preference of consumer tastes (Baharuddin and Sharifudin, 2015). The taste factor for cocoa processing products in the SME scale industry needs to get attention in order to create customer attraction. Once the importance of taste factor then there is some research that discusses the importance of the unique taste of food products related to taste and consumer health (Enax, et al., 2015; Luomala, et al., 2015; Kwon, 2017). Related to the realization of processed cocoa products that have a unique taste then it must be supported by the availability of quality raw materials. The criteria of standard cocoa raw materials are fermented cocoa beans, because cocoa processing products in the form of cocoa powder, cocoa paste, and cocoa powder processed from fermented cocoa beans can meet the quality standard requirements (Towaha, 2012). Based on this to improve performance on the IBP aspect in the cocoa industry must be supported by the raw material supply of fermented cocoa beans.

The next priority sequences of KPIs for measuring the performance of IBP perspectives on the SME-scale cocoa industry include: machine and equipment maintenance (KPI_{P4}) at the fifth priority, the precise diversification of cocoa processing products (KPI_{P7}) and cost of production (KPI_{P8}) at sixth priority, brand design and packaging product (KPI_{P14}) on priority 7, percentage of unmet product demand of KPI_{P3} and comparison of productive and non-productive time of KPI_{P6} machines and equipment on the eighth priority, Production capacity (KPI_{P2}) realization in the ninth priority and availability of data based on type, specification and product quality (KPI_{P11}). Priority ranking sequence based on the weighted value of KPIs is a determinant factor for the contribution of KPIs to the performance of the SME cocoa processing industry on the perspective of IBP. This indicates that the KPIs that are the focus of attention for performance improvement are those that have the greatest weight value.

4. Conclusion

The priority weighted value of KPIs in the perspective of Internal Business Process (IBP) is the determinant of the magnitude of the contribution of KPIs to the performance value achieved by the SME processing cocoa industry. Results of the analysis indicate that KPIs which become the main priority is KPI_{P13} with weight value 0.144. This suggests that performance improvements should prioritize product realization factors that meet quality standards. The quality factor of cocoa processed products that meet the quality standard can improve customer satisfaction and become the main factor of improvement of cocoa industry performance and competitiveness. KPIs which are second priority supporters for performance improvement on the IBP perspective are related to efforts to minimize defective products and resource usage efficiency with a weighted value of 0.125.

References

[1] Alzoubi, M.H., and Khafajy (2015). The Impact Of Business Process Management On Business Performance Superiority. *International Journal of Business and Management Review*, 3(2):17-34.

[2] Badan Pusat Statistik (Central Bureau of Statistics) – BPS (2014). The area and production of people's plantation cocoa plant. Area of People's Crops by Type of Plants. Available https:// bps.go.id/linkTabelStatis/view/id htm [accessed Jun. 27, 2016].

[3] Baharuddin, A.R., and Sharifudin, M.S. (2015). The impact of geographical location on taste sensitivity and preference. *International Food Research Journal*, 22(2): 731-738.

[4] Delmas, A.M., Pekovic, S. (2015). Resource Efficiency Strategies and Market Conditions, *Long Range Planning*, 48:80-94.
[5] ElMekkawy, T.Y., Hachkowski, P.A., Strong, D. and Mann, D.D. (2006). Defect analysis for quality and productivity improvements in a manufacturing system. *Canadian Biosystems Engineering*, 48: 7.9 -7.12.
[6] Enax, L., Weber, B., Ahlers, M., Kaiser, U., Diethelm, K., Holtkamp, D., Faupel, U., Holzmüller, H.H., and Kersting, M. (2015). Food packaging cues influence taste perception and increase effort provision for a recommended snack product in children. *Front. Psychol*. 6:882. doi:10.3389/fpsyg.2015.00882.
[7] Gomes, R. C., & Lírio, V. S. (2014). Strategic Planning in Brazilian Small-Scale Municipalities: Is the Balanced Scorecard a Feasible Tool? *Revista de Administração da UFSM*, 7(1): 8-21.
[8] Kaplan, R. S., and Norton, D. P. (1992). The Balanced Scorecard – Measure That Drive Performance. *Harvard Business Review*, 70(1), 71-79.
[9] Kwon, Y.D. (2017). Ethnic foods and their taste: salt and sugar. *Journal of Ethnic Foods*, 4: 133-134.
[10] Lamatinulu, Pratikto, Santoso, P.B., and Sugiono (2017). Design of Strategy to Increase the Added Value and Competitiveness of Products Mini Cocoa Processing Industry Based OVOP with using Interpretive Structural Modeling(ISM). *Journal of Engineering Science and Technology Review*, 10 (5): 98-103.
[11] Lamatinulu, Dahlan, M., and Ramlawati (2018). Identification and Determination of The Priority of Key Performance Indicators Perspective of Customers on Cocoa Processing Industry Of Smes Scale in South Sulawesi. *International Journal of Engineering Sciences & Research Technology*, 7(7): 41-47.
[12] Lamatinulu and M. Dahlan, (2016). Determination of Key Performance Indicators Priorities aspects of Teaching - Learning Process and Atmosphere Academic Study Programs in Private Higher Education. *Research Journal of Applied Sciences*, 11(12): 1495-1500.
[13] Luomala H., Jokitalo, M., Karhu, H., Luoma, H.L.H., Hopia, H., Hietamaki, S. (2015). Perceived health and taste ambivalence in food consumption. *Journal of Consumer Marketing*, 32(4): 290-301.
[14] Saaty, T. L. (1993). *Decision Making for Leader: The Analytical Hierarchy Process for Decisions in Complex World*, University of Pittsburgh. Pittsburgh.
[15] Suchanek, P., Richter, J., and Kralova, M. (2017). Customer Satisfaction with Quality of Products of Food Business. *Prague Economic Papers*, 26(1): 19-35.
[16] Thompson, B.C. (2009). Descriptive Data Analysis. *Air Medical Journal*, 28(2): 56-59.
[17] Tohidi, H. and Jabbari, M.M. (2012). The important of Innovation and its Crucial Role in Growth, Survival and Success of Organizations. *Procedia Technology*, 1: 535-538. doi: 10.1016/j.protcy.2012.02.116.
[18] Towaha, J., Anggraini A.D. and Rubiyo (2012). Keragaan mutu biji kakao dan produk turunannya pada berbagai tingkat fermentasi: Studi kasus di Tabanan, Bali (Performance of cocoa bean quality and its derivate products under some fermentation levels: a case study in Tabanan, Bali). *Pelita Perkebunan*, 28(3): 166-183.
[19] Sfez, S., Dewulf, J., Soete, D.W., Schaubroeck, T., Mathieux, F., Kralisch, D., and Meester, S.D. (2017). Toward a Framework for Resource Efficiency Evaluation in Industry: Recommendations for Research and Innovation Projects. *Resources*, (6)5:1-23.
[20] Turuduoglu, F., Suner, N., and Yildirim, G. (2014). Determination of Goals under Four Perspectives of Balanced Scorecards and Linkages between the Perspectives: A Survey on Luxury Summer Hotels in Turkey. *Procedia - Social and Behavioral Sciences*, 164: 372-377.
[21] Uddin S.M. and Rahman C.M.L. (2014).Minimization of Defects in the Sewing Section of a Garment Factory through DMAIC Methodology of Six Sigma. *Research Journal of Engineering Sciences*, 3(9): 21-26.
[22] Xiulia, L., Baozhia, C., and Hanqing X. (2012). Study on Principle of Product Defect Identification. *Procedia Engineering*, 43:393-398.

Continual Human Resources Empowerment through Human Capital and Commitment for the Organizational Performance in Hospitality Industry

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Abstract

The research orientation is motivated by internal organizational problems, namely the problem of improving organizational performance which is influenced by the empowerment of human resources and human capital. The research investigates how the mediating role of human capital and employee commitment. Method of the research was a survey method. Structural Equation Modeling (SEM) analysis was applied to find out the correlation and influence among the observed variables, while the type of research was explanatory. Based on the statistical data, there are 134-star hotels and destination of other tourism objects in East Java that will become targets of the respondents. Participants in this research were 216 respondents. The result of the research showed that human resources empowerment has an insignificant effect on the performance of the organization. Both human capital and commitment have been able to mediate HR empowerment in improving the performance of the organization. This study recommends the importance of human resource development in human capital. It is recommended that the hotel management focus more on competency standards for workers in the hospitality industry.

Keywords: *human capital; commitment; empowerment; hospitality.*

1. Introduction

Fluctuation of the occupancy level in star hotels in East Java has still below 50% per year, on the average, and it shows that, in general, the performance of the star hotels are still low and have not shown any significant development. Therefore, the performance should be improved. Lower performance in such star hotels is estimated that not only the external factors, which affect them but also internal factors of the hotel's organization. The external factors are triggered by global security problems, which have become a serious concern. Such security problem relates to terrorism action that has created a performance to be less beneficial for global tourism industry due to the tourists' safety has become the main factor, and of course, it would be disturbed because of the bomb action in the destination as well as the tourism facilities (hotel). This has encouraged other countries to put into effect the travel warning for their citizens who visit Indonesia.

This the research was more focused on the internal problems of the organization, such as the organizational performance improvement, which is affected by human resources empowerment and human capital, by conducting the research in East Java. The reason is, East Java relatively close to the world's tourism destination, Bali, which enables it to have rapid development in the future, however the fact in the field shows that the hotels' occupancy level in East Java have relatively dynamic and fluctuating.

Factors, which cause lower performance of the star hotels in East Java include the organizational capability of the hotel in anticipating the effect of external environment change and lack of the organizational capacity in adapting to the change. Clarke (1999) revealed that the change in the market has occurred rapidly and the businesses should respond quickly in order to sustain, but most companies have failed.

One of the causes that relate to a failure in anticipating the external change is human resources (Martinsons *et al*., 2017; Shah *et al*., 2017; Isaac & Ruitenberg,2017; Reason, 2017, and Wehrmeyer, 2017). Nirwandar (2006) stated that one of weaknesses in the tourism industry and the supporting factors (hotel) in Indonesia is lower competence of the human resources. Therefore, it has triggered lower organizational capacity to take action more quickly in order to adapt to the change immediately, and it has caused lower performance of the organization (Ashford, 2018; Chandrasekhar, 2018; Tomczak at al., 2018; Spyropoulou *et al*., 2018; Marasi *et al*., 2018, Drucker, 2004; Nielson, 2008; Stewart, 2006).

However, human resources empowerment plays important role in the hospitality industry. Why is the attention directed to the empowerment problem? Bryson (2018), Bailey *et al*. (2018), d'Estrée & Parsons (2018), Liu *et al*. (2018), Guo *et al*. (2018) and Nixon (1994) recognized the challenge of empowerment that emerged from both external and internal challenges, which are faced by the organization. The external challenge is as a result of high competition level, the change of workforce structure, and higher expectation of the consumers. Meanwhile, the internal challenge relates to the employee's retention, motivation, and development of the employees (Yao *et al*., 2018; Wang *et al*., 2018; and Hisler & Bandow, 2018) This is the correlation between human resources empowerment and human capital. Furthermore, in order to achieve optimal performance of the organization, it requires higher commitment of the employees to the organization (Drucker, 2004). However,

topic about the human resources empowerment rarely emerges in hospitality and tourism industries (Baum, 2018; Ladkin, 2018; Lai, *et al*., 2018; Sainaghi *et al*., 2018; Murphy *et al*., 2018; Kandampully *et al*., 2018; Erstad, 1997; Lashley, 1999; Jarar & Zairi, 2002).

Theoretically, human resources empowerment has affected on success of the management in the company (Wilkinson, 1998; Noe, *et al*., 2006), in which empowerment refers to delivering responsibility and authority to the employees to make decision that relates to all aspects of the product development and customer service (Noe, *et al*., 2006). Besides that, human resources empowerment has been able to increase contribution of the human resources to the organization (Alwi, 2001).

Empirically, there were two groups of different results of the research. The first group of the research has supported the theory that human resources empowerment has improved the organizational performance (Lashley, 1999, 2000; Jarar, 2002; D'Anunzio *et al*., 1999; Setiawan, 2005) and the other group has different result empirically, in which, even though the human resources empowerment has been done, it has not been able to improve the organizational performance (Siegel, 2000; Ugboro, 2006; Zulkarnain, 2008). Based on the description above, a question emerges, why such difference emerges in relation to the role of human resources empowerment, which has not been able to improve the organizational performance, therefore it requires further consideration about the effect of human resources empowerment on performance of the organization.

It has been presumed that the low performance of the organization has related to human investment (human capital) and commitment of the employees to the organization. It means that even though the employees have been empowered but the commitment of the employees have not emerged yet; therefore, the performance of the employees have not been able to be improved (Erstad, 1997; D'Anunzio *et al*., 1999; Fernandes, 2006; Oakland *et al*. 2007, Kuokkanen *et al*., 2007, Puig at al., 2012). In order to improve performance of the organization, it requires such human resources empowerment culture through the appropriate human resources investment (Erstad, 1997; Clarke, 1999), by concentrating on optimal behaviors as is presumed by the employees and whether they have worked well as well as creating employee's involvement in decision-making in order to be more committed to participating and responsible for the achievement of the organization's goal through initiatives and ideas that will be developed within the organization.

Based on the explanation above, a gap has existed in the form of conflict or different results of the research that requires more explanations about the role of human capital and the commitment of the employment as mediators. Such different results are presumed due to different ways of the organization to invest in human resources development and capability of the human resources to commit to the organization. These two variables are suggested to be able to describe different results of the organizational performance, even though each organization has applied such human resources empowerment.

In a service the company, interaction among human resources empowerments is required, particularly in improving the performance of the company (Cho, *et al*. 2006). However, this research is different from the previous research; therefore it will provide some original contributions to the scientific world. This research tries to explain why there are no stable results of human resources empowerment toward the performance of the organization, as described above.

How does human resources empowerment affect the performance of the organization, how does human resources empowerment affect on human capital. How does human resources empowerment affect the commitment of the employees. How does human capital affect the commitment of the employees. How does human capital affect the on the performance of the organization. How does the commitment of the employees affect onthe performance of the organization? The objective of the research was to develop the theoretical model of human resources empowerment in the hospitality industry, which integrated human resources empowerment, human capital on the commitment of the employees and performance of the organization. Such theoretical model development of human resources empowerment has been done by testing the integrated empirical model operationally and empirically, as well as analyzing it.

Empowerment is a way that enables the employee to be more capable of making a decision (Bowen and Lawler, 1992), and as a personal phenomena in which each individual must be responsible for his/her own actions (Pastor, 1996). The first definition relates to how does the management facilitate and implement such empowerment culture, and the second definition emphasizes the importance of the individual to be a success in implementing the empowerment.

HRM approach in human resources empowerment has emphasized on the adjustment between the resources and objectives of the organization, which have maintained and preserved the organizational culture. Sometimes, a radical change may occur about competence, which is required in the future to achieve continuation and change of the organization. This research was based on result of the research by Real and Valle (2011), who conducted the research on manufacturing company and examined the mediation role of human capital between human resources practices and organizational capacity of the learners. Result of the research showed that human capital plays the role in mediating the human resources practices and organizational capacity of the learners. Furthermore, Puig *et al*. (2012) suggested to the next researchers to examine the effect of human capital on the performance of the company in the non-manufacturing industry. In the model of Denison (Mobley *et al*. 2005), human resources empowerment is one of the indicators in the model of organizational culture. This is conformed to the statement given by Stewart (1998) that empowering others means cultural change. Such empowerment would not run well if the entire cultures of the organization have not changed fundamentally (Stewart, 1998).

2. Human Capital

Human capital is a part of the analysis instruments in the individual level. Furthermore, the working individual requires special knowledge and expertise as attached in the theory of human capital, which describes that investment in knowledge and expertise will gain more benefits (Becker, 1993). Factors that could improve human capital are formal education and experiences as the base to overcome any managerial situation. Honig (1998) stated that factors, which affect on human capital, include education and experience, so that they will increase productivity, entrepreneurship activities, and success in business.

Becker (1993) described that human capital as a result of skill, knowledge, and training, which are owned by an individual, including investment accumulation, such as educational activities, job training, and migration. Furthermore, Echrenberg and Smith (1994) found that a part-time worker would gain less human capital. This is due to less working hours and working experiences (Renes and Ridder, 1995; Wolf, 2002). Also, Williams (2000) added that by increasing working experiences, it will increase acceptance in the future.

Bontis *et al*, (2002:621-642) defined it as "the individual knowledge supply of the organization as described by the workforces in the organization or company". The increasing knowledge is a base of the economy as an attribute to increase the role toward "intellectual capital is an intangible and important source for the company ir order to survive in strict competition (Ross and Ross, 1997). Human Capital and Social Capital are the fundamental components of the Intellectual Capital (Nahapiet and Ghoshal, 1998).

Reynolds, *et al*. (1999) found some factors that affect on the

human capital. Age and gender are the influential factors on the entrepreneurship education. The experience factor, in general, shows that the older the age, between male and female, tend to have different education and vocational school choices as they desired. Furthermore, less female chooses to be an entrepreneur than males, in which this phenomenon has been examined specifically toward education (Robert *et al*, 1991). Each individual has 3 (three) sources, which complete each other as part of human capital. Those three elements of human capital include intellectual capability, social capability, and emotional capability, which interact with each other within the individual and could affect the organization. For each individual, democracy in doing the job is a responsibility to do the job and include developing our own capabilities. The world moves fast and requires all capabilities of human capital to be developed as fast as possible. The need for up-to-date knowledge and establish persistent relationship should be maintained. Each individual will be aware of any risk of the job and make a choice about the job, as well as develop the capability.

Based on diverse opinions and theories that have been stated previously, the human capital variable is taken as one of the observed variables. Indicators of human capital are assessed through education, experience, training, and development.

3. Commitment of the Organization

Definition of commitment, in general, is an agreement or approval between the workforces and the company (Irmawati, 2004: 9). Gibson *et al*. (1985) expressed definition of the commitment as a condition, which involves identification and loyalty toward the company where the individual works. Furthermore, Huber (1985) described that both acceptance and commitment toward the target are frequently interpreted in similar meaning, but in fact, each of them has a different idea. Acceptance to the target means an agreement to do something, and for commitment, the individual accept it but it does not mean the individual pursues the imposed target. Therefore, it can be said that the workforces accept and commit to the job implementation to reach the target if they know and recognize the established target along with their willingness and agreement.

Therefore, it can be concluded that the organizational commitment as an identification sense (believe in the organizational values), involvement (willingness to try the best in the interest of the organization), and loyalty (desire to be loyal as member of the related organization), as expressed by an employee toward his/her organization. The organizational commitment is a condition, in which the employee has been really attracted by the goals, values, and targets of the organization. Commitment to the organization means more than just a formal membership, because it includes feeling fond of the organization and willingness to try the best in the interest of the organization in order to achieve the goal. Based on this definition, the organizational commitment involves the loyalty to the organization, involvement in doing the job, and identification toward values and goal of the organization.

Each employee has different stand and behavior that based on his/her organizational commitment. Employee who has commitment to the organization, based on the effective stand, shows different attitude in comparison with the employee who has “continuance” stand. Employee, who wants to be the member of the related organization, will be desired to endeavor efforts in accordance with the organization’s goal. On the contrary, the uninterested employee will avoid suffering any financial loss and other loss, so that they would not any optimal efforts. Meanwhile, the developed normative component as a result of socialization experiences depends on to the extent of obligation sense that is perceived by the employee. Such normative component creates a sense of obligation on the employee to respond for what has been accepted from the organization.

Therefore, an individual who has high commitment will have a sense of identification toward the organization; get involved deeply in officialdom and loyalty as well as positive affection toward the organization. Besides that, the behaviors tend to lead to the organization’s goal and desire to stay in the organization in the long-term. In order to develop the organizational commitment, it requires these three main aspects: identification, involvement, and loyalty of the employee toward the organization.

4. Performance of the Organization

Performance of the organization is intended as an achievement of the organization in doing its activities in a given period of time (usually in a year). Performance is a reflection whether the organization has succeeded or not in running the business. There are some standards to assess performance of an organization, but basically, they are divided into two types, subjective and objective. The objective standard relates to profitability of the product sales and the subjective profitability indicator is determined by perception of the manager toward profitability of the company’s activities (Zeller, Stanko and Cleverly in Wasis Budiarto and Ristrini, 2004). Jauch and Glueck (1999) stated that performance can be seen from two aspects, such as: qualitative and quantitative. Quantitatively, performance of the organization can be recognized from achievement of the organization in comparison with what the organization did in the past or with other competitors in a number of factors, such as: net profit, share price, dividend level, profit per share of stock, output for return of capital, output on return of equity, market share, growth of sales, loss of working days due to the workers are on strike, cost of production and the efficiency, turnover of the employees, and satisfaction index of the employees. The qualitative perimeter includes questions in order to find out whether the goals, strategies, as well as integrated and comprehensive plans have been consistent, appropriate, and well-run.

According to Delaney and Huselid (1996), performance can be assessed from the performance perception of an organization in relation with the competitors that include some aspects, such as: quality of the products or services, development of new product, customer’s satisfaction, product price, increasing sales, profitability, and etc. In accordance with Narver and Slatter in Appiah-Adu (2000), performance can be assessed from development of the sales growth, success of the new product and ROI in the last three years. Based on some concepts that have been mentioned above, they show that indicator of the performance standard of an organization can be done objectively by assessing directly on capability of the organizational performance and based on the managers’ perception or the company’s owner toward the given indicators.

5. Hypothesis of the Research

Referring to result of the basic theoretical model that has been described and result of the research conducted by some experts, the proposed hypothesis are as follow:

Hypothesis 1: There is a significant influence of human resources empowerment variable on human capital variable.

Hypothesis 2: There is a significant influence of human resources empowerment on commitment of the employee.

Hypothesis 3: There is a significant influence of human capital variable on commitment of the employee variable.

Hypothesis 4: There is a significant influence of human resources empowerment on performance of the organization.

Hypothesis 5: There is a significant influence of human capital on performance of the organization.

Hypothesis 6: There is a significant influence of the employee’s commitment on performance of the organization.

Furthermore, a model has been developed to study and examine the HR Empowerment, Human Capital, and Commitment of the Employee, as well as their influences on performance of the organization. This research has examined the influence of Human Capital on Commitment of the Employee, and then the effect of both variables on performance of the organization was examined. Such model development has some benefits, such as obtaining information about outputs of the model development as being applied in hospitality industry.

6. Method Research

Populations of the research are the entire star hotels in East Java, particularly that locate in certain cities, such as two-, three-, four-, and five-star hotels, which comprise of 69 hotels (PHRI Jatim, 2012). On the average, there are 9 managers that include General Manager, Resident Manager, Duty Manager, Room Division Manager, Marketing Manager, Food and Beverage (F&B) manager, Chief Accountant, Chief Engineering, and Personnel Manager. Determination of the sample used non-probability sampling, the proportional sampling. As the analysis unit was the hotel's manager by some consideration that the hotel's manager has complete information and plays as the decision-maker.

Respondents of the research were the functional managers in the star hotels who have fulfilled characteristics for being observed. The reasons are that the functional managers are the decision-maker in the operational level and comprehend the empowerment concept and the organizational change in the hotel organization. Data Analysis Technique used the inferential statistics to examine the effect of independent and dependent variables. While the analysis used to respond hypothesis of this research used the Structural Equation Model or SEM.

7. Results and Discussion

7.1. Results

The analysis result of calculation on modification indices is presented below.

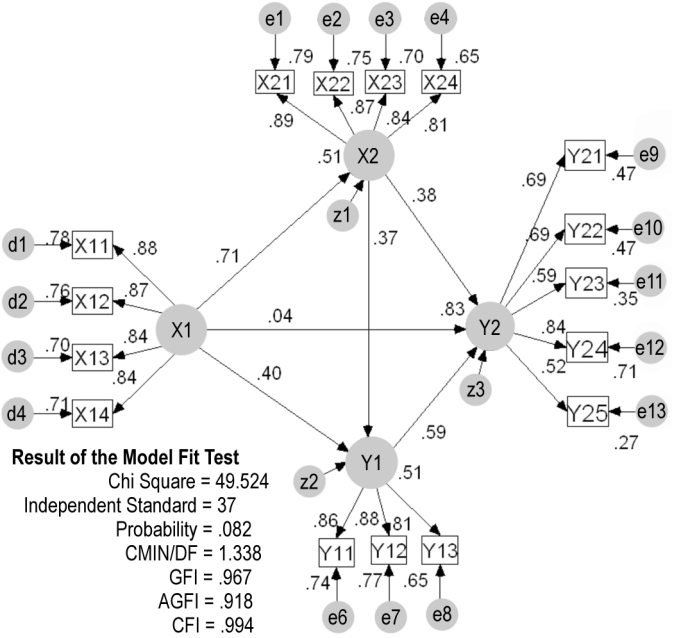

Figure 1.
Result of Evaluation
on the Structural Model

Source:
Processed Primary Data (2018)

The fit of the evaluation model provides the following results. Value of GFI is 0.967 that means 96.7% covariant matrix of the population can be explained by covariant matrix of sample, so that the model fit is good, based on the GFI value. RMSEA is 0.040 and has met the criteria of the suggested recommendations, such as below 0.080, so that the model fit is good, based on RMSEA. The recommended AGFI is 0.90 and an analysis on this evaluation model, AGFI is 0.918. GFI has good status because the values have beyond the minimum limit of the recommended values. Other criteria have good status because the calculation results have fulfilled the recommended values. The result of the model test using chi-square has decreased the value to 49.524 by the probability value of 0.082. The result of this test describes that the empirical data is not different from the proposed model (prob > 0.05). Index of the model fit by Tucker Lewis Index (TLI) recommends the values higher than 0.95, and the result of the model calculation has reached 0.987. As well as for the fit index by Comparative Fit Index (CFI), which recommends the value is higher than 0.95 and result of the calculation, has reached 0.994. Results of the analysis concluded that the evaluation model has fitness that is acceptable.

7.2. Hypothesis Test

The hypothesis test on the structural model relates to result of the regression coefficient test in each line as presented in the Table 1.

Hypothesis	Line Direction			Coef. Regress.	Standard Error	Critical Ratio	*p-value*
H1	HR empowerment	→	Human Capital (HC)	0.714	0.064	10.565	0.000
H2	HR empowerment	→	Commitment	0.400	0.106	4.254	0.806
H3	Human Capital (HC)	→	Commitment	0.373	0.109	4.096	0.000
H4	Emp	→	Performance	0.040	0.052	0.468	0.640
H5	Human Capital (HC)	→	Performance	0.383	0.61	4.386	0.000
H6	Commitment	→	Performance	0.590	0.052	6.683	0.000

Table 1. Result of the Hypothesis Test on the Structural Model
Source : Processed Primary Data (2018)

Testing on the first hypothesis showed that the coefficient of regression from HR empowerment construct toward the human capital construct is 0.714 by C.R. is 10.562 (higher than 2) and *p-value* 0.000 (lower than 0.05). In the standardized form, this coefficient value is 0.260. This result decides that the obtainable coefficient of regression has shown a significant effect of HR empowerment construct on the human capital construct. Therefore, the hypothesis of the research on the significant influence of HR empowerment on Human Capital has been proved (acceptable).

Testing on the second hypothesis showed that the coefficient of regression from HR empowerment construct toward the employee's commitment construct is 0.400 by C.R. is 4.254 (higher than 2) and *p-value* 0.000 (lower than 0.05). In the standardized form, this coefficient value is 0.018. This result decides that the obtainable coefficient of regression has shown a significant effect of HR empowerment constructs on the employee's commitment construct. Therefore, the second hypothesis about the significant influence of HR empowerment on employee's commitment has been proved (acceptable).

Testing on the third hypothesis showed that the coefficient of regression from the human capital construct toward the commitment construct is 0.373 by C.R. is 4.096 (higher than 2) and *p-value* 0.000 (lower than 0.05). This result decides that the obtainable coefficient of regression has shown a significant effect of the human capital construct on the commitment construct. Therefore, the hypothesis of this research on the significant influence of human capital on commitment has been proved (acceptable).

Testing on the fourth hypothesis showed that the coefficient of regression from HR empowerment construct toward the performance construct is 0.037 by C.R. is 0.468 (lower than 2) and *p-value* 0.640 (higher than 0.05). This result decides that the obtainable coefficient of regression has shown the insignificant effect of HR empowerment construct on the organizational performance construct. Therefore, the hypothesis of this research about the significant influence of HR empowerment on performance has not been proved (unacceptable).

Testing on the fifth hypothesis showed that the coefficient of regression from the human capital construct toward the performance, the construct is 0.383 by C.R. is 4.386 (higher than 2) and *p-value* 0.000 (lower than 0.05). This result decides that the obtainable coefficient of regression has shown a significant effect of the human capital constructs on the performance construct. Therefore, the hypothesis of this research about the significant influence among human capitals on performance has been proved (acceptable).

Testing on the sixth hypothesis showed that the coefficient of regression from the commitment construct toward the performance construct is 0.586 by C.R. is 6.683 (higher then 2) and *p-value* 0.000 (lower than 0.05). This result decides that the obtainable coefficient of regression has shown a significant effect of the employee's commitment construct on the performance construct. Therefore, the hypothesis of this research about the significant influence among commitments of the employees on performance has been proved (acceptable).

7.3. Discussion

Some interesting findings from the research, based on the result of the statistical test, showed that HR empowerment has insignificant influence on the performance of the star hotels. It means that HR empowerment in the hospitality industry, in accordance with the perception of the managers, has not been able to improve the performance of the hotel. Theoretically, the findings of the research did not support the theory as stated by Noe (2006) that HR empowerment affected the success of the management in the company. Also, results of the research did not support the previous researches by Rose (2007); Lashley (1999, 2000); Jarrar & Zairi (2002); D'Anunzio-Green et al. (1999) and Kotter (2002). Referring to result of the research by Jarrar & Zairi (2002), HR empowerment has become an alternative for the organization development, in which it can be used as base of a strategy that can improve performance of the organization (Gutierrez et al., 2018; Bryson, 2018; Ginter et al., 2018; Chan, 2018; Paauwe & Boon, 2018; Boon et al., 2018; Chamberlin et al., 2018; Collings et al., 2018; and Huda et al., 2018). Result of the research has supported the research conducted by Zulkarnain (2008), which showed that the empowerment program has an insignificant effect on competition of the entrepreneurship and business growth.

Indirectly, HR empowerment has affected the performance of the organization through Human Capital and Commitment. Result of SEM analysis showed that HR empowerment has not been able to improve the performance of the organization directly, but it could improve indirectly through Human Capital and Commitment, HR empowerment is stronger in affecting the organizational performance improvement. It means that Human Capital and Commitment have been able to mediate the effect of HR empowerment on the performance of the organization.

Based on result of the research analysis, it showed that HR empowerment has a significant influence on Human Capital. It indicated that human capital as in accordance with the perception of the manager, it has been affected significantly by HR empowerment that has been done.

Indicators of this Human Capital variable include education, development, training, and experience. Result of SEM analysis showed that education is the main indicator informing Human Capital, and in accordance with result of the loading factor, the experience is the weak indicator informing the Human Capital. It means that a greater number of lower education level will affect lower human capital, which must be done by the organization.

Findings from result of the research showed that Human Capital variable could mediate HR empowerment variable in improving the performance of the organization. It means that human resources investment, which has been done by the organization, would provide a contribution to the performance improvement of the star hotel organization if the organization has empowered its employees. Therefore, the employee can be appointed as a partner in improving performance of the organization through human capital.

Based on result of the analysis, it showed that HR empowerment construct has positive and significant influence on Commitment. HR empowerment in this research has been classified by indicators of participative, initiative, loyalty, and responsibility. Meanwhile, Commitment variable has been explained by indicators of normative, affective, and continuation.

The results stated that in the organization, a human has responsibility for the organizational management so that human resources within the organization will have high commitment for the achievement of the organization's goal that has been established. Referring to result of the research by Jarrar & Zairi (2002), HR empowerment demand the extended roles, authorities, and power, as well as the increasing flexibility about how are those roles played, and then it can be said that the only competitive profitable sources are human in the organization who have responsibilities, educated, and flexible.

Based on the analysis, result of the research showed that Human Capital has a positive and significant influence on Commitment. It shows that the organization of the star hotels, which have implemented the development program for their employees, have provided adequate education and training for the employees so that they will have sufficient experiences. This has affected the increasing commitment of the employees toward the organization.

Human capital has a positive and significant influence on the performance of the organization. This finding showed that the better the hotel's organization in building and developing the human resources, the faster the improvement of the organizational performance will occur. In order to increase human resources' capabilities in the star hotels, it requires high involvement of the management in determining the direction of

their policies and concerns toward the improvement of education and other HR development.

Commitment has a positive and significant influence on the performance of the organization. The commitment in this topic is the employees' loyalties to maintain a good industrial relationship with the organization whenever it faces susceptible condition, and of course, it shows that if the organization has the high commitment, it will be able to maintain high performance.

Human capital has a positive and significant influence on Commitment. These findings showed that the organization's attention on human resources development through education and training will increase the employee's commitment to the organization. However, commitment to the organization has been described by some indicators, such as loyalty to the organization, involvement in doing the job, and identification on values and goal of the organization.

HR empowerment has indirectly affected on the organizational performance through Human capital and Commitment. It indicates that both Human Capital and Commitment could mediate the increasing organizational performance if management of the organization has been empowered, so that investment in intangible assets will run faster and become a better organization. Finally, it will increase the organizational performance.

Results of the research proved that the performance of the organization can be improved indirectly by empowering human resources through human capital and commitment. The HR empowerment has characterized parameter that each member of the organization has participate in achieving the company's goal, initiate in doing the job, has strong loyalty and responsibility toward the achievement of the organizational performance, therefore, it will lead the organization to achieve better performance.

In order to improve the performance of the organization through Human Capital, it requires more concerns from the management that concerning with improvement of the human resources development through education and training for the employees. Furthermore, it must be implemented to support the employees to learn continuously and the more important thing is the management should have a strong motivation to implement the programs for human resources development.

Result of the research proved that improvement of the organizational performance can be achieved if the employees in the star hotel organization have a strong commitment to achieve the organization's goal mutually. In order to achieve the goal, it requires their feelings to perceive identification toward the organization, get involved completely in the officialdom, as well as loyalty and positive affection toward the organization, and more important is motivator provided by the stakeholders, so that the managers could actualize themselves to the related organization.

This research proved, both directly and indirectly, that HR empowerment affects the increasing organizational performance, which means that the increasing organizational performance will occur continuously but slower. However, the organization should pay more attention to the development of the human resources and increase the commitment of the employees to the organization.

8. Conclusions and Suggestions

8.1. Conclusions

The better human resources empowerment does not immediately improve performance of the organization. It means that more empowered manager of the star hotel organization, it has not been able to improve performance of the organization. HR empowerment would be able to increase the organizational performance through human capital and if HR has high commitment to organization, it means that human capital and commitment would be able to increase the mediation of HR empowerment in increasing the organizational performance. Commitment is highly determined by the empowered Human Resources besides human capital, and the organizational performance will increase rapidly if the organization has the empowered human resources, which is continuously developed, in order to obtain high commitment to the organization, and of course, it will increase the organizational performance.

8.2. Suggestions

Due to most of the star hotel's managers still feel unsatisfied on the empowerment practices, therefore it is suggested to more emphasize the empowerment on the managers by delivering greater authority and responsibility to the managers in decision-making, particularly in doing their duties in order to achieve both work and customer's satisfaction in hotel sector, so that it will be able to improve performance of the organization. In order to develop human resources in human capital, it is suggested for the hotel management to be more focused on the standard of competence for the workforces in the hospitality industry. Provide training to all levels of the employees in order to be more empowered and capable in providing the right information to the market about the organization. This is based on response of the respondents who give low value on information given by the employees to the market, in which the information should not contradict with the real condition of the organization. It means that information given to the employees should be correct in order to avoid the employees give the contradictive information to the market.

For further researcher, some important and appropriate variables should be tested as human resources-based performance mediator in order to achieve the customer's satisfaction, such as human resources competence and emotional skill, and of course, it would enable the strategic human resources variable can be adjusted with the corporate strategy.

References

[1] Adu, K., A. (1997). Market Orientation and Performance: Do the Findings Established in Large Firm Hold in the Small Business Sector? *Journal of Euro-Marketing*; 6, 3; ABI/INFORM Global, p.1

[2] Alwi, S., (2001). *Human Resources Management: Competitive Superiority Strategy (Manajemen Sumber Daya Manusia: Strategi Keunggulan Kompetitif)* First Edition, BPFE, Yogyakarta.

[3] Ashford, S. J., Wellman, N., Sully de Luque, M., De Stobbeleir, K. E., & Wollan, M. (2018). Two roads to effectiveness: CEO feedback seeking, vision articulation, and firm performance. *Journal of Organizational Behavior*, 39(1), 82-95.

[4] Bailey, C., Mankin, D., Kelliher, C., & Garavan, T. (2018). *Strategic human resource management*. Oxford University Press.

[5] Baum, T. (2018). Sustainable human resource management as a driver in tourism policy and planning: a serious sin of omission? *Journal of Sustainable Tourism*, 26(6), 873-889.

[6] Beltrán-Martín, I., & Bou-Llusar, J. C. (2018). Examining the intermediate role of employee abilities, motivation and opportunities to participate in the relationship between HR bundles and employee performance. *BRQ Business Research Quarterly*, 21(2), 99-110.

[7] Boon, C., Eckardt, R., Lepak, D. P., & Boselie, P. (2018). Integrating strategic human capital and strategic human resource management. *The International Journal of Human Resource Management*, 29(1), 34-67.

[8] Boon, C., Eckardt, R., Lepak, D. P., & Boselie, P. (2018). Integrating strategic human capital and strategic human resource management. *The International Journal of Human Resource Management*, 29(1), 34-67.

[9] Bryson, J. M. (2018). *Strategic planning for public and nonprofit organizations: A guide to strengthening and sustaining organizational achievement*. John Wiley & Sons.

[10] Bryson, J. M. (2018). *Strategic planning for public and nonprofit organizations: A guide to strengthening and sustaining organizational achievement*. John Wiley & Sons.

[11] Chamberlin, M., Newton, D. W., & LePine, J. A. (2018). A meta-analysis of empowerment and voice as transmitters of high-performance managerial practices to job performance. *Journal of Organizational Behavior*. Vol. 39, Issue 10, pp. 1296-1313.

[12] Chan, L. (2018). Positive Organizational Leadership: Some Recent Findings in Positive Organizational Scholarship. *M.A. in Leadership Studies: Capstone Project Papers*. 23. https://digital.sandiego.edu/solesmalscap/23

[13] Chandrasekhar, V., Goldsmith, A., Krishna, S., & Madan, R. K. (2018). *U.S. Patent No. 9,867,064*. Washington, DC: U.S. Patent and Trademark Office.

[14] Cho, Seonghee, Robert H. Woods, SooCheong (Shawn) Jang, Mehmet, E. (2006). Measuring The Impact of Human Resource Management Practices on Hospitality Firms Performance, *International Journal of Hospitality Management*, 25, p 262 -277.

[15] Clarke, Liz, (1999). *The Essence of Change, Manajemen Perubahan*, Translated by Martin Muslie & Magdalena S, Publisher Andi, Yogyakarta.

[16] Collings, D. G., Wood, G. T., & Szamosi, L. T. (2018). *Human resource management: A critical approach*. In *Human Resource Management* (pp. 1-23). Routledge.

[17] D'Annunzio-Green, Norma, John Macandrew, 1999, Re-empowering the empowered – the ultimate challange ?, *Personnel Review*. Vol. 28 No. 3, 1999, pp. 258-278.

[18] d'Estrée, T. P., & Parsons, R. J. (2018). Patterns of Encounter and Integration: Navigating Culture in Conflict Resolution Capacity-Building. In *Cultural Encounters and Emergent Practices in Conflict Resolution Capacity-Building* (pp. 349-385). Palgrave Macmillan, Cham.

[19] Daley, D., M. (2002). *Strategic Human Resource Management, People and Performance Management in the Public Sector*, Pearson Education, New Jersey.

[20] Drucker, Peter F, Joseph A. Maciariello (2008). *The Daily Drucker 366 Days of Insight and Motivation to Complete the Right Things* (The Daily Drucker 366 Hari Wawasan dan Motivasi untuk Menyelesaikan Hal-Hal yang Benar), translated by Natalia Ruth Sihandrini, Publisher PT Elex Media Komputindo, Jakarta.

[21] Erstad, Margaret (1997). Empowerment and Organizational Change, *International Journal of Contemporary Hospitality Management*, 9(7), pp. 325-333, MCB University Press.

[22] Fernandes, Sergio, Hal G. Riney, (2006). Managing Successful Organizational Change in The Public Sector, *Public Administration Review*; March/Apr 2006, 66, 2 p. 168.

[23] Ginter, P. M., Duncan, W. J., & Swayne, L. E. (2018). T*he strategic management of health care organizations*. John Wiley & Sons.

[24] Guo, S. J., & Anderson, L. B. (2018). Workplace adversity and resilience in public relations: Accounting for the lived experiences of public relations practitioners. *Public Relations Review*, 44(2), 236-246.

[25] Gutierrez-Gutierrez, L. J., Barrales-Molina, V., & Kaynak, H. (2018). The role of human resource-related quality management practices in new product development: A dynamic capability perspective. *International Journal of Operations & Production Management*, 38(1), 43-66.

[26] Heisler, W., & Bandow, D. (2018). Retaining and engaging older workers: A solution to worker shortages in the US. *Business Horizons*, 61(3), 421-430.

[27] Huda, M., Mulyadi, D., Hananto, A. L., Nor Muhamad, N. H., Mat Teh, K. S., & Don, A. G. (2018). Empowering corporate social responsibility (CSR): insights from service learning. *Social Responsibility Journal*, 14(4), 875-894.

[28] Isaac, A. R., & Ruitenberg, B. (2017). *Air traffic control: human performance factors*. Routledge.

[29] Jarrar, Yasar F., Mohamed Zairi, (2002). Employee empowerment – a UK survey of trends and best practice, *Management Auditing Journal*, 17(5), pp. 266-271.

[30] Kandampully, J., Zhang, T., & Jaakkola, E. (2018). Customer experience management in hospitality: A literature synthesis, new understanding and research agenda. *International Journal of Contemporary Hospitality Management*, 30(1), 21-56.

[31] Kuokkanen, Liisa, Tarja Suominen, Sirku Rankinen, Marja Leena, Kukkurainen, Nina Savikko, Diane Doran (2007). Organizational Change and Work-related Empowerment, *Journal of Nursing Management*, 15, 2007, pp 500-507.

[32] Ladkin, A. (2018). *Tourism human resources*. *The SAGE Handbook of Tourism Management*, 254.

[33] Lado, A.A, Wilson M. (1994). Human Resource Systems and Sustained Competitive Advantage a Competence-based Perspective. *Acad Manage Rev*. No. 19 (4).

[34] Lai, I. K., Hitchcock, M., Yang, T., & Lu, T. W. (2018). Literature review on service quality in hospitality and tourism (1984-2014) Future directions and trends. *International Journal of Contemporary Hospitality Management*, 30(1), 114-159.

[35] Lashley, C. (1999). Employee empowerment in services : a framework of analysis, *Personnel Review*, 28 N 3, 1999, pp 169-191.

[36] Liu, B. F., Fowler, B. M., Roberts, H. A., & Herovic, E. (2018). Keeping hospitals operating during disasters through crisis communication preparedness. *Public Relations Review*. https://www.sciencedirect.com/science/article/pii/S036381111830016X

[37] Marasi, S., Bennett, R. J., & Budden, H. (2018). The Structure of an Organization: Does It Influence Workplace Deviance and Its' Dimensions? And to What Extent? *Journal of Managerial Issues*, 30(1).

[38] Martinsons, M. G., Davison, R. M., & Huang, Q. (2017). Strategic knowledge management failures in small professional service firms in China. *International Journal of Information Management*, 37(4), 327-338.

[39] Mobley, William H., Lena Wang and Kate Fang. (2005). Organizational Culture: Measuring and Developing it in Your Organization, *Knowledge @ CEIBS*, Summer 2005.

[40] Murphy, K., Torres, E., Ingram, W., & Hutchinson, J. (2018). A review of high performance work practices (HPWPs) literature and recommendations for future research in the hospitality industry. *International Journal of Contemporary Hospitality Management*, 30(1), 365-388.

[41] Neill, Stern, Gregory M Rose, (2006). The Effect of Strategic Complexity on Marketing Strategy and Organizational Performance, *Journal of Business Research* 5(9), pp. 1-10.

[42] Neilson, Gary L. Bruce A. Pasternack, (2008). *Result*, Translated by Andre Wiriadi, Publisher PT Elex Media Komputindo, Jakarta.

[43] Nilson, Solveig Aud (2008). Tools for empowerment in local risk management, *Safety Science* 4(6), pp. 858-868.

[44] Nirwandar, S, (2006). Development of the Tourism Sector in Local Autonomy Era (Pembangunan Sektor Pariwisata Di Era Otonomi Daerah), *Proceeding Discussion on Maritime Tourism Development in Small Islands*, Bogor, 23rd February 2006.

[45] Noe, Rymond A., John R. Hollenbeck, Barry Gerhart, Patrick M. Wright (2006). *Human Resources Management Gaining a Competitive Advantage*, Fifth Edition, McGraw Hill/Irwin Companies, New York.

[46] Oakland, J.S., S.J. Tanner, (2007). A New Framework For Managing Change, *The TQM Magazine*, 19(6), p 572-589.

[47] Ooghe, H., & De Prijcker, S. (2008). Failure processes and causes of company bankruptcy: a typology. *Management Decision*, 46(2), 223-242.

[48] Othman, Rozhan Bin, (1996). Strategic HRM: Evidence From the Irish Food Industry, *Personnel Review*, Vol. 25, No. 1, pp. 40-58.

[49] Paauwe, J., & Boon, C. (2018). Strategic HRM: A critical review. In *Human Resource Management* (pp. 49-73). Routledge.

[50] Puig, Vicente Roca, Inmaculada Beltran Martin and Mercedes Segrra Cipres (2012). Combined effect of human capital, temporary employment and organizational size on firm performance, *Personal Review*, Vol. 41 No. 1, pp. 4-22, Emerald Group Publishing Limited, Castellon, Spain.

[51] Reason, J. (2017). The contribution of latent human failures to the breakdown of complex systems. In *Human Error in Aviation* (pp. 5-14). Routledge.

[52] Rose, Raduan Che, Naresh Kumar. (2006). The Influence of Organisational and Human Resource Management Strategies on Performance, *Performance Improvement*, Volume 45, Number 4, p 18-24
[53] Sainaghi, R., Baggio, R., Phillips, P., & Mauri, A. G. (2018). Hotel performance and research streams: a network cluster analysis. International *Journal of Contemporary Hospitality Management*. https://doi.org/10.1108/IJCHM-05-2017-0260
[54] Sekaran, Uma (2000). *Research Methods for Business: A Skill Building Approach*, Third Edition, John Willey & Sons, Inc. New York.
[55] Senior, Barbara (2002). *Organisational Change*, Second edition, Pearson Education Limited, London.
[56] Setiawan, Margono (2005). *The Effect of Leader's Power, Empowerment, Motivation, on Commitment and Job Satisfaction of the Lecturer (Pengaruh Kekuasaan Pemimpin, Pemberdayaan, Motivasi, Terhadap Komitmen dan Kepuasan Kerja Dosen) (A Study of The Lecturer's Perception DPK PTS in Jember, Malang, Kediri and Madiun)*, Dissertation, Postgraduate Program, University of Brawijaya, Malang.
[57] Seville, Erica, David Brunsdon, Andre Dantas, Jason Le Masurier, Suzanne Wilkinson, and John Vargo (2006). *Building Organisational Resilience: A Summary of Key Research Findings*, Resilient Organizations Program New Zealand, www.resorgs.org.nz
[58] Shah, N., Irani, Z., & Sharif, A. M. (2017). Big data in an HR context: Exploring organizational change readiness, employee attitudes and behaviors. *Journal of Business Research*, 70, 366-378.
[59] Siegel, Marc., Susan Gardner (2000). Contextual Factor of Psychological Empowerment, *Personnel Review*, Vol. 29, No. 6, 2000, pp. 703-722.
[60] Simsek, Hasan and Karen Seashore Louis (1994). Organizational Change as Paradigm Shift, Analysis of The Change Process, *Journal of Higher Education*, Vol. 65, No. 6 (November/Desember), by the Ohio State University Press.
[61] Spyropoulou, S., Katsikeas, C. S., Skarmeas, D., & Morgan, N. A. (2018). Strategic goal accomplishment in export ventures: the role of capabilities, knowledge, and environment. *Journal of the Academy of Marketing Science*, 46(1), 109-129.
[62] Stewart, Allen Mitchell (1998). *Empowering People: Pemberdayaan Sumber Daya Manusia (Human Resources Empowerment)*, Publisher Kanisius, Yogyakarta.
[63] Stewart, Jenny, and Michael O'Donnell (2007). Implementing Change in a Public Agency, Leadership, Learning and Organizational Resilience, *International Journal of Public Sector Management*, Vol. 20 No. 3, pp. 239-251.
[64] Steyrer, Johannes, Michael Schiffinnge, Reinhart Lang (2008). Organizational Commitment – A missing Link Between Leadership, behavior and Organizational Performance, *Scandinavian Journal of Management International Journal*, 24, pp. 364-374.
[65] Tabachnick, Barbara G., Linda S. Fidell (1996), *Using Multivariate Statistics*, Third Edition, Harper Collins College Publishers, New York, USA.
[66] Tomczak, D. L., Lanzo, L. A., & Aguinis, H. (2018). Evidence-based recommendations for employee performance monitoring. *Business Horizons*, 61(2), 251-259.
[67] Álvaro López-Cabrales, Juan C. Real, Ramón Valle (2011). "Relationships between human resource management practices and organizational learning capability: The mediating role of human capital", *Personnel Review*, Vol. 40, Issue: 3, pp. 344-363.
[68] Wang, S., Liu, Y., & Shalley, C. E. (2018). Idiosyncratic deals and employee creativity: The mediating role of creative self-efficacy. *Human Resource Management*, 57(6), 1443-1453.
[69] Wehrmeyer, W. (2017). *Greening people: Human resources and environmental management*. Routledge.
[70] Wilkinson Adrian. (1998). Empowerment: Theory and Practice, *Personnel Review*, Vol. 27, No. 1, 1998, pp 40-56.
[71] Yao, T., Qiu, Q., & Wei, Y. (2019). Retaining hotel employees as internal customers: Effect of organizational commitment on attitudinal and behavioral loyalty of employees. *International Journal of Hospitality Management*, 76, 1-8.

The Determinants of Tourists' Satisfaction in the Sicilian Agritourism Structures: A Factor Analysis

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Abstract

Agritourism is a particular form of rural tourism that has as its objective the enhancement of the territory and the rural heritage. The main motivation for the tourist is linked to the attention for the territory to food, tradition, environment and culture. In order to study the customer satisfaction in the Sicilian agritourism, we have analysed the factors that affect the customer's judgment of the overall experience, applying two statistical methods: a Factor Analysis and a Logit model. From the study, it has emerged that the satisfaction of the tourist essentially depends on how and how much the agritourism structure is able to satisfy the tourists' expectations.

Keywords: *customer; tourism; rural; agritourism; satisfaction.*

1. Introduction

Agritourism is a particular form of rural tourism whose main objectives are the diversification of entrepreneurial activity and the enhancement of the rural territory through the promotion of typical products, and the recovery of traditions. The average tourist of the farm usually travels because he appreciates the genuineness, the direct contact with the managers, and the good value for money. The main motivation for tourists is related to the attention given to the quality of the gastronomic products that plays a fundamental role in this activity (Albayrak and Caber, 2018. Panzone *et al*., 2016). The farm allows the visitor to rediscover the close bond that exists between food and its territory of origin, but also to safeguard and promote territorial specificities, developing its potential (Hung *et al*., 2015; Lanfranchi *et al*., 2014a). Agritourism in Italy has experienced uninterrupted growth in the last twenty years, reaching 12.7 million presences in 2017, with an increase in revenue of 6.7% compared to the previous year, reaching 1 36 billion euros, with a total offer of 23,406 active companies. In Italy, Sicily the region with 307 structures and a capacity of 6,444 beds represents a constantly growing reality and which we believe deserves special attention. Following other studies that measure the customer satisfaction, which focuses on perceptions and attitudes (i.e. Vega-Vázquez *et al*, 2017; Pizam and Ellis, 1999). This study focuses on measuring the agritourist's satisfaction level in the Sicilian agritourism structures, through the evaluation of a Logit model on the overall satisfaction of their experience in the structure (Lanfranchi *et al*., 2015; Asciuto *et al*., 2013).

2. Methods and data

A questionnaire ad hoc was designed to measure the agritourist's perceptions and satisfaction levels towards the services and facilities provided by the agritourism farm in Sicily. Data was collected in the spring and summer of 2018. Ninetythree agritourist customers form the sample used in our analysis. Subjects were mostly female (72%) and the age ranging from 18 to 30 years old. Customers were asked demographic information such as gender and age, also their attitudes, and the behaviour in their lifestyle. The agritourism attributes were believed to cover some relevant elements considered important to customers in relation to agritourism evaluation such as room quality, service provider, guest interaction, the judgement on the local food tasting and the explanations of the history of the place. For all these questions, a -point scale was used to indicate a growing level of judgement of the customer of the attributes considered. In order to study the customer satisfaction in the Sicilian agritourism, we analysed which factors affect the customer's judgment of the overall experience. Two statistical methods have been used for the analysis of the survey respondents, a Factor Analysis (FA) and a Logit model. In particular, the Factor Analysis was applied to reduce, the number of the variables present in the dataset, into a smaller set of variables called factors (Spearman, 1904). The list of all the items used is reported in the next Section (Tab.1). In general, the unobservable factors describe the correlation between the original variables considered in the dataset. This technique extracts maximum common variance from all the variables and puts them into a common score. The predicted scores were used as independent variables to estimate the overall satisfaction of the customers with the agritourism farms, applying a Logit model. In our Logit model we have considered as dependent variable a dummy variable that takes the value equal to 1 if the judgment of the subject on the overall satisfaction of his/her experience is excellent and 0 if otherwise. Between the independent variables we consider the age of the subjects (Age: 1 = age is ranged between 18-20 years old; 2 = 21-25; 3 = 26-30), the gender of the subject (gender: 1 = woman; 0 = man), if the structure is present on the web (Internet: 1 = yes; 0 = otherwise), and the three predicted scores by the factorization procedures (Lanfranchi *et al*., 2016).

3. Results

Using the scree plot, which is a decreasing function showing the variance explained by each factor in a factor analysis and assuming that each of the original variables has as Eigenvalue

equal to 1, we found that three factors extracted together account for 85% of the total variance in the dataset. In this manner, we have reduced the number of variables from 19 to 3 underlying factors. To test the reliability between the items used in the factor analysis, before performing the factorization on our variables, we calculated their reliability (Cronbach's Alpha = 0.79). In the following table (Tab. 1), we report the results of our factor analysis.

Items	Variable	Factor1 Agritourism attitude	Factor2 Services and Facilities	Factor3 Customer attitude
How important is the total cost of the holiday	Price	0.006	-0.208	0.379
How important is the variety of services offered	Variety services	0.385	-0.251	0.221
How important is the quality of the services offered	Quality services	0.291	-0.113	0.382
How important is air quality	Air quality	0.354	-0.329	0.400
How important are the climatic factors	Climatic factors	0.226	-0.176	0.481
How the services offered have affected the booking	Services booking	0.502	-0.068	-0.076
How the structure was integrated with the environment	Integrated	0.313	-0.010	-0.036
How many times could you taste the typical local products	Tasting frequencies	0.679	-0.340	-0.024
How she/he has been involved in farm activities	Involvement	0.567	-0.065	-0.055
How the history and traditions of the place were explained	Traditions	0.545	-0.042	-0.307
Received information on production techniques	Production techniques	0.539	-0.243	-0.357
Evaluation of waiting times at the reception	Reception waiting	0.192	0.396	0.194
Evaluation on the common areas of the structure	Common areas	0.345	0.419	-0.044
Evaluation on the tasting service of local specialties	Specialty tasting	0.744	-0.249	-0.152
Room cleaning rating	Cleanliness room	0.155	0.465	0.255
Evaluation of the quality of the attractions carried out	Attraction quality	0.636	0.196	-0.040
Evaluation on the ability to cope with particular requests	Urgencies	0.414	0.241	-0.225
Evaluation on the resolution of problems / requests	Problem solving	0.328	0.620	-0.017
If she/he has been received with courtesy at the reception	Courtesy	0.534	0.394	0.343

Table 1. Items used in the Factor Analysis

The first factor "agritourism attitude" includes items that identify the very essence of agritourism, that is, an integrated accommodation facility that blends with the environment and local traditions. The second factor "services and facilities" regards the quality of staff and the general services of the structure. The third factor "customer attitude" regards the attitude and behaviour of the customers in the environmental element. Using the predicted score factors as independent variables; we have estimated the probability of being overall satisfied with the experience in the agritourism applying a Logit model. The estimation results (coefficients and marginal effects), are reported in the following table (Tab. 2). The estimated coefficients indicate that the quality of the services that are directly linked to the territory such as, the possibility to taste the local food, explanation of the tradition (Agritourism attitude) and the quality of the structures and of the staff (Services and Facilities), have a positive and significant impact on the tourist is overall satisfaction. The attitude of the subjects versus the environmental values influences negatively their level of satisfaction, and we have the same effect if the coefficient associated to this score factor is not statistically significant. The results show that demographic variables and if the structure has or does not have an Internet site, they are not relevant variables in the evaluation of the tourist is overall satisfaction. Through the analysis of the marginal effects, we can better interpret our results. In particular, if the perceived quality of the services related to the "agritourism attitudes" increases by one unit, then the probability of being satisfied increases by 33%. A unit increase in the perceived quality of the "Services and Facilities" factor will result in an estimated 25% increase in consumer' probability satisfaction.

Overall satisfaction	Coef.	Std. Err.	P. value	dy/dx	Std. Err.	P. value
Factor 1	1.38	0.39	***	0.33	0.09	***
Factor 2	1.03	0.34	**	0.25	0.08	**
Factor 3	-0.18	0.34		-0.04	0.08	
Age (ref. 18-20)						
21-25	-0.24	0.87		-0.06	0.21	
26-30	-0.18	0.91		-0.04	0.22	
Gender	-0.43	0.62		-0.10	0.15	
Internet	0.53	0.71		0.12	0.16	
Constant	-0.32	1.15				

*Notes: * P <0.05; ** p <0.01; *** p <0.001*

Table 2. Logistic regression on overall satisfaction

4. Discussion and conclusion

The results of our statistical analysis, underline the importance of several factors related to the perception of the actual service performed by agritourism in Sicily. Factors that can be affect positively or negatively the propensity to being satisfied with the agritourism farm. In addition, if in this study, we cannot take into account the future behaviour of the subjects (i.e., González *et al*., 2007; Lanfranchi *et al*., 2014b; Baker and Crompton, 2000); we can consider these as a consequence of their overall level of satisfaction. In this sense, understanding the factors that can affect the judgement of the customers becomes relevant. We can suppose that a customer satisfied today, will be more inclined to repurchase the same product and, in this particular case, do the same kind of experience staying again at an agritourism, or will start to pass on positive word of mouth. Moreover, from our study emerges the importance of the traditions and the environment that the agritourism farm represents. The possibility to taste the typical local products, the explanation of the production techniques and the history and the traditions of the place, are the attributes, which are relevant for the tourist. Although for the customers who pay more attention to environmental issues, such as the importance of air quality and climatic factors, the propensity to be satisfied decreases, this factor does not seem to be significant. Instead, the customer's expectations assume a significant importance. Expectations of a customer on the agritourism product, in fact fall within the Factor 1 and in a positive manner. This means that the expectations that the customer has at the time of booking based on the services offered are not disappointed. Therefore, the positive association between expectation and the judgement of the services used (experience) are matched, and the agritourist is driven to increase the psychological comfort generated by the assonance of the states (Oliver, 1981). Agritourism has become a new profitable business opportunity, not only for the farms, which can be used in an alternative and complete manner, but also as an input for the local economic development (Lanfranchi, M., 2010; Fleischer and Pizam, 1997).

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References

[1] Albayrak, T., Caber, M. (2018). Examining the relationship between tourist motivation and satisfaction by two competing methods. *Tourism Management*, 69, 201-213.
[2] Asciuto, A., Franco, C.P.D., Schimmenti, E. (2013). An exploratory study of sustainable rural tourism in Sicily. *International Journal of Business and Globalisation*, 11 (2), 149-158.
[3] Baker, D. A., Crompton, J. L. (2000). Quality, satisfaction and behavioral intentions. *Annals of tourism research*, 27(3), 785-804.
[4] Fleischer, A., Pizam, A. (1997). Rural tourism in Israel. *Tourism Management*, 18(6), 367-372.
[5] González, M. E. A., Comesaña, L. R., Brea, J. A. F. (2007). Assessing tourist behavioral intentions through perceived service quality and customer satisfaction. *Journal of business research*, 60(2), 153-160.
[6] Hung, W.-T., Ding, H.-Y., Lin, S.-T. (2015). Determinants of performance for agritourism farms: an alternative approach. *Current Issues in Tourism*, 19 (13), 1281-1287.
[7] Lanfranchi, M., Giannetto, C., & De Pascale, A. (2016). Economic analysis and energy valorization of by-products of the olive oil process: "valdemone DOP" extra virgin olive oil. *Renewable and Sustainable Energy Reviews*, 57, 1227-1236.
[8] Lanfranchi, M., Giannetto, C., Abbate, T., Dimitrova, V. (2015). Agriculture and the social farm: Expression of the multifunctional model of agriculture as a solution to the economic crisis in rural areas. *Bulgarian Journal of Agricultural Science*, 21 (4), 711-718.
[9] Lanfranchi, M., Giannetto, C., De Pascale, A. (2014a). A consideration of the factors influencing tourism development in relation to biodiversity conservation. *WSEAS Transactions on Business and Economics*, 11 (1), 508-513.
[10] Lanfranchi, M., Giannetto, C., De Pascale, A. (2014b). Nature based tourism: Natural balance, impacts and management. *Quality-Access to Success*, 15 (SUPPL.1), 224-229.
[11] Lanfranchi, M. (2010). Sustainable technology as an instrument of the enviromental policy for the attainment of a level of socially acceptable pollution. *World Futures: Journal of General Evolution*, 66 (6), 449-454.
[12] Oliver, R. L. (1980). A cognitive model of the antecedents and consequences of satisfaction decisions. *Journal of marketing research*, 17(4), 460-469.
[13] Panzone, L., Di Vita, G., Borla, S., D'Amico, M. (2016). When Consumers and Products Come From the Same Place: Preferences and WTP for Geographical Indication Differ Across Regional Identity Groups, *Journal of International Food and Agribusiness Marketing*, 28 (3), 286-313.
[14] Pizam, A., Ellis, T. (1999). Customer satisfaction and its measurement in hospitality enterprises. *International journal of contemporary hospitality management*, 11(7), 326-339.
[15] Spearman, C. (1904). "General Intelligence," Objectively Determined and Measured. *The American Journal of Psychology*, 15(2), 201-292.
[16] Vega-Vázquez, M., Castellanos-Verdugo, M., Oviedo-García, M.Á. (2017). Shopping value, tourist satisfaction and positive word of mouth: the mediating role of souvenir shopping satisfaction. *Current Issues in Tourism*, 20 (13), 1413-1430.

The Determinants of Performance Behavior of Bank Employees in Indonesia

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Abstract

Psychological empowerment performed by supervisor gives positive experience towards organization members. Employees experiencing psychological empowerment will work enthusiastically. They will enjoy everything at work. Moreover, they will be more confident at facing challenge. Employees engaged are willing to give extra time for their company. Field survey of this research is conducted to bank employees in Indonesia. Research variable is measured by using Likert scale, that is, starting from 1 for very disagree answer to 5 for very agree answer. Complex relationship between research variables is tested by using PLS-SEM. This research uses SmartPLS software. Loading factor and AVE are used to determine validity. Meanwhile, cronbach's alpha and composite reliability are used to determine reliability. Indicator used has passed validity and reliability tests. All hypotheses of this research are supported. The bases are coefficient parameters and T Statistics. The research agenda is discussed in this research.

Keywords: *psychological empowerment; employee engagement; performance behavior.*

1. Introduction

Company needs employees with flexible performance behavior (Tuuli and Rowlinson, 2009), considering not all things can be formulated in job description. Employees are expected to be able to contribute more than their job description. Therefore, contextual behavior performance is really necessary (Sonnetag and Frese, 2002). The scope of performance behavior becomes wider. It is not only limited to individual task, but also has expanded to interpersonal relationship. Employees who care about their social environment are needed. It is important that they be able to face disagreement wisely as well as to talk about positive things of their department. They are expected to be individuals with totality in working for the company. Moreover, good communication becomes priority in daily activity. This research will investigate the determinants of performance behavior.

Engagement is able to trigger contextual performance behavior (Christian et al., 2011). Passion and pride of work become the main foundation of engagement. They have initiative to learn something new. Employees engaged have sufficient knowledge about their scope of work. Passionate employees may bear difficulties at work. They are also able to solve every problem patiently as well as to see possibility in any situations. They enjoy all of their works. While they are working, happy expression is seen on their face. They feel that time goes by fast (Sanneh and Taj, 2015). This research will review the determinants of employee engagement.

Psychological empowerment can be considered as antecedent for engagement (Jose and Mampilly, 2014). Employees who get psychological empowerment have high optimism about their ability. They become more confident as well as work professionally. Moreover, employees who are given authority at work have bigger possibility to reach success (Yilmaz, 2015). They are able to make decision wisely. Giving authority may increase their performance. The employees may give a very big impact for the organization. Any constructive changes continue to rise. In the end of the day, their work becomes more meaningful in their life.

Theoretical contribution given is the proof of the determinants of behavior performance. The linkage of those three variables has not been found yet in any research. It is expected that this research can fill the research gap on performance behavior with two predictors. The researcher thinks this research is necessary, considering that the current researches mostly test those three variables partially. It is expected that this research be able to give more comprehensive understanding about the linkage between variables. The relationship between variables is framed using Social Exchange Theory perspective. This study will also provide practical implication for supervisor as well as recommendation for the next researchers.

2. Previous Studies

2.1. Theoretical Background

This research uses Social Exchange Theory in framing the relationship between variables. Employees' performance will be proportional to the benefits that they receive (Blau, 1964). Employees who are cared and supported are willing to repay. Based on psychological side, employees who are empowered

are able to run decision making wisely. They will be fully responsible for their work. When employees are aware that they are empowered, they will get engaged to their job (Otken and Erben, 2010). They will work with pleasure. Facing challenge, the employees will persevere to finish it. They will work together to develop the company. Kinship atmosphere will be created at work. They will be willing to give extra time to finish their work. They will have performance behavior which can support other co-workers to make an achievement (Nawrin, 2016). They are willing to fight for reaching the organization's goals. Interrelationship is attached to the boss and the employees.

2.2. Hypothesis Development

Psychological empowerment enables employees to reach the optimal point at work (Shuck et al., 2011). They master the skills needed. Moreover, the employees will have high optimism at facing difficulties because they are confident with their capability. Competence may direct the employees to get engaged at work (Stander and Rothman, 2010). People with high passion will be able to finish their work on time. For them, working is fun. Those who are engaged are able to work longer. They have high perseverance. Employees who are given opportunity to develop themselves are able to create an innovation. By giving enough autonomy, employees are trained to be responsible at making decision. People with high potential will feel comfortable at work. Creativity is inseparable at the work environment. The authority given by the leader leads to employee engagement (Sun, 2016). Employees will be motivated to learn something new. They are not easy to give up when they fail. The employees will look for the best solution for the common interest. The hypotheses are arranged below:

H1: Psychological empowerment influences employee engagement positively.

Good focus is the basis of the completion of every job (Tanwar, 2017). Enjoying working, time seemingly goes by fast. Therefore, employees can reach the standard of performance valuation. Those who get engaged make a lot of achievement. They are proud of their performance. Looking at the social side, employees who get engaged always help their co-workers who are in trouble (Devi, 2017). Any forms of appreciation are given to the team members who successfully meet the target. Passionate employees are willing to work overtime. Employees who get engaged always do their best (Kim et al., 2012). They are always ready to give their contribution to develop the organization. The second hypothesis is formulated below:

H2: Employee engagement influences performance behavior positively.

Employees who affect their department tend to work seriously (Ping, 2011). They think that what they do will bring something good for their life. Moreover, relationship with colleagues gets closer. It becomes easier for them to work together. Their relationship leads to betterment. An employee who has been empowered well is able to get job satisfaction. Spirit within the employees enables them to work optimally (Sreenivas, 2014). The employees improve their skills in order to meet the work demands. Everything related to performance valuation is always under control. Employees who have got psychological empowerment will be cooperative (Degago, 2014). They struggle to develop the organization. For them, organization development becomes priority. Psychological empowerment makes an employee be able to meet the work standard. Research model is on Figure 1. Based on the explanation, the third hypothesis is formulated below:

H3: Psychological empowerment influences performance behaviors positively.

3. Objectives of Study

Based on the gaps and contribution of the research stated before, this research aims to test the direction and influence between variables.

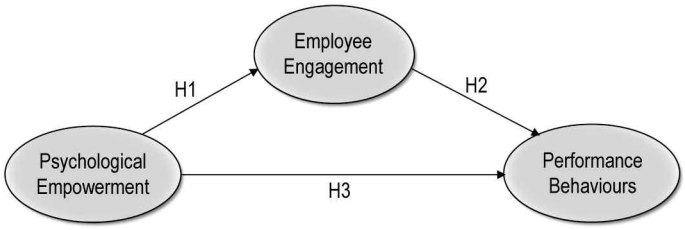

Figure 1. Hypothesized research model

4. Methodology

The measurement of variables refers to the previous research. To make it easy to understand, research indicator is adapted to the contexts in Indonesia. Variable indicator is reflexive. The measurement of psychological empowerment variables refers to Spreitzer (1995) with Cronbach's Alpha value is 0.843. The measurement of psychological empowerment variables refers to Schaufeli et al (2006) with Cronbach's Alpha value is 0.885. The measurement of psychological empowerment variables refers to Williams and Anderson (1991) and Van Scotter and Motowidlo (1996), with Cronbach's Alpha value is 0.91. Variable indicator of performance behaviors includes task behaviors and contextual behaviors.

Survey is conducted to bank employees in Indonesia. Sample collection method used in this research is non-probability sampling determined by using purposive sampling. After then, the employees are given the copy of questionnaires to answer. The questionnaire also includes a cover letter of the research describing purpose and scope of the research as well as asking the employees to be respondents. The number of the questionnaire analyzed is 95 pieces, and it has met the minimum requirements recommended by Chin and Newsted (1999), that is, around 30 until 100 respondents for the test using PLS-SEM. The questionnaire consists of two parts, namely demography and research variable. Descriptive statistic is used to describe respondent demography. Software used is SPSS. In the question part of research variable, respondents choose an option at one end of the Likert scale. The options start from 1 for very disagree answer to 5 for very agree answer.

Through consideration and comparison about the use of PLS-SEM and CB-SEM, complex relationship between research variables will be tested by using PLS-SEM. This research uses SmartPLS software. There are some standards on PLS-SEM. To pass validity test, loading factor value and AVE should be more than 0.5 (Hair et al, 2011). The research also pays attention to the reliability to see the consistency of the answers. It can be seen through Cronbach's alpha or composite reliability. Both of them should be above 0.7 (Hair et al, 2012). For the hypothesis, T Statistics should be above 1.96 (Petter et al, 2007). The research uses bootstrap 500 (Chin, 1998).

5. Results

5.1. Respondents Profile

Demographical questions include gender, age, length of service, and educational background. The majority of the respondents are females (57.9%).

Gender	Sum	Percentage
Male	40	42.1
Female	55	57.9
Sum	95	100

Table 1. Gender of respondents

Based on age, most of the respondents are around 30 to 39 years old (41.1%). Respondents whose age is above 50 are only 7.4%.

Age	Sum	Percentage
19 – 29	27	28.4
30 – 39	39	41.1
40 – 49	22	23.2
≥ 50	7	7.4
Sum	95	100

Table 2. Age of respondents

Based on the length of service in banking company, the majority of the respondents have been working for 2 to 10 years (36.8%). Meanwhile, respondents who have been working for more than 31 years are only 16.8%.

Length of work	Sum	Percentage
2 – 10 years	35	36.8
11 – 20 years	23	24.2
21 – 30 years	21	22.1
≥ 31 years	16	16.8
Sum	95	100

Table 3. Length of work

Based on educational background, the majority of the respondents are scholars (49.5%). Respondents whose educational background is post-graduate are 21.2%.

Level of education	Sum	Percentage
High School / Diploma	28	29.5
Bachelor	47	49.5
Postgraduate	20	21.1
Sum	95	100

Table 4. Level of education

5.2. Measurement Model Testing

Research measurement used is valid. Loading factor and AVE value as well as reliability value are above 0.5. The research indicator is reliable. Its cronbach's alpha and composite reliability value is above 0.7. The total of research indicator is 23. The indicator of employee engagement is 6. The indicator of performance behavior is 8. The indicator of psychological empowerment is 9. Complete result of measurement model testing is seen in table 5.

Indicators	Employee Engagement	Performance Behaviors	Psychological Empowerment	AVE	Cronbach's Alpha	Composite Reliability
EE1	0.614	-	-	0.695	0.910	0.930
EE2	0.898	-	-			
EE3	0.857	-	-			
EE4	0.929	-	-			
EE5	0.828	-	-			
EE6	0.836	-	-			
PB1	-	0.719	-	0.564	0.889	0.911
PB2	-	0.702	-			
PB3	-	0.832	-			
PB4	-	0.799	-			
PB5	-	0.817	-			
PB6	-	0.771	-			
PB7	-	0.629	-			
PB8	-	0.714	-			
PE1	-	-	0.711	0.519	0.885	0.906
PE2	-	-	0.756			
PE3	-	-	0.734			
PE4	-	-	0.551			
PE5	-	-	0.775			
PE6	-	-	0.776			
PE7	-	-	0.708			
PE8	-	-	0.781			
PE9	-	-	0.665			

Table 5. Result of outer loading

5.3. Structural Model Testing

Based on structural model testing, those three hypotheses are supported. For the first hypothesis, its T Statistics value is 2.087 (more than T Table 1.96) with parameter coefficient is 0.233, which means positive and significant. For the second hypothesis, its T Statistics is 2.881 (more than T Table 1.96) with parameter coefficient is 0.250, which means positive and significant. And then, for the third hypothesis, its T Statistics is 2.316 (more than T Table 1.96) with parameter coefficient is 0.273, which means positive and significant. Complete result of structural model testing is on table 6.

No.	Hypothesis	Coefficient parameters	T Statistics	T Table	Result
1.	Psychological empowerment → employee engagement	0.233	2.087	1.96	Significant, positive
2.	Employee engagement → performance behaviors	0.250	2.881	1.96	Significant, positive
3.	Psychological empowerment → performance behaviors	0.273	2.316	1.96	Significant, positive

Table 6. Result of path coefficients

6. Discussion

The first hypothesis of this research is supported. Successful psychological empowerment gives benefit not only for individual, but also organization (Nawrin, 2016). All members of the organization can struggle for the organization development. They have enthusiasm to finish every difficulty. Employees who get engaged may give significant effect. Freedom which is given to them may change the work environment. They make innovation to develop their talent. Employees become loyal to the company. They are willing to sacrifice their time in order to meet their target. Initiative to improve their skill becomes part of their work life. The wide insight about work makes the employee confident (Jose and Mampilly. 2014). They are motivated to do the best.

Psychological empowerment given will be more meaningful when the employees feel secure. Insecurity will reduce en-

gagement (Stander and Rothmann, 2010). Employees will be comfortable in secure environment. Therefore, it is important for the management to keep its workplace secure. Security is related to the focus of work. Good focus enables the employees to work for a long time. They enjoy their activity. Boredom at work can be overcome quickly. Employees who get engaged show high loyalty to their company. They become more committed to their work (Fairlie, 2011). They are reluctant to move to another company.

Psychological empowerment may lead to work satisfaction (Sun, 2016). Satisfied employee will preserve their performance. They pay attention to their work aspect carefully. Certain part reducing their performance can be immediately overcome. They do little negligence. Employees have high attendance and discipline. The employees' productivity continues to rise. Psychological empowerment may trigger the growth of creativity in a department (Zhang and Bartol, 2010). Employees have a lot of opportunities to show their opinion. Co-workers respecting each other's opinion make the work environment conducive for creating innovation. As a result, unique product is generated.

The second hypothesis is supported. Competent employees always finish their work on time. They are able to find the right solution. Engagement brings positive effect for work behavior (Rich et al, 2010). Employees are able to have task and contextual behavior. Employees who get engaged are able to play an active role in their department. They are always ready anytime. They have good communication with each other. The employees who get engaged are willing to share information to other co-workers. They are able to be a good team work. Everyone tries to hide each other's weaknesses (Sameh and Taj, 2015). Team members' knowledge and skills are improved. All of the activities generate maximum result with minimum cost. There will be a lot of innovations. It is often created product which is above the target.

Besides showing a good performance behavior, employees who get engaged also report that there is welfare (Brunetto et al., 2014). Looking at psychological side, they are comfortable with their activity at work. From psychical side, they have good health. They are able to manage their stress well. From social aspect, they have got justice. Prosperous employees have high commitment and loyalty. They do not want to leave their work. Their loyalty will certainly give positive impact for the company. The company is unnecessary to carry out recruitment and training for new employees. As a result, the company's profitability increases.

The third hypothesis is supported. Opportunity and freedom may create enthusiasm for the employees (Christian et al., 2011). They will be motivated to be responsible for their job. They will also work systematically. Every employee has been empowered psychologically to have sense of belonging to the company. They will have initiative to help team members to improve themselves. They tend to talk about positive thinks. There will always be appreciation for team members who reach success. Work atmosphere that is full of joy makes the employees love their work. Employees will be able to have task and contextual behavior harmonically (Tuuli and Rowlinson, 2009).

Furthermore, psychological empowerment enables the organization to respond to changes quickly (Degago, 2014). Employees who have psychological empowerment are able to compete to face work dynamics. They are able to adapt and to take action immediately. Competent employees may generate solution in order to make the company able to compete. Having freedom and opportunity, employees are able to create various competition strategies. They will be willing to work wholeheartedly because they feel responsible to repay the company's favor (Dajani, 2015). It is in line with Social Exchange Theory that substantially states that all benefits received by employees will be repaid in the form of constructive work behavior.

7. Conclusions

The result of data processing shows that the third hypothesis is supported. Significant contribution in the form of empirical proof stating that the two predictor variables used is determinant of performance behavior. The determinants are able to give significant influence. Relationship between three variables is unidirectional. Theoretical implication is employees need to firstly engage before generating a good performance behavior. Psychological empowerment from supervisor may lead to engagement process and relevant performance behavior. Employees need to feel indebt before being able to give contribution to the company. They will be more engaged when they think that their work is meaningful. Positive performance behavior for the organization is built based on their will to return the company's favor (Jose and Mampilly, 2015).

Practical implication given is supervisor needs to be serious in performing psychological empowerment. It can be carried out by giving autonomy while working. Employees will think that their work is meaningful when they are given trust and freedom. They will be motivated to make changes in their department. Finally, dedication and positive performance behavior are created.

In this research, the number of performance behavior predictor is two. Seeing from the complexity of workplace, it is still limited. The next research should consider some other variables related to performance behavior. Those variables are job insecurity (Stander and Rothmann, 2010), burnout (Fairlie, 2011), and perceived supervisor support (Jose and Mampilly, 2015).

Seeing from the time horizon, this research is cross-sectional study. The next research can conduct longitudinal study. By using longitudinal study, the researcher may get some benefits. First, the researcher is able to see long-term impact of practice and strategy of psychological empowerment in the company. Second, the researcher gets deeper understanding about the ability of each variable that is able to face work dynamics.

References

[1] Blau, P. (1964). *Exchange and Power in Social Life*. New York: Wiley.

[2] Brunetto, Y., Shacklock, K., Teo, S., and Wharton, R.F. (2014). The impact of management on the engagement and well-being of high emotional labour employees. *The International Journal of Human Resource Management*, 25(17), pp. 2345-2363.

[3] Chin, W. (1998). The partial least squares approach to structural equation modeling, in G. A. Marcoulides (Ed.). *Modern Methods for Business Research*. Hillsdale, NJ: Lawrence Erlbaum Associates, pp. 295-336.

[4] Chin, W.W., and Newsted, P.R. (1999). Structural equation modeling analysis with small samples using partial least squares, In *Statistical Strategies for Small Sample Research*, Hoyle, R. (ed.), Sage Publications, Thousand Oaks, CA, pp. 307-341.

[5] Christian, M.S., Garza, A.S., and Slaughter, J.E. (2011). Work engagement: a quantitative review and test of its relations with task and contextual performance. *Personnel Psychology*, 64(1), pp. 89-136.

[6] Dajani, M.A.Z. (2015). The Impact of Employee Engagement on Job Performance and Organisational Commitment in the Egyptian Banking Sector. *Journal of Business and Management Sciences*, 3(5), pp. 138-147.

[7] Degago, E. (2014). A Study on Impact of Psychological Empowerment on Employee Performance in Small and Medium Scale Enterprise Sectors. *European Journal of Business and Management*, 6(27), pp. 60-71.

[8] Devi, S. (2017). Impact of employee engagement on organizational performance: A study of select private sector banks. *International Journal*

of Commerce and Management Research, 1(2), pp. 10-13.
[9] Fairlie, P. (2011). Meaningful work, employee engagement, and other key employee outcomes: Implications for human resource development. *Advances in Developing Human Resources*, 13(4), pp. 504-521.
[10] Hair, J. F., Sarstedt, M., Ringle, C. M., and Mena, J. A., (2012). An assessment of the use of partial least squares structural equation modeling in marketing research. *Journal of the Academy of Marketing Science*, 40, pp. 414-433.
[11] Hair, J.F., Ringle, C.M., and Sarstedt, M., (2011). PLS-SEM: Indeed A Silver Bullet. *Journal of Marketing Theory and Practice*, 19(2), pp. 139-150.
[12] Jose, G., and Mampilly, S.R. (2014). Psychological Empowerment as a Predictor of Employee Engagement: An Empirical Attestation. *Global Business Review*, 15(1), pp. 93-104.
[13] Jose, G., and Mampilly, S.R. (2015). Relationships Among Perceived Supervisor Support, Psychological Empowerment and Employee Engagement in Indian Workplaces. *Journal of Workplace Behavioral Health*, 30, pp. 231-250.
[14] Kim, W., Kolb, J.A., and Kim, T. (2012). The relationship between work engagement and performance: a review of empirical literature and a proposed research agenda. *Human Resource Development Review*, 12(3), pp. 1-29.
[15] Nawrin, R. (2016). Impact of Psychological Empowerment on Employees' Work and Organization Engagement: A Study in the Manufacturing Sectors, Bangladesh. *Mediterranean Journal of Social Sciences*, 7(5), pp. 389-395.
[16] Otken, A.B., and Erben, G.S. (2010). Investigating the relationship between organizational identification and work engagement and the role of supervisor support. *İktisadi veİdari Bilimler Fakültesi Dergisi*, 12(2), pp. 1-26.
[17] Petter, S., Straub, D., and Rai, A., (2007). Specifying formative constructs in information systems research. *MIS Quarterly*, 31(4), pp. 623-656.
[18] Ping, P.M. (2011). *The Relationship Between Employee Empowerment and Team Performance*. Malaysia: Universiti Malaysia Sarawak.
[19] Rich, B.L., Lepine, J.A., and Crawford, E.R. (2010). Job engagement: antecedents and effects on job performance. *Academy of Management Journal*, 53(3), pp. 617-635.
[20] Sanneh, L., and Taj, S.A. (2015). Employee engagement in the public sector: a case study of Western Africa. *International Journal of Human Resource Studies*, 5(3), pp. 70-101.
[21] Schaufeli, W.B., Bakker, A.B., and Salanova, M. (2006). The measurement of work engagement with a short questionnaire: a cross-national study. *Educational and Psychological Measurement*, 66(4), pp. 701-716.
[22] Shuck, B., Reio, T.G., and Rocco, T.S. (2011). Employee engagement: An examination of antecedent and outcome variables. *Human Resource Development International*, 4(4), pp. 427-445.
[23] Sonnentag, S., and Frese, M. (2002). Performance concepts and performance theory. In: *Psychological management of individual performance*, S. Sonnentag, ed., John Wiley, Chichester, 3-25.
[24] Spreitzer, G. M. (1995). Psychological empowerment in the workplace: dimensions, measurement, and validation. *Academy of Management Journal*, 38(5), pp. 1442-1465.
[25] Sreenivas, J.N.G. (2014). Impact of Psychological Empowerment on Employee Performance – A Conceptual Review. *IOSR Journal of Business and Management*, 16(6), pp. 1-5.
[26] Stander, M.W., and Rothmann, S. (2010). Psychological empowerment, job insecurity and employee engagement. *SA Journal of Industrial Psychology*, 36(1), pp. 1-8.
[27] Sun, X. J. (2016). Psychological Empowerment on Job Performance – Mediating Effect of Job Satisfaction. Psychology, 7, pp. 584-590.
[28] Tanwar, A. (2017). Impact of Employee Engagement on Performance. *International Journal of Advanced Engineering, Management and Science*. 3(5), pp. 510-515.
[29] Tuuli, M.M., and Rowlinson, S., (2009). Performance consequences of psychological empowerment. *Journal of Construction Engineering and Management*, 135(12), pp. 1334-1347.
[30] Van Scotter, J. R., and Motowidlo, S. J. (1996). Interpersonal facilitation and job dedication as separate facets of contextual performance. *Journal of Applied Psychology*, 81(5), pp. 525-531.
[31] Williams, L. J., and Anderson, S. E. (1991). Job satisfaction and organizational commitment as predictors of organizational citizenship and in-role behaviors. *Journal of Management*, 17(3), pp. 601-617.
[32] Yilmaz, O.D. (2015). Revisiting the Impact of Perceived Empowerment on Job Performance: Results from Front-Line Employees. *Turizam*, 19(1), pp. 34-46.
[33] Zhang, X., and Bartol, K.M. (2010). Linking empowering leadership and employee creativity: the influence of psychological empowerment, intrinsic motivation, and creative process engagement. *Academy of Management Journal*, 53(1), pp. 107-128.

Revisit Intention: The Study of Community Based Tourism

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Abstract

This research aims to test the relationship between variables in a model that explains factors influencing revisit intention. Factors influencing revisit intention are explained by motivation, perceived destination quality, site image, and satisfaction. This research used survey respondents, and respondents in this research are domestic tourists and international tourists visiting community-based tourism (CBT) in Special Region of Yogyakarta. Sampling technique is convenience. The total number of respondents is 235 people. SEM is used as data analysis technique. The result of this research shows that revisit intention model is accepted, means that there are relations between motivation, perceived destination quality, site image, and satisfaction and revisit intention. This research uses the setting of CBT that is still seldom to be researched for tourism in Indonesia, and explores revisit intention model in relation to motivation, perceived destination quality, destination image, and satisfaction variables in a model that has never been studied by other researchers.

Keywords: *motivation; satisfaction; image; quality and revisit intention.*

1. Introduction

Trend of tourism sector development can be seen by seriousness of various countries both in Asia and other parts of the world in managing tourism sector with the aim of being an international tourism destination and being able to absorb labor from communities. In Southeast Asia region, Indonesia placed fourth below Thailand, Malaysia, and Singapore in terms of the number of tourists and tourism sector revenue. Tourism sector, as one strategic sector in national development for the past decade keeps showing significant contribution to support national economy, especially in obtaining foreign exchange. The number of tourist visits to Special Region of Yogyakarta increases significantly since 2012-2017. Unfortunately, the enhancement of number of tourist visits has not been able to attract tourists to be loyal. Yogyakarta has not been a single destination, and tourist visits to Yogyakarta has not been done repeatedly. Tourists who have been visited Yogyakarta seldom to come back visiting Yogyakarta (Sugandini et al., 2018). Tourist loyalty towards Yogyakarta is still low, whereas loyalty is very important because an increase by 5% in consumer loyalty can increase profit by 25% to 85%. Besides that, an increase by 60% in selling to new consumers is the result of recommendations from previous consumers, and this is an indicator of consumer loyalty (Reicheld and Sasser, 1990).

This research aims to (1) test revisit intention model, (2) analyze factors influencing behavioral loyalty that proxied by revisit intention on community based tourism (CBT). Factors influencing revisit intention submitted in this research are motivation, perceived destination quality, site image, and satisfaction. Revisit intention according to Barret (2009), can be explained as strong probability to revisit tourism destination with or without positive attitude towards service provider. Repeat visitor is the stable market for a tourism destination because they provide free advertisement in the form of mouth-to-mouth recommendations from family members and friends (Lau and McKercher, 2004). Studies conducted by Alegre and Cladera (2006), Yoon and Uysal (2005) show that tourist satisfaction has positive effect on revisit probability to a tourism destination. Previous researches have shown that contribution of different aspects of a destination have different satisfaction rate (Kozak and Rimmington, 2000, Alegre and Cladera, 2006). So it is right to explain tourist satisfaction with a complex concept, based on tourism perception from various aspects of tourism destination. Bigne et al., (2001) show that there is a relation between quality, satisfaction, and tourist's intention to revisit and willingness to recommend the destination to other people. Repeat visitors expected to have an adjusted image of a destination than first-timers, so repeat visitors usually have small probability of their experiences and expectations happen to be different. If the number of previous visits influence site image (Fakaye and Crompton, 1991), this will also influence satisfaction and their intention to come back.

Satisfaction and revisit intention can be influenced by tourist motivation as well (Mannel and Iso Ahola, 1987; Fielding et al., 2008). Yoon and Uysal (2005) stated that motivation might have direct effect towards revisit intention. Motivation can be considered important to tourism development because without interest or needs then tourism journey will never exist. Tourism motivation research becomes important and considered to be one of the most complex tourism research fields and motivation represents main influence of the patterns of tourism demand (Bonera, 2008). Furthermore, recent studies show that site image is another determinant from loyalty. Influence of site image towards loyalty was explained by Fredericks and Salter II (1995).

The first theoretical contribution in this research refers to finding by Um et al., (2006) which stated that a lot of theoretical and empirical evidence exploring what becomes tourism antecedent and how antecedent from different tourist visits influence visit intention on tourism destination still show different results. This is caused by tourist behavior that is aggregate and satisfaction on every destination has different attribute (Chen and Tsai, 2007, Susilowati and Sugandini (2018). Analysis result that has been done by Zahorik and Rust (1993) also stated that unsatisfied customers are evidently still loyal to the company, this is because there is no or less availability of another alternative service provider, and vice versa, satisfied customers can also move to another company because they wish to be more satisfied with service offered by that company. Sugandini et al., (2018), stated that even though consumer satisfaction is a precondition to consumer loyalty but this role is not so obvious. Because either satisfied or unsatisfied consumers can be disloyal to the company, and vice versa they can be loyal to the company as well. The result of this research is expected to strengthen previous study about the influence of satisfaction towards loyalty, and also the influence of motivation, perceived destination quality, and image on revisit intention. So it can enhance the generalization of revisit intention model that has been established.

The second theoretical contribution in this research associated with motivation as a factor influencing destination image, perceived destination quality, and satisfaction. Although several researches have concerned on exploring the influence of previsit factor on revisit intention, (Baloglu and McCleary, 1999), the influence of pre-visit motivation and post-visit satisfaction toward tourist visit intention is less satisfactory (Baloglu and McCleary, 1999; Huang and Hsu, 2009). (Huang and Hsu, 2009) shows lack of study concerned on exploring relation between pre-during-post-visit and satisfaction. This research designed to fill this gap and analyze the influence of motivation towards destination image, perceived destination quality, and satisfaction on community-based tourism.

Practical contribution from this research is: the result of this research gives the right marketing strategy referrals for tourism manager, government, and communities about how to increase tourist loyalty especially on community-based tourism (CBT). This caused by CBT that is based on the participation of local communities and a Pro-Poor Tourism, so it has different strategy with tourism managed professionally by the government. CBT becomes important to be analyzed because it is a part of tourism product, with good management, then local communities can adapt to change easily, and CBT can help community to be open-minded (Manyara and Jones, 2007).

2. Literature Review

2.1. Revisit Intention

Many behavior literatures have used “intention” as a proxy to actual behavior and continuity of using product as well as service (Zaltman and Wallendorf, 1979). The concept of revisit intention comes from behavioral intention. Behavioral intention is the intention from visitor to revisit the tourism destination in a year and the intention to frequently revisit the destination. Oliver, 1997 defined intention as the probability that is expressed to be engaged in behavior. Intention is an individual subjective probability that he/she will do certain behavior. Intention has a better predictive technique and explanation about revisit intention from tourists can help us understand future behavior of tourists.

Revisit intention is a consumer loyalty from the behavioral side. Dimensions of behavior from consumer loyalty according to Zeithaml et al. (1996) consist of: talking positive things about the company, revisit intention, recommend the destination to other people; push other people to have business with that company; consider that company as the first choice in the future. Other factor involved in behavioral intention evaluation including the willingness to recommend to other people and positive words (Bigne, 2001). One of the most important factors influencing revisit intention from customer might be satisfaction (Bigne et al., 2001; Kozak, 2002; Kozak and Rimmington, 2000). Site image is another determinant factor of loyalty (Fredericks and Salter II, 1995).

2.2. Satisfaction

Consumer satisfaction is one of the goals of marketing activities which links purchasing and consumption process with post-sales phenomena. The basic argument to satisfy consumers is to improve profitability by splitting the business, gaining a higher market share, and getting repeat business and referrals. Tse and Wilton (1998) defined consumer satisfaction as: consumer response toward perceived discrepancy/non-conformity evaluation between the previous expectation (or some other performance norm) and actual performance of the product as perceived after consumption. Satisfaction has a central position in business practice because of the benefit it generates for the company. The consequences or benefits that can be obtained by company from consumer satisfaction are quite a lot.

First, most researchers agree that satisfied consumers are conducive to consumer loyalty (Anderson, Fornell and Lehmann, 1994; Fornell et al., 1996). Consumers who feel satisfied with a product or service are likely to repurchase if they have a chance to buy it again (Fornell et al., 1996). Second, consumer satisfaction is possible to have a result of positive referral or word-of-mouth communication (Heskett et al., 1994). Positive word-of-mouth communication is effective to affect potential consumers; therefore companies that have the ability to satisfy their consumers will get benefit from the next increase of market share. Third, satisfied consumers will be willing to pay more for the benefits they receive and it is possible that they are more tolerant of price increases (Anderson, Fornell and Lehmann, 1994 and Fornell et al., 1996). Therefore, a company that can satisfy its consumers will be able to reduce price elasticity from consumers and potentially get a higher profit margin. Fourth, consumer satisfaction lower costs that involved in the future transaction of company and in handling consumer complaint (Anderson, Fornell and Lehmann, 1994). Since consumer satisfaction is directed to repurchase and referrals, a company that is able to satisfy its consumers is more likely to spend less on promotions to attract new customers. Furthermore, with satisfied consumers the company will receive fewer complaints (Fornell et al., 1996) and it means lower costs to deal with failures. Kozak and Rimmington (2000) stated that tourist satisfaction has a positive effect on the possibility of revisit intention. Thus, tourist satisfaction and revisit intention have become key indicators for the success of the regional tourism industry (Kozak, 2002; Kozak and Rimmington, 2000).

H1: Satisfaction has a positive influence toward revisit intention.

2.3. Destination Image

Norman (1991) defined image as a model that expresses beliefs and understanding of a phenomenon or situation. Image is a common idea or perception of a company, unit, or product. Therefore, image can be interpreted as perceptions of phenomenon, or an impression stored in memory. The image of the destination is the impression of tourists on tourism destinations. Mcintosh et al. (1995) stated that every tourism destination has its own destination image that contains beliefs, impressions, and perceptions. Mathison and Wall, (1982) stated that image is an expression of knowledge, impressions, prejudices, imaginations, and emotional outlook that a person or group has for particular object or place. Calantone, et al., (2002) mentioned that destination image is a perception from potential

tourists to a certain destination. Gartner (2003) added that destination image is a combination of complex perception from many products and attributes.

Destination image is also a reflection of the tourist attraction that felt by consumers. Destination image is an important concept in consumer behavior research because it also affects consumer personality, subjective perception, consumer value, satisfaction, and revisit intention (Dobni and Zinkhan, 1990). Destination images used as an important factor in assessing consumer perception, quality, satisfaction, and revisit intention (Chen and Tsai, 2008).Li, Cai, Lehto, and Huang (2010) showed that consumer who satisfied with the image they perceived from pedestrian tourism is possible to come back to visit the site. Destination image plays an important role in understanding tourists' behavior. Besides, destination image that perceived after the visit will affect the satisfaction and consumer intensity to revisit in the future.

H2: Destination Image has a positive influence toward satisfaction.

H3: Destination Image has a positive influence toward perceived destination quality.

2.4. Perceived Destination Quality

Destination is defined as a location of attractions, tourists' facilities and services and combination of these tourism features in the destination level. Zabkar et al., (2010), grouped two destination attributes, which is four As (Attractions, Access, Amenities and Ancillary Services) and six As (Attractions, Access, Amenities, Available Packages, Activities and Ancillary Services). Perceived quality is defined as consumer perception about high quality or superior product (Zeithaml, 1988), quality is consists of two main elements:(1) How far a product or service can fulfill consumers' needs, and (2) How far a product or service is free from deficiencies (imperfect/poor). Service quality is often used by researcher and practitioners to evaluate consumer satisfaction. Generally, it is stated that consumer satisfaction is depends on offered product/service quality (Anderson and Sullivan, 1993). Many researchers have emphasized the important of perceived service quality in its relation with consumer satisfaction and loyalty. Chen and Chen, (2010) is also stated that there is a relationship between image, consumer expectations, perceived quality, perceived value, consumer satisfaction, and loyalty. In tourism context, quality is the attribute of service performance, where it refers to psychological outcomes from visitor participation in tourism activities (Chen and Chen, 2010; Cole and Scott, 2004; Crompton and MacKay, 1988). Tourism activities are naturally hedonis, and based on consumer experience (Otto and Ritchie, 1996; Ryan, 1997) and research about perceived quality, tourism industry is usually for practical and theoretical interests. Generally, the quality perceived by visitors are tend to related with their experience while on visit process than the service offered by tourism site itself.

Jin et al., (2013) and Kao et al., (2008) stated that destination quality is consists of program, facility, and attraction. Quality occurs because it is made of immersion, surprise, participation, and fun. Lemke, Clark, and Wilson (2011) showed that quality measurement must be based on product category of hedonism, involvement, product complexity, and connectivity. DeRojas and Camerero (2008) stated that experience quality perceived by visitors is consists of quality of interaction, physical environment, and output. Therefore, some researchers (Jin et al., 2013; Kao et al., 2008) stated that quality must be measured based on hierarchy multidimension model in order to accurately measure the quality perceived by visitors in the tourism site. Marketing literatures shows that satisfaction has positive influence toward post-purchase behavior (Anderson and Sullivan, 1993). According to the theory, perceived quality refers to consumer satisfaction, which will produce intentions such as word-of-mouth recommendations and further on the revisit intention (Brady and Robertson, 2011). Kozak (2002) stated that the impact of the entire quality or satisfaction with its own aspects on tourism destination have an influence toward tourists intention to revisit or recommend to other people.

H4: Perceived destination quality has an influence toward satisfaction.

H5: Perceived destination quality has an influence toward revisit intention.

2.5. Motivation

Tourist motivation represents what encourages someone or a group of people to have a trip, either they aware or unaware, and either stable or transitional needs. Motivation has been identified as a significant determinant of behavior intention in visiting tourism destination. Baloglu (2000) tested a model to test the organization of information construction, motivation, and mental in the visit intention. The empirical study conducted by Baloglu, 2000; Huang and Hsu, 2009) showed that trip motivation is a predictor of revisit intention. Crompton (1979) showed that motivation is the one of many variables that can contribute in explaining tourist behavior. Everyone who is involved in the behavior has many reason to feel satisfied, for example they have many different needs that have to ve fulfilled while planning their behavior.

Tourist motivation which is related with the reason why people go on a trip is still become an important and tough issue in tourism research. There are some researches that explore people motivation and behavioral diversity. Baloglu, 2000; Huang and Hsu, 2009) showed that motivation is not only can be used to explain tourist behavior, but also for a predictor of revisit intention (Li et al., 2010). Huang and Hsu (2009) explored the relationship of tourist motivation to revisit intention in Hong Kong. The result shows that shopping motivation has significant influence toward revisit intention. Yoon and Uysal (2005) also explored tourist motivation to visit Northern Cyprus. The research result suggested to the marketer of tourism destination to consider practical implication of motivation because motivation is the basic factor in increasing satisfaction toward destination image and increasing tourist loyalty. Motivation can be seen as the important antecedent of revisit intention through satisfaction in the tourism destination.

H6: Motivation has positive influence toward destination image

H7: Motivation has positive influence toward perceived destination quality

H8: Motivation has positive influence toward satisfaction.

3. Research Method

The research is conducted through survey using explanatory research approach, which is a research that explain causal relationship between variables through hypothesis test (Sekaran, 1999), and with survey sample, which is a sample taken from a population and using questionnaire as the main data collecting tools and the analysis unit is individual. Convenience sampling is used because there is no certain limitations in the sample that taken. Range of sample in this research includes all tourists who visit community based tourism in Special Region of Yogyakarta without considering their length of stay, tourism destination, origin of tourists, gender, and age during the period of data collecting. The number of sample in this research is 235. All 5 constructs is measured using 5 point Likert scale. The data analysis technique is using SEM with AMOS (*Analysis of Moment Structure*) program. The direct influence (path coefficient) is seen from standardized regression weight, with comparative significance test of CR (Critical Ratio) value which equal to t value. From the output of AMOS program will be observed the causal relationship between variables by looking at the direct and indirect effects and the total effects. The significance

assessment is based on probability (p) value, and the limit of significance used is the value of $p \leq 0.05$. Test on developed model is done through many criteria of Goodness of Fit, which is Chi-square, probality, RMSEA, GFI, and TLI.

4. Result

4.1. Descriptive Characteristic of Respondents

Respondent characteristic is an image of respondents existence in the research region, and in this research, the region is CBT in Special Region of Yogyakarta and the respondents are domestic or foreign tourists. This respondent characteristic is based on gender, age, type of desired CBT, origin of tourists, visit purpose, and source of travel information. The data about respondents characteristic can be seen on Table 1.

Demography			
Gender	Man 51%, Woman 49%	Origin of tourists	Domestic tourists 52% Foreign tourists 48%
Age	≤ 20 years old 51% ≥ 20 years old 49%	Purpose of tour	Visiting family 26% Holiday57% Education 17%
Education	JHS, SHS 41% Diploma, Bachelor 29% Others 30%	Tourism Attraction	Ease of access 29% Supporting facilities 22%, Popularity 11%, Affordable price 16%
Job	Student 33% Private 30% Government employee 37%		New tourism 9%, Special event 4%
Type of desired CBT	Special interest; mountain, forest 47% Cultural/Historical. Religious Tourism, museum 33% Nautical tourism/beach 20%	Source of travel information	Friends/Family (20%) Brochures (5%) Internet (22%) Social media (21%) Travel agent (32%)

Table 1. Respondent Characteristic

4.2. Validity and Reliability Test Result

This research is using data cross sectional that collected from 235 CBT tourists which spread in Special Region of Yogyakarta. This data is conducted using instrument which equipped with Indepth Interview. The analysis result of confirmatory factor analysis that done by researcher shows that all five constructs (motivation, destination image, perceived destination, satisfaction and revisit intention) which consists of 21 questions has a goof validity because it has standardized factor loadings ≥ 0.3 and reliable, which showed from construct reliability value over 0.7 and variance extracted is recommended in 0.50 level (Hair et al., 1998).

4.3. Data Normality Test Result

Test of distribution normality is conducted using Skewness Value from the data that used which usually presented in descriptive statistic. Statistic value to test the normality is z-value. If the z-value is larger than critical value, then it can be concluded that data distribution is abnormal. Critical value can be determined based on the significance level 0.01 (1%) of ± 2.58. The result is the CR value are mostly on ± 2.58 and it means that the assumption of normality is fulfilled and the data is feasible to use in subsequent estimation.

4.4. Multicollinearity, Singularity and Outlier Test

Test of multicollinearity symptoms between independent variables shows that there is no multicollinearity symptoms that damaging model which is seen from determinant of sample covariance matrix value of **8.64E+20** and this value is far from zero. Therefore, it can be concluded that there is no multicollinearity or singularity. Data outlier test result is done by two ways, which are detection toward univariate outliers by observing z score value, all cases that have z score ≥ ± 3.0 means that outlier is occur. From the collected data, there are 5 univariate outliers or multivariate outliers.

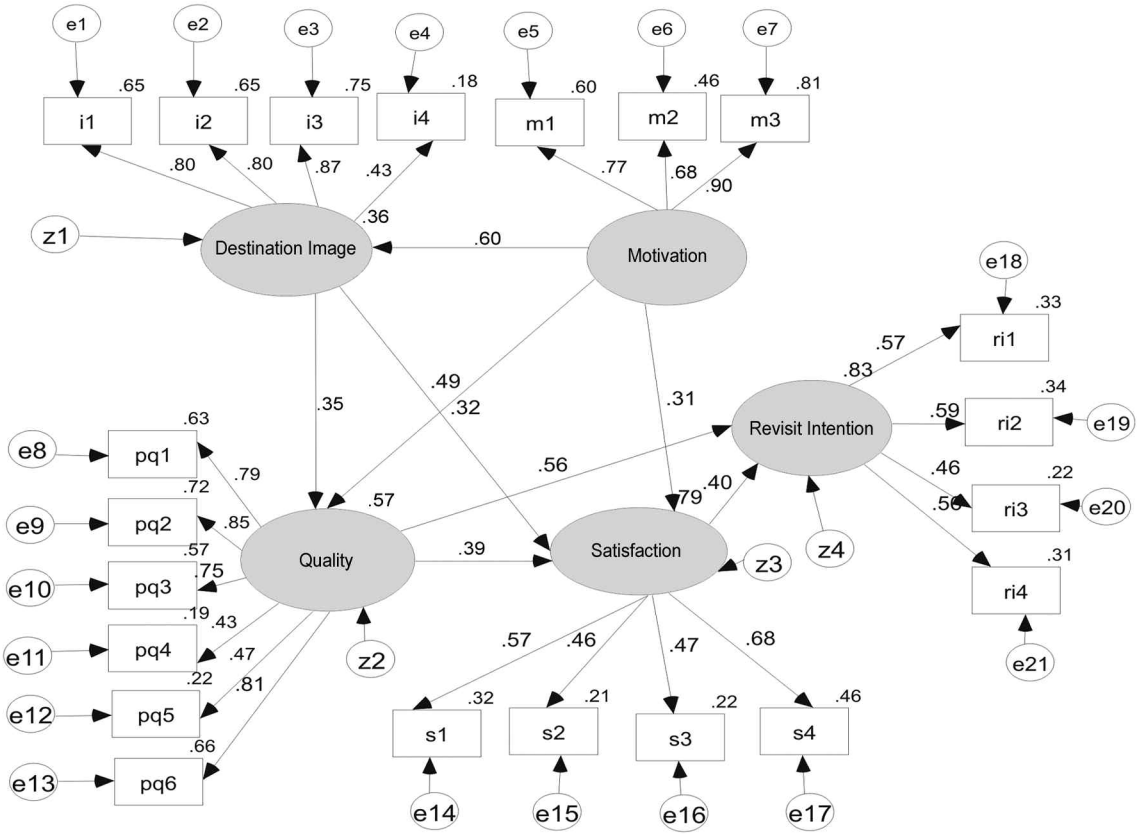

Figure 1. SEM of Revisit Intention

4.5. Test Result of Revisit Intention Model using SEM

Test result of SEM Model of consumer loyalty by using AMOS 4.01 can be seen on Figure 1, and evaluation toward the model test result can be seen on Table 2.

Criteria	Result	Critical Value*)	Model Evaluation
Cmin/DF	4.370	1≤ Cmin/DF≤ 5.00	Good
Probability	0.000	≥ 0.05	Moderate
RMSEA	0.072	≤ 0.08	Good
GFI	0.970	≥ 0.90	Good
TLI	0.987	≥ 0.95	Good
CFI	0.930	≥ 0.94	Good

Table 2. Criteria Evaluation of Goodness of Fit Indices
Source: *) Hair et al., (1998)

From Table 2, it can be seen that the model can be accepted. In order to test the hypothesis of causal relationship between motivation, destination image, perceived destination quality, satisfaction and revisit intention, it is presented path coefficient that shows causal relationship between variables. The relationship is presented on Table 3.

The test result is conducted by comparing probability (p) value which is significant if the p value ≤ 0.05. By using that criterion, it can be seen that all path is significant. Satisfaction has significant positive effect toward revisit intention of 40.3%. Destination image has significant positive toward satisfaction of 31.6%. Destination image has significant positive toward perceived destination quality of 34.7%. Perceived destination quality has significant positive toward Satisfaction of 38.6%. Perceived destination quality has significant positive toward revisit intention of 55.5%. Motivation has significant positive toward destination image of 60.4%. Motivation has significant positive toward perceived destination quality of 49.4%. Motivation has significant positive toward satisfaction of 30.8%.The influence of motivation toward quality which mediated by image is 21%. The influence of motivation toward quality which mediated by image and quality is 46.3%. The influence of motivation toward revisit intention which mediated by image, quality and satisfaction is 70.1%. The influence of image toward satisfaction which mediated by quality is 13.4%. The influence of image toward revisit intention which mediated by quality and satisfaction is 37.4%. The influence of quality toward revisit intention which mediated by satisfaction is 15.6%.The standardized direct effect (SDE), standardized indirect effect (SIE) and standardized total effect (STE) can be seen on Table 4.

Table 3. Path Coefficient (Standardized Regression) between Variables

Path	Path Coefficient	CR	Probability (p)	Information
Satisfaction → Revisit Intention	0.403	2.437	0.015	Supported
Destination image → Satisfaction	0.316	3.411	0.001	Supported
Destination image → Perceived Destination quality	0.347	4.539	0.000	Supported
Perceived Destination quality → Satisfaction	0.386	3.569	0.000	Supported
Perceived Destination quality → Revisit Intention	0.555	3.357	0.001	Supported
Motivation → Destination image	0.604	8.506	0.000	Supported
Motivation → Perceived Destination quality	0.494	6.173	0.000	Supported
Motivation → Satisfaction	0.308	3.004	0.003	Supported

Dependent variable	Motivation			Image			Quality			Satisfaction		
	SDE	SIDE	STE	SDE	SIDE	STE	SDE	SIDE	STE	SDE	SIDE	STE
Image	0.604	0.000	0.604	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Quality	0.494	0.210	0.704	0.347	0.000	0.347	0.000	0.000	0.000	0.000	0.000	0.000
Satisfaction	0.308	0.463	0.771	0.316	0.134	0.450	0.386	0.000	0.386	0.000	0.000	0.000
Revisit_intention	0.000	0.701	0.701	0.000	0.374	0.374	0.555	0.156	0.711	0.403	0.000	0.403

Table 4. Recapitulation of Direct Effect, Indirect Effect, and Total Effect between Variable

5. Discussion

The result of this research shows the evidence that revisit intention antecedent such as motivation, destination image, perceived destination quality, and satisfaction are supported. Revisit intention model testing using SEM also shows the result of a fit model. Tourist motivation as dependent variable influences revisit intention through the mediation of image, quality, and satisfaction. The influence of motivation in this research positioned to be indirectly influencing revisit intention, because many findings of previous researches still show inconsistent results (Um et al., 2006). This research supports research finding done by Baloglu, (2000); Huang and Hsu (2009) stated that journey motivation is the predictor of revisit intention. Crompton (1979), Li et al., (2010); Huang and Hsu (2009); Yoon and Uysal (2005), also show that motivation is the only one from many variables that contribute to tourist behavior. The influence of image towards quality and satisfaction are accepted, so the finding of this research supports the findings of Mathison and Wall, (1982) Calantone, et al. (2002) who stated that destination image is an important factor in evaluating customer perception, quality, satisfaction, and revisit intention (Chen and Tsai, 2008; Li, etal.,2010). The influence of quality towards satisfaction and revisit intention found in this research supports research findings done by Chen and Chen, (2010). Jin et al., (2013), stated that quality must be measured based on hierarchical model and multidimensional model to be able to measure accurately on quality felt by the visitors at tourism destination and also the finding of Kozak (2002) which stated that the overall quality influence towards satisfaction with various aspects on tourism destination influenced on tourist intention to revisit or recommend it to other people. This research also shows that the influence of satisfaction towards revisit intention is significant positive. So the finding of this research strengthens the result of previous researches on CBT setting about the relation between satisfaction and revisit intention. The result of this research supports Anderson, Fornell and Lehmann, (1994); Fornell et al., (1996) who stated that consumer satisfaction will effect on revisit intention if there is a chance to come back (Fornell et al., 1996). This research also supports the research results that have been done by Heskett et al., (1994); Anderson, Fornell and Lehmann, (1994) and Fornell et al., (1996) which stated that satisfied consumers will lead to repeat purchases, furthermore, with the existence of tourist satisfaction has positive effect on revisit intention (Kozak, 2002; Kozak and Rimmington, 2000).

6. Limitations and Future Research Directions

This research concerns about antecedent influencing revisit intention on only CBT. Tourism industry has a different characteristic from one to another. So this research has limitation in terms of generalizing its finding, and the result of this research is not easy to be generalized into different tourism products, because there are different consumer characteristics on every tourism destination. Also, this research just measures behavioral loyalty, while for attitudinal loyalty is not analyzed in this research, it would be better if future research analyzes attitudinal loyalty as well in predicting loyalty. The dimension of

attitudinal loyalty that should be researched including (1) willingness to repurchase and/or but additional product or service from the same company, (2) willingness to recommend the company to other people, and (3) commitment to the company not to move to competitors. This research only explores the relation between motivation, destination image, perceived destination quality and satisfaction variables in predicting revisit intention, perceived value, complaint intention, reputation and experience variables should be added in future researches, so a more complete finding will be obtained.

References

[1] Alegre, J and Cladera, M. (2006). “Repeat Visitation in Mature Sun and Sand Holiday Destinations”, *Journal of Travel Research*. Vol 44, pp: 288-297.

[2] Anderson, E.W., Fornell, C and Lehmann, D.R. (1994), “Customer satisfaction, market share, and profitability: findings from Sweden”, *Journal of Marketing*. Vol. 58, pp: 53-66.

[3] Anderson, E.W and Sullivan, M.W. (1993). "The antecedents and consequences of customer satisfaction for firms." *Marketing Science*, Vol. 12, pp. 125-143.

[4] Baker, D. A and Crompton, J. L. (2000). “Quality, satisfaction, and behaviour intentions”, *Annals of Tourism Research*, 27(3) 785-804.

[5] Baloglu, S. (2000). “A path-analytical model of visitation intention involving information sources, socio-psychological motivations and destinations images, In A. Woodside,G. Crouch, J. Mazanec, M. Oppermann and M. Sakai, (Eds.)”, *Consumer Psychology of Tourism Hospitality and Leisure* (pp. 63-90). New York: CABI Publishing.

[6] Baloglu, S. and McCleary, K.W. (1999). “Model of destination image formation”, *Annals of Tourism Research*, 35 (4), 11-15.

[7] Barrett, L. F. (2009). “The future of psychology: Connecting mind to brain”, *Perspectives on Psychological Science*. Vol. 4, pp: 326-339.

[8] Bigne, J. E., Sanchez, M. I and Sanchez, J. (2001). “Tourism image, evaluation variables and after purchase behaviour: inter-relationship”, *Tourism Management*. Vol. 22(6), pp: 607-616.

[9] Bonera, M. (2008). “The vacation decision making process: tourism in the garda lake”, *8th Global Conference on Business & Economics*, October 18-19, Florence, Italy.

[10] Brady, M. K. and Robertson, C. J. (2001). “*Searching for a consensus on the antecedent role of service quality and satisfaction: Exploratory cross-national study*” New York: Mc Graw Hill.

[11] Calantone, R.J., Cavusgil, S.T. and Zhao, Y. (2002). “Learning orientation, firm innovation capability, and firm performance”, *Industrial Marketing Management*, Vol. 31 No. 6, pp. 515-24.

[12] Chen, C and Chen, F. (2010). “Experience quality, perceived value, satisfaction and behavioral intentions for heritage tourists”, *Tourism Management*. Vol. 31, pp: 29-35.

[13] Chen, C and Tsai, D. (2007). “How destination image and evaluative factors affect behavioral intentions? *Tourism management*. Vol. 28, pp: 1115-1122.

[14] Chen, C and Tsai, M. (2008). “Perceived value, satisfaction, and loyalty of tv travel product shopping: Involvement as a moderator”. *Tourism Management*. Vol. 29, pp: 1166-1171.

[15] Cole, S and Scott, D. (2004). “Examining the mediating role of experience quality in a model of tourist experiences”, *Journal of Travel and Tourism Marketing*, 16(1), pp. 77-88.

[16] Crompton, J.L (1979), “Motivations for pleasure vacation”, *Annals of Tourism Research*. Vol. 6, pp: 408-424.

[17] Crompton, J and MacKay, K.J. (1988). “A conceptual model of consumer evaluation of recreation service quality.” *Leisure Studies*, 7: 41-49.

[18] Danaher, P. J and Arweiler, V. (1996) “Customer satisfaction in the tourist industry: A case study of visitors to New Zealand,” *Journal of Travel Research*. Vol. 35, pp. 89-93.

[19] De Rojas, C and C. Camarero (2008). “Visitors’ experience, mood and satisfaction in a heritage context: Evidence from an interpretation centre”, *Tourism Management*. 29. 525-537.

[20] Dobni, D., and Zinkhan, G. M. (1990). “In search of brand image: A foundation analysis”, *Advances in Consumer Research*, 17, 110-119.

[21] Fakaye, P.C and Crompton, J.L. (1991). “Image differences between prospective, first-time and repeat visitors to the lower rio grande valley”, *Journal of Travel Research*. Vol. 30 (2), pp: 10-16.

[22] Fielding, K.S., McDonald, R and Louis, W.R. (2008). “theory of planned behaviour, identity and intentions to engage in environmental activism”, *Journal of Environmental Psychology*. Vol. 28, pp: 318-326.

[23] Fornell, C., Johnson, M.D., Anderson, E.W., Cha, J and Bryant, B.E. (1996). “The American customer satisfaction index: Nature, purpose and findings”, Journal of Marketing. Vol. 60, pp: 7-18.

[24] Fredericks, J.O., and Salter J.M. (1995). "Beyond customer satisfaction", *Management Review*, Vol. 84, Issue. 5, pp. 29-32.

[25] Gartner, W.B and Carter, N.M. (2003). “Entrepreneurial behavior and firm organizing processes. In Z. J. Acs & D. B. Audretsch (Eds.)”, *Handbook of Entrepreneurship Research* (pp. 195-221). Dordrecht, NL: Kluwer.

[26] Hair Jr., Anderson R.E., Tatham R.L and Black W.C (1998). “*Multivariate data analysis*”, New Jersey: Prentice-Hall International, Inc Hawkins D.I., Best.

[27] Heskett, J.L., Jones, T.O., Loveman, G.W., Sasser, W.E and Schlesinger, L.A. (1994). “Putting the service-profit chain to work”, *Harvard Business Review*. Vol. 72 (2), pp: 164-175.

[28] Huang, S and Hsu, C.H.C. (2009). “Effects of travel motivation, past experience, perceived constraint, and attitude on revisit intention”, *Journal of Travel Research*. Vol. 8(1), pp: 29-44.

[29] Jin, N.P., Line, N.D. and Gog, B. (2013). “Experiential value, relationship quality, and customer loyalty in full-service restaurants: the moderating role of gender”, *Journal of Hospitality Marketing & Management*. Vol. 22, pp: 679-700.

[30] Kao, Y.-F., Huang, L.-S. and Wu, C.-H. (2008). “Effects of theatrical elements on experiential quality and loyalty intentions for theme parks”, *Asia Pacific Journal of Tourism Research*, Vol. 13(2), pp: 163-174.

[31] Kozak, M. (2002). “Destination benchmarking”, *Annals of Tourism Research*, Vol. 29(2), pp: 497-519.

[32] Kozak, M and Rimmington, M. (2000). “Tourist satisfaction with mallorca, spain, as an off-season holiday destination”, *Journal of Travel Research*. Vol. 38(3), pp: 260-269.

[33] Lau, L.S and McKercher, B. (2004). “Exploration versus consumption: a comparison of first time and repeat tourists”, *Journal of Travel Research*, Vol. 42(3), pp: 279-285.

[34] Lemke F., Clark M and Wilson H. (2011). “Customer experience quality: an exploration in business and consumer contexts using repertory grid technique”, *Journal of the Academy of Marketing Science*. Vol. 39(6), pp. 846-869.

[35] Li, M., Cai, L., Lehto, X and Huang, J. (2010). “A missing Link in Understanding Revisit intention – the role of motivation and image”, *Journal of Travel & Tourism Marketing*. Vol. 27(4), pp: 335-348.

[36] Mannell, R. C., and Iso-Ahola, S.E. (1987). “Psychological nature of leisure and tourism experience”, *Annals of Tourism Research*. Vol. 14(3), pp: 14-33.

[37] Manyara, G. and Jones, E. (2007). “Community-based tourism enterprises development in Kenya: an exploration of their potential as avenues of poverty alleviation”, *Journal of Sustainable Tourism*, Vol. 15(6), pp: 1-17.

[38] Mathieson, A and Wall, G. (1982). “*Tourism: economic, physical and social impacts*”, Longman: Harlow, UK.

[39] McIntosh, R. W., Goeldner, C. R and Ritchie, J. B. (1995). “T*ourism: principles, practices, philosophies*”, John Wiley and Sons.

[40] Normann (1991). “*Service Management*”, Chicester, England: Wiley & Son.

[41] Oliver (1999). “Whence consumer loyalty?” *Journal of Marketing*. Vol. 63 (Special Issue), pp: 33-44.

[42] Otto, J. and Ritchie, B. (1996). “The service experience in tourism”, *Tourism Management*. Vol. 17 (3), pp: 165-174.

[43] Petrick, J.F. (2004). “The roles of quality, value, and satisfaction in predicting cruise passengers’ behavioural intentions”, *J. Travel Res*. Vol. 42(4), pp: 397-407.

[44] Reichheld, F.F. and Sasser, E.W. Jr. (1990). "Zero defections: quality comes to services", *Harvard Business Review*, Vol. 68(5), pp: 105-111.
[45] Rust, R. T., and Zahorik, A. J. (1993). "Customer satisfaction, customer retention, and market share", *Journal Retail*. Summer, Vol. 69, pp: 193-215.
[46] Ryan, C. (1997). "*The Tourist Experience: A New Introduction*", London: Cassell.
[47] Sekaran, U. (2003). "*Research Methods for Business*", 4th ed. Hoboken, NJ: John Wiley & Sons.
[48] Sugandini, D., Effendi, M.I, Aribowo, A.S., Utami, Y.S. (2018). "Marketing Strategy on Community Based Tourism in Special Region of Yogyakarta". *Journal of Environmental Management and Tourism*, Volume IX, Issue 4 (28) Summer.
[49] Susilowati, C and Sugandini, D. (2018). "Perceived value, eword-of-mouth, traditional word-of mouth, and perceived quality to destination image of vacation tourists", *Review of Integrative Business and Economics Research*, Vol. 7(s1), 312-321.
[50] Tourism Statistics of the Special Region of Yogyakarta, 2017
[51] Tse and Wilton (1998). "Two approaches to service quality dimensions: an extension", *Journal of Marketing Research*. Vol. 25, pp: 203-212.
[52] Um, S., Chon, K and Ro, Y. H. (2006). "Antecedents of revisit intention", *Annals of Tourism Research*, Vol. 33(4), pp: 1141-1158.
[53] Zeithaml, V.A. (1998). "Consumer perceptions of price, quality and value: A means-end model and synthesis of evidence", *Journal of Marketing*. Vol. 52(3), pp: 2-22.
[54] Yoon, Y and Uysal, M. (2005). "An examination of the effects of motivation and satisfaction on destination loyalty: A structural model", *Tourism Management*. Vol. 26(1), pp: 45-56.
[55] Zabkar, V., Brenc, M.M and Dmitrovic, T. (2010). "Modelling perceived quality, visitor satisfaction and behavioural intentions at the destination level", *Tourism Management*, Vol. 31(4), pp: 537-546.
[56] Zaltman, Gerald, and Wallendorf, M. (1979). "*Consumer Behavior*", 2nd Edition, Englewood Cliffs, New Jersey, Prentice Hall.
[57] Zeithaml, V.A and Bitner, M.J. (1996), "*Services Marketing*", McGraw-Hill, New York, N.Y

Privatization and Financial Performance: Evidence from Indonesia

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Abstract

The main purpose of this study is to investigate the realtionship between privatization of state-owned enterprises (SOEs) and financial performance. Net profit margin (NPM) is used to assess the efficiency level whereas return on asset (ROA) and return on equity (ROE) are used to assess the level of profitability for financial performance evaluation. Based on purposive sampling, 19 SOEs are obtained as the sample. The results showed NPM and ROA decreased significantly after the privatization. In conclusion, SOEs in Indonesia has not been realized perfectly.

Keywords: *privatization; net profit margin; return on asset; return on equity.*

1. Introduction

The State of Republic Indonesia to date has 142 SOEs and from that number has been privatized to 19 SOEs (Ministry of state owned enterprise republic of Indonesia, 2010). In other words, 123 SOEs have not yet been privatized. SOEs is a moving business entity in various real and not real sectors of business established and owned by the government in order to seek profit so as to supplement state income reflected in the State Budget, and can be categorized as business enterprises where the main objective to be achieved is to maximize shareholder wealth (Republic of Indonesia, 2003), (Kierulff and Learned, 2009).

One of the many strategies that have been applied to SOEs is the restructuring program in the form of privatization so that internal conditions, financial performance, and corporate value will be better (Ministry of state owned enterprise republic of Indonesia, 2010). Good financial performance can be meaning in some aspects such as income, efficiency, and profitability. The Government of the Republic of Indonesia as the owner, as the majority shareholder or not of, will have a positive impact in the form of increased inflows of funds such as dividend payments or taxes if the SOE's has good performances.

The component of state income in the form of dividend payments in the State Budget (APBN) is called Non-Tax State Revenue (PNPB), therefore it is very realistic if the State always issues general policies every year to improve the performance of SOEs and increase its contribution to the State Budget (Directorate of APBN, 2017). Masterplan Ministry of SOE also mentioned that one of the strategies, in order to improve performance, is through restructuring and privatization (Ministry of State Owned Enterprise Republic of Indonesia, 2010).

Some studies related to the performance of SOEs before and after the privatization program conducted in various other countries in recent years still show have different results and controversy. William and Robert conducted a State-Owned Enterprise study in several European countries and his research results show that post-privatization of operational and financial performance has increased significantly (L. William, C. Robert, 1998). Omran recorded the same results as Megginson, but they have some other finding such as decreasing the number of employers, the risk and the amount of debt even though are not significant post-privatization (Omran, 2004). The other SOE's research is conducted in Canada and the results indicate a significant increase in financial and operational performance post-privatization (Anthony and Aidan, 2002). Several other researchers note different results, Tu and Yu concluded that the good and bad performance of State-Owned Enterprise after privatization depends on the institutional factors that take over the company. If the institution previously has a business engaged in a business that is in line with the SOE's' business then the performance becomes better, if otherwise have unrelated business field then the performance worsened (Tu and Yu, 2015), Lin concluded that to improve the performance State-owned enterprises in China do not go through privatization programs but through corporate programs that mean some SOEs that have business-related businesses made into a group of business entities so that management becomes more focused and performance improves (Lin, 2001), and Alanasi, Liu and Forster conducted research on companies doing IPO (Initial Public Offering) on the Saudi Stock Exchange to obtain results that financial performance as measured by ROA and ROS (Return On Sales) becomes worse after doing go public, and even the performance becomes damaged related to the IPO (Alanazi, Liu, and Forster 2011). Research related to the financial performance of State- Owned Enterprise before and after privatization has been done in many countries both developed and developing countries, but the results still show some controversy. Further research is needed to fill in the results of research gaps and to re-confirm again whether it is true or not that privatization programs can improve performance so that the results of research can be used as more useful recommendations for the parties or institution state or private that need it.

The performance of SOEs in Indonesia is decreasing and one of the indicators is decreasing the number of dividends paid to the government as well as the decreasing contribution to the APBN as Table 1. One of the strategies used by the Government of Indonesia as a way out is in the form of restructuring and privatization programs (Ministry of state owned enterprise Republic of Indonesia, 2010). In Indonesia there are still many SOEs that have not been privatized, therefore it is urgent to research how the performance of the previously privatized

SOEs if has improved the post-privatization performance or not so that the results of the research can be recommended whether the privatization program can be continued.

Year	Budget (RP-T)	Dividend (Rp-T)	Percentage (%)
2015	1794	37	2.06
2016	1823	34	1.86
2017	1750	41	2.34

Table 1. State-Owned Enterprise Contribution to State Budget

2. Literature Review

2.1. State Owned Enterprises (SOEs)

According to Law Number 19 the Year, 2003 concerning SOEs is a limited liability company whose capital is divided into shares of which all or at least 51% (fifty-one percent) of shares are owned by the Republic of Indonesia whose main purpose is to pursue profit (Republic of Indonesia, 2003). The legal entity of SOEs in Indonesia other than Public Corporation (Perum) in the majority is a limited liability company (Corporation) is a legal entity whose capital in the form of stock sheets, and everyone share has one vote, which owns more than 50% of the shares are the majority shareholder (Republic of Indonesia, 2003).

The purpose of the establishment of State-Owned Enterprise is to provide goods/services of high quality and strong competitiveness and the pursuit of profit in order to increase the value of the company (Republic of Indonesia, 2003), so it can be categorized as a business organization whose main purpose is to maximize shareholder wealth (Kierulff and Learned, 2009). Coverage of the business sector is cultivated is very wide both the real sector and non real, upstream industry and total number of SOEs as many as 142 and 19 of them have been privatized (Ministry of state owned enterprise republic of Indonesia, 2010) and total assets of all SOEs in Indonesia reached 3500 Trillion Rupiah in 2013 (Watch, 2013).

The government is very interested in SOEs performing well so that the tax is big because the company has a profit because if loss cannot be taxed. In addition, the majority shareholder will also receive other income in the form of dividend payments, as the Government always issues the general policies set forth in the State Budget to always improve the performance of SOEs (Directorate of APBN, 2017).

2.2. Restructuring and Privatization

The condition of SOEs in Indonesia is unhealthy one of the indicators is the decrease in the number of dividends paid to the Government as well as the declining contribution to the state budget (Directorate of APBN, 2017). The general policy program pursued is restructuring, namely the efforts made in the framework of the restructuring of SOEs which is one of the strategic steps to improve the internal condition of the company in order to improve the performance and increase the value of the company (Directorate of APBN, 2017). The restructuring is done with the intention to nourish the State-Owned Enterprise to operate efficient, transparent and professional. The purpose of restructuring is to improve the performance and value of the company, provide dividend and tax benefits to the state, produce products and services at competitive prices to consumers, and facilitate the implementation of privatization.

Concrete steps in the implementation of the program are one of them privatization namely the sale of shares of SOEs either partly or wholly, to other parties in order to improve the performance and value of the company, enlarge the benefits for the state and society, and expand share ownership by the public (Directorate of APBN, 2017). The sale of SOE's or assets deliberate by the government to private parties is be called as privatization (William and Jeffry, 2001).

Privatization is carried out with the intention of expanding public ownership of SOEs, improving the efficiency and productivity of the company, creating sound financial structure and sound management, creating healthy and competitive industry structures, creating competitive and globally-oriented Persero and fostering a business climate, macro, and market capacity.

Privatization is done with the aim to improve performance and add value to the company and enhance public participation shareholding Limited (Republic of Indonesia, 2003). Privatization, Megginson call as the denationalization interpreted as surrender effective control of a company to the managers and owners of private and usually occur if the majority of the company's shares are transferred to private ownership (L. William, C. Robert, 1998). Furthermore, they categorize the privatization of Partial Privatization and Full Privatization. The Full model means post-privatization of the old owner is not a majority shareholder, but if still the majority can be interpreted following the partial model (L. William, C. Robert, 1998). Changes in the role of the government from the role of owner and implementer become regulator and policy promoter and privatization is carried out by selling stocks based on capital market provisions, direct selling of shares to investors, and selling shares to management and/or employees concerned (Ministry of state owned enterprise republic of Indonesia, 2010).

2.3. Financial Performance

The purpose of a business organization is to gain profit and when it goes public it will be reflected in the stock price so that the maximization of shareholders' wealth is ultimately the main object to be achieved (Kierulff and Learned, 2009). There are several indicators of whether the goal has been achieved, one of which is the financial performance that will measure how far the goal has been achieved. The better the financial performance the better the achievement of goals and vice versa will be further away from the direction of the goal.

The financial performance uses several measuring instruments in the form of financial ratios to measure whether the company's objectives have been met. There are many categories of financial ratios such as ROA, ROE and Net Income Margin (NIM), (Nimtrakoon, 2015), (Slavica Jovetic, 2016).

2.4. Privatization and Financial Performance

Generally, state-owned enterprises (SOEs) are not successful, many economists argue that one of the causes is the intervention of the government, and after privatization of work the performance has improved (Pingle, 1997). SOEs in Indonesia are not much different also experienced a decrease in performance, strategies to overcome them through restructuring and privatization programs (Ministry of state owned enterprise republic of Indonesia, 2010). The government undertakes a privatization program on SOEs in the hope that in addition to obtaining funds it also benefits from increased efficiency, acquainted with competition, attracting foreign investors and spreading ownership (William M, Stephen, 2000). Post-execution of privatization program strategy the financial performance will be better, including such as increasing sales, profitability level, operational efficiency level, capital expenditure, employee amount, dividend payout and debt downturn (L. William, C. Robert, 1998), (Anthony and Aidan, 2002).

3. Materials and Methods

The research population is SOE in Indonesia which amounts to 123 (Ministry of state owned enterprise republic of Indonesia, 2010) and using purposive sampling method that is selecting the sample from research population with the certain consideration. Three components are taken into consideration in the determination of the sample, the first SOE has been privatized and the second is available privatization prospectus and the third

available stock price list for 3 years before and after it is privatized. Based on the sampling method, 19 samples of SOEs were selected.

4. Results

4.1. Performance Efficiency

The financial ratios used to measure the efficiency of SOEs before and after the Privatization Program are the ratio between net profit and sales rate or NPM. 3-year empirical data before and after the Privatization Program as Table 2.

Ratio	Before	After	Change
NPM	11.31%	1.45%	-8.7%
ROA	12.14%	4.09%	-6.6%
ROE	17.32%	12.40%	-2.8%

Table 2. Performance before and after the Privatization Program

Based on Table 2 it can be analyzed that the efficiency of SOEs as measured by NPM after privatization showed an average decrease of 87%. Before being privatized an average of 11.31% NPM and post-privatization of 1.45%.

4.2. Profitability Performance

The financial ratios used to measure the profitability of SOEs before and after the Privatization Program are the ratio between net income to total assets or ROA and the ratio between net income to equity (ROE). 3-year empirical data before and after the Privatization Program as Table 2.

Based on Tables 2 it can be analyzed that the profitability of SOEs if measured by ROA after privatization shows an average decline of 66%, whereas if measured by ROE post-privatization showed an average decrease of 28%. ROA before being privatized on average 12.14% and post-privatization of 4.09% and ROE before privatized on average 17.132% and post-privatization of12.40%.

4.3. Normality test

The study used three financial performance variables: NPM, ROA and ROE and all data related to those variables should be tested for normality of data in advance to select the difference test of parametric or non-parametric mean that finally used to test the hypothesis.

Variables	Asymp. Sig. (2-Tailed)		Significant
	Before	After	0.05
NPM	0.704	0.017	0.561
ROA	0.628	0.561	0.347
ROE	0.976	0.347	0.017

Table 3. Result of Kolmogorov-Smirnov-Test

Based on the Kolmogorov-Smirnov normality test Table 3, it can be analyzed that two financial performance variables ROA and ROE have Asymp. Sig. (2-tailed) larger alpha (α) 0.05 so that it can be concluded to be normally distributed. The other financial performance of NPM has Asymp. Sig. smaller than alpha (α) 0.05 so it can be concluded not normally distributed. The test implies that to examine the differences in financial performance of ROA and ROE of SOEs before and after the Privatization Program is used T-test of two paired samples (Parametric) and the remainder is used Wilcoxon (Non-Parametric) Marked-Ranking Test.

4.4. Hypothesis Testing

The results of NPM before and after the privatization program are shown in Table 4.

Information	Result
Before – Average	11.31%
After – Average	1.45%
Asymp. Sig	0.000

Table 4. Result Wilcoxon-Test

Based on Wilcoxon test results in Table 4 has Asymp value. Sig 0.000 and smaller than the alpha value (α) 0.05, so the research hypothesis which states that there are differences in financial performance of SOEs seen from the significant NPM before and after the privatization program concluded acceptably. This means that it is significantly proven that the financial performance viewed from the aspect of efficiency (NPM) has decreased. Post privatization of SOE efficiency is even lower.

The results of ROA before and after the privatization program are shown in Table 5.

Information	Result
Before – Average	12.14%
After – Average	4.09%
T-Count	2.519
Asymp. Sig	0.021

Table 5. Results T–Test Pair Sample

Based on the result of paired sample T-test as Table 5 has t-count value 2.519 bigger when compared with t- Table value with (α) 0.05 equal to 2 or level of significance 0.021 less than alpha value (α) 0.05, research hypothesis stating that there are differences in financial performance of SOEs seen from significant ROA before and after the privatization program concluded acceptably. This means that it is significantly proven that the financial performance viewed from the aspect of profitability (ROA) has decreased. Post privatization profitability SOEs are even lower.

The results of ROE before and after the privatization program are shown in Table 6.

Information	Result
Before – Average	17.32%
After – Average	12.40%
T- Count	1.166
Asymp. Sig	0.259

Table 6. Results T–Test Pair Sample

Based on the result of paired sample T-test as Table 6 has a t-count value of 1.166 smaller than the value of t-Table with (α) 0.05 of 2 or 0.259 significance level greater than the value of alpha (α) 0.05, so the hypothesis research that states that there are differences in financial performance of SOEs seen from significant ROE before and after the privatization program concluded not acceptable. This means that it is not significantly proven that the financial performance viewed from the aspect of profitability (ROE) has decreased. Post privatization profitability SOEs are even lower but not significant (signified).

5. Discussion

Based on the descriptive analysis and statistical test it can be seen that the efficiency of SOEs as measured by NPM post-privatization decreased significantly. The net profit gain for each rupiah decreased. The company's financial statements, in this case, the income statement photographed the operational activities in the form of money. Starting from the sale then reduced by non-operational and operational cost so that finally obtained net profit. The assumption of constant revenue (before and after privatization), the smaller the net profit the greater the total cost incurred, the greater the cost incurred inefficient SOEs in running their business activities. The condition of state-owned enterprises after privatization is increasingly inefficient.

ROA is also used to evaluate the performance of SOEs financials other than NPM. Based on the descriptive analysis and statistical test it can be seen that the profitability of SOEs as measured by ROA after privatization decreased significantly. Net profit earned for each unit of rupiah asset value decreased. If the net profit per unit of asset increase is analogous to the assets of the valuable SOEs, on the contrary, if the net profit per asset unit decreases is also analogous to the less valuable asset of SOEs. State-owned enterprises post-privatization is worse because the privatization program makes assets – asset SOEs are getting less expensive.

The third financial performance indicator beside NPM and ROA is ROE. Based on the descriptive analysis and statistical test it can be seen that the profitability of SOEs as measured by post-privatization ROE decreased but not significantly. The net profit gain for each rupiah unit of equity value decreased. If the net income gain per unit of equity raise is analogous to the valuable state-owned equity, on the contrary, if the net profit per equity unit decreases, it is also analogous to the increasingly unqualified SOEs equity. The condition of SOEs after privatization is worse because, with the privatization program, SOEs equity becomes less expensive.

The privatization program is implemented within the framework of improving the efficiency and value of the company, with empirical evidence of efficiency as measured by the NPM, so the goal of privatization has not been achieved. The financial performance that wants to be improved actually decreases post-privatization, this finding supports the research result from Alanasi (Alanazi, Liu, and Forster, 2011) even though with different research object. The results of (Tu and Yu, 2015) further strengthen these empirical findings, as they record the performance of SOEs in China after the privatization worsened, even (Lin 2001) in his research with the object of SOEs also in China mentioned to improve performance not through privatization program but by forming a corporation (holding), meaning that SOEs with similar business activities become one group of management so that efficiency and effectiveness happen by itself.

2. Conclusion

This study concludes that (1) The financial performance of SOEs after privatization when viewed from the aspect of NPM and ROA is significantly lower when compared before the privatization; and (2) The financial performance of SOEs after privatization when viewed from the aspect of ROE is lower but not significant when compared to before the privatization. Suggestion for further research, the privatization program is not a simple corporate action, therefore post-privatization is necessary adjustments related to business operations, and really takes a long period of time. Event study used in this research only use 3 year period of the post-privatization window so there is the possibility of post-privatization performance not yet reflects real condition.

References

[1] Alanazi, Ahmed S, Benjamin Liu, and John Forster (2011). “The Financial Performance of Saudi Arabian IPOs.” *International Journal of Islamic and Middle Eastern Finance and Management* 4(2): 146-57. www.emeraldinsight.com/1753-8394.htm, accessed on 18th of July 2019.

[2] Anthony, E, and R Aidan (2002). “Privatization in Canada: Operating and Stock Price Performance with International Comparisons”. DOI: 10.1111/j.1936-4490.2002.tb00676.x

[3] Binder, John J. (1998). “The Event Study Methodology Since 1969.” *Review of Quantitative Finance and Accounting* 11(2):111-37.

[4] Chen, Anlin, Li-Wei Chen, and Lanfeng Kao (2010). “Leverage, Liquidity and IPO Long-run Performance: Evidence from Taiwan IPO Markets” *International Journal of Accounting & Information Management* 18(1): 31-38. http://www.emeraldinsight.com/doi/10.1108/18347641011023261.

[5] Corhay, Albert, Stanley Teo, and Alireza Tourani Rad (2002). “The Long Run Performance of Malaysian Initial Public Offerings (IPO): Value and Growth Effects”. *Managerial Finance* 28(2): 52-65. http://www.emeraldinsight.com/doi/10.1108/03074350210767690.

[6] Directorate of APBN, Directorate General of Budget (2017). “Information on the State Budget of 2017”: 1-48.

[7] Kierulff, Herbert, and Grant Learned (2009). “Limiting Laissez Faire Profits: The Financial Implications”. *Journal of Business Ethics* 90(3): 425-436.

[8] L. William, C. Robert, van Matthias (1998). "The Financial and Operating Performance of Newly Privatized Firms: An International Empirical Analysis". *The Journal of Finance* Vol. 53, No. 3, pp. 1081-1110.

[9] Lin, CR. (2001).“Corporatisation and Corporate Governance in China’s Economic Transition.” *Economics of Planning* 34(1-2): 5-5. http://apps.webofknowledge.com.libezproxy2.syr.edu/full_record.do?product=UA&search_mode=GeneralSearch&qid=17&SID=3Chp2AMvKx6zg58BbD9&page=1&doc=1.

[10] Ministry of State Owned Enterprise Republic of Indonesia (2010). Master Plan BUMN (State Owned Enterprise) 2010-2014”: 1-121.

[11] Nimtrakoon, Sirinuch (2015). “The Relationship between Intellectual Capital, Firms’ Market Value and Financial Performance.” *Journal of Intellectual Capital* 16(3): 587-618. http://www.emeraldinsight.com/doi/10.1108/JIC-09-2014-0104.

[12] Omran, Mohammed (2004). “Performance Consequences of Privatizing Egyptian State-Owned Enterprises: The Effect of Post-Privatization Ownership Structure on Firm Performance”. *Multinational Finance Journal*, Vol. 8, No. 1/2, pp. 73-114.

[13] Pingle’, Vibha (1997). “Managing State-Owned Enterprises: Lessons from India”, *International Journal of Sociology and Social Policy*, Vol. 17 No. 7/8, pp. 179-219.

[14] Republic of Indonesia (2003). “Law No. 19 of 2003 on State Owned Enterprises”: 1-37.

[15] Slavica Jovetic, Jelena Puric (2016). “Comparative Analysis of Financial and Non-Financial Performance Elements of Joint-Stock Companies”. *Ekonomika*, Vol. 62, No. 3, pp. 93-110.

[16] Tu, Guoqian, and Frank Yu. (2015). “Tunneling or Not? The Change of Legal Environment on the Effect of Post-Privatization Performance.” *Journal of Business Ethics* 129(2): 491-510. http://dx.doi.org/10.1007/s10551-014-2169-9.

[17] Watch, Corruption (2013). *State Owned Enterprise in Numbers*. www.bumn.go.id, accessed on 18th of July 2019.

[18] William, L, and M Jeffry (2001). “From State to Market: A Survey of Empirical Studies on Privatization”. *Journal of Economic Literature*, Vol. 39, No. 2, pp. 321-389.

[19] William M., Stephen, J. (2000). “Privatization Think Again.” In University of Oklahoma: Reproduced with permission of the copyright owner, 14-27.

Management of the Remediation of Old Environmental Burdens

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Abstract

Improving the quality of life from the point of view of health and safety of the population is currently also subject to improving the environmental profile of the area. All development goals and strategies are today, whether viewed from a global or regional or local point of view, in a coordinated way in relation to environmental damage and fulfillment of socio-economic parameters (EIA/SEA/HIA process) of development. However, the old environmental burdens caused by environmentally inappropriate consumption and production in the past that are transferred to the present and the sustainable development of society as environmental debt remain a problem in the EU and in the regions of Slovakia.

Keywords: *environmental burdens; environmental management; EIA/SEA/HIA process.*

1. Introduction

With a view to implement Directive 2006/21/EC of the European Parliament and of the Council, a specific document entitled "Methodological procedure for the remediation and reclamation of closed abandoned waste sites from the extractive industry" has been developed at the national level. The Directive directs the Member States to take measures that will positively affect the operator's compliance with the obligations of the operator for the management of the waste facility. However, the concepts of remediation and reclamation are now often interchanged. Remediation and reclamation procedures and techniques are mutually similar and possibly the same, so they are often overlapping in practice.

"Reclamation shall be such an adaptation of the area affected by the landfill, which will allow return to a satisfactory state with particular emphasis on soil quality, wildlife and wild growing plants, natural habitats, freshwater ecosystems, landscape and appropriate land use".

Remediation methods contribute to the removal of the pollutant, possibly removing the risk of pollution by reducing it to remediation limits. An important publication is the

Atlas of remediation methods of environmental burdens (part of the Environmental Burden Information System), which focuses, among other things, on a more comprehensive information base for a total of more than 80 remediation methods. Remediation methods may be classified from different aspects, such as:

- From the point of view of the type of polluted environment (water, soil, rocks, ...).
- From the application point of view: in situ, ex situ.
- From the point of view of the mechanism, respectively the principle of remediation (biological methods, chemical, ...).

2. Environmental burdens and the implementation of environmental policies in Europe and Slovakia

Within the framework of its development strategies, the EU is also focusing on the achievement of a sustainable state of the environment with an emphasis on its protection. Fig. 1 presents an overview of EU policies devoted to the environmental field. It can be said that the number of binding environmental policy objectives is significantly higher than the number of non-binding

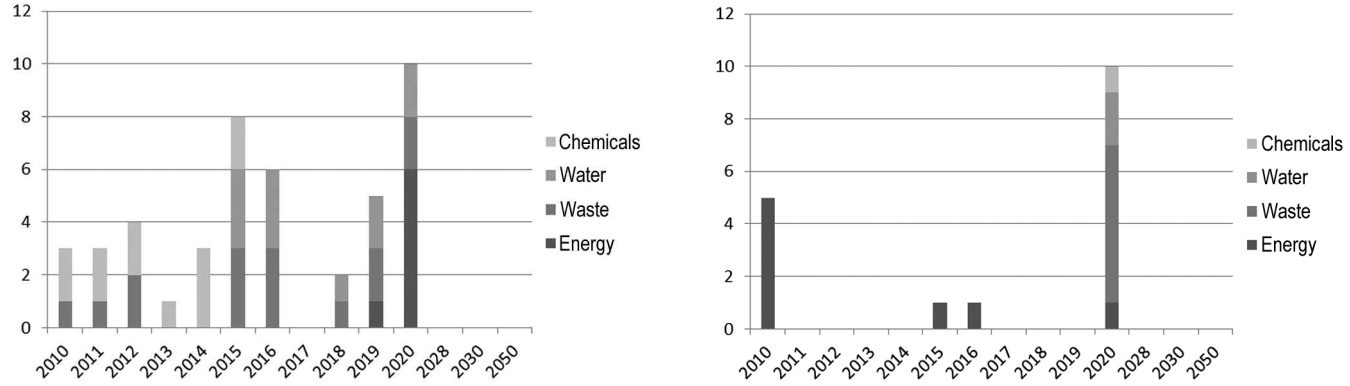

Figure 1. Overview of objectives within the different EU environmental policy areas [2]

objectives. For example, in 2013, environmental policy objectives were exactly in the opposite ratio. Non-binding environmental objectives with a total of 68 were prevailing compared to binding environmental policy objectives of 63, with most of the targets set to 2015. A frequent trend in the implementation of environmental policies in the European area is breach of obligations. There are time spans between policy adoption and implementation, such as 5-10 years, which results in the costs from non-compliance with environmental policy. These costs are estimated at up to approximately EUR 50 billion over a one-year period.

Strategies need to be formulated in such a way that they are feasible and at the same time aimed at maintaining the minimum costs of eliminating negative environmental impacts. A more detailed overview of the objectives of environmental and climate policies overlaid with a time axis is shown in Fig. 2.

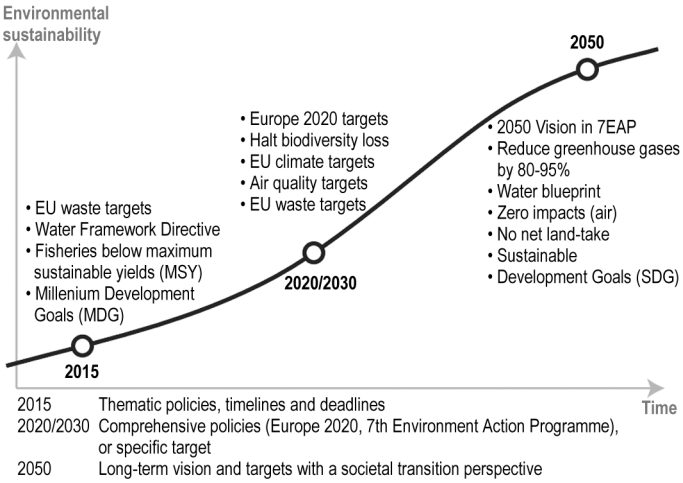

Figure 2. Timeline of environmental policy objectives

In relation to the worked-out strategies and visions centered on achieving a sustainable state in Europe, the state of the environment is monitored and evaluated through several instruments. One of them includes the environmental report, which is produced by the European Environment Agency over a five-year period.

Currently, the most recent comprehensive assessment report providing an overview of the state of the environment in Europe, its outlook and sustainability is the report entitled "The European Environment. The condition and outlook of 2015. Synthesis".

The information and data contained in this report was provided by the European Environment Agency together with the European Environment Information and Observation Network. In the sense of this assessment report, it can be said that the trend of increasing environmental pollution persists and ecosystems are reaching the level of critical pollution. Globalization is a trend that is closely linked to the change in consumer and production patterns in countries and increases the pressure on the environment.

From the point of view of European production, pressure is particularly prevalent on the use of resources, the amount of emissions and their ensuing consequences for the environment. From the point of view of European consumption, there is pressure on the environment, for example through emissions contained in consumed products and services.

3. Management of contaminated territories in Europe

The European Environment Agency makes information and data gathered reflecting progress in the management of contaminated territories, which is closely related to soil condition assessment, available on its website. According to the EEA estimates, there are about 2.5 million sites in Europe, specifically in 39 European countries (EEA members) with potentially contaminated soil. An overview of the amount of potentially contaminated areas is shown in Fig. 3. At the same time, this number is expected to grow in the future.

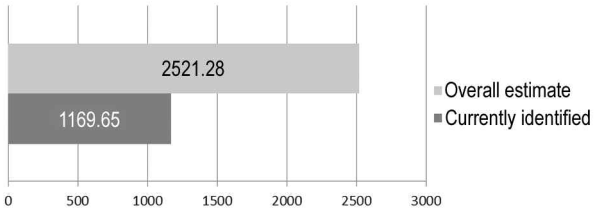

Figure 3. Potentially contaminated sites – places found (x1000)

In part of the sites, about 342,000 sites, soil contamination was identified, with 15% of them already being remediated. A closer look at the number of contaminated areas is provided in Figure 4.

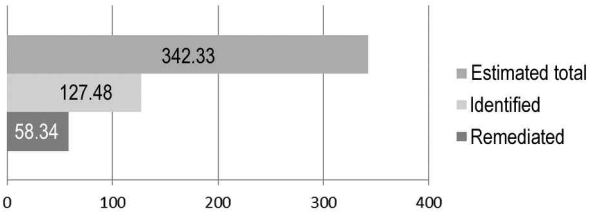

Figure 4. Contaminated sites – places found (x1000)

With regard to estimates of contaminated and potentially contaminated sites, it should be noted that only one third of the countries surveyed have such data. The number per 1,000 inhabitants is on average 41.7 potentially contaminated sites and 5.7 contaminated sites. Estimates show that there are up to two and a half million of potential environmental burdens in Europe, of which 14% are those that are dangerous, requiring implementation of remedial measures. The procedure for managing and controlling contaminated sites consists of four consecutive steps:

- ❑ Identification of contaminated sites.
- ❑ The preliminary investigation.
- ❑ The main investigation.
- ❑ Implementation of specific risk elimination measures, pollution removal.

Progress can be recorded in any of these steps that are applied in European countries, which can be tracked within the databases of potentially contaminated, contaminated and remediated sites identified. Some countries are still individually supplementing these 4 steps of soil pollution management with other specific objectives. One of the specific problems that prevent a complete inventory of contaminated sites is the fact that each country has and works with its own definition of contaminated site. This disparity makes it very difficult and prevents the comprehensive inventory of contaminated sites. In spite of its significance, soil is not fully protected by legislation in the EU. As the SOER report of 2015 states, up to 42‰ of funds spent on the management of contaminated sites comes from public funds on average. The considerable expenditure of European countries spent on the management and administration of contaminated sites is shown in Fig. 5.

The soil is predominantly contaminated by the production of different types of waste but also as a result of industrial and professional activities such as mining and oil production, the mining industry or production in power plants and the existence of landfills. The unauthorized and dangerous handling of waste and hazardous substances has a dominant position within contamination.

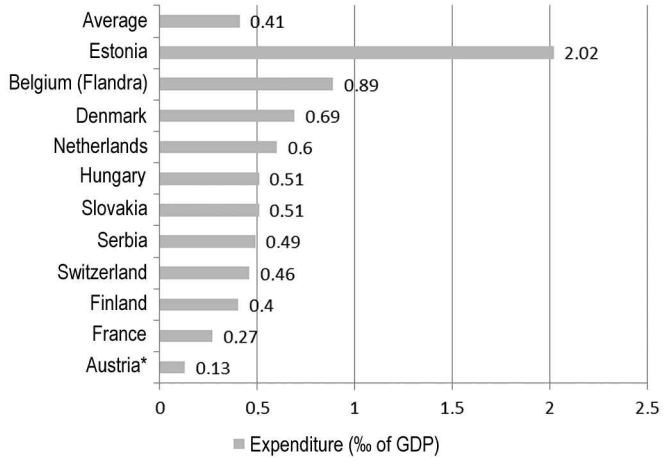

Figure 5. Annual national expenses for the management of contaminated sites in mil. EUR (expenditure ‰ GDP)

4. The state of environmental burdens in the conditions of the Slovak Republic

Environmental burdens affect the environment and its elements in a fundamental way, mainly due to inadequate or weak technical and safety measures, human factor failure or adverse climatic changes. It is also necessary to know the extent of the environmental burden of the specific sites observed in this context. The state of Europe's burden and environmental pollution is observed through the work of several bodies publishing data in "online" information systems. In the European area, for example, the activities of the European Environment Agency (EEA) can be mentioned.

Many of the identified sites showed signs of long-term and uncontrollable leakage of hazardous substances that have a negative impact on the environment. In part of the identified sites, the enterprises still showed active production, some of them have finished production and implemented remediation with subsequent monitoring of the site.

The designation "likely environmental burden" or "potential environmental burden" is used for sites where no sufficient evidence has been obtained confirming the presence of contamination. Using filters enabling the selection of the chosen categories and types, it is possible to select the current state of environmental burdens recorded as "settling ponds" in the "online" information system from the point of view of the allocated priority environmental burden. Three categories were thus created. Of the total of 40 energetics environmental burdens in the Register, 14 belong to group A, 8 of them represent group B and finally 18 energetics burdens are in group C.

Another interesting register, which is accessible and also publicly available "on-line", is the Register through the state-owned enterprise Vodohospodárska výstavba. There are 61 items registered in this register, providing clear information not only about the name of the settling ponds as a water structure pursuant to Act No. 364/2004 Coll. on water (according to Section 52 (1) (a)), but it also informs about the status, monitoring, authority and watercourse.

A summary of settling ponds selected for rehabilitated and reclaimed/decommissioned from the above-mentioned water structures register is given in Table 1.

Reclaimed	Reclaimed/cancelled
ŽIAR NAD HRONOM	ŽILINA – STARÉ – TRNOVÉ
LINTYCH	SEDEM ŽIEN
ŠPANIA DOLINA	DÚBRAVA 01,02
PEZINOK	DÚBRAVA 03
POPROČ	ŠPANIA DOLINA
BODNÁREC	

Table 1. Overview of reclaimed and cancelled settling ponds (water structures)

The most water structures identified as settling ponds are, according to this register, recorded in the Košice and Banská Bystrica Region, in the equal number of 16. The least number of such structures are located in the Bratislava Region (2) and the Prešov Region (3).

In total, there are 27 water structures in the form of settling ponds in operation and 15 settling ponds not in operation. However, more than half of the registered, up to 34 water structures – settling ponds, must be subject to regular monitoring. The most water structures (settling ponds) are assigned to the 4th category. The second category includes 18 water structures (settling ponds), including the EVO Vojany settling pond, examined as part of our results.

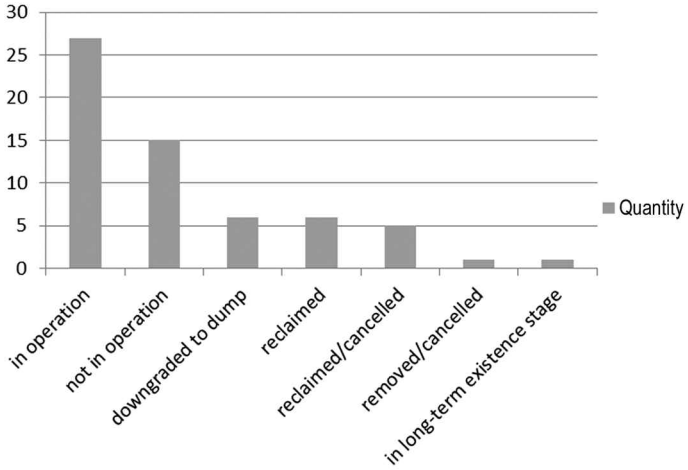

Figure 6. Overview of settling ponds registered as water structures and their current status [8]

5. Identification and assessment of environmental burden risks

Risk in accordance with STN EN ISO 31000 "Risk management" is defined as "*uncertainty in the implementation of intentions", as opposed to the original risk definition as "the likelihood or probability of loss*".

It is possible to categorize several types of risk, such as individual, social, technical, economic and environmental risks. For each type, a particular object, source, and consequence of risk can then be assigned. In Fig. 7, a model explaining the development of risk is depicted. Risk assessment in risk management depends on the assessment of the likelihood of occurrence of the phenomenon (denoted as negative) and the implications of the occurrence of such an event. However, the implementation of appropriate protective measures can have a positive effect on risk elimination. It is therefore important to emphasize not only the imminent danger but also the risk prevention measures.

Risk management has been linked with environmental management tools since 1980. However, not all environmental risks are always revealed. Some of the risks may remain hidden initially, with their existence not being demonstrated until later. Such risks may also be the cause of long-term adverse damages. Environmental risk factors (individual types) are included in Fig.8.

Pursuant to the "Methodological Guideline No. 1/2012-7 of 27.1.2012 for the elaboration of an analysis of a polluted area", environmental risk is explained as "the concentration of the pollutant in the value and duration of the occurrence of unacceptable effects from the polluted area on the environment and to the emergence of health risk".

The public interest in responding to environmental issues to protect the environment and to eliminate adverse environmental impacts, issues of the financial coverage of operators of an environmental burden and related environmental risk assessments have led to the publication in 2014 of the Methodological manual

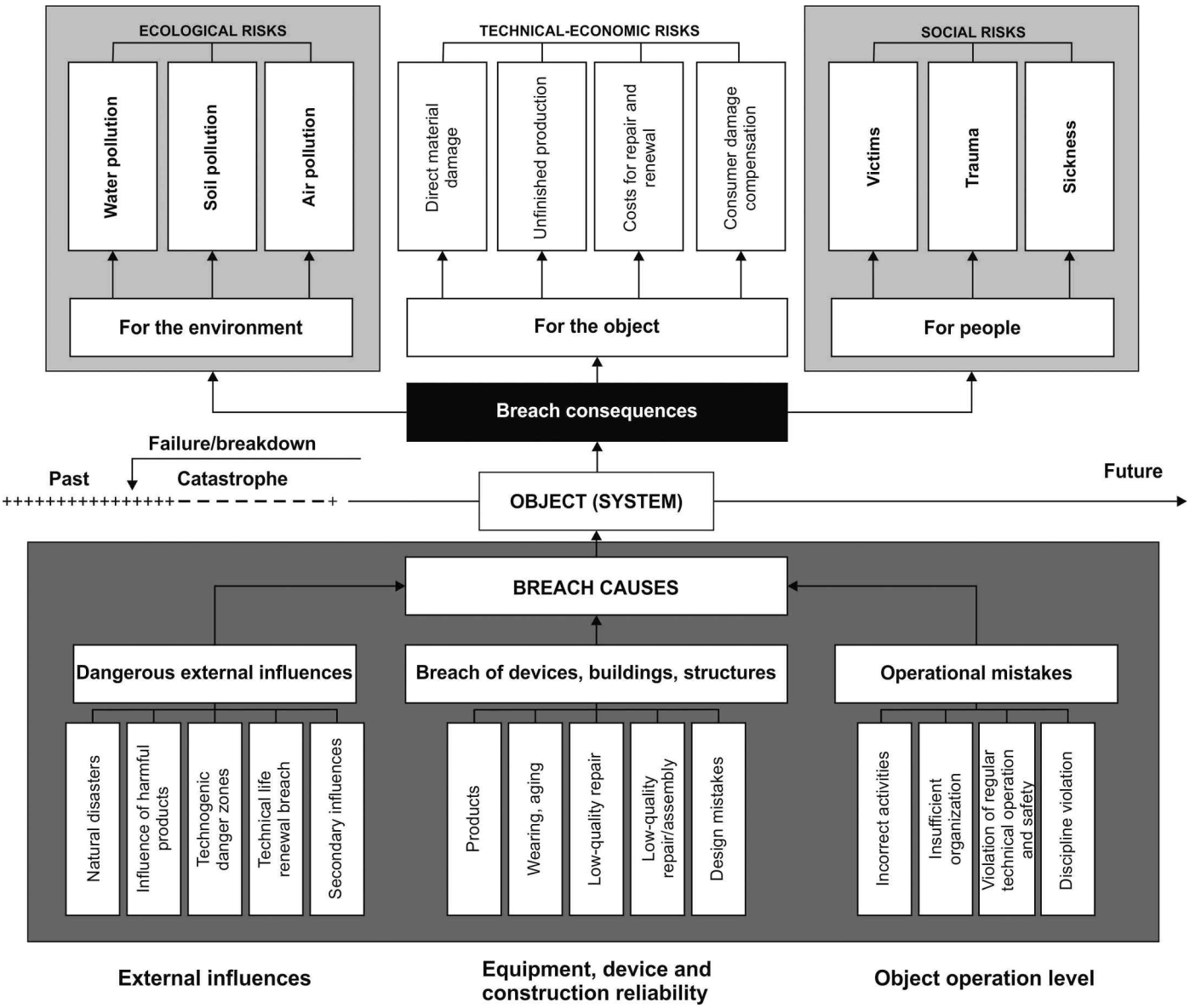

Figure 7. Risk model with objects, resources and consequences implementation

ENVIRONMENTAL RISK FACTORS			
PHYSICAL (radioactivity, noise, vibration)	CHEMICAL (harmful wastes and chemical substances)	BIOLOGICAL (environmental mutagenesis)	EMERGENCY/NATURAL DISASTERS (floods, fires, earthquakes)

Figure 8. Environmental risk factors – types

for operators of environmental burdens and state administration entitled "Risk assessment system for the assessment of environmental damage pursuant to the Act of the National Council of the Slovak Republic No. 359/2007 Coll.".

This methodological handbook is designed to accompany subjects through individual steps of environmental risk assessment but also to facilitate the identification and method of financially assessing operators' liability for a particular environmental damage. The operator of an environmental burden has to proceed in the following 8 steps in the assessment of environmental risks in the sense of the mentioned methodological handbook as shown in Fig. 9.

The first seven steps are carried out in practice in the form of a completed table in accordance with the instructions in the handbook, where the examples are given, but the last eighth step is realized by creating a specific map base for the assessed environmental burden.

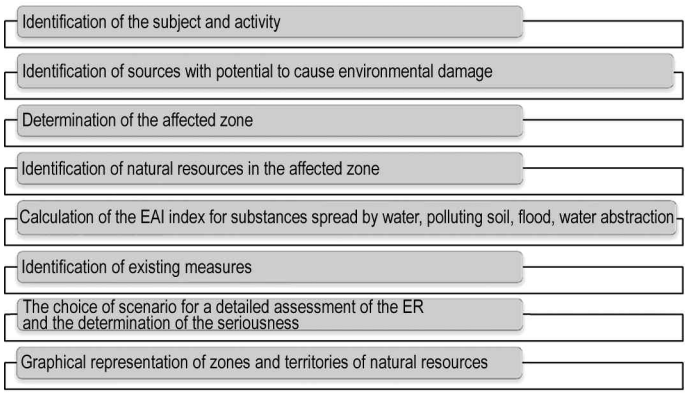

Figure 9. Eight steps of the initial risk assessment

The current differentiated approach can be considered as the problematic nature of carrying out the risk analysis in which the contaminated sites appear. Many legislative requirements for performing risk analyzes lead to the situation where the entity performing risk analysis during the preparation of inputs carries out the selection of procedures, criteria and methods, which ultimately cause the rejection of some of the risks of subsequent analysis. The aim of the remediation of the environmental burden is to eliminate pollution to the level of an "acceptable risk" in the context of the sustainability of the site. Feasibility

studies of remediation include the risk assessment of variants of remediation solutions and the economic effectiveness of remediation.

6. Conclusion

There are several types of remediation methods and procedures, as we have already mentioned in the text above. Each organization, considering the specific conditions and extent of pollution, decides on the implementation (under the given conditions) of the most appropriate solution, of course using the lowest cost. At the same time, organizations are not interested in sharing their remediation practices in a competitive environment, but it is in the interest of the state to obtain such data and have a more comprehensive overview of the remediation methods used. Creating a uniform procedure for assessing site remediation can be described as very demanding. All remediation work is linked to specific conditions. The suitability of the use of the remediation method of the polluted site are determined by the nature of the pollution, the natural conditions, the operation itself and, last but not least, the remediation limits.

For the processing of data on the economic cost of remediation, information available from specific cases of already implemented remediation can be used. However, even in this case, there are problems. Within the carrying out of remediation, there is indeed information available about the cost of remediation, but only as overall cost. The cost of the sub-items in these cases is not available. Creating a flexible model example could help to better predict the cost of remediation and to better compare costs of the remediation of environmental burdens. A sample example of a site for subsequent remediation should include at least information on the standard area along with the specification of hydrogeological ratios. Within the created sample site, it is possible to estimate the costs necessary to perform the remediation on the basis of the specified parameters, but in practice there is an overestimation or understatement of these costs, which may differ significantly from the forecasts.

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References

[1] Cowi, E. (2011). *The cost of not implementing the environmental acquis*. Final report to European Commission Directorate General Environment. [online]. 2011. 171 s. [cit. http://ec.europa.eu/environment/enveco/economics_policy/pdf/report_sept2011.pdf.

[2] Suresh, P., Rao, S. (2004). *Contaminated site remediation: performance assessment and decision making, department of civil and environmental engineering*. Beyer Distinguished Lecture Series, University of Houston, Seminars, October 29, University of Houston, TX U.S.

[3] EEA (2015). *The European environment – state and outlook 2015*. Synthesis report. European Environment Agency. Luxembourg. Publications Office of the European Union. 212 p.

[4] Majerník, M., Daneshjo, N., Stofkova Repkova, K., Sanciova G. (2016). Integrated auditing of enterprise management systems in a globalized environment. In: *16th International Scientific Conference on Globalization and its Socio-Economic Consequences*, Rajecke Teplice, Octtober 05-06, 2016 Slovakia.

[5] Majerník, M., Daneshjo, N., Sanciová, G. (2016). Theoretical and methodological principles of impact assessment of strategic documents on environment and health. In: *Advances and Trends in Engineering Sciences and Technologies II: Proceedings of the 2nd International Conference on Engineering Sciences and Technologies*, 29 June - 1 July 2016, High Tatras Mountains, Tatranske Matliare, Slovak Republic, p. 537-542, CRC Press Balkema, Netherlands, Tajlor & Francis Group.

[6] Majerník, M., Sanciova, G., Daneshjo, N, Krivosudska J. (2016). Modeling of integrated impact assessments of development strategies. In: *Advances and Trends in Engineering Sciences and Technologies II: Proceedings of the 2nd International Conference on Engineering Sciences and Technologies*, 29 June - 1 July 2016, High Tatras Mountains, Tatranské Matliare, Slovak Republic, p. 543-548, CRC Press Balkema, Netherlands, Tajlor & Francis Group.

[7] NRC (1997). *Innovations in ground water and soil cleanup: From Concept to Commercialization*. Comittee on Inovative Remediation Technologies, National Research Council, Water Science and Technology Board, Board on Radioactive Waste, Management, Commision on Geosciences, Environment and Resources. Washington DC. The National Academy Press. Washington D.C. 297 p.

[8] Schneegurt, Mark A. a kol. (2001) Biomass byproducts for the remediation of wastewaters contaminated with toxic metals. In: *Environmental Science & Technology*, 35(18): 3786-3791.

Economic and Mathematical Modeling of the Process of Production of Quality Agricultural Products

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Abstract

The article presents a method of parallel optimization of the structure of acreage for the calculation of economic and mathematical models of traditional and organically oriented systems of land use, characterized by the introduction of an additional set of environmental and qualitative criteria of restrictions: the stock of land suitable for organic production, gross output of quality organic products and the cost of their production. Based on the proposed methodology the mathematical model and proved the effectiveness of the functioning of the zonal agroecosistemi foothills of Altai. Taking into account the full involvement in the agricultural turnover of land suitable for the production of organic products, the level of profitability was 39.7% against 17.3% in the case of optimization of the structure of acreage in the traditional system of agricultural production.

Keywords: *economic and mathematical modeling; quality of agricultural products; sectoral economics; organic products; optimization of production processes; production efficiency.*

1. Introduction

The main criterion for effective land use is the output of products and the receipt of profit per unit area. At the same time, from the consumers' point of view, the energy value of agricultural products made in an area and its environmental safety are of the greatest interest. As a result, the task of environmental-economic assessment of agricultural production becomes urgent, for a comprehensive solution to which the authors propose to use an economic-mathematical model to optimize the structure of sown areas with the introduction of an additional set of organic (environmental) criteria constraints.

2. Methods

The theoretical and methodological basis of the study consisted of the works of domestic and foreign scholars on the problems of the production of organic products; land development issues; economic and mathematical modeling. The methodological basis was a systematic approach, which made it possible to ensure the comprehensiveness and purposefulness of the research. The work also used analytical, design-calculated, economic-statistical, economic-mathematical, and monographic research methods.

3. Results

In the course of the study, an attempt was made to create an optimized land-use model of the Altai Foothills zonal agroecocluster using economic and mathematical modeling based on the parallel functioning of both the traditionally established industrial system of agricultural production and the organically oriented system. The authors consider it reasonable that the transition to an organically oriented system of agricultural production should be phased, with the gradual introduction of fallow and unused land into agricultural circulation (Voronkova 2014; Baryshnikov, 2016).

Formulation of the problem. In the projected Altai Foothills agroecocluster, such a structure should be formed that would ensure maximum agricultural production from each hectare of land subject to simultaneous parallel industrial and organic land use, taking into account soil fertility, conditions of the territory, requirements of agricultural engineering, crop rotation, economic efficiency of production of certain types of crops, contractual obligations and sales plans of organic products.

According to the model building conditions, it is required, based on the available production resources, to identify the most optimal structure of sown areas, both for industrial and organic land use, which would ensure the fulfillment of plans for food sales, would cover the internal needs of the business entity with the maximum economic effect. The optimality criterion in a problem can be: the maximum of gross or marketable output in monetary terms, the maximum production of a certain type of product in physical terms, the maximum of net profit (Glukhov, 2005).

The estimated sales price of organic agricultural products is higher than that of similar products produced by traditional agricultural technology by at least 20-40%. It is also necessary to provide an additional 10-15% of the cost for changing the agricultural technology of cultivation of crops, certification, advertising, promotion of organic products.

Economic and mathematical models for optimizing the structure of sown areas are presented in the works by Russian scientists; in the mathematical formulation, they have the following form (Dik, 2005; Shikin, 2004):

Identifying the maximum function (maximum net income)

$$Z_{\max} = \sum_{j \in A} c_j x_j - k \quad (1)$$

where c_j – gross output in terms of money received from 1 ha of

crops of the j-th crop;

x_j – crop area of the j-th crop;

k – production costs for the cultivation of a variety of crops A.

1) Limited land resources:

$$\sum_{j \in A} a_{ij} x_j \le b_i (i \in M) \quad (2)$$

where a_{ij} – cost of the land resource of the i-th type;

b_i – volume of the land resource of the i-th type;

M – multitude of types of the land resource.

2) Identification of production costs:

$$\sum_{j \in D} d_{ij} x_j = K \quad (3)$$

where D – multitude of types of production costs;

d_{ij} – production costs per 1 ha of the j-th cultivated crop.

3) Fulfillment of agrotechnical requirements for the cultivation of crops and certain organizational and economic conditions:

$$\sum_{j \in A} x_j >< Q_j \quad (4)$$

where Q – crop rotation saturation limits for individual crops or groups of crops; or

$$\sum_{j \in A} a_{ij} x_j \le a_{ij}^{\Theta} x_j \quad (5)$$

where a_{ij}, a_{ij}^{Θ} – coefficients of the ratio between forecrops and individual crops.

Ensuring the needs of animal husbandry with own fodder products:

$$\sum_{j \in A} v_{ij} x_j \ge V_i \quad (6)$$

where v_{ij} – output of the i-th type of fodder from 1 ha of sown crops;

V_i – need for fodder of the i-th type.

To develop an economic-mathematical model of a zonal agroecocluster, an economic assessment of cultivated crops, applied crop rotations and agricultural technologies should be carried out and the necessary information should be prepared: the size of arable land, the list of crops cultivated in this area, information on their yield, gross output in monetary terms or net income per 1 hectare of acreage; the availability of production resources and the norms of their costs per 1 hectare of cultivated crops; agrotechnical requirements; introduction of organic and mineral fertilizers, etc (Sycheva et al., 2017).

The authors developed and applied a method for the parallel optimization of the structure of sown areas in economic and mathematical modeling to assess the economic efficiency of parallel agricultural production using organic and traditional agricultural systems, where an additional set of organic criterion constraints – the area of land suitable for organic production products, gross organic output, production costs in organic products – is introduced into the value of the objective function. The objective function takes the following form:

$$Z_{\max} = \sum_{j \in A} c_j x_j - k + \sum_{j \in A} c_{jo*} x_{jo*} - k_{jo*} \quad (7)$$

where

c_j – gross output in terms of money received from 1 ha of the j-th crop sown;

x_j – crop area of the j-th crop;

k – production costs for the cultivation of a variety of crops A.

c_{jo*} – gross output in monetary terms obtained from 1 ha of crops from a reserve of land suitable for the production of organic products of the j-th crop with an organic system of agricultural production;

x_{jo*} – the sown area of the reserve of land suitable for the production of organic products of the j-th crop in the organic system of agricultural production;

k_{jo*} – production costs for the cultivation of a variety of crops A with the organic system of agricultural production on the area of the reserve land suitable for the production of organic products.

1. Limited land resources:

$$\sum_{j \in A} a_{ij} x_j \le b_i (i \in M) \quad (8)$$

where a_{ij} – cost of the land resource of the i-th type;

b_i – volume of the land resource of the i-th type;

M – variety of types of the land resource.

2. Identification of production costs:

$$\sum_{j \in D} d_{ij} x_j = K \quad (9)$$

where D – variety of types of production costs;

d_{ij} – production costs per 1 ha of the j-th cultivated crop.

3. Fulfillment of agrotechnical requirements for the cultivation of crops and some organizational and economic conditions:

$$\sum_{j \in A} x_j >< Q_j \quad (10)$$

where Q – crop rotation saturation limits for individual crops or groups of crops; or

$$\sum_{j \in A} a_{ij} x_j \le a_{ij}^{\Theta} x_j \quad (11)$$

where a_{ij}, a_{ij}^{Θ} – coefficients of the ratio between forecrops and individual crops.

4. Ensuring the needs of animal husbandry with own fodder products:

$$\sum_{j \in A} v_{ij} x_j \ge V_i \quad (12)$$

where v_{ij} – output of the i-th type of fodder from 1 ha of sown crops;

V_i – need for fodder of the i-th type.

Designation of variables, ha:

x_1 – area planned for winter rye;
x_2 – area planned for wheat;
x_3 – area planned for barley;
x_4 – area planned for oats;
x_5 – area planned for buckwheat;
x_6 – area planned for peas;
x_7 – area planned for sowing other cereals and leguminous crops;
x_8 – area planned for soybeans;
x_9 – area planned for rapeseed;
x_{10} – area planned for sunflower;
x_{11} – area planned for potato;
x_{12} – area planned for vegetables;
x_{13} – area planned for annual grasses for hay;
x_{14} – area planned for annual grasses for green fodder;
x_{15} – area planned for perennial grasses for hay;
x_{16} – area planned for perennial grasses for green fodder;
x_{17} – area planned for corn for silage and green fodder;
x_{18} – area planned for silage crops;
x_{19} – area planned for disuse (fallow);
x_{20} – total area of arable land;
x_{21} – hay area;
x_{22} – grassland area;
x_{23} – fallow land area;
x_{24} – area under perennial plantings;
x_{25} – total agricultural land;
x_{26} – total value of commercial agricultural products, thousand rubles;
x_{27} – amount of cost of agricultural production, thousand rubles;
x_{28} – reserve of lands suitable for the production of organic products, ha;
x_{29} – area of winter rye (from a reserve of land suitable for organic products);

x_{30} – area of wheat (from a reserve of land suitable for organic products);
x_{31} – area of barley (from a reserve of land suitable for organic products);
x_{32} – area of oats (from a reserve of land suitable for organic products);
x_{33} – area of buckwheat (from a reserve of land suitable for organic products);
x_{34} – area of peas (from a reserve of land suitable for organic products);
x_{35} – area of cereals and leguminous crops (from a reserve of land suitable for organic products);
x_{36} – area of sunflower (from a reserve of land suitable for organic products);
x_{37} – area of potato (from a reserve of land suitable for organic products);
x_{38} – area of vegetables (from a reserve of land suitable for organic products);
x_{39} – total value of commercial products (produced on the area from a reserve of land suitable for organic products), thousand rubles;
x_{40} – amount of production costs (on the area of a reserve land suitable for the production of organic products), thousand rubles.

$x_1, x_2 ... x_{40} \geq 0$

It seems expedient to compile three variants of economic and mathematical models for the agroecocluster "Foothills of Altai". The first option provides for the optimization of the existing structure of arable lands of agricultural producers of the foothill zone, while fully maintaining the traditional farming system. The second option is to introduce into the structure of sown areas suitable for the production of organic products (from the area of fallow land and unused arable land), or **arable land suitable for organic products (ALSOP)**, in the amount of 50,000 hectares. The third option is the involvement in agricultural circulation of all not used cropland and fallow land of the Foothill Altai Region zone (ALSOP) in an amount of 181,333 hectares. The second and third variants provide for obtaining organic products from the area of **organically applicable fallow land (OAFL)**, as well as the application of organic fertilizers in ALSOP.

The total area of the foothill zone is 1,899 thousand hectares of land, including 1,722 thousand hectares of agricultural land, 728 thousand hectares – arable land, 266 thousand hectares – natural hayfields, 680 thousand hectares – pastures. In accordance with the agrotechnical requirements of crop rotation, the following minimum and maximum possible limits for the cultivation of individual crops or groups of crops are defined in percent of the total arable land.

As a result of solving the economic and mathematical problem in EXCEL software, the first option optimized the existing structure of the acreage. The optimized area of agricultural land amounted to 1,722.5 thousand hectares, arable land – 728 thousand hectares, hayfields – 265.9 thousand hectares, pastureland – 680 thousand hectares, fallow land – 46.3 hectares, perennial plantations – 2.2 thousand hectares.

Parameters	Existing area, ha	% to total	Optimal solution	% to total	Deviations (+;-) ha
Grain crops total	393,424	54.0	393,990	54.1	566
Industrial crops	45,640	6.3	45,671	6.3	31
Potato	7,212	1.0	7,214	1.0	2
Vegetables	1,261	0.2	1,261	0.2	0
Feed crops	121,468	16.7	111,752	15.4	-9,716
Disused (out of crop)	23,974	3.3	33,093	4.5	9,119
Unused land	135,000	18.5	135,000	18.5	0
Arable land	727,979	100	727,979	100	0

Table 1. Optimized structure of sown areas in the farms of the foothill zone according to the first option (traditional farming system)

By the optimal solution, the arable land area is fully used and amounts to 728 thousand hectares. Grain crops account for the largest share in the optimal structure of arable land and make up 54.1% (394 thousand hectares), which is higher than the actual value by 566 hectares. By the optimal solution, the area of spring wheat increased by 2,172 hectares, barley – by 141 hectares, buckwheat – by 710 hectares. The area of sunflower increased by 96 hectares; in general, the area under industrial crops increased by 31 hectares. The area of feed crops decreased by 9.7 thousand hectares, while at the same time the area disused (out of crops) according to the optimal solution was 4.5% (33.1 thousand hectares), having increased by 9.1 thousand hectares. The optimized structure of the acreage to a greater extent than the existing one meets the requirements of crop rotation for this zone.

The second variant of the economic-mathematical model for optimizing the structure of sown areas provides for the introduction into agricultural use of 50 thousand hectares of ALSOP for the production of ecological food in this area. To this end, the authors will introduce an additional criterial set of environmental variables and restrictions, including the introduction of organic fertilizers, additional material and labor costs for maintaining an organic farming system, as well as yields, costs and prices for organic food that are different from the traditional farming system.

Parameters	Area, ha	% to total	Optimal solution	% to total	Deviations (+;-) ha
Grain crops total	393,424	54.0	402,121	51.7	8,697
Industrial crops	45,640	6.3	47,925	6.2	2,285
Potato	7,212	1.0	7,764	1.0	552
Vegetables	1,261	0.2	1,463	0.2	202
Feed crops	121,468	16.7	125,135	16.1	3,667
Disused (out of crop)	23,974	3.3	62,238	8.0	38,264
Unused land	135,000	18.5	131,333	16.9	-3,667
Arable land	727,979	100	777,979	100	50,000

Table 2. Optimized structure of sown areas in the farms of the foothill zone according to the second option (parallel farming using traditional and organically oriented systems)

In this version of the economic-mathematical model, there is no unused arable land left. Grain crops account for the largest share in the optimal structure of arable land and make up 51.7% (402.1 thousand hectares), which is higher than the actual value by 8.7 thousand hectares. The optimal structure of the acreage under this option almost fully meets the requirements of crop rotation for this zone.

The third variant of the economic-mathematical model for optimizing the structure of the sown areas of agricultural producers in the foothill zone provides for the involvement of the entire area of fallow land and unused arable land (ALSOP) for the purposes of maintaining organically oriented land use. As well as in the second optimization model, in parallel, the authors introduce an additional set of variables and restrictions on the making of

ecological products.

Parameters	Area, ha	% to total	Optimal solution	% to total	Deviations (+;-) ha
Grain crops total	393,424	54.0	464,587	60.0	71,163
Industrial crops	45,640	6.3	61,945	8.0	16,305
Potato	7,212	1.0	9,834	1.3	2,622
Vegetables	1,261	0.2	1,781	0.2	520
Feed crops	121,468	16.7	158,734	20.5	37,266
Disused (out of crop)	23,974	3.3	77,431	10.0	53,457
Unused land	135,000	18.5	0	0	-135,000
Arable land	727,979	100	774,312	100	46,333

Table 3. Optimization of the structure of sown areas in the farms of the foothill zone according to the third option (parallel farming according to traditional and organically oriented systems)

The optimal structure of the crop acreage according to the third option fully complies with the crop rotation requirements for this zone. For systematic transition of part of agricultural enterprises to the principles of organically oriented land use and the production of high-quality and environmentally friendly domestic food, successful experience in the operation of environmentally oriented companies is required, as well as innovative developments in the field of agriculture, which can be implemented at the regional level through a system of zonal agroecoclusters.

Parameters	Introduction of 50,000 ha of ALSOP (second option)		Introduction of 181,333 ha of OAFL (third option)	
	ha	%	ha	%
Grain crops	8,697	17.4	71,163	39.2
Industrial crops	2,285	4.6	16,305	9.0
Potato and vegetables	754	1.5	3,142	1.7
Feed crops	0	0	37,266	20.6
Disused (out of crop)	38,264	76.5	53,457	29.5
Total	50,000	100	181,333	100

Table 4. The distribution of the introduced ALSOP by crop groups

According to the second option, the largest share in the structure of the organically applicable fallow land involved in agricultural production will be disused area, as it is a good background for cereals, industrial crops, potatoes and vegetables. In the current land use structure of this zone, the disused area does not meet the requirements of crop rotations.

Parameters	Actual	Option 1	Option 2	Option 3
Revenue, thousand rubles	1,413.8	1,549.7	1,728.6	2,914.5
Costs, thousand rubles	1,230.0	1,314.7	1,406.7	2,086.4
Profit, thousand rubles	183.8	227.3	321.9	828.1
Profitability, thousand rubles	14.9	17.3	22.9	39.7

Table 5. Financial results obtained as a result of optimization of the structure of sown areas

4. Discussion

The calculation of three variants of economic and mathematical models showed the economic efficiency of a gradual transition to organically oriented land use. When calculating economic and mathematical models of land use optimization, the authors have developed and applied a method for the parallel optimization of the structure of sown areas under the traditional land use system and the farming system which takes greening into account. The calculation of the proposed options for optimizing the structure of the acreage, including partial and full involvement of an organically applicable fallow land in agricultural circulation, suggests the viability of the proposed project of the Altai Foothills agroecocluster.

The formation of an organically oriented farming system does not mean a rejection of industrial agricultural production. In the authors' opinion, both organic and industrial farming systems can function effectively in parallel with each other, gradually transforming into such an agrarian technology that can meet the current and expected public needs for high-quality and environmentally safe food (Akmarov, 2012; Miloserdov, 2012; Avarsky et al., 2014).

5. Conclusion

For a systematic transition of part of agricultural enterprises to the principles and production of high-quality and environmentally friendly domestic food, successful experience in the operation of environmentally-oriented companies is required, as well as innovative developments in the agro-industrial sector, which can be implemented at the regional level through a system of zonal agroecoclusters. The implementation of the proposed recommendations is possible if there is an effective organizational and economic mechanism of governmental support and stimulation of ecologically oriented agricultural entrepreneurship, which, in turn, should be considered as an important component of the global organic market structure, which is currently in a dynamic development stage.

References

[1] Sycheva, I.N., Ovchinnikov, Y.L., Permyakova, E.S., Voronkova, O.Yu. (2017). Organic Production at Long-fallow Lands as a Strategic Resource of the Food Import Substitution Policy. *Revista Espacios*, 38(33), 40.

[2] Akmarov P.B. (2012). Ecological and economic aspects of increasing the energy productivity of agricultural land in models of optimal farming. *Vestn. Perm. nat. researches Polytechnic un. Social.-Econ. science*, 15, 66-73 (in Russian).

[3] Baryshnikov G.Ya., Voronkova O.Yu., Baryshnikova O.N, Elchishchev E.A. (2016). *Regionalization of the territory of the Altai Territory for the production of environmentally friendly agricultural products*. Barnaul: Azbuka (in Russian).

[4] Voronkova O. Yu. (2014). Unused arable land is an important resource for the production of organic food. *AIC: economics, management*, 10, 51-59 (in Russian).

[5] Glukhov, V. V. (2005). *Mathematical methods and models for management*. Saint-Petersburg: Lan (in Russian).
[6] Dik, V. V. (2005). *Methodology of forming solutions in economic systems and instrumental environments of their support*. Moscow: Finance and Statistics (in Russian).
[7] Miloserdov V.V. (2012). World Food Crisis and Russia's Place in It. *Russia's Agri-Food Policy*, 1, 13-17 (in Russian).
[8] Avarsky N. D., Taran V. V., Sokolova J. E., Stefanovsky V. G. (2014). The market of organic products in Russia: the current state and development potential. *Economics of Agriculture of Russia*, 5, 29-37 (in Russian).
[9] Shikin, E.V. (2004). *Mathematical methods and models in management*. Moscow: Business (in Russian).

Are there Regional Differences in the Quality Perception of Fresh Citruses? A Preliminary Study on Italian Consumers

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Abstract

Citrus fruits are among the most important crops for Italy both in terms of production and the area invested but their consumption appears to be slightly down and an in-depth study of their potential in the market becomes necessary in view of a relaunch in commercial terms.
The aim of this survey was to investigate the main aspects of consumption, through the analysis of the dynamics related to the process of buying fresh citrus fruits, looking at a sample of consumers from northern Italy and a sample of consumers from southern Italy.
In order to comply with the lines of research, the surveys were conducted in two different areas: the first located in northern Italy, particularly in the metropolitan areas of Milan (MI) and Turin (TO), and the second in the Calabria region, in the five different provinces. A total of 846 face-to-face surveys were carried out: 346 units in northern Italy and 500 in southern Italy.
Citrus fruits confirm their 'health function' as they are strongly associated with nutritional and health benefits. Oranges and clementines have almost similar levels of appreciation in both areas, even for mandarins there are no particular differences, although perhaps in northern Italy there is a slightly higher appreciation. Among other citrus fruits only lemons show a certain degree of appreciation, while minor citrus fruits such as grapefruits, citrons, bergamots, and limes do not seem to significantly attract the sample considered in any of the areas examined.

Keywords: *citrus fruits; fresh; consumption; quality perception; health function.*

1. Introduction

Citrus fruits are among the most important crops for Italy both in terms of production and the area invested, constituting 9% of the gross marketable production and about 12% of the area invested compared to the total of the national fruit and vegetable sector (Ismea, 2017; Nicolò et al., 2017).

In Italy, the consumption of citrus fruits appears to be fairly consolidated and homogeneous, both in the southern regions, where citrus fruits are grown and produced, and in the areas of central and northern Italy where citrus fruits, although not cultivated, are highly appreciated by consumers (Scuderi and Pecorino, 2015). Despite their economic importance, in terms of sales and employees in the sector, the consumption of citrus fruits appears to be slightly down and an in-depth study of their potential in the market becomes necessary in view of a relaunch in commercial terms (Iofrida et al., 2018).

Analysing the reference literature reveals that recent studies on citrus consumption have been focussed only on certain types of citrus fruits. In 2004, a study was conducted on the product characteristics and attributes that could influence consumer choice for satsumas and mandarins (Campbell et al., 2004; Campbell et al., 2006). In addition, consumer preferences for fresh citrus were investigated by Gao et al. (2011) the authors found that freshness, flavour, and appearance were the most relevant attributes for fresh citrus consumers.

Although citrus fruits are among the most consumed fruit in the world, both fresh and as processed products (juices, extracts, etc.) and numerous studies have highlighted their importance in terms of the environment and landscape (Di Vita et al., 2015; 2018), limited scientific contributions appear on the consumption of these products.

The aim of this survey was to investigate the main aspects of consumption, through the analysis of the dynamics related to the process of buying fresh citrus fruits, looking at a sample of consumers from northern Italy and a sample of consumers from southern Italy.

Previous studies have in fact shown how consumption follows different dynamics, i.e. preferences segment differently in relation to the different regional identity of consumers (Panzone et al., 2016). Therefore, starting from consumption habits and places of purchase, preference levels for the following citrus fruits were analysed: oranges, clementines, mandarins, lemons, grapefruits, citrons, bergamots, and limes,

as well as the health-nutritional moments and motivations related to citrus consumption. The analysis was carried out in two different Italian regional contexts, the southern and the northern, in order to outline more precisely the characteristics and consumption patterns of citrus fruits and any differences in terms of consumer perception of quality.

2. Data collection and Method

This survey on the consumption of fresh citrus fruit in Italy was carried out between October and December 2016. In order to comply with the lines of research, the surveys were conducted in two different areas: the first located in northern Italy, particularly in the metropolitan areas of Milan (MI) and Turin (TO), and the second in the Calabria region, in the five different provinces.

With regard to the northern areas of Italy, the questionnaires administered totalled 346 units (180 in Milan, 166 in Turin), while the surveys in Calabria were carried out on a sample of 500 individuals. Both were carried out through the use of the same questionnaire card completed on the spot and administered by favouring the face-to-face method.

The questionnaire card made it possible to acquire various pieces of information on the socio-economic and cultural aspects of the subjects interviewed, on their behaviour in the purchasing phases in relation to the characteristics of the commercial distribution, on their perception of the quality and price of these products, as well as on opinions linked to consumption. The questionnaires were administered in some hypermarkets of the large-scale retail trade in areas representative of the consumption of agricultural and food products in the cities of Turin and Milan and in the five provincial capitals of the Calabria region.

The questions contained in the questionnaire aimed to obtain qualitative and quantitative information on the various aspects that the survey aimed to explore. The questions asked were either closed (or bound) or multiple-choice, offering the respondent a series of options from which they were asked to choose the one closest to their opinion or behaviour. Moreover, almost all questions were articulated through specific Likert scales.

The questionnaire was divided into five parts and information on the different types of citrus fruits most consumed was gathered. The questionnaire on the consumption of fresh citrus fruit was divided into four sections. The first part of the questionnaire was aimed at measuring the frequency of purchase and consumption of the following citrus fruits: oranges, clementines, mandarins, lemons, grapefruits, citrons, bergamots and limes. The second part required consumers to express their perceptions of any health aspects related to citrus fruit consumption in general. The third section of the questionnaire was aimed at detecting the significance and the level of importance assigned to the intrinsic and extrinsic attributes of oranges and clementines. The last part of the questionnaire concerned the socio-economic characteristics and some physical characteristics of the consumers interviewed.

The data were aggregated into two different blocks, the first containing the information from the north and the second containing the information from the south of Italy. A variety of statistical analyses were undertaken, carried out through the calculation of mean, mode, and medians. The characteristics of the sample in the two areas examined are shown below (Table 1).

Subsequently, a qualitative analysis was carried out by developing perceptual maps as in a previous study (Di Vita et al., 2017). Perceptual maps are a marketing technique that allow for the visualisation of consumer preferences or perceptions (Garber et al., 2003). In this paper, maps allowed us to visualise the characteristics of the citrus fruits considered the most important by respondents. The perceptual maps we developed had two dimensions and they were used to identify any attributes linked to citrus fruits such as sensory and nutritional parameters and ease of use.

Calabria

Category	*Variable*	*Number*	*Percentage*
Gender	*Women*	*254*	*50.8*
	Men	*246*	*49.2*
Age	*18-30*	*137*	*39.6*
	31-45	*142*	*41.0*
	46-60	*155*	*44.8*
	> 60	*66*	*19.1*
Education	*Primary – middle school*	*101*	*20.2*
	High school	*234*	*46.8*
	University	*130*	*26.0*
	Post graduate	*35*	*7.0*
Average monthly income euro	*< 1000*	*60*	*17.3*
	1,000-2,000	*188*	*54.3*
	2,000-4,000	*111*	*32.1*
	>4,000	*45*	*13.0*
	Did not answer	*96*	*27.7*
Total		*500*	*100*

Torino-Milano

Category	*Variable*	*Number*	*Percentage*
Gender	*Women*	205	59.2
	Men	141	40.8
Age	18-30	73	21.1
	31-45	104	30.1
	46-60	134	38.7
	> 60	35	10.1
Education	*Primary – middle school*	41	11.8
	High school	111	32.0
	University	164	47.3
	Post graduate	31	8.9
Average monthly income	< 1.000	24	6.9
	1,000-2,000	128	37.0
	2,000-4,000	84	24.3
	> 4,000	20	5.8
	Did not answer	90	26.0
Total		346	100

Table 1. Socio-economic characteristics of the sample

1. Results

Below are the main results obtained from an initial processing carried out through simple descriptive statistical analysis (mean, mode, median). In order to outline more precisely the characteristics and consumption patterns of citrus fruits, the analyses were conducted in parallel in the two geographical areas of investigation.

The first block of questions focused on the dynamics related to the process of buying fresh citrus fruits. With regard to the frequency of purchase, there is a first, albeit slight difference between the areas examined, in fact, in the south the purchase of citrus fruits occurs more frequently, usually twice a week, while in northern Italy the purchase is generally made on a weekly basis (Table 2).

Table 2. Frequency of purchases

	CALABRIA	TO-MI
	%	%
Once a month	15.0	6.1
Once a week	36.0	52.6
Several times a week	38.4	38.2
Daily	10.6	3.2

With regard to the places of acquisition, the survey reveals some similarities between the two samples. In both areas the

habit of buying mainly from traditional retailers still remains. At the same time, however, there are significant differences with regard to purchases made at large-scale retail outlets.

Citrus fruit purchases at the hypermarket and supermarket are more frequent in northern Italy, while in Calabria citrus fruit purchases at discount stores are more prevalent.

Finally, as was to be expected, purchases from producers and purchasing groups are more important in the south, although purchases from producers also represent a trend with a certain degree of diffusion in the north.

Table 3.
Place of purchase

	Supermarket	Fruit and vegetables shop	Discount	Producer	Purchase groups	Hypermarket
	%	%	%	%	%	%
CALABRIA	21.8	24.2	14.3	16.1	9.1	14.5
TO-MI	30.8	23.9	7.9	12.9	3.3	21.1

It is interesting to analyse the degree of preference that individual consumers give to different types of citrus fruit. In this sense, the levels of appreciation for oranges and clementines appear almost similar in both areas; even for mandarins there are no particular differences, although perhaps in the area of northern Italy there is a slightly higher appreciation.

As far as the other types of production are concerned, only lemons show a certain degree of appreciation, while grapefruit, citrons, bergamots, and limes do not seem to significantly attract the sample considered. The latter result is almost certainly due to the lower availability and variety of production as well as the lower consumption of these citrus fruits.

Table 4.
Preference levels for individual citrus fruit

	Oranges	Clementines	Mandarins	Lemons	Grapefruits	Citrons	Bergamots	Limes
CALABRIA								
Mean	**4.6**	**4.7**	**4.6**	3.8	2.9	2.8	2.9	2.6
Median	5	5	5	4	2	2	2	2
Mode	6	7	6	4	1	1	1	1
TO-MI								
Mean	**5.6**	**5.7**	**5.0**	4.6	2.8	1.9	1.7	2.1
Median	6	6	5	5	2	1	1	1
Mode	7	7	7	5	1	1	1	1

On the basis of the surveys carried out, the moment of greatest consumption of citrus fruit is mainly concentrated during meals, in particular the sample analysed has peaks of consumption during lunch and dinner.

As far as the times of the day are concerned, these do not appear to be as significant. Therefore, citrus fruits seem to follow a fairly widespread custom among Italians, which sees the consumption of fruit concentrated mainly during meals while they are poorly consumed as a snack, or aperitif.

Table 5.
Consumption times during the day

	Breakfast	Mid-morning snack	Lunch	Afternoon break	Aperitif	Dinner
CALABRIA						
Mean	3.2	3.5	**4.4**	**3.8**	2.8	**3.9**
Median	3	3	5	4	2	4
Mode	1	1	6	1	1	1
TO-MI						
Mean	3.1	3.5	4.3	3.9	2.2	4.5
Median	2	3	5	4	1	5
Mode	1	1	7	1	1	7

Citrus fruits fully confirm their "healthy identity" when consumers express the reasons that lead them to consume these products. The reasons given by the interviewees are strongly linked to the nutritional and health aspects in general. This perception is slightly higher in the northern sample. Taste is also considered a highly significant factor in both areas.

On the other hand, citrus fruits are perceived as capable of providing only low energy and as such are perceived as poor dietetically. Finally, economic factors also appear to be irrelevant, given that the price does not seem to significantly influence the consumption of these products.

Table 6.
Consumption motivations

	Nutritional	Health	Energy	Taste	Money saving	Dietary
CALABRIA						
Mean	4.7	**5.0**	4.3	**4.8**	4.0	3.7
Median	5	5	4	5	4	4
Mode	7	7	5	7	2	1
TO-MI						
Mean	**5.4**	**5.7**	4.0	**5.6**	3.0	3.0
Median	6	6	4	6	3	2
Mode	7	7	4	7	1	1

Since recent literature highlighted the antioxidant properties of citrus fruit, arguing that their high intake seems to be responsible for degenerative diseases risk reduction (Silalahi, 2002), and given the importance of the perception of health the consumers have towards specific agro-food products (Di Vita et al., 2016), the second part of the survey sought to deepen the level of knowledge and perception that consumers have about the possible health properties of citrus fruits. Consumers were asked to indicate which components, contained in citrus fruits, they considered important from a health and nutritional point of view.

The overall perception of citrus as a health product is higher among consumers in northern Italy (98%) but is also strongly significant in the Calabrian sample (85.6%). This outcome is in line with a recent paper on raspberry and blueberry consumption, where the health-related aspects are considered an important issue in quality assessing of fresh fruit product (Girgenti et al., 2016; Blanc et al., 2018).

The survey then analysed the relevance attributed by the interviewees to the main health and nutritional components of citrus fruits.

As a first result, the prominent role of citrus fruit as a "vitamin source" emerges in both areas, although this perception is slightly greater in northern Italy. The presence of mineral salts and, especially in the north, the presence of beta-carotene, are also quite important components.

From the first results, therefore, a fair level of knowledge of the first three components emerges, while the presence of folic acid and flavonoids are poorly perceived, probably due to the lack of knowledge on the part of consumers, and therefore appear to be of little relevance.

Table 7.
Relevance of health and nutritional components

	Mineral salts	Vitamins	Fibre	Beta-carotene	Flavonoids	Folic acid
CALABRIA						
Mean	4.3	**5.1**	4.0	**4.4**	4.0	4.0
Median	5	6	4	5	4	4
Mode	6	7	4	5	4	5
TO-MI						
Mean	**4.8**	**6.2**	4.3	**4.4**	3.2	3.2
Median	5	7	4	5	3	3
Mode	6	7	4	6	1	1

Subsequently, the analysis was aimed at assessing whether there is consumer interest in citrus fruits richer in antioxidants and vitamins. In both areas a high interest was observed, equal to 66.8% in Calabria and 68.7% in northern Italy.

The consumers were asked to express their willingness to pay a price differential for citrus fruits with a higher content of antioxidants. Based on the average prices for oranges (1.1 euro in the south and 1.8 euro in the north) and mandarins (1.2 euro in the south and 1.9 euro in the north), Table 8 shows the main results on the willingness to pay for oranges richer in antioxidants expressed by respondents.

In both areas, about a third of respondents do not appear willing to pay a price differential for citrus fruits richer in antioxidants. Nevertheless, there is a high acceptance for price differentials increased by 10%, again about one third of respondents for both areas examined. To a lesser extent, even the price range increased by 10-20% shows a certain acceptance; however, the acceptance of increased price decreases significantly after that, about 20% in Calabria and 15% in northern Italy.

	Null	Up to 10%	10-20%	20-30%	Up to 50%
CALABRIA	32.5	30.7	22.2	9.4	5.2
TO-MI	37.9	36.4	15.6	7.2	2.9

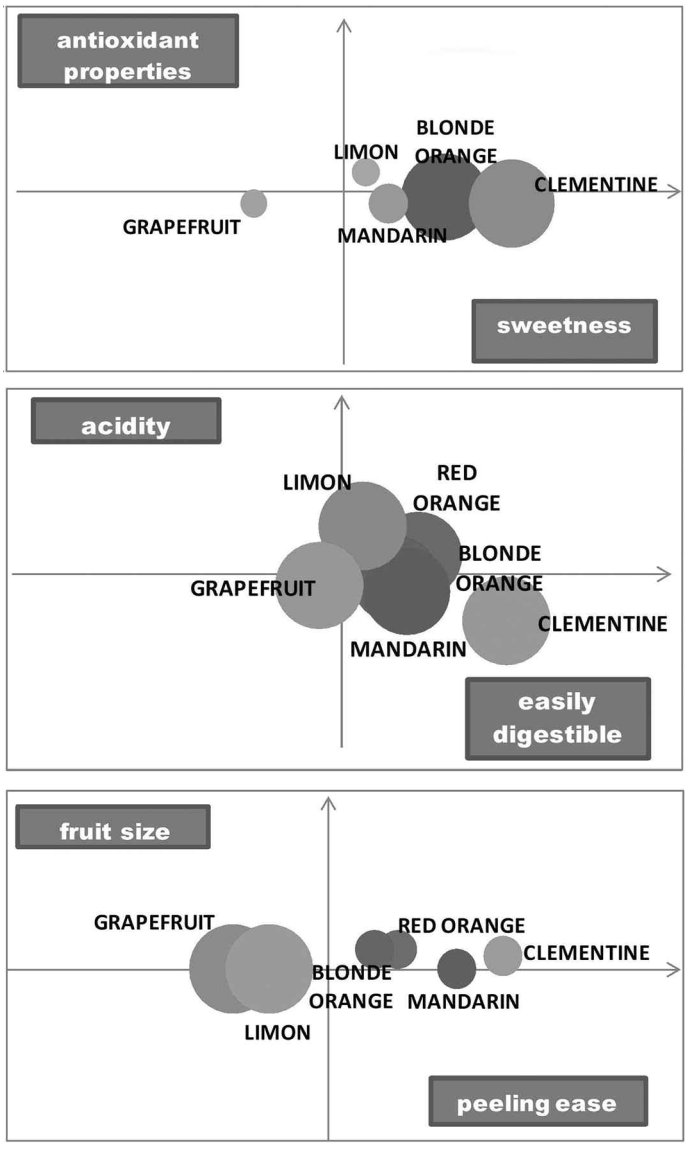
Table 8. Willingness to pay for a citrus richer in oxidising substances (%)

In the final part, perceptual maps were made on the basis of certain sensory, nutritional, and user-friendliness parameters in order to compare the different levels of perception that the consumer sample has about the quality of the main citrus fruits examined. Figures 1, 2, and 3 show the results obtained from the analysis of the consumers interviewed in Calabria.

The first graph shows the relationship between antioxidant properties and sweetness perceived by consumers. The ability of citrus fruits to have an antioxidant power is recognised by consumers across all citrus fruits, with the exception of grapefruit, in which is considered the least important. On the other hand, mandarins and clementines are considered among the sweetest citrus fruits.

The second graph relates the acid content and digestibility of citrus fruits. As far as the acid content is concerned, the sample interviewed consider the lemon and, to a slightly lesser extent, the red orange as the most acidic citrus fruit. Clementine is considered the most digestible citrus fruit, while the consumer perceives the digestibility of red orange and mandarin as high.

Finally, Figure 3 shows the interrelationship between 'ease of peeling' and the size of the fruit. With regard to the parameter 'ease of peeling', the following citrus fruits are considered the most suitable: clementines, mandarins and red oranges. While there are no significant differences in fruit size, the most appreciated size is medium-large.

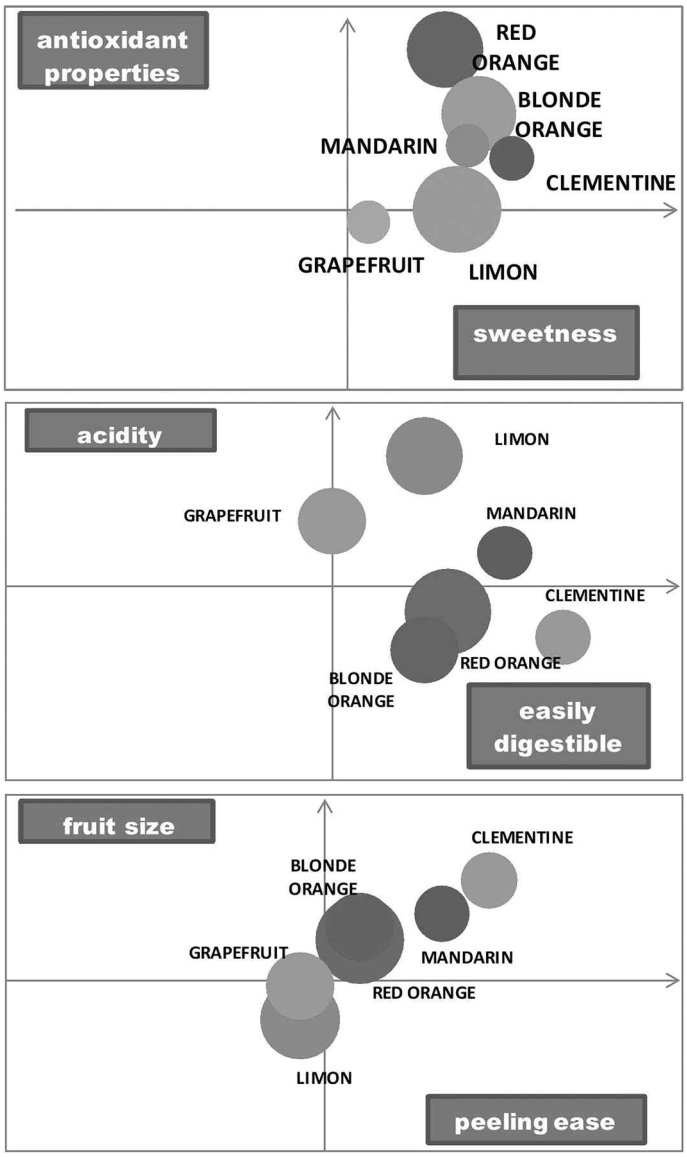


Figures 1, 2, and 3. Perceptual maps of Southern consumers

Perceptual maps were also created for the data collected in northern Italy, as shown in Figures 4, 5, and 6. In this area the results differ for some types of citrus fruit. There is, in fact, a different perception in the case of the antioxidant properties of citrus fruits; the red orange, first of all, and the blond orange are considered as the citrus fruits richer in oxidizing substances, while sweetness is considered an attribute more present in clementines and to a lesser extent in the same blond oranges.

As far as the acid content is concerned, the interviewees place lemon in first place, as one might expect, followed in descending order by grapefruit and mandarin. While clementines and mandarins are considered by the sample as the most easily digestible citrus fruits.

The ease of peeling is considered higher for clementines and mandarins, unlike in the southern area, and the size of the fruit (size) is among the quality parameters of importance, it is particularly important for clementines and mandarins.



Figures 4, 5, and 6. Perceptual maps of Northern consumers

4. Conclusions

The general objective of this study on the consumption of fresh citrus fruit was to investigate the interest shown by consumers in these products and to identify ideas and indications for the strengthening and development of the Calabrian citrus fruit sector in the national market.

The results largely confirm the findings of the current economic literature on citrus fruit consumption, although further and more in-depth analyses are deemed necessary in order to better define the degrees of correlation between the different variables examined.

Citrus fruits confirm their 'health function' as they are strongly associated with nutritional and health benefits; consumers perceive as positive the high presence of vitamins, minerals and, especially in the north, the presence of beta-carotene. In both areas, about a third of the respondents are willing to pay a price differential increased by 10%, to have citrus fruits richer in antioxidants.

Going back to the analysis of individual citrus fruits, it was found that oranges and clementines have almost similar levels of appreciation in both areas, even for mandarins there are no particular differences, although perhaps in northern Italy there is a slightly higher appreciation. Moreover, with regard to the production of Calabrian citrus fruits, clementines and blond oranges are quite well known and appreciated by consumers in northern Italy.

As far as other types of production are concerned, only lemons show a certain degree of appreciation, while minor citrus fruits such as grapefruits, citrons, bergamots, and limes do not seem to significantly attract the sample considered in any of the areas examined.

References

[1] Blanc, S., Accastello, C., Girgenti, V., Brun, F., & Mosso, A. (2018). Innovative Strategies for the Raspberry Supply Chain: An Environmental and Economic Assessment. *Quality-Access to Success*, 19(165), 139-142.

[2] Campbell, B. L., Nelson, R. G., Ebel, R. C., Dozier, W. A., Adrian, J. L., & Hockema, B. R. (2004). Fruit quality characteristics that affect consumer preferences for Satsuma mandarins. *HortScience*, 39(7), 1664-1669.

[3] Campbell, B. L., Nelson, R. G., Ebel, R. C., & Dozier, W. A. (2006). Mandarin attributes preferred by consumers in grocery stores. *HortScience*, 41(3), 664-670.

[4] Di Vita, G., Falcone, G., D'Amico, M., De Luca, A.I., Stillitano, T., Strano, A., Gulisano, G. (2018). Can sustainability match quality citrus fruit growing production? An energy and economic balance of agricultural management models for PGI Clementine of Calabria, *Agronomy Research*, 16(5), 1986-2004.

[5] Di Vita, G., Allegra, V. Zarbà, A. S. (2015). Building scenarios: a qualitative approach to forecasting market developments for ornamental plants, *International Journal of Business and Globalisation*. Vol. 15, No. 2, 130-151.

[6] Di Vita, G., De Salvo, G., Bracco, S., Gulisano, G. and D'Amico, M. (2016). Future market of pizza: which attributes do they matter", *AGRIS on-line Papers in Economics and Informatics*, Vol. 8, No. 4, pp. 59-71.

[7] Di Vita, G., Bracco, S., D'Amico, M. (2017). Mapping the Italian cured meats' attributes: a qualitative approach. *Quality-Access to Success*, 18(S2), 181-188.

[8] Gao, Z., House, L. O., Gmitter Jr, F. G., Valim, M. F., Plotto, A., & Baldwin, E. A. (2011). Consumer preferences for fresh citrus: impacts of demographic and behavioral characteristics. *International Food and Agribusiness Management Review*, 14(1), 23-40.

[9] Garber, L. L., Hyatt, E. M., & Starr, R. G. (2003). Measuring consumer response to food products. *Food Quality and Preference*, 14(1), 3-15.

[10] Girgenti, V., Massaglia, S., Mosso, A., Peano, C., & Brun, F. (2016). Exploring perceptions of raspberries and blueberries by Italian consumers. *Sustainability*, 8(10), 1027.

[11] Panzone, L., Di Vita, G., Borla, S., D'Amico, M. (2016). When consumers and products come from the same place: preferences and WTP for geographical indication differ across regional identity groups, *Journal of International Food and Agribusiness Marketing*, Vol. 28, Issue 3, 1-28.

[12] Silalahi, J. (2002). Anticancer and health protective properties of citrus fruit components. *Asia Pacific journal of clinical nutrition*, 11(1), 79-84.

[13] Scuderi, A., & Pecorino, B. (2015). Protected designation of origin (PDO) and protected geographical indication (PGI) Italian citrus productions. *Acta Horticolturae*, 1065, 1911-1917.

[14] Iofrida N., De Luca A. I., Silveri F., Falcone G., Stillitano T., Gulisano G., Strano A. (2018). Psychosocial risk factors' impact pathway for social life cycle assessment, *The international journal of life cycle assessment*, https://doi.org/10.1007/s11367-018-1482-4

[16] Nicolò B. F., De Luca A. I., Stillitano T., Iofrida N., Falcone G., Gulisano G. (2017). Environmental and economic sustainability assessment of Navel oranges from the cultivation to the packinghouse according to Environmental Product Declarations System, *Quality-Access to Success*, 18(158):108-112.

Quality Assessment Tendencies and Import Substitution Prospects of Juice Production in the Russian Market

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Abstract

This study is aimed at analyzing the Russian and foreign juice products markets. The research methodology includes the analysis of secondary market information. The results of this study are the general condition picture of the juice products market over the past few years and the provision of recommendations for import substitution of juices and juice products in Russia. The volumes of import and export of juice products in Russia are presented. The reasons for the dependence of Russian producers on imported raw materials are defined. The main trends in the development of Russian gardening and fruit and berry processing technologies are established. The basic conditions and terms of import substitution in the Russian market of juice products are determined.

Keywords: *export; domestic market; consumption volume; production volume; fruit and berry raw materials; import substitution; production technology; chemical composition; fruit juice.*

1. Introduction

The Russian economy is undergoing changes that affect the activities of all types of businesses, including the juice production and sales market. Juice is a popular drink in almost all countries of the world. However, the volume of consumption of juice products in Russia is almost 2 times lower than in the countries of the European Union (EU) and the annual consumption of juice averages about 20-22 liters per person. In this regard, the Russian juice market is far from saturation and in the coming years, the volume of production and sales of Russian products will increase.

The number of developing countries, using the strategies of import substitution, is growing (Debowicz and Segal, 2012; Ogujiuba, Nwogwugwu and Dike, 2011). It is assumed that the import substitution policy is not only suitable for the encouragement of industrialization but also contributes to sustainable economic growth (Adewale, 2012; Rodrigues, 2010; Roy, 2017).

After the introduction of the Decree of the President of Russia in August 2014 "On the Application of Certain Special Economic Measures to Ensure the Security of the Russian Federation" and the establishment of a specific list of goods for which the restrictions are imposed, significant changes have occurred in the structure of the Russian juice market. The total annual volume of imports of products subject to the embargo is about 9 billion USD. The embargo is applicable to the EU countries, the USA, Australia, Canada, and Norway, many of which were either suppliers of raw materials for the production of reconstituted juices or finished juices. The volume of the Russian juice market in 2014 amounted to 2.7 billion liters or 169.87 billion rubles. Over the past decades, the imported products dominated the juice market (almost 90%) (Businesstat, 2014). The world largest juice producers are the USA, Germany, and China. Russia ranks fourth in terms of production and consumption of juice products.

The imposition of the embargo led to a change in the structure of raw materials imports for the production of juices and finished products. Poland, the main supplier of pome fruits and concentrates, left the Russian market. The deliveries from the Netherlands stopped, the shipments from Ukraine dropped sharply (Haukkala, 2015; Holland, 2015). In this regard, the large-scale tasks on import substitution, requiring full support for the revival of domestic production of raw materials, were set before the Russian producers of fruits and vegetables by the Ministry of Agriculture of Russia.

This article is aimed at studying the Russian juice market (import and export volumes, the reasons for the dependence of Russian producers on imported raw materials, the specifics of Russian horticulture and fruit and berry processing technologies) and the development of recommendations for the import substitution of juice products in Russia.

2. Methods

The analysis of secondary market information was conducted by the authors hereof, namely: the analysis of industry portals, trading platforms, articles and reviews, reference materials, Rosstat data, specialized publications and the data provided by the marketing agencies.

According to the Businesstat, it can be noted that over the past three years, there has been a decline in the production of fruit and vegetable juices in Russia. In 2014, 2,603,975.8 thousand conventional monetary units of juices were produced in Russia, which is less than the volume of production registered in 2013. During this period, the sales volume decreased by almost 4-5% and by 0.5% compared with the level of 2013.

In addition to the sanctions, the embargo and a decrease in the purchasing power of the ruble, the decrease in the level of consumption of juices is also due to the fact that the restored packaged juices made of imported raw materials have lost the confidence of consumers who have adhered to a healthy lifestyle in which nutrition plays a crucial role (Sagi and Nikulin, 2017; Boulanger et al., 2016; Wegren, 2014). The buyers began to worry about the nutritional status of juices made from concentrates obtained in distant countries. The consumers began to give preference to the juices of Russian producers,

made by direct pressing. The leading place in the production of juice products is occupied by the nectars (38% of the total production; moreover, the consumers prefer apple (13%) and tomato (5%) juices to other types of juice) (IndexBox, 2016).

The leading players in the Russian juice market are currently both international and Russian companies. Today, there are about 2,300 juice products in the Russian market, while manufacturers try to diversify the range of their products by producing new types of juices, nectars and juice-containing drinks. Producers focus on the natural properties of beverages, due to which they actively develop the category of "organic" juices and juices with additional useful properties. Unfortunately, many consumers do not know the difference between different technologies of juice production, their assortment characteristic, between juice, nectar and juice-containing drink, therefore the consumer choice often depends on advertising, the brand and the color of the design and packaging of the drink. The impact of production technology and storage of juices on their quality was also analyzed by the authors to develop recommendations for import substitution.

3. Results

3.1. The influence of the technology of juice production on its chemical composition

The fruit technology of juice production determines the chemical composition of the resulting product and the quantitative ratio of the components. In the production of both clarified and unclarified juices, the water-soluble substances (sugars, acids, free amino acids, ascorbic acid, B vitamins, a significant portion of mineral and phenolic substances) are almost completely transferred to the product, while the insoluble or poorly soluble in water substances (polysaccharides, with the exception of soluble pectins, lipids, and carotenoids) are almost completely left in fruit pomace.

Also, the composition of the juice is influenced by enzyme/heat treatment and subsequent storage of the finished product. At the same time, along with the transformations of individual substances or groups of substances, the disappearance of one compound or the appearance of new compounds takes place (Schobinger, 2004, p. 131). The consequences of heat treatment can be a change in the organoleptic properties or a decrease in the nutritional value of the product, since the enzymes interact mainly with proteins, pectins, aroma-forming and phenolic substances and ascorbic acid. With appropriate enzyme processing, the pectins contained in the juice can be largely hydrolyzed to form, for example, about 1 gram of galacturonic acid per 1 liter of apple juice. Small amounts of methanol are also produced during the pectin hydrolysis. During the fermentation of sugar, in addition to other substances, ethanol, glycerin, lactic acid and volatile acids, as well as a number of aromatic substances, are formed in small quantities.

The use of various production technologies and methods of blending in juice production causes differences in the content of plant phenols. The enzymatic clarification results in the hydrolysis of hydroxycinnamic acid derivatives and the changes in the content of proanthocyanidins. One of the results of the influence of the technology of juice production on the composition is a change in color, as well as a possible darkening. The interaction of phenolic substances with the oxidative enzymes (phenol oxidases and some peroxidases) is accompanied by the enzymatic darkening of the pulp of fruits and juices. It can be avoided by rapid inactivation of the enzymes by heating the juice before heat treatment.

Due to modern technological capabilities, darkening does not have a large negative impact on the quality of juice. During storage, a nonenzymatic browning may occur, which primarily involves the reducing sugars and amino acids, uronic acids, ascorbic acid, amines, and other substances. As a result of complex polycondensation, high-molecular dark products (melanoidins) are formed. The darkening mechanism has not been fully understood yet, but one of the intermediate products is hydroxymethylfurfural (GMF), the presence of which can be determined by analytical methods. It is worth noting that unprocessed fruits and vegetables contain no GMF.

Concentrated fruit juices are particularly susceptible to nonenzymatic darkening, as it increases with an increase in the content of soluble solids. The deterioration of taste and smell and the reduction of nutritional value are associated with darkening (Eliseeva and Grishina, 2015a, pp. 51-52). Color change may be caused by the reaction of phenolic compounds with salts of heavy metals at low acidity values. This color change does not play a big role, but can change the composition of red and blue anthocyanins (anthocyanidin glycosides). A great influence on the conversion of anthocyanins, along with the temperature in juice production, is exerted by the storage temperature and duration. The change in flavor, the loss of vitamins and the change in the mineral composition of the product may depend on the technology of juice production. Aroma-forming substances are mainly formed by the action of enzymes from the corresponding preceding compounds. When the cell structure is destroyed, for example, by means of mechanical grinding, pressing and other similar processes, the enzymatic processes begin immediately, some of which can proceed at a high speed.

In other words, the enzymatic hydrolysis processes catalyzed by hydrolases lead to intensive splitting of fruit esters with the formation of acids and alcohols. In turn, the enzymatic-oxidative processes in the presence of oxygen in the air also lead to the formation of aldehydes, alcohols, and aldehyde carboxylic acids that possess a very intense odor and taste. In most cases, the typical substances of fruit flavor clearly differ from the aromatic substances of fruit juices. In the fruit juice production, the components can be formed that are absent in the natural cellular structure or are present in it only in insignificant quantities, and the content of other aromatic substances is more or less reduced (Eliseeva and Grishina, 2015b, p. 29). It should be noted that the content of alcohols often increases during the storage of ripe fruits due to the aldehyde conversion reaction. The use of pectolytic enzymes leads to the enzymatic transformation of certain aromatic substances (especially fruit esters), depending on the type, amount and duration of the action of the enzymes.

Heating, concentration, and storage have a negative effect on the aroma composition. For example, the content of decanal in orange juice rises continuously for the entire shelf life; the content of hexanal and octanal increases only during the first two months of storage, and then slowly decreases. From the point of view of the physiology of nutrition in the production and storage of juices, an important problem is to prevent the loss of essential vitamins, for example, ascorbic acid. Thiamine at low acidity values of fruit juices is quite stable. During the production and storage, the content of carotene, riboflavin, and niacin slightly changes (Ulakhanova and Eliseeva, 2015, p. 39). The loss of vitamin C is especially noticeable, in particular, for citrus juices, nectars made of black currants and strawberries, while in apple and grape juices ascorbic acid is almost absent.

Among other things, the losses depend on the choice of processing technology and storage conditions. In the presence of oxygen or heavy metal salts, the content of ascorbic acid is reduced, and therefore the contact of raw materials with air and heavy metal salts should be avoided. It is worth noting that a natural mixture of orange flavonoids is a strong ascorbic acid stabilizer. Minerals, contained in fruits, are characterized by different solubility in water. For example, the content of potassium in juice correlates well with the yield of juice, while this is true to magnesium only in the case of certain types of fruits. Phosphates and calcium are transferred to juice only in a small amount, so that a significant part of the total amount of phosphorus, magnesium and calcium remains in the fruit pomace. With an increase in pressure during pressing, the content of mineral substances increases, and it becomes even higher when using the diffusion technology for juice production.

3.2. Russian and international juice producers: market supply and consumption

In 2013, the "healthy" juice category grew by 6% in physical terms and by 14% in value terms and this trend was observed in 2014 (Moneymakers Factory, 2015). The main juice producers in Russia are two international companies – PepsiCo and Coca-Cola. The total market share of these companies is approximately 82%.

The largest manufacturers incorporated in PepsiCo are Wimm-Bill-Dann and Lebedyansky. Wimm-Bill-Dann enterprises produce juices, juice-containing and soft beverages J7, Rio Grande, fruit drinks "Chudo yagoda", 100% Gold, DJ. Lebedyansky OJSC owns such trademarks as "Dolka", "Ya", "Privet", "Tonus", "Severnaya yagoda", "Tropikanka", and "Fruktoviy sad" (Eliseeva, 2012).

"Multon" and "Nidan" companies should be noted among the manufacturers belonging to Coca-Cola Company. These juice and juice products producers have both strengths and weaknesses. One of the competitive advantages of Lebedyansky is the presence of a full-scale brand line in all price segments, from the affordable "Privet", "Dolka" and "Fruktoviy Sad" juices and nectars to the segment of premium pulp-containing juices and nectars "Ya".

The strengths of Wimm-Bill-Dann are: significant financial resources obtained by placing the company's shares on the New York Stock Exchange in the United States; a well-established sales system in the regions. The company makes large investments in marketing and advertising. Weakness: Wimm-Bill-Dann does not always clearly position its products in the juice market.

The strengths of Multon are: the use of international experience in the promotion of brands, the presence of a strong brand in the mass segment of the Dobry juice. Weakness: the difficulty of making operational decisions due to the large size of the company.

Nidan has an aggressive marketing policy in the market. But there are two factors that indicate the company's weaknesses – the lack of a strong brand in the middle and high price segments and the weak sales system in the regions (IndexBox Russia, 2016).

The following companies can be attributed to the largest juice producers: PepsiCo LLC (Moscow Region); Coca-Cola LLC (Nizhny Novgorod Region); OJSC Deneb (Dagestan); CJSC "Commercial and Industrial Company "Dana" (Kursk Region); LLC Firm Nectar (Samara Region); LLC Niagara National Water Company (Chelyabinsk Region); Dicomp-Classic LLC (Saratov Region); CJSC "Leda" (Tula Region); LLC Production and Commercial Firm "Alisa" (Tatarstan); "Belogorye i K" LLC (Belgorod Region) (Moneymakers Factory, 2015).

It should be noted that Russian companies are developing more rapidly than the international ones. Regional companies showed very rapid growth in turnover in 2014, as the turnover of Niagara increased by 64%, and Dikomp-Classic grew by 21% compared to the previous year (Simachev, Kuzyk, and Zudin, 2016).

It is noteworthy that Russian-made juices and nectars actively displace the imported products. In 2015-2017, there were significant changes in the juice market, as in other sectors of the food industry, which were caused by the changes in the economic situation in Russia. In 2015-2016, the volume of production and consumption of juices decreased in relation to 2014. The volume of production of juice products in 2015 decreased by 28%, and in 2016 by almost 30% (IndexBox Russia, 2016). Such a decrease in production was due to an increase in production costs due to the depreciation of the ruble, because large volumes of raw materials are imported to Russia. In addition, consumer demand has decreased due to lower purchasing power. First of all, the demand for more expensive drinks decreased, the sales of 100% of juices in 2015 decreased by 16%, the sales of nectars decreased by 13.4%, the sales of juice-containing drinks – by 7.9%. According to the analysts of Euromonitor International, the consumption of juices in physical terms has steadily increased since 2010, it began to decline slightly in 2013 (-2% by 2012). In 2014, the decline accounted to 4%, and in 2015 – 13%. In value terms, the market decline in 2015 amounted to more than 5%. From January to July 2017, juice production decreased by almost 21% (Euromonitor International, 2018). According to the Ministry of Agriculture, the producers are limited to the volumes of Russian raw materials for fruit and vegetable processing: jams, compotes, and juices; they are forced to use imported semi-finished products for production. At the same time, in some enterprises the depreciation of production assets exceeded 47% (Press Service of the Ministry of Agriculture of Russia, 2017).

Some decrease in the juice market has been observed since 2015. However, the largest manufacturers confirm the decline in sales, due to competition between the juice brands and their own retail chains, which, as a rule, have a significantly lower retail price. Currently, almost 70% of production is practically concentrated, which complicates the development of smaller productions (Euromonitor International, 2018). These manufacturers pay great attention to constant updating of the range of flavors, creation of the mixes of classic and exotic flavors, expanding the line of national drinks. The Ministry of Agriculture pays great attention to the intensification of the development of technical-intensive gardening in Russia and widely implements an industry support program in terms of import substitution.

There has been a reduction in the frequency and volume of juice consumed by the population. It should be borne in mind that many juice producers belong to foreign capital, which is directly interested in foreign exchange earnings and the increase in production in this situation has become inappropriate. The Eurasian Economic Commission takes measures to regulate the import duties on fresh and processed fruits to reduce the cost of production of juice products.

However, in the current economic situation, the Central Federal District leads in juice production and the volume of production in it is 43% of the total production. The Volga Federal District occupies the second place, and the Southern Federal District occupies the third place, they produce 80-85% of all Russian production volume (Euromonitor International, 2018). In 2017, there was a tendency of stabilization of the market, the market moved to a new state of equilibrium, the decline in retail trade turnover decreased. Stabilization of the market should intensify production.

Modern Russian juice industry is dependent on imported raw materials. Almost all finished juice drinks are made of concentrated raw materials. The concentrated juice production plants, as a rule, are located in the immediate vicinity of the fruit growing area. Since many fruits and vegetables either do not grow in the territory of Russia, or their production is insufficient, or has a strong influence on the volume of supplies, the seasonality of harvest, most manufacturers use imported concentrated semi-finished products. The share of imports of concentrated juices for the production of reconstituted juices in the Russian juice market is large and amounts to about 80%. More than 70% of all imports are concentrated juice of orange, grapefruit, pineapple and other tropical fruit (Euromonitor International, 2018).

Russian raw materials are mainly used for the production of apple and, in smaller quantities, cherry, black currant, cranberry, grape juice. At the same time, Russia exports a part of its juice-containing products (IndexBox Russia, 2016). The export of juice products is mainly aimed at the post-Soviet space: Kazakhstan, Belarus, Kyrgyzstan, Turkmenistan, Armenia, Abkhazia, Tajikistan, Georgia. The export of Russian-made juices from January to September 2014 amounted to 15.94 million liters, which corresponds to 601.6 million rubles (Moneymakers Factory, 2015).

The embargo imposed on imports from Australia, Ukraine, the USA, Canada, Norway and the EU further aggravated the

problem of a shortage of raw materials for the production of juices.

Besides the fact that fruits and vegetables grown in the territory of Russia are not enough to meet the domestic needs of the country, many types of fruits do not grow in the territory of Russia. Therefore, juice manufacturers are forced to look for the suppliers that do not fall under the embargo mentioned above. In this regard, the geography of imports was changed. The main volumes of fruits and concentrated juices are imported to Russia by China, Turkey and the countries of Latin America. The leading position in the market of raw materials for the production of apple juice is occupied by China, which ranks first in the world in apple production, annually produces more than 810 thousand tons of concentrate and is the leader among the suppliers of juice concentrate to Russia. In 2014, the deliveries of juice from China to Russia amounted to 66.7 thousand tons (Shagaida and Uzun, 2017). However, it is difficult to assess how these changes will affect the quality of products.

Direct-pressed juices are made directly from fruits and vegetables. It is important to understand that direct-pressed juices and concentrated juices are prepared in factories located in close proximity to fruit plantations. Therefore, it can be said that producers of direct pressing and concentrated juices receive primary raw materials directly in the countries where fruits and vegetables grow. The volume of consumption of concentrated juices for the production of finished juice products is 500-600 million liters per year, while the volume of imported juice from "warm" countries is 90-85% (Russian National Agriculture Agency, 2017). This is primarily due to climatic conditions.

3.3. The actions of the Russian government to develop Russian gardening

Russian gardening has got the unlimited potential for expanding the planting areas and increasing the crop volumes, but until 2010 these opportunities were used very little. In 2013-2015, a sharp increase in the volume of plantations was observed in the territory of Russia. Pome fruits are preferred when planting. In 2014, the total area of fruit and berry plantations in Russia was 513.6 thousand hectares, of which 250.3 thousand hectares were accounted for seed crops. The total amount of fruit crops collected in Russia in 2014 amounted to 3 million tons of fruit and berries.

The state program for the development of agriculture and regulation of agricultural products markets for 2013-2020 provides for laying of perennial fruit and berry plantations. In 2014, it was planned to plant 6.4 thousand hectares, the actual planting for the specified period amounted to more than 8 thousand hectares. In Russia, it is planned to increase funds for the development of gardening in 2015, exceeding the level of state support for fruit and berry producers by five times as of last year (in 2014 – 418.8 million rubles, and in 2015 – about 2 billion rubles).

This decision is related to the introduction of anti-Russian sanctions by the countries of the European Union and the United States, the fall of the ruble exchange rate and, consequently, the rise in price of mineral fertilizers and fuel, as well as the import substitution strategy (Directorate-General for External Policies of European Parliament, 2017; Venkuviene and Masteikiene, 2015). The Ministry of Agriculture believes that in a few years up to 70% of small-fruit crop (raspberries, blackberries, strawberries), fruit crop (pears, apples, persimmon) will be of Russian origin. In 2016, it is planned to implement state support for gardening at the amount of up to 2.5 billion rubles. After 2016, gardening subsidies will decline: in 2017, 1.757 billion rubles will be allocated from the budget, in 2018 – 994 million rubles, in 2019 – 829 million rubles, in 2020 – 864 million rubles (IndexBox Russia, 2016).

Against the background of such prospects, Russian producers have got the encouraging opportunities to obtain their own raw material base, update the production and increase the production volumes of juice drinks targeted at a wide range of consumers.

4. Conclusion

To implement the import substitution of juice drinks in Russia, it is required to carry out sufficient economic transformations, taking into account the influence of juice production technologies on its chemical composition and take appropriate actions for product quality improvement.

Firstly, it is necessary to ensure conditions for increasing the volume of fruit and vegetable production, the creation of a national production fund of seeds and planting material. The most favorable areas for the development of this field are the southern regions of Russia, the black-earth zone and non-black-earth regions of Russia adapted for fruit and vegetable production. At present, the enterprises of the Krasnodar and Stavropol Regions, the Volga Region, the Belgorod and Orenburg, Kaliningrad and other regions have achieved great success in the introduction of new modernized capacities and an increase in the production of juice for Russian raw materials.

Secondly, with the growth of Russian production, an increase in the volumes of modern vegetable and fruit storage facilities, an increase in the processing capacities, and the solution of logistical risks in the supply chain management system will be required.

The producers will prefer inexpensive and high-quality raw materials, a modern chain of production, storage, and transportation, which will ensure real import substitution of juice-containing products in the Russian market. Given the intensive development of horticulture and processing industries, it is reasonable to plan to implement the bulk of import substitution in the juice products market within 3-5 years.

References

[1] Adewale, A. R. (2012). "Does import substitution industrialisation strategy hurt growth? New evidence from Brazil and South Africa" *African and Asian Studies* 11(3), 288-314, DOI: 10.1163/15692108-12341235.

[2] Boulanger, P., Dudu, H., Ferrari, E. and G. Philippidis (2016). "Russian roulette at the trade table: A specific factors CGE analysis of an agri-food import ban" *Journal of Agricultural Econ* 67, 272-291, DOI: 10.1111/1477-9552.12156.

[3] Debowicz, D. and P. Segal (2012). "Structural change in Argentina, 1935-60: The role of import substitution and factor endowments" *The Journal of Economic History* 74, 1211-1212, DOI:10.2139/ssrn.2198612.

[4] Directorate-General for External Policies of European Parliament (Policy Department) (2017). "*Russia's and the EU's sanctions: economic and trade effects, compliance and the way forward*", retrieved at 07 March 2018, http://www.europarl.europa.eu/RegData/etudes/STUD/2017/603847/EXPO_STU(2017)603847_EN.pdf.

[5] Eliseeva, L.G. (2012). "Comparative analysis of the development of the Russian market of juice-containing drinks" *Food Commodity Expert* 9, 35-40, retrieved at 13 March 2018, https://elibrary.ru/item.asp?id=20173374.

[6] Eliseeva, L.G. and Grishina E.V. (2015a). "Comparative characteristics of the content of vitamins in pomegranate juices, presented in the retail network of Moscow" *Food Commodity Expert* 9, 51-52.

[7] Eliseeva, L.G. and Grishina E.V. (2015b). "Distinctive signs of revealing violations of the production technology of pomegranate juice through the use of peel and pits" *Scientific Periodical "IN SITU"* 3, 26-29, retrieved at 21 April 2018, http://efir-msk.ru/sbornik/IS-3-2015 pdf.

[8] Haukkala, H. (2015). "From cooperative to contested Europe? The conflict in Ukraine as a culmination of a long-term crisis in EU–Russia relations" *Journal of Contemporary European Studies* 23(1), 25-40, DOI: 10.1080/14782804.2014.1001822.

[9] Holland, Sh. R. (2015). “Economic powers that be: U.S.-Russo political actions and their affect on the Russian economy” *Senior Honors Theses* Paper 509, 509-512, retrieved at 17 March 2018, http://digitalcommons.liberty.edu/honors/509.
[10] IndexBox Russia (2016, January 27). “ The market of juices and nectars. Marketing research”, retrieved at 22 March 2018, http://www.indexbox.ru/reports/marketingovoe-issledovanie-rynok-sokov-i-nektarov/
[11] Moneymakers Factory (2015, January 31). “How does the market for the production and sale of juices in Russia organized”, retrieved at 15 November 2018, http://moneymakerfactory.ru/biznesidea/ryinok-sokov-v-rossii.
[12] Ogujiuba, K., Nwogwugwu, U. and E. Dike (2011). “Import substitution industrialization as learning process: Sub Saharan African experience as distortion of the “Good” *Business and Management Review*, 1, 8-21.
[13] Rodrigues, M. (2010). “Import substitution and economic growth” *Journal of Monetary Economics*, 57, 175-188, DOI: 10.1016/j.jmoneco.2009.12.004.
[14] Roy, T. (2017). “The origins of import substituting industrialization in India” *Economic History of Developing Regions* 32, 71-95, DOI: 10.1080/20780389.2017.1292460.
[15] Sagi, J. and E.K. Nikulin (2017). “The economic effect of Russia imposing a food embargo on the European Union with Hungary as an example” *Studies in agricultural economics* 119, 85-90, DOI: 10.7896/j.1708.
[16] Schobinger, W. (Ed.) (2004). “Fruit and Vegetable Juices: Scientific Foundations and Technologies” Profession, Saint Petersburg.
[17] Shagaida, N. and V. Uzun (2017). “The food embargo and choice of priorities” *Problems of Economic Transition* 59(1-3), 202-217, DOI: 10.1080/10611991.2017.1319197.
[18] Simachev, Y., Kuzyk, M., and N. Zudin (2016). “Import dependence and import substitution in Russian manufacturing: A business viewpoint” *Foresight and STI Governance* 10, 25-40, DOI: 10.17323/1995-459X.2016.4.25.45.
[19] Ulakhanova, D.P. and Eliseeva, L.G. (2015). “Research on the quality of apple juices acquired in the retail network of the city of Moscow” *Food Commodity Expert* 10, 39-43.
[20] Venkuviene, V. and R. Masteikiene (2015). “The impact of Russian Federation economic embargo on the Central and Eastern European countries business environments” *Procedia Economics and Finance* 26, 1095-1101, DOI: 10.1016/S2212-5671(15)00935-1.
[21] Wegren, S. K. (2014). “Russia's food embargo”, *Russian Analytical Digest* 157, 8-12.

Nature Management Imperatives in the System of Ensuring Food Security in Russia

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Abstract

The purpose of the paper is to explore the opportunities of observing nature management imperatives in solving the problem of ensuring the food security of countries and their regions. A case study of the Rostov Region – a typical region of the South of Russia – covers the opportunities of solving the issues of food supply using the methods and technologies for the greening of agriculture. It is shown that on the basis of nature-like technologies, it is possible to organize the production of valeologically safe and economically affordable food products, providing a favorable living environment for the population. The results obtained and proposed may be of interest to managers of farming enterprises and their business practices. Researchers can use the recommendations in terms of substantiating a conceptual model in which the production function – ensuring food security – is represented by three system-complementary components: sufficiency (necessary quantity), affordability (institutional and economic conditions for the use of food products) and quality (environmental friendliness and valeology) of food while the boundary conditions for the realization of this goal are the imperatives of nature management (compliance with the requirements of nature-friendly agrotechnologies and environmental protection measures). The algorithm of the research conducted using the Russian empirical base can be adapted to the conditions of the institutional-economic environment of any state.

Keywords: *nature management imperatives; food security; Sustainable use of natural resources; greening; nature-like technologies; food sufficiency and safety; agrifood sector.*

1. Introduction

Environmental issues, including those in the field of agrarian environmental management, have ceased to be the subject of research of individual scientists, but have moved into the category of socially significant, actively discussed and requiring urgent actions at the global level. At the end of the 20th – beginning of the 21st century, along with the issues of sustainable use of natural resources (including land use), such as the rigidity of the imperatives of accounting for natural constraints of economic growth (Sengupta, 2013; Kryazhimskiy, Tarasyev and Usova, 2015), the following emerged: the need to restore the impaired balance of metabolic processes (König et al., 2017), heightened socio-economic contradictions of the transition to a post-industrial society, acceleration of the urbanization process, domination of market preferences in the motivation of economic activity, overcoming of negative factors of unsustainable use of natural resources.

Ensuring food security is the most important link in the system of measures of guaranteed normal existence of society, and, at the same time, a multidimensional macroeconomic problem. Global Food Security Index defines food security as "the state in which people at all times have physical, social and economic access to sufficient and nutritious food that meets their dietary needs for a healthy and active life", namely affordability, availability, quality & safety, natural resources and adjustment (The Economist Group, 2018). This multidimensional aspect is associated with the need to ensure the growth of the efficiency of public production, increase the level of individuals' incomes and reduce their differentiation, preserve a green natural environment as a condition for ensuring the valeological safety of food and the welfare of the human noosphere.

Food security includes three aspects: quantitative (the degree of realization of the current demand for agricultural and food products), qualitative (meeting the need for high-quality food safe for health), and socio-economic (growth of household incomes, ensuring the availability of food for all groups of the population at the reproductive level). The first aspect is projected onto the sphere of reproduction of material values, the second – onto the sphere of reproduction of natural resources and environmental goods, and the third – onto the sphere of reproduction of economic relations guaranteeing the real availability of ecologically pure and valeologically safe food as the categorical imperative of the reproduction process of human life. It is the agro-industrial sector (AIS) that is the main manufacturer of vital products, most of them being not replicable in other industries, which uses for this purpose such specific production facilities as land, cultivated plants, and productive animals. Economic ties in the agro-industrial sector, in this regard, can be viewed as a relationship in connection with the supply of natural resources for agricultural production, products processing, market exchange, and consumption.

The system of modern agricultural technologies includes, first of all, fight against soil erosion, use of organic fertilizers, agroforestry, cultural and technical reclamation, grass sowing, liming sour soils, minimizing the anthropogenic impact on the soil, soil-protective technologies, biological methods of protecting plants, optimal crop rotation. These measures to improve the soil quality are considered "soft", because they do not make drastic changes in the ecological balance of agroecosystems and contribute, at the same time, to an increase in soil fertility. These technologies should take priority over the "deep" transforming amelioration (primarily hydro-technical), massive use of chemical and technological impacts on the agro-ecosystem of

high doses of mineral fertilizers and pesticides, use of powerful heavy machinery with a heavy ground load in agriculture. Fully replacing such "tough" technologies and methods with *environmentally friendly* ones and implementing, at the same time, anti-erosion measures makes it possible to increase crop production by about 1/3. As a result of the implementation of the program of *general greening* in agriculture, the possible increase in agricultural products in terms of grain, according to experts, may reach 50-70 million tons.

The use of *nature-like* technologies in the process of the greening of agriculture is very promising for solving this problem. Nature-like technologies are fundamentally new technologies for generating and consuming energy modeled on living nature. They do not cause damage to the surrounding world, but exist in harmony with it and allow maintaining the balance disturbed by man between the biosphere and the technosphere. They combine materials, technologies, and functions of animate and inanimate nature, and are based, as a rule, on bioindustrial technologies, electronics, and robotics (Osipov, Rumyantseva and Eremina, 2018). Ideally, such technologies are able to restore the balance between the biosphere and the technosphere disturbed by man, since *the meaning of nature-like* technology is to restore homeostasis, a natural, self-consistent resource cycle, broken by "hard" technologies, taken out of the natural environmental context. The tools for creating such a technosphere are convergent nano-, bio-, information, cognitive technologies (Lyons and Smith, 2018; Ali et al., 2014; Bhattacharyya et al., 2011; Handford et al., 2014). The sectors using nature-like technologies associated with the agro-industrial sector are: energy saving and alternative energy (Brown et al., 2011), environmentally friendly waste recycling, biotechnology, genetic engineering and gene therapy, environmentally friendly production technologies in various fields, microbiology.

The simplest example of a conglomerate based on nature-like technologies is a solar vegetarium. It is a structure (system), which, due to its optical and physical properties, is able to accumulate solar energy, distribute and use it (for example, for growing vegetables). The life-support systems of such a vegetarium allow for repeated use of water, carbon dioxide and other elements necessary for maintaining the growth of plants. The inventor of a solar vegetarium is the Russian physicist Anatoly Ivanov, who built his first version in the mid-1950s. After 35 years (in 1989), regardless of the discoverer, a similar invention was repeated by the Chinese peasant Wang Lei. Due to the support of the Government of China, which abolished taxes on agricultural producers, such vegetariums became widespread, first in the south of China, and then throughout the country as a whole. Currently, they are common in India.

This study is focused on resolving the existing contradiction in the practice of nature management between mental targets to maximize food production and the need for green and environmentally friendly measures with a lack of financial resources. The subject of the research is the technology of compliance with the environmental imperatives of nature management while ensuring the food security of the country and its regions.

Purpose of research: justification of the environmental imperatives of nature management in solving the problem of food supply at the national and regional levels.

Objectives of research:

(a) identification of the general natural and climatic conditions for the functioning of the agri-food sector of Russia,
(b) diagnosing the state of the system of economic use of natural resources in the domestic agri-food sector,
(c) regional interpretation of the targets of the "Doctrine of Food Security of Russia",
(d) development of a system of measures for the mass development of natural agrotechnologies and environmental protection activities in the region (Rostov Region).
(e) justification of practical recommendations on the implementation of the environmental imperatives of the process of ensuring food security in the regions of southern Russia.

2. Methods

The instrumental and methodological tools of this research include the following methods: conceptual-categorical and comparative analysis, analysis of the empirical information background, evolutionary genetic and historical-logical approach, subject-objective determinacy, use of econometric characteristics (indicators) of the state of nature management systems, instrumental-functional opportunities, the cognitive validity of which, due to the effect of complementarity, significantly increased the heuristic potential of this research.

The study was conducted within the framework of the tradition of the classical economic doctrine in the format of the reproductive approach in the unity of all its moments (aspects): reproduction of material goods (food and other goods of agriculture); reproduction of ecological benefits of the environment (favorable natural conditions of human activity); reproduction of the social genotype of nature management relations (sustainable nature management) and reproduction of the individual as the main general civilizational social value. The authors consider the problem of food security (providing people with food in the required quantity and of proper quality) while observing the imperatives of sustainable nature management. In the meantime, in the ratio of the above aspects (moments) of the reproductive approach, the gradient of green development of the nature management system of the agri-food sector is determined by the imperative of human personality development, while other aspects reflect the conditions for solving this problem, fundamental for the fate of humanity.

The information and empirical background of the research is presented by statistical data of the Ministry of Agriculture and Food of the Rostov Region, reference information of Rosstat, the authors' results of previous studies of the problem, facts cited in academic publications, materials of the Internet.

3. Research Background

Such systems, which significantly reduce damage from natural-meteorological anomalies, play a special role in the republics of the North Caucasus, a significant area of which is represented by mountains and foothills, while employment of the population in agriculture is dominant (Kolesnikov and Ovchinnikov, 2017)

It should be noted that in the agro-industrial sector of the South of Russia, in general, there are significant environmental risks – the situation associated with non-ecological technologies for the disposal of solid industrial and household waste, removal of construction debris from cities to rural areas and lands unused in agricultural production. As a result, spontaneous ignition of debris often occurs with the release of poisonous gases. The decomposition products of solid waste are washed away with sediments, untreated water from sewage systems is discharged into open aquatic bodies, thereby polluting the atmosphere, hydrosphere, and lithosphere, causing significant environmental damage to the natural resources system.

At the same time, there are also positive "breakthrough" projects, testifying to the progress in solving this problem. One of them is the implementation of the Pure Don regional investment project. The project is focused on the qualitative improvement of the sewage collection and treatment system, in compliance with the current environmental protection requirements for reducing anthropogenic and industrial impacts on the soil, water, and air.

Improving the environmental safety of the sewage water treatment process is achieved by the disposal of sludge and effective disinfection of the water mass, including through the operation of an ultraviolet neutralization unit. The creation of a 10-km strip of planting and landscaping of the adjacent territory contributes to the solution of environmental problems within this project. A significant part of the project (total investment in it

being 4.7 billion rubles) has already been implemented by CJSC ABVK-EKO. The project is planned to be completed by the end of 2020. The positive effect of this innovative investment project is already obvious, and similar nature protection comprehensive projects will be implemented in other regions of Russia (Expert South, 2018).

The importance of such projects increases as the environmental situation in Russia becomes more complicated, which has caused deterioration in the quality of agricultural raw stock and food products in recent years according to a number of indicators. Thus, in some regions of the country, there is an acute problem of contamination of food with mycotoxins, the level reaching 18%. There are some cases of poisoning associated with the emergence of a large number of highly dangerous carcinogenic mycotoxins in poor quality cereal products, peanuts, sunflower, fruits, and vegetables. And this is despite the fact that Russia, along with Brazil, is rated as one of the most food-safe countries of the BRICS, especially in comparison with India and China (Tantri and Shaurav, 2018).

The main reason for the decline in the quality of grain is the forced (due to a lack of finance) refusal of producers from the basic elements of the nature-based wheat cultivation technology, non-compliance with the deadlines for the implementation of agricultural practices. This leads to a deterioration of the phytosanitary condition of crops, which is often aggravated by the non-execution of procedures for the preliminary assessment of the quality of grain in the formation of the seed stock.

As for fruit and vegetable products, in recent years, the range and types of vegetable and fruit crops have been significantly updated, but their nutritional, flavoring and technological properties have improved slightly, and in some cases have deteriorated. In fruit and vegetable raw stock, there are fewer vitamins and other biologically active substances, while environmentally harmful components are more.

Along with the deterioration of technological properties and reduced nutritional value, the level of ecological safety of food products decreases. Violation of regulations on the use of pesticides and the use of outdated technologies lead to the fact that in a number of areas, a high content of pesticides is noted in the analysis of food samples; they do not meet the hygienic standards for heavy metal salts. The level of food contamination increases in areas with unfavorable environmental conditions. The unfavorable situation develops in areas with high industrial pollution.

The most important reasons for this situation are often noncompliance with environmental (sanitary and epidemiological) standards and imperfection of the existing standardization, which does not meet modern requirements from the standpoint of product safety guarantees and consumer protection. The existing system of sanitary and hygienic monitoring does not cover the whole cycle “production – storage – processing – sale”. When analyzing the quality of finished products, it is often not taken into account, in what conditions it was made, what pesticides were used.

In Russia, the system of material incentives for the production of organic food (subsidies, concessional loans, tax incentives) is not sufficiently effective. This actualizes the formulation as the ultimate goal of agricultural production: providing in sufficient quantities the processing and food industries with high-quality raw stock, and people – with valeologically safe products consumed in a natural form.

The main purpose of the food and processing industry is to develop safe food for health in the required quantities and in a sufficient assortment, providing all major groups of the population, taking into account the national, age and sex composition, health status, location and working conditions.

Achieving this goal is complicated by the fact that in recent years a significant proportion of raw stock that does not meet modern requirements has been supplied to enterprises of the processing industries. Thus, a large amount of low-quality grain with low content and quality of protein and gluten was supplied for processing. A similar picture is observed in the production of raw materials of animal origin (Lunze et al., 2015).

An important problem for the agro-industrial sector is the opposition to imports and to using genetically modified organisms in agriculture and the processing industry. Evidence of the magnitude of the risk of their use is the cost of 15% of GDP in health care in the United States, where much of these funds are directed at combating the effects of mass obesity from food intake, which preferentially contains amino acids produced by genetically modified organisms. In the Russian Federation, the use of genetically modified organisms can worsen the health of the population. The way of solving this problem is the examination of food for biodiversity, regulation of the process of using GMOs. In a broad sense, one should speak about sustainable nature management, which contributes to the conservation of natural resource potential and human health, the rational use of natural resources and the provision of an effective method for their reproduction.

The main objectives of the “Doctrine of Food Security of Russia in the Production of Agricultural and Fish Products, Raw Materials and Food” (hereinafter referred to as “Doctrine”) are aimed at providing high-quality food for the country's population, as well as expanding food exports (Decree of the President of the Russian Federation, 2010).

As for the achievement of the indicators established by the Doctrine of Food Security of Russia, in 2016 the share of domestic own grain production was 99.2% (the Doctrine’s threshold was exceeded by 4.2 percentage points), potatoes – 97.4% (the Doctrine’s threshold was exceeded by 2.4 percentage points), sugar – 94.6% (the Doctrine’s threshold was exceeded by 14.6 percentage points), meat – 86.3% (the Doctrine's threshold was higher by 9.6 percentage points).

These figures were improved in 2017. The President even instructed to develop some measures to reduce commercial risks from lowering the purchase prices for agricultural products due to high yields. Production volumes in the domestic agro-industrial sector exceeded all expectations. Practically, the tasks set in the Doctrine of the country's food security were fulfilled (Medvedev, 2017). Russia in 2017 had a record grain harvest in the last 100 years. According to the Ministry of Agriculture of Russia, 132.7 million tons of grain was harvested in the country. This is facilitated by the development of modern and high-tech agribusiness, enabling to compete in the international market.

This leads to the formulation of a rather ambitious task: by the early 2020s, Russia's agro-industrial sector should become a cluster of the “food spiral of growth”, get on a wave of growth. Such a statement means the formation of a set of industries with the single driver (namely, the AIS), which “draws into the growth funnel” all related sectors. In this spiral, experts say, innovations are taking root well, making it possible, in terms of serious investments, to efficiently update the economy of the whole country (Gurova, Kolerova and Polunin, 2018).

However, despite the successes, the tasks of mastering environmentally sound, non-exhaustive models of nature management remain topical; the transition to agricultural technologies that guarantee the maximum conservation of soil fertility and increase in yields; the expansion of crops via unused arable land; the reconstruction and construction of land reclamation systems; the accelerated development of the livestock sector. The main threat to food security in the field of reproduction of material values in Russia is the instability of agricultural production in areas of high-risk farming – they amount to 80%, a high probability of adverse weather conditions (Shokri, Arkhipov, Belokrylova, Filonenko, 2017) and the lack of systemic measures of agro-economic policies conducted in the regions. Significant damage from natural and meteorological anomalies in the agricultural sector adversely affects the economic performance of agricultural producers and reduces the investment attractiveness of the agricultural sector (Pacheco et al., 2018).

The expansion and more intensive use of the potential of aquatic biological resources and new bioindustrial technologies

for their reproduction provided for in the Doctrine is very important; the creation of new technologies for deep and comprehensive processing of food raw stock, the improvement of methods for storing and transporting agricultural and fish products; the increase in the rates of structural and technological modernization of the agro-industrial and fishery sectors.

Taking into account the imperative of localization of resources, production, and marketing of agri-food products at the level of the constituent entities of the Russian Federation, it seems reasonable to solve the problem of ensuring regional food security based on environmentally friendly nature management. It is advisable to illustrate its solution taking as the case study one of the most important "granaries of Russia" – the Rostov Region.

The region is in the top ten of the all-Russian rating for the making of basic agricultural products:

1st place in the production of wheat, sunflower;

2nd place in the production of grain and leguminous crops, eggs;

3rd place in the production of vegetable oil, meat, sausages.

Exports of food products and agricultural raw stock in 2017 amounted to 4.1 billion US dollars (50% of the total exports of the Rostov Region). Products of the agro-industrial sector of the region are exported to more than 60 countries. In addition to grain, the farmers of Don export vegetable oil, cereals, bread, flour, molasses, confectionery (Ovchinnikov and Lysochenko, 2013).

These data provide a basis for concluding that the Rostov Region belongs to a group of constituent entities of the Russian Federation with developed industrial and agro-industrial sectors. The share of the agro-industrial sector of the region is 4.3% in the gross output of the national agri-food sector.

The Rostov Region has significant advantages compared with other regions. The index of the level of land resources is 2.28. In Russia, in general per inhabitant, 1.44 hectares of farmland and 0.87 hectares of arable land are accounted for, which is almost 1.5 times less than in the Rostov Region. In the field of agriculture, there are many companies being new "gazelles" with a growth rate of at least 15% per year.

State support for enterprises of the agrarian sector of the region was carried out in the past years as part of the program activities of the Regional Long-Term Target Program "Development of Agriculture and Regulation of Agricultural Products, Raw Stock and Food in the Rostov Region for 2010-2014". It was continued in the format of the State Program of the Rostov Region "Development of Agriculture and Regulation of the Markets for Agricultural Products, Raw Stock and Food", providing for the implementation period 2014-2020 (Girard, 2015).

Measures are taken to assist food and processing industries in promoting products to the regional trading networks. Enterprises attend the meetings of the Regional Commission on the Development of Trade Activities in the Rostov Region with the consideration of problematic issues. In addition, procurement sessions are held with representatives of trading networks and regional manufacturers, where problems and conditions of cooperation are discussed.

In order to enhance the motivation of regional manufacturers, especially agricultural enterprises, to improve the quality and competitiveness of products made, a voluntary certification system "Made on the Don" was introduced in the Rostov Region, registered by Rosstandard (Federal Agency for Technical Regulation and Metrology) and in the Unified Register of Voluntary Certification Systems of the Russian Federation. Today, 39 enterprises have been issued valid certificates confirming the quality of products, including 22 enterprises of the agro-industrial complex sector (56%). In 2017, some 13 AIS enterprises received for the first time or extended their certificates for 25 types of products. So, the certificate "Made on the Don" was granted to such regional producers as the Tatsinsk Dairy Plant, Belyi Medved company (one of the active participants in the dairy market), Yug Rusi bakery factory, Aksai confectionery factory.

To build up export potential, the Don area manufacturers are invited to participate in exhibitions. In January 2014, at the Green Week 2014 international exhibition in Berlin, thirteen Don enterprises of the food and processing industry took part in the tasting contest "Safety and Quality of Agricultural Products and Foodstuffs". As a result, food products of the Rostov Region were awarded 23 gold medals, one silver medal, and one bronze medal.

In 2017, local agribusiness entities attended the II All-Russian Forum of Food Security, the XX Agro-Industrial Forum of the South of Russia, the international exhibition of food products and specialized equipment "SIAL CHINA 2017" (Shanghai, China), the international exhibition of food, beverages, equipment for the HoReCa sector of the Gulf countries "GULFOOD 2017" (Dubai, United Arab Emirates), the international agricultural exhibition-forum "Agriscape" (Abu Dhabi, United Arab Emirates), joined the business mission aimed at promoting Russian products to the market of Saudi Arabia and raising investments in the domestic agro-industrial sector (Riyadh, Kingdom of Saudi Arabia), and also took part in the food exhibition "Hospitable Rostov" (Rostov-on-Don), in the 19th Russian agro-industrial exhibition "Golden Autumn 2017" (Moscow). At the "Golden Autumn 2017", some products of Don manufacturers were awarded 100 medals, including 49 gold.

For the first time, the Ministry of Agriculture of Russia at the "Golden Autumn 2017" exhibition, to demonstrate the best regional practices, organized a collective exposition "Family Livestock Farms" of 4 constituent entities of the Russian Federation, among which was the exposition of a peasant farm in the Rostov Region.

In 2017, the II All-Russian Forum on Food Security was held, at which the issues of implementation and the need to make changes to the Food Security Doctrine were discussed at a high expert level. In early 2018, the Russian Ministry of Agriculture submitted a new draft of the Food Security Doctrine.

The updated Doctrine should ensure food security as an essential component of the country's national security. For the Rostov Region, it seems to be a prescribed and reasonable strategy for the inclusion of the agro-industrial sector in the "food growth spiral" cluster. In order to strengthen the position of the region in conditions of very tough competition, it is necessary to carry out accelerated technical and technological modernization of the agro-industrial sector of the South of Russia as a whole. This implies the introduction of new plant varieties, the expansion of the range of resource and energy-saving technologies, advanced scientific developments.

An example of promising technologies for the agricultural sector is the method of microclonal propagation. It plays an important role in the accelerated cloning of fruits, berries, tubers, ornamental plants and tree species. Experience in this area clearly indicates the achievement of obvious results: plants acquire more pronounced viable characteristics (compared to naturally produced planting material), have high reproduction rates, and in the case of fruits and berries, a significant increase in yield is achieved. All this testifies in favor of the fact that clonal micropropagation is an advanced technology in crop production. The promise of this technology is ensured by the fact that the project "Construction of the Center for Clonal Micropropagation "Black Sea Biotechnology Center" is being implemented in Crimea. The amount of investment is 3.3 billion rubles; the completion date of the project is 2025.

Innovative projects and new technologies, of course, require the provision of agricultural sectors, food and processing industries with highly qualified personnel.

The reasons for limiting the competitiveness of domestic products in the world market, according to the players of the agro-industrial sector, are: insufficient efficiency of state tools for supporting agricultural exports, high transport costs, lack of processing facilities, high protective duties in foreign markets, lack of practices in modern sales and marketing of agricultural

goods, insufficient information about markets, poorly developed logistics infrastructure of agricultural exports, failure to comply with strict sanitary and phytosanitary standards in importing countries, insufficiently developed transport infrastructure for exports of agricultural products, poor quality of products, lack of accredited certification centers and laboratories in the Russian Federation.

4. Results

The economic externalities of natural disasters are not limited only to damage caused. The development of state, municipal, corporate systems for fighting disasters, ensuring the functioning of these systems, including their facilitation and remuneration of employees, measures to prevent disasters and reduce the magnitude of possible damage, require large expenditures.

In order to improve the financial sustainability of agricultural producers, the need to adopt a new federal regulation to restructure agricultural producers' debts to credit institutions is becoming increasingly obvious – in terms of granting a delay or installment payment of loans for 15 years.

To increase the competitiveness of domestic products, the support of economic entities from the state in the following areas is necessary:

- conducting negotiation processes aimed at creating a favorable regime for exported goods;
- study of the issues of lowering interest rates on loans: the average rate on loans in Russia currently stands at 12-13% (in cases where repayment of a part of the loan is not foreseen), which significantly reduces the possibility of lending to agricultural producers, especially farmers.

Taking into account a number of restrictions on the volumes and the applied mechanisms of state support for agricultural production, it is necessary to adjust its measures in the basic areas in order to adapt them to the conditions of referring to the "green basket". Thus, analyzing the state of food security in the region in the field of material facilities for food production, it can be noted that the resource and economic potential is sufficient. The main problems remain in the reproduction of environmental benefits.

The ecological situation in the Rostov Region, as in the entire Russian Federation, is characterized by a high level of anthropogenic and technogenic impact on the environment and significant environmental consequences of past economic activity. In the Rostov Region, more than 1.5 million people live in cities with high levels of air pollution. The volume of wastewater that is not sufficiently treated and discharged into surface aquatic bodies remains high. The tendency to the deterioration of soil and land continues. The processes leading to the loss of fertility of agricultural land and its withdrawal from economic circulation are developing intensively. Desertification, to some extent, covers the eastern districts of the Rostov Region. The amount of waste that is not involved in the secondary economic turnover and delivered to landfills increases. At the same time, the conditions of storage and disposal of waste often do not meet the requirements of environmental safety (Ovchinnikov and Ketova, 2015).

About 600 thousand tons of pollutants are emitted annually into atmospheric air (2014 – 650.6 thousand tons, 2015 – 618.7 thousand tons, 2016 – 629.3 thousand tons). The main sources of pollution remain motor vehicles, enterprises of the fuel and energy and machine-building sectors, construction industry. According to the quality characteristics, a high level of air pollution for the period 2014-2017 is observed in the cities of Novocherkassk and Rostov-on-Don.

The dynamics of wastewater discharge without proper treatment tends to decrease (2014 – 54.6 million m3, 2015 – 53.8 million m3, 2016 – 53.8 million m3).

The main sources of pollution of aquatic bodies are the utilities of the region. In addition, a significant part of pollutants enters the watercourse with unorganized discharges from the catchment areas (from agricultural facilities, territories of cities and settlements). There is an acute problem of storm sewers in urban areas.

In order to ensure environmental safety in the Rostov Region, the following strategic forecasting-policy tools have been adopted and are being implemented. The strategy of preserving the environment and natural resources of the Rostov Region for the period up to 2020, approved by the Decree of the Government of the Rostov Region of February 5, 2013 No. 48, is a document defining the main directions and priorities of the state policy of the Rostov Region in improving the environment.

The State Program of the Rostov Region "Environmental Protection and Rational Nature Management", approved by the Decree of the Government of the Rostov Region of September 25, 2013 No. 595, has been implemented since 2014 and includes 6 sub-programs: "Environmental Protection in the Rostov Region", "Development and Use of Mineral Wealth Reserves of the Rostov Region", "Development of the Water Management Complex of the Rostov Region", "Development of Forestry in the Rostov Region", "Formation of an Integrated System of Waste and Secondary Material Resources Management in the Territory of the Rostov Region", "Ensuring the Implementation of the State Program".

From the beginning of the implementation of the said Program, 5.3 billion rubles were allocated from all sources of funding to implement its actions. This is all the more important because 2017 was declared by the President of the Russian Federation as the Year of Ecology and the Year of Specially Protected Natural Territories. At the end of the year, 100 environmental projects were implemented in the Rostov Region. The total amount of financing is 3.2 billion rubles, of which 2.3 billion rubles is the funds of investors. "Ekostroy-Don", "Eco-Spas Bataysk", "Kamenskvolokno", "AMILKO", "Chistiy gorod", Rostov Electrometallurgical Plant, "Rostovvtorpererabotka", "Mars", "Brewing Company Baltika" introduced technologies for separate collection, recycling, and disposal of waste. In the Myasnikovsk District of the Rostov Region, "Center-100 Rostov-na-Donu" company built the first complexes of the centralized system for collection and disposal of medical waste.

Thus, in the Rostov Region, a holistic program of greening the environment is being consistently implemented. In the field of reducing the negative impact on the environment by production and consumption waste in 2017, some 20 projects were implemented; in the field of environmental education – 19 projects; 18 projects are aimed at the conservation of water resources and the same number – at the development of specially protected natural territories and the preservation of the animal world. In the area of standardization of the impact on the environment and the transition to green technologies in the Year of Ecology, 13 projects have been implemented; 6 other projects are dedicated to the protection of forests and 6 more – to the region's adaptation to the changing climate.

The experience of the Rostov Region in environmental safety was presented in December 2017 at the V All-Russian Congress on Environmental Protection and the II International Exhibition and Forum "ECOTECH-2017". In the format of this exhibition, cooperation agreements on the implementation of projects aimed at reducing the negative impact on the environment and the preservation of biological diversity were signed between the Government of the Rostov Region and "Brewing Company Baltika", "DonBioTech", Association for the Conservation and Repopulation of Rare and Endangered Species of Animals "Living Nature of Steppe". The planned volume of investments is 947.0 million rubles worth.

Actually, measures are taken to protect the environment in completely new formats. As part of the All-Russian campaign "Russia – the Territory of Eco-Pioneers – Young Defenders of Nature", more than 1,700 events were held. The following events were organized and carried out: interregional festival of

ecological tourism “Sung Steppe”, the educational campaign “Ecology and Culture – the Future of Russia!”, the seventh regional meeting of young environmentalists, which launched the social project among schoolchildren “Environmental Future of the Rostov Region”. With the participation of the business community, the Rostov Region is developing a network of environmental education centers. The Ecorium center was opened in the city of Rostov-on-Don, hosting training seminars for volunteers on the organization of separate waste collection.

In 2017, in the Rostov Region, the initiative project “Green Marathon” PRO-Motion of ECO-Movement on the Don” was implemented. The same name web page on the Internet posts more than 1,000 pieces of news on environmental topics. In the Year of Ecology, the 2018 volunteer project “I am for a clean HOME! My home is the Quiet Don!” was presented (Don State Public Library, 2018). Its action covers a five-year period.

According to the results of road activities and work with the “Interactive Map of Dumps”, 384 places of unauthorized disposal of waste were eliminated, which is by 73% more than in 2016. The Rostov Region was among the ten best among other regions of the Russian Federation for cleaning landfill sites within the framework of the All-Russia People’s Front project (General Arrangement, 2018).

As the analysis has shown, the Rostov Region is very interested in solving the problems of environmental remediation and protection. To ensure the raw material needs of the economic sector, 183 licenses were issued for the right to use subsoil areas; 55 state examinations of mineral reserves were carried out. In 2017, the search and appraisal work on groundwater for domestic water supply to Milyutinsk rural settlement was continued; work began on the assessment and exploration of groundwater reserves for drinking water supply to Northern rural settlement of the Zimovnikovsk District of the Rostov Region. In the field of environmental analysis, the following was carried out: monitoring of the state of disposal of pesticides and agrochemicals in the city of Bataysk; monitoring and control of environmental quality in the territory of the Rostov Region; monitoring the state of atmospheric air using an automatic monitoring station; regional accounting and control of radioactive substances and radioactive waste; maintaining a regional inventory of industrial and household waste. Work continued on the conservation of the biological diversity of the natural resources of the Rostov Region: maintaining the Red Book of the Rostov Region in terms of monitoring protected animals and plants and the development of a nursery of Red Book plant species.

5. Discussion

Practical recommendations:

(1) transition to nature-like agrotechnical methods, methods of agricultural production, ensuring harmonization of the interaction of agro-industrial nature management systems with the natural environmental conditions, ensuring the safety of the reproductive potential of the natural state of homeostasis and the production of organic food;
(2) increasing the motivational effectiveness of state programs to support agricultural producers introducing environmentally friendly agricultural technologies in plant growing and animal husbandry; the allocation of targeted subsidies to organic food producers;
(3) adoption of a state program of grant support for agricultural machinery producers, ensuring the introduction of nature-like technologies in the functioning of the agri-food sector of Russia;
(4) strengthening in the system of training of agricultural production personnel a component focused on the formation of general cultural and professional competences of specialists in the field of resource-saving and environmental agricultural technologies.

The national economic significance of the study consists in the socio-economic and environmental-economic effect expected as a result of the implementation of the proposed practical recommendations.

6. Conclusions

In the system of measures for the region’s strategic development, the priorities in the field of ecology and environmental management are:

- ensuring the water quality class 4A; conservation and reproduction of the forest reserve;
- increasing the share of specially protected natural areas in the total area of the Rostov Region to 4% by 2024;
- preservation of the biological diversity of the area of the Rostov Region, increasing the level of public ecological culture.

The core projects for the implementation of these priorities include:

(1) clearing aquatic bodies in order to improve them and prevent the negative impact of water; reduction of unauthorized discharges of pollutants into aquatic bodies; overhaul of hydraulic facilities in poor condition, located in the territory of the Rostov Region and owned by municipalities;
(2) ensuring the sustainable protection of forests from fires, preventing emergencies associated with fires in forest plantations; reforestation on forest land; prevention of unauthorized logging of forest plantations.

The development of the system of specially protected natural territories in the Rostov Region, preservation of flora and fauna, improving the functioning of the system of specially protected natural territories are of fundamental importance.

The issue of food security in the region is closely related to food production technologies and ensuring the ecological safety of food. From the point of view of the economic theory of welfare, the problem of food safety and quality is one of the specific features of the agrarian market, causing its equilibrium to be in the Pareto-inefficient state. This, in turn, is the economic basis of the need for state policy to support the agrarian sector and the possibility of redistributing the company's financial resources for its development. At the same time, ecological well-being and environmental cleanliness are very important.

In order to ensure food security, it is necessary to intensify activities in the field of compliance with the imperatives of food quality and safety, including:

(a) development of fundamental and applied research in the field of biotechnological production methods and biomedical assessment of the quality and safety of new types of food sources and ingredients;
(b) widespread introduction of educational programs on healthy nutrition with the involvement of the media;
(c) financial support for the production of valeologically safe and economically affordable food products (subsidies, concessional loans);
(d) establishment of tax incentives for enterprises producing ecologically safe food products and investing in technical re-equipment of facilities through the introduction of innovative nature-like technologies that ensure the production of environmentally friendly products;
(e) introduction of fines for the production and sale of environmentally “hazardous” products and taxes on the use of environmentally hazardous technologies.

References

[1] Ali, M.A, I. Rehman, A. Iqbal, S. Din, A.Q. Rao, , A. Latif, T.R. Samiullah, S. Azam, and T. Husnain (2014). “Nanotechnology, a new frontier in Agriculture” *Advances in Life Sciences* 1 (3), 129-138, http://www.als-journal.com/58-143-1-rv/

[2] Bhattacharyya, A. P. S. Datta, P. Chaudhuri, and B. R. Barik (2011). "Nanotechnology – a new frontier for food security in socio economic development" *Disaster, Risk and Vulnerablity Conference 2011* (March 12-14), School of Environmental Sciences, Mahatma Gandhi University, India in association with the Applied Geoinformatics for Society and Environment, Germany, 116-120.
[3] Brown, J. H., W. R., Burnside, A. D. Davidson, J. R. Delong, W. C. Dunn, M. J. Hamilton, and W. Zuo (2011). "Energetic limits to economic growth" *BioScience* 61 (1), 19-26, https://doi.org/10.1525/bio.2011.61.1.7
[4] Girard, M. (2015). "*Trade and transition: Russia's agricultural pitfalls and prospects for the 21st century*": Honors College, University of Maine, Orono, USA, https://digitalcommons.library.umaine.edu/honors/213
[5] Handford, C. E., M. Dean, M. Henchion, M. Spence, C. T. Elliott, and K. Campbell (2014). "Implications of nanotechnology for the Agri-food industry: Opportunities, benefits and risks" *Trends in Food Science & Technology* 40 (2), 226-241, https://doi.org/10.1016/j.tifs.2014.09.007
[6] König, H.J., F. Graef, J. Schindler, A. Fasse, K. Mutabazi, C. Lambert, P. Ngwenya, G. Uckert, H. Mahoo, F. Hattermann, and S. Sieber (2017). "Combining participatory, qualitative and quantitative methods for impact assessment of food value chains into an integrated framework" *Food Security* 9 (6), 1309-1321, https://doi.org/10.1007/s12571-017-0739-2
[7] Kryazhimskiy, A.V., A.M. Tarasyev, and A.A. Usova (2015). "Proportional economic growth under conditions of limited natural resources" *Proceedings of the Steklov Institute of Mathematics* 291 (127), 127-145, https://doi.org/10.1134/S008154381508012X
[8] Lunze, K., E. Yurasova, B. Idrisov, N. Gnatienko, and L. Migliorini (2015). "Food security and nutrition in the Russian Federation – a health policy analysis" *Global Health Action* 8 (1), 27537, http://dx.doi.org/10.3402/gha.v8.27537
[9] Lyons, K., and N. Smith (2018). "Governing with ignorance: Understanding the Australian food regulator's response to Nano food" *Nanoethics* 12, 27, https://doi.org/10.1007/s11569-017-0309-2
[10] Osipov, V., N. Rumyantseva, and O. Eremina (2015). "Territorial zoning by natural conditions as a nature-like technology in engineering geology" *Procedia – Social and Behavioral Sciences* 214, 338-343, https://doi.org/10.1016/j.sbspro.2015.11.656
[11] Pacheco, L. F., M. Altrichter, H. Beck, D. Buchori, and E. H. Owusu (2018). "Economic growth as a major cause of environmental crisis: Comment to Ripple et al." *BioScience* 68 (4), 238, https://doi.org/10.1093/biosci/biy006
[12] Sengupta, E. R. (2013). "*Ecological limits and economic development*": Oxford University Press, New Delhi, https://doi.org/10.1093/acprof:oso/9780198081654.001.0001.
[13] Shokri, Sh.A., A. Arkhipov, O. Belokrylova, and Yu. Filonenko (2017). "Vulnerability assessment of the agricultural economy in Russia (using the example of Rostov Region, Southern Federal District)" "[Otsenka uyazvimosti ekonomiki sel'skogo khozyaystva Rossii (na primere Rostovskoy oblasti, YUFO)]" *Universe of Russia: Sociology, Ethnology* [Mir Rossii] 26 (2): 82-97, https://mirros.hse.ru/article/view/4867/5230
[14] Tantri, M. L. and K. Shaurav (2018). "*Food security in BRICS – current status and issues*" in *Working Paper* 419 by M. Reimeingam, Ed., The Institute for Social and Economic Change: Bangalore, India, http://www.isec.ac.in/WP%20419%20-%20Malini%20L%20Tantri_12%20-%20Final.pdf
[15] The Economist Group (2018). *Global Food Security Index. Methodology*, https://foodsecurityindex.eiu.com/Home/Methodology.
[16] General arrangement (2018). Interactive map of dumps, http://kartasvalok.ru/#
[17] Gurova, T., V. Kolerova, and Yu. Polunin. (2018). "*A Thousand Lucky People*" 10 (1066), 26-28, http://expert.ru/expert/2018/10/tyisyacha-schastlivchikov/
[18] Don State Public Library (2018). 2018 – *Year of the volunteer and volunteer in Russia. Motto of 2018 on the Don "I am for a clean home! My home is Quiet Don!"*, http://ecodon.dspl.ru/pages/news/news.aspx?nid=1624
[19] Kolesnikov, Yu. S. and V.N. Ovchinnikov (2017). "*Traditional economic practices of the peoples of the North Caucasus: Ethnoeconomics – XXI century*": Sodeistviye – XXI century, Rostov-on-Don
[20] Medvedev, D. "Food Security Doctrine Indicators Almost Fulfilled" *Ekonomika i zhizn* 41 (9707), 19 October 2017, 1, https://www.eg-online.ru/news/358136/
[21] Ovchinnikov, V.N. and A.A. Lysochenko (2013). "Positioning the Southern Russian regions in the format of globalization imperatives of Russian accession to the WTO: Ensuring food security" *Terra Economicus* 11 (1-2), 14-17, 113-118, https://econpapers.repec.org/article/scn031478/14383606.htm
[22] Ovchinnikov, V.N. and N.P. Ketova (2015). "Economic imperatives of the reproduction process in the regional environmental management system" *Bulletin of Adyghe State University. Economics Series*, 4, 125-127, vestnik.adygnet.ru/files/2015.4/4176/122-129.pdf
[23] Decree of the President of the Russian Federation (2010). No. 120 "On Approval of the Doctrine of Food Security of the Russian Federation" *Rossiyskaya Gazeta* – Federal Issue 5100 (21), 1, http://base.garant.ru/12172719/
[24] Expert South (2018). "*100 largest investment projects of the South Federal District in 2017*" 1-2, 34, http://expert.ru/south/2018/7/

A Quantitative Method for Multicriteria Analysis of the Assets of a Critical System in the Management Process of Information Security

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Abstract

The selection of an optimal solution for the identification of the critical assets is a rather complex process, as all the valuable assets of an organization have to be identified, classified and quantified under a common approach, within the risk management process.
The paper proposes a quantitative method for the identification of critical assets/ services within information security assessment and analysis process which is based on multi-criteria analysis.
The aim of this paper is to present a more objective method for the assessment, ranking and quantification of critical assets/services through the analysis of predefined criteria using TOPSIS method.
The authors consider that by using this method we can take better decisions in ranking critical assets/services.

Keywords: *information security; critical system; multicriteria analysis; critical asset; TOPSIS method; normalization, weight.*

1. Introduction

The critical information system represents a special class of systems because its dysfunctions could lead to catastrophic effects such as losses of human lives, great financial loss, explosions, fire hazards etc.).

The specialized literature shows a constant preoccupation with the improvement of the quality of the critical systems during their development and operation.

Sommerville, (2007) [1] classifies the critical systems in three large classes: safety-critical systems in which failures lead to the loss of life or serious environmental damages (for instance, nuclear power plant management system); mission-critical systems in which dysfunctions obstruct the objective-oriented activities (for instance, the air navigation system) and the business-critical systems in which failures could lead to great economic losses (as, for instance, the financial and banking system).

It should be noted that the identification and the analysis of the critical assets/services represent a basic component of the risk management, of the increased efforts of the interested parties for the information security as to ensure the adequate protection for the operating systems with high functional responsibility (for instance, business systems, disaster emergency systems, command and control systems, defense systems or government telecommunications services systems etc.).

The identification of critical information for the assets/services or of network critical information (for example, a Web server or a DBMS) also allow the security programs to prioritize the lists of the classified assets (for instance, files and directors considered to be quite sensible or important for the role and mission of the system).

In the same time, the limitation of the access to the critical assets/services (interruption, unauthorized utilization or theft) could also have major consequences on security (for instance, the file servers that the users' community depend on).

The task achievement is a real challenge as it is difficult to identify correctly which assets play a major part in the fulfillment of the mission, which are the adequate evaluation criteria and the type of the analysis, the nature and effects of the consequences that could appear in a critical information system, for instance in the command and control system of the air safety.

It is also important to note that "the internet replaces more and more the data networks that were implemented as to become a transporter for a larger number of critical applications – for example, financial data transactions or security operations – and then, the impact of the operational failures could become dramatic".

We could conclude that the **internet** has become also a critical infra structure even though it was not conceived for this purpose" (see FP7-288021– ©The EINS Consortium, 2014) [2].

The assessment and the analysis of the assets of the critical information systems are meant to estimate and classify according to different security criteria, the importance, the value etc. to be found in a system.

Generally speaking, criticality criteria are based on the three common attributes of information security: **C**onfidentiality, **I**ntegrity, **A**vailability. Criticality makes also use of the value of the assets in order to estimate the final value and some other relevant criteria. Usually, the higher the level of criticality is, the bigger the impact becomes, with unfavorable consequences for the asset security as well as for the assessed system.

An accurate identification of the critical assets allow the interested parties to rank as first priority the critical assets/ services of the system even though, budget restrictions and material resources limitations are sometimes an almost impossible obstacle to protecting all the assets.

The critical assets/services identification and assessment process permits the interested parties to conceive and refine the investigation activities, the maintenance plans and the financial projects regarding most important fields of activity and low costs.

The analysis and detailed evaluation of the risks can thus be limited to key assets as, for example, damaged assets that could have disastrous effects on information security, national

economic safety, national public safety and health or on any of these combinations (see USA PATRIOT Act, 2001) [3].

In the present, there is no available method for the identification of the critical aspects which could offer a clear orientation to these requirements even though many risk and assessment methodologies appeal to a specific type of identification of the critical assets from the information security systems.

2. General approach

The assessment of the information system critical assets, as a part of the information security management process, introduces a complex approach to their identification and analysis as to better quantify and manage them and to classify them in an order which observes work requirements and risk processing within organizations.

Standard ISO/IEC 27005:2011 defines only the general frame of assets classification without a clear orientation to their classification and selection although there is a strong need for an efficient method for their analysis. ISO 27005 refers mostly to the utilization of subjective evaluation and of quality requirements for the identification and the assessment of organization's assets.

Depending on the criticality level of an asset/service, risk management could be seen as a network approach while considering the availability of the deviation, with a minimum impact for each and every asset or, for each component, giving full information about it and proceeding to a complex investigation on damage possibilities.

The present paper proposes a plan for the identification of the critical assets/services based on the concept of multi-criteria decision making, as to offer most intelligible ways of solving this type of problems.

2.1. Multi-criteria analysis – implies decision making (evaluation, ranking, selection) on available options characterized by multiple, usually conflicting attributes (see Hwang, C.L.and Yoon, K. (1981) [4].

Baker et al. (2001) [5] considers that decision making should begin with the identification of the decisional factors and of the interested parties, minimizing possible disagreements by pointing out the problems, requirements, aims and criteria.

TOPSIS method will be used in order to quantify and classify critical assets based on evaluation criteria (attributes).

2.1.1. TOPSIS method (*Technique for Order of Preference by Similarity to Ideal Solution*) was developed by Hwang, C.L. and Yoon, K. (1981) [4] based on the concept that "the chosen option should have the shortest geometric distance from the positive ideal solution and the longest geometric distance from the negative ideal solution" (see Yoon, K., Hwang, C. L.1995) [6]. The ideal solution is the selection of ideal scores (or evaluations) from all the considered criteria. TOPSIS assumes that each criterion has an increasing or decreasing tendency of the monotonic utility. Therefore, it is rather easy to find positive and negative ideal solutions. Euclidean distance is utilized to evaluate the relative closeness of the options against the ideal solution. Thus, the order of preference for the options is given by the comparison of these relative distances. It is also assumed that there are *m* options (options) and n criteria (attributes) where *m* and *n* are finite and the score for each option is set according to each criterion taken into account. This method includes several phases as follows:

Step1. **Option identification**

The options offer different approaches regarding the way the goals are fulfilled, in which any option has to comply with the given requirements. The best option will be the option which gets closest to the goal fulfillment. Following the analysis, the requirements impossible to achieve have to be excluded and an explicit list of options be made.

Step 2. **Defining criteria**

Decision criteria, which differ among options, have to be based on goals. It is necessary to define different criteria for performance measuring for each option that can fulfill the established goals. Criteria grouping can ease the control process when the selected set of criteria is adequate to the problem and to the calculation of the weight of criteria for certain methods.

According to Baker et al. (2001) [5], these criteria should be:

- capable of differentiate "significantly" between options and support the comparison between the performances considered for every option;
- complete as to include all the targets;
- operational and significant;
- non-redundant;
- few in number.

In our case, a decision referring critical assets classification should take into account aspects such as value, replacement costs, vulnerabilities of assets/controls (antivirus/malware software, Intrusion detection, CA, TVCI systems, mechanical and physical etc), CID (human, software, hardware, maintenance) etc.

These could be considered some of the decision criteria for the multi-criteria analysis and for establishing a cost-benefits ratio of the critical assets in a system.

We created a table model to evaluate and classify the information critical assets/services according to criticality level; it includes criteria, measuring units indicator, value range, optimization type.

CRITICALITY CRITERIA[1]		DESCRIPTION	MU Indicator	Value Range	Optimization type Max.+ / Min. -
C_1	<established criteria>	< brief description of the criterion >	<measuring unit>	<established by analyst> (i.e. from 1– to 10)	<benifits- costs>
C_i	.....	.....	.....	.....	.....
C_m	.....	.....	.....	.....	.....

Table 2.1. Criteria and range value – set for the assets of an information critical system

Step 3. **Construct decision matrix**

In our case the options are represented by the assets of an information critical system of an organization which we analyze through multi-criteria analysis in order to classify them

where a_{ij} describes the measurement of the option – *i performance*, within criterion *j*.

Table 2.2.		Criteria			
Option		C_1	C_2	…C_j…	C_n
asset 1	A_1	a_{11}	a_{12}	…	a_{1n}
asset 2	A_2	a_{21}	a_{22}	…	a_{2n}
	…	…	…	…	…
asset i	A_i	…	…	a_{ij}	…
…	…	…	…	…	…
asset m	A_m	a_{m1}	a_{m2}	…	a_{mn}

Step 4. **Construct normalized decision matrix**

In this procedure different dimensions of options are transformed in non-dimensional ones which allows comparisons across criteria.

Scores or data are normalized as follows:

[1] the characteristics of an asset are concerned with the impact on the productivity of an organization. For instance, the impact of a corrupted database on the capacity of an organization to produce incomes (Jones, A.J., 2005) [7]

where:

$$r_{ij} = \frac{a_{ij}}{\sqrt{\sum_{i=1}^{m} a_{ij}^2}} \qquad [1]$$

where $i = 1, ..., m$; $j = 1, ..., n$

Step 5. **Construct the weighted normalized decision matrix**

Assume we have a set of weights $w_j = (w_1, w_2, w_3, ..., w_n)$, where: ($\Sigma w_j = 1, j = 1,\ldots n$) for each criterion, where:

Multiply each column of the normalized decision matrix by its associated weight. An element of the new V matrix is $v_{ij} = w_j r_{ij}$, respectively.

Table 2.3.		Criteria			
Option		**C_1**	**C_2**	**...C_j...**	**C_n**
asset 1	**A_1**	r_{11}	r_{12}	...	r_{1n}
asset 2	**A_2**	r_{21}	r_{22}	...	r_{2n}
	...	...	...	...	...
asset i	**A_i**	...	...	r_{ij}	...
...	...	...	...	...	...
asset m	**A_m**	r_{m1}	r_{m2}	...	r_{mn}

Table 2.4.		Criteria			
Option		**C_1**	**C_2**	**...C_j...**	**C_n**
asset 1	**A_1**	v_{11}	v_{12}	...	v_{1n}
asset 2	**A_2**	v_{21}	v_{22}	...	v_{2n}
	...	...	...	...	...
asset i	**A_i**	...	...	**v_{ij}**	...
...	...	...	...	...	...
asset m	**A_m**	v_{m1}	v_{m2}	...	v_{mn}
Weight		**w_1**	**w_2**	**...w_j...**	**w_n**

Step 6. **Determine the ideal and negative ideal solutions**

Ideal A* and negative ideal A solutions are defined as follows:

$$A^* = \{v_1^*, v_2^*, ..., v_j^*..., v_n^*\}, \qquad [2]$$

where (v_j^* is the best value for criterion-j across all options)

$$v_j^* = \{\max_i (v_{ij}) \mid j \in J, \min_i (v_{ij}) \mid j \in J' \mid i = 1,2,3, ..., m\} \qquad [2.1.]$$

$$A^- = \{v_1^-, v_2^-, ..., v_j^-..., v_n^-\}, \qquad [3]$$

where (v_j^- is the worst value for criterion-j across all options).

$$v_j^- = \{\min_i (v_{ij}) \mid j \in J, \max_i (v_{ij}) \mid j \in J' \mid i = 1,2,3, ..., m\} \qquad [3.1.]$$

where: $J = \{j = 1,2,3, ..., n \mid j$ associated with benefits criteria$\}$, $J' = \{j = 1,2,3, ..., n \mid j$ associated with cost criteria$\}$.

For benefit criteria, the analyst wants to have a maximum value between options (t*he assets of an information critical system in multi-criteria evaluation process*). For cost criteria, the analyst wants to have a minimum value between options.

Obviously, A* is closest to the solution of the preferred or ideal option. Similarly, A^- indicates the solution of the less preferred option or negative ideal.

Step 7. **Calculate the separation measures for each option**

To measure the separation distances of each options for the ideal solution and the negative ideal solution, n-dimensional Euclidian distance method is utilized:

$$S_{i^*} = \sqrt{\sum_j^n \left(v_{j^*} - v_{ij}\right)^2}, \; i = 1, ..., m \qquad [4]$$

where Si* stands for separation (in the Euclidean sense) of each option against the ideal solution.

$$S_{i^-} = \sqrt{\sum_j^n \left(v_{j^-} - v_{ij}\right)^2}, \; i = 1, ..., m \qquad [5]$$

where S_i^- stands for separation (in the Euclidean sense) of each option against the ideal negative solution.

Step 8. **Calculate relative closeness to the ideal solution**

The relative closeness of an A_i option with respect to ideal solution A* is defined as follows:

$$Ci^* = S_i^- / (S_i^* + S_i^-), \text{ where } 0 \le C_i^* \le 1, i = 1, ...m, \qquad [6]$$

Select option with C_i * closest to 1

for $C_i^* = 1$, if $A_i = A^*$ and for $C_i^- = 0$, if $A_i = A^-$

Step 9. **Set the scale with the preference order of the option**

The best satisfied option can now be established according to the preference order of C_i^*.

That is why the best option is the one which has the shortest distance to the ideal solution. The relation between options reveals that the option which has the shortest distance to the ideal solution is guaranteed to have the longest distance to the negative ideal solution.

In our case, the best satisfied option concerns the identification of the asset most exposed to critical circumstances in the context of risk settings , which is defined by criticality criteria.

3. Case study for method validation

For our case study, in this section we will present an illustrative application of a banking information critical system (Fig. 3.1).

The system has a three level architecture (client, web server and directory services) and utilizes a work space organized on a complex integration platform.

The communication system is a specialized system that ensures communication with external users via internet services and communication with internal users via intranet.

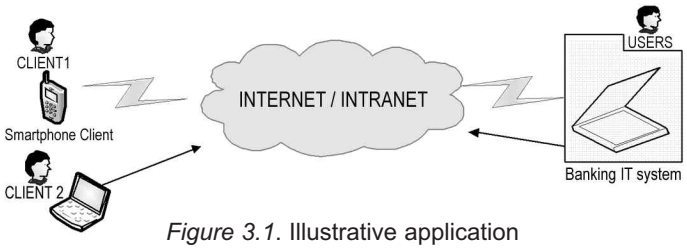

Figure 3.1. Illustrative application

As such, it uses a radio/wireless network for mobile terminals Smartfone/PDA with internet access and computers from the internet computers as well as intranet network computers which have access to the communication services. We are interested in determining which are the best options with respect to the established criteria, that is a ranking, as objective as possible, of the critical assets/services considered in the telecommunication services (for instance – to establish the assets/services criticality and distribute the budget according to the required security level). In order to establish the preference order of the option of the assets, depending on their level of criticality, we will use a set of predefined calculation tables excel.

We have also developed a table containing value ranges and criteria, appropriate for the required situation as in table 3.1.

In order to evaluate asset criticality we will consider $A = \{A_i$, for i = 1,2,3, ..., 6} a set (finite) of asset options and C $\{c_j$, for j = 1,2,3, ..,8} a set of criteria (finite) as to establish the scores of the preferences for the assets of a critical information system, with the best solution; in this respect we created a matrix table displaying asset options and criteria values, as shown in table 3.2.

The normalization of the analysis matrix (see table 3.2), is an operation by which criteria values expressed in different measuring units are transformed in a common measuring scale which allows the comparison between them, as shown in table 3.3.

In order to determinate the weight of each option depending on the measuring criterion, we created a matrix table as seen in table 3.4.

CRITERIA FOR CRITICALITY		DESCRIPTION	MU Indicator	Value range	Optimization type Max.+ / Min. -
C_1	Vulnerability level	An asset can be vulnerable an attack, given its misplacement in the system, the visibility of the valuable assets (**CIA**, monetary values etc.) or other circumstances that can increase the possibility of a security breach with negative consequences	*Number of attacks/ period of time short (1) to longer (10)* (attacks recorded in a definite period of time, for instance 1 month)	**1–10**	**Min.**
C_2	Asset value	The more relevant and numerous the business processes supported by an asset are, the greater the value of that specific asset is	*Asset value (thousands of $)* small **(1) to big (10)**	**1 – 10**	**Min.**
C_3	Asset availability	Availability value is measured by the damage level which could be a result, as a consequence of the destruction, taking away or unauthorized utilization [8] . Availability values are generally derived from the importance of the services they support.	*Damage values (thousands of $)* reduced impact (**1**) to big impact (**10**)	**1–10**	**Max.**
C_4	Asset confidentiality[1)]	The impact coming from the unauthorized disclose of confidential information or its inappropriate utilization, is measured by the level of damage that could result, reasonably speaking. Some physical assets[2)] could also justify the protection for confidentiality reasons (see TRA-1, 2007) [8].	*Damage values (thousands of $)* reduced impact (**1**) to big impact (**10**)	**1 – 10**	**Max.**
C_5	Asset integrity[3)]	Integrity value is applied mainly to information and is measured by the damage level which that could result, reasonably speaking, from a unauthorized modification of the information or of the characteristic of an asset, for example, the security characteristic	*Damage values (thousands of $)* reduced impact (**1**) to big impact (**10**)	**1 – 10**	**Max.**
C_6	Asset replacement value[4)]	Costs associated with the replacement of an *asset with a new one, with the same efficiency, mounting expenses, training etc.* – the said asset being stolen or damaged. For instance, the cost of a stolen laptop or the reconstruction of a building that was set on fire	*Replacement cost* (*thousands of $)* Low cost **(1)** to high cost (10)	**1 – 10**	**Min.**
C_7	Reputation affected	Loss of credibility/ negative effect caused by losses associated with an external perception that the organization leadership is incompetent, criminal or unethical	*Loss of value* (*thousands of $)* Little affected **(1)** to very affected **(10)**	**1 – 10**	**Min.**
C_8	Degree of dependency	identification of the dependency of the assets regarding business processes and the other assets which could influence the value of the assets (see ISO 27005:2011) [9]	*Dependency level* low **(1)** la high **(10)**	**1 – 10**	**Min.**

1) It is considered that data confidentiality has to be kept throughout its lifespan…security and storage needs for data and processing programs should be directly connected to the value that represents the confidentiality of processed and stored data ISO 27005:2011) [9]
2) for instance, unauthorized access to certain military equipments can expose the operational capacities; other produces can be analyzed as to determine trade secrets by utilizing reverse engineering technology; and some other security components could be examined by potential attackers as to discover their vulnerabilities (see TRA-1, 2007) [8].
3) If a business process is bad on the integrity of certain data produced by software then the input data have to be reliable. More than that, information integrity depends on the hardware and software used for their processing and storage etc.
4) The cost of information recovery and replacement (if that is possible) and the economic consequence of the loss or compromising of the asset, as the legal consequences or the regulatory consequences engendered by the disclosure, modification, non-availability or destruction of information.

Table 3.1. Matrix table – Criteria and value range

Asset options *	Criterii**	C_1	C_2	C_3	C_4	C_5	C_6	C_7	C_8
	*a_i – a set (finite) of asset options *critical information system*; **c_j - a set of criteria (finite) by means of which we will establish the scores with the best solution; where i = 1,2,3, ..., 6; j = 1,2,3, ..,8	Vulnerability level	Asset value	Asset availability	Asset confidentiality	Asset integrity	Replacement value	Affected reputation	Dependency degree
	Measuring unit (M.U)	No. of attacks	Thousand of/$	Thousand of/$	Thousand of/$	Thousand of/$	Thousand of/$	Thousand of/$	no. of dependencies
	Optimization type	**min.**	**min.**	**max.**	**max.**	**max.**	**min.**	**min.**	**min.**
A_1	Bank users	**3**	**4**	**4**	**3**	**3**	**3**	**4**	**2**
A_2	WEB Proxy server	**5**	**6**	**9**	**5**	**5**	**4**	**3**	**4**
A_3	Database server	**6**	**7**	**8**	**9**	**9**	**5**	**4**	**5**
A_4	Online banking	**7**	**3**	**7**	**8**	**8**	**4**	**6**	**3**
A_5	Safe, monetary values	**4**	**5**	**5**	**2**	**5**	**4**	**5**	**2**
A_6	Power feeding system	**4**	**3**	**7**	**3**	**3**	**5**	**4**	**7**

Table 3.2. Matrix table with asset options and criteria values

Asset options	Criteria	C_1	C_2	C_3	C_4	C_5	C_6	C_7	C_8
	Calculate: $r_{ij} = \frac{a_{ij}}{\sqrt{\sum_{i=1}^{m} a_{ij}^2}}$ for, i = 1,2,3, ..., 6; j = 1,2,3, ..,8	Vulnerability level	Asset value	Asset availability	Asset confidentiality	Asset integrity	Replacement value	Affected reputation	Dependency degree
A_1	Bank users	0.275	0.341	0.197	0.252	0.235	0.337	0.441	0.193
A_2	WEB Proxy server	0.458	0.512	0.445	0.421	0.392	0.450	0.331	0.386
A_3	Database server	0.550	0.598	0.395	0.757	0.707	0.562	0.441	0.483
A_4	Online banking	0.641	0.256	0.346	0.673	0.628	0.450	0.662	0.290
A_5	Safe, monetary values	0.366	0.427	0.247	0.168	0.392	0.450	0.552	0.193
A_6	Power feeding system	0.366	0.256	0.346	0.252	0.235	0.562	0.441	0.676

Table 3.3. Matrix table with normalized values of the options and the criteria shown in table 3.2

Active Options*	Criteria	C_1	C_2	C_3	C_4	C_5	C_6	C_7	C_8
	Calculate: $w_j * r_{ij}$ for, i = 1,2,3, ..., 6; j = 1,2,3, ..,8	Vulnerability level	Asset value	Asset availability	Asset confidentiality	Asset integrity	Replacement value	Affected reputation	Dependency degree
A_1	Bank users	0.028	0.034	0.030	0.051	0.035	0.027	0.053	0.019
A_2	WEB Proxy server	0.046	0.051	0.067	0.084	0.059	0.036	0.040	0.039
A_3	Database server	0.055	0.060	0.059	0.152	0.106	0.045	0.053	0.048
A_4	Online banking	0.064	0.026	0.052	0.135	0.094	0.036	0.080	0.029
A_5	Safe, monetary values	0.037	0.043	0.037	0.034	0.059	0.036	0.066	0.019
A_6	Power feeding system	0.037	0.026	0.052	0.051	0.035	0.045	0.053	0.068
Weight ($\sum w_j = 1$)		**0.1**	**0.1**	**0.15**	**0.2**	**0.15**	**0.08**	**0.12**	**0.1**

Table 3.4. Matrix table for weight determination

Determine a ranking of the solutions for the asset options, in our case *the assets of a banking information system*, option A* respectively, with the highest benefit and option A⁻ the less preferred with respect to the relevant criteria c_j, for which we will utilize a matrix table as shown in table 3.5.

In order to calculate separation measures of the options to the ideal solution, we will utilize a matrix table as shown in table 3.6.

Asset options*	Criteria	C_1	C_2	C_3	C_4	C_5	C_6	C_7	C_8
	A* indicates the solution for the most preferred or the ideal asset Indicates the solution for less preferred or negative ideal asset	Vulnerability level	Asset value	Asset availability	Asset confidentiality	Asset integrity	Replacement value	Affected reputation	Dependency degree
	Optimization type	**min.**	**min.**	**max.**	**max.**	**max.**	**min.**	**min.**	**min.**
A_1	Bank users	***0.028***	0.034	**0.03**	0.051	**0.035**	***0.027***	0.053	***0.019***
A_2	WEB Proxy server	0.046	0.051	***0.067***	0.084	0.059	0.036	***0.04***	0.039
A_3	Database server	0.055	**0.06**	0.059	***0.152***	***0.106***	**0.045**	0.053	0.048
A_4	Online banking	**0.064**	***0.026***	0.052	0.135	0.094	0.036	0.08	0.029
A_5	Safe, monetary values	0.037	0.043	0.037	**0.034**	0.059	0.036	**0.066**	***0.019***
A_6	Power feeding system	0.037	0.026	0.052	0.051	**0.035**	**0.045**	0.053	**0.068**
PREFERRED SOLUTION		**A*= { *0.028, 0.026, 0.067, 0.152, 0.106, 0.027, 0.04, 0.019* }** **A⁻ = { 0.064, 0.06, 0.03, 0.034, 0.035, 0.045, 0.066, 0.068 }**							

Table 3.5. Table for the determination of the ranking of the solutions for asset options

Asset options*	Criteria	C_1	C_2	C_3	C_4	C_5	C_6	C_7	C_8	
	Calculate : $S_{i^*} = \sqrt{\sum_j^n (v_{j^*} - v_{ij})^2}$ for, i = 1,2,3, ..., 6; j = 1,2,3, ..,8	Vulnerability level	Asset value	Asset availability	Asset confidentiality	Asset integrity	Replacement value	a Affected reputation	Dependency degree	S_{i^*} option separation from the negative ideal solution
A_1	Bank users	0	0.000036	0.001369	0.010201	0.005041	0	0.000169	0	**0.129677**
A_2	WEB Proxy server	0.000324	0.000625	0	0.004624	0.002209	0.000081	0	0.0004	**0.090901**
A_3	Database server	0.000729	0.001156	0.000016	0	0	0.000324	0.000169	0.000841	**0.056877**
A_4	Online banking	0.001296	0	0.000225	0.000289	0.000144	0.000081	0.0016	0.0001	**0.061115**
A_5	Safe, monetary values	0.000081	0.000289	0.0009	0.013924	0.002209	0.000081	0.000676	0	**0.134759**
A_6	Power feeding system	0.000081	0	0.000225	0.010201	0.005041	0.000324	0.000169	0.002401	**0.135801**

Table 3.6. Matrix table for calculation of separation measures for the ideal solution

In order to calculate the separation measures of the option to the negative ideal solution, we will utilize a matrix table as shown in table 3.7.

The final step aims at establishing the preference order of the options that is, in our case, establishing the hierarchical order of the assets according to their criticality level. Therefore, we calculate the relative closeness to the ideal solution respectively, the relative closeness of an option Ai against the ideal solution A* as shown in table 3.8.

The analysis of the results shown in Table 3.8 indicates that asset option WEB Proxy server is the asset with the most important criticality <0.963671457>: on the 2nd place is Database server with <0.715480107>: and on the 3rd place is Bank users with <0.62547087>etc.

Asset options*	Criteria Calculate : $S_{i^-} = \sqrt{\sum_j^n (v_{j^-} - v_{ij})^2}$ for, i = 1,2,3, ..., 6; j = 1,2,3, ..,8	C_1 Vulnerability level	C_2 Asset value	C_3 Asset availability	C_4 Asset confidentiality	C_5 Asset integrity	C_6 Replacement value	C_7 Affected reputation	C_8 Dependency degree	S_{i^-} option separation from the negative ideal solution
A_1	Bank users	0.001296	0.000676	0	0.000289	0	0.000324	0.000169	0.002401	**0.005155**
A_2	WEB Proxy server	0.000324	0.000081	0.001369	0.0025	0.000576	0.000081	0.000676	0.000841	**0.006448**
A_3	Database server	0.000081	0	0.000841	0.013924	0.005041	0	0.000169	0.0004	**0.020456**
A_4	Online banking	0	0.001156	0.000484	0.010201	0.003481	0.000081	0.000196	0.001521	**0.01712**
A_5	Safe, monetary values	0.000729	0.000289	0.000049	0	0.000576	0.000081	0	0.002401	**0.004125**
A_6	Power feeding system	0.000729	0.001156	0.000484	0.000289	0	0	0.000169	0	**0.002827**

Table 3.7. Matrix table for calculation of separation measures for the negative ideal solution

		Preference order scale	
		$Ci^* = Si^- / (Si^* + Si^-)$	Select option with Ci * closest to 1 for $C_i^* = 1$, if $A_i = A^*$ and for $C_i^- = 0$, if $A_i = A^-$
Asset option		where $0 \le C_i^* \le 1$, i = 1, ...m	
A_1	Bank users	**0.62547087**	**3**
A_2	WEB Proxy server	**0.963671457**	**1**
A_3	Database server	**0.715480107**	**2**
A_4	Online banking	**0.142294725**	**6**
A_5	Safe, monetary values	**0.540826181**	**4**
A_6	Power feeding system	**0.444693997**	**5**

Table 3.8. Matrix table for the calculation of the relative closeness to the ideal solution

The validity of the resulting solutions is easy to check and the method involved can be considered as a strong evaluation method with a high level of objectivity.

It should be noted that a correct decision making implies as input data, the evaluation of the options against the established criteria. Depending on the selected criteria, the evaluation can be either objective (factual) compared to a common measuring scale, which is understood (for instance, financial losses) or subjective (based on one's judgment) that is, it reflects the experience of the analyst.

4. Conclusions

The assessment of the assets of the critical systems of information security represents a key factor in evaluating the consequences resulting from an incident as that incident can exert influence on several assets (for instance, dependent assets) or only on a part of an asset.

The different threats and vulnerabilities can have different consequences on the assets, as for example, the loss of confidentiality, integrity or availability (see ISO 27005:2011) [9].

The identification process of critical assets represents a first phase in the risk identification process. The objective of this phase is to identify and classify, in a common approach, all the valuable assets of the organization, called *critical assets*: people, procedures, information, software, hardware, networks, non tangible assets (for instance, image and reputation) etc. and their work dependencies [10].

The evaluation and the quantification of the critical assets by means of TOPSIS method resulted in an efficient analysis in point of benefits and costs and also in an efficient analysis in point of ranking and prioritizing for the evaluation and the analysis of information security in the management process of information security.

This method is based on a simple process easy to use and organize. The number of steps remains the same no matter how many options can be. A disadvantage is given by fact that the use of Euclidean distance does not take into account the correlation of the options.

It is difficult to evaluate the options and maintain the coherence of the judgment. The advantage of its simplicity and of its capability to maintain the same number of steps, despite the size of the assessed system, made it suitable for the examination of some other methods as well as for a decision making tool.

It should be noted that this multi-criteria analysis, TOPSIS method, can be successfully used to evaluate options in terms of a set of decision criteria as to determine a ranking of the vulnerabilities or of the checkings in a critical telecommunication security system.

References

[1] Sommerville, I. (2007). *Software Engineering*. Addison Wesley, 8th edition, 44p. Retrieved from http://stst.elia.pub.ro/news/IS/IS_PPT/Software%20engineering%208th%20ed.pdf.

[2] FP7-288021– ©The EINS Consortium (2014). *Internet Science – Going Forward: Internet Science Roadmap*, Editor: Ioannis Stavrakakis (NKUA), David Hutchison (ULANC), pp 52-53. Retrieved from https://eprints.soton.ac.uk/373227/1/373227.pdf.

[3] USA PATRIOT Act (2001). (U.S. H.R. 3162, Public Law 107-56), Washington, DC, Title VII and VIII

[4] Hwang, C.L.and Yoon, K. (1981). *Multiple Attribute Decision Making: Methods and Applications*, Berlin/Heidelberg/New-York: Springer Verlag.

[5] Baker et al. (2001). *Guidebook to Decision-Making Methods, WSRC-IM-2002-00002*, Department of Energy, United States of America, pp 2-5. Retrieved from https://www.researchgate.net/publication/255621095_Guidebook_to_Decision-Making_Methods

[6] Yoon, K., Hwang, C.L. (1995). "*Multiple Attribute Decision Making: An Introduction*", Sage Publications, Inc.
[7] Jones, A.J. (2005). *An Introduction to Factor Analysis of Information Risk (FAIR)*. Risk Management Insight LLC. pp 23-27. Retrieved from https://www.yumpu.com/en/document/read/7271140/an-introduction-to-factor-analysis-of-information-risk-fair.
[8] TRA-1 (2007). Harmonized Threat and Risk Assessment Methodology, Annex B, Asset Identification and Valuation Phase: B-11. Retrieved from https://cyber.gc.ca/sites/default/files/publications/tra-emr-1-e.pdf
[9] ISO/IEC 27005:2011 Information technology -- Security techniques -- Information security risk management.
[10] Firoiu, M. and Bacivarov, I. (2016). Physical and Logical Security Risk Assessment Procedure for SMEs, according to ISO/IEC 27005:2011 and SR ISO 31000:2010 Standards, *Quality-Access to Success*, Vol. 17, No. 152, pp. 86-98.

The Quality of Management Accounting Information System is the Key to Increasing User Satisfaction of Information Systems: Evidence of State Owned Enterprises (SOE's) in Indonesia

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Abstract

This study aimed to examine the influence of management accounting information system (MAIS) to the users satisfaction of information system. User satisfaction is very important and it is a major conceptual contribution in the quality of information system. This study uses survey method and causality by using the PLS (partial least square) as the test tool. This research is conducted at 56 state-owned enterprises (SOEs) with 236 empower operational managers as respondents. The finding shows that the quality of management accounting information system effects on system user satisfaction. It also shows that some companies in the state-owned sector still have a low the quality of management accounting information system, so that it impacts on the satisfaction of operational managers in that sector. Integration is the main measurement of the quality of management accounting information system which is indicated by its business simplification.

Keywords: *integration; quality; management accounting information systems; user satisfaction; state owned enterprises.*

1. Introduction

User satisfaction of information system depends on the quality or success of information systems to help users complete their tasks and based on the use intensity (Weber, 1999:907; Stair & Reynolds, 2010:74). Information system is said qualified if the information systems users use the information systems that is available in company and feel satisfied with the information systems used (Bukhari, 2005). In the context of management accounting information system, it is found the same thing, the quality of management accounting information system is the satisfaction key of operational managers in manufacturing company at private sector, because of the quality of information system, the operational managers can make decisions in completing the job faster and more right (Napitupulu, 2015).

Management accounting information systems is the same as information systems in general (Kaplan, 1984). Management accounting information system is part of the accounting information system in company (Hansen & Mowen, 2007:7; Susanto, 2008:84). Management accounting information system (MAIS) is *the set of human and capital resources within an organization that is responsible for the production and dissemination of information deemed relevant for internal decision making* (Belkaoui, 2002:9). Thus, MAIS is an integral part of an organizational structure and for monitoring process, to motivate, to provide performance measurement, such as authority delegation, to communicate goals, participation and feedback of information (Jones, 1985).

Measuring the user satisfaction of information systems is related to the problems of relationship between users with the staff of information systems, the quality of information which is produced by information system, and the reliability of the information system itself to assist users in completing the work (Weber, 1999:890). Thus, it can be proven that the users' satisfaction of information systems from the user perspective when it meets user expectations (Fisher, 2001). This is in line with the expectations of Victor H. Vroom theory which says that the strong tendency to act in a certain way depends on the strength of hope in which the action will be followed by a particular output and on the output attractiveness for the individual (Robbins, 2007:238). Output that impact on individuals will be better when the users feel the satisfaction of the information that is generated by the quality information system (DeLone & McLean, 1992, 2003).

Many studies about user satisfaction of information systems refers to the model DeLone & McLean (1992), as Seddon & Kiew (1996); Rai *et al* (2002); Wixom & Todd (2005); Dastgir & Mortezaie (2012); Aggelidis & Chatzoglou (2012) and Chang *et al* (2012), proved that the quality of information systems to the positive influence user satisfaction and create job satisfaction. In particular in the context of management accounting information systems, research conducted Mia & Patiar (2001); Hamdan (2012); Fleischman *et al* (2010) and Weisenfeld & Killough (2001) proved that the quality of management accounting information systems provide satisfaction in decision making, both short-term decisions and long term.

Proving the Results of previous research, so This research was conducted at State Owned Enterprises (SOEs). The problems that arise today are there are still many SOEs have not had integrated information system and efficient information system yet, so it boosts operational costs the number of SOEs, including the cost of logistics (Japarin, 2014). The impact of it is that all users are dissatisfied to the condition of information system that is used. Referring to this condition, the study aims to examine the influence of management accounting information system (MAIS) against user satisfaction of information system. This study will discuss the characteristics of information systems quality and measure user satisfaction of information systems on the satisfaction in decision-making as well as the convenience in

using management accounting information system at State Owned Enterprises.

2. Literature Study and Hypothesis Development

2.1. The Quality of Management Accounting Information Systems

The accounting information system of an organization has two major subsystems: financial accounting information system (FAIS) and management accounting information systems (MAIS), in which both sub accounting systems are distinguished on the goal, the input nature and the process type that are used to transform inputs into outputs (Hansen & Mowen, 2007:7; Susanto, 2008:84). Further Hansen & Mowen (2007:7) says that FAIS produces information which is used by external companies, they use economic events as input and it is processed in accordance with the rules and certain principles. While management accounting information systems is an integral part of an organizational structure and for monitoring process, to motivate, to provide performance measurement, such as authority delegation, to communicate goals, participation and feedback information (Jones, 1985).

Management accounting information system (MAIS) is the same as information system in general which is able to support and to serve the purpose of company strategy (Kaplan, 1984). Thus, an information system should serve at least one purpose, but it may also serve several purposes at once. Serving its purpose is the fundamental justification, when the system stops to serve the purpose, it must be replaced (Hall, 2011:5). The purpose of management accounting information systems is to provide information for operational activities, for planning, controlling, evaluation and continuous improvement and for decision-making (Wilkinsion, 1989:5; Hall, 2011:14; Hansen & Mowen, 2007:4). Thus, management accounting information systems has a broad scope so that it enables managers to obtain information in the successful economic decision-making for long term (Hoque, 2003:6). To generate information in accordance with user needs, the quality of management accounting information systems is required.

The concept of quality of management accounting information system in this study is the specification that can be used as a framework that is integrated within company by utilizing the resources for providing the relevant information to managers and employees in an organization, both financial and non-financial information, for decision-making in reaching destination specifically within organization. When system can meet the needs of users, the quality of management accounting information system can give satisfaction to the system users itself (Napitupulu, 2015).

According to Laudon & Laudon (2012:530) in general information systems in business entities pay attention to five (5) measurement variables, namely: *scope*, *time*, *cost*, *quality*, and *risk*. Meanwhile in terms of the quality of information systems, Stair & Reynolds (2010:57) describes the general characteristics of the quality of information system is *Flexible*, *Efficient*, *Accessible*, and *Timely*. Kaplan & Atkinson (1998:1) says that to test MAIS, whether it has motivated and helped managers or not in achieving organizational goals, it can be viewed the *timely*, *efficient*, and *effective* from the system.

Researchers who measure the quality of information systems such as Ong *et al* (2009) and Wixom & Todd (2005) use the dimensions of *Reliability*, *Flexibility*, *Integration*, *Accessibility*, *Timeliness*. Chang *et al* (2012) uses dimensions of Security, Ease of Use and Efficiency. Specifically Heidmann *et al* (2008) measures the quality of management accounting information system using dimensions of *Integration*, *Flexibility*, *Accessibility*, *Formalization* and *Media richness*.

The measurements on quality of management accounting information system in this study use the measurements that are used by Napitupulu & Situngkir (2016), namely integration, flexible, reliability, efficient.

Dimension		Indicators
Integration	1	Set of components and formal procedures related to one another, such as software, hardware and networks.
	2	Simplification of business processes, so that companies become more competitive.
	3	Master Data Management centralized improves the accuracy of data and management information.
Flexible	1	Useful for all people who will need it as a result of business development.
	2	System has input options
	3	System has output options
Reliability	1	System is available for users to use.
	2	System provides reliable information for decision making.
Efficient	1	Number of inputs produce varying outputs.
	2	Fast system response time.
	3	Efficient data storage (files are not too big, so they do not spend a lot of memory).
	4	Efficient data backup.
	5	To determine the amount of time needed to complete the job.

Table 1. Dimensions of the Quality of Management Accounting Information Systems

2.2. User Satisfaction of Information Systems

The satisfaction of information systems users from the user perspective meets user expectations (Fisher, 2001). This is in line with expectations theory of Victor H. Vroom which says that the strong tendency to act in a certain way depends on the strength of hope where the action will be followed by a particular output and on the outputs attractiveness for the individual (Robbins, 2007:238). The output that impacts on individuals will be better when the users feel the satisfaction of quality information generated by the quality system (DeLone & McLean, 1992, 2003; Stair & Reynolds, 2010:74).

Specifically, user satisfaction can be defined as "*… the extent to which users believe that the information system available to them meets their information requirements*" (Ives *et al*, 1983) and according to Ong *et al* (2009) define user satisfaction is "*…the extent to which an individual's attitude influences the gap between expectations and the perceived performance of the system*". More Rainer & Harrison (1998:376) say "*end-users satisfaction is an individual's attitude toward the use of computers, spanning all computer-related activities required or necessary to accomplish one's job*".

The concept of information system user satisfaction in this study is how far the users believe that the available information systems meet their information needs and how far the individual attitudes are influenced by the gap between expectations and perceived performance from the information system. In this study, the measurement of information system user satisfaction uses pleasure and satisfaction in making a decision (DeLone & McLean, 1992) by using user interface design indicators, effectiveness and usefulness of the system and any error messages, and customizing the user's workflow and system design (Fisher, 2001). The Dependence on information systems, the Timeliness which is generated for decision-making and the Relevance of the output in the decision (Weber, 1999). Measurement of information systems user satisfaction in this study are:

Dimensions		Indicators
Enjoyment	1	User interface design
	2	The dependence on information systems
	3	The effectiveness and usefulness of the system and all error messages
	4	Adjusting between the user's workflow and system design
Decision Making Satisfaction	1	Timeliness generated for decision-making
	2	Relevance of output in decision-making

Table 2. Dimensions and Indicators on User Satisfaction of Information System

2.3. Hypothesis Development

Seddon & Kiew (1996) tested the success of a DeLone & Mclean model system, in which the results showed that user satisfaction is a measure that describes information systems quality. Rai *et al* (2002) also proved DeLone model which is published in 1992, in which as respondents are users of computerized student information system at universities, his research found information systems quality and information quality affect user satisfaction.

Other researchers who measure information systems quality to user satisfaction are Wixom & Todd (2005), Dastgir & Mortezaie (2012). Wixom & Todd (2005) conducts a survey on organizations types such as health care, consumer goods, financial services and government, found the result that information systems quality significantly affect user satisfaction on information systems. The research results of Dastgir & Mortezaie (2012) provide evidence that the information content which is provided by accounting information system, such as information accuracy, report format, ease of use and timeliness of the information that is provided by accounting information system affect end-user satisfaction. In line with the research results of Aggelidis & Chatzoglou (2012) who found information systems quality and information quality influence significantly and relate positively to the overall end-user satisfaction. The same as the research of Chang *et al* (2012), proves the quality of information systems affects positively on job satisfaction.

Particularly, in the context of management accounting information systems, the research which is conducted by Mia & Patiar (2001), found that managers are satisfied when using management accounting information system to take short-term and long-term decisions, managers satisfaction is related to the frequency at which the information system is available. Hamdan (2012) also states that management accounting information system should be based on satisfaction and measure of the use frequency which can support decision making. Other research about the satisfaction that is perceived by user in using the services of management accounting information system is in connection with the interest and information quality that is based on the accuracy of the information, timeliness, and relevance (Fleischman *et al*, 2010). Management accounting information system that provides number (number value) which is correct and detail, easy to access and use information systems, as well as provide timely information will increase the managers satisfaction of financial data, non financial data and increase their focus on the production quantity (Weisenfeld & Killough, 2001). Thus, the support given by information center is an important part of the evaluation of end-user satisfaction with the data storage, in which the information center interaction with the end user for the development fase and improvement fase will improve user satisfaction of information systems (Chen *et al*, 2000).

The quality of information system characteristics, one of them, is efficiency (Stair & Reynolds, 2010:57). The information system that combines technical efficiency and sensitivity to the needs of organizations and users can influence job satisfaction and higher productivity (Laudon & Laudon, 2012:548). Beside efficiency and reliability, other important information systems characteristics are integration and flexibility. If the user is not satisfied with the information systems integration, the system will not be used by user and the information which is produced will not be used properly Ribiere, *et al* (1999). Well-integrated information systems software, hardware, and networks (Whitten & Bentley, 2007:26) will establish the ability of management accounting information system to coordinate various segments within organization (Sharma et al, 2006). Likewise with the flexibility of information systems, information systems that are not flexible will affect user satisfaction, because the system information that is not easy to use in the work will hamper the effectiveness of the work completion (Wixom & Todd, 2005). Thus, the information system design should be useful for those who need it (Kendal and Kendal, 2011:169). Hypothesis: The Quality of management accounting information system affects the information systems user satisfaction.

3. Research Methods

3.1. Data analysis

The method used is explanatory survey method, which describes causal relationships and correlations between variables by hypothesis testing (Singarimbun & Effendi, 1995:5). The survey was conducted to gather facts through the questions to the people who are intended to help answering research hypothesis as the information source about the quality of management accounting information systems on information systems user satisfaction. The hypothesis test uses analysis of structural equation modeling (SEM) based on Partial Least Square (PLS). To determine the level of significance, it uses α=5%. The study hypothesis is the Quality of Management Accounting Information System affects on User Satisfaction of Information Systems. Research model in this study is:

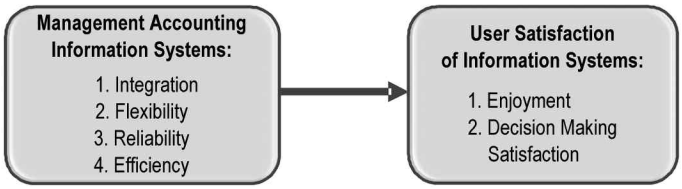

Figure 1. Research Model

3.2. Data collection

The population target of the study was 83 SOEs with a sample of 56 SOEs. The number of respondents who participated is 236 operational managers. Selection of the respondents target is operational managers, for operational managers run daily tasks using information systems and need to make decisions with respect to their daily tasks. From the number of respondents who are listed, there are the details for each SOEs business sector as in the following table:

No	Sector Code	SOEs Sector	Sample	Respondent
1.	IM	Industry of Manufacture	10	48
2.	FSI	Industry of Financial Services and Insurance	15	54
3.	PSC	Industry of Professional Services and Construction	12	49
4.	BST	Industry of Big and Small Trade	5	29
5.	AFF	Industry of Agriculture, Forestry and Fisheries	6	28
6.	TW	Industry of Transportation and Warehousing	8	28
			56	**236**

Table 3. Business Sector in SOEs

4. Result and Discussion

4.1. Result

Based on the test results, it can be seen that t_{count} value of management accounting information system track quality on information system user satisfaction (41.947) is greater than $t_{critical}$ (1.96). Because t_{count} is greater than $t_{critical}$, the error rate of 5% was decided to reject Ho so Ha is received. So, based on the test results, it can be concluded that the quality of management accounting information system affects the information systems user satisfaction in SOEs. The study results provide empirical evidence that the better the quality of management accounting information system will improve information systems user satisfaction in SOEs.

This study also provide empirical evidence that the better the quality of management system accounting information will

improve the Users satisfaction of information systems in the SOEs. Influence values from the quality of management accounting information system on information systems user satisfaction in SOEs is followed by the validity of each indicator and measurement dimension of study variables. The validity of an indicator and the dimensions of a study variable can be seen from the loading factor of first order and second order testing. The first order testing measures the indicator validity and the second order testing measures the dimensions validity of a study variables.

Based on the results of the first order on confirmatory factor analysis it can be seen that the loading factor value of each indicator is greater than 0.50. This means that all indicators are declared valid as a tool for each dimension. Composite reliability (CR) value of each dimension is greater than 0.70 which indicates that the indicators have consistency in measuring each dimension. Furthermore, the value of average variance extracted (AVE) of each dimension is greater than 0.50 which indicates that on average more than 50% of the information contained in each indicators can be reflected through its dimensions, whether it is the dimension for SIAM quality or the dimensions for information systems user satisfaction.

The Quality of Management Accounting Information System. Based on the loading factor test, it can be interpreted that the "business process simplification" indicator became the most powerful indicator in reflecting the Integration dimensions, while the "centralized master data management" indicator became the weakest indicator in reflecting the Integration dimension. For the indicators that reflect Flexible dimensions, the "system has selection input" indicator became the most powerful indicator in reflecting Flexible dimension, while the "useful to all those who will need it" indicator became the weakest indicator in reflecting Flexible dimensions. The most powerful indicator reflects Reliability dimension is the "systems are available for the user to use" dimension, while the "system provides reliable information for decision-making" indicator became the weakest indicator that reflects Reliability dimension. On the Efficient dimension, “fast system response time" indicator became the most powerful indicator in reflecting Efficient dimension, whereas the "specifies the amount of time needed to complete the work" indicator became the weakest indicator in reflecting Efficient dimension.

Information Systems User Satisfaction. Looking at the loading factor results of the indicator which is used, it can be explained that "the effectiveness and usefulness of the system and all error messages" became the most powerful indicator reflects the "pleasure" dimension while the lowest indicator in reflecting the pleasure dimension is "dependence on information systems". Pleasure dimensions is the most powerful measurement tool in determining information system user satisfaction. This proves that a quality system is capable of giving pleasure to operational managers in carrying out their daily duties and responsibilities as well as the decision-making on the work performed. While the most powerful indicator reflects the "satisfaction in decision-making" dimension is the "the relevance of output in the decision" indicator which means that the output result of a system is the most important thing that becomes the basis for consideration in decision making.

4.2. Discussion

The study results have accepted the hypothesis that was built, namely the quality of management accounting information system affects the information systems user satisfaction. The study results are consistent with the concept of Weber (1999:907), in which information system user satisfaction depends on the quality or success of information systems can assist in task completion based on the number of users as well as the nature of system user. This is in line with DeLone & McLean (1992, 2003) and Stair & Reynolds (2010:74) said that user satisfaction can be seen in information systems quality and information quality that are produced.

In general, SOEs has quality of management accounting information system which is "good", but if it is traced based on SOEs sector, there are still SOEs business sectors that have the quality of management accounting information system which is categorized as "less good". Financial services and insurance sectors have the best quality of management accounting information system. This sector has the technology information system which is so well developed it is because keeping the business risk that is run in this sector is much higher than the business risk in other sectors. The risks that is faced is to maintain the most liquid assets of customers, thus this sector must maintain customer confidence and other investors. However, this condition is different from agriculture, forestry, and fisheries sectors that have "less good" of management accounting information system. Agriculture, forestry, and fisheries sectors have less good management accounting information system integration dimensions. Thus not all SOEs have computerized and well integrated information systems.

Integration dimension is the main dimensions of the basic concepts on management accounting information system, as it is contained in the definition meaning of accounting information systems in general that accounting information system is an integrated framework in the companies that use physical resources to transform economic data into financial information (Wilkinson, 1989:4). In general management accounting information system is a set of human resources and capital in an organization that is responsible for generating and disseminating relevant information for internal decision making (Belkoui, 2002:9). Set of resources can be defined as a collection (integration) of the sub-systems/components both physical and nonphysical that are interconnected with each other in harmony to process transaction data which is related to financial problems into financial information (Susanto, 2008:72).

The integration problems of information systems impact on other management accounting information system dimensions namely dimensions of flexible, reliable and efficient. The lack of management accounting information system flexibility in SOEs, because management accounting information system has not been able fully accessed or used by operational managers to get the information as needed and the authority when they are out of office room or in another room. If there is a change (either internal policy changes as well as changes outside of company) information system has not been able to be quickly adapted to the operational manager work. While for the input and output options at management accounting information system in SOEs has not fully suit the needs and interests of operational managers in SOEs.

The lack of management accounting information system reliability value in SOEs is due to the information system that is provided has not yet met the needs of operational managers that is appropriate to the authority and responsibility done. It also occurs in conditions of information systems that are used have not provided reliable information for decision making in accordance with the authority and responsibilities of operational managers. These conditions impact on the management accounting information system efficiency in SOEs, namely in conducting data storage and backup data it is still not efficient.

The study results answer the problems which arise mainly about the problem of information systems quality. The problems that occur in SOEs, ie the number of SOEs have information systems that are not integrated and are inefficient, so that it boosted operating costs of SOEs, including logistics costs (Japarin, 2014). All the impact was the facilities and services that are spread over several SOEs companies and their subsidiaries could potentially pose logistical inefficiencies, because the utilization of assets and investments, services are not integrated, and there is competition between similar SOEs companies/subsidiaries (Setijadi, 2014).

The quality of management accounting information system is directly proportional to the information systems user satisfaction

in SOEs. In which in general management accounting information system user satisfaction value in SOEs is in “good” categories. Based on SOEs sector, financial services and insurance sectors had the highest level of user satisfaction and for agriculture, forestry, and fisheries have "less good" information system user satisfaction. The low of management accounting information system user satisfaction on SOEs sector as there are operational managers who feel less comfortable with management accounting information system interface design in SOEs, there are also operational managers who have not felt that management accounting information system in SOEs facilitate the interaction with all users of information systems. There are still operational managers who are not dependent on management accounting information system that is used in SOEs, because there are still operational managers who think that management accounting information system has not been effectively used and management accounting information system in SOEs has not been able to give an error message in every work process that is performed.

For the user satisfaction in decision making, there are still operational managers who are not satisfied, because there is no precise reports time which is generated by information systems and there are also operational managers who are not satisfied with the reports relevance that is generated by management accounting information system in SOEs. These conditions favor the research results which is conducted by Mia & Patiar (2001) and Hamdan (2012) that satisfaction is felt by managers in using management accounting information system if it is able to support decision-making, both short-term and long-term decisions. Likewise, the research results which is conducted by Weisenfeld & Killough (2001), management accounting information system which provides timely information will increase the manager satisfaction on financial data, non financial data and increase their focus on the production quantity. This is confirmed the research results which are conducted by Fleischmen et al (2010) that the satisfaction felt by the users on management accounting information system services is related to the interests and quality of information that is accurate, timely and relevant.

5. Conclusion

The study found that the quality of management accounting information system affects on information systems user satisfaction. The quality of information system is the key to user satisfaction. This means that the quality of management accounting information system is directly proportional to the information systems user satisfaction. The quality of management accounting information system and user satisfaction in financial services and insurance sectors have the best conditions, while agriculture, forestry, and fishing are the sectors that have the lowest the quality of management accounting information system and user satisfaction.

For the measurement of the quality of management accounting information system, integration is a primary measurement of the quality of management accounting information system, which integration is marked by the simplification of an activity or “business processes simplification". Besides integration, the quality of management accounting information system is measured from flexibility, reliability and efficiency of information systems. In SOE, the most dominant indicator indicates the management accounting information system flexibility if an information system has an input selection. The most dominant indicator for management accounting information system reliability dimensions is "useful to all those who will need it" and a dominant indicator of management accounting information system efficiency dimension in SOEs is "systems provide reliable information for decision-making".

The study results only tested the quality of management accounting information system, thereby to increase the repertoire of knowledge in accounting field it is recommended to further research to test this study concept by using other factors that affect the quality of management accounting information system, so it impacts on information systems user satisfaction. This study is expected to be developed to see other factors influencing quality of management accounting information system and user satisfaction of information system, such as organizational culture (Napitupulu, 2018), effectiveness of internal control and user involvement of information system. And then Information System User Competence, Information System User Involvement (Napitupulu, 2015).

References

[1] Abdhali, U.W. (2011). Data aset negara belum terintegrasi baik. by <http://www.bisnis.com/articles/data-aset-negara-belum-terintegrasi-baik>

[2] Aggelidis, V.P., & Chatzoglou, P.D. (2012). Hospital information systems: Measuring end user computing satisfaction (EUCS). *Journal of Biomedical Informatics*, Volume 45. pp. 566-579.

[3] Belkoui, A.R. (2002). *Behavioural Management Accounting*. London: Quorum Books.

[4] Bukhari, R.H. (2005). The relationship between system usage and user satisfaction: a meta-analysis. *Journal of Enterprise Information Management*. Volume 8. Issue 2. pp. 211-234.

[5] Chang, C.S. Chen, S.Y. & Lan, Y.T. (2012). Motivating medical information system performance by system quality, service quality, and job satisfaction for evidence based practice. *BMC Medical Informatics and Decision Making*. Volume 12. No 135. pp. 1-12.

[6] Chen, L., Soliman, K.S., Mao, E. & Frolick, M.N. (2000). Measuring User Satisfaction with Data Warehouses: An Exploratory Study. *Information & Management*. Volume 37. pp. 103-110.

[7] Dastgir, M. & Mortezaie, A.S. (2012). Factors Affecting the End-User Computing Satisfaction. *Business Intelligence Journal*. July. Volume 5. No. 2. pp. 292-298.

[8] DeLone, W.H. & McLean, E.R. (1992). Information Systems Success: The Quest for the Dependent Variable. *Information Systems Research*. Vol. 3, No. 2, pp. 60-96.

[9] DeLone, W.H. & McLean, E.R. (2003). The DeLone and McLean Model of Information Systems Success: A Ten-Year Update, *Journal of Management Information Systems*. Volume 19, No. 4, pp. 9-30.

[10] Fauzi, G. (2011). Mendagri Kritik Buruknya Pelaporan Keuangan Daerah. by <http://news.okezone.com/read/2011/11/09/337/ 526926 /mendagri-kritik-buruknya-pelaporan-keuangan-daerah> [9/11/2012]

[11] Fisher, J. (2001). User Satisfaction And System Success: Considering the Development Team. *Australasian Journal of Information System*, Vol. 9, No.1, pp. 21-29.

[12] Fleischman, G., Walker, K. & Johnson, E. (2010). A field study of User Versus Provider Perceptions of Management Accounting System Services. *International Journal of Accounting and Information Management*. Vol. 18, No. 3, pp. 252-285.

[13] Hall, J.A. (2011). *Accounting Information Systems*. 7th Edition, Mason-USA: South-Western Cangage Learning.

[14] Hamdan, M.W. (2012). The impact of accounting information systems (AIS) development life cycle on its Effectiveness and critical success factors. *European Scientific Journal*. Volume 8, No. 6 (March), pp. 19-32.

[15] Hansen, D.R. & Mowen, M.M. (2007). *Managerial Accounting*. 8th Edition, USA: Thomson.

[16] Heidmann, M., Schäffer, U. & Strahringer, S. (2008). Exploring the Role of Management Accounting Systems in Strategic Sensemaking. *Information Systems Management*. Vol. 25. pp. 244-257.

[17] Hoque, Z. (2003). *Strategic Management Accounting*. USA: Spiro Press.

[18] Ives, B., Olson, M.H., & Baroudi, J.J. (1983). The measurement of user information satisfaction. *Communications of the ACM*. Volume 26, No.10. pp. 785-793.

[19] Japarin, S. (2014). Pelni: Induk Usaha Maritim Tekan Biaya Logistik. by: http://www.investor.co.id/home/pelni-induk-usaha-maritim-tekan-biaya-logistik/84522

[20] Jones, C.S. (1985). An Empirical Study of The Role of Management Accounting Systems Following Takeover or Merger. *Accounting Organizations and Society*. Volume 10, No. 2, pp. 177-200.
[21] Kaplan, R.S. & Atkinson, A.A. (1998). *Advanced Management Accounting*. 3rd Edition. Prentice Hall International.
[22] Kaplan, R.S. (1984). The Evolution of Management Accounting. *The Accounting Review*. Volume 59, No. 3 (Jul.), pp. 390-418.
[23] Laudon, K.C. & Laudon, J.P. (2012). *Management Information Systems - Managing The Digital Firm*. 12th Edition. Pearson Prentice Hall.
[24] Singarimbun, M. & Sofian, E. (1995). *Metode Penelitian Survai*, LP3ES.
[25] Melchor, M.Q. & Julian, C.P. (2008). The Impact of the Human Element in the Information Systems Quality for Decision Making and User Satisfaction. *The Journal of Computer Information Systems*. Winter Volume 48. No 2. pp. 44-52.
[26] Mia, L. & Patiar, A. (2002). The use of management accounting systems in hotels: an exploratory study. *International Journal of Hospitality Management*. Vol. 20, Issue 2 (June), pp. 111-128.
[27] Napitupulu, I.H. (2015). Antecedence of user satisfaction in management accounting information systems quality: user involvement and user competency (survey of Indonesia manufacture company managers). *International Journal of Applied Business and Economic Research*. Vol. 13, No 2. pp. 561-577.
[28] Napitupulu, I.H. and Situngkir, A. (2016). Integrated Management Accounting Systems For Competitive Adventage: The Case in State-Owned Enterprises of Indonesia. *International Business Management*. Vol. 10. No. 23. pp. 5643-5650.
[29] Napitupulu, I.H. (2018). "Organizational Culture in Management Accounting Information System: Survey on State-owned Enterprises (SOEs) Indonesia. *Global Business Review*. Vol. 19, No. 3, pp.1-16.
[30] Ong, C.S., Day, M.Y., & Hsu, W.L. (2009). The measurement of user satisfaction with question answering systems, *Information & Management*. Vol. 46. pp. 397-403.
[31] Rai, A., Lang, S.S., & Welker, Robert B. (2002). Assessing the validity of IS success models: An empirical test and theoretical analysis. *Information Systems Research*. Mar. Vol. 13. No. 1. pp. 50-69.
[32] Rainer, R.K. & Harrison, A.W. (1998). *Introduction to Information Systems: Supporting and Transforming Business*. 8th Edition. McGraw-Hill International. New York.
[33] Ribiere, V., LaSalle, A.J., Khorramshahgol, R. & Gousty, Y. (1999). Hospital information systems quality: a customer satisfaction assessment tool. *Proceedings of the 32nd Hawaii International Conference on Systems Sciences*. Maui. Hawaii. January 5-8.
[34] Robbins, S.P. (2007). *Perilaku Organisasi*. Edisi Kesepuluh. Jakarta: Indeks.
[35] Rochimat, D. (2012). Integrasikan Proses Bisnis, Vivere Group Pakai Solusi ERP. by <http://swa.co.id/corporate/corporate-action/integrasikan-proses-bisnis-vivere-group-pakai-solusi-erp> [18/5/2012].
[36] Seddon, P.B. & Kiew, M.Y. (1996). A Partial Test and Development of Delone and Mclean's Model of IS Success. *Australasian Journal of Information System*. Vol. 4. No. 1. pp. 90-109.
[37] Setijadi (2014). Sistem Logistik RI Belum Optimal. by: http://www.beritasatu.com/ekonomi/181379-sistem-logistik-ri-belum-optimal.html
[38] Sharma, R., Jones, S. & Ratnatunga, J. (2006). The relationships among broad scope MAS, managerial control, performance, and job relevant Information – A concomitant analysis. *Review of Accounting and Finance*. Vol. 5. No. 3. pp. 228-250.
[39] Stair, R.M. & Reynolds, G.W. (2010). *Principles of Information Systems*. 9th Edition. Boston-USA: Course Technology.
[40] Susanto, A. (2008). *Sistem Informasi Akuntansi*. Bandung: Lingga Jaya.
[41] Weber, R. (1999). *Information System Control and Audit.* USA: Prentice-Hall International.
[42] Weisenfeld, L.W. & Killough, L.N. (2001). One Company's Experience with Accounting Information System Changes – An Analysis of Manager's Satisfaction. *The Review of Business Information Systems*. Vol. 5. No. 2. pp. 21-36.
[43] Whitten, J.L. & Bentley, L.D. (2007). *Systems Analysis and Design Methods*. McGraw-Hill. New York.
[44] Wilkinson, J.W. (1989). *Accounting Information System: essential concepts and applications*. John Wiley & Sons Inc.
[45] Wixom, B.H. & Todd, P.A. (2005). A Theoretical Integration of User Satisfaction and Technology Acceptance. *Information Systems Research*. Mar. Vol. 16. No. 1. pp. 85-102.
[46] Yuzal, S. (2010). Sistem Informasi Perguruan Tinggi Perlu Dibenahi. by <http://kampus.okezone.com/read/2010/02/25/65/307004/ sistem-informasi-terpadu-perguruan-tinggi-perlu-dibenahi> [9/11/2012].

Risks and Opportunities Approaching in Occupational Health and Safety Management Systems

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Abstract

This article analyses the requirements of the ISO 45001 standard on risk and opportunity approach, in conjunction with the requirements of the BS 45002 series of standards and underlining both important issues to be addressed and possible related measures. Finally, there are some considerations regarding the way in which risk-based thinking should be audited.

Keywords: *approach; risks; opportunities; occupational health and safety; audit.*

1. Introduction

The concept of risk has always been implicit in management systems standards, by requiring organizations to plan and manage their business processes so that to avoid unwanted results.

Organizations responded to this requirement by emphasizing planning and process control with the greatest impact on the quality of products and services.

The way organizations manage risk varies according to their business context.

The use of risk-based thinking highlights the importance of risk awareness, risk management and risk assessment methodologies that are not necessarily appropriate for all situations and organizations.

Therefore, "risk-based thinking" means to take into account the qualitative risk (and depending on the organization's context, the quantitative risk), to define the rigor and degree of formalism necessary to plan and control the management system, as well as its processes components and activities.

However, not all processes of a management system represent the same level of risk in terms of the organization's ability to achieve its objectives. Some require more careful and formal planning and controls than others.

Risk-based thinking is not complex. A person automatically makes decisions based on risk.

So, when we prepare a hot tea, we automatically hold the teapot handle to avoid burning and choose a mug to resist boiling water. Or, to cross the street we can go directly or use the existing bridge. The choice we make will be determined by the way we take into consideration risk.

Risk is commonly understood to have only negative consequences, however the effects of the risk may be both negative and positive.

In the new standards for management systems, risks and opportunities are often quoted together. However, the opportunity is not necessarily the positive side of the risk. An opportunity is a set of circumstances that makes possible the realization of something. Taking advantage of or not taking advantage of an opportunity presents different levels of risk.

Thus, in the example above, if we cross the street directly we will get on the other side sooner, but if we take advantage of this opportunity there is an increased risk of being injured in traffic.

Risk-based thinking takes into account both current situations (go directly or use the bridge), but also the possibilities for change.

Analysis of this situation shows opportunities for improvement:

- An underground passage leading directly to the other side of the road;
- Protected pedestrian crossing, or
- Deviation of traffic so the area becomes pedestrian.

By taking risk into consideration, into the whole of its management systems and processes, the probability of achieving the proposed objectives is improved, yields are more consistent and customers can be confident they will receive the desired product or service.

Risk-based thinking:

- Improves the manner of management;
- Establishes a proactive culture of improvement;
- Helps to comply with legislation;
- Ensures the achievement of the quality of products and services;
- Improves customer confidence and satisfaction.

2. Actions to approach risks and opportunities

Understanding risks and opportunities is vital to improve the way an organization manages health and occupational safety (OHS).

An effective occupational health and safety management system uses risk-based thinking at every stage.

There are different types of risks and opportunities to consider, including:

- OH&S risks for workers (injury factors or professional illness);
- Risks for the management system (system blocking factors, e.g. systems that do not work together, lack of trained staff, etc.);
- Opportunities to improve OH&S performances (factors that enhance security of the workplace or healthier work practices, e.g. Reduction of damaged equipment or ensuring that workers take regular breaks during their

working day);
- Opportunities to improve the management system (factors for a better functioning of the organization's system, for example better communication on what needs to be done, how to do or what to change, sharing knowledge, or involving all workers).

Not all risks and opportunities are just as important. So they should be prioritized and efforts should be concentrated on those with the greatest impact.

Although the organization should take into account all potential risks to OH&S performance, it is not necessary to keep detailed documented information for all these.

Emphasis should be placed on those hazards that are likely to occur or on the greatest impact, thus leading to the most significant risks.

For opportunities, the focus should be on those on which realistic action can be taken, with priority given to those that can improve performance.

As a starting point should be the factors that can harm people, both in terms of security and health.

There may be a multitude of factors at a workplace that have the potential to harm people – these are dangers. Danger becomes a great risk if it is possible to happen, and injuries to a person (or more people) could be serious. These are the dangers and risks that require the utmost care.

It is worth mentioning that security risks usually involve distinct events (incidents), while health risks can occur both immediately and in time after exposure to a hazard.

To identify hazards, a step-by-step logical approach is needed to cover all the activities of the organization, planned or unplanned (permanent or temporary) changes, as well as possible emergency situations (fires, explosions, attacks) that can lead to different hazards and risks.

It may be useful to address the different types of hazards, such as:

- Physical (working at height or in small spaces, extreme temperatures, fatigue);
- Chemical (exposure to hazardous liquids or harmful atmosphere);
- Biological (organic hazards such as viruses, insects, bacteria);
- Psychological (stress, harassment, excessive work);
- Mechanical (sharp objects, moving parts, machines and tools);
- Electrical (faulty electrical equipment, contact with an electric conductor);
- Natural (flood, high or low heat, storms, earthquakes).

Once the risks have been identified and understood, they should be evaluated and prioritized.

The organization should try to eliminate the dangers if it can, or reduce the risks as much as possible but reasonably (this is often called "as low as reasonably practicable" or ALARP).

The organization must establish, implement and maintain processes to eliminate hazards and reduce OH&S risks, using the following hierarchy of actions to be initiated (controls):

- Elimination of danger;
- Substitution/replacement with less dangerous processes, operations, materials or equipment;
- Use of technical/engineer controls and work reorganization;
- Use of administrative controls, including training;
- Use of appropriate personal protection equipment.

Each control is considered less effective than the previous one.

It is recommended to combine some of the above controls in order to succeed in reducing OH&S risks to the lowest possible level, in practice. At the same time, we must be aware that the most appropriate controls set today for the organization's risks may change over time due to the emergence of new materials or technologies.

In addition to risk assessment, an organization should consider opportunities such as making changes to the working environment, working conditions and how to organize work.

When planning opportunities, an organization should consider what can have the greatest impact and when it might be a good time to act. One of the most important opportunities is when there are changes in the organization or in its activities and there is a chance to include OH&S measures within the changes rather than dealing with issues that arise after the change took place.

OH&S improvement opportunities can include:

- Taking into account the dangers and risks involved in planning and designing new installation, acquiring equipment or introducing a new process and other planned changes;
- Improving monotonous work or work at a predetermined level by transferring workers to other activities;
- Using technology to improve OH&S performance, for example automation of high-risk activities.

OH&S management system improvement opportunities can include:

- Improving the visibility of top management support for OH&S management system (e.g. social media communications or highlighting OH&S performance in strategic business plans);
- Improving organizational culture related to security and training;
- Improving incidents investigation processes;
- Increasing employee participation in OH&S decision-making;
- Collaboration with other organizations in the OH&S field.

At the same time an organization should also consider the risks and opportunities that are not directly associated with harmful aspects for humans but affect the effectiveness of the OH&S management system. For example:

- An organization may need to coordinate part of its activities with its neighbours as it may affect the OH&S management system through delays or difficulties in working with them;
- A fluctuating, continually changing workforce with different levels of experience may mean that training and communication needs to be adjusted to ensure that people have the necessary skills;
- An organization that introduces new products, services or activities may not have the knowledge and competence to address the possible dangers and risks, thus affecting the operation of the OH&S management system.

Another key part of risk management is awareness and compliance with statutory and regulated requirements (such as those from a parent company or provided in a contract). There are different requirements for certain types and sizes of business, so it is important for top management to be aware of changes of requirements, associated risks, and to communicate to workers as appropriate.

We should not, however, forget, that not all risks and opportunities require action. For example, organizations can make an informed decision to accept risk without taking any action other than identifying and evaluating them, including ongoing monitoring, so that actions planned to address risks and opportunities may include setting targets or can be included in other management system processes.

3. Risks and opportunities approaching and the context of the organization

The risks and opportunities that need to be considered by the organization depend on the type of organization, what it does and where it operates. This is the context of the orga-

nization. For example, if the organization produces cars in a large factory on the outskirts of a city, the risks to the health and safety of its workers are very different from those faced by workers in a small cafe in a quiet village.

The context is not the same, organizations grow and activities change (e.g. new production lines or new technology). The workforce changes over time. Any change in the organization has an impact on its risks and opportunities.

The context also includes factors that are not controlled by the organization. For example, if there is an emergency situation (fire, storm, massive snowfalls, and floods), the risks and opportunities of the organization can change.

Similarly, if the world economy collapses, the legislation changes or there are changes in the political landscape, the risks and opportunities of the organization may change.

The context also includes persons and other organizations, that may be affected by the management system or that may affect it. These are the stakeholders of the organization.

Indeed, even when the organization determines the relevant stakeholders, it should determine which of the parties pose a risk to its sustainable success if its relevant needs and expectations are not met, and which of them can offer opportunities to enhance sustainable success of the organization.

The organization should always take into account the needs and expectations of stakeholders as well as any associated risks and opportunities. For example:

- Regulatory authorities: there are risks to the organization's employees if they do not comply with OH&S legislation, but also risks to the organization itself, if the violation leads to criminal prosecution or closure of the business;
- Supply Chain: The organization's OH&S management system is at risk if contracted workers do not know and do not comply with health and safety rules. An entrepreneur expects his workers to be protected, but the contractor could also introduce additional risks at work that affect other workers due to their activities, duet to the lack of training in OH&S or due to lack of awareness of how these activities are taking place. On the other hand, there is the opportunity to share good practice and knowledge;
- Shareholders: there are risks if the shareholders or owners of the organization do not support the management system through personal example or through appropriate investments. Alternatively, if shareholders or owners invest time and effort, there are opportunities to improve OH&S MS.

4. Support

In order to effectively manage OH&S risks, the organization must have sufficient time, financial resources and, when necessary, equipment.

The OH&S management system is at risk if a lack of funding leads to the failure to apply the established protection measures or to the impossibility of changing the current working method. However, there is no need to waste much time discussing how to reduce the number of documented information, or to consume important resources with the establishment and implementation of a comprehensive health monitoring system, if an organization has a low risk and exposure to serious hazards is rare.

Workers are usually the most important resource when it comes to managing the risks and opportunities for both people and the management system. Providing time for workers to think and act on risks and opportunities is a good starting point.

It is also essential that issues related to competence to be addressed. There are different types of competencies to be considered, such as competence to:

- Perform specific tasks safely and without endangering others;
- Identify hazards, understand the risks and effectively manage these risks; and
- Plan, respond and manage emergencies.

Requirements of competence do not remain the same, both in the case of individual and organizational skills. It is important to make sure that they are regularly reviewed and that action is taken to eliminate any gaps.

It is important to avoid creating too complicated documents or too many documented processes and procedures. The organization should only document what is necessary to ensure that the OH&S management system can work effectively and that the legal and regulated requirements are met.

The way the organization communicates to workers and other people must be appropriate to those who need to be informed, otherwise there is a risk that the affected person will not be aware of the dangers and related measures, or of the changes that appear. For example, for a company that develops software, an online communication platform is the most appropriate way, while for a company that produces mechanical components, direct discussions and display of information on a panel will be the best choice for communication.

5. Emergency situations

Organizations should identify potential business-related emergencies and prepare an intervention plan in these situations.

When identifying an emergency situation one should take into account the likelihood of occurrence and its severity.

Actual emergency situations do not always happen, just as expected, so the organization should ensure that it performs an on-site risk assessment in case of a real situation and that it can adapt its response to it, in real time.

The ability to respond to a real emergency situation can be tested through simulations. However, test exercises and scenarios should vary, in order to avoid self-belief or the assumption that everything will work, and the tested situation will be the same as the real one.

6. Monitoring, measuring, analyzing and evaluating performance

Performance assessment must provide answers to two questions:

a) Are the management system (and its processes) functioning correctly with respect to the applicable requirements?
b) Are there controls that have been put in place to prevent injury and illness?

Risk management plays an important role in answering both questions. Taking risks into account can help the organization decide what needs to be measured and what needs to be monitored.

There are many aspects that could be measured and / or monitored within a management system, so it is important to focus on those that can provide us with information about:

- Meeting legal requirements, including those that have recently changed;
- MEETING other requirements, such as those agreed with suppliers or the parent company;
- Achieving the objectives of the OH&S;
- Improving or reducing OH&S performance.

The organization should ensure that controls are in place to prevent injury and illness and that they are effective.

The organization should prioritize its greatest risks.

For example, if the organization has controlled activities, by issuing official permits (e.g. work at heights or open fire) or through specific procedures, it is important to verify that they are properly awarded / established.

Similarly, fire protection controls can be measured both by verifying that there is a regular inspection of escape routes (to

check if they are identified, accessible and known to the members of the organization) and by measuring the time required for evacuation of the building during simulations in the event of a fire.

7. Internal audit

Internal audits of the OH&S management system should cover the entire system within a set period of time, usually one year.

But the audit should focus especially on areas with both OH&S risks and higher risks associated with the management system.

As far as the risks and opportunities related to OH&S are concerned, internal audits provide an opportunity to check whether:

- ❑ Risk and opportunity assessments are updated and reviewed periodically;
- ❑ Workers who are performing an activity understand the way the risk is assessed and appropriate controls are used;
- ❑ Workers have the necessary expertise, including to identify the risks of OH&S;
- ❑ There is a risk assessment related to changes in the organization;
- ❑ Opportunities are identified and applied to eliminate hazards and reduce risks.

It is important that top management assess the overall performance of the OH&S management system rather than focus on certain parts of it. The various measurements, monitoring and audits of activities should determine whether:

- ❑ The organization understands the OH&S risks and has implemented appropriate controls;
- ❑ Workers understand the risks of OH&S that may affect them and apply the agreed controls;
- ❑ It is necessary that the risk control modalities be changed or whether there is an opportunity to eliminate a hazard or to reduce the risk;
- ❑ The organization complies with legal requirements and other requirements.

8. Improvement

The ways to improve the OH&S performance of the organization or the OH&S management system should be clear from the system performance evaluation. Although some improvements may involve complex planning and require time to be implemented, yet rapid and simple changes in how to perform an activity can lead to improvement.

Improvement can include:

- ❑ More frequent assessment of risks and opportunities and related measures;
- ❑ Change of best practices by joining organizations and professional associations or forums in the field of OH&S;
- ❑ Improving organizational and individual knowledge;
- ❑ Changing the way it works (for example: checking security measures before starting work is done by at least two people).

9. Audit of risk-based thinking

An audit of the manner in which risk-based thinking is applied in an organization cannot be performed as an independent activity. This topic should be followed throughout the audit of the management system, starting with top management interviews.

Auditors should look for evidence that confirm the fact that the organization applies a methodology (more or less formalized but not required to have one) to enable it to determine effectively the risks and opportunities when planning the management system.

The role of the auditor is not to conduct its own risk and opportunity determination, but to ensure that the organization applies its methodology consistently and effectively.

However, if the auditor's knowledge of the organization's context indicates to him that the organization has failed to determine a clearly / generally accepted risk or opportunity, it may question the organization's approach.

An auditor should act and collect objective evidence taking into account the following aspects.

- ❑ What inputs are used by the organization to determine the risks and opportunities?

Normally these entries should include the following:

- An analysis of external and internal aspects;
- The strategic direction of the organization;
- Relevant stakeholders and their relevant requirements;
- The scope of the management system;
- Processes of the organization.

The auditor should note that the organization must determine the amount of documented information required to provide objective evidence of the application of risk-based thinking, but at the same time be aware that there is no specific requirement in standards of how to document the results of risk and opportunity.

The need for an organization with regard to the quantity and type of documented information may vary greatly due to the organization's context, size, culture, nature of products and services, applicable legal and regulatory requirements or customer requirements etc.

- ❑ How did the organization determine the risks and opportunities taking into account the above mentioned aspects?

Objective evidence may take various forms, for example:

- Minutes of the meetings;
- SWOT analysis;
- Reports on the client's feedback ;
- Brain-storming type activities;
- An analysis of competitors;
- Planning, analysing and evaluating process-related activities, e.g. strategic planning, design and development, marketing, production and service delivery, corrective actions;
- The documented information related to the management's analysis;
- Risk assessment procedures and related records if the organization opted for such an approach.

- ❑ Risks and opportunities determined in the organization are related to:
  - Activities performed to deliver consistent products or services that meet customer requirements and applicable legal and regulatory requirements and to increase customer satisfaction;
  - Significant environmental aspects;
  - Other insignificant environmental issues;
  - Activities to improve health and safety at work and OH&S performance;
  - Activities set out to eliminate or minimize the risks of OH&S;
  - Compliance obligations;
  - The elements evaluated in the context of the organization's analysis;
  - Environmental conditions;
  - Relevant requirements of the relevant stakeholders.

Auditors should take into account that the determination of risks and opportunities at the level of the entire management system, considering its deliberate outputs, might take into consideration:

- Inputs of the management system;

- The staff involved;
- Equipment;
- Documented information;
- The activities carried out;
- Measurement and monitoring;
- Outputs of the management system.

❑ How have the risks and opportunities been approached within the organization?

Required actions may take various forms, for example:

- An analysis of old objectives or the establishment of new ones;
- Action plan;
- In-service training;
- Elaboration or modification of the working instructions;
- Targeting and improvement projects, etc.

Auditors should ensure that the measures taken are proportionate to the risk or opportunity.

❑ Has the effectiveness of the above mentioned actions been evaluated within the organization?

Finally, the auditor should confirm whether internal audits and performance assessment activities consider effective application of risk-based thinking.

10. Conclusions

Although ISO 45001 has so many references to risks and opportunities, the standard does not require a certain type of approach, the need for a formal approach or risk management.

No one is required to use risk-based thinking constantly, documented, or risk management, because survival is not mandatory.

But if you want to survive, to maintain your business and meet the intentional goals of the OH&S management system, that is to prevent injuries and illness for workers and to provide safe and healthy jobs, there is no other way than to integrate the management elements of the risk existing in your own company, in the overall business management and make permanent efforts that all staff understand and apply in day-to-day work, risk-based thinking. We must not forget that risk management is a "journey" not a "destination".

References

[1] ISO 45001:2018 – Occupational health and safety management systems – Requirements with guidance for use.

[2] BS 45002-0:2018 – Occupational health and safety management systems, Part 0: General guidelines for the application of ISO 45001.

[3] BS 45002-1:2018 – Occupational health and safety management systems – General guidelines for the application of ISO 45001, Part 1: Guidance on managing occupational health.

[4] BS 45002-2:2019 – Occupational health and safety management systems – General guidelines for the application of ISO 45001, Part 2: Risks and opportunities.

[5] BS 45002-3:2018 – Occupational health and safety management systems – General guidelines for the application of ISO 45001, Part 3: Guidance on incident investigation.

[6] IRCA&CQI, ISO 45001:2018 – Understanding the International Standard, CQI, 2018 Report.

[7] Roncea, C. (2018). Risk management, from impartiality to business orientation, *International Conference on Quality and Reliability – CCF*, the XVIth edition, Sinaia, Romania, 26-28 September 2018.

[8] Roncea, C. (2016). Considerations on approaching risk and opportunity audits, in light of the requirements of new editions of standards for management systems, *International Conference on Quality and Reliability* – CCF, the XV th edition, Sinaia, Romania,14-16 September 2016.

Intrapreneurial Self-Capital. An Overview of an Emergent Construct in Organizational Behaviour

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Abstract

In a period of radical changes of work environment, companies are living continuous transformations and the onset of new challenging issues such as "industry 4.0", workers ageing and globalization, can lead to a reorientation of organizational behaviour. In this context, researches focused on new psychosocial constructs could be crucial to better understand the complex mechanisms linking work environment, social life and individual reaction to the new obstacles provided by these changes. Intrapreneurial self-capital (ISC) is defined as a set of individual resources used to cope with career and life construction challenges and includes dimensions of core self-evaluation, hardiness, creative self-efficacy, resilience, goal mastery, decisiveness, and vigilance. Focusing on the last five years scientific production on ISC, by means of a commentary review, we present this new construct for the 21th century work hindrance and obstacles, aiming to describe the importance of the intrapreneurial self-capital in this era of changes. Differences and similarities with other constructs and the implications for psychological well-being are considered, along with best practice and methods to apply these evidences.

Keywords: *: intrapreneurial self-capital; organizational behaviour; psychological construct; psychological well-being; individual resources.*

1. Introduction

We're living in the era of changes, from the Industry 4.0 and the increasing digitalization to the process of ageing of workers. Organizations and companies have to prepare themselves to a frenetic period of mutation and leaps.

In the last 20 years the environment and the type of problems that companies face have changed.

Factors such as the constant globalization, the recent global economic crisis, the numerous social transformations and technological advances require both new management methods focused on diversity and the development of a new set of skills to manage work-related stress (Mucci et al., 2016; Giorgi et al., 2015). Consequently, job transitions and modification are more frequent and complex (Savickas, 2011), so modern Occupational Medicine and Occupational Psychology have to deal with emerging issues such as mental well-being, stress and violence at work, active aging and migrant workers problems (Arcangeli et al., 2019; Copello et al., 2015; Mucci et al., 2019).

In this context those who consider changes as an opportunity to learn respond more positively to the challenges of postmodern society (Wanberg and Banas, 2000; Di Fabio, 2014; Di Fabio and Gori, 2016a). This overview will describe the intrapreneurial construct and competencies, understood as one of the key factors within a mutable and protean work environment (Di Fabio and Duradoni, 2019).

Intrapreneurial self-capital is defined as a core of individual intrapreneurial resources used to cope with career and life construction challenges and includes dimensions of core self-evaluation, hardiness, creative self-efficacy, resilience, goal mastery, decisiveness, and vigilance (Di Fabio, 2014). Intrapreneurs differ from entrepreneurs: entrepreneurs have an innovative idea and are committed to realize it using their own abilities and passion for their own profit and advantage (Honig, 2001), in contrast, intrapreneurs develop their innovative ideas within the organization (Di Fabio,2014).

From the 19th Century, literature and scientists focused their studies and attention on two big fields: the former concerns personal characteristics and competencies of the intrapreneurs while the latter concerns the characteristics and hallmarks of intrapreneurial organizations. The Research focusing on intrapreneurs' competencies and distinctive characteristics has found that an intrapreneur is basically a risk taker, an adapter, and an innovator (Cox and Jennings, 1995). Intrapreneurs also have tenacity, vision, aversion to repetition, creativity, innovativeness, and resilience (Davis, 1999). Honig (2001) demonstrate that the learning style of intrapreneurs was linked to a self-development motivation and desire.

Lubkins and Kans (2007) assert that intrapreneurs prefer uncertain environments, and use information in a rational and trenchant process. Intrapreneurs have also been described as possessing self-determination, freedom, and autonomy when making decisions, and it has been found that they can be motivated through projects even when self-imposed. (Menzela, Aaltiob, and Ulijna, 2007). Other recent studies have related intrapreneurship with high self-esteem and self-efficacy (Ronen, 2010), internal locus of control (Muller et al., 2002; Ronen, 2010), and low neuroticism (Ronen, 2010). Di Fabio (2014) developed the ISCS (Intrapreneurial Self-Capital Scale). She considered the ISC a higher order construct based on 7

evidence-based constructs (i.e., core self-evaluation, hardiness, creative self-efficacy, resilience, goal mastery, decisiveness, vigilance).

In short we can define ISC as a positive self-evaluation combined with internal locus control and the ability to be committed, also a subject with high ISC have a set of soft and hard competencies such as thinking out of the box, problem solving, risk assessment, decision making, rational thinking and more. Di Fabio described ICS as "*the positive self-evaluation of the self-concept, the hardiness exhibited by individuals as commitment, control and challenge, the self-efficacy*" (Di Fabio and Gori, 2016a).

This commentary review aims to describe the importance of the Intrapreneurial self-capital (ISC) construct.

2. Materials and Methods

This literature review has a twofold purpose: to describe a new and emergent construct with the largest number of sources and to help research to understand the existing body of knowledge inherent ICS construct.

The research was conducted using Google scholar and Scopus as databases. The following key words and their combinations were used: Intrapreneurship self-capital, Entrepreneurship, corporate entrepreneurship, innovativeness, well-being and employability. Moreover the search was conducted using papers and published books. For the specific ICS literature review we included only sources written in Italian or English and published between 2014 and 2019, while the historical background has been written without time restrictions.

3. Differences between Entrepreneurship, Corporate Entrepreneurship and Intrapreneurship

Intrapreneurship shares many of the aspects of entrepreneurship, which mostly concern personal characteristics and competencies, indeed an intrapreneur is an "inside" entrepreneur and the biggest difference regards the context (Azami, 2013).

Intrapreneurship is restorative and entrepreneurship is developmental. Restorative action is taken to counter organizational stagnation instead individual entrepreneurship creates something from nothing (Azami, 2013). Kuratko, Montagno, and Hornsby (1990) define intrapreneurship as autonomous strategic employee behaviour to exploit a given business opportunity.

The Norwegian study made by Åmo (2006) tried to explain the relation between corporate entrepreneurship (measured as the organization's desire for employee innovation behavior) and intrapreneurship (measured as autonomous strategic employee behavior). Study participants were 877 (employees working as bosses (43), middle managers (354) and white-collar workers (340)).

Corporate entrepreneurship (Floyd and Wooldridge, 1999) and intrapreneurship (Pinchot and Pellman, 1999) both describe incremental processes of renewal of the organization through innovation behaviour from employees. He found that both are related to employees' proactivity and innovative behaviours. The relation between corporate entrepreneurship was stronger but useless without Intrapreneurship. Åmo (2016) suggests that corporate Entrepreneurship and intrapreneurship should be treated as one multifaceted construct.

4. Differences between Intrapreneurship self-capital and psychological capital

ISC is a higher construct that refers to a personal well-being promoted by competencies, abilities, skills, attitudes and characteristics (Di Fabio, 2014). The psychological capital (PsyCap) refers to a personal psychological state denote by positive self-efficacy (Bandura, 1982), optimism (Seligman, 1991), resilience and hope (Snyder, 1994). ICS and PsyCap share some aspects such as the confidence of individuals in their own ability and openness to the future, the strategic design of goals, the optimism and the perceived self-motivation. Even if the PsyCap could be considered similar to ISC (Luthans et al., 2006) these are different constructs. Di Fabio, Palazzeschi and Bucci's (2017) studies have found positive and strong correlation between ICS and PsyCap (Pearson's r ranged from 0.43 to 0.59 among university students and from 0.44 to 0.60 among workers). However, the intensity and the size of the correlation indicates that these two constructs are independent (Di Fabio, Palazzeschi and Bucci, 2017).

5. Gender differences in ICS construct

Adachi and Hisada's research (2017) have found some differences between gender in intrapreneurship competencies, attitudes and skills. Firstly, they have found that marriage, children and family size are positively correlated to intrapreneurship and entrepreneurship and the part-time have negative relation with ISC. Secondly, the study have found interesting results suggesting that (for entrepreneurship and intrapreneurship) the gender differences in the employment-related variables are more significant than those in the family-related variables.

Considered these results the eventual differences between the two genders are underlying the work and employment culture. Authors conclude that perception of psychosocial risks increases worker's vulnerability to work-related stress and differs between genders.

These results are similar to what was stated in the entrepreneurship much earlier: "*Although there are more similarities than differences, male and female entrepreneurs do differ in several ways. For instance, in terms of motivation, men are often motivated by the drive to control their own destiny, to make things happen. This drive often stems from disagreements with their bosses or a feeling that they can run things better. In contrast, women tend to be more motivated by independence and achievement that arise from frustration with a job in which they have not been allowed to perform at the level of which they are capable.*" (Hisrich, 1990)

6. ISC as a high order construct

Di Fabio considers seven construct to build her high order construct of ICS: core self-evaluation, hardiness, creative self-efficacy, resilience, goal mastery, decisiveness and vigilance (see Table 1).

The first component of the Di Fabio's ICS theory is the Core self-evaluation (Judge et al., 2003) that refers to positive self-esteem, self-efficacy, internal locus of control, and the absence of maladaptive pessimism. Bono and Judge (2003), related Core self-evaluation is positively associated with performance, while other studies found positive relation with employability (Judge and Hurst, 2008) and career decision-making self-efficacy (Koumoundourou, Kounenou, and Siavara, 2012).

The hardiness, firstly developed by Kobasa and Maddi (1982), refers to a concept mostly close to the LOC of Rotter (1954), and is defined by Di Fabio as "*the resistance exhibited by individuals and includes the tendency to fully engage in all aspects of life, to identify goals, and to set priorities*" (Di Fabio, 2014).

The personality dispositions of hardiness are commitment, control, and challenge. Commitment refers to the disposition or tendency to involve oneself in challenges, events, and life in general (Maddi, Hoover and Kobasa 1982). The control

disposition is expressed as a propensity to feel and act as if one is influential (Averill, 1973; Phares, 1976). And the third component refers to the tendency to consider changes like incentives to growth and self-develop (Csikzentmihalyi, 1975). Creative self-efficacy refers to oneself perception of ability to solve problems in a new and creative way, thinking out of the box (Tierney and Farmer, 2002). Resilience can be defined as an ability to bounce-back adversity and challenges, stress and even traumatic events (Goldstein and Brook, 2005).

Goal Mastery refers to the ability to achieve goals strategically and the tendency to pursuit constantly the self-developing of skill and abilities (Midgley et al., 2000).

Decisiveness refers to the self-determination in decision making and the freedom and autonomy to make decisions (Menzela Aaltiob and Ulijna 2007). Decisiveness is positively associated with performance (Creed, Prideaux and Patton, 2005) and employability (Abu Talib and Tan, 2009).

The last component, vigilance, refers to the tendency to be cautious and heedful on a decision making (Mann et al., 1997). Vigilance is positively related with performance (Senko, Hama and Belmonte, 2013), employability (Burns et al., 2000), career decision-making self-efficacy (Ueichi et al., 2012), and lack of career decision-making difficulties (Osipow and Gati, 1998).

First-order construct	Definition	Reference literature
Core Self-Evaluation	A positive self-concept in terms of self-esteem, self-efficacy, locus of control, and the absence of pessimism.	Judge et al., 2003
Hardiness	Individual's beliefs about the self, the world, and how one should remain connected with this world using three dimensions: commitment, control, and challenge.	Maddi, 1990 Bartone, 1995
Creative Self-Efficacy	One's perception of one's own ability to creatively solve problems, including the perception of one's own problem-solving skills and ability to generate new ideas.	Tierney and Farmer, 2002
Resilience	The perceived ability to cope with adversity in an adaptive way and use adaptive strategies to deal with discomfort and/or adversity.	Campbell-Sills et al., 2006
Goal Mastery	The continuous development of skills and attainment of the highest possible level of performance.	Midgley et al., 2000
Decisiveness	The perceived ability to make decisions in a timely manner in any life context.	Frost and Shows, 1993
Vigilance	The adaptive decision-making style defined as a careful and adaptive search for relevant information to evaluate options before making a decision.	Mann et al., 1997

Table 1. From Di Fabio and Duradoni, (2019), Frontiers in Psychology, 10:1060.
The scale developed by Di Fabio (2014) for the ISC Construct

Di Fabio developed a scale to measure the ISC construct. The scale called "Intrapreneurial self-capital scale", consists of 28 items measured by a Likert scale (ranging from 1 = strongly disagree to 5 = strongly agree). The ISC items were chosen starting from a pool of items adapted from other existing and empirically based scales: 4 items were taken from The Core Self-Evaluation scale (Judge et al., 2003) to measure the core self-evaluation dimension, while from The Hardiness Scale (Bartone, 1995) were taken 9 items to measure: commitment, control and challenge. Moreover, were taken some items from The Creative Self-Efficacy (Tierney and Farmer, 2002), The Connor-Davidson Resilience Scale (Campbell-Sills and Stein, 2006),The Goal Mastery Orientation Scale of the Patterns for Adaptive Learning Survey (Midgley et al., 2000), The Indecisiveness Scale (Frost and Shows, 1993), and The Melbourne Decision Making Questionnaire (Mann et al., 1997) (see Table 2).

The study participants were 171 students from Italian high schools, 72 men (42.11%) and 99 women (57.89%), with an average age of 18.12 years (SD = 0.83).

The ISC scale has been verified using a second-order confirmatory factor (CFA) through the use of the 6th version of the statistical software SPSS AMOS (IBM Corp, Armonk, NY, USA), using the maximum likelihood method. The model fit was analyzed using the ratio between chi-square and degree of freedom. The reliability of the ISCS's internal consistency was verified via Cronbach's alpha coefficient. Moreover, the concrete validity was verified through Pearson's (r) correlation of the ISCS with performance in terms of GPA (Grade Point Average) measured at the end of the scholastic year, with the Self-Perceived Employability for Students (SPES),the short form of the Career Decision Self-Efficacy Scale(CDSES-SF), and also with the Career Decision-Making Difficulties Questionnaire (CDDQ).

Results indicate correlations of the ISCS with performance in terms of GPA at the end of the scholastic year (.32), the SPES (.36), the CDSES-SF (.46), and the CDDQ (-.26). The Cronbach's alpha coefficient, with a value of α = .86 showed good internal consistency.

Di Fabio (2014)	Journal of Employment Counseling	Development of the ISC scale, study participants were 171 (72 male, 99 female) italian high school students. The ISCS uses a 5-point Likert-type scale. The scale is composed by 28 items. The ICS scale is correlated with GPA (.32), SPES (.36), CDSES-SF (.46) and CDDQ (-.26). The Cronbach's alpha coefficient is .86.
Di Fabio and Van Esbroeck (2016)	Counsel. Giornale Ital. Ric. Appl	This study aims to describe how attitudes, competencies and skills used in career management and promoted by ISC are also beneficial in a life design perspective. This means that the ISC may consequently fit the life-design paradigm. When analyzing the characteristics of a life design approach it can be argued that within the ISC construct elements are found which are in line with the life design paradigm. Characteristics that improve the life design process as adaptability and self-efficacy are included in the ISC concept.
Di Fabio and Gori (2016a)	Nova Science Publishers	Study participants were 141 (124 male) white collar workers. Mediation analyses were conducted following the Baron and Kenny (1986) procedure. The study found correlation between Emotional Stability (low Neuroticism) is positively related with Flourishing (β = .424, $p < .001$). Emotional Stability (low Neuroticism) is positively related to Intrapreneurial Self-Capital (β = .498, $p < .001$).

		Emotional Stability (low Neuroticism) was positively related to Self-Esteem (β = .379, p < .001). Results indicate that ISC mediates the relationship between Emotional Stability (low Neuroticism) and Flourishing, producing a significant reduction in the relationship between these two constructs.
Di Fabio, Palazzeschi and Bucci (2017)	Frontiers in Psychology	258 participants, (Italian public and private workers) the 59% were male. The participants' ages ranged from 29 to 58 years (M = 45.59, SD = 9.92). The study results indicate strong and positive correlations between the BFQ, ISCS, SWLS, and FS. Personality traits accounted for 31% of the variance in life satisfaction. At the second step, intrapreneurial self-capital added 9% of the incremental variance. The model overall accounted for 40% of the variance. At the first step, personality traits accounted for 39% of the variance in flourishing. At the second step, intrapreneurial self-capital added 12% of the incremental variance. The model overall accounted for 51% of the variance.
Di Fabio and Kenny (2018)	Sustainability	Study participant were 573 university students of psychology (23.45% of the participants were men and 76.55% were women.). The study used Pearson's r correlation hierarchical regression results indicate ISC significantly related to all dimensions of well-being, the contribution of ISC for eudaimonic well-being was more robust than the contribution of the affective components of hedonic well-being. ICS is related with PANAS Positive Affects scale (.44), PANAS Negative affects scale (-.38); SWLS (Satisfaction with Life Scale) (.52) and MLM (Meaning in Life Measure (.54); FS (Flourishing Scale) (.56).
Adachi and Hisada (2017)	Springer Science	The study has found that marriage, children, and family size have additional positive effects on women's entrepreneurship, whereas part-time work has additional negative effects.
Augusto Felicio et al. (2012)	Management Decision	Intrapreneurship factor have the following variables: Innovation (b= 0.81); Uncertain risk taking (b = 0.70) Risk-Challenges perception (b = 0.93); competitive energy (b = 0.51) ; pro-activity (b = 1.04) and Autonomy (b = 0.58)
Gawke, Gorgievski, and Bakker (2017)	Journal of Vocational Behavior	Study participants were 618 (random workers form 5 Netherlands companies). Employee intrapreneurship was measured with the eight-item version of employee intrapreneurship scale of Gawke, Gorgievski and Bakker. Employee intrapreneurship have higher levels of personal resources at T2 (r = .57; p < .01). The study have found that employees with more personal resources and also had higher levels of work engagement (r = .32; p < .01).
Woo (2017)	Career Development International Emerald Insight	Career adaptability was found to be significantly related to personality traits: neuroticism (r= 0.198, p <0.01), extraversion (r=0.148, p<0.01), openness (r=0.380, po0.01), agreeableness (r=0.258, p<0.01), and conscientiousness (r=0.377, p<0.01). In addition, the results also indicate a strong relation between career adaptability and intrapreneurship (r=0.383, p<0.01). Furthermore, intrapreneurship was negatively correlated with neuroticism (r=−0.181, p<0.01) and positively correlated with extraversion (r=0.201, p<0.01), openness (r=0.203, <o0.01), agreeableness (r=0.231, p<0.01), and conscientiousness (r=0.229, p<0.01).
Yariv and Galit (2017)	The Journalof Entrepreneurship	The study participants were 335 (in 21 organizations of various types sited in Israel). Intrapreneurship was measured through the De Jong, Parker, Wennekers and Wu (2011) scale. The questionnaire included nine items. To measure the level of organizational support, have been used the Alpkan et al.'s (2010) questionnaire. The perception of incivility was measured by the work incivility scale (WIS) developed by Cortina et al. (2001). Incivility was negatively correlated with both sub-factors of organizational support: management support (r = –0.305, p < 0.01) and risk taking (r = –0.106, p < 0.01) intrapreneurship was positively correlated with management Support (r = 0.388, p < 0.01) and risk taking (r = 0.444, p < 0.01).
Duradoni and Di Fabio (2019)	Sustainability	The study participants were 120 Italian workers (85 female), employed as high school teachers in Tuscany. Sample's average age was 48 years (s.d. = 11.11). A total of 91.67% have a master's degree, while 8.33% reported having a high school diploma. The average length of service was 17.71 years (s.d. = 12.44, Min = 1 year, Max = 42 years). The hypotheses of the study were: 1) Extraversion is positively correlated with both intrapreneurial self-capital and employees' innovative behavior, 2) intrapreneurial self-capital is positively correlated with employees' innovative behavior, 3) intrapreneurial self-capital mediates the effect of extraversion on employees' innovative behavior and 4) Intrapreneurial self-capital mediates the effect of extraversion on employees' innovative implementation behavior. Extraversion resulted as the most highly correlated personality trait with the variables of interest. Indeed, extraversion showed significant and robust correlations with the IBI (Innovative Behavior Inventory) total score (Pearson r = 0.42, p = 0.001) and the IBI implementation dimension (Pearson r = 0.30, p = 0.001), as well as with the ISCS score (Pearson r = 0.57, p = 0.001). The IBI total score and the ISCS score were also related (Pearson r = 0.54, p = 0.001). Finally, intrapreneurial self-capital was shown to be positively correlated with innovative implementation behavior (Pearson r = 0.32, p = 0.001).
Di Fabio and Peirò (2018)	Sustainability	The study analyze the psychometric validity of the new scale for assessing human capital sustainability leadership for Italian workers. The participants were 207 leaders (females = 66.67%) from public and private health and care organizations in Tuscany. The second-order confirmatory factor analysis (CFA) involved 274 Italian leaders from different public and private organizations. The new integrated leadership scale is composed of 16 items on a Likert scale with five responses (from 1 = none to 5 = very much).The results revealed a factor structure with four dimensions (Ethical leadership, Sustainable leadership, mindful leadership and Servant leadership) that explained 66.71% of the variance of the new scale for assessing human capital sustainability leadership. The scale was also related to: Workplace Relational Civility Scale (WRCS) and High Entrepreneurship, Leadership, Professionalism Questionnaire (HELP-Q).
Bee Seok et al. (2019)	Sustainability	Study purpose was to determine the factor structure and psychometric properties of the Malaysian version of ISCS (Di Fabio, 2014). The study participants were 1491 university students in Sabah, Malaysia. The final indices of Goodness of Fit showed satisfactory fit to the data (CFI= .91, TLI= .94,

		RMSEA= .06, SRMR= .04). The Cronbach's alpha of the Malaysian ISCS is 0.81. The Malaysian ISCS correlates with Career Adaptability r = 0.31 (p < 0.01) and with Life Project Reflexivity r = 0.44 (p<0.01), thus showing an adequate concurrent validity evidence.
McIlveen and Di Fabio (2018)	Springer	This research presents a case study of a female university student. A qualitative instrument, the Life Adaptability Qualitative Assessment (LAQuA) (Di Fabio, 2015), was administered before and after a training based on ISC Di Fabio (2014) high order construct. The results demonstrate that ISC training (ISCT) can enforce self-perception, reflexivity and adaptability, confidence, stress management and mostly a great awareness of her own abilities and opportunities
Di Fabio and Saklofske (2019)	Sustainability	This research is divided in two studies supporting the contribution of trait emotional intelligence (EI) to ISC beyond that explained by the 3 personality trait models. The ISCS, Trait Emotional Intelligence Questionnaire Short Form (TEIQue-SF), Big Five Questionnaire (BFQ), Mini International Personality Item Pool Scale (Mini-IPIP), HEXACO-60, and Eysenck Personality Questionnaire Revised Short Form (EPQ-RS) were administered to 210 (females: 60.48%) first and second year university students (Study 1) and 206 ((females: 56.80%) university students in the last three years of undergraduate university studies (Study 2). In the first part, study participants average age was 20.94 with SD = 0.86. In the second part, participants average age was 24.29, with SD = 1.38). Hierarchical regression analyses demonstrated that Emotional Intelligence (EI) explained additional variance in ISC beyond that accounted for each of the three personality trait models for both samples.
Mennini et al. (2018)	Quality-Access to Success	The aim of the research was to investigate the correlations and the relations between intrapreneurial self-capital, engagement, general well-being and satisfaction with life by using a sample of university students. The participants were 101 (72 women, 28 men and 1 person who did not declare gender, the participants were aged 18-29 years, the average age was 21.50) students and four tests have been administered (Intrapreneurial self-capital Scale (ISCS), Utrecht Work Engagement Scale (UWES-9),General Health Questionnaire-12 items (GHQ-12), Satisfaction With Life Scale (SWLS),). The results resulted in 8 upper-middle correlations. More specifically, it was found that well-being and satisfaction with life are strictly linked to engagement (r = .426, .r = .358) and also, as expected, that intrapreneur-self-capital higher-order construct play a key role in the manifestation of well-being (r = .529).

Table 2. Evidence from studies and research

7. ISC and well-being

High level of well-being (WB) has been correlated with a massive amount of positive behaviours and psychological and physical positive outcomes (Ryff and Singer, 2008; Deci and Ryan, 2004; Lecca et al., 2018). WB has also been correlated to work success and relationships (Luhmann at al., 2013; Lyubomirsky, King and Diener, 2005) and resilience (Di Fabio and Palazzeschi, 2015). WB is associated with lower mortality (Chida and Steptoe, 2008), healthier ageing (Ostir et al., 2000) and higher protection from cognitive decline (Gerstorf et al., 2007). On the other hand, episodic acute stress such as robberies and thefts exposure can affect perceived WB (Setti et al., 2018).

There are two type of WB: Hedonic WB (Diener and Suh, 2003; Lykken and Tellegen, 1996) and Eudaimonic WB (Ryff and Singer 2008; Seligman, 1991; Seligman and Csikszentmihalyi, 2000). The first one, also named subjective well-being, is defined in terms of satisfaction with life, pleasure attainment, and pain avoidance (Andrews and Withey, 1976; Di Fabio and Gori, 2016b), instead the Eudaimoic vision consider WB in terms of self-realization, values and capabilities (Seligman and Csikszentmihalyi, 2000; Ryff and Singer, 2008). EWB and HWB should not be considered mutually exclusive but included in a continuum (Henderson and Knight, 2012).

8. Conclusion

The ISC is still a young construct and academic attention has recently arrived. It appears as a construct that fit with the demands of the insecure modern working world that requires competencies like innovativeness and decision making in risky context.

In addition to its potential usefulness in the workplace, the theory is based on evidence-based, valid and above all positive psychological assumptions and constructs.

The studies made by Di Fabio and collaborators suggest that it is possible to empirically verify the intrapreneurial self-capital like an high construct by using the ISCS, although the scale was mostly validated through national studies.

Anyway, the studies made by Di Fabio and collaborators promoted a powerful construct for the 21st century that still present some limits.

Firstly, the studies made by Di Fabio and collaborators was limited by the samples (Italian high school students or Italian white collar workers). Secondly, most of the researches made on the Italian territory were dislocated in Tuscany. Nonetheless, the construct attractiveness is increasing and encourage for future research and analysis. Also, the ISC training seems to be able to empower competencies like adaptability, stress management and can enforce self-evaluation. Even the ISC training is limited by few researches. In conclusion, the construct of ISC still lacks solid research but its potential will increasingly attract the attention of the reference scientific literature.

References

[1] Abu Talib, M., and Tan, K. A. (2009). Predictors of career indecision among Malaysian undergraduate students. *European Journal of Social Sciences*, 8(2), pp. 215-224.

[2] Adachi, T., and Hisada, T. (2017). Gender differences in entrepreneurship and intrapreneurship: an empirical analysis. *Small Business Economics*, 48(3), pp. 447-486. doi: 10.1007/s11187-016-9793-y.

[3] Åmo, B. W. (2006). The influence from corporate entrepreneurship and intrapreneurship on white-collar workers' employee innovation behaviour. *International journal of innovation and learning*, 3(3), pp. 284-298. doi: 10.1504/IJIL.2006.009223.

[4] Andrews, F. W., and Withey, S. B. (1976). *Social Indicators of Well-Being: Americans Perceptions of Life Quality*. New York: Springer.

[5] Arcangeli, G., Giorgi, G., Mucci, N., Bernaud, J.L., and Di Fabio, A. (2018). Editorial: Emerging and Re-emerging Organizational Features, Work Transitions, and Occupational Risk Factors: The Good, the Bad, the Right. An Interdisciplinary Perspective. *Frontiers in Psychology*, 9, 1533. doi: 10.3389/fpsyg.2018.01533.

[6] Augusto Felício, J., Rodrigues, R., and Caldeirinha, V. R. (2012). The effect of intrapreneurship on corporate performance. *Management Decision*, 50(10), 1717-1738. doi: 10.1108/00251741211279567.

[7] Averill, J. R. (1973). Personal control over aversive stimuli and its relationship to stress. *Psychological bulletin*, 80(4), pp. 286-303. doi:10.1037/h0034845.
[8] Azami, S. (2013). Intrapreneurship "an exigent employment". *International Journal of Scientific and Technology Research*, 2(4), pp. 194-198.
[9] Bandura, A. (1982). Self-efficacy mechanism in human agency. *American psychologist*, 37(2), pp. 122-147. doi: 10.1037/0003-066X.37.2.122.
[10] Bartone, P. (1995). *A short hardiness scale*. Washington, DC: Walter Reed Army Inst. of research.
[11] Bee Seok, C., Abd Hamid, H.S. and Ismail, R. (2019). Psychometric Properties of the Intrapreneurial Self-Capital Scale in Malaysian University Students. *Sustainability*, 11(3), 881. doi: 10.3390/su11030881.
[12] Burns, L. R., Dittmann, K., Nguyen, N. L., and Mitchelson, J. K. (2000). Academic procrastination, perfectionism, and control: Associations with vigilant and avoidant coping. *Journal of Social Behavior and Personality*, 15(5), pp. 35-46.
[13] Campbell-Sills, L., and Stein, M. B. (2007). Psychometric analysis and refinement of the Connor–Davidson Resilience scale: Validation of 10-item measure of resilience. *Journal of Traumatic Stress*, 20(6), pp. 1019-1028. doi: 10.1002/jts.20271.
[14] Chida, Y., and Steptoe, A. (2008). Positive psychological well-being and mortality: a quantitative review of prospective observational studies. *Psychosomatic medicine*, 70(7), pp. 741-756. doi: 10.1097/PSY.0b013e31818105ba.
[15] Copello, F., Garbarino, S., Messineo, A., Campagna, M., Durando, P., Mavilia, M.G., Cartosio, M., Toletone, A., Sossai, D., Guglielmi, O., Bersi, F., Dini, G., Gelsomino, G., Secchini, S., Di Reto, G., Cerabona, V., Di Nezza, A., Abetti, P., Giordano, F., Mascia, N., Angius, N., Fabbri, D., Lecca, L.I., and Virgona, P. (2015). Occupational medicine and hygiene: Applied research in Italy. *Journal of Preventive Medicine and Hygiene*, 56(2), pp. E102-E110. doi: 10.15167/2421-4248/jpmh2015.56.2.494.
[16] Cox, C., and Jennings, R. (1995). The foundations of success: The development and characteristics of British entrepreneurs and intrapreneurs. *Leadership and Organization Development Journal*, 16(7), pp. 4-9. doi: 10.1108/01437739510100892.
[17] Creed, P., Prideaux, L. A., and Patton, W. (2005). Antecedents and consequences of career decisional states in adolescence. *Journal of Vocational Behavior*, 67(3), pp. 397-412. doi: 10.1016/j.jvb.2004.08.008.
[18] Davis, K. S. (1999). Decision criteria in the evaluation of potential intrapreneurs. *Journal of Engineering and Technology Management*, 16(3-4), pp. 295-327. doi: 10.1016/S0923-4748(99)00013-2.
[19] Deci, E. L., and Ryan, R. M. (2004). *Handbook of self-determination research*. University of Rochester Press.
[20] Diener, E., and Suh, E. M. (2003). Measuring Subjective well-being to compare the quality of life of culture. In *Culture and subjective well-being*. MIT press.
[21] Di Fabio, A. (2014). Intrapreneurial self-capital: A new construct for the 21st century. *Journal of Employment Counseling*, 51(3), pp. 98-111. doi: 10.1002/j.2161-1920.2014.00045.x
[22] Di Fabio, A., and Gori, A. (2016a). *Neuroticism and flourishing in white collar workers: from self-esteem to intrapreneurial self-capital for adaptive outcomes. Psychology of emotions, motivations and actions. Neuroticism: Characteristics, impact on job performance and health outcomes*. Hauppauge, NY, US: Nova Science Publishers.
[23] Di Fabio, A. and Gori, A. (2016b). Measuring adolescent life satisfaction: psychometric properties of the satisfaction with life scale in a sample of Italian adolescents and young adults. *Journal of Psychoeducational Assessment*, 34(5), pp. 501-506. doi: 10.1177/0734282915621223.
[24] Di Fabio, A. and Kenny, M. (2018). Intrapreneurial self-capital: A key resource for promoting well-being in a shifting work landscape. *Sustainability*, 10(9), 3035. doi: 10.3390/su10093035.
[25] Di Fabio, A. and Van Esbroeck, R. (2016). Intrapreneurial self-capital: a concept fitting a life-designing intervention. Counseling. *Giornale Italiano Di Ricerca e Applicazioni*, 9. doi: 10.14605/CS921611.
[26] Di Fabio, A. and Duradoni, M. (2019). Intrapreneurial Self-Capital: A Primary Preventive Resource for Twenty-First Century Entrepreneurial Contexts. *Frontiers in Psychology*, 10, 1060. doi: 10.3389/fpsyg.2019.01060.
[27] Di Fabio, A. and Palazzeschi, L. (2015). Hedonic and eudaimonic well-being: the role of resilience beyond fluid intelligence and personality traits. *Frontiers in Psychology*, 6, 1367. doi: 10.3389/fpsyg.2015.01367.
[28] Di Fabio, A., Palazzeschi, L. and Bucci, O. (2017). In an Unpredictable and Changing Environment: Intrapreneurial Self-Capital as a Key Resource for Life Satisfaction and Flourishing. *Frontiers in Psychology* 8, 1819. doi: 10.3389/fpsyg.2017.01819.
[29] Di Fabio, A. and Peirò, J. (2018). Human Capital Sustainability Leadership to promote sustainable development and healthy organizations: A new scale. *Sustainability*, 10(7), 2413. doi: 10.3390/su10072413.
[30] Di Fabio, A. and Saklofske, D. H. (2019). The contributions of personality traits and emotional intelligence to intrapreneurial self-capital: Key resources for sustainability and sustainable development. *Sustainability*, 11(5), 1240. doi: 10.3390/su11051240.
[31] Duradoni, M., and Di Fabio, A. (2019). Intrapreneurial self-capital and sustainable innovative behavior within organizations. *Sustainability*, 11(2), 322. doi: 10.3390/su11020322.
[32] Floyd, S.W. and Wooldrigde, B. (1999). Knowledge creation and social networks in corporate entrepreneurship: The renewal of organizational capability. *Entrepreneurship Theory and Practice*, 23(3), pp. 123-143. doi: 10.1177/104225879902300308.
[33] Frost, R. O., and Shows, D. L. (1993). The nature and measurement of compulsive indecisiveness. *Behavior Research Therapy*, 31(7), pp. 683-692. doi: 10.1016/0005-7967(93)90121-A.
[34] Gawke, J. C., Gorgievski, M. J. and Bakker, A. B. (2017). Employee intrapreneurship and work engagement: A latent change score approach. *Journal of Vocational Behavior*, 100, pp. 88-100. doi: 10.1016/j.jvb.2017.03.002.
[35] Gerstorf, D., Lövdén, M., Röcke, C., Smith, J., and Lindenberger, U. (2007). Well-being affects changes in perceptual speed in advanced old age: Longitudinal evidence for a dynamic link. *Developmental psychology*, 43(3), pp. 705-718. doi: 10.1037/0012-1649.43.3.705.
[36] Giorgi, G., Arcangeli, G., Mucci, N., and Cupelli, V. (2015). Economic stress in the workplace: The impact of fear of the crisis on mental health. *Work*, 51(1), pp. 135-142. doi: 10.3233/WOR-141844.
[37] Goldstein, S., and Brooks, R. B. (2005). *Handbook of resilience in children*. New York, NY, US: Kluwer Academic/Plenum Publishers. doi: 10.1007/b107978.
[38] Henderson, L. W. and Knight, T. (2012). Integrating the hedonic and eudaimonic perspectives to more comprehensively understand wellbeing and pathways to well-being. *International Journal of Wellbeing*, 2(3), pp. 196-221. doi: 10.5502/ijw.v2i3.3.
[39] Hisrich, R. D. (1990). Entrepreneurship/intrapreneurship. *American Psychologist*, 45(2) pp. 209-222. doi:10.1037/0003-066X.45.2.209.
[40] Honig, B. (2001). Learning strategies and resources for entrepreneurs and intrapreneurs. *Entrepreneurship Theory and Practice*, 26(1), pp. 21-35. doi: 10.1177/104225870102600102.
[41] Judge, T. A., Erez, A., Bono, J. E., and Thoresen, C. J. (2003). The Core Self-Evaluations Scale: Development of a measure. *Personnel Psychology*, 56(2), pp. 303-331. doi: 10.1111/j.1744-6570.2003.tb00152.x.
[42] Judge, T. A., and Hurst, C. (2008). How the rich (and happy) get richer (and happier): Relationship of core self-evaluations to trajectories in attaining work success. *Journal of Applied Psychology*, 93(4), pp. 849-863. doi: 10.1037/0021-9010.93.4.849.
[43] Kobasa, S. C., Maddi, S. R., and Kahn, S. (1982). Hardiness and health: a prospective study. *Journal of personality and social psychology*, 42(1), pp. 168-177. doi: 10.1037/0022-3514.42.1.168.
[44] Koumoundourou, G. A., Kounenou, K., and Siavara, E. (2012). Core self-evaluations, career decision self-efficacy, and vocational identity

among Greek adolescents. *Journal of Career Development*, 39(3), pp. 269-286. doi: 10.1177/0894845310397361.
[45] Kuratko, D. F., Montagno, R. V., and Hornsby, J. S. (1990). Developing an intrapreneurial assessment instrument for an effective corporate entrepreneurial environment. *Strategic management journal*, 11, pp. 49-58. doi: 10.1016/j.bushor.2013.08.009.
[46] Lecca, L.I., Campagna, M., Portoghese, I., Galletta, M., Mucci, N., Meloni, M., and Cocco, P. (2018). Work related stress, well-being and cardiovascular risk among flight logistic workers: An observational study. *International Journal of Environmental Research and Public Health*, 15(9), E1952. doi: 10.3390/ijerph15091952.
[47] Lubkins, L., and Kans, K. (2007). *Entrepreneurial strategic process*. London, England: Elsevier.
[48] Luhmann, M., Lucas, R. E., Eid, M., and Diener, E. (2013). The prospective effect of life satisfaction on life events. *Social Psychological and Personality Science*, 4(1), pp. 39-45. doi: 10.1177/1948550612440105.
[49] Luthans, F., Avey, J. B., Avolio, B. J., Norman, S. M., and Combs, G. M. (2006). Psychological capital development: toward a micro-intervention. Journal of Organizational Behavior: *The International Journal of Industrial, Occupational and Organizational Psychology and Behavior*, 27(3), pp. 387-393. doi: 10.1002/job.373.
[50] Lykken, D., and Tellegen, A. (1996). Happiness is a stochastic phenomenon. *Psychological science*, 7(3), pp. 186-189. doi: 10.1111/j.1467-9280.1996.tb00355.x.
[51] Lyubomirsky, S., King, L., and Diener, E. (2005). The benefits of frequent positive affect: Does happiness lead to success? *Psychological bulletin*, 131(6), pp. 803-855. doi: 10.1037/0033-2909.131.6.803.
[52] Maddi, S. R., Hoover, M., and Kobasa, S. C. (1982). Alienation and exploratory behavior. *Journal of Personality and Social Psychology*, 42(5), pp. 884-890. doi: 10.1037/0022-3514.42.5.884.
[53] Mann, L., Burnett, P., Radford, M., and Ford, S. (1997). The Melbourne Decision Making Questionnaire: An instrument for measuring patterns for coping with decisional conflict. *Journal of Behavioral Decision Making*, 10(1), pp. 1–19. doi: 10.1002/(SICI)1099-0771(199703)10:1<1::AID-BDM242>3.0.CO;2-X.
[54] McIlveen, P., and Di Fabio, A. (2018). Intrapreneurial self-capital training: a case study of an Italian University student. In *Narrative Interventions in Post-modern Guidance and Career Counseling*, pp. 197-209. Springer, Cham. doi: 10.1007/978-3-319-98300-4_11.
[55] Mennini, E., Pandolfi, C., Giorgi, G., Arcangeli, G., and Mucci, N. (2018). The Manifestation of Well-being in Engagement and in Intrapreneur's Skills: An Empirical Investigation in a Sample of University Students. *Quality-Access to Success*, 19(162), pp. 113-121.
[56] Menzela, H. C., Aaltiob, I., and Ulijna, J. M. (2007). On the way to creativity: Engineers as intrapreneurs in organizations. *Technovation*, 27(12), pp. 732-743. doi: 10.1016/j.technovation.2007.05.004.
[57] Midgley, C., Maehr, M. L., Hruda, L. Z., Anderman, E., Anderman, L., Freeman, K. E., and Urdan, T. (2000). *Manual for the patterns of adaptive learning scales*. University of Michigan.
[58] Mucci, N., Giorgi, G., Roncaioli, M., Perez, J.F., and Arcangeli, G. (2016). The correlation between stress and economic crisis: A systematic review. *Neuropsychiatric Disease and Treatment*, 12, pp. 983-93. doi: 10.2147/NDT.S98525.
[59] Mucci, N., Traversini, V., Giorgi, G., Garzaro, G., Fiz-Perez, J., Campagna, M., Rapisarda, V., Tommasi, E., Montalti, M., and Arcangeli, G. (2019). Migrant Workers and physical health: An umbrella review. *Sustainability*, 11(1), 232. doi: 10.3390/su11010232.
[60] Muller, G. F., Garrecht, M., Pikal, E., and Reedwisch, N. (2002). Intrapreneurs: Trait-related similarities and differences compared with other employees and entrepreneurs. *Zeitschrift fur Personal psychologie*, 1, pp. 19-26.
[61] Osipow, S. H., and Gati, I. (1998). Construct and concurrent validity of the Career Decision-Making Difficulties Questionnaire. *Journal of Career Assessment*, 6(3), pp. 345-364. Doi: 10.1177/106907279800600305.
[62] Ostir, G. V., Markides, K. S., Black, S. A., and Goodwin, J. S. (2000). Emotional well-being predicts subsequent functional independence and survival. *Journal of the American Geriatrics Society*, 48(5), pp. 473-478. doi: 10.1111/j.1532-5415.2000.tb04991.x.
[63] Phares, E. J. (1976). *Locus of control in personality*. General Learning Press.
[64] Pinchot, G. and Pellman, R. (1999). *Intrapreneuring in Action; A Handbook for Business Innovation*. Berret-Koehler Publishers Inc.
[65] Ronen, S. (2010). Determinants of intrapreneurship among high-tech engineers. In Malach-Pine, A. and Özbilgin M.F. (Eds.). *Handbook of research on high-technology entrepreneurs*. Cheltenham, England: Edward Elgard.
[66] Rotter J.B., (1954). *Social learning and clinical psychology*. New York, US: Prentice-Hall.
[67] Ryff, C. D., and Singer, B. H. (2008). Know thyself and become what you are: a eudaimonic approach to psychological well-being. *Journal of Happiness Studies*, 9(1), pp. 13-39. doi: 10.1007/s10902-006-9019-0.
[68] Savickas, M. L. (2011). *Career counseling. Theories of psychotherapy series*. Washington, DC: American Psychological Association.
[69] Seligman, M. E. P. (1991). *Learned Optimism*. New York, US: Knopf.
[70] Seligman, M. E., and Csikszentmihalyi, M. (2000). Positive psychology: An introduction. *American Psychologist*, 55(1), pp. 5-14. doi: 10.1037/0003-066X.55.1.5.
[71] Senko, C., Hama, H., and Belmonte, K. (2013). Achievement goals, study strategies, and achievement: A test of the “learning agenda” framework. *Learning and Individual Differences*, 24, pp. 1-10. doi: 10.1016/j.lindif.2012.11.003.
[72] Setti, I., van der Velden, P., Sommovigo, V., Ferretti, M.S., Giorgi, G., O'Shea, D., and Argentero, P. (2018). Well-being and functioning at work following thefts and robberies: A comparative study. *Frontiers in Psychology*, 9, 168. doi: 10.3389/fpsyg.2018.00168.
[73] Snyder, C. R. (1994). *The psychology of hope: You can get there from here*. New York, US: Simon and Schuster.
[74] Tierney, P., and Farmer, S. M. (2002). Creative self-efficacy: Its potential antecedents and relationship to creative performance. *Academy of Management Journal*, 45(6), pp. 1137-1148. doi: 10.2307/3069429.
[75] Ueichi, H., Kuriyama, N., Saito, T., and Kusumi, T. (2012). Effect of the deliberate decision-making style on career decision-making processes and coping with regret after high school. *Psychologia*, 55(1), pp. 28-44. doi: 10.2117/psysoc.2012.28.
[76] Wanberg, C. R., and Banas, J. T. (2000). Predictors and outcomes of openness to changes in a reorganizing workplace. *Journal of applied psychology*, 85(1), pp. 132-142. doi: 10.1037/0021-9010.85.1.132.
[77] Woo, H. R. (2018). Personality traits and intrapreneurship: the mediating effect of career adaptability. *Career Development International*, 23, pp.145-162. doi: 10.1108/CDI-02-2017-0046.
[78] Yariv, I., and Galit, K. (2017). Can Incivility Inhibit Intrapreneurship? *The Journal of Entrepreneurship*, pp. 26(1), 27-50. doi: 10.1177/0971355716677386.