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Journal of Management Systems, 6 issues per year

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Indexed in: **WEB OF SCIENCE – ESCI, SCOPUS, EBSCO, PROQUEST** and listed in **CABELL'S Whitelist**

Publisher and Journal address:

Str. Theodor Burada, No. 6, Sector 1, 010215 - Bucharest, Romania

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Print:

S.C. Interbrand Impex S.R.L.

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p-ISSN 1582-2559; e-ISSN 2668-4861; ISSN-L 2668-4861

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Modern Organization Effective Functioning Evaluation

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Abstract

The economic conditions of modern organizations are associated with a number of changes increase in the external and internal environment caused by the process of digital transformation and business sphere transformation. The quantity growth of managerial decisions made raises the question of their quality improving in the first place. The purpose of the work is the substantiated need for the efficiency concept transformation, considering new phenomena and a review of approaches to its definition and evaluation in the activities of a modern organization. Factors affecting the organization's effectiveness assessment have been systematized. It is concluded that it is necessary to consider complex factors affecting the effectiveness of the organization in order to ensure its real assessment.

Keywords: efficiency; economic efficiency; management; evaluation; support; organization functioning.

1. Introduction

Currently management activity as all areas of human activities is in the process of the emergence and global changes development that are caused by digitalization and the fundamentally new business conditions appearance. In the process of modern technologies development, not only new means of labor appear, as it was earlier in history, but the information sphere and communications are developing also in a completely different way, both between individuals and between social entities. At the same time, the old functional directions of the organization's activities are withering away, as well as the active appearance of new products and tools previously unknown to humankind in the field of production and sales, born by the information technologies development. That is, in order to increase efficiency, achieve set goals aimed at the final result, it is necessary to ensure continuous development. Any organization can develop both progressively it means to introduce new business processes, improve management systems, and regressively which means not to improve its activities, just to stand still, which in the end will lead to decline. Of course, the main one is progressive development, which helps improve efficiency.

A modern organization is a consciously managed social formation consisting of a group or groups of people functioning in a certain period of time on a relatively constant basis, with certain boundaries in socioeconomic relations both within and outside a given group, group associations or a given formation as a whole, ensuring the achievement of a common goal or set of goals.

At the same time, the influence of the external environment on the organization's activities and ensuring its efficiency growth has increased many times, which often leads in short periods of time to both rapid promotion and equally rapid falls of companies.

2. Methodology

In the specialized literature there is an opinion that management can be considered as constant "balancing" on the verge between many contradictions caused by the influence of various kinds of factors. At the same time, the organization's current economic conditions can contribute to the emergence of a situation that can be considered both favorably in ensuring the effectiveness of its functioning, and vice versa.

The economic effect is the result of economic activity, which, as a rule, is measured by the difference between the cash income from the activity and the cash costs of its implementation. A positive economic effect is achieved when cash income exceeds cash expenditures, and a negative one is achieved when cash expenditures exceed cash income. There are many interpretations of this term because of its popularity and frequent use in various sciences. Efficiency is a complex economic category (Fu-Kwun, 2006; Limareva, Limarev, 2014). Let us consider several definitions of the concept associated with the activities of an industrial organization and, in particular, with an analysis of the organization functioning and its units. It can be interpreted that on the one hand the organization's effectiveness is achieving a positive result in the productive resources use, on the other hand, as achieving set goals. This view is based on the fact that an organization is always a multi-purpose system.

The goal is formed on the basis of the influence possibilities, and these opportunities are determined by the combination of interests and values, motives and limitations in the organization's functioning. Practice shows that in current activities managers are guided by various kinds of specific economic goals: increasing their share in the developed market segment, expanding sales markets for traditional products, creating new sales markets through the development of new products and services, creating stable or growing demand for products, and

reducing production costs and circulation, growth of labor productivity, rational use of resources, financial condition improvement, etc., up to the bankruptcy prevention. In addition to goals of an economic nature, organization management may have social nature goals (Panfil, Murtazina, 2016; Akhmetshin, 2017).

It is with a purpose that any managerial influence in the any form of ownership organization's functioning and sphere of activity begins. A situation is possible when for some period of time managers form a whole complex to achieve a specific goal or a whole complex of interrelated goals. Thus, the system for ensuring the effective functioning of the organization is built primarily on the principles of establishing the target orientation of its work and the measures developed complexity. The organization's set of goals determines the strategy for choosing priorities in the development and implementation of management decisions, as well as the subsequent assessment of the decisions made effectiveness and implemented measures.

Therefore, the economic efficiency category can be considered not only from the point of view of the organization's development intensity, but also from the point of view of ensuring the proper level of its functioning, which in turn is determined by:

- according to the results determined by the goals' achievement in the implementation of certain activities;
- rational use of resources;
- intensity of the processes development in the system and their external manifestation;
- comprehensively.

From the above positions, it can be seen that economic efficiency combines the results of past management decisions, the current state and future changes that affect all of its elements in the future in a single process.

Efficiency can be described as the following:

- ratio of the results achieved by the enterprise to labor costs;
- result;
- compliance with planned results and actual;
- variety of functional systems; satisfactory performance;
- probability of achieving the targets;
- ratio of real and regulatory effects (Akhmetshin, Kuderova, Ryumshin, Gayazova, Romanova, Erzinkyan, 2019).

In another opinion, the essence of the organization's economic efficiency is to achieve the highest possible results at the lowest cost. In an effort to satisfy the end consumer, it is important to consider the positive economic cost-effectiveness, in other words, it is necessary to achieve a reduction in the cost of the enterprise's main activities. The essence of the company's efficiency increasing problem is to increase the economic result per unit of cost in the process of using existing resources. To maximize the organization's effectiveness, it is necessary to evaluate the possibility of:

- more efficient use of its fixed assets;
- working capital turnover ratio growth;
- labor productivity growth.

The problem of assessing the organization's effectiveness is one of the main for its owners and managers. Of course, each organization has its own specific features, operates in certain conditions, has limited opportunities, and also faces problems while doing business. However, any entrepreneurial activity is aimed at obtaining a certain result, namely, maximizing profits at the lowest cost (Korshunova, Parshina, 2017). Having estimated the importance of various resources in the production process, the role of factors that affect the funds' use, it is possible to determine methods that will help to increase the fixed assets

efficiency use and enterprise's production capacities, ensure lower production costs and increase labor productivity. Efficiency is an accurate indicator that allows to evaluate comparable parameters relative to the selected object. There are many approaches and concepts to the definition of effectiveness (Kraev, Tikhonov, Novikov, 2018).

As an indicator, economic efficiency is determined by the ratio of the economic effect (the result obtained) and the costs that generated this effect. In other words, the larger the value of the economic activity result and the smaller the costs' volume, the higher the efficiency is. The term "economic efficiency" can be applied to the enterprise's activities, and in general to the entire economic system functioning. The following performance indicators are distinguished:

- relative value (target or resource), which implies all types of profitability;
- absolute indicators calculated by the income method, and using the breakeven point of the project, the method of discounted cash flows, payback period, capitalization of income;
- relative indicator calculated by income methods, using the profitability index and project profitability, the method of internal rate of return (return on investment);
- individual set of financial and non-financial organization's indicators, which allow to evaluate the financial, investment, marketing and other areas of the organization.

Most currently used methods and approaches for analyzing the organization's effectiveness and its financial condition contain the same indicators and can complement each other. These approaches can be used separately or comprehensively. It will depend on the analysis's goals and objectives, the available information base. The analysis of scientific approaches to under-standing and the effectiveness evaluating is given in Table 1.

Based on the analysis of the approaches given in Table 1, it can be concluded that the main methods and techniques used to study the state of the organization are standard and are used by various authors. The stages of application, the totality of all methods in the approach, the number of economic indicators that are calculated and analyzed and their names may differ. The economists rely on indicators of liquidity, financial stability, business activity and profitability as the main (Shishkina, 2000; Yashin, Puzov, 2005).

Of particular interest is the group of techniques, which is based on these indicators and uses matrix diagnostic analysis. To calculate a comprehensive indicator that determines the enterprise's efficiency, it is precisely those most important indicators of the organization's activity that are used by economists. The calculated matrix elements are characteristics of the organization's potential use. If the indicators are more than one, then the resource use efficiency and profitability increase, and vice versa. The aggregate index is calculated using the following formula:

$$I = \frac{2 \sum_i \sum_j I_{Cij}}{n^2 - n}$$

where I_{Cij} are matrix parameters, which are calculated as the dependence of the growth rate of one indicator of financial and economic activity on the growth rate of another. The methodology described characterizes the enterprise's financial condition from several sides, which allows it to be successfully applied in practice. A large number of initial matrix parameters makes the approach the most reliable and multifaceted. Also, the advantage of this method is the ease of application and results analysis. In this regard, according to the author, it is advisable to evaluate the enterprise's effectiveness using a matrix diagnostic analysis (American Management Association, 2007; Heilman, Kennedy-Phillips, 2011).

In turn, the types (methods) of analysis can be divided into the following:

Analysis steps	Indicator
Analysis of "internal efficiency"	Depending on the specifics of the business
Definition of financial results	Profit margin Asset use efficiency indicators (inventory turnover ratios, assets, current assets) Profitability indicators (return on sales, assets, equity)
Financial analysis	Liquidity indicators (balance sheet liquidity, general liquidity ratios, quick liquidity ratios, absolute liquidity ratios) Indicators of capital structure (ratios of ownership, financial independence, provision with own funds) Net working capital ratio
Performance analysis	Generalized indicators of the enterprise's profitability
Management efficiency	The ratio of profit to the entire sale of the enterprise or to revenue from sales without VAT
Business activity	The return on the total assets of the enterprise, fixed assets, turnover of fixed assets, turnover of working capital, turnover of stocks and costs, turnover of receivables, turnover of equity
Liquidity, market stability	Ratio of coverage and liquidity, autonomy, provision of stocks and costs with own working capital
Absolute financial effect assessment	Financial performance indicators Profit indicators (gross profit, profit from product sales, net profit, etc.)
Evaluation of the enterprise's efficiency level: a) development pace; b) business profitability level; c) effectiveness of the use of resource potential	Profitability (income) indicators The growth rate of total assets, sales, profits, net assets, net worth due to capitalized profit (growth stability coefficient) Earnings per share, return on equity capital, return on total assets, return on sales (turnover), margin return, return on costs
Analysis of financial condition: Assessment of property status	Ratios of fixed and current assets, depreciation of fixed assets, renewal, disposal
Asset liquidity and current solvency	Absolute, urgent and current liquidity ratios; working capital, security working capital
Balance sheet liquidity	The ratio of the elements of the asset and liability balance
Capital structure	Coefficients of independence, financial dependence, financing, investment, structure of long-term assets, structure of borrowed capital, financial stability
Net asset analysis	Net assets
Profitability	Net profit; return on assets, sales, equity, investments
Business activity	Sales revenue, capital productivity, labor productivity, turnover of current assets (in days and in turns), coefficient of sustainability of economic growth
"Balance reading"	Balance sheet indicators
Organization solvency analysis	Absolute, current liquidity ratios and interim coverage ratio
Analysis and assessment of financial stability	Coefficients: ratio of borrowed and own funds, mobility of own funds, ratio of non-current assets by the sum of own funds and long-term liabilities
Analysis and evaluation of business activity	Fulfillment of the plan by the main indicators, indicator of resource productivity, coefficient of sustainability of economic growth
Analysis and evaluation of profitability	Return on advanced capital and return on equity.

Table 1. Scientific approaches to understanding and effectiveness evaluating

- horizontal and vertical analysis of indicators that allow you to determine changes in indicators in dynamics and structure, show the rate of change and provide an opportunity for forecasting;
- coefficient analysis, when various coefficients (relative indicators) are calculated that allow drawing conclusions about qualitative changes in the organization's activities;
- comparative (spatial) analysis, when the organization's performance is compared with the competitors' performance and within the industry.

Information sources about the company, which are used for performance analysis, can be divided into official sources of the company's information disclosure and regulatory documents; documents included in the accounting (financial) statements; extra-account sources. It should be noted that accounting and reporting information is the most important information among all sources, as it most widely, clearly and in a timely manner gives insight into the financial and economic activities of the organization and the results obtained. Therefore, the main information base for calculating the performance indicators provided for in the above models is the enterprise's financial statements. A study of approaches to understanding, analyzing and evaluating effectiveness allows us to conclude that economists use similar sets of indicators, but the names of indicators or calculation formulas may vary. The most complete organization's effectiveness assessment on the basis of financial statements is possible by using horizontal and vertical analyzes and a general indicator of the effectiveness level (Zheng, Yang, McLean, 2010; Mouzas, 2006).

Therefore, effectiveness can be evaluated from various points of view.

In practice, for the organization's stable economic development, taking into account the interaction and cooperation of all business processes in the implementation of a whole range of diverse functional activities: marketing, commercial, industrial, innovative, logistics, organizational, financial and credit activities, etc., it is necessary to ensure products' high quality level and

achieving high financial results, through the current scientific and technical development of material and technical base and full spectrum of resource support, and, as noted previously, the high-level of personnel and intellectual capacity. However, a stable growth in the effectiveness of the organization's activities can be discussed only when there are no changes. Modern science has proven that change is inevitable. Their nature is diverse and aims to ensure commercial success for management and owners. With changes, both external and internal, stability gives the way to the change (Konovalov, Tikhonov, Fursov, Sogacheva, Pyanova, 2017; Quain, 2019). With the appearance of crisis phenomena, this can lead to unstable, disharmonious changes. The modern essence of this assumption is that any impact on the organization's activities usually generates changes in external and internal variables that characterize the organization's activities from the perspective of efficiency. Any changes lead to the fact that the past practical management experience with its well-established stereotypes must certainly be violated, because the organization otherwise would not be able to timely and correctly respond to these changes. A modern management team is obliged to prevent or suppress possible disturbances in the managed system, use them for good and provide adaptation to rapidly changing environmental conditions that have already been accomplished or, what is much more efficient, timely predicted.

From the managing human resources standpoint, the following main factors influence the organization's activities effectiveness increase:

- focus shows the readiness of any organization to achieve the goal;
- motivation presence means that each employee should be motivated to strive to achieve the best results in the work;
- emotionality means that the presence of positive or negative group emotions in a team contributes either to an increase in labor productivity, and, consequently, to an increase in the organization's activity effectiveness, or, conversely, to its reduction.

3. Conclusion

A modern manager should have such a set of competencies, using his experience and knowledge to fully ensure the use of favorable circumstances and at the same time minimize the risks of adverse appearance of a number of factors, minimizing and leveling risks and possible losses. At the same time, modern conditions require the management to make great efforts and expenses to motivate employees of the organization to maximize the use of their knowledge and skills, leaving them the opportunity to display personal initiative.

The analysis of theory and practice allowed the authors to identify the following 3 groups of factors to increase the organization's effectiveness:

- sources of organization's efficiency improving are reducing production costs, appropriate use of natural, material resources, reducing time costs, improving the quality of services and products;
- main organization's development and improvement directions are the implementation and use of innovation, know-how, improving of the organization's technical and economic level, basic planning methods introduction and development, forecasting, business management; enterprise's organizational structure improvement;
- implementation indicator in the organization's production management system is the expansion of the range of products / services, equipment modernization, use of the latest technologies in production, and management system improvement; formation and development of market relations, influence of state, economic and social policies on the organization.

Thus, taken together, the use of all directions of the organization's efficiency increasing and considering all the factors that has any influence, it leads to a general increase in efficiency. It is very important to use the ways to increase efficiency at the same time, as soon as a combination can achieve a positive result.

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Efficiency Evaluation of the Medical SPA Sector in Slovakia: An Application of DEA Method

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Abstract

The issue of quantifying the efficiency of enterprises is an important prerequisite determining their position in today's competitive environment. In the last decade, there is a wide range of methods and procedures that can be used depending on the relevant sector, data availability, evaluation criteria, etc. Within the medical and health care sector, the Data Envelopment analysis (DEA) has become the most commonly used tool. The aim of paper was to evaluate and compare the level of technical efficiency of Slovak spa enterprises in 2013 and 2017 using a suitable DEA model. Three input variables were considered within the BCC DEA model created: number of beds, consumption costs, personnel costs and two output variables: number of clients, total utilization of beds. Data analysed were obtained from the annual financial statements of spa enterprises as well as a non-public statistical database of the National Health Information Centre of the Slovak Republic. All necessary calculations and implementing the basic DEA algorithms were processed by MS Excel Solver. The results revealed significant weaknesses of Slovak spa sector, since only 6 enterprises (DMUs) were identified as effective over the monitored period. Thus, the great majority of analysed DMUs (either in 2013 or 2017) performed their activities inefficiently, as they were not within the required efficiency frontier. Out of the 21 DMUs analysed, 13 managed to improve their technical efficiency, while the remaining 8 DMUs' efficiency score decreased by 13.53% on average. The best results were achieved by DMU09, DMU03 and DMU03, vice-versa, the lowest efficiency score was recorded for DMU04, DMU06 and DMU17. In summary, the results pointed to significant efficiency shortcoming of these enterprises, therefore, it is important to formulate possibilities for improving future development as soon as possible.

Keywords: efficiency; inputs; outputs; DEA method; Slovak spas.

1. Introduction

In the today's highly competitive environment, efficiency is one of the most frequently applied terms to help identify the strengths and weaknesses of the evaluated units – enterprises, national economic sectors or the entire economies (Kočišová 2015). Moreover, the business environment is evolving faster and it constantly comes to social, technological and other changes. Thus, it is important to react on these changes promptly and predict them ideally (Gallo, Tomčíková 2019; Šofranková, Kiseláková, Horváthová 2017). In the empirical studies of domestic as well as foreign authors, the Data Envelopment Analysis (DEA) method belongs to the best known and the most widely used for measuring efficiency of any subjects' types performing the same or even similar activity. In this regard, DEA is a method with broad-spectrum utilization, and it has been introduced in many areas in practice. Despite the growing importance of medical spa enterprises, there are no studies focused on evaluation and comparison of their technical efficiency which inspired us to carry out this research in Slovakia.

In the Slovak Republic, spa therapy is an integral part of the public health system, but medical facilities providing these services also act as tourist establishments. Spa facilities primarily provide health care benefits based on the therapeutic effects of climate and the natural resources of the environment (Derco 2014; Dryglas, Rózycki 2016; Dryglas, Salamaga 2017). They are not specific for the treatment of concrete diseases and

their prices reflect actual costs. The financial stability of these medical spas is based on the balance between medical products covered by public health insurance and medical and wellness products reimbursed by patients (Derco, Pavlišinová 2016). Moreover, as reported by Io Storto, Goncharuk (2017), overall European health care systems are facing several challenges since the early 2000s as a consequence of a number of factors, e.g. increasing costs of health care services, ageing of population associated to the rise of chronic diseases, unequal access to health care services, uneven distribution of health care professionals and infrastructure across regions.

Based on the above, we consider spa tourism as an inherent part of Slovak tourism, which is getting more and more attention because people started to prefer healthy lifestyle, taking care of their mind, body and spirit. Moreover, demographic trends in population ageing have put increasing pressure on health care costs, so spa resorts and enterprises are considered serious medicine in Slovakia. However, they do not represent a separate economic sector as it interferes with all spheres of economic and social life. The research aim of this paper is, therefore, to conduct an efficiency analysis for the medical spa enterprises in Slovakia between 2013 and 2017 by implementing a nonparametric frontier DEA method. The authors also addressed the issue of assessing the performance and effectiveness of the sector in their previous scientific studies (Čabinová et al. 2018a, Čabinová et al. 2018b).

The structure of the paper is as follows. The next Section 1 explains the concept of enterprise efficiency evaluation and

provides a brief overview of research studies concerning the DEA model application in Slovak conditions. Section 2 describes data and the methodology used and the selection of input/output variables. Section 3 presents the results of technical efficiency score and the last Section 4 concludes with a summary of key findings, limitations of study and future research direction.

2. Literature Review

In the modern society, several approaches exist for defining efficiency. According to Cyrek (2017), the efficiency is understood as the relationship between outputs and inputs and it is often analysed in terms of goals. Carstina et al. (2015) emphasise that efficiency is closely interdependent to effectiveness, meaning that an efficiency undertaking without being effective will not have a very long period of existence, and an effectiveness of enterprise without obtaining efficiency automatically lead to unfavourable economic results. According to Grmanová, Strunz (2017), efficiency is a relative indicator that reflects the results of a particular entity by means of comparing them with the results of other similar entities. Farrell (1957) proposed that a firm's efficiency has two components: technical efficiency and allocative efficiency. Technical efficiency reflects the ability of the firm to obtain the maximal output from the given set of inputs. Allocative efficiency reflects the firm's ability to use the inputs in optimal proportions, given their prices and production technology. These two types of efficiency are then combined into the overall economic efficiency, which can be examined from the perspective of an input or an output-based model. As reported by Gallo, Mihalčová (2016) and Mihalčová, Gallo, Pružinský (2017), the main factor to company success is monitoring the actual market situation, therefore, a competitive struggle is won only by enterprises that are adequately dedicated to evaluating efficiency and using the right approaches and measuring tools. Kiseľáková et al. (2015) add that this process can detect key information on company efficiency and future prospects affected by various risks.

According to Kočíšová (2015), methods for the efficiency measurement can be divided into a few groups. The earliest techniques, which used to measure efficiency through the *ratio analysis*, examined the financial statements of the evaluated units and compared them with a benchmark. *Parametric methods*, which include the Stochastic Frontier Approach (SFA), the Thick Frontier Approach (TFA) and the Distribution Free Approach (DFA), are used to measure economic efficiency. *Nonparametric methods*, which include Free Disposal Hull (FDH) and DEA are used to measure technical efficiency. As reported by Emrouznejad, Yang (2018), in recent years, there has been an exponential growth in the number of publications related especially to theory and applications of DEA in terms of efficiency evaluation. According to the authors, until end of 2016, the number of journal articles reaches 10,300 and the distinct authors reach 11,975 in total. In general, it is possible to use DEA for measuring the efficiency of banks, schools, universities, libraries, hospitals, supermarkets, etc.

However, only several authors dealt with the application of the DEA method in Slovak conditions, mostly in *banking sector*. For example, Zimková (2015) analysed the technical efficiency and the super-efficiency of a representative sample of insurance institutions in Slovakia with the aid of DEA. This paper differs from the so far published literature, as it extended the application of radial DEA models (the CCR and BCC model) by a non-radial model (the SBM model) and a super-efficiency model. The main aim of Kočíšová's (2012) research paper was to analyse relative efficiency of the Slovak banking sector. This paper focused on the analysis of 206 branches of selected Slovak commercial bank during year 2010, realised by using of DEA models. The article also paid attention to the question, whether external economic surrounding influences performance of bank branches. Palečková (2017) also estimated the

efficiency change in the Slovak banking sectors, but in comparison with other V4 countries during the 2009-2013 period. By means of the DEA and Malmquist index, the author studied whether banks belonging to a financial conglomerate are efficient than other banks in the sector. Grmanová, Ivanová (2018) focused on the efficiency evaluation of Slovak banks in 2009 and 2013. After the input-output analysis, the authors determined efficiency scores in all models created and tried to find out which indicators are important for the efficient bank in terms of efficiency sustainability. Horváthová, Mokrišová (2018) applied DEA method also for predicting the risk of bankruptcy within the selected Slovak *hotel companies* and then compared results achieved with the results of Altman model. The authors found that DEA method is an appropriate alternative to Altman model, and they recommend, especially for Slovak companies, to apply cost ratio when calculating risk of bankruptcy. Bielik, Hupková (2011) focused their research on non-parametric DEA approach application to estimate efficiency of Slovak *agricultural companies* during period 1999-2007 and identify future development trends. As the main reason of inefficiency in analysed data set was identified input of assets. Kočíšová (2015) also investigated the relative technical efficiency of agricultural sector in Slovakia as well as EU countries by means of DEA. The author analysed efficiency using both the input and output-oriented models with the assumption of a variable return to scale during the period 2007-2011. The purpose of study was to indicate causes of inefficiency and made recommendations for inefficient agricultural sectors. Mendelová, Bieliková (2017) presented a new proposal for diagnosing the corporate financial health by DEA, to predict financial distress of Slovak manufacturing companies using the proposed procedure, and to assess the potential of DEA as a tool for predicting financial distress of the company. The proposed two-step procedure results into the identification of three zones of corporate financial health with different stage of corporate distress risk. The application of the proposed procedure to Slovak *manufacturing companies* and its comparison with the logistic regression model and decision tree show relatively satisfactory results of the proposed methodology in terms of correct classification of non-bankrupt firms.

Some research studies of Slovak authors are focused on the application of DEA method also in the non-profit sector. E.g. Kubák et al. (2014) applied DEA to study technical efficiency of *university faculties* in the Slovak republic based on the dataset of Academic Ranking and Rating Agency. The results showed that the most serious efficiency imbalances are within Economic Sciences group, Technical Sciences group, Theological Sciences and Group of Arts. On the other hand, the most balanced situation was revealed within the Natural Sciences group, Medical Sciences Group and Agricultural Sciences Group. Lukáč, Mihálik (2018) used the DEA method to introduce a model for helpful assessment of the marketing communication efficiency within Slovak *museums*. In the public and non-profit sector, this methodological approach appears very rarely, and according to findings, it has not been applied yet in the museum sphere in Slovakia. While searching for the solution, the authors were inspired by the production economics, from which they chose the DEA statistical method to evaluate the efficiency of production units and identify inefficiencies. Lacko, Hajduová, Andrejovský (2015) evaluated the technical efficiency of selected private Slovak *hospitals* using DEA approach. For the time period from 2007 to 2014, CCR and BCC input models were used. It was proved, that significant increase of efficiency was only in one hospital evaluated. The results were the same in using common DEA methods and in DEA bootstrap. Szabo et al. (2018) focused on the efficiency evaluation of specialized hospital facilities (National Institute of Cardio-vascular Diseases, j.s.c.; Central-Slovakian Institute of Cardiovascular Diseases j.s.c.; East-Slovakian Institute of Cardio-vascular Diseases j.s.c.) by applying the DEA method along with other methods of research – financial ratios and prediction models. The data were

analysed using the separate methods and the discussion is about suggesting a model that can be applied in specialized hospital facilities for the purpose of evaluating their efficiency.

Based on the above-mentioned, there are no research studies evaluating and comparing the efficiency of Slovak spa enterprises even though they are gaining prominence in our national economy. For this reason, we have focused on the technical efficiency evaluation and comparison of Slovak spa enterprises by applying the DEA method in years 2013 and 2017.

3. Data and Methodology

3.1. Research Sample and Data

Due to rich abundance of healing resources on the relatively small territory, Slovakia is one of the major and the most interesting spa countries in Europe. Currently, there are 21 spa towns and a total of 30 spa businesses. Given the financing particularities and the legal framework, the analysis did not include spa enterprises having the legal form of a non-profit organisation, a government-subsidised organisation or a state-owned company. Therefore, the final research sample consisted of 21 medical spa enterprises with the official permission from the Ministry of Health of the Slovak Republic to operate the natural health spas and spa medical institutions in Slovakia. Namely, these spa enterprises have been analysed: Spa Bardejov, j.s.c. (DMU01), Spa Horezza, j.s.c. (DMU02), Spa Bojnice, j.s.c. (DMU03), Spa Brusno, j.s.c. (DMU04), Spa Dudince, j.s.c. (DMU05), Spa Horný Smokovec, I.I.c. (DMU06), Spa Kováčová, I.I.c. (DMU07), Spa Lučivná, j.s.c. (DMU08), Spa Lúčky, j.s.c. (DMU09), Spa Nimnica, j.s.c. (DMU10), Spa Nový Smokovec, j.s.c. (DMU11), Spa Sliač, j.s.c. (DMU12), Spa Štós, j.s.c. (DMU13), Spa Trenčianske Teplice, j.s.c. (DMU14), Spa Vyšné Ružbachy, j.s.c. (DMU15), Medical Thermal spa, j.s.c. (DMU16), Spa Číž, j.s.c. (DMU17), Spa Piešťany, j.s.c. (DMU18), Spa Rajecké Teplice, j.s.c. (DMU19), Spa Turčianske Teplice, j.s.c. (DMU20), Spa Pieniny Resort, I.I.c. (DMU21). According to the statistical classification of economic activities (SK NACE Rev. 2), Slovak spa enterprises belong to section Q – *Health and social assistance*, Division 89 – *Health* and specific subcategory 86.909 – *Other health care activities*.

The data used in this study were obtained from the annual financial statements and reports of enterprises analysed, which are available on the internet portal managed by a company DataSpot, I.I.c. Some indicators were obtained from public as well as non-public statistical database of the National Health Information Centre of the Slovak Republic over the analysed period of 2013-2017.

3.2. DEA Method

In this paper, efficiency score was quantified by the DEA method representing the dominant approach to assessing the efficiency of the health care system but also other economic areas. To process all the calculations and implement basic DEA algorithms, we have used *MS Excel Solver* as it can perform the optimisation required, whether nonlinear or linear programming formulations are used.

DEA is a non-parametric mathematical programming technique that measures efficiency of a decision-making unit (DMU) relative to other similar DMUs with the simple restriction that all DMUs lie on or below the efficiency frontier. In the DEA method, efficiency is measured by the distance of a DMU from an envelopment frontier constructed as a set of linear combinations of the input and output measurements of the DMUs belonging to the production possibility set (PPS) (Seiford, Thrall 1990). DEA in its present form was first introduced in 1978 by Charnes, Cooper and Rhodes. It is based on Farrell's seminal article "*The Measurement of Productive Efficiency*" from 1957 (Mikušová 2015). Farrell (1957) introduced a model, which measured the

efficiency of production units with one input and one output. It was the inception of DEA. Then Charnes, Cooper, Rhodes (1978) proposed a CCR model which assumed constant returns to scale (CRS). Then Banker, Charnes, Cooper (1984) introduced a BCC model which assumed variable returns to scale (VRS). Later, Tone (2001) introduced a more comprehensive measurement of efficiency that provides a more accurate efficiency measurement than the basic radial model.

Indeed, DEA has many advantages and, particularly, it is very flexible, versatile and requires minimal assumptions relative to the production technology. In addition, DEA does not require price data, and, consequently it can be used to measure efficiency in non-marketed sectors (Io Storto, Choncharuk 2017). The another advantage of DEA models is that the weights of the inputs and outputs used are obtained by linear programming optimization tasks and they are not assigned on the basis of the subjective perception of the production unit. On the other hand, the application of DEA models' spectrum is eliminated by several disadvantages or limitations – results are sensitive to outlier values, it's just about measuring relative efficiency and the sample size is usually limited (Štefko, Gavurová, Kočíšová 2018).

The selection of a suitable DEA model is influenced by many factors, e.g. the characteristics and size of the DMUs, the nature of available data, the evaluation criteria, the purpose of performing DEA, etc. Evaluating the effectiveness of DMUs by several models may be useful but does not always capture the essence of the research problem. Therefore, it is important to consider the following characteristics when choosing a suitable DEA model:

- ❑ tracking of **returns to scale** (CCR or BCC model),
- ❑ the relationship between **inputs** and **outputs** (input or output oriented model).

The first important theoretical decision in DEA specification is the application of returns to scale. In general, we may consider:

- ❑ constant returns to scale (CRS marked also as the CCR model),
- ❑ variable returns to scale (VRS marked also as the BCC model).

If we assume a CRS relationship between the input and output values, then the size of the input does not influence the marginal change of output. The assumption of CRS can only be accepted if all production units operate at the optimum size. Within the health care sector, the CCR DEA model was preferred e.g. by authors Samut, Cafri (2016); Io Storto, Goncharuk (2017). According to these authors, in the studies on hospitals' performance, the CCR model provides better results as there is no restricting scale or effect on the relation of inputs and outputs. One common aim of all health care organizations is to provide high quality services using their resources, such as beds, personnel, etc. in the most minimal way. This shows that CCR models are suitable to be used in the evaluation studies on the efficiency of health care facilities. However, if the effect of the change of input is not constant then a VRS relationship exists. In this case, the production possibilities frontier is not defined by a straight line but a curved curve. The BCC DEA model was used in research studies presented e.g. by Sendek (2014); Sendek, Svitálková, Angelovičová (2015). As reported by authors, the basic CCR DEA model cannot be used in the field of health care services since, understandably, we generally do not assume constant economies of scale in hospitals in terms of a linear increase of outputs when increasing the inputs and vice-versa. Hajduová, Herbrik, Beslerová (2015); Lacko, Hajduová, Andrejovský (2015); Papadaki, Staňková (2016); Štefko, Gavurová, Kočíšová (2018); Szabo et al. (2018) decided to apply both approaches (CCR as well as BCC model) in their research studies and compare the results achieved through both

types of model. According to the authors, there is an imperfect competition in the health care sector, which is manifested by limited funding opportunities, market entry regulation, merger or market exit constraints resulting in inefficient management, so it is necessary to apply the BCC model in addition to the CCR model.

The second important theoretical decision in DEA specification is the application of:

- input-oriented model,
- output-oriented model.

If the objective is to minimize the amount of inputs without the change of output values, then the input-oriented models should be applied. In the case of these models we try to find out the minimal level of inputs which is needed to produce a given level of outputs. Within the health care sector, the input-oriented DEA model was preferred e.g. by Kontodimopoulos, Nanos, Niakas (2006); Czapionka et al. (2014); Hajduova, Herbrink, Beslerová (2015); Samut, Cafri (2016); Büchner, Hinz, Schreyögg (2016). As reported by these authors, due to the fact that the hospital has a social responsibility to provide medical treatment and care to the public, assessment of operational efficiency of hospitals should follow especially the input-oriented DEA model, which focuses on minimizing inputs with fixed outputs. They assume that outputs are represented mainly by the need of services and individual objectives of health care providers should be to minimize inputs. Moreover, the controllability of inputs compared to outputs also requires the use of input-oriented DEA model to be applied. If the objective is, however, to maximize the amount of outputs without the change of input values, then output-oriented models should be used. Contrariwise, under the output-oriented models, we try to find out the answer which maximum level of outputs can be achieved by using the given level of inputs in order for DMUs to be considered effective. The output-oriented DEA model was used in research studies presented e.g. by Araújo, Barros, Wanke (2014); Oikonomou et al. (2016); Karagiannis (2015); Mahate, Hamidi, Akinci (2016); Dénes et al. (2017). According to authors who prefer output-oriented DEA model, lowering inputs in the provision of health service is undesirable, while increasing outputs is feasible. The primary objective in the field of health care is the human health, so the demand for primary health care services has a tendency to expand and not to decrease. In summary, the aim of health care facilities should not be to reduce inputs and costs but to concentrate on increasing outputs.

As reported by Jablonský (2008), to obtain the outputs the DMUs require several inputs that are usually minimized, i.e. their lower values lead to higher performance of the unit. Assuming the simplest case – one input and one output – the performance of the units can be simply expressed as the *ratio of output to input*. In such a case we can receive many different financial characteristics with data that can be taken from financial statements. These simple ratio characteristics do not correspond to each other. That is why for the evaluation of the overall efficiency of the DMU it is necessary to take into account several inputs and outputs simultaneously. So let us consider the set of homogenous units $U_1, U_2, \dots, U_n$ described by r outputs and m inputs. Let us denote by $\mathbf{X} = \{x_{ij}, i = 1, 2, \dots, m, j = 1, 2, \dots, n\}$ the matrix of inputs and $\mathbf{Y} = \{y_{kj}, k = 1, 2, \dots, r, j = 1, 2, \dots, n\}$ the matrix of outputs. In general, the measure of efficiency of the unit U_q can be expressed as:

$$\frac{\text{weighted sum of outputs}}{\text{weighted sum of inputs}} = \frac{\sum_k u_k y_{kq}}{\sum_j v_j x_{jq}}$$

where $v_j, j = 1, 2, \dots, m$ is the weight assigned to the j -th input and $u_k, k = 1, 2, \dots, r$ is the weight of the k -th output. The evaluation of the efficiency of the unit U_q by a DEA model consists in maximization of its efficiency score under the constraints that the efficiency scores of all other units cannot be greater than 1 (or 100%). The weights of all inputs and outputs

have to be greater than zero in order for the model to include all the characteristics. Such a model can be formulated as follows:

$$\begin{aligned} & \text{maximize} && \frac{\sum_k u_k y_{kq}}{\sum_j v_j x_{jq}} \\ & \text{subject to} && \frac{\sum_k u_k y_{kp}}{\sum_j v_j x_{jp}} \leq 1, \quad p = 1, 2, \dots, n \\ & && u_i \geq \varepsilon, \quad i = 1, 2, \dots, n \\ & && v_j \geq \varepsilon, \quad j = 1, 2, \dots, n \end{aligned} \quad (1)$$

This model is known as a primal **CCR model**. From the computational point of view it can be more efficient to work with the dual formulation:

$$\begin{aligned} & \text{minimize} && z = \theta - \varepsilon (\sum_{i=1}^m s_i^- + \sum_{k=1}^r s_k^+) \\ & \text{subject to} && \sum_{j=1}^n \lambda_j x_{ij} + s_i^- = \theta x_{iq}, \quad i = 1, 2, \dots, m \\ & && \sum_{j=1}^n \lambda_j x_{kj} - s_k^+ = y_{kq}, \quad k = 1, 2, \dots, r \\ & && \lambda_j \geq 0, \quad s_k^+ \geq 0, \quad s_i^- \geq 0, \end{aligned} \quad (2)$$

where $\lambda = (\lambda_1, \lambda_2, \dots, \lambda_n)$, $\lambda \geq 0$, is the vector of weights assigned to the evaluated units, s^+ and s^- are vectors of positive and negative slacks in input and output constraints, ε is an infinitesimal constant and θ is a scalar variable expressing the reduction rate of inputs in order to reach the efficient frontier. The unit U_q is efficient if the following two conditions hold:

1. The optimum value of the variable θ^* is equal to 1.
2. The optimum values of all slacks s^+ and s^- is equal to zero (Jablonský 2008).

According to above-mentioned author, the CCR model (2) assumes constant returns to scale (CRS). The modification of the CCR model taking into account variable returns to scale (VRS) can be derived from the model (2) by adding the convexity constraint $e^T \lambda = 1$. Moreover, non-decreasing (NDRS) or non-increasing returns to scale (NIRS) can be considered by adding $e^T \lambda < 1$ or $e^T \lambda > 1$ respectively. The model (2) is an input oriented DEA model, i.e. the aim of this model is to find how to reduce the inputs of non-efficient units in order to reach the efficient frontier. Similarly, it is possible to formulate an output oriented model. The basic modifications of the model (2) are given in the following list:

Input oriented models	Output oriented models
min $z = \theta - \varepsilon (\sum_{i=1}^m s_i^- + \sum_{k=1}^r s_k^+)$	max $g = \phi + \varepsilon (\sum_{i=1}^m s_i^- + \sum_{k=1}^r s_k^+)$
st $\sum_{j=1}^n \lambda_j x_{ij} + s_i^- = \theta x_{iq},$	st $\sum_{j=1}^n \lambda_j x_{ij} + s_i^- = x_{iq},$
$\sum_{j=1}^n \lambda_j x_{kj} - s_k^+ = y_{kq},$	$\sum_{j=1}^n \lambda_j x_{kj} - s_k^+ = \phi y_{kq},$
$\lambda_j \geq 0, \quad s_k^+ \geq 0, \quad s_i^- \geq 0,$	$\lambda_j \geq 0, \quad s_k^+ \geq 0, \quad s_i^- \geq 0,$
CRS $\sum_{j=1}^n \lambda_j = \text{free}$	CRS $\sum_{j=1}^n \lambda_j = \text{free}$
VRS $\sum_{j=1}^n \lambda_j = 1$	VRS $\sum_{j=1}^n \lambda_j = 1$
NDRS $\sum_{j=1}^n \lambda_j < 1$	NDRS $\sum_{j=1}^n \lambda_j < 1$
NIRS $\sum_{j=1}^n \lambda_j > 1$	NIRS $\sum_{j=1}^n \lambda_j > 1$

Based on a thorough literary research of research studies carried out in a similar sector (health care facilities), we can state that the BCC output-oriented DEA models are applied most often. Therefore, in the context of the defined aim of paper, we decided to apply this approach and to compare the results achieved at the beginning and the end of observed period.

3.3. Characteristics of input and output variables

This study analyse efficiency, meaning that the evaluated units (DMUs) are doing things right, and it examines this mainly by looking at the relationship between the inputs used and the outputs produced. In this regard, to perform the DEA estimation, inputs and outputs need to be defined. In the following Table 1 we present an overview of some empirical studies focused on the identification of selected inputs and outputs applied in DEA models in the field of health care. We consider the given health facilities as characteristically closest to the spa company examined in the analytical part of the paper. Moreover, we have

Authors	Country	Inputs	Outputs
Szabo et al. (2018)	Slovakia	number of employees, number of beds, costs of material, costs of personnel	number of outpatient's attendance, number of hospitalizations and number of operations
Štefko, Gavurová, Kočíšová (2018)	Slovakia	number of beds, number of medical staff, number of CT and MT devices, number of medical equipment together	bed occupancy rate, average nursing time in days
Sendek, Svitáľková, Angelovičová (2015)	Slovakia, Czech Republic	number of beds, full time equivalents, bed-days, cost of medicines and medicinal products	number of hospitalizations, outpatient visits in hospitals
Papadaki, Staňková (2016)	Czech Republic	operating cost	number of beds, number of hospitalised patients, bed usage in days
Dénes et al. (2017)	Hungary	number of hospital beds, number of physicians employed, number of nurses employed, number of professional health care workers and other non-physician specialist	number of patients' day, number of patients discharged
Kočíšová, Hass Symotiu, Kludacz-Alessandri (2018)	Poland	average time of hospitalisation (in days), average costs of day hospital treatment	average number of patients per bed per year, share of accredited hospitals as a proportion of the number of all hospitals, net profit per physician

Table 1. Overview of selected empirical studies – inputs and outputs used in DEA models
(Source: own processing)

selected research studies provided only within the V4 countries with similar health care conditions and opportunities.

On the basis of the mentioned above and data availability, among the input variables of evaluating efficiency using the DEA method were included:

- *number of beds* (total number of beds available in spa facilities),
- *consumption costs* (costs of material, energy and freight deliveries),
- *personnel costs* (wages, regards for the members of the decision-making bodies, payments into funds of social security and social benefits).

The output variables included in the analysis were:

- *number of clients* (total number of clients who visited spa facilities),
- *total utilization of beds* (percentage use of the total number of beds available in spa facilities).

The correlation rate is an important indicator that has a large impact on the robustness of the DEA model. Correlation analysis is a prerequisite for selecting the appropriate inputs and outputs. On the one hand, if a very high correlation is found between one input variable and another input variable (or between individual output variables), this input (or output) variable can be considered equivalent to another. Therefore, this input (or output) can be left out from the model. On the other hand, if the input has a very low correlation with another input (or the correlation between the outputs is very low), so it may indicate that this variable is not suitable for the model. We performed a correlation analysis for each combination of variables and come to conclusion that selected input and output variables for efficiency evaluations are appropriate since neither apparently high nor low correlation rates were found.

4. Results and discussion

The aim of paper was to evaluate and compare the level of technical efficiency of Slovak spa enterprises in 2013 and 2017 using a suitable DEA model. First of all, we expressed descriptive characteristics of the chosen input and output variables (see Table 2) based on data provided by National Health Information Centre of the Slovak Republic and DataSpot, I.I.C.

Indicators	Average	Minimum	Maximum	Standard deviation
Number of beds	12,570	12,181	13,142	375
Consumption costs (in €)	1,196,973	1,176,291	1,217,483	15,325
Personnel costs (in €)	1,969,806	1,793,050	2,235,240	159,140
Number of clients	301,924	278,429	316,046	13,069
Total utilization of beds (in %)	61.00	53.70	64.70	3.78

Table 2. Descriptive statistics of input and output variables included in the analysis (Source: own processing)

Over the years 2013-2017, there were 12,570 beds available (on average) in Slovak spa facilities. The highest number of beds was recorded in 2015 (13,142) but it dropped significantly by 6.11% in the following year. The latest available data concerning this input indicator suggest a negative trend as the number of beds in Slovak spas reached an overall minimum (12,181). Unfortunately, more recent data are currently unavailable. Total expenditure on consumption of material, energy and freight deliveries within the Slovak spa sector ranged from € 1,176,291 to € 1,217,483. Since 2013, there has been an annual decrease in costs of 0.65% until reaching its total minimum of € 1,176,291 in 2015. Over the next two years, the total consumption costs increased by € 41,192, which is quite paradoxical due to declining number of beds and clients of the analysed spa facilities. During the period under review, the average personnel costs in Slovak spa enterprises reached the value of € 1,969,806. Until 2017, their amount (unlike consumer costs) increased by € 442,190 (growth by 24.66%). It is worthy to note that labour costs formed the predominant part of personnel costs, which is an understandable result given the high professional competence of qualified staff in this sector. As reported by Gallo et al. (2019), human resources are probably the main direct beneficiaries of all processes carried out in health care facilities. The total number of spa clients ranged from 278,429 (2013) to 316,046 (2016). In the last analysed year 2017, there was a slight decrease in the number of visitors by 1.56%, however, it was still above the overall average level (301,924). Since the beginning of the period under review, the total use of beds available in Slovak spa facilities had been increasing (by 2.70%). The only exception was year 2015, when the indicator dropped to the lowest and generally undesirable minimum of 53.70%.

As already mentioned, the MS Excel Solver was used to measure efficiency scores of the selected group of Slovak medical spas. Even though the DEA analysis can be performed by various software, the DEA Solver is the most recent and popular software for DEA analysis, which is basically an MS Excel plugin. Following Figures 1 and Figure 2 illustrates results achieved in our BCC DEA model, which was constructed only on data from 2013 and 2017. The intention was to compare the efficiency score over the last 5 years in order to estimate future development and trends. If the efficiency score is equal to 1 (or 100 %), it implies that the DMU is efficient, while if it is less than 1 (or 100 %), the DMU is inefficient.

In 2013, only DMU09 was an effective spa enterprise, as the level of its technical efficiency was 100% (or 1). A total of 11 enterprises ranged above the average efficiency score (76.10%), which accounted for the vast majority of the analyzed research sample. The lowest efficiency of 53.09% was achieved by DMU17, which recorded even the most unacceptable values of the variables analyzed. In 2017, up to 5 DMUs (DMU01, DMU03, DMU05, DMU14, DMU21) became efficient, but only 9 of all achieved a higher efficiency score than overall average

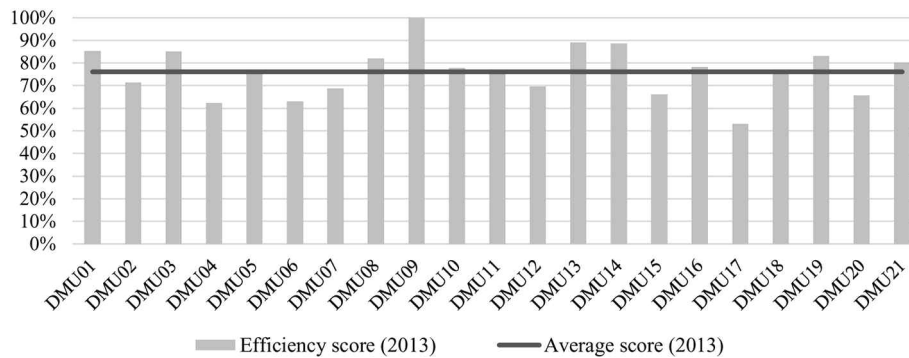


Figure 1. Technical efficiency scores of Slovak spa companies achieved in 2013
(Source: own processing)

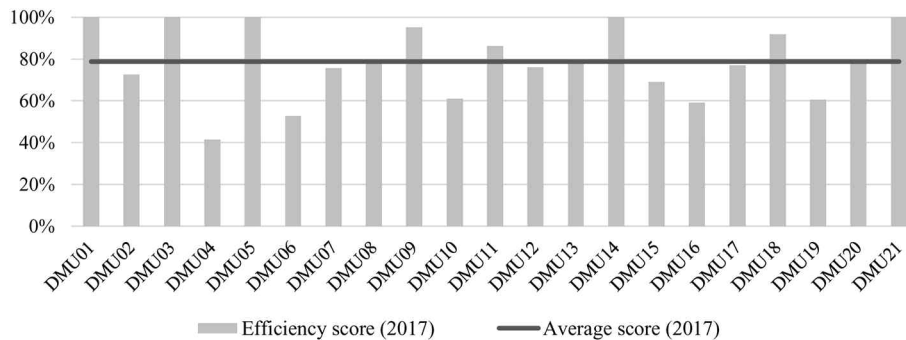


Figure 2. Technical efficiency scores of Slovak spa companies achieved in 2017
(Source: own processing)

(78.81%). The cause of this fact was a slight increase in the average efficiency score; otherwise the number of these spa enterprises would remain stable.

In comparison of 2013 to 2017, the average efficiency score within the Slovak spa sector increased slightly from 76.10% to 78.81%. Since 2013, a total of 13 spa companies have become more efficient (DMU01, DMU02, DMU03, DMU05, DMU07, DMU11, DMU12, DMU14, DMU15, DMU17, DMU18, DMU20, DMU21) by an average of 12.70%. In this case, the continuously increasing use of beds in these spa facilities as well as the total revenues from the provision of services can be considered as the main reasons for improving the given positive development. The remaining 8 enterprises (DMU04, DMU06, DMU08, DMU09, DMU10, DMU13, DMU16, S DMU9) recorded a 13.53% decrease in efficiency score compared to 2013. Overall, the lowest

efficiency score (51.86%) was achieved for DMU04 in 2017. This negative decline from baseline year was caused by major financial problems of recent years, which led to a deterioration of the overall position of the spa in a difficult competitive environment and to an annual decreasing number of visitors. Currently the company is in restructuring, therefore we assume that the level of efficiency continues to fall markedly. Table 3 below shows the resulting efficiency ranking of spa enterprises based on the application of DEA method in 2013 compared to 2017.

Within the analysed sample of spa enterprises in 2013 and 2017, only 6 can be considered effective as they reached the efficiency score at the level of 100%. The positive fact is that in most of these cases, enterprises have become effective in the last analysed year 2017. The only exception is DMU09, whose efficiency score dropped to 95.33% due to inefficient management of material and labour costs. Despite this fact, it can be ranked among the most effective enterprises in the given sector. The most significant increase from the baseline efficiency score in 2013 (75.94%) to a maximum of 100% was recorded in the case of DMU05. DMU17 (23.89%) and DMU21 (19.81%) recorded almost equally significant progress. A more detailed analysis of the input and output variables for these three companies shows that the significant increase in efficiency was mainly due to considerable investments in the expansion of spa capacities, which in turn led to an increase in the number of visitors and the attractiveness of the spa itself.

5. Conclusion

This paper aims at efficiency evaluation of Slovak medical spa enterprises over the years 2013 and 2017. For this purpose, the non-parametric DEA method was used, which can be considered as one of benchmarking tools applied to measure the efficiency of homogeneous organisational units. In our research, these homogeneous organisational units were represented by 21 medical spa enterprises operating in Slovakia. According to the similar research studies conducted in health care areas, three input variables were considered in the

Spa enterprises		Rank (2013)	Rank (2017)	Rank change
Spa Bardejov, j.s.c.	DMU01	4	1	↑ 3
Spa Horezza, j.s.c.	DMU02	14	15	↓ 1
Spa Bojnice, j.s.c.	DMU03	5	1	↑ 4
Spa Brusno, j.s.c.	DMU04	20	21	↓ 1
Spa Dudince, j.s.c.	DMU05	12	1	↑ 11
Spa Horný Smokovec, I.I.c.	DMU06	19	20	↓ 1
Spa Kovačová, I.I.c.	DMU07	16	14	↑ 2
Spa Lučivná, j.s.c.	DMU08	7	10	↓ 3
Spa Lúčky, j.s.c.	DMU09	1	6	↓ 5
Spa Nimnica, j.s.c.	DMU10	10	17	↓ 7
Spa Nový Smokovec, j.s.c.	DMU11	13	8	↑ 5
Spa Sliač, j.s.c.	DMU12	15	13	↑ 2
Spa Štós, j.s.c.	DMU13	2	11	↓ 9
Spa Trenčianske Teplice, j.s.c.	DMU14	3	1	↑ 2
Spa Vyšné Ružbachy, j.s.c.	DMU15	17	16	↑ 1
Medical Thermal spa, j.s.c.	DMU16	9	19	↓ 10
Spa Číž, j.s.c.	DMU17	21	12	↑ 9
Spa Piešťany, j.s.c.	DMU18	11	7	↑ 4
Spa Rajecké Teplice, j.s.c.	DMU19	6	18	↓ 12
Spa Turčianske Teplice, j.s.c.	DMU20	18	9	↑ 9
Spa Pieniny Resort, I.I.c.	DMU21	8	1	↑ 7

Table 3. The resulting rank of the spa enterprises compiled on the basis of DEA application (Source: own processing)

analysis: number of beds, consumption costs, personnel costs of and two output variables: number of clients and total utilization of beds. Based on a thorough literary research of research studies carried out in a similar sector (health care facilities), we can state that the BCC output-oriented DEA models are applied most often. Based on performed analyses and implemented DEA model, we have come to the following key conclusions:

- ❑ In comparison of 2013 to 2017, only 6 spa enterprises (DMU01, DMU03, DMU05, DMU09, DMU14 a DMU21) can be considered effective.
- ❑ Overall, the average efficiency score of the Slovak spa enterprises increased insignificantly by 2.71%.
- ❑ Out of the 21 DMUs analysed, 13 managed to improve their technical efficiency (not average efficiency within the spa sector), while the remaining 8 DMUs' efficiency score decreased by 13.53% on average.
- ❑ The best results were achieved by DMU09, DMU01, DMU03, even despite slight fluctuations in the reporting period. On the contrary, the lowest efficiency score was achieved by DMU04, which recorded one of the most significant drops over the analysed 5 years. DMU06 and DMU17 also achieved efficiency rate at a relatively low average level.
- ❑ In summary, findings reveal that the great majority of analysed spa enterprises (either in 2013 or 2017) are inefficient, as they lie below the efficiency frontier (100%).

However, our findings are also subjected to some limitations. The first limitation of this study is the fact that it focuses on the reality of one single country (Derco 2017). It is important to stress that Slovakia is located in central Europe, a region where the spa sector and its social status are more prevalent than in other parts of the world. Another limitation is also the data unavailability for more recent years (2018 or 2019) and variables used in the efficiency DEA model specifications. At the same time, a dynamic approach could be employed, by applying Malmquist Index. However, it will be the subject of our further scientific research studies as well as processing of modern models enhancing the performance and efficiency of Slovak spa enterprises.

We consider this approach as beneficial for practice. Its application may lead to improved management and technical efficiency of Slovak medical spa enterprises and thus can be the basis for the formulation of measures leading to the improvement of the current state of Slovak medical spa sector.

Acknowledgements

This scientific paper was elaborated within the framework of the project GaPU 37/2019 – *Efficiency evaluation of the Medical Spa Sector in Slovakia: An Application of DEA method*.

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Organizational Communication, Organizational Learning, and Attitude toward Change: Mediating Effect of Organizational Commitment of Public Sector Employees

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Abstract

Globalisation and regional autonomy are still significant issues faced in regional economic development. In order to improve competitiveness and management of assets, local governments should have the human resources management mechanism of human resources who have a proactive attitude towards change are individuals who are highly committed to the goals the organization wants to achieve. This study aims to explain aspects that can improve employee commitment and attitude toward change, by investigating the role of organizational communication, job involvement and organizational learning. The study was conducted on 239 employees of local government agencies in Banyumas district. Data analysis was carried out with the Least Square Partial program. This study found that through organizational commitment, the indirect influence of organizational communication, job involvement and organizational learning on attitudes toward change is significant and positive. It is imperative for regional government agencies to continuously improve communication, job involvement and organizational learning that support efforts to increase employee commitment in their organizations.

Keywords: organizational communication; job involvement; organizational learning; organizational commitment; attitude toward change.

1. Introduction

Globalisation and regional autonomy require speed and foresight of local governments in managing regional potential to become more competitive. The local government needs to adjust its pace of movement with the demands of the community and the opportunities for cooperation offered by the private sector and abroad (Napitupulu et al., 2017). Transformation efforts are a necessity for local governments by understanding various internal and external factors so that bureaucratic professionalism can be achieved. Organizational readiness for change is determined by the views and attitudes held by the members to change. In this case, the employee becomes essential. Employees who are committed to change will have a particular perspective that can encourage a series of actions aimed at the successful implementation of changes in the organization (Meyer et al., 2002). In various organizational settings, commitment becomes an essential factor in achieving congruence between individual goals and organizational goals (Ketchand & Strawser, 1998). Changes in an organization start from the preparation stage, namely the awareness to change. Employees who are aware of the changes will have a degree of understanding and acceptance better change that will lead to commitment, namely internalising the changes in the implementation of the work (Conner, 1992).

In the process of change, it is very natural for an individual to experience feelings of insecurity and comfort due to changes in work relations and daily activities (Nadler, 1987). The perception that the work environment is uncertain will direct employees to become resistant and decrease commitment to the organization (Ashford et al., 1989). Changes in an organization also have the potential to cause role ambiguity,

namely a situation where employees do not have clear direction about their role in a job or organization (Rizzo et al., 1970). Employees can also experience role conflicts, namely the inconsistency between the efforts made and what is expected by the organization. Not only that, but change also has the potential for role overload. In order to anticipate this, organizations need to design good communication by prioritising continuous feedback to reduce resistance to change and improve employee moral (Klein, 1996). Various forms of activities such as training can increase employee commitment (Bhatnagar, 2007). When an organization can facilitate employees in developing their capabilities, employees will have the desire to try better and be committed to carrying out their duties (Paul & Anantharaman, 2004). Through learning, the organization helps employees to be more committed to the organization and increases the feeling of its membership in the organization. This research aims to analyse the factors that influence employee attitudes toward change. Organizational commitment leads to the determinant factor in shaping the positive attitude of employees towards change. Organizational commitment can be achieved through organizational communication, job involvement and organizational learning.

2. Literature Review and Hypotheses

2.1. Effect of Organizational Communication on Organizational Commitment

Organizational communication is a dynamic process that functions as the primary tool for the success or failure of the organization concerning the task environment (Benkhoff, 1997). Allen (1992), Aranya and Jacobson (1975) state that inter-

personal communication is likely to make employee enthusiast to give opinions and views relating to the issues around them and communicate with superiors, colleagues and supervisors is a factor that influences organizational commitment. This statement supports the results of Downs's (1988) research which states that there is a positive relationship between organizational communication and organizational commitment. Chen et al. (2006) concluded that the communication was positively related to organizational commitment. Based on the results of previous research hypotheses can be formulated as follows:

H1. Organizational communication has a positive effect on organizational commitment

2.2. Effect of Job Involvement on Organizational Commitment

Bhatti and Qureshi (2007) stated that job involvement could be measured by the degree to which employees feel actively participate in their work or to what extent the employee is looking for some self-expression and actualisation in his work. Job involvement will make someone able to issue the best ability in doing a job because she or he was involved in the job (Knoop, 1995). Previously, Blau and Boal (1987) concluded that high job involvement would increase commitment organization. Job involvement makes employees feel they have the ability and can contribute to the work. Job involvement can make employees more adaptive in facing change because this enabled them to see the opportunities and benefits of these conditions (Kanungo, 1982). An adaptive employee can improve his ability to respond to change so that he can commit to organizational goals. Employees can be committed and have a positive attitude towards change if they see the opportunity given by the organization in developing employee career paths.

H2. Job involvement has a positive effect on organizational commitment

2.3. Effect of Organizational Learning on Organizational Commitment

Research conducted by Mowday et al., (1979) concluded that organizational learning affects organizational commitment. Pedler et al., (1991) explained that in the context of the congruence of goals and values of employees towards the organization, organizational activities that facilitate the learning of all the members could increase employee commitment. Furthermore, Bhatnagar (2007) states that organizational learning increases the level of employee commitment.

H3. Organizational learning has a positive effect on organizational commitment.

2.4. Organizational Commitment on Attitudes Toward Change

Iverson's (1996) research concluded that organizational commitment is the factor that most influences attitudes toward change after the factor of union membership. Employees who have a strong commitment to being more in line with the goals and values of the organization as well as better to accept the changes (Begley & Czajka, 1993). This research supports Guest's opinion (1987) that employees who are committed will be more receptive to organizational changes than employees who do not commit. The results of the study of Lau and Woodman (1995) prove that organizational commitment has a direct and significant effect on the dimensions of change. Yousef's (2000) research concluded that affective commitment has a direct and positive effect on employee attitudes toward change.

H4. Organizational commitment affects the attitude towards change

Based on the hypothesis presented above, the research framework is presented as follows.

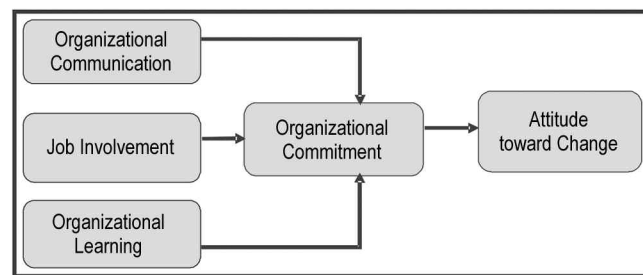


Figure 1. Research model

3. Research Methods

This research was explanatory as it aims to examine the influence of organizational communication, job involvement and organizational commitment to changing attitudes toward change. Sources of data obtained through the data of primary data obtained directly from the object of research by distributing questionnaires to the respondents. Data collection in this study was carried out by the survey method, namely using a questionnaire containing the measuring construct or variable items used in the research model. The model of the questionnaire used is a closed and open questionnaire. The population in this study was all employees of the Regional Government Agency in Banyumas Regency, Central Java. The sampling method uses the proportionate stratified random sampling method. In this study, there were 239 respondents. The variable measurement tool that will be used in this study uses interval data measurements.

This study was designed to test the relationship model of multiple relationships between variables, which involve many variables and the information to be obtained is simultaneous, so quantitatively the analysis technique used is the Partial Least Square model estimation. Chin (1998) states that Partial Least Square does not assume a particular distribution for parameter estimation, then the parameter technique is not needed. The PLS evaluation model is based on prediction measurements that have non-parametric properties. Outer model with reflexive indicators is evaluated by convergent validity and discriminant validity from the indicator and composite reliability for block indicators. Stone (1974) and Geisser (1975) stated that the structural model or inner model was evaluated by looking at the presentation of variance explained by looking at the R-square value for the latent dependent construct and also seeing the magnitude of the structural path coefficient. The stability of these estimates is evaluated using statistical t-tests obtained through bootstrapping procedures.

4. Results

4.1. Characteristics of Respondents

In this study, the data collected by the questionnaire directly as much as 248 questionnaires. From the results of questionnaires, 239 questionnaires were fulfilling the requirements to be analysed in order to test the hypothesis. The characteristics of the respondents in this study included the sex of education and work period. The majority of respondents aged 31 to 40 years (41%), the majority of respondents were male (74%), had an equivalent educational background of undergraduate (49%). The length of work of the respondents varies and is balanced between those who have more than 15 years of work experience (43%) and those who work less than 15 years (57%).

4.2. Convergent Validity

Convergent validity is used to determine the validity of each relationship between the indicator and its latent construct. The individual reflexive size is said to be high if it correlates more

than 0.7 with the construct we to measure. However, for the initial phase of research on the development of a scale of measurement the loading value of 0.50 to 0.60 is considered sufficient (Ghozali, 2006). Based on this criterion, the indicator whose loading value is less than 0.50 is dropped from the analysis and the estimation is carried out. The results of data processing using PLS produce outer loading for each indicator (manifest variable) of the construct (variable). The results showed that there is a value loading value below 0.5. After processing indicators such invalid, then all the indicators have loading values above 0.70.

4.3. Composite Reliability

Evaluation of indicator block reliability is done using composite reliability. Compared to Cronbach Alpha, composite reliability assumes that all indicators are given equal weight.

Variable	Composite Reliability	Confirmation
OC	0.917	reliable
JI	0.868	reliable
OL	0.893	reliable
CM	0.907	reliable
AC	0.913	reliable
Note: OC: organizational commitment; JI: job involvement; OL: organizational learning; CM: organizational communication; AC: attitude towards change		

Table 1. Composite Reliability

Composite reliability is a closer approximation with the assumption that parameter estimation is accurate while Cronbach alpha tends to lower bound estimate reliability. According to Chin (1998), an indicator is said to have good reliability if the value is greater than 0.7. Reliability test results with composite reliability can be seen in table 1. Table 1 showed that all latent variables can be accepted, with the measurements of composite reliability of all variables above 0.7. Thus, the constructs developed in this study are reliable.

4.4. Hypothesis Testing

The inner model describes the relationship between latent variables based on substantive theory. Assessing the inner model is to look at the relationship between latent constructs by paying attention to the results of the estimation of the path parameter coefficients and their level of significance. Hypothesis testing can be done by considering the level of significance and path parameters between these latent variables as shown in table 2.

Hypotheses	Estimate	Mean	Std. Dev.	t-statistic	R-square
CM → OC	0.340	0.395	0.101	3.378	0.351
JI → OC	0.507	0.500	0.097	5.208	0.120
OL → OC	0.593	0.608	0.097	5.208	0.363
OC → AC	0.404	0.479	0.087	4.632	0.363
Note: OC: organizational commitment; JI: job involvement; OL: organizational learning; CM: organizational communication; AC: attitude towards change					

Table 2. Hypothesis Testing

In assessing the PLS model begins by looking at the R-square value for each latent dependent variable. Changes in R-square values can be used to assess the effect of independent latent variables on latent dependent variables, whether they have substantive influence.

Statistical testing shows the effect of organizational communication on the organizational commitment. It appears in the calculated t-statistic value that is equal to 3.378 significant because it is bigger than the T-table which is 1.97 with a significant level of 0.05. The results show that there is a significant effect of organizational communication on organizational commitment. The coefficient of the influence of organizational communication and organizational commitment at 0.340 is

positive. Based on these results it can be concluded that H1 is accepted. Thus, there is a positive and significant influence of organizational communication on organizational commitment.

The testing revealed that the effect of job involvement on the organizational commitment has t-statistic value equal to 5.208 significant (>t-table which is 1.97 with a significant level of 0.0). T-test indicates that there is significant influence of job involvement towards organizational commitment. The coefficient of the influence of organizational involvement on organizational commitment equal to 0.507 is positive. Based on these results it can be concluded that H2 is accepted. Thus, there is a significant positive effect of work involved on organizational commitment.

Statistical testing presented that the effect of organizational learning on the organizational commitment calculated with t-statistic is significant and has value equal to 5.208. This results show that there is a significant effect of organizational commitment on attitudes toward change. The coefficient of influence between organizational commitment and attitude towards change at 0.404 is positive. Based on these results it can be concluded that H3 is accepted. Thus, there is a positive and significant influence on organizational learning on organizational commitment.

The empirical examination on testing the effect of the construct (latent) on an organizational commitment to attitudes toward change revealed t-statistic which is significant and has value equal to 4.632 (>t-table which is 1.97 and significant level of 0.05). This indicates that there is a significant effect of organizational commitment on attitudes toward change. The coefficient of influence between organizational commitment and attitude towards change at 0.404 is positive. Based on these results it can be concluded that H4 is accepted. Thus, there is a positive and significant influence on the organizational commitment to attitudes toward change.

5. Discussion

The results of analysis by using SmartPLS indicated that based on the value of t-test statistic is calculated, demonstrating the acceptance of H1. This result shows that there is a positive and significant influence of organizational communication on organizational commitment. Organizational communication is believed to play an essential role in encouraging member organizations to devote their efforts to the work of the organization. Willingness to make a serious effort on behalf of the organization is one of the three factors of organizational commitment. Strong trust, acceptance of the goals of organizational values and a great desire to maintain membership are organizational commitments. In this research setting, organizational communication is the other factor for the emergence of organizational commitment. With the logic of employees who have good relations with the leadership and get constructive feedback from superiors, they have a high commitment to the organization. This logic is supported by research conducted by Chen et al. (2006) which concluded that organizational communication is positively related to organizational commitment. The results of this study also support the research of Downs (1988) stating that there is a positive relationship between organizational communication and organizational commitment. The results of the study are consistent with the proposed hypothesis and have the meaning that the organizational commitment that employees have is influenced by organizational communication.

The results of the study as shown in table 2 demonstrate the acceptance of H2. This shows that there is a positive and significant influence of work involved on organizational commitment. In this research setting, job involvement is another factor in the emergence of organizational commitment. The logic that underlies that employee involvement in decision making that will affect employees and increase employee autonomy and control over their working lives will make employees more motivated,

more loyal to the organization, more productive and more satisfied with their work (Scholl, 1981). This logic is supported by research conducted by Blau and Boal (1987) which concluded that high job involvement would increase organizational commitment. The results of the study mean that organizational commitment held by employees is influenced by job involvement.

Hypothesis 3 which states that organizational learning has a positive effect on organizational commitment is also evident in this study. The efforts of various learning practices carried out by the organization not only can improve the ability of employees, but also can increase the desire of employees to showcase the efforts of employees who are better at completing their work. When an employee can achieve organizational goals through his best efforts, he is confident that there will be congruence between his goals and objectives. It can increase employee commitment.

Hypothesis 4 which states that organizational commitment has a positive effect on attitudes toward change is also evident in this study. With the logic of employees who have high commitment will be more in line with the goals and values of the organization and more comfortable to accept changes in logic. This is supported by research conducted by Lau and Woodman (1995) which prove that organizational commitment has a direct and significant effect on the dimensions of change. The results of the study are consistent with the proposed hypothesis. The results of this study also support the research conducted by Yousef (2000) which concluded that affective commitment directly and positively influences employee attitudes toward change. The research result means that an employee attitude towards change is influenced by organizational commitment which is owned by the employee.

6. Conclusion

This study found that through organizational commitment, the indirect influence of organizational communication, job involvement and organizational learning on attitudes toward change is significant and positive. In other words through mediating organizational commitment, a significant and positive influence between organizational communication, job involvement and learning organizational attitude towards positive attitudes toward change will emerge. Based on the critical findings of the study, to increase the positive attitude towards change, it is suggested to the leaders of regional government agencies to continuously improve communication, job involvement and organizational learning that support efforts to increase employee commitment in their organizations.

The implementation of the concept of work involved can be done through efforts to actively involve employees in the process of setting goals, decision making, and work activities. This can encourage employees to actively develop themselves so that the organizational commitment of employees to the organization is well maintained. Then the implementation of the concept of organizational communication can be done through increasing the pattern of communication of superiors to subordinates who have been established by developing sufficient communication. Organizational communication supports personal development and employee performance both emotionally and intellectually in an atmosphere of openness and concern for employees so that employees feel understood.

Indicators of trust in direct superiors are indicators of the highest loading factors in forming organizational communication. It is therefore recommended that the leaders of Local Government Agencies develop appropriate and fair policies for several reasons. First, it can reduce conflict among employees. Second, it can eliminate prejudice bias towards each other. Third, it takes time to study the emotional aspirations of employees and how they relate to collaborative work. Fourth, choose people suitable for roles in teams that have good

professional abilities and emotional intelligence. Fifth, it is important to reward employees who excel and cleanse the organization of negative influences. Seventh, it should be compiled core values and standards of behaviour that can be accepted by each other, create an atmosphere of mutual concern and motivate creativity. Eight, it can support for developing heartfelt mentality and service in employee relations with each other. Then indicators of feeling centred/ engaged in work are indicators with the highest loading factors in shaping work engagement. Therefore it is recommended that the leaders of Regional Government Agencies continue to create a work environment that supports employee synergy and participation.

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The Entrepreneurial Competency, Innovation Capability, and Business Success: The Case of Footwear Industry in Indonesia

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Abstract

This research analyzes the effect of entrepreneurial competence and innovation capability on the business success of the footwear industry in Indonesia. This research uses a survey method with a quantitative approach. The questionnaires were distributed of 450 and 340 were returned. The hypotheses were examined by structural equation modeling. Hypothesis testing result proves that entrepreneurial competency influence innovation capability. Entrepreneurial competency and innovation capability positively influence the business success of the footwear industry in Indonesia. Innovation capability has the greatest influence on business success. We suggest improving innovation capability and entrepreneurial competence to improve the business success of the footwear industry in Indonesia. The originality of this study is entrepreneurial competence and innovation capability can predict business success and the finding also shows that innovation capability can mediate the entrepreneurial competency's effect on business success of the footwear industry in Indonesia.

Keywords: *entrepreneurial competency; innovation capability; business success.*

1. Introduction

The footwear industry has become an important role in the Indonesian economy (Antonio & Kusumastuti, 2019). According to the Central Bureau of Statistics (Badan Pusat Statistik Indonesia), footwear industries contributed approximately 0.27% of the Indonesian gross domestic product in 2018 (Antonio & Kusumastuti, 2019). Indonesian footwear industry production is also exported to many countries, but in recent years the growth of Indonesia's footwear exports has tended to decrease, in 2018 there was an increase of export value, but it was not significant if compared to the previous few years.

Year	Export Value	YoY Growth
2018	\$5.3 billion	6.5%
2017	\$5.0 billion	3.5%
2016	\$4.8 billion	6.7%
2015	\$4.5 billion	2.3%
2013	\$5.3 billion	6.5%
2014	\$4.4 billion	13%
2013	\$3.9 billion	11%
2012	\$3.5 billion	6%
2011	\$3.3 billion	32%

Table 1. The Indonesian Footwear Export 2011-2018
Source: www.indonesia-investments.com

The previous study proved that entrepreneurial competencies and innovation capability can improve business success.

Dhamayantie (2017) examined the entrepreneurial competency's effect on business success. She found that entrepreneurial competency positively effects on the firm success. Antonio & Kusumastuti, (2019) also found that entrepreneurial competencies on the business performance or success of small and medium enterprises (SMEs) in the Malaysian hospitality and tourism industry (HTI). Besides influencing business success, entrepreneurial competence also affects innovation capability. The findings of research conducted by Mohammadkazemi, et al, (2016) found that entrepreneurial competence has a role as a predictor of innovation. Innovation capability can also increase business success. Mai, et al (2019) conducted a study about the effects of innovation on firm profitability in Vietnam. They found that there was a positive effect of innovation on the profitability of the firm. In contrast, a study by Dessyana, et al (2017).found that innovation did not significantly affect on business success. Besides that, we also set innovation as an intervening variable. This is based on a study by Umar et al., (2018) which places innovation as mediating or intervening variables. We will examine it in the case of the footwear industry in Indonesia.

Therefore, our study intends to examine:

1. The entrepreneurial competency's effect on innovation capability;
2. The entrepreneurial competency's effect on the success of the business;
3. The innovation capability's effect on the success of the business.

2. Literature Review

2.1. Entrepreneurial Competency

Entrepreneurship defines as an individual being willing in taking a risk to create value (Frederick, et al., 2016). Entrepreneurship also refers to the opportunity recognition process and pursuit that leads to growth that creates value and bears risk (Mohsin, et al., 2017). Sánchez, (2012) defines competency as individual characteristics that improve their performance and work effectiveness. Meanwhile, Man, et al. (2008) entrepreneurial competencies are also related to managerial competencies. According to S Sajilan, et al., (2016) entrepreneurs must develop their competencies, because entrepreneurs must manage all their business activities. Entrepreneurs can develop essential entrepreneurial competencies by training. Thus, management development programs should be implemented in the small business sector to enhance the ability of the firm to compete successfully. Man, Lau, & Snape, (2008) entrepreneurial competency dimension are:

1. Strategic competencies;
2. Opportunity competencies;
3. Relationship competencies;
4. Conceptual competencies;
5. Organizing competencies;
6. Commitment competencies.

2.2. Innovation Capability

Yang, (2012) cited that innovation defines as idea generation and new idea implementation, processes of works, product development, and services improvement. Innovation capability is the potential ability of an organization to position itself in an arena of modernism such as new product development, technology and other advancements that result in competitive advantages over its rivals (Yang, 2012). Huang, (2018) cited that innovation capability as the abilities (1) to develop new products to satisfy market requirements; (2) to apply proper processes and technologies to produce new products; (3) to develop and adopt new products, processes, and technologies to satisfy future requirements; and (4) to respond to unexpected technological actions taken by competitors and to create sudden opportunities. Innovations can be classified into several forms (Okpara F.O, 2007):

1. Innovation in the process, including changes and improvements to the method. This contributes to increasing productivity;
2. Products or services innovation. While progressive innovation is dominant, radical innovation opens new markets. This increases demand effectively, which encourages increased innovation and work;
3. Innovation in management and work organizations, and the exploitation of human resources.
4. Innovations centered on people, culture, structure, processes, and technology.

2.3. Business Success

Business success is a general term that is often used for some or all of the activities of an organization in a period regarding several standards such as past costs or projected based on efficiency, accountability or accountability of management and the like (Priansa & Cahyani, 2015). The principle business success is the achievement obtained from the implementation of certain tasks, in realizing the goals, objectives, mission, and vision of an organization, as well as the level of achievement of results, to realize company goal (Lee, et al., 2013). It appears that business success is the result of work-related to organizational goals, efficiency, and effectiveness of other business successes (Munisi & Randoy, 2013).

The business success seen from business performance in the industry, in general, is a picture of the achievements obtained by the company in its operations, both related to financial aspects, marketing, the collection and distribution of funds, technology and human resources (Zhu et al., 2016). Each company has determined each business strategy carried out, this is aimed at the end of business performance. Business performance is the result of a company's work or work performance that can be known through a comparison between the totality of expenditures at a certain time divided by the totality of inputs during a certain period (Lopes-Costa & Munoz-Canavate, 2015, p. 64). Measuring Business Success (Butler, 2006.p. 49).

1. Growth or maximization of profitability;
2. Growth of venture capital;
3. Reached market share, or expansion of the customer base;
2. Sales turnover growth;
3. Personal income or wealth.

2.4. Hypotheses and Research Model

2.4.1. The Influence of Entrepreneurial Competency on Innovation Capability

An entrepreneur must have entrepreneurial competence so that they are able to innovate in carrying out their business activities. The existence of a link between entrepreneurial competence is proved by a study conducted by Mohsin, et al (2017) shows that some entrepreneurial competencies influence corporate innovation. They argued that entrepreneurs must have the right competencies for undertaking innovative projects. Umar et al., (2018) also found that business success in Malaysia was influenced by entrepreneurial competencies and firm innovation. All dimensions of entrepreneurial competencies influence innovation. It means that the entrepreneurial competencies are very crucial in fostering innovation capability.

H1: Entrepreneurial competency influence innovation capability.

2.4.2. The Influence of Entrepreneurial Competency on Business Success

Entrepreneurs with high entrepreneurial competency will tend to be more successful in running their business because they have the competencies needed to manage their business. Ardyan & Putri, (2014) entrepreneurial competence has a positive and significant effect on business success in Indonesia. Sajilan & Adeyinka-ojo, (2016) which shows that there is an influence between competence on business growth in carrying out business activities. Ahmad, Wilson, & Kummerow, (2010) concluded that there was a significant influence between competencies on the success of small and medium enterprises in Malaysia. They also stated that entrepreneurial competence is very crucial for entrepreneurs because it gives entrepreneurs knowledge about how they do their business and encourages them to be more aware of the potential positive or negative impacts of their behavior.

Research results by Chatterjee (2016) research entrepreneurial competencies on business success in India. Competence is measured by leadership, communication, relationships, and technical competence. The finding informed that not all competency dimensions tested in the study affected business success. Technical competence did not significantly affect business success. The same research results by Abraham & Tupamahu, (2016) also show that competence is one of the factors that influence the success of micro small and medium enterprises.

Laguna, M, & W, (2012) conducted research related to manager competencies on the success of small and medium businesses. They examined how general and specific managerial competencies influence small and medium enterprises

success with 264 managers as respondents. The success of SMEs was measured with economic growth indicators compared to competitors in the market. They found that success in running a business was influenced by managerial competence.

H2: Entrepreneurial competency influence business success

2.4.3. The Influence of Innovation Capability on Business Success

The innovation capability of the firm will make business more successful. Gunday, et al., (2011) conducted a study about innovation on the firm success of Turkish manufacturing firm. They found that there was an innovation's effect on the success of a firm. The results of research conducted by Zuliarni (2014) shows that innovation is also very important and will provide benefits to entrepreneurs in the continuity of their businesses so that business objectives are achieved efficiently and effectively.

H3: Innovation capability influence business success

Based on the literature, we proposed the conceptual model below:

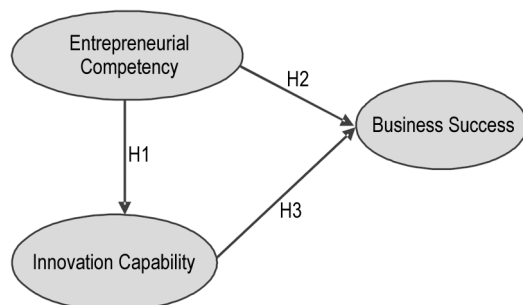


Figure 1. Conceptual Framework

3. Research Methodology

3.1. Sample and Respondent

The unit of analysis in this study is small and medium enterprises in the case of the footwear industry in Bogor Regency, West Java Province, Indonesia. Respondents who became the observation unit in this study were entrepreneurs or the owner of

the footwear industry in Bogor Regency, West Java Province. Respondents in the study filled the questionnaire given. Questionnaires were distributed as many as 450 questionnaires and returned to 340 questionnaires.

3.2. Measures

Business success is measured using 5 items we adopted from Butler, D, (2006, p. 49). Entrepreneurial competency is measured using 8 items adopted from Man et al., (2008). Innovation capability uses 6 items from the opinion of Okpara F.O, (2007). Data collection was done by questionnaire, which is measured using a Likert scale 1 to 5: 1-very low, 2-low, 3-moderate, 4-high, 5-very high.

Variable	Indicator	n item
Business Success	1. Profitability growth	5
	2. Capital growth	
	3. Market share	
	4. Sales growth	
	5. Personal income or wealth	
Entrepreneurial Competency	1. Strategic competencies	8
	2. Opportunity competencies	
	3. Relationship competencies	
	4. Conceptual Competencies	
	5. Organizing Competencies	
	6. Commitment Competency	
Innovation Capability	1. Process innovation	4
	2. Structure Innovation	
	3. Product innovation	

Table 2. Construct and Measurements

4. Result and Discussion

4.1. Measurement Model

The measurement model explains the relationships between manifest (observed variables) and latent variables (unobserved variables). The value of factor loading, the Composite Reliability (CR), and Average Variance Extracted (AVE) was used to see convergent validity test. The recommended loading factor value of > 0.50 (Bagozzi, Yi, & Sing, 1991), while the recommended Composite Reliability (CR) value of > 0.70 and the Average Variance Extracted (AVE) value > 0.50 (Hair at al., 2013).

Variables	Item	Factor Loadings	CR	AVE
Entrepreneurial Competency	EC_1: I always set the goal and vision of our firm	0.754	0.89	0.501
	EC_2: I can formulate the business strategy	0.814		
	EC_3: I can make an environmental scanning	0.638		
	EC_4: I can make an opportunity recognition	0.667		
	EC_5: I can make cooperation and networking	0.778		
	EC_6: I dare to take a risk	0.649		
	EC_7: I have flexibility and willingness to adapt	0.733		
	EC_8: I have good motivation and ambition	0.603		
Innovation Capability	IC_1: The firm has a good technology in making a product	0.672	0.86	0.502
	IC_2: The firm has adequate production equipment	0.686		
	IC_3: The firm has adequate human resources	0.737		
	IC_4: The firm gives support for creative employees	0.666		
	IC_5: The product in our firm has many designs	0.757		
	IC_6: The product of our firm has a variety of prices	0.726		
Business Success	BS_1: The firms has always been profitable in the past 3 years	0.691	0.83	0.501
	BS_2: The capital of our firm is always available and increasing in the past 3 years	0.777		
	BS_3: Market share of our firm is growing	0.674		
	BS_4: The product sales of our firm is growing	0.729		
	BS_5: My incomes from this business is growing	0.664		

Table 3. The Measurement Model

The measuring model result shows that all items have loading factor value > 0.50. The entrepreneurial competency's Composite Reliability (CR) value shows value of 0.89 > 0.70, and the Average Variance Extracted (AVE) value show value of 0.501 > 0.50. Innovation Capability's Composite Reliability (CR)

value shows value of 0.86 > 0.70, and Average Variance Extracted (AVE) value show value of 0.502 > 0.50. Business Success Composite Reliability (CR) value shows value of 0.83 > 0.70, and Average Variance Extracted (AVE) value show value of 0.501 > 0.50. It means the data in this study are valid and reliable.

4.2. The Goodness of Fit Test

According to Hair et al, (2017) some criteria in the goodness of fit test are the value of Adjusted GFI (AGFI) > 0.90, the value of Goodness of Fit Index (GFI) > 0.90, the value of CFI > 0.90, TLI value > 0.90, RMSEA < 0.08, and RMR value < 0.05.

The Goodness of Fit Index	Result	Decision
Cmin/DF	1.732	Good Fit
Adjusted Goodness of Fit (AGFI)	0.902	Good Fit
The Goodness of Fit Index (GFI)	0.923	Good Fit
Comparative Fit Index (CFI)	0.960	Good Fit
Tucker Lewis Index (TLI)	0.954	Good Fit
Root Mean Square Error of Approximation (RMSEA)	0.046	Good Fit
Root Mean Square Residual	0.020	Good Fit

Table 4. The Goodness_of Fit Test

The value of Adjusted Goodness of Fit (AGFI) is 0.902 > 0.900. The value of Goodness of Fit Index (GFI) is 0.923 > 0.900. The value of Comparative Fit Index (CFI) has a value of 0.960 > 0.900. Tucker-Lewis Index (TLI) is 0.954 > 0.900. The Value of Root Mean Square Error of Approximation (RMSEA) is 0.046 < 0.080 and Root Mean Square Residual (RMSR) value is 0.020 < 0.05. It means that the overall model is fit and suitable, and we do not need to modify the model and can proceed with the estimation of the model.

4.3. Hypotheses Testing

Table 5 shows that all hypotheses in this study can be accepted. The recommended critical ratio (C.R.) value is > 1.96 and probability value < 0.05 (Byrne, 2010).

			Estimate	S.E.	C.R.	P
Innovation Capability	<---	Entrepreneurial Competency	.453	.085	6.323	.000
Business Success	<---	Entrepreneurial Competency	.142	.087	2.166	.008
Business Success	<---	Innovation Capability	.477	.086	6.256	.000

Table 5. Regression Weight Full Model

The first hypothesis testing shows that entrepreneurial competence positively and significantly affect the innovation capability of the firm with t-value = 6.323 > t-table = 1.967, and probability value (P-value) of 0.000 < 0.05. It means that entrepreneurial competence positively and significantly influences innovation capability. In terms, the more competent an entrepreneur, the innovation capability of the footwear industry tend to increase. The second hypothesis also show that entrepreneurial competence has positive effect on business success with t-value = 2.166 > t-table = 1.967, and p-value of 0.008 < 0.05. It means that entrepreneurial competence positively and significantly influences business success. In other words, the higher the entrepreneurial competencies of. an entrepreneur, then business success tends to increase. The third hypothesis test results indicate a positive and significant effect between innovation capability on business success with t-value = 6.256 > t-table = 1.967, and p-value of 0.000 < 0.05. It means that business success was positively and significantly influenced by innovation capability. In other words, the higher innovation capability of the firm, then business success tends to increase.

4.4. Direct and Indirect Effect Result

The information about the direct and indirect influence of entrepreneurial competence, innovation capability, and business success is shown in table 6.

Table 6 shows that the direct effect of entrepreneurial competence on innovation capability was 0.453 or 45.3%. The

	Direct Effect	Indirect Effect	Total Effect
Entrepreneurial Competency → Innovation Capability	0.453	-	0.453
Entrepreneurial Competency → Business Success	0.142	-	0.142
Innovation Capability → Business Success	0.477	-	0.477
Entrepreneurial Competency → Innovation Capability → Business Success		0.216	0.216

Table 6. Direct and Indirect Effect

effect of direct entrepreneurial competency on business success is 0.142 or 14.2%. The direct effect of innovation capability on business success is 0.477 or 47.7%. The indirect effect of entrepreneurial competency on business success through innovation capability is 0.216 or 21.6%.

4.5. Discussion

This present research results of our study find that there is a positive and also significant influence of entrepreneurial competencies on business success. The finding shows that entrepreneurial competence influences innovation capability. We begin to analyze the first hypothesis that shows entrepreneurial competency positively and significantly effect on innovation capability. It means the higher of entrepreneurial competency the higher the innovations capability. This finding consistent with a study conducted by Mohammadkazemi, et al. (2016) examined that there was a correlation between entrepreneurial competence and innovation.

Hypothesis 2 also was successfully examined that proves entrepreneurial competency influences business success. In this case, the higher the entrepreneurial competencies, the higher the chance of business success of the footwear industry in Bogor, West Java Province, Indonesia. This finding confirms some of the results of previous studies related to entrepreneurial competencies' effect on business success. Sánchez (2012) has also conducted research related to entrepreneurial competencies on business success, the result found that entrepreneurial competency can predict firm success. Dhamayantie (2017) also found that entrepreneurial competency affect performance. Ahmad, Wilson, & Kummerow, (2010) concluded that there was a significant influence between competencies on the success of small and medium enterprises in Malaysia. They also stated that entrepreneurial competence is crucial for entrepreneurs because it gives entrepreneurs knowledge about how they do their business and encourages them to anticipate the potential positive or negative impacts of their behavior. The same results also found by Christiana, et al (2014) entrepreneurial competence has a significant influence on business development. The results inform that business success was positively influenced by entrepreneurial competency, this means that the higher the entrepreneurial competency possessed by business owners, the higher the development of batik SMEs in the Center for Pesindon will also be higher. This means that to improve business development there needs to be entrepreneurial competence in the form of technical competence, marketing competence, finance competence and human relations competence in managing their business.

The result of hypothesis three also found that innovation capability influences the business success of the footwear industry in Indonesia. If the company can innovate well this will encourage increased sales and profitability of the company. The results of this study are consistent by Zaheer (2015) shows that innovation is an important factor in supporting business success in Australia. This research is also supported by the results of research by Setiawan, et al., (2019) shows that eco-innovation can increase business success, in this case of improving the marketing performance of the food industry in Indonesia. (Egwu, Udu, & Onu, 2019) found that the three relevant innovation

dimensions (process, market and supply chain) are significantly correlated with business success or firm performance.

The finding of our study also shows that innovation capability has the greatest effect on business success. The indirect effect of entrepreneurial competence through innovation capability on business success is larger than the direct effect of entrepreneurial competency on business success. It means that innovation in this study has a role as an intervening variable or in another term, innovation capability can mediate entrepreneurial competency's effect on business success.

5. Conclusion

The findings show that business success is influenced by entrepreneurial competence and innovation capability. It means entrepreneurial competence and innovation capability play a role to improve the success of the footwear industry in Indonesia. According to the direct and indirect effect, the direct effect of innovation capability has the greatest influence on business success. It means that innovation capability has a greater contribution to improving business success. The indirect effect of entrepreneurial competency on business success through innovation capability has the greatest effect than the direct effect of entrepreneurial competency on business success. It means that innovation capability has a role as an intervening variable or mediates the effect of entrepreneurial competency on the business success of the footwear industry in Indonesia.

Based on the research results, our suggestions are:

1. For further research, we suggest to use more independent variables and also make a larger sample to get better results and more accurate.
2. We suggest to improve innovation capability and entrepreneurial competencies, for example by doing training in using technology to make products better and the process more efficient.

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The Strategy of Choosing Promising Markets for the Enterprise – Subject of Foreign Economic Activity on the Basis of Accessibility, Safety and Profitability Criteria

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Abstract

The purpose of the presented research is a strategic choice and assessment of the markets both from the point of view of the potential benefit for the enterprise - subject of foreign economic activity (FEA) from actions in such a market, and from the position of activity safety. To assess each parameter of market choice for the enterprise-subject of FEA, the necessary tools have been developed. Estimation of the market fundamental availability is carried out on the basis of identification of certain possible barriers on it using the developed analytical additive multiplicative function. The market safety assessment is based on the influence of micro and macro factors, developed by an additive multiplicative function, a certain significance and an ordinal descriptive scale for each of the factors. Market profitability is estimated basing on the developed analytical indicators. The proposed approach to the market choice for the enterprise – the subject of foreign economic activity and behavior in such markets allows to determine the security of certain external local markets for the direct enterprise activity, and provides enterprise management information to make sound management decisions in the field of foreign economic activity.

Keywords: strategic market choice; market safety; market profitability; market barriers; exit scenarios.

1. Introduction

The state and security of the foreign economic activity of an enterprise – subject of foreign economic activity substantially depend not only on management decisions, but also on the state of the specific market in which the enterprise operates. Negative trends inherent in the economies of some countries in modern conditions are rapidly spreading and causing global crises that are extremely difficult to transfer for countries with underdeveloped economies (Zlotenko, et al., 2019). There is a high level of threats for many enterprises – subjects of foreign economic activity today; therefore, a conservative view on the balance between safety and efficiency is appropriate (Rudnichenko et al., 2019; Havlovska et al., 2019). If security level in the market is unsatisfactory, further assessment of economic efficiency and the development of a market entry strategy would not be feasible, because the activity in such a market would be too risky for an enterprise. If security in the market is sufficient for an enterprise, further steps are possible, namely: an assessment of the economic efficiency such a market can provide to the enterprise.

In case economic efficiency is unsatisfactory, then access to such a market is possible from the point of view of the company economic security, but it is still inappropriate in terms of ensuring its performance. And only in the case of calculating sufficient market profitability, after recognizing its fundamental accessibility and security, it is possible to make a strategic market choice.

2. Theoretical basis

The first attempts to explain the entry of enterprise to foreign markets are found in the researches by scholars of early mercantilism (15th century). The main doctrine was active monetary balance, aimed at justifying the policy of accumulating money. The following attempts to explain the entry of enterprise to foreign markets are found in the researches by the scientists of the theory of classical political science, namely: A. Smith – the absolute advantage theory, which he discovered in 1776 in his research “An Inquiry into the Nature and Causes of the Wealth of Nations”, where he justified the profitability of foreign trade

(Smith, 1960); D. Ricardo – the principle of comparative advantage based on the same assumptions, however, using the notion of opportunity costs (Ricardo, 1817/1819/1821); J. S. Mill – the theory of international values, in which the price at which the exchange is made is justified (Mill, 1909).

Further development of the explanation of the exit of enterprises into foreign markets continues within the framework of the neoclassical theory, first – by E. Heckscher, and later – by B. Ohlin. According to the Heckscher-Ohlin theorem, each country exports only those products for which it has excess production factors, and imports only those products for which it has a shortage of production factors (Deardorff, 1982). The Heckscher-Ohlin theorem was developed by well-known American economist Paul Samuelson. He found that mutual trade leads to the equalization of relative and absolute prices for homogeneous factors of production (Samuelson, 1972).

J. Keynes considered economic processes from the point of view of a macroeconomic approach using the methods of limit, functional analysis and economic mathematical modeling (Keynes, 1936). A further explanation of the entry of enterprise to foreign markets continues within the neo-Keynesian theory. Representatives of this theory, namely the theory of economic growth, are R. Harrod and E. Domar, whose methodology was close to the J. Keynes's methodology. Harrod developed the theory of the relationship between the economic growth rates, savings and investment (Harrod, 1960), O. Domar developed the concept of the impact of investment income from foreign investment on the balance of payments, employment and export of capital, and stated that if the investment growth rate is more rapid than investment income from foreign investments growth, then the balance of payments is active: an increase in employment, business activity, GDP, capital exports is observed (Domar, 1946).

R. Coase investigated the specifics of the relationship between market participants and the emergence of additional transactions and costs associated with the installation and maintenance of such relationships in the framework of the theory of transaction costs. The foundations of this theory were outlined by him in his work "The Nature of the Firm" (1937 p.) (Coase, 1937).

A significant number of market theories (from the point of view of the entry of enterprise into foreign market) belongs to modern theoretical achievements. Thus, the monopolistic advantage theory was proposed by S. Hymer, developed by C. Kindleberger, R. Caves, G. Johnson, R. Lacroix. According to this theory, the possession of tangible or intangible assets gives the enterprise a competitive advantage, and, therefore, the prerequisites of activity in foreign markets (Hymer, 1960; Kindleberger, 1969; Caves, 1971).

The product life cycle theory in the world market was proposed by R. Vernon in 1966. (Vernon, 1966). To simplify the analysis, the number of life cycle stages is reduced to three: new, mature, and standard (common) product. And the countries, in turn, are divided into the countries-innovators, the countries-followers and other countries, which in the latter begin to consume and produce the product.

The competitive advantage theory was proposed by M. Porter and substantiated in the book "On Competition: Updated and Expanded Edition" (Porter, 2008). According to M. Porter, the presence of natural resources in the country cannot become a competitive advantage of the nation. On the contrary, countries with rich natural resources may lag behind in economic development, and those countries that are experiencing a lack of natural resources can actively develop.

The theory of intra-industry trade considers the analysis of the essence and economic results of the phenomenon of parallel import and export of products within the framework of the same industries. The principal difference between the classical theory and the theory of intra-industry trade is that the subject of the study of the latter is primarily products that are close substitutes in the areas of consumption and production, or in both these areas (Grubel and Lloyd, 1975). Studies conducted (first of all, by H. Grubel and P. Lloyd, as well as by their followers) showed that the higher the intensity of intra-industry trade compared with the basic industries is, the more technologically saturated the industry is. H. Grubel also investigated the phenomenon of intra-industry trade in another aspect.

Having analyzed the theoretical achievements of more than one generation of scientists involved in the functioning of markets and individual subjects in such markets, it is advisable to note the presence of quite different approaches to explaining the causal relationships of individual businesses entering foreign markets. The prerequisites for a market choice for an enterprise – subject of foreign economic activity are possible forms of entering such a market, its quantitative characteristic, the existing risks in such a market and its safety for the enterprise. Entering the external market requires the choice of a certain form of such an exit (direct or indirect export, direct investment, joint activity), taking into account its quantitative characteristics.

3. Methods

It seems appropriate to offer options for the enterprise in the case of various combinations of assessments of accessibility, safety and profitability of the potential market (Table 1).

No.	Is the market fundamentally affordable?	Is market security sufficient?	Is market returns sufficient?	Situation characteristics	Fundamental solution
1	No	No	No	It is impossible to enter the market due to its inaccessibility for the enterprise	To wait. To repeat analysis in case of changes in market availability
2	No	No	Yes		
3	No	Yes	No		
4	No	Yes	Yes		
5	Yes	No	No	It is possible to enter a certain market, but impractical for an enterprise due to the lack of economic attractiveness and a low level of security	To wait until the security or profitability of the market changes for the better
6	Yes	No	Yes	It is possible to enter the market, and the market represents the interest for the enterprise through economic attractiveness. However, the market is not sufficiently safe for the enterprise	To formulate additional measures to ensure the economic security of the enterprise in such a market
7	Yes	Yes	No	It is possible to enter the market, market security is sufficient, but the market provides low returns	Search for alternative options for the use of capital or activity in the market with higher returns with adequate security
8	Yes	Yes	Yes	It is advisable to enter the market, returns and market security are sufficient	Carry out market activity

Table 1.
Evaluation of market entry prospects for an enterprise – subject of foreign economic activity, depending on the values of the criteria considered

It is clear that half of the cases considered in table 1 provides for the rejection of further operations on the market because of its inaccessibility for the enterprise. Of course, the best option in the case of the fundamental availability of the market is option 8, in which both the profitability and the security of the market are sufficient. However, there are other options. So, a situation when the security of the market is sufficient, but the market provides low profitability is possible (Option 7). Option 6 is more interesting. It characterizes the situation when the market profitability meets the requirements of the enterprise, but the market has low security. Finally, option 5 has a certain potential for an enterprise, which is characterized by insufficient profitability of the enterprise and insufficient security of the market. For such an option, it is possible for an enterprise to enter the market, but it is impractical due to the lack of economic attractiveness and a low level of security.

Let us reveal the proposals for assessing the availability of the market, assessing its security and assessing its profitability in more detail.

Using an analytical function to assess market accessibility requires solving several questions: determining the type of function (additive, multiplicative, one step equation, etc.), determining the significance of the coefficients used, and constructing the scale of interpretation of the final indicator.

To solve the problem, it was proposed to use a multiplicative-additive function

$$F = \sum_{i=1}^k f_i \cdot a_i$$

Note: in table 2, the figures indicate such barriers for the enterprise that is the subject of foreign economic activities to entry to the market: 1 – economic; 2 – administrative; 3 – infrastructure; 4 – ecological; 5 – socio-cultural; 6 – sanitary-epidemiological; 7 – criminal

	Barrier type							Geometric mean	Part	Rank
	1	2	3	4	5	6	7			
1	1	1	3	3	5	3	1/5	1.601	0.195	2
2	1	1	3	3	3	3	1/3	1.369	0.173	3
3	1/3	1/3	1	3	3	1	1/5	0.930	0.107	4
4	1/3	1/3	1/3	1	1	1/3	1/5	0.424	0.043	7
5	1/5	1/3	1/3	1	1	1	1/5	0.496	0.049	6
6	1/3	1/3	1	3	1	1	1/5	0.679	0.083	5
7	5	3	5	5	5	5	1	3.433	0.350	1

Table 2. Determining the significance of certain types of barriers to calculate the market availability for the enterprise – the subject of foreign economic activity

According to the traditional rules of the hierarchy analysis method, the estimate of v_{ij} in each cell of the matrix reflects how much more weighty, in terms of influence on the final result, is the element of the considered population, located in row i , above the element that is located in column j . The grading scale used is also traditional for the hierarchy analysis method (Saaty, 1993): “1” – an element located in row i has a similar effect on the final result under consideration as well as an element located in column j ; “3” – an element located in row i has a certain advantage in influencing the final result under consideration over an element located in column j ; “5” – an element located in row i has a tangible advantage in influencing the final result under consideration over an element located in column j ; “7” – an element located in row i has a significant advantage in influencing the final result under consideration over an element located in column j ; “9” – an element located in row i has a decisive advantage in influencing the final result under consideration over an element located in column j . In addition, the matrix of the established estimates is symmetric about its main diagonal, according to one of the rules according to the Saaty method: $v_{ij} = 1/v_{ji}$.

It is necessary to say the following, commenting on the results of assessing the significance of certain types of barriers to the availability of certain markets for a subject of foreign economic activity: the indicator of significance for the barrier of each species is presented in the column of particles (Table 2). The sum of all indicators of significance for the aggregate of barriers in the activities of the enterprise is 1.0.

To confirm the reliability of the obtained results on assessing the significance of certain types of barriers for calculating the availability of certain markets for enterprises – subjects of foreign economic activity, the consistency of the obtained matrix

where F – final assessment of the estimated phenomenon, process or object, $f \in \{f\}$ – intermediate estimates of factors or indicators that influence the final assessment, $a \in \{a\}$ – significance coefficients of individual factors or indicators that affect the final score, k – the number of factors or intermediate indicators taken to calculate. Taking into account the task – assessing the availability of certain markets for the enterprise, it is proposed to use a modified additive multiplicative function

$$F = \sum_{i=1}^k f_i^t \cdot a_i$$

with value $t = 2$. Consequently, the actual modified function will have the following form:

$$F = \sum_{i=1}^k f_i^2 \cdot a_i$$

The use of an additive-multiplicative function allows us to immediately resolve the issue of coordinating the dimensions of each of the indicators and the resulting indicator (due to a dimensionless estimate), as well as the issues of constructing a scale for interpreting the final indicator (in case of the sum of all significance coefficients $a \in \{a\}$ is equal to units, then the rating scale itself will be in the range from the minimum to the maximum final assessment of each of the intermediate indicators). The determination of the significance of each of the arguments of the evaluation function is carried out by an expert on the basis of the hierarchy analysis method according to T. Saaty (Table 2).

of primary estimates was calculated. The tool for assessing consistency is the consistency index I (Gubanov et al., 2010), which is calculated on the basis of its own column of matrix. The consistency index for the current matrix of primary estimates is $I_{cp} = 5.52\%$, and $I_{max} = 8.09\%$. The maximum eigenvalue of the matrix is 7.48 with its dimension equal to 7. It is traditionally considered that the upper limit for the matrix consistency index according to the Saaty method is 10% (Saaty, 1993) (i.e., the value that is less than 10% indicate the consistency of the estimation matrix).

It is advisable to present the order of determining values for each of the arguments in the proposed additive multiplicative model for assessing market accessibility for the enterprise – subject of foreign economic activity after determining the significance of each argument. For this, when using the five-position ordinal scale according to the Sturges formula (Sturges, 1926), the number of intervals for evaluation is $n = 1 + 3.322 \cdot \lg(N)$, where n – the number of intervals of the assessment scale, and N – the number of units of the totality to be evaluated. The intervals are equal in size, since the assumption of the moment of assessment is the value of the quantitative intermediate estimates for each of the barriers in question are evenly distributed. According to Sturges formula for the used five-position ordinal scale, taking into account the proposed quadratic dependence of the resulting estimate on the intermediate estimates, the number of intervals is equal to $n = 1 + 3.322 \cdot \lg(25) = 5.64$. That is, the number of intervals used for interpretation is 6 (rounded 5.64). In the case of a uniform distribution of the resulting indicator and the linear nature of the function, it would be possible to use the traditional formula of the interval

$$L = \frac{F_{max} - F_{min}}{n}$$

For the proposed formula, taking into account the quadratic dependence of the resulting indicator on the intermediate estimates, the total significance of the individual identified barriers equal to one, and the five-point ordinal scale used to form intermediate estimates, F_{max} is equal to 25 and $F_{min} = 1$. However, the linear approach to allocating the interval (it, according to the formula, would be 4.0) is not correct. Therefore,

Interval number	Lower limit of interval F_1	Upper limit of interval F_1	Interpretation of the possibility of an market entry for an enterprise on the basis of value F_1 , which falls into the appropriate interval
1	1	2.5	The market entry for an enterprise is quite possible and relatively easy
2	2.5	4	The market entry is quite possible for an enterprise, but needs to overcome certain barriers
3	4	9	The market entry is complicated, although possible, because it involves overcoming various barriers
4	9	13	The market entry for an enterprise is fundamentally possible, but requires the overcoming barriers of a different nature
5	13	16	The market entry for an enterprise is essentially complicated, accompanied by the need to overcome a significant number of barriers
6	16	25	The market entry for an enterprise is almost impossible due to the set of barriers impact

Table 3. Interpretation of the possibility of market entry for an enterprise based on the consideration of existing barriers according to the calculated value F_1

However, the general interpretation will be carried out not only on the basis of the interval method (Table 3), but also taking into account the limit values. In such a situation, if at least one of the values of f_i is equal to "5", then the market entry for an enterprise is impossible. That is, in fact, the calculation of the F_1 value will be carried out in this way:

$$\begin{cases} \text{if } \forall f_i \neq f_{i \max} \therefore F_1 = \sum_{i=1}^k f_i^2 \cdot \alpha_i \\ \text{if } \exists f_i = f_{i \max} \therefore F_1 = F_{\max} \end{cases} \quad (1)$$

where f_i – barrier assessment by number and based on the ordinal scale of assessment;

F_1 – assessment of market availability for the enterprise engaged in FEA;

k – the number of barriers considered to assess the market availability for an enterprise engaged in FEA;

α – assessment of the significance of the barrier by number, based on the specific significance of each of these barriers.

It is obvious that the conditions in the composition of formula (1) are opposite to each other and cannot be fulfilled simultaneously (either there is at least one maximum value among the intermediate estimates of individual barriers, or not). The content of formula (1) is as follows: if at least one f_i from the composition $f_i \in \{f\} = f_{i \max}$, then the general assessment of market availability in points automatically becomes the maximum, that is, according to the formed table 3, the market entry for an enterprise is almost impossible due to the insurmountable impact of one of the barriers.

Commenting on the intervals of the developed scale for estimating the possibility of an enterprise entering the market based on taking into account existing barriers (Table 3), we note the following. The intervals of the developed scale are not uniform, but this seems logical, given the quadratic nature of the dependence. The size of the interval increases towards the end of the grading scale. Interval No. 6 automatically means that the value of some f_i in formula (1) is equal to 5 (which is determined by empirical determination of the elasticity of individual factors in the calculation of F_1), and therefore the second requirement in formula (1) and therefore, for the second requirement in formula (1), the value of F_1 is taken to be the maximum, and this in the formed scale of interpretation of the resulting indicator determines the impossibility of the company to enter the market.

The upper limit of the second and third intervals are significant for the interpretation of the indicator F_1 values. Exceeding the upper limit of the second interval means that there are several barriers that have received a rating "3", that is, such barriers exist, limit the enterprise, but can be overcome, although with a large amount of resource costs. Similarly,

the intervals of the scale of the F_1 indicator (estimating the possibility of an enterprise's exit to a particular market) is based on the empirical testing of the function F , taking into account the weight of individual identified barriers (Table 2). This allows to construct a set of intervals of the resulting F_1 indicator and offer a qualitative interpretation of their estimate (Table 3).

exceeding the upper limit of the third interval means that there are one or more barriers that have been rated "4", that is, they significantly limit the ability of an enterprise to enter the external market, require considerable effort and resources to overcome. Intervals No. 4 and No. 5 in the formed assessment scale indicate that there are barriers – for the interval No. 4 their number is less, or their impact is less significant, for the interval No. 5, respectively, their number is greater and the impact of such barriers is more significant – which substantially limit the company's ability to enter the foreign market. All this will complicate the possibility of external market entering for the enterprise.

The assessment of the significance of individual factors affecting the market security for an enterprise – subject of foreign economic activity, is presented in table 4.

	1	2	3	4	5	Geometric mean	Part	Rank
1	1	3	1/3	3	1	1.246	0.214	2
2	1/3	1	1/5	1/3	1/3	0.375	0.057	5
3	3	5	1	3	3	2.667	0.386	1
4	1/3	3	1/3	1	1/3	0.644	0.129	4
5	1	3	1/3	3	1	1.246	0.214	2

Note: in table 4, the figures indicate such factors of the macro level of the market economic security for an enterprise - subject of foreign economic activity: 1 – institutional; 2 – socio-cultural; 3 – fiscal; 4 – investment; 5 – transaction

Table 4. The assessment of the significance of individual factors affecting the market security for an enterprise – subject of foreign economic activity

Commenting on the results of assessing the significance of the factors of the micro level of economic security of the market, it is necessary to note the following. First of all, the results obtained are rather consistent: the average index of consistency, calculated from the data in Table 4 is 5.95% (the minimum value of the index of consistency is taken at the level of 10%), even the maximum value of the index of consistency for individual lines of the formed matrix of estimates is 10.3%, that is, slightly exceeds the established consistency limit for the matrix of primary estimates.

The fiscal factor has the highest significance according to the evaluation results. Its significance is slightly more than 40% in the factors aggregate. The institutional and transactional factors received same assessment, in terms of the extent of the impact on the market security for an enterprise – subject of foreign economic activity.

In contrast to the assessment of market entry barriers, even

with the maximum assessment of the impact of a certain factor of the market economic security, it is fundamentally impossible to performance for an enterprise in such a market, however, the economic security of such a market for the enterprise can be extremely low.

The applied additive multiplicative formula for calculating the market economic security for an enterprise – subject of foreign economic activity is analogous to the calculation of market availability and has the form

$$F = \sum_{i=1}^k f_i^2 \cdot a_i$$

The content of indicators is similar to formula (1). It is only calculated for the market economic security based on the influence of the selected factors and significance ratio of such factors. The only difference is the absence of a second part of the formula that maximizes the overall estimate of F if at least one of the partial estimates f_i is maximal:

$$F_2 = \sum_{j=1}^l g_j^2 \cdot \beta_j \quad (2)$$

where F_2 – the assessment of the market economic security

Interval number	Lower limit of interval F_2	Upper limit of interval F_2	Interpretation of market economic security for an enterprise – subject of foreign economic activity based on the value of F_2 , which falls into the appropriate interval
1	1	2.3	The market is absolutely safe
2	2.3	4	The market is quite safe
3	4	8.2	The market is segmentally safe
4	8.2	13.2	The market is dangerous for the enterprise, it poses a serious threat to the enterprise in its foreign economic activity
5	13.2	16	The market is extremely dangerous for the enterprise
6	16	25	The market is critically dangerous for the enterprise

Table 5. Interpretation of assessment of market economic security for an enterprise – subject of foreign economic activity based on the value of F_2

Based on the scale of interpretation of the assessment of the market economic security for the enterprise – subject of foreign economic activity (Table 5), it is possible to interpret the calculated indicator F_2 and thus assess the economic security of a particular local market for the enterprise.

In the future, the profitability of the potential market for the enterprise – the subject of foreign economic activity should be evaluated. It is proposed to conduct such an assessment on the basis of a set of analytical indicators, in particular, profit on the

for an enterprise – subject of foreign economic activity;

t – the number of factors that are being considered for assessment of the market economic security for an enterprise – subject of foreign economic activity;

g_j – the factor assessment number j based on the ordinal rating scale;

β_j – the assessment of number j factor significance based on the specific significance of each of these factors.

The number of intervals for interpreting F_2 according to the proposed formula is calculated similarly by the Sturges formula and, despite the identical scale of the assessment scale of the indicator F_1 , will be the same. The boundaries of the intervals and the interpretation of their content are presented in table 5.

Comparing tables 3 and 5 we should note that despite the same number of intervals, the identity of the used additive multiplicative function and the uniformity of the assessment scale (with the identical minimum and maximum values for both indicators), the interval boundaries for the F_2 and F_1 indices will be similar but unequal. This is due to the different elasticities of the resulting functions for various factors they include.

foreign market, transaction costs, etc. However, when solving the task of evaluating the entry to a specific local market, there may be a situation of multi-variation of such a choice. In such a situation, it is appropriate to use the equivalence of market access based on the ratio of their safety and profitability. It is useful to represent such a ratio in a matrix form (Fig. 1). In the matrix, at the intersection of estimates of the market economic security and its profitability, there should be separate local markets for the enterprise.

		Economic security			
		Minimum level	Maximum permissible level	Normal level	High level
Profitability	Minimum	Country – 1			
	Insignificant		Country – 2		
	Significant			Country – 3	
	High				Country – n

Figure 1. Matrix of estimation of foreign markets according to criteria of profitability and economic safety

In the formed matrix it is expedient to allocate separate zones according to the criterion of the ratio of profitability and market security. Such zones will determine the market priority of a certain country for the enterprise by the results of the ratio of economic security and its profitability. Zones are presented in the matrix on the ratio of market economic security and its

returns in figure 2.

The matrix (Figure 2) identifies eight zones, each of which has different estimates for the combination of market security and its profitability. Characteristics of seven of these zones are given in table 6.

		Economic security			
		Minimum level	Maximum permissible level	Normal level	High level
Profitability	Minimum	8			5
	Insignificant		6	3	
	Significant		4	2	
	High	7			1

Figure 2. Matrix of estimation of foreign markets according to criteria of profitability and economic safety

Zone number	Zone characteristic	Evaluation of the feasibility of the enterprise entering the relevant local market
1	High rates of profitability and security of the company on the market	The market is promising and safe, hence the entry is advisable
2	Sufficient indicators of market profitability and economic security of the market	The market is reasonably promising and safe, so it is feasible and reasonable to enter it
3	Enough market security at a relatively high level of profitability	The market is sufficiently safe and relatively promising, therefore, the entry to it seems expedient in the absence of more attractive alternatives
4	Insufficient security of the market at a sufficiently high profitability	The market is dangerous, but it is highly profitable, therefore, the entry to it must be commensurate with the level of risk and due to the management's preferences to it. The entry expediency is questionable
5	Sufficient market security provided its minimum profitability	The market is safe from an economic point of view, but it does not represent a significant interest in its profitability. The entry to the market is feasible only if it is not possible to enter markets with higher profitability or with an orientation solely on market safety indicators, regardless of its profitability
6	Extremely acceptable level of market security at an insignificant level of profitability	The market is dangerous and does not represent a significant interest in the position of its profitability. The entry to the market is inappropriate
7	The minimum level of market security with high market profitability	The entry to the market is inappropriate, since the probability of absolute losses is extremely high
8	Minimum indicators of market profitability and its economic security for the enterprise	The entry to the market is not feasible, even if it is possible

Table 6.

Characteristics of zones in the matrix of foreign market estimation according to the criteria of profitability and economic security

4. Results

The developed matrix for estimating foreign markets by the criteria of profitability and economic security (Figure 2) allows us to determine the viability of individual foreign local markets for an enterprise. It is clear that for practical use such a matrix should be filled. The specific content of such a matrix is linked to a specific industry. The established matrix for estimating foreign markets by the criteria of profitability and economic security for Ukrainian enterprises in the field of engineering is presented in figure 3.

It should be emphasized that the current matrix (Fig. 3) presents proposals not on the entry of engineering enterprises into certain markets, but on the assessment of such markets by the criteria of profitability and safety. For example, the markets of Germany or Austria are exceptionally attractive according to both criteria, and therefore entering to them is extremely interesting for enterprises (Zone 1, Figure 3). However, it should be understood that orientation to such countries requires ensuring high competitiveness and quality of domestic products, and this is quite problematic today, although some enterprises work quite successfully on such markets.

		Economic security			
		Minimum level	Maximum permissible level	Normal level	High level
Profitability	Minimum	Somalia, Congo	Armenia	Switzerland, Denmark, Sweden, Finland	Japan, Australia
	Insignificant	Iraq, Iran	Tajikistan, Azerbaijan	Belarus	Poland
	Significant	South Africa	Kazakhstan	China	England, France
	High	Russian Federation	Egypt, Iran	Netherlands, Spain, Portugal	Germany, Austria, UAE

Figure 3. The matrix for estimating security/profitability of foreign commodity markets for engineering enterprises

The markets of the Netherlands, Spain, Portugal and China (Zone 2, Figure 3) are quite attractive and safe. However, they are rather specific and require technologically complex products. At the same time, the Chinese market is significant in terms of volume, but the situation in such a market is constantly changing and technologically complex products are replaced by local analogues with time, which leads to a loss of prospects of access to such a market. Only imports of products and components that are significantly cheaper than branded prototypes are relevant.

The markets of Kazakhstan, Iran and Egypt are promising from the point of view of profitability and are rather dangerous (Zone 4, Figure 3). There is a fairly stable demand for industrial products in such markets, but there are significant risks associated with the instability of the socio-political situation and significant logistics costs. These markets are fairly "explored" for Ukrainian enterprises, however, they require a detailed analysis of potential counterparties and insurance for almost all stages of interaction with them.

As for the markets of Poland and Belarus, it is necessary to note the sufficient safety of such markets, but also their low profitability (Zone 5, Figure 3). The entry to such markets is possible and appropriate in the absence of more attractive alternatives. Although the advantage of these markets is the territorial location and common border, which greatly simplifies the logistics processes.

The markets of other countries are not sufficiently attractive by the criterion of profitability or security, so entry to them is possible, but purely individualized with the choice of a separate

counterparty under condition of guarantees of security interaction.

The market attractiveness can be conditional either on super-profits or on receipt of foreign currency earnings, which in a certain way reduces the influence of inflation processes on the enterprise activity.

Depending on the segment of matrix of security/market benefits balance (Figure 1-2) for an enterprise, in case of a decision to enter the relevant market, it is expedient to develop an initial scenario for ensuring its economic security. Since the matrix (Figure 1) has a dimension of 4×4 , only 16 variants of action scenarios can be singled out. Such a number of options, on the one hand, is sufficient to cover the full range of situations in the enterprise (within the framework of scenario analysis), and on the other hand, the number of options for analysis is not excessive. The description of these options and the description of the initial scenario on the part of the enterprise are presented in table 7.

The scenario should include not only actions and managerial decisions on entering the market, but also detailing the procedures and stages of such an entry, as well as justifying the model of the "ideal counterparty" of a particular market. Specific management measures should be specified for each scenario on the basis of certain strategic benchmarks and goals for each of them, with a view to their practical implementation in a particular enterprise (Table 8).

In addition to certain specific management measures and actions (Table 9), certain methods and techniques of work on the external local market that can be used of interest to ensure

Scenario number	Security level	Profitability	Strategic benchmarks and goals
1	Minimum	Minimum	Refuse to enter the external local market, search for other external local markets for the enterprise
2	Minimum	Insignificant	Refuse to enter the external local market in the short term, search for other external local markets for the enterprise
3	Minimum	Significant	Prevent enterprise losses. Prevent partial threats and risks. Remote work with the market
4	Minimum	High	Prevent enterprise losses. Change the format of work with a focus on profit taking in the short term. Gain a foothold on the market to improve security
5	Maximum permissible level	Minimum	Refuse to enter the external local market, search for other external local markets for the enterprise
6	Maximum permissible level	Insignificant	Refuse to enter the external local market in the short term, search for other external local markets for the enterprise
7	Maximum permissible level	Significant	Prevent damage to the enterprise. Prevent partial threats and risks
8	Maximum permissible level	High	Prevent damage to the enterprise. Gain a foothold on the market to improve security and profit in the medium term
9	Normal	Minimum	Positive decision to enter the market in the absence of alternatives in the long term
10	Normal	Insignificant	Positive decision to enter the market in the absence of alternatives in the long term
11	Normal	Significant	Positive decision to enter the market
12	Normal	High	Positive decision to enter the market and to gain a foothold on it with a focus on long-term cooperation
13	High	Minimum	Positive decision to enter the market if it is necessary to receive additional orders or the need for additional capacity loads
14	High	Insignificant	Positive decision to enter the market if it is necessary to receive additional capacity loads and the potentially cover promising segments of the market
15	High	Significant	Positive decision to enter the market with appropriate active actions in order to maximize the coverage of market segments and establish a stable relationship with counterparties
16	High	High	Active integration into the market with the highest possible coverage of segments and counterparties in the market

Table 7. Scenarios for entry/non-entry of the enterprise to a specific market according to the estimation matrix (Figures 1-2)

Scenario number	Strategic benchmarks and goals	Specific management measures and actions taken
1	Refuse to enter the external local market, search for other external local markets for the enterprise	Termination of analytical actions to assess the expediency of entering the market. Exclusion of the market from a list of potential alternatives
2	Refuse to enter the external local market in the short term, search for other external local markets for the enterprise	Termination of analytical actions to assess the expediency of entering the market. Exclusion of the market from the list of potential alternatives in the short term
3	Prevent enterprise losses. Prevent partial threats and risks. Remote work with the market	Detailed analysis of the threats and risks inherent in a particular market. Decision on the inappropriateness of entering the market due to the impossibility of minimizing the risks and threats in such a market. Setting up remote work with the market (for example, through an existing participant of such a market without the physical presence of the enterprise)
4	Prevent enterprise losses. Change the format of work with a focus on profit taking in the short term. Gain a foothold on the market to improve security	Detailed analysis of the threats and risks inherent in a particular market. Making a decision on entering the market in order to minimize the risks and threats in such a market in the short-term perspective
5	Refuse to enter the external local market, search for other external local markets for the enterprise	Termination of analytical actions to assess the expediency of entering the market. Exclusion of the market from a list of potential alternatives
6	Refuse to enter the external local market in the short term, search for other external local markets for the enterprise	Termination of analytical actions to assess the expediency of entering the market. Exclusion of the market from the list of potential alternatives in the short term
7	Prevent damage to the enterprise. Prevent partial threats and risks	Entry into the market on the condition of a strictly regulated procedure of interaction with counterparties on it. Monitoring and preventing the most typical risks in the market. Insurance against potential risks. Work on advance payment by the counterparty and post payment by the enterprise
8	Prevent damage to the enterprise. Gain a foothold on the market to improve security and profit in the medium term	Entry into the market on the condition of a strictly regulated procedure of interaction with counterparties on it. Monitoring and preventing the most typical risks in the market. Insurance against potential risks. Set up a settlement system with counterparties using guarantees
9	Positive decision to enter the market in the absence of alternatives in the long term	Entry into the market in the absence of more attractive alternatives, as well as for the purpose of additional capacity loads. Regulation of the volume of resource support of interaction with counterparties. Tight control of transaction costs. Set up a settlement system with counterparties using guarantees
10	Positive decision to enter the market in the absence of alternatives in the long term	Entry into the market in the absence of more attractive alternatives, as well as for the purpose of additional capacity loads. Regulation of the volume of resource support of interaction with counterparties. Tight control of transaction costs. Set up a settlement system with counterparties using guarantees
11	Positive decision to enter the market	Entry into the market with simultaneous search for the possibility of concluding long-term contracts. Regulation of interaction with potential counterparties, focused on enhancing such interaction and the search for new partners in the local market
12	Positive decision to enter the market and to gain a foothold on it with a focus on long-term cooperation	Entry into the market with the conclusion of long-term contracts and expansion of representation on the market with the participation of agents and the establishment of affiliates of the enterprise
13	Positive decision to enter the market if it is necessary to receive additional orders or the need for additional capacity downloads	Entry into the market with the focus on additional profits and its operational fixation with simultaneous saving of resources (mandatory compliance with the positive benefit/cost ratio)
14	Positive decision to enter the market if it is necessary to receive additional capacity downloads and the potentially cover promising segments of the market	Entry into the market with the focus on additional profits and the use of free capacity of the enterprise. Find additional reserves to cover constant costs. Savings in transaction costs when dealing with potential counterparties
15	Positive decision to enter the market with appropriate active actions in order to maximize the coverage of market segments and establish a stable relationship with counterparties	Entry into the market with a simultaneous search for long-term contracts and maximum coverage of the market. Regulation of interaction with potential counterparties, focused on activation of such interaction and search for new partners in the local market
16	Active integration into the market with the highest possible coverage of segments and counterparties in the market	Entry into the market with the conclusion of long-term contracts and expansion of representation in the market with the participation of agents and the establishment of affiliates of the enterprise. Aggressive marketing policy. Use of all possible means and tools to capture part of the market

Table 8. Content of measures within the scenarios of the entry/non-entry of the enterprise to a specific market based on the results of the evaluation of local external markets according to the criteria of profitability and safety

the profitability of the enterprise and economic security of its foreign economic activity in the local foreign market depending on the scenario of entering the external market, which is determined by a combination of the profitability of such a market for the enterprise and its economic security.

It is clear that such methods and techniques can be varied,

and the use of several methods and techniques can be used for a particular scenario. Recommendations on the use of certain methods and techniques in different scenarios of the company entry into the external market, determined by the combination of profitability and economic security of such a market, are presented in table 9.

Scenario number	Methods and techniques of work on the external local market									
	1	2	3	4	5	6	7	8	9	10
1	x	x	x	x	x	x	x	x	x	x
2	x	x	x	x	x	x	x	x	x	x
3	v	v	v	v	v	v	v	0	0	x
4	v	v	v	v	v	v	v	v	v	0
5	x	x	x	x	x	x	x	x	x	x
6	x	x	x	x	x	x	x	x	x	x
7	v	v	v	v	v	v	x	x	0	0
8	v	v	v	v	v	v	v	v	0	0
9	v	v	v	v	v	v	v	v	v	x
10	v	v	v	v	v	v	v	v	v	x
11	v	v	v	v	v	v	x	x	v	v
12	v	v	v	v	v	v	x	x	v	v
13	v	v	v	v	x	x	x	x	v	v
14	v	v	v	v	x	x	x	x	v	v
15	v	x	v	x	x	x	x	x	v	v
16	v	x	v	x	x	x	x	x	v	v

Note: in table 9 the mark “v” means that it is advisable to use the corresponding method or technique in the case of a specific scenario; the mark “x” means that the appropriate method or technique is not advisable to use in the case of a specific scenario, it is of little effect or does not make sense; the mark “0” means that it is impossible to unequivocally determine the expediency of applying the appropriate method or technique, and its use requires additional analysis. The numbers denote such methods and methods of work in the external local market which help to reduce risks and threats to the foreign economic activity of an enterprise: 1 – the regulation of the procedure of interaction with the counterparty; 2 – advance payments from the counterparty; 3 – insurance of risks with the involvement of third parties; 4 – self-risk insurance on the basis of reservation; 5 – limiting risks; 6 – involvement of third parties in the implementation of certain foreign economic transactions; 7 – involvement of third parties as guarantors for the implementation of certain foreign economic transactions; 8 – involvement of third parties as guarantors of the financial component of certain foreign economic transactions; 9 – establishing interaction with the actors of the institutional environment of the relevant market (for example, electronic declaration); 10 – entry into the association and union of the relevant target markets.

Table 9.

Methods and techniques of work in the external local market depending on the scenario of the company entry into the market

Commenting on the methods and techniques of work on the external local market, it is necessary to note the following. The presented methods and techniques are aimed at ensuring the economic security of the enterprise – subject of foreign economic activity, and provide for the specifics of the chosen scenario to be taken into account. The four scenarios that do not foresee a decision to enter the external markets (1, 2, 5, 6) a

priori are not provided with appropriate methods that are logical and understandable. The maximum use of methods and techniques occurs in scenarios 4, 9, 10, since in these cases, enterprise management needs to apply all possible tools to ensure the economic security of foreign economic activity. Other scenarios involve the use of a variety of methods and tools depending on market security and its profitability.

Scenario number	Forms of work on the external local market									
	1	2	3	4	5	6	7	8	9	10
1	x	x	x	x	x	x	x	x	x	x
2	x	x	x	x	x	x	x	x	x	x
3	v	x	v	x	x	v	x	x	x	x
4	v	x	v	x	x	v	x	x	x	x
5	x	x	x	x	x	x	x	x	x	x
6	x	x	x	x	x	x	x	x	x	x
7	v	x	v	x	x	v	x	x	x	x
8	v	x	v	x	x	v	0	x	x	x
9	v	x	v	x	x	v	0	0	0	0
10	v	x	v	v	v	v	0	0	0	0
11	v	v	x	v	v	v	0	0	v	v
12	v	v	x	v	v	v	v	v	v	v
13	v	v	x	v	v	v	v	v	v	v
14	v	v	x	x	v	x	v	v	v	v
15	v	v	x	x	v	x	v	v	v	v
16	v	v	x	x	v	x	v	v	v	v

Note: in table 10 the mark “v” means that it is advisable to use the appropriate form of entering the foreign market in the case of a specific scenario; the mark “x” means that the appropriate form of access to the external market is impractical and unreasonable to use in the case of a specific scenario; the mark “0” means that it is not possible to unequivocally establish the expediency of a certain form of entering the foreign market, and the situation requires more detailed analysis. The numbers denote the forms of the enterprise work in foreign markets: 1 – direct export-import activity through the department of foreign economic activity; 2 – direct export-import activity through direct representation on the local external market; 3 – involvement of intermediaries (agents, distributors) for export-import activity; 4 – export franchise; 5 – licensing; 6 – production under contract; 7 – contract management; 8 – joint venture; 9 – direct investment through production or assembly enterprises; 10 – direct investment through sales subsidiaries

Table 10. Forms of work on the external local market depending on the scenario of the company entry into the market

Regardless of the methods and techniques used, one of the issues that needs to be addressed in the case of an enterprise entry into an external local market is to determine the form of work in such a market. The range of company work forms on the market is very wide (Table 10).

It is clear that different forms of enterprise entry into the external local market will be of different interest for each of the 16 selected scenarios. The analysis of expediency of application of certain forms is carried out in table 10.

According to the information given in tab. 10, the form of work on the external local market implies a fundamental decision to enter the external market, and in case of a negative decision (scenario 1, 2, 5, 6) the use of any methods loses its meaning.

Proposals for assessing the balance of safety / profitability of foreign commodity markets for engineering enterprises, and the evaluation of such markets, made it possible to form an appropriate list of scenarios for entry into foreign markets. It provides enterprise management with appropriate management tools, and allows to make operatively managerial decisions on methods and techniques of work in foreign markets and choose the form of work on the external local market, depending on the chosen scenario of the company entry into such a market using tables 9 and 10.

5. Conclusions

In the given research the algorithm of strategic choice of market(s) for the enterprise – subject of foreign economic activity and behavior in such market is offered taking into account criteria of availability, safety and market profitability, and also the necessary instrumentation of an estimation on each of algorithm stages is specified. Variants of the company's actions are defined in case of different combinations of assessments of availability, safety and market profitability.

The main stages of the analysis of the expediency of entering the commodity markets from the standpoint of the security oriented approach are outlined and the procedure for determining the significance of certain types of barriers for calculating the market availability for the enterprise – subject of foreign economic activity is specified, as well as the results of their estimation with an expanded descriptive characteristic of the values for each barrier are presented. The matrix of estimation of foreign markets according to criteria of profitability and economic safety with characteristic of corresponding zones of matrix is offered and tested. A matrix for estimating the balance of safety/profitability of foreign commodity markets for Ukrainian machine-building enterprises is formed.

Scenarios for an enterprise entry/non-entry into a specific market are developed and the content of activities under the enterprise entry/non-entry scenarios for a specific market based on the assessment of local external markets, according to profitability and safety criteria are suggested. The methods, techniques and forms of work in the external local market, depending on the scenario of the enterprise entry/non-entry into a specific market are defined.

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Analysis of Selected Talent Management Practices in Terms of their Impact on Keeping Talented Employees in Slovak Companies

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Abstract

The paper deals with the issue of talent management, focusing in particular on the importance of implementing talent management practices for recruiting and keeping talented employees. The paper also presents the results of the research carried out on a sample of 140 talented workers working in Slovak companies. The aim of the research was to find statistically significant connections between selected talent management practices and the talented employee's degree of conviction to stay in the company. Three talent management practices have been selected, namely extraordinary performance incentives, education and development, and job enrichment. Three statistical hypotheses were tested in the research using the Pearson correlation coefficient. In the case of extraordinary performance incentives, education, and development, the hypotheses were confirmed. The research has highlighted the importance of implementing these practices in order to keep talented employees.

Keywords: talent management; talent employees; recruitment; training and development; job enrichment.

1. Introduction

Companies which want to survive and grow in the current environment, outperform their existing competition and increase their added value must attract and retain quality and talented employees. In today's rapidly changing and constantly evolving global marketplace, companies are aware that they cannot do without talent, skills and knowledge of their employees (Tucker, Kao and Verma, 2005; Lewis and Heckman, 2006; Collings and Mellahi, 2009). Talent management has become a major challenge for companies around the world (Tarique and Schuler, 2010; Schuler, Jackson and Tarique, 2011; Scullion and Collings, 2011).

Koubek (2007) states that the number of talented individuals in the population is rather limited. Therefore, for the sake of the companies' own competitiveness, they should try to recruit and make the best use of these limited resources using the most efficient tools available. Companies should not forget they have to take care for their talented employees, develop their potential and try to keep them in the company (Horváthová, 2010). In a 2007 report, the Boston Consulting Group pointed out that talent management was one of the key challenges facing the HR profession in the near future.

2. Literature review

When taking the talent management from the global point of view, it can be seen as a human resource practice aimed at balancing multidirectional labor market forces, employee needs and economic interests (Mellahi and Collings, 2010). Generally speaking, talent management consists of five consecutive steps. Forman (2005) states that the talent management process is

cyclical, not linear. The cycle does not only affect talents, but also stimulates greater employee engagement. The phases that make up the cycle consist of the following activities: talent planning; talent acquisition; talent development; talent deployment; talent retention and evaluation. Engagement of employees is a good tool to help any company to gain a competitive advantage over others because human capital is the company's most valuable asset. Therefore, the development and cultivation of these assets makes logical sense. In general, committed employees are perceived as deeply involved in their work and enthusiastic about it. The condition for the effective functioning of talent management in the company is the support of the company's management and the business strategy of the company. The practical tools of talent management are individual processes of talent management – acquisition, development and keeping of talent. Talent management should not only target individuals with high potential, e.g. preferably managers in top management positions. A broader approach is needed to identify talents and key employee segments across the entire hierarchy of an organization. Likewise, talent management, as stated by Koubek (2007), should not only focus on talent – individuals, but also on the optimal integration of talented people into teams and, for a synergistic effect, developing talent of the whole team (Bertová, Coculová and Svetozárovová, 2014).

When we talk about all the above phases or steps, there is an essential aspect that unites them all – company's culture. Organizational culture affects processes, tactics, and management mantras. Therefore, the talent management shall be understood as a strategy that is tailored to fit the company's culture, mission and values. The term 'talent pool' is often mentioned with regard to the above. Talent management aims at managing the talent pool and develops career paths for the best talents in the company. This may include career planning,

development programs and a range of other feasible strategies for high-potential and / or high-performance employees as the company deems appropriate (Cappelli, 2009).

According to Cannon and McGee (2007), there are several reasons for the need to address the issue of human resources, especially talented individuals, who greatly affect the performance and especially the competitiveness of the company. These are the continuous growth of specialization in all disciplines associated with a sharp increase in knowledge, the need for continuous innovation, research and development, limited flexibility of companies to train unskilled employees and the related search for talented and skilled employees on the labor market – headhunting), ever less flexibility of the workforce (because of multi-career families, seeking a better work-life balance, growing demands for requirements that should be met by ideal work and the like).

By definition, talent management aims to support and maintain a talent pool that has required skills (Lewis and Heckman, 2006). Talent audits are needed to recruit and keep a given category of employees (Botha, Bussin, and De Swardt, 2011). Talent audit benefits both the company and its employees, not only by developing internal staff through continuous training for the benefit of the company, but also by enabling employees to grow and move on to more challenging tasks. When performing talent audits, the company can act more flexibly to keep talents (McCartney and Garrow, 2007). An integral and very important part of talent management are activities that ensure the maintenance and stabilization of talented individuals in the company. The goal is to ensure that talented employees remain in the company as committed members of the team committed to their work, thus preventing their departure, as that would have an extraordinary and disproportionate impact on the company.

Talent management helps bring talented employees challenging tasks and incite inside them the feeling of responsibility and belonging. Given the changing nature of the workforce and the routine or sedentary nature of some tasks, companies also need to focus on workplace flexibility and role flexibility, giving employees room to adjust their tasks according to their expertise and interests. The following activities or initiatives resulting from talent management best practices:

- ☐ Performance management through the feedback process, both positive and negative, as well as recognition when justified (Otley, 1999) gives employees room for improvement and motivation to continue in their performance.
- ☐ In addition to performance management, remuneration strategies are also tools for effective talent management. The employee who feels rewarded fairly, whether financially or otherwise, will continue to deliver results and feel satisfied with their work.
- ☐ Talent training and development programs keep employees' skills at the required level. Maintaining the spirit of learning automatically improves the skills and abilities of employees. In addition, it provides training and development opportunities for personal growth of employees.
- ☐ Career management and planning, including succession planning.

The level of employee involvement therefore affects employees' decisions to stay in or leave the company. Due to the involvement, companies must strive to develop the relationship between the employer and the employee based on which the employee would feel welcomed and needed. Human resources experts can influence who decides to leave the company and who stays through talent management tools. Employee retention and challenges of employing employees are related to the employee's perception of the entire work experience and the way they are treated by the organization. It

should be remembered that there will always be employees who are unwilling to accept any commitments. The company must know which employees or groups of employees to focus their efforts on. Loss of talented employees is detrimental to the company's performance and future success. Talented employees leave the organization for countless reasons, but mainly because they are not motivated and sufficiently satisfied with their work (Coff, 1997). The importance of employee retention can be explored through the Resource Based Theory of Competitive Advantage (Barney, 1986, 1991, 1997). Resource-based theory suggests that companies have "bundles" of resources that lead to competitive advantages. The more unique and difficult to replicate this bundle of resources is, the stronger its competitive advantage (Shrader, Blackburn and Iles, 1997). Human resources, such as talented employees, are among the hardest to imitate and are key to a competitive advantage (Singh, Terjesen and Vinnicombe, 2008).

If the company has employees who are specialized and competent, the company can benefit from their increasing performance. On the part of the company, it is important to pay adequate attention to such employees and to strengthen the emotional bond between the company and talented employees. When pressure comes, these emotional handcuffs are designed to ensure that employees "don't jump out of the boat" (Hewitt, 2011). One study confirmed that there is a positive relationship between employee engagement and the psychological impact the company has on them (Kahn, 1990). When employees get the sense of security from their employers, they tend to be more involved in the workplace. Therefore, focusing on these things has now become a necessity. This sense of security can be provided to employees by establishing deep emotional and intellectual ties with them, thus guaranteeing the desired behavior and loyalty in return (Gibbons, 2006).

3. Methodology

In order to ascertain the situation with the talent management in the conditions of Slovak companies, the research addressing this issue was carried out in the period March-May 2019. The aim of the research was to find statistically significant connections between selected talent management practices and the degree of employee's conviction to stay in the company. The research focuses on three selected practices that make up the talent management (according to the study of Hafez, AbouelNeel and Elsaid, 2017):

- ☐ Motivation to give extraordinary performance.
- ☐ Training and development.
- ☐ Job enrichment.

Talent management practices are independent variables and were measured through the Likert scale, where value 1 expressed strong disagreement and value 5 strong agreement with the practice in the company. The degree of conviction to stay in the given company as a dependent variable was measured by a 5-point scale, where a value of 1 expressed a weak conviction and value 5 a strong conviction to stay in the company. The research sample consisted of 140 respondents, i.e. talented employees working in various companies around Slovakia. In order to address talented employees, cooperation with HR personnel of individual companies was necessary. HR departments distributed the questionnaires to their key employees, i.e. those they consider talented. Data collection was performed using a standardized questionnaire. The questionnaire also included identification questions that made it possible to describe the research sample of talented employees in terms of age and experience in the field, which is shown in Figure 1 and 2. To fulfill the stated goal, 3 statistical hypotheses were tested using the correlation analysis method.

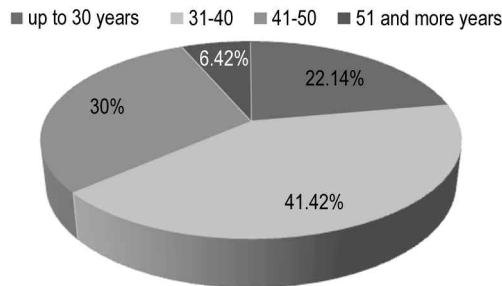


Figure 1 Composition of the research sample in terms of age

The composition of the research sample in terms of age points to the fact that the largest group of talented employees is people aged 31-40, i.e. employees who are young, more open to new challenges and are more flexible in adapting to new requirements and who have already had some work experience.

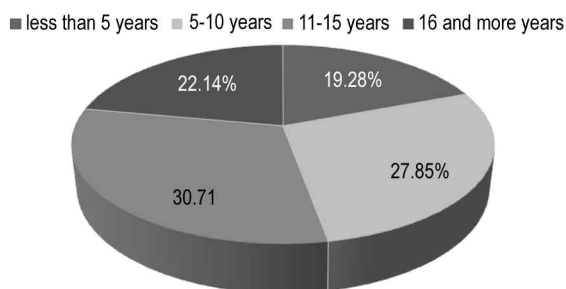


Figure 2. Composition of the research sample in terms of work experience

In terms of work experience, the most talented employees have 11-15 years of experience, while a slightly lower number has 5-10 years of experience.

4. Results and discussion

One of the prerequisites for retaining talent in the company is to implement certain talent management practices, which include incentives for extraordinary performance, education and development and job enrichment (according to a study by Hafez, AbouelNeel and Elsaid, 2017). The first variable examined was the motivation to give extraordinary performance. It is very important for the company not only to recruit a talented employee, but at the same time to create adequate conditions for his/ her best performance. Therefore, the company must use various incentives to motivate employees to give their best performance. It can be assumed that if the employee is not sufficiently motivated, he / she will not make any extra effort in performing his / her duties. Likewise, if the employee feels that extraordinary efforts are not sufficiently appreciated, he / she might develop a thought of leaving the company. For this reason, proper motivation is a very important factor in retaining employees.

H1: We assume a statistically significant relationship between the degree of motivation to give extraordinary performance and the degree of conviction for staying in the company.

		Degree of motivation for extra performance
The degree of conviction for staying in the company	ro	.430
	p	.000
	n	140

Table 1. Testing H1

(Source: results of IBM-SPSS-Statistics-20)

Table 1 shows that the value of the Pearson correlation coefficient is 0.43, which is a moderate dependency in terms of interpretation of the relationship. The statistical significance of p is 0.000, indicating that the hypothesis H1 has been confirmed and there is a moderate dependence between the degree of motivation to give extraordinary performance and the degree of conviction for staying in the company. Compared to the study conducted by Hafez, AbouelNeel and Elsaid (2017) this hypothesis was not confirmed in their research sample (Egyptian employees).

The second independent variable examined is education and development. Respondents were to assess the level of satisfaction with the educational and development opportunities provided by the company. Talented employees also want to develop their skills and abilities and do not want to stagnate. Therefore, it is essential that the company has a training strategy focused on the needs of talented employees, the possibilities of developing their strengths, improving individual performance and individual competencies, strengthening their motivation and enabling their career development. For talented employees, a special development program should be developed and implemented in close cooperation with their managers, for example a comprehensive program for a precisely specified group of talents. This program should be an extension of the standard training offer that talented employees should normally receive from line management and human resources management.

H2: We assume a statistically significant relationship between the degree of satisfaction with education and development, and the degree of conviction to stay in the company.

		Level of satisfaction with education and development opportunities
The degree of conviction for staying in the company	ro	.397
	p	.001
	n	140

Table 2. Testing H2

(Source: results of IBM-SPSS-Statistics-20)

The value of the Pearson correlation coefficient in this case is 0.397. In terms of interpretation of the context, this can be considered a positive relationship with medium dependence. The statistical significance of p in this case is 0.001. It follows that the hypothesis has been confirmed and there is a statistically significant correlation between the possibility of education and development and the conviction to remain in the company. If the company creates the conditions for the development of talented employees and invests in education, the talented employees will have a greater degree of responsibility towards the employer and at the same time a higher sense of loyalty, which leads to their stay in the company.

Job enrichment is another independent variable examined that was expected to have an impact on the retention of a talented employees in the company. The job enrichment concept has become an essential management tool for improving employee motivation. If the employer gives employees tasks in order to make their work more interesting, meaningful and at the same time intensify their sense of responsibility, we talk about job enrichment. The purpose of job enrichment is to motivate employees by adding to their duties a greater diversity. Due to rapid environmental change and increasing levels of competitive rivalry, companies are beginning to shift from traditional ideological orientation – that is seeing money as the biggest motivational factor – to a direction where employees value their work, have more control over their work planning and make decisions themselves how the work should be done (Choudhary, 2016).

H3: We assume a statistically significant relationship between job enrichment and degree of conviction for staying in the company.

		Job enrichment
The degree of conviction for staying in the company	ro	.235
	p	.050
	n	140

Table 3. Testing H3

(Source: results of IBM-SPSS-Statistics-20)

The value of the Pearson correlation coefficient in this case is 0.235, which in terms of interpretation of the relationship means a positive relationship with a weak dependence. In terms of statistical significance, the p-value is 0.05. On this basis, it can be concluded that the hypothesis H3 was not confirmed and thus not accepted.

5. Conclusion

Talent management represents a relatively new area of research, even though companies have always had their "key staff", practices and procedures. It should be also noted that these were not narrowly targeted to the category of talented staff. Given that many companies are more often aware that high-quality human resources are a prerequisite for success, more attention is being paid to talent management. The aim of the paper was to analyze the field of talent management in Slovak companies. In that respect the research has been carried out to verify statistically significant connections between selected talent management practices and the conviction of employees to stay in the company. Given that there are several talent management practices, three practices have been selected (the same as those selected by the authors Hafez, AbouelNeel and Elsaid (2017)) thus allowing us to compare results with that from Egypt. The results of the research carried out under the conditions of the Slovak Republic have shown that the most talented workers are people aged 31-40 and those with 11-15 years of experience. Concerning the correlations of selected talent management practices and conviction of employees to stay in the company, our hypotheses were confirmed in 2 cases, namely in the case of the motivation to give extraordinary performance and the education and development. Based on the correlation, it can be confirmed that the more Slovak employers motivate their employees to high performance, the greater their commitment to remain in the company. This assumption has not been confirmed in the case of studies carried out in Egyptian companies. Furthermore, it has been found that if companies create better opportunities for the education and development of talented employees, the tendency of the employee to consider leaving the employer is much lower. It is therefore clear that these two practices play a very important role in both the development and the retention of talented employees. It should be in the interest of the company to pay due attention to these practices, as talented employees are of particular interest in the labor market. Therefore, talented employees can choose in which company they want to work and build their career. By investing resources and time in talented employees, the company is also investing in its future.

Acknowledgement

The paper has been elaborated within Slovak Grant Agency under Grant KEGA 012PU-4/2019.

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Quality Management Optimisation of Job Distribution for Multi-Stage Production with Unequal Servers

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Abstract

The paper discusses the study of multi-stage production with several service areas in order to further optimise the quality of the management of the distribution of jobs.

Modelling is carried out and methods of solving the discrete optimisation problem are proposed. As a result of modelling and optimisation of a production system with several areas, a mathematical model of a production system with several workshops was constructed, considering the multiplicity of routes of the incoming flow of jobs for servicing.

It is shown that the equality of the probabilities of the full loading of areas between themselves is a necessary and sufficient condition for balanced loading of a production system with several areas.

Keywords: multi-stage production; distribution of jobs; quality management; multiplicity of routes.

1. Introduction

The paper discusses the study of multi-stage production with several service areas in order to further optimise the management of the distribution of jobs.

2. Formulation of the optimisation problem

Let us consider a multi-stage production with several areas (processing centres), to the input of which arrives a deterministic or random flow of jobs with a strict decision path [1, 2]. The purpose of the study is to construct a mathematical model of multi-stage production with several areas and the subsequent optimisation of the quality management of the distribution of jobs. As a criterion for optimisation, we take the achievement of balanced loading of the system [3, 4]. This is due to the fact that we do not know a priori what type of jobs will arrive for service at any particular point in time. Therefore, the more balanced the production load, the greater the reserve of its productivity. The appearance of new types of services should also be considered [1]. Since we cannot predict what production resources will be used to solve

them, a balanced productivity reserve for each resource seems rational. In total, there are several sources of jobs [5]. Each area consists of several service zones that are identical in function and is intended for specific service operations. For specificity, let the production system consist of N areas and J sources of jobs. Let us consider the operation of such a production system [1] (Figure 1).

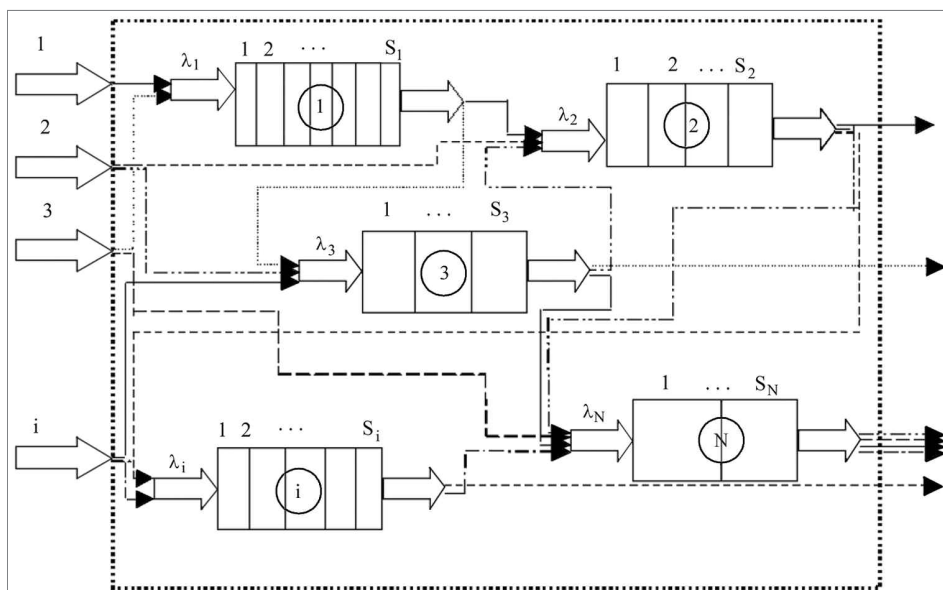


Figure 1. Standard structure of the production system

An analysis of this system allows us to specify the service demand in one (i -th) area ($i=1, \dots, n$) for the j -th source of jobs ($j=1, \dots, J$) and determine the intensity of the flow of jobs. With non-priority service, the total demand for the i -th service [6]

$$\lambda_i = \sum_{j=1}^J \lambda_{ij}, i=1, \dots, n, \quad (1)$$

where λ_{ij} is the intensity of the flow of jobs for the i -th area from the j -th source. Then each area can be visualised as a queueing system. Here, each i -th area has the form shown in Figure 2.

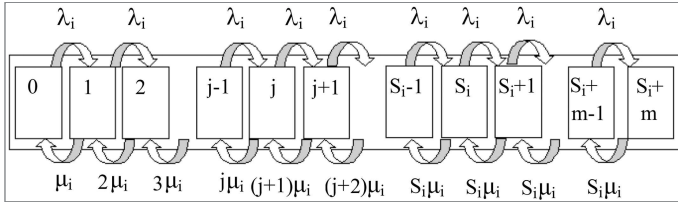


Figure. 2. The operation of the i -th area as a queueing system

If we consider each area as a multi-channel QS [7], then its characteristics are:

- Intensity of the arrival of jobs for service to the specified area λ_i , $i=1, \dots, n$.
- Area performance for the i -th type of jobs μ_i , $i=1, \dots, n$;
- The number of functionally identical service zones of the i -th workshop S_i , $i=1, \dots, n$, $S_i > 1$.

Then for each type of repair we obtain a multi-channel QS, the number of places in the queue of which is unlimited. For this QS, the following occupation probability formulas for each individual channel are valid [8, 9]:

$$P_{ki} = \frac{P(k, \alpha_i)}{R(S_i, \alpha_i) + P(S_i, \alpha_i) \beta_i \frac{1 - \beta_i^m}{1 - \beta_i}} \quad (2)$$

Here P_{ki} is the k -th channel occupancy probability for the i -th QS,

$$\begin{aligned} \alpha_i &= \frac{\lambda_i}{\mu_i}, \\ \beta_i &= \frac{\lambda_i}{S_i \mu_i}, \\ P(k, \alpha_i) &= \frac{\alpha_i^k}{k!}, \\ R(S_i, \alpha_i) &= \sum_{j=0}^{S_i} \frac{\alpha_i^j}{j!} \end{aligned}$$

Here m is the number of places in the queue. If the number of places in the queue is not limited, then $\beta_i^m \rightarrow 0$. Then for the i -th type of service we shall have the following waiting probability:

$$P_{0i} = \frac{1}{\frac{\alpha_i^{S_i+1}}{S_i! (S_i - \alpha_i)} + \sum_{k=0}^{S_i} \frac{\alpha_i^k}{k!}},$$

and the probability of a full load

$$\begin{aligned} P_i &= 1 - \sum_{k=0}^{S_i-1} P_k = 1 - P_{0i} R(S_i - 1, \alpha_i) = P_{0i} \left(\frac{1}{P_{0i}} - R(S_i - 1, \alpha_i) \right) = \\ &= P_{0i} \left(\sum_{k=0}^{S_i} \frac{\alpha_i^k}{k!} + \frac{\alpha_i^{S_i+1}}{S_i! (S_i - \alpha_i)} - \sum_{k=0}^{S_i-1} \frac{\alpha_i^k}{k!} \right) = P_{0i} \left(\frac{\alpha_i^{S_i}}{S_i!} + \frac{\alpha_i^{S_i+1}}{S_i! (S_i - \alpha_i)} \right) = \\ &= P_{0i} \frac{\alpha_i^{S_i}}{S_i! (S_i - \alpha_i)} (S_i - \alpha_i + \alpha_i) = P_{0i} \frac{\alpha_i^{S_i}}{(S_i - 1)! (S_i - \alpha_i)} = \\ &= \frac{1}{\frac{\alpha_i^{S_i+1}}{S_i! (S_i - \alpha_i)} + \sum_{k=0}^{S_i} \frac{\alpha_i^k}{k!}} \cdot \frac{\alpha_i^{S_i}}{(S_i - 1)! (S_i - \alpha_i)} = \end{aligned}$$

$$= \frac{\alpha_i^{S_i}}{\frac{\alpha_i^{S_i+1}}{S_i! (S_i - \alpha_i)} + \sum_{k=0}^{S_i} \frac{\alpha_i^k}{k!}} = \frac{\alpha_i^{S_i} S_i}{\alpha_i^{S_i+1} + S_i! (S_i - \alpha_i) \sum_{k=0}^{S_i} \frac{\alpha_i^k}{k!}}.$$

Finally, for P_i , we obtain:

$$P_i = \frac{S_i}{\alpha_i + \frac{S_i! (S_i - \alpha_i)}{\alpha_i^{S_i}} \sum_{k=0}^{S_i} \frac{\alpha_i^k}{k!}} \quad (3)$$

Based on these expressions, it is possible to choose a rational variant that ensures the consistency of the flow of jobs, areas and units of equipment, and the type of equipment with a certain throughput [10]. In order to analyse various variants of using this production system in conditions of limited resources, we consider the following optimisation problem. As an objective function, we consider achieving balanced system loading [3]:

$$D(P) \rightarrow \min, \quad (4)$$

Here, the variance D is defined as

$$D(P) = \frac{1}{N} \sum_{i=1}^N (P_i - P_{med})^2 = \frac{1}{N} \sum_{i=1}^N P_i^2 - P_{med}^2, \quad (5)$$

where P_{med} is defined by the following formula

$$P_{med} = \frac{1}{N} \sum_{i=1}^N P_i$$

In addition to the fact that such an objective function most accurately reflects the purposes of the original problem, it is "convenient" from a mathematical point of view (that is, convenient for differentiation).

The limitations are the costs of the production process:

$$\sum_{i=1}^n c_i \mu_i S_i \leq C, \quad (6)$$

where c_i is the cost of providing service of the i -th type, C is the resources allocated per month. We must also consider the capital cost of introducing an additional item of equipment:

$$\sum_{i=1}^n c_i^{cap} \leq C^{cap},$$

where c_i^{cap} is capital cost for the i -th type of equipment; C^{cap} – resources allocated for capital expenditures.

Finally, the optimisation problem will be of the form [10]

$$\begin{aligned} D(P) &\rightarrow \min, \\ \sum_{i=1}^n c_i \mu_i S_i &\leq C, \\ \sum_{i=1}^n c_i^{cap} (S_i) &\leq C^{cap}, \\ \mu_i S_i &\geq \lambda_i, i=1, \dots, n \end{aligned} \quad (7)$$

It is necessary to find such S_i for each type of repair, for which the loading of the area would be balanced (i.e., which would afford a minimum to the objective function).

3. Methods of optimisation of the composition of production

3.1. Finding probability values that afford a minimum to the objective function

Before considering all possible techniques to solve problem (7), we analyse the objective function (5). By definition, variance is non-negative. Then, if there are points from the domain at which the variance vanishes, we can say that they afford a minimum to the objective function in the given domain (i.e., that a solution will be found). Let us find out at what probability values the variance vanishes. From formula (5) we have

$$D(P) = \frac{1}{N} \sum_{i=1}^N (P_i - \frac{1}{N} \sum_{i=1}^N P_i)^2,$$

then the variance equality to zero is equivalent to the following

equation

$$P_i = \frac{1}{N} \sum_{j=1}^N P_j, \text{ for any } i \text{ from } 1 \text{ to } n.$$

Then we can write down the following system of equations.

$$\begin{cases} P_1 = \frac{1}{N} \sum_{j=1}^N P_j \\ P_2 = \frac{1}{N} \sum_{j=1}^N P_j \\ \dots \\ P_N = \frac{1}{N} \sum_{j=1}^N P_j \end{cases}$$

Since the right sides of all equations are equal, the left sides will also coincide. This implies a sufficient condition for minimum. **The N -dimensional function $P=(P_1, \dots, P_N)$ from the domain of problem (7) will afford a minimum if the following conditions are satisfied**

$$P_1 = P_2 = \dots = P_i = \dots = P_N \text{ for all } i=1, \dots, N. \quad (8)$$

In source terms, this statement will be reformulated as follows.

A production system with N areas will be loaded evenly if the probabilities of a full load for each area coincide (i.e., the condition (8) is satisfied).

3.2. Classification of methods of solving the problem (7)

Condition (8) is sufficient for function (5) to achieve its minimum value (i.e., zero). But this does not mean that problem (7) cannot have other solutions, which are different from form (8). Let us consider possible methods of solving this problem.

- Since S_i can only be an integer, the problem described above is the problem of integer programming. Therefore, the first of the variants of solving this problem is to solve it by one of the methods of integer programming [11]. The drawback of this variant of solving the problem (7) is that all these methods somehow reduce to enumeration, which significantly slows down the search for a solution in the case of large N . Moreover, with a sufficiently strong scatter of S_i values, the number of enumerations will also increase significantly. Therefore, it is necessary to look for any other ways to solve this problem.
- Another variant of solving this problem is to solve it using the methods of Lagrange multipliers. This method is as follows [12]. Let there be the following conditional extremum problem:

$$\begin{aligned} J(u) &\rightarrow \max \\ u \in U &= \{u \in R^n \mid g_i(u) \leq 0, i=1, \dots, n\} \end{aligned} \quad (9)$$

We can write down the Lagrange function of the form

$$L(u, y) = J(u) + \sum_{i=1}^n y_i g_i(u) \quad (10)$$

and the solution (u^*, y^*) is sought from the following system of equations

$$\begin{cases} L_{u_1}(u, y) = 0 \\ L_{u_2}(u, y) = 0 \\ \dots \\ L_{u_n}(u, y) = 0 \\ y_1 g_1(u) = 0 \\ y_2 g_2(u) = 0 \\ \dots \\ y_n g_n(u) = 0 \end{cases} \quad (11)$$

In order to consider this problem as a conditional extremum problem, it is necessary to differentiate the objective function. In

particular, it is necessary to differentiate $S_i!$ and

$$\sum_{k=0}^{S_i} \frac{\alpha_i^k}{k!}$$

by the variable S_i , which cannot be done directly. Moreover, the objective function has a rather complicated form, and the problem is obtained with restrictions of types of inequalities, so it will not be entirely rational to solve it using this method. To find the minimum of the function, we use the standard method. According to the second Weierstrass theorem [13], every function, which is continuous in a bounded domain, reaches its greatest and smallest value in this domain. As we know, the function can reach its minimum (or maximum) value at extreme points or at the boundary of the domain. Then the minimum of the function can be found as follows [13].

1. Find the extreme points of the objective function.
2. Find the boundary points of the domain on which the objective function is defined.
3. Compare the value of the objective function at the extreme points and boundary points and choose the minimum value.

But, to use this method, it is necessary that the objective function be:

1. Defined for all argument values in the domain.
2. Continuous in the domain.

In this problem, the function is defined only for integer values of the arguments; therefore, the use of the classical minimum searching method in this case is impossible. Moreover, the objective function is determined by expressions that can be defined only for integers (for example, $S_i!$ or summation from 1 to S_i). Then the following approximation problem arises. It is necessary to replace the initial objective function with such a function that it is defined for all real numbers, is continuous in the domain of the objective function, and differs from the initial function as little as possible. So, we can solve the problem for the approximating function, and then approximately find the values of the initial function that would afford a minimum to problem (8).

It should be noted that far from always direct computational methods can be applied. Interesting results can be obtained using artificial neural networks [14,15].

4. Conclusion

As a result of modelling and optimisation of a production system with several areas, the following problems are formulated:

1. A mathematical model of a production system with several workshops is constructed, considering the multiplicity of routes of the incoming flow of jobs for servicing.
2. It is shown that the equality of the probabilities of the full loading of areas between themselves is a necessary and sufficient condition for balanced loading of a production system with several areas.
3. Interesting results can be obtained using artificial neural networks.

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Process Redesign to reduce Stocks of Obsolete Parts in Automotive Industry

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Abstract

The starting point of this paper represents the current problem within Supply Chain department: the stock of obsolete parts that leads to a great loss of profit and increase costs, in an automotive company.

The process of replacing obsolete references takes about 60 days, and many of the customers orders remain in past due.

This article includes a thorough analysis of the obsolete parts movement and the process of replacing old references. Input data were centralized and compared using graphics, targets have been set and performance indicators for measurement. Six Sigma improvement method was applied. The purpose of this paper is to redefine the process of replacing obsolete parts (named supersession) in order to satisfy the delivery time of the orders to the customers. Following the results, ideas for improvement were searched and a plan was proposed.

Keywords: customers; stocks, stakeholders, continuous improvements; key performance indicators; quality process; risk; control.

1. Introduction

In the last years, one may notice extended approaches regarding the efforts of organizations to understand customers' requirements in order to maintain their competitive position in the market and increasing customer satisfaction. Customer and quality orientation are demonstrated by constant evaluation of the achieved performance. According to the ISO 9001:2015 [1] and IATF 16949:2016 [2], considered as reference standards, a company with activity in production and servicing of turbochargers – automotive industry, in every region of the world and in all classes of vehicles and types of engines, has been considered as case study.

The purpose of this paper is to highlight the steps followed for the application of the Quality Management System [3 ... 13].

2. Defining the problem

At the moment, reducing the costs is perhaps one of the most important priority of the company. Following analysis performed in the Supply Chain Department, it turns out that obsolete parts stocks lead to high profit loss and increased costs. At this point the process of replacing references takes about 60 days and the customers orders risk to remain in past due (PD).

For this study case, couple of references representing turbochargers, were analyzed (PN) from 2017, 2018 and 2019 which were in process of being replaced with the new references. Stock movements were analyzed from warehouse and may be seen in Table 1.

From table 1 we can see that the 5 references add up to a

Location	Material	Quantity	Entry Date	PN	Amount (EUR)
601FR	4953593074	11	11/05/2017	819976-5015S	1726.78
601FR	4951927548	11	01/03/2018	818183-5030S	3585.45
601FR	4951928886	1	27/08/2018	818183-5030S	325.95
601FR	4959517396	2	05/12/2018	871284-5001S	528.56
601FR	4958423518	2	24/11/2018	871284-5001S	528.56
601FR	4951408233	10	08/08/2019	799171-5004S	549.4
601FR	4953119224	12	26/04/2019	798128-5006S	1748.4
601FR	4953592751	6	26/04/2019	798128-5006S	874.2
Total		55			9867.3

Table 1. The input data for stock movements

total of 55 parts left in stock with a loss of 9867.3 EUR. For the references presented above we have made a cost comparison between the remaining stocks and the quantity of parts in the past due from customers orders reported during the supersession. This comparison may be seen in Figure 1 and Figure 2.

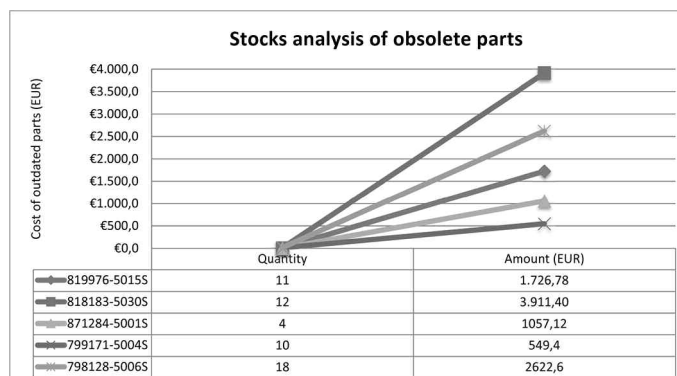


Figure 1. Stock analysis of obsolete parts

3. The objectives of the planning

The strategic objectives are defined below in Table 2. The analysis was performed on the basic indicators measured during January-June, these only changing three times a year. The indicators considered are presented in Table 3.

For reaching and exceeding, each indicator has received score 1. The minimum accumulated grade can be 8 and distribution of results in the general classification is done by colours:

- ❑ Red – if the score obtained is less than 3;
- ❑ Yellow – if the score obtained is between 3 and 5;
- ❑ Green – if the score obtained is greater than 5;

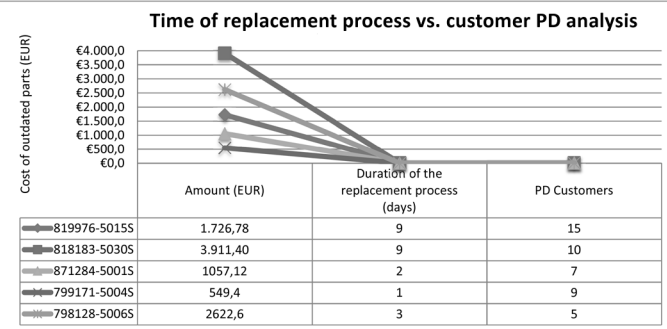


Figure 2. The duration of replacement process vs. customers PD analysis

Perspective	Strategic objectives	Indicators	Actions
Financial	Increase SC efficiency	Stock reduction 100%	Reduction of working capital
	Trying to meet costs	Reduction of logistics costs / unit: 10%	Grouping partner's capabilities
Processes	Maximum customer delivery time: 10 days	Reduced delivery time to 10 days	Optimization of the partner process
	Increased flexibility of operations	Reducing supersession from 60 to 7 days	Optimization of the partner process
Intensity of cooperation	Increased data exchange between partner providers	The number and frequency of data exchange	IT - Networking Improvement – Delivery Partners
	Increased coordination between partner providers	Number of coordination meetings required	Statistical management of stocks
Innovation and development	Increased trust and satisfaction among partner providers	Establishing indicators for trust and satisfaction	Defining common visions and guidelines
	Increasing the quality level in the company	Number of unresolved conflicts	Establishing an "arbiter" for SC

Table 2. Strategic objectives

No.	Indicators	Objective	Score
1	Cost reduction with 10%	40%	< 0 > 1
2	Reduction of logistics costs / unit with 10%	50%	< 0 > 1
3	Reduced delivery time to 10 days	11%	< 0 > 1
4	Reducing supersession from 60 to 7 days	65%	< 0 > 1
5	The number and frequency of data exchange	10 topics	< 0 > 1
6	Number of coordination meetings required	70%	< 0 > 1
7	Establishing indicators for trust and satisfaction	-	qualifying 1+5
8	Number of unresolved conflicts	-	qualifying 1+5

Table 3. The basic indicators of study

4. Analysis and measurement

The indicators monitored during four quarters (Q1, Q2, Q3, Q4) and the results may be seen in Table 4. In figures 3, 4, 5 and 6 may be seen diagrams for each quarter result.

No	Indicators	Year 2019				Total
		Q1	Q2	Q3	Q4	
1	I ₁	0	0	0	1	1
2	I ₂	1	1	0	0	2
3	I ₃	1	0	1	0	2
4	I ₄	0	1	0	1	2
5	I ₅	1	1	3	4	9
6	I ₆	1	1	0	2	4
7	I ₇	1	0	3	1	5
8	I ₈	2	4	3	4	13

Table 4. The indicators results per year

Following the KPIs monitored, we can see that the indicators I1, I2, I3 and I4 were under average, meaning that there are still nonconformities which prevent achievement of the general objective. Reducing the stocks of obsolete parts, will reduce costs as well and this will improve the delivery time of orders not slipped in time to the customers.

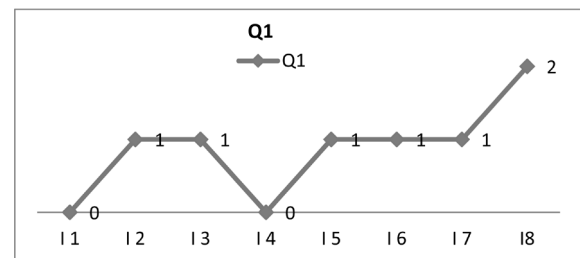


Figure 3. Results chart for Q1

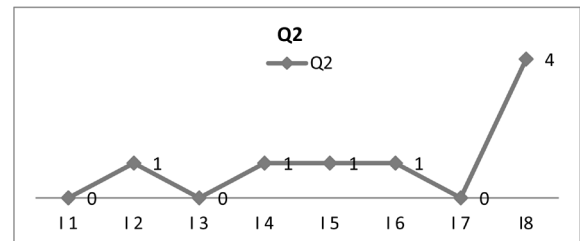


Figure 4. Results chart for Q2

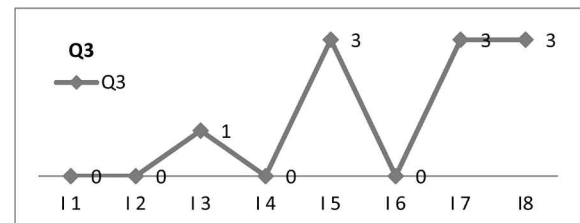


Figure 5. Results chart for Q3

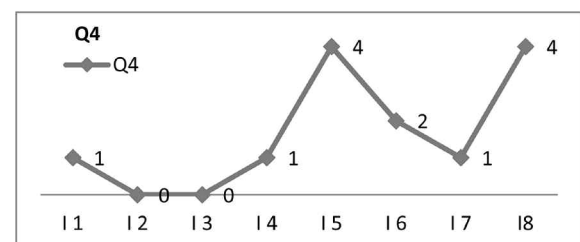


Figure 6. Results chart for Q4

5. Process improvement and sustain

The situation identified by monitoring indicators, indicates that stocks of obsolete parts and especially the process of their replacement leads to the recording of unrecoverable costs. Also, the replacement process leads to delayed delivery of customer orders.

Further, to achieve the general objective we will improve the process of replacing obsolete parts. To identify risks and combat them we will use Six Sigma improvement method defined by DMAIC and used to improve the process.

The solid basis of Six Sigma project is the map of thinking process, Tmap, shown in Table 5.

What do we know?	What don't we know?	What are the questions we have to answer?	What actions should be taken to answer the questions?	Actions	The delegate	Deadline
Stock for old PN	When will it end?	Do we have enough orders to run out the stock on old PNs?	Contact customer desk	Email to customer desk	Elena Lascu	16.05.2019
The new PN	The new PN is DSR for the old PN	Does the Engineering Department know about the change (NPI person)?	To contact the engineering and marketing department for the online register	To contact the engineering and marketing department for the online register	Elena Lascu	15.06.2019
The new PN	Is the new PN defined in the plant?	Does the customer desk know about the change?	Check in the system and inform customer desk	Email to customer desk	Elena Lascu	15.06.2019

Table 5. Tmap of thinking process

In Table 6 one may see SIPOC diagram. The process of replacing obsolete parts is presented in Figure 7. To determine the quality of the process and measure customer satisfaction, QFD method was applied in Figure 8, involving people from departments of production, marketing, sales, supply chain.

Quality House help to identify, group and interpret those critical requirements of the customers, which will satisfy the process.

From the results one may see that the process stages with the highest weight are: DSR confirmation, create PN and BOM, price adjustment, email from supplier companies and excel tracker from Vendor Scheduler (delete, create OR new).

Based on the inputs from Quality House, Pareto diagram was traced which will help in elaboration of the action plans in order to adopt the decision. Table 7 presents the values at entry level.

Suppliers	Inputs	Process	Outputs	Customers
Supply companies	Email	Updated data	Start replacement process	The updated process tracking file
The special technical supplier	Email, online catalogue	Accurate information in a timely manner	DSR confirmation	The updated process tracking file
ISC specialist	Email	PN created in SAP	The new PN created in SAP	The updated process tracking file
Lead Financial Analyst	Email	Financial vision created	Creation of financial vision in SAP for the new PN	The updated process tracking file
Quality specialist	Email	Vision of the quality created	Creation of financial vision in SAP for the new PN	The updated process tracking file
SIOP Leader	Email	Updated data in SAP	Check / adjust the system settings for the new PN	The updated process tracking file
Vendor Scheduler	Excel tracker	Orders to suppliers created in SAP	Delete SA for old PN and create SA for new PN	Placing orders to suppliers
Vendor Scheduler	Excel tracker	Stock on old PN to be checked	Check weekly if the stock on the old PN is decreasing	The decision to proceed with the replacement process
Sr Customer Support Specialist	Email	Updated prices in SAP, accurate information	Set the price for the new PN	The updated process tracking file
SIOP Leader	Email	All safety stock is moving on the new PN	Move the safety stock from the old PN to the new one	The updated process tracking file
Demand & Asset Planning	Email	All forecast is moving on the new PN	Move FCST from old PN to new one	The updated process tracking file
Customer Desk	Email	All customers orders are moving on the new PN	Move customer orders from old PN to new one	The new PN's will be available at the requested delivery dates

Table 6. SIPOC Diagram

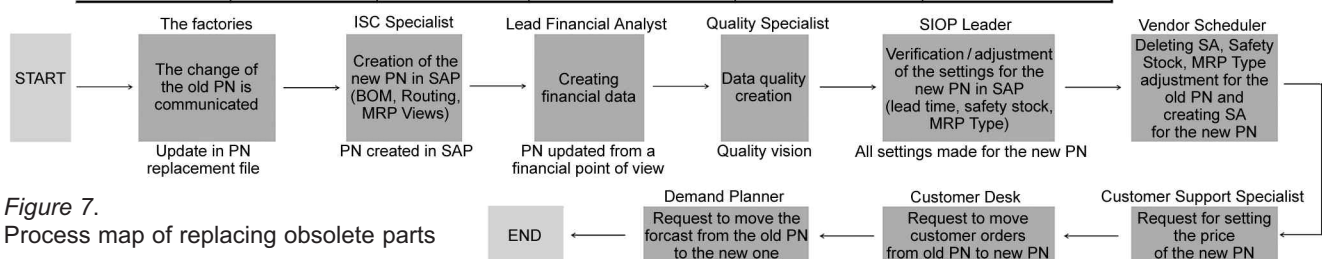


Figure 7. Process map of replacing obsolete parts

			Customer's requests															Outputs																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
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		Start PP replacement process	5	DSR Confirmation			5	Creation of the new PN in SAP			5	Creating financial data			3	Data quality creation			1	Verification / adjustment of the settings for the new PN in SAP			3	Deleting SA, Safety Stock, MRP Type adjustment for the old PN and creating SA for the new PN			3	Check if the stock for old PN is finished, weekly			5	Set price for new PN			5	SS moves from the old PN to the new PN			3	FCST moves from the old PN to the new PN			1	Move commands from the old PN to the new one			1																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
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Figure 8: Quality House

Inputs	Total value	% Total
DSR confirmation	132	13.836
Create PN and BOM	114	11.949
Price adjustment	110	11.530
Email from the supplier companies	94	9.85
Excel tracker from Vendor Scheduler (delete, create new OR)	90	9.434
Email to / from SIOP Leader	76	7.966
Excel tracker for old stock monitoring	64	6.708
Email to / from the Customer Desk	64	6.7
Email to / from Lead Financial Analyst	58	6.079
Email to / from SIOP Leader	56	5.87
Email to / from Quality Specialist	48	5.031
Email to / from Demand Planner	48	5.031

Table 7. Process activities with nonconformities

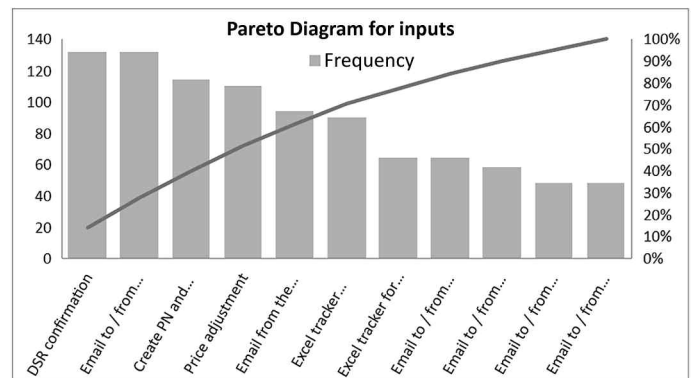


Figure 9. Pareto Diagram for inputs

Figure 9 shows Pareto diagram, where blocks represent the category and number of notifications and the curve represents the frequency of nonconformities.

It can be seen from the diagram above that prioritizing the entries, have a greater impact on the process and if we solve the first 5 types of activities in the process, associated irregularities decrease by about 80%.

Next, we will analyze these stages in the process of replacing obsolete parts with the aid of the FMEA analysis method, to be able to identify the risks that may lead to the fulfilment of the above and to combat them. FMEA method is shown in Table 8, the risk categorization in Table 9 and in the end Figure10 present the supersession process that was re-defined.

Process / Input steps	Detection mode	Risks	Sev	Potential causes	Freq.	Current control	Appearance	Aggregate coefficient	Recommended actions	Responsible	Actions taken	PSEV	PFreq	Papp.	Total
Email from the customer desk from the supply companies	The data was not received until in a timely manner	Inability to investigate and correct problems in a timely manner	7	Inefficient process / supersession is announced when the requirement is covered in the system	5	N/A	8	280	We check with the engineering department to find a common point to announce the change	Customer desk supplier, vendor scheduler, engineering department	Meeting with the Engineering Department	7	5	1	35
Look for DSR in the online catalog or email Specialist Technical Support	Data not found in the online catalog. The data was not received until in a timely manner	Inability to continue with the next steps of supersession	7	Inefficient process / manual process / lack of employees for DSR verification in the system	4	N/A	7	196	To be checked with the engineering department	Engineer	Meeting with the Engineering Department	7	4	1	28
Email to ISC Specialist for creating new PN in SAP (BOM, Routingsview)	Data not transmitted on time	Unable to continue with the next steps of supersession	7	The person involved is too busy or on vacation	4	N/A	4	112	Discussion with MD Specialist presenting the process map	Master data	Meeting with MD Specialist	7	1	1	7
Excel tracker from Vendor Scheduler (delete, create new SA)	Forget about checking the stock for the old PN in SAP	Remaining stock of E&O	8	Inefficient process / manual process / rush	5	Weekly check of tracker parts	8	320	Check tracker parts	Vendor scheduler	Parts checked weekly intracker	8	1	1	8
Email to Customer Support Specialist for price drawers of the new PN	The price for the new PN is not set	Customer cannot place orders for new PN and will stay in PastDue because of the old PN	7	Disinterestedness of the person in charge / without replacement during the vacation	5	Reminder emails, escalated until the price is established	8	280	Presentation of the procedure in cases of supersession	Customer sales specialist	Presentation of the process map	7	5	1	35

Table 8. FMEA Table

No.	Process Step	Risk	Aggregation coefficient	Negligible risk (1-70)	Tolerable risk (70-200)	Greater risk (>200)
1	Email from customer desk to the supplier companies	Inability to investigate and correct problems in a timely manner	280			X
2	Look for DSR in the online register or email Specialist Technical Support	Inability to continue with the next steps of supersession	196		X	
3	Email to ISC Specialist to create a new PN in SAP (BOM, Routingsview)	Unable to continue with the next steps of supersession	112		X	
4	Excel tracker from Vendor Scheduler (delete, create new SA)	Remaining stock of E&O	320			X
5	Email to Sr Customer Support Specialist for price drawers for the new PN	Customer cannot place orders for new PN and will stay in PastDue because of old PN	280			X
6	Email from customer desk of the supply companies	Inability to investigate and correct problems in a timely manner	280			X

Table 9. Risk categorization

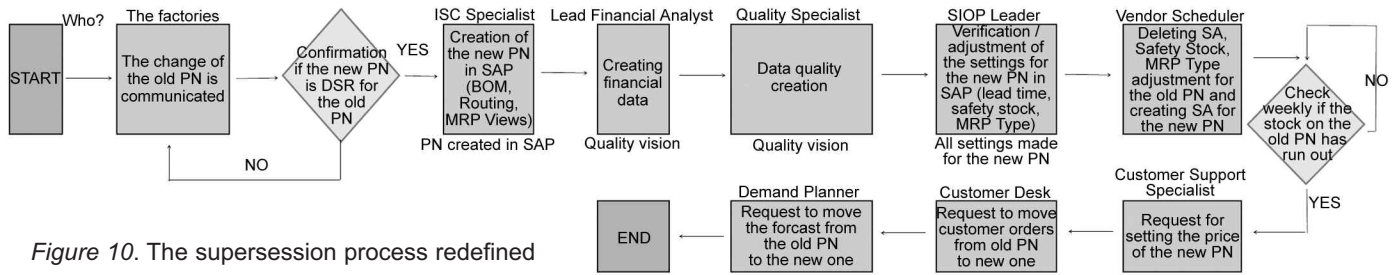


Figure 10. The supersession process redefined

Control plan - Process of replacing obsolete parts					
Process step	What to check	Frequency	Source	Actions	Responsible
Email CD from the supplier companies	Open the OP replacement process	Weekly	100%	The supplier plant to announce before the PN change in production	CS
DSR search in the online register or email to STS	DSR	Daily	100%	Presentation of the procedure to those involved in the process	VS
Email to ISC Special to create new PN in SAP	The new PN should be set up and documented in SAP	Daily	100%	All information must be clear and precise	VS
Excel tracker from VS	Old PN stock	Weekly	100%	The process is continued only if the stock on old PN is finished	VS
Email to CSS for price setting for the new PN	If the price is set	Weekly	100%	Reminder email to set the price for the new PN	Customer Desk

Table 10. Control plan for redesigned process of replacing obsolete parts

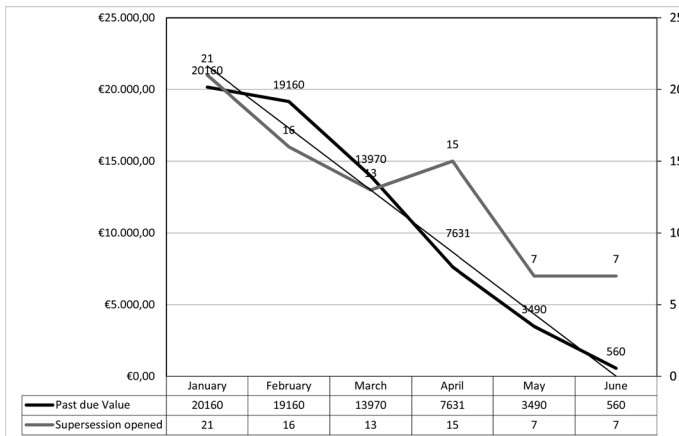


Figure 11. The results obtained before and after implementation of the improvement methods

In Figure 11, one may notice the results obtained before and after implementation of the improvement methods.

6. Comments on the results

Applying the methods of risk control, the initial state of organization changed and, in this way, changes have been made on risks previously considered to be negligible or tolerable.

In the Major Risk category, the risks were classified:

1. Excel tracker from Vendor Scheduler (delete, create new SA);
2. Email from customer desk from the supplier plants;
3. Email to Customer Support Specialist for price drawers for the new PN.

For these risks, in Table 10, the measures that will be taken were listed, too. The process of replacing obsolete parts has also been redefined by introducing verification steps such that by introducing them to be able to control the stocks available on the old parts.

Redefining the process of replacing obsolete parts has had an effect on delayed orders to customers, falling from 98 pieces in January to 1 piece in June and the value of delayed orders has been reduced from 20160 € in January to 560 € in June. From the point of view of the profit on stocks, costs for obsolete parts stocks decreased by 40500 EUR. In addition, duration of

the process has decreased from about 60 to 7 days as a result of the redefinition of the process map.

All these considerable results have been represented in Figure 11 through a diagram where the difference can be observed before redefining the process of replacing obsolete parts and after its improvement.

7. Conclusion

To have control over the process of replacing obsolete parts after applying the new changes to improve it, a control plan and working procedure were developed for the replacement of old and new parts has been revised.

One may emphasize that the most important thing to ensure customer satisfaction appears the early determination of risks in the organization's processes and their elimination before reaching customers.

The current research brings improvements to the organization through real measurements. On a large and diversified scale, the study is generally in nature and can be implemented in other units [14 ... 16].

Acknowledgement

This work has been funded by the European Social Fund from the Sectoral Operational Programme Human Capital 2014-2020, through the Financial Agreement with the title "Scholarships for entrepreneurial education among doctoral students and postdoctoral researchers (Be Antreprenor!)", Contract no. 51680/09.07.2019 - SMIS code: 124539.

Abbreviations

The following abbreviations were used during the documenting of the study:

- PN – part number
- PD – Past Due
- SC – Supply Chain
- Q1...Q4 – quarters of year
- I1...I8 – indicators
- KPI – Key Performance Indicators
- DMAIC – Define, Measure, Analyse, Improve and Control
- Tmap – Test Management Approach
- NPI – New Product Engineering
- SIPOC – Suppliers, Inputs, Process, Outputs, Customers
- QFD – Quality Function Deployment

OR – Order
ISC – integrated supply chain
SAP – integrated software platform
SIOP – Sales Inventory & Operations Plan
SA – scheduler agreement
FCST – forecast
MRP – Material requirements plan
DSR – direct service replacement
SS – safety stock
BOM – boom of materials
VS – Vendor Scheduler

CD – Customer Desk
Sev – Severity
Freq. – Frequency of occurrence
App. – Appearance
PSERV – Probability of severity
PFreqv – Probability of frequency
Papp. – Probability of appearance
MD – Master distributors
OP – Operation Plan
STS – Special Technical Support
CSS – Customer Support Specialist

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Managerial Innovations in Methodology of Solving Export-Import Activity Problems and Ensuring International Corporations Business Excellence

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Abstract

The purpose of the research is to develop a new methodological basis for identifying, analyzing and solving problems of international corporations export-import activities and to ground the directions for ensuring their business excellence. The approach originality provides introduction of a conceptual model that aims to eliminate the negative symptoms of international corporations export-import activities based on the results of comprehensive market research, effectiveness of export-import activities and calculation of the integrated indicator of business excellence. The leading corporations of Slovakia and India in the production of bi-axially oriented polypropylene (BOPP) films were the primary basis for this study. The results of the research showed the need to implement a system of managerial innovation for reasoning the directions of ensuring international corporations business excellence. This is achieved because of using logically formalized methods and provides the improvement of organizational and structural interaction of management entities in the process of solving export-import activity problems. Important factors for ensuring business excellence are also the optimization of export and import costs, as well as an increase in export revenue for Slovak companies, and an increase in market share and cost optimization for Indian companies. The practical value of the obtained results is to develop a set of managerial innovations that can improve the efficiency of export-import activities and improve international corporations business.

Keywords: managerial innovations; conceptual model; export-import activity; diagnostics; business excellence index; international corporations; logically formalized methods.

1. Introduction

Modern business of international corporations is accompanied by many problems that need to be solved urgently to ensure business excellence. Among these problems are usually misalignment between business and IT, difficulty of deriving IT goals from business goals, creating secured business PM, reengineering BPs, managing business environment and customer power (Alotaibi, Y. & Liu, F., 2017), limited use of information systems in managing business processes (Van der Aalst, W., La Rosa, M. & Santoro, F., 2016), how to adapt the approach to specific situations and to be flexible in scheduling the work (Ernst van Aken, J. & Berends, H., 2018), lack of strategic logic in the activity, implementation of ineffective strategies, insufficient level of innovation activity, neglect of crisis phenomena impact, insufficient use of strategic opportunities (Kryvovyzuk, I. & Strilchuk, R., 2016).

In modern conditions of deepening the business internationalization, the priority is the solution of dilemma between the duration and costs of finding and solving the problems of international corporations export-import activities and the attainment of business excellence. Successful implementation of export-import activities by corporations increases the level of their sales and profits in the international markets, accelerates the modernization of technologies and business processes,

allows to gain an advantage over competitors in the foreign and domestic markets. On the other hand, the risks of doing business and the costs of export-import activities are increasing. Doing business in the international market, therefore, requires the corporations to identify the global problems that accompany the development of their activity field, the efficiency of export-import activities, to establish the degree of business excellence. Such important scientific and applied tasks are achieved through continuous improvement of management activity, which should be accompanied by implementation of new tools and technologies that can facilitate the process of identifying business problems and making effective strategic decisions.

Important role in solving export-import activity problems and ensuring international corporations business excellence at the present stage of their development belongs to management methodology application that meets the requirements of a successful business and the situation that characterizes their behavior in the market. In spite of the fact that the modern scientific school of innovative management has developed a large number of methods capable to provide high efficiency of doing business on an international level, the conditions and environment in which corporations operate are constantly changing, and the methods of doing business are constantly changing too. This requires managers to develop and implement managerial innovations, new methods of researching business

results, and reasoning the directions for ensuring its excellence.

2. Literature Review

Management innovations were used to solve many problems of international corporations various activities. It is proved that limited use of innovations in managerial activity causes a decrease in competitiveness and the risk of bankruptcy of international corporations (Kryvovyazyuk, I., 2014), which requires active implementation of managerial innovations, despite the complexity of their use and implementation (Broekhof, M. & Godillot, B., 2015). In recent years, as a new method for solving business problems and innovations the method TRIZ is proposed, which is developed as a theory and a set of applied tools to support solving so-called "nonordinary" problems (Ruchti, B. & Livotov, P., 2001; Souchkov, V., 2007). Implementing the Seeking Solutions approach, which is a type of open innovation, focuses on solving complex business problems and provides: a call for problems, problem selection, problem broadcast, and a collaborative event (Deutsch, C., 2013). Using an integrated methodological approach MIM3 in the context of best practices for improving management innovation based on key provisions of strategic management, project management, innovation methods, standards for innovation management, knowledge management, and financial management (Alfaro, E., 2017), points to expediency of using a comprehensive approach dealing with business excellence. It is determined that to improve decision-making quality we should actively use management based on evidence that includes a critical assessment of organizational data, professional expertise, stakeholder values and scientific literature (Barends, E. & Rousseau, D., 2018). The active use of various methods of quantitative and qualitative research, along with the use of mixed methods (Bell, E., Bryman, A. & Harley, B., 2019; Sekaran, U. & Bougie, R., 2016) can also improve the quality of making management decisions. Management innovation creates a long-term advantage if it is based on a new management principle, it is systemic, encompassing a range of processes and methods, and it is part of an ongoing program of invention, where progress compounds over time (Hamel, G., 2006). From this perspective, method flexons is interesting, which provides a way of shaping difficult problems to reveal innovative solutions that remain hidden, because of clearer defining and structuring the problem, generating more guesses (ideas), determine the right level of analysis, making the relations between variables of a system, along with the causes and effects of decisions, more explicit, objectivity of discussing and decision making (Leclerc, O. & Moldoveanu, M., 2013).

The issue of international corporations export-import activities is also constantly in the field of scientists view. It is proved that under market competitive conditions, under the influence of globalization factors, it is very important to have reliable and detailed information about the state of foreign economic activity, where information and analytical support of assessing foreign economic activity from the positions of competitiveness on the basis of a comprehensive approach are very helpful (Zosimova, 2018) as well as analysis and control as its management functions (Knyshek, O., 2017). Using the results of controlling export-import activity is quite logical to choose the main directions of strategy implementation at the enterprise (Malyarets, L. et al., 2017). At the same time, analytical support is very important for forming the strategies of export-import activity development. It is accompanied by using multicriterial optimization method, which uses a genetic algorithm, multi-dimensional regression analysis, and a taxonomic method for calculating the integral index of development (Malyarets, L. et al., 2018). It is proved that in the modern economy, which is integrated into the world market, export and import activity takes complex forms, and its timely diagnostics has a positive impact on its economic efficiency (Kononenko, Ya., 2018). It is determined that in order to increase the efficiency of export-

import activity, attention should be paid to the dynamics of financial indicators, which characterize the profitability of activity, financial stability and business activity of the corporation (Britchenko, I. et al., 2018). In order to optimize foreign economic activity revenues for export-oriented corporations, it is advisable to use optimization models, in particular, ABC analysis (Pitel, N. & Alioshkina, L., 2016). Identifying dependencies between effective and factor traits of export-import activity development is necessary for the managers of enterprises to substantiate the choice of management decisions related to gaining competitive advantage for enterprises, which will provide them with increase of export-import activity, increase of profit, strengthening market position and financial condition. (Krasilych, I., 2017).

The works of modern scientists, devoted to the issues of using managerial innovations in international corporations activities and identifying and analyzing the problems of export-import activity, show the lack of attention to issues of ensuring their business excellence. Therefore the development of a new methodological basis for identifying, analyzing and solving the problems of international corporations export-import activities and grounding the directions for ensuring their business excellence aims to fill this gap in the system of scientific research.

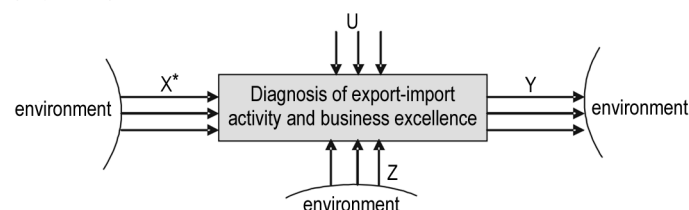
3. Methodology

The research is aimed at forming and implementing a methodology for identifying, analyzing and solving the problems of international corporations export-import activities and grounding the directions for ensuring their business excellence.

The analyzed sample consists of leading corporations of Slovakia and India in the field of BOPP films production. Increasing sample is difficult because of obstacles to access to international corporation reporting data. The research data were obtained from official reports published on the corporation websites (Terichem Tervakoski, as and Xpro India Ltd), from the reports of international organizations (UNCTADstat) and data from market research firms and consulting companies (Esticast Research & Consulting, Market Research Com, CNBC LLC). Data of the listed international organizations, consulting companies and corporations involved in the BOPP films production were auxiliary to the authors' results.

Despite the obvious use in the modern enterprises the methods of identifying, analyzing and solving the problems of international corporations export-import activities as an effective mechanism for analyzing negative phenomena and processes, and grounding the directions of ensuring their business excellence, they exist only in the form of separate components of their implementation.

We recommend a conceptual model which is aimed at eliminating the negative symptoms of international corporations export-import activities based on the results of comprehensive market research, the effectiveness of export-import activities and the calculation of business excellence integral indicator (Figure 1).



*X – input diagnostic parameters, factor signs, exogenous parameters;
Y – output diagnostic parameters, effective signs, endogenous parameters;
Z – perturbation parameters, random factors, random components;
U – parameters of business and its excellence management.

Figure 1. Conceptual model of research of international corporations export-import activity
(Source: Author's)

Where X is indicators of market dynamics and international corporations export-import activity, internal factors causing the problems of doing business, Y is a set of solutions for solving the problems of international corporations export-import activity and ensuring their business excellence, Z is sectoral obstacles to the way of business development and activity risks, and U is the results of export-import activity, efficiency and conditions of export, efficiency and conditions of import, market and competition.

Since X , Y , Z , and U will have different characteristics for different corporations, it is difficult to predict the use of a unified method for the study results, however, the general scheme of international corporations export-import activities and substantiation of the directions of ensuring their business excellent is standard.

To solve the tasks it is appropriate to use the following methods: analytical, synthesis and grouping – for comprehensive market research and identifying global problems of doing business on it; indicator, trend analysis and Pareto diagram – to determine the efficiency of international corporations export-import activities; economic comparison and taxonomic analysis – to determine the level of excellence in doing business; logic and formalized methods – to improve the organizational and structural interaction between management entities in the process of solving the problems of export-import activities.

It is proved that the systematic approach in management involves a set of measures aimed at improving management systems and improving the organizational structure of management. Therefore, one of the results of the conceptual model implementation will be improving the organizational and structural interaction between management entities in the process of solving the problems of export-import activities.

4. Results

4.1. Results of comprehensive research and analysis of global business problems in the BOPP films market

The BOPP films market is an integral part of the chemical industry. It was found that in the world chemical products exports, polypropylene film in 2018 was 6.31% (UNCTAD, 2019). In the future, the BOPP film market will grow by 5.04% to 2024 (Estic Research & Consulting, 2018), according to the growth in the food, pharmaceutical and electronics industries. Overall, it is expected to grow by \$ 20.9 billion to 2024 (Converting Quarterly, 2019).

It is determined that the volume of the chemical industry exports in the world is constantly changing. Thus, during 2013-2014, there was a slight increase in exports, and already in 2015, exports declined. However, since 2017, exports of chemical products in the world have increased. The same dynamics is in the BOPP films export, whose share in the structure of chemical products export increased by 0.05%. Imports of polypropylene film are characterized by a slight increase during 2011-2015, a decrease in imports by 0.65% in 2016 and an increase by 7.58% in 2017 (UNCTAD, 2019). Among the countries exporting and importing BOPP films are the countries with advanced economies (China, Germany, Slovakia, the USA, UK, Japan). Much more imports than exports are in the developing countries, including Latin America, the UAE, and India. The share of exports and imports of the third world countries is insignificant, while the import of the BOPP films is much higher than exports for such countries. This tendency is explained by the fact that in the third world countries there are practically no own enterprises producing BOPP films, and the existing ones provide internal needs.

It is proved that recently many manufacturers of the BOPP films focus their attention on the production of capacitor films, as the modern progressive development of such industries as electronics and machine building is favorable for corporations

producing raw materials for these industries. Among them are manufacturers of capacitor BOPP films, the demand for which increases every year.

The analysis of the situation in the world market of the BOPP films showed that among the global problems of doing business in the BOPP films market are the following:

- significant dependence of international corporations on raw materials and their quality. Raw materials for the BOPP films production are polypropylene granules. The quality of raw materials is a key indicator that determines the quality of the BOPP film itself, and therefore the possibility of its successful sale. It is also directly proportional to the income of the manufacturing company;

- rapid development of competitors. Over the last 10 years, significant development in the BOPP films market was achieved by Asian film manufacturers (FSPG HI-TECH CO, HuanYuan Plastic Film Co. Ltd, Anhui Eastern Communication Group (China), Jiangsu Shenda Group (China), Gettel Group (China), Jindal Poly Films (India), Cosmo Films (India), Xpro India Limited (India), Samyoung Chemical Co. Ltd (South Korea), Toray Advanced Film Co. Ltd (Japan). Due to cheap labor (China, India) and significant achievements in the innovative development of the BOPP films (South Korea, Japan) enterprises have succeeded in increasing their competitiveness and threatening manufacturers from Europe and South America;

- high entry barriers for new international corporations. The BOPP films market is divided between a number of large companies, that is why it is almost unavailable for new players;

- significant need for technologically appropriate equipment. The cost of such equipment reaches tens of millions of euros. It is due to the technologically complicated process of the BOPP films production;

- currency fluctuations for raw materials and finished products prices. This is especially noticeable for developing countries producers, as the growth of the exchange rate causes the growth of polypropylene cost, leading to higher prices for the final product;

- complex international logistics and the need to comply with international payment rules. The reason for this is the natural geographical location of the enterprises and the location of major transport routes. One of the popular ways to solve the problem in the BOPP films market is to establish representative offices or branches abroad to facilitate sales. Thus, much of international corporations of the BOPP films market have their offices in the world, which allows to take into account the different features of sales;

- the problem of identifying the product and reliable information about it. Due to the high level of fraud in the BOPP films market;

- differences in approaches to doing business. This problem is special for enterprises entering the Asian market.

The need to solve these problems, as well as to study the ways to overcome them, leads to an analysis of the condition and symptoms of export-import activities of the BOPP films manufacturers.

4.2. Analysis of dynamics of excellence indicators and negative symptoms of international corporations export-import activities

The modern world market of BOPP films is geographically divided into two regions: European and Arabic-Asian. Each region is represented by powerful manufacturers of BOPP films. Terichem Tervakoski, a.s. (Slovakia) is one of the largest manufacturers in the European market of BOPP films., in the Asian market – Xpro India Ltd (India), whose share of exports and raw materials imports is very high.

To identify symptoms of negative phenomena, summary indicators were selected to reflect changes in the effectiveness of investigated international corporations export-import activity (Table 1).

Indicators	Terichem Tervakoski, a.s.			Xpro India Ltd		
	2015	2016	2017	2015	2016	2017
Export revenue, EUR million	48.35	43.91	49.67	21.92	24.88	30.23
Export costs, EUR million	44.55	41.79	46.29	21.49	24.31	29.36
Gross export profit, EUR million	3.80	2.13	3.38	0.44	0.57	0.86
Overall efficiency of export	0.09	0.05	0.07	0.02	0.02	0.03
Export profitability, %	7.86	4.84	6.80	1.99	2.30	2.86
Export conditions indicator	1.03	1.05	1.04	1.06	1.05	1.07
Import conditions indicator	1.03	1.04	1.05	1.01	1.02	1.03
Import costs, EUR million	9.00	12.00	15.00	2.00	2.50	2.90
Capacitor Films Market Share, %	25.0	27.0	31.0	11.0	10.0	9.0
Market growth rate	0.921	0.990	1.061	0.921	0.990	1.061

Table 1. Excellence indicators of international corporations export-import activities
(Source: Author's)

It is proved that the dynamics excellence indicators of export-import activity is significantly higher at Xpro India Ltd compared to Terichem Tervakoski, a.s., and it resulted in a significant increase in export profit and gross export profit.

The symptoms of investigated international corporations export-import activity were analyzed by Pareto method. It is determined that the negative symptoms of Terichem Tervakoski, a.s. export-import activity is increasing the cost for import and export of the enterprise, a growth of import conditions indicator, a decrease in gross profit on exports, decreasing the overall efficiency of exports and export profitability indicator. For Xpro India Ltd the negative symptoms were decreasing the market share, increasing import and export costs, increasing import conditions indicator. Comparing Pareto diagrams based on data before and after process improvement, you can evaluate the effectiveness of taken measures. According to this method,

about 20% of all symptoms create 80% of the consequences.

4.3. Results of the research of international corporations business excellence

Assessment of business excellence of the world BOPP films manufacturers was carried out by taxonomic analysis. To form the observation matrix the evaluation criteria were chosen, which best reflect the results and environment of doing business in the international markets: the results of export-import activity, efficiency and export conditions, efficiency and import conditions, market and competition. The data given in Table 1 are taken as the estimates. Further steps of taxonomic analysis were made using a standardized methodology (Pluta, V., 1980). The final results of the research of corporates business excellence are presented in Table 2.

Year	C_{i0}	$\overline{C}_0$	S_0	C_0	d_i	Integral indicator of business excellence	Level of business excellence
Terichem Tervakoski, a.s.							
2015	0.33	0.67	0.71	2.10	0.16	0.84	high
2016	1.66				0.79	0.21	Low
2017	0.02				0.01	0.99	High
Xpro India Ltd							
2015	1.83	1.17	0.54	2.26	0.81	0.19	Low
2016	1.20				0.53	0.47	sufficient
2017	0.50				0.22	0.78	high

Table 2. Results of assessment of excellence level of international corporations business
(Source: Author's)

It was proved that Xpro India Ltd was characterized by increasing the level of business excellence throughout the period of study, which was due to the small number of negative symptoms of activities that were caused mainly by the influence of the parameters of groups X and U , and it requires to retain the priority of management decisions. For Terichem Tervakoski, a.s. there are significant differences in the levels of business excellence, which is associated with a large number of negative symptoms caused by the influence of the parameters of groups X , Z and U , and it requires a change in the priority of management decisions.

4.4. Implementation of managerial and organizational innovations system to ensure the international corporations business excellence

The modern development of international business is still far from perfect and depends on the validity of management decisions made on the results of diagnostics of its condition. It is determined that for international manufacturers of the BOPP films, the negative trends in the market leads to the separation of businesses within TNC by different product groups, as well as increasing the negative symptoms of export-import activity and increasing their influence on the level of business excellence. In particular, one of the key negative symptoms is increasing import costs, as manufacturers mainly import raw materials for the BOPP films, increasing export costs, which is greatly

influenced by the increase in overhead costs, decreasing sales volumes and market share, which is caused by the rapid development of existing competitors and new ones. The existing obstacles to business development show the need to implement a system of managerial innovations to ground the directions of ensuring international corporations business excellence:

- active implementation logically formalized methods in the practice of managerial decision making, in particular the “tree of problems” and the “tree of goals”. The main goals for achieving the strategic goal of Terichem Tervakoski, a.s. and Xpro India Ltd are to optimize the cost of export (achieved by reducing the cost of export products and reducing overhead costs), to optimize the cost of import (through the search for alternative sources of raw materials supply and reducing overhead costs), to increase profits from export (by increasing the volume production and search for new markets), to increase market share (by gaining consumer loyalty). The implementation of logically formalized methods improves the organizational and structural interaction between management entities in the process of solving the problems of export-import activities (Figure 2);

- implementing a set of measures to ensure international corporations business excellence (Table 3);

- innovative projects implementation for international corporations: for Terichem Tervakoski, a.s. is a project aimed at increasing export profits by expanding the range of the BOPP films by manufacturing capacitor films for lithium-ion batteries; for Xpro India Ltd is a project aimed at reducing the cost of

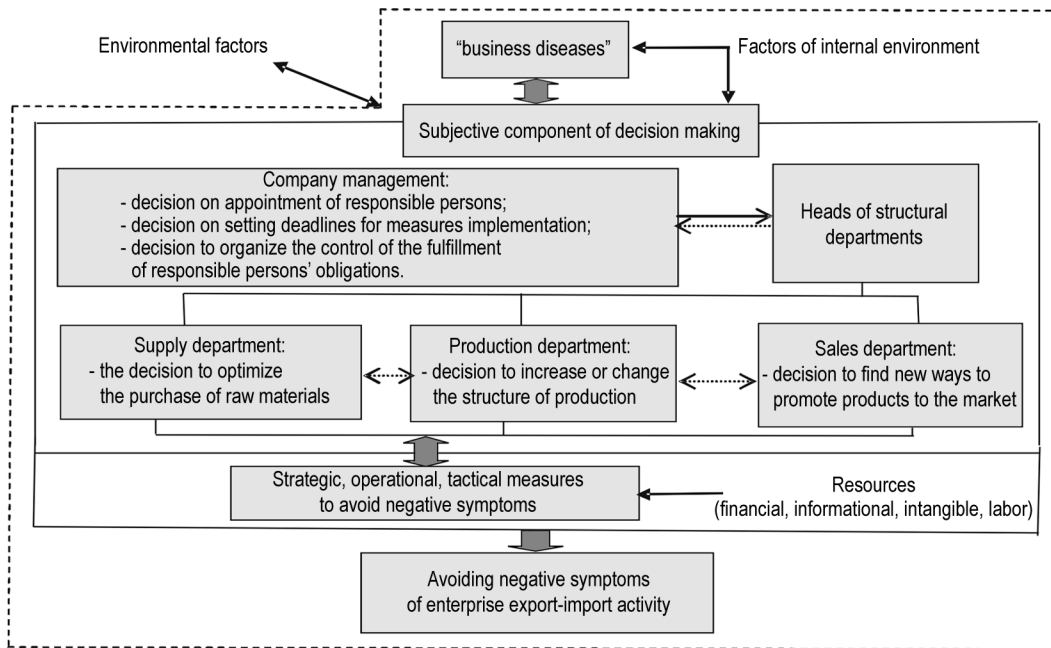


Figure 2. Organizational and structural interaction between management entities in the process of solving export-import activity problems
(Source: Author's)

Terichem Tervakoski, a.s.	Xpro India Ltd
<i>Reducing the costs of export</i>	
- improving the organization of production and labor.	- implementation of the "just in time" system.
- development of new workshops, production units and productions.	- change in the structure of production.
<i>Reduction of the overhead costs by exporting company</i>	
- review the terms of supply according to Incoterms 2010.	
<i>Reduction of the overhead costs by importing company</i>	<i>Reduction of the cost of raw material import</i>
- review of contracts with suppliers in the raw material pricing sector.	- reduction of BOPP film waste in the production process.
- independent production of necessary materials.	- purchasing materials together with other buyers from one supplier
- implementation of resource-saving technologies.	
<i>Increase in production</i>	<i>Winning consumer loyalty</i>
- purchase of additional pieces of equipment.	- sales promotion due to lower prices.
- expansion of the range of BOPP films.	- investment in improving product quality.
<i>Search for new markets</i>	- forming a strong brand.
- access to the North American market of BOPP films and expansion of cooperation with General Electric.	

Table 3. A set of measures to ensure international corporations business excellence
(Source: Author's)

import and export through the creation of non-defective manufacturing by recycling the BOPP films waste into polypropylene.

Implementation of management innovation system will optimize export and import costs, will increase export profit and market share for international corporations.

5. Conclusion

Thus, managerial innovations are an important basis for solving many problems for international business entities. In the conditions of competition aggravation for the markets of raw materials and sales of products, the value of managerial innovations increases to solve the problems of export-import activity. The use of the conceptual model of research of international corporations export-import activity represents the necessary methodology of identifying, analyzing and solving the problems of international corporations export-import activity and grounding the directions of ensuring their business excellence. Comprehensive market research reveals global problems of doing business in the international economic environment. The analysis of the efficiency of international corporations export-import activities is the basis for revealing the dynamics of its indicators changes and the negative symptoms of export-import activities. Determining the level of excellence in doing business by taxonomy methods outlines the reserves for improving the

efficiency of export-import activities. The most important result of using this model is the development of managerial and organizational innovations system to ensure the international corporations business excellence. During the process of development and decision-making this is achieved through the use of logically formalized methods, economic and organizational measures development and innovative projects implementation in the practice of managing international corporations.

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Risk-Oriented Approach to Constant Improvement Processes at QMS Enterprises in Gas Distribution System

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Abstract

The article is devoted to the issues of implementing the concept of continuous improvement of activities within the framework of the quality management system of gas distribution enterprises through the introduction of innovations using a risk-based approach to management. The authors propose a methodological approach to monitoring the environment of the enterprise and also the authors suggest classification of the environmental and internal factors into two integrated categories – PREREQUISITES and OBSTACLES, adapted for implementation in gas distribution enterprises, taking into account the strategic aspect of planning the processes of continuous improvement of the QMS taking into account the requirements of GOST RISO 9001-2015.

Keywords: quality management system; innovation; continuous improvement; principles of quality management; strategic planning.

1. Introduction

Gas distribution enterprises are the part of fuel and energy complex of the country; it plays a leading role in Russian economy for many years. These gas distribution organizations (GDO) should solve a number of problems in order to be effective: reliable and safe transporting of gas to the consumers – when tariffs for this service are not allowed to rise; large scale modernization of gas distribution chains; maintenance of competitiveness of natural gas in comparison with alternative sources of fuel. The solution of such versatile tasks is possible only within the long-term program of development which cannot be developed and carry out effectively without rational use of modern tools of quality management. Especially important aspect of activity within quality management in modern business conditions began to play risk-focused approach to management. It is especially relevant to use strategic approach in financing planning of companies' innovative development. The demand of a risk management constantly increases in modern economy – it is confirmed not only by noticeable increase in scientific research of risk problems, intensity of contacts of economic entities with consultants and insurers, but also by growth of orders for development of risk management systems from the enterprises of various industries.

At the same time, today a great number of theoretical and

applied problems of risk management which are especially important for the large, integrated corporations implementing the strategy of the innovative development, have not found the solution yet [1].

2. A risk-based approach to the process of continuous improvement of activities within the quality management system

One more important aspect of the gas distribution enterprises activity which is also connected with implementation of the current version requirements of the GOST RISO 9001-2015 standard – implementation of continuous improvements – became the mandatory requirement of the standard now: “the organization has to define and choose opportunities for improvement and carry out necessary actions for implementation of consumers requirements and increase their satisfaction”[2]. Within the quality management system (QMS) the enterprises have to carry out continuous improvements, therefore the problem of effective innovative investment activities within the process of constant improvement is especially relevant today. Strategic aspect of innovative activity should also conform to new requirements of the ISO standard and industry standards on a quality management system of the organizations. Need of

risk and opportunities management, according to requirements of QMS, defines need of carrying out the complex analysis of the factors of external and internal environment influencing the enterprise activity, including cost efficiency and payback periods of innovative projects [3]. However, at present, the management of companies does not pay enough attention to the analysis of the innovation impact on various external risks and specialists of the companies lack the skills and practical experience of using the internal environment of functioning, in addition to the relevant analytical tools. At the same time, the transformation processes of the gas distribution system in a highly turbulent environment can provoke the emergence of significant risks of investing in innovation, which will result in a significant reduction in the effectiveness of innovative measures in gas distribution organizations. In this regard, within the framework of the functioning of the QMS in the development of a strategy aimed at continuous improvement of activities, including the emphasis on innovation and investment aspect – the need to make a comprehensive risk analysis arises [4].

A detailed analysis of the risk-management terminology and the use of these categories within the QMS functioning is presented in the article by Popova L. F., who, following the developers of the ISO standard, argues that risk management contributes to the achievement of planned results and the prevention of undesirable ones [5]. Moreover, the standard does not contain specific requirements for the organization of the risk-management process. In our study, we tried to combine two important aspects of GDO activities implemented within the framework of the QMS – risk management and implementation of continuous improvements.

3. Classification and monitoring of the external and internal environment factors of the enterprise

In accordance with the requirements of GOST R ISO 9001-2015 (p. 4.1-4.2), it is necessary to identify risks related to external and internal factors, as well as external and internal stakeholders within the framework of the risk-oriented approach to management. Determining the factors of external and internal environment in relation to continuous improvements, in the implementation of innovation, we offer to **classify** the factors affecting innovation and investment activities, innovative prerequisites and obstacles – for a detailed analysis of innovative risks and opportunities. Offering this system of classification, we rely on the classical models available in scientific economic literature and similar approaches of modern scientists.

The classical approach to the systematization of environmental factors is used in the models of SWOT and PEST analysis. In this case, the groups of factors are combined together according to their functional purpose, and in each group there may be factors that have both positive and negative effects.

Focusing on the analysis of certain activity aspects E. F. Nikitskaya systematized innovative problems depending on their impact on the maintenance of a certain level of innovative development in Russia; she identified global innovative challenges, innovative threats and innovative barriers [6]. In the author's interpretation, challenges determine the inevitability of innovation, threats create destructive trends in the external environment associated with the innovation sphere, and barriers are interpreted as acute problems that create real obstacles to the launch of innovation and investment mechanisms. However, the author notes that sometimes there is no clear line between challenges and innovative threats or threats and barriers. Besides, E. F. Nikitskaya considered mainly global, i.e. external to the object of study problems.

In general, any attempt to systematize the factors and their analysis is associated with some difficulties, such as: ambiguity of interpretation, which means different understanding by experts of the macro environment nature, the boundaries of its

field of activity; short-term orientation, which means the reducing of the financing of strategic analytical research because of economic difficulties; misunderstanding by senior management of the value of the analysis; the complexity to encourage line managers to participate in the analysis and use its results; resistance to changes in forecasting methods; diversification of organizations, which means their work in several related fields, in several areas, that complicates expert estimations in dynamics of various macro-environments [7].

For better understanding of the existing opportunities, problems and risks of innovation and investment development of GDO, we propose to systematize them by identifying two poles (or directions) of influence: positive (PREREQUISITES) and negative (OBSTACLES), each of which has an internal and external review area depending on the scope of their impact on innovation and investment industries development.

A group of factors that fall into the category of PREREQUISITES are events that have a positive impact on the development of the gas distribution industry, determining the possibilities of innovation and investment activities. The category of OBSTACLES combines factors that have a negative impact on the industry, indicates the risks of innovation and investment activities.

4. Monitoring factors of the external and internal environment of the enterprise

On the basis of the proposed classification, we have developed a system of monitoring and assessing the impact of environmental factors and the internal state of the enterprise, determining the opportunities and risks of innovation and investment activities of the regional gas distribution enterprise – the procedure of PO monitoring. Under the monitoring of external and internal environmental factors, we mean a set of measures: collection/registration, storage and analysis of information affecting the object from the external environment or characterizing the internal state of the object, as well as the subsequent judgment on the behavior/state of the object at a given time and the forecast of its future behavior. The logic of the structural organization of this complex process is reflected in the developed by the author simulation model of PO-monitoring. Its simulation character is determined by the possibility of studying systems based on the construction of models that describe the real system with sufficient accuracy.

The abbreviation PO indicates the name of the investigated poles – PREREQUISITES and OBSTACLES. The structural and logical sequence of actions during PO monitoring is shown in figure 1.

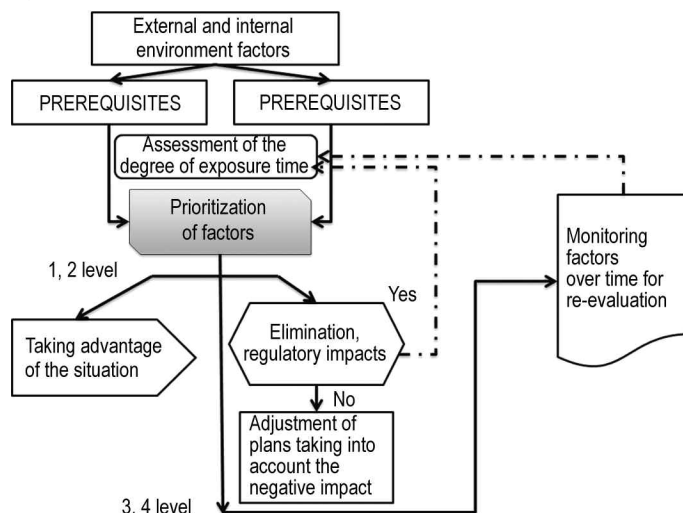


Figure 1. PO-monitoring model of risk factors of innovation and investment activity of GDO in the framework of QMS improvement processes

Pole	Impact sphere	Content of the factor (events)	Aftermath	Predicted result
prerequisites +	External	1. State strategy of science and innovation development	Control and support from the state to the enterprises which are carrying out innovative activity in the sphere of target programs	Possible increase in technological innovative developments for application in gas distribution
		2. Increase in requirements of the state to ensuring with owners safe use and maintenance of IHGE (in-house gas equipment)	Growth of volume of rendering services and need of GDO for increase in labor productivity and hi-tech tools and equipment	Purchase and introduction of modern equipment and tools
		3. Toughening of requirements of the state to environmental protection	Growth of need for use of modern technologies and materials	Introduction of innovative technologies, equipment and materials
		4. Fast development of scientific and technical progress and information technologies	Presenting in special literature, media, at exhibitions the results of scientific researches, promotion of their effective operation on GDO objects	Probability of application of innovative technology solutions at reconstruction and updating of fixed assets increases. Requirement to find investments sources on their introduction is formed
		5. Trend to develop alternative types of fuel	Creates potential risk to lose amounts of works and income as a result of transition of consumers to alternative energy sources	Activation of search, development and implementation of perspective technologies and non-standard decisions for ensuring significant competitive advantages, namely decrease in cost of service
	Internal	6. Operation of dangerous production objects and legislatively established regulations, requirements, norms	Requirement is formed to find resources in order to ensure safe and reliable operation of gas supply facilities without growth of prime cost	Development and deployment of automated control systems programs (telemechanics, telemetry) for technological processes, improvement of a dispatching management system
		7. Wear (amortization) of fixed assets for 30–50%	Need to reconstruct gas distribution networks	Improvement of technological infrastructure and implementation of new technologies into spheres of transportation and use of gas
Obstacles	External	8. Implementation of regions' gasification programs	Gasification of remote settlements, achievement of 100% level of regions' gas supply, lack of economic benefit(gain)	Exceeding of operating costs growth over the growth rate of revenues from gas transportation and inefficiency of production activities of GDO
		9. State regulation and peculiarities of pricing	Limitation of the growth rate on GDO services regardless of their economic feasibility. The price is set per unit volume of gas transportation, and costs are not directly dependent on the volume of transportation and GDO does not have the ability to influence the volume of transportation, which leads to a limitation of GDO impact on financial results	No mechanism of formation and attraction of investments. Lack of financial resources for innovative development
		10. Decrease in research and innovative activity	Insufficient level of modern technologies and equipment introduction	Increasing costs of obsolete equipment maintenance using inefficient technologies
	Internal	11. Specifics of fixed assets for the duration of the service life	Long payback period	No mechanism to attract external investment
		12. Insufficient level of personnel qualification and development of in-house (in-company) science	Insufficient level of modern technologies introduction	Increased risk of loss of gas consumers due to the possibility of reducing competitors' prices for alternative fuels through the introduction of new technologies
		13. Lack of experience in managing innovative projects	Insufficient level of modern technologies and equipment introduction	Increased competition from private companies in related unregulated market segments

Table 1. Classification of risk factors of innovation and investment (II) activities of GDO in the framework of QMS improvement

Each of these stages involves a number of consistent procedures and the use of a variety of tools for quality management and strategic analysis of innovation and investment activities. Here are the results of the PO monitoring carried out on the basis of the developed model. Implementing the systematization and evaluation of the identified factors of the external and internal environment, we use the form developed by the author (table 1). Usually, the analysis of factors affecting the development of enterprises and industries is carried out by an expert method. For carrying out not only qualitative, but also quantitative assessment for the purpose of research objectivity increase we offer at PO-monitoring in an expert assessment to use the system of criteria allowing characterizing the current situation. We have developed criteria for assessing factors in terms of "significance", "strength of influence" and "time of onset" (tables 2-4).

Consequences	Criterion of factors significance	Mark (score) (1-3)	Graphic representation
Very important	Influences investment (II) innovative activity of GDO directly	3	③
Moderate	Influences II (investment innovative) activity of GDO indirectly	2	②
Minor	Causes individual responses in the II activities of the GDO	1	①

Table 2. Criteria for assessing the significance of factors on investment innovative (II) activity of GDO

Influence	Power of influence	Marks (score) S (1-5)
Very high	II activity is largely dependent on the impact of this factor	5
High	This factor affects II activity of GDO	4
Moderate	This factor affects II activity of GDO indirectly	3
Insignificant	The impact is indirect, almost not affecting the activities of the GRO	2
Influence is very weak	The impact of II on GDO practically is not felt	1

Table 3. Criteria for assessing the influence of factors on the II activities of the GDO

Factor	Possible time of onset of factors	Mark (score) T (5-1)
A very short period of onset of this factor	During 1 year	5
Short period of onset of this factor	From 1 to 3 years	4
The average period of the beginning of the factor impact	From 3 to 5 years	3
Long period of the beginning of the factor impact	From 5 to 10 years	2
Events will occur in a remote time period, or may not occur at all	In 10 years and later	1

Table 4. Criteria for estimating the time of onset of factors

Some selected factors require active regulatory influence or elimination, many factors are remote in time and do not constitute significant obstacles in the near future; sometimes

they can be withdrawn in the situation of effective regulation and favorable economic position. Such a variety of impacts in terms of the strength and speed of events requires the development of

a matrix evaluation system, which, among its other advantages, also helps to visualize the results obtained.

To determine the priority of the impact of factors on the strength of influence and the onset of factors (events), we suggest using a matrix that clearly shows the squares of the highest priority of using PRECONDITIONS and the urgent need to regulate or eliminate existing OBSTACLES: the most important zones are the third positive and sixth negative (Figure 2).

There are eight zones on the PO-monitoring matrix, which differ in the strength and time of onset of the influence of factors, and the factors in these zones are indicated by icons, the size of which reflects the significance of the factor for the gas distribution industry. Color indication helps to enhance the level of visual perception of information and activates the degree of its impact on the need to make management decisions to adjust the strategic plans of the GDO.

As seen in the third positive and sixth negative zones, factors are located that in the next three years will directly influence the innovation and investment activities of the GRO. Combining the characteristics of zones according to the degree of influence and the time of onset of factors in the PO-monitoring matrix, we identified three levels of priority factors (Table 5).

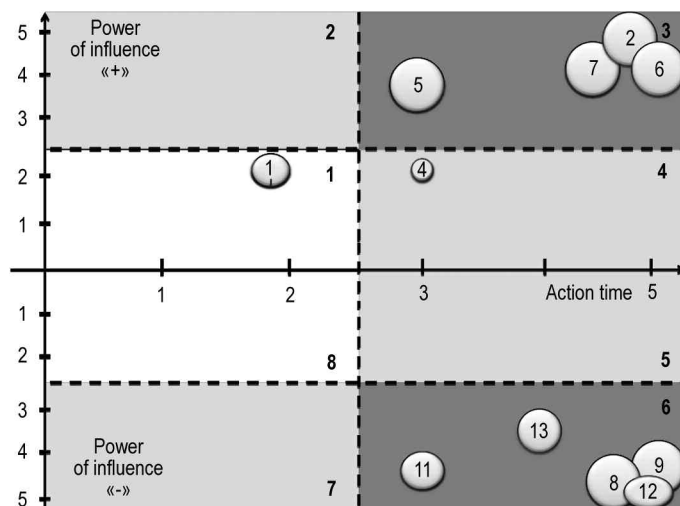


Figure 2. Matrix of PO-monitoring risk-factors of innovation and investment (II) activity of GDO in the framework of QMS improvement processes

Factors priority level	Incoming zones	Level characteristics
1-st level – red zone	3+, 6-	Zone of high priority factors, whose influence is high, their impact is possible in the next 1-2 years. When making strategic decisions, the management of the organization should primarily focus on them.
2-nd level – yellow zone	4+, 2+, 5-, 7-	Average priority factors, their power of influence is moderate, their impact is expected within 3-5 years. These factors must be taken into account when developing a strategy.
3-rd level – white zone	1+, 8-	Low priority level. The impact of these factors is weak and is expected in the next 5-10 years. These factors can be practically ignored when developing a strategy, but during the further monitoring period, rating of these factors may change.

Table 5. Graduation of priority levels of risk factors of innovation and investment (II) activity of GDO in the framework of QMS improvement

5. Making strategic decisions on innovations

Based on this information, a matrix has been built, which establishes the relationship between the factors of the first priority level, goals, and strategic innovation initiatives. Thus, Table 6 establishes goals in accordance with the influence of factors of the first level of priority and proposes strategic innovative solutions for realizing these goals for the Volgograd Region GDO (gas distribution organizations).

6. Conclusion

Thus, modern quality management systems, making enterprises to improve their activities continuously, make them also monitor the current situation in the external and internal environment and assess the existing prerequisites and development obstacles, that is, to use a risk-based approach in its implementation.

The proposed methodological approach to the classification,

Factors of 1-st priority level	Goals	Strategic innovation initiatives and mechanisms for removing barriers to innovation
1	2	3
Increasing state requirements for ensuring safe use and maintenance of in-house gas equipment. (IHGE) The trend of alternative fuels. Depreciation of fixed assets by 30-50%	Active introduction (use) of innovative technologies, equipment and materials	Improvement of the anticorrosive protection of steel gas pipelines due to: the introduction of systems for the remote control of electrochemical protection facilities, the introduction of the telemechanics systems of hydraulic fracturing, the transfer of gas pipelines using polyethylene. Application of 'tie-in method' without pressure reduction. Introduction of highly sensitive gas analyzers
Operation of hazardous production facilities	Increase of reliability and safety of gas distribution networks taking into account cost optimization	Introduction of the automated system of gas distribution objects dispatching control. Creation of a single database and complete information about the gas distribution system in the Volgograd region with the help of GIS (geoinformational system) "SPHERE"
Implementation of regions' gasification programs	Development and approval of an adaptive mechanism of state support for enterprises investing in the creation or expansion of production facilities using natural gas in the technological process. This mechanism should stimulate the connection of gas consumers to the existing gas pipelines, in which there is a technical possibility of gas supply	Provision of tax benefits for the payment of property tax and income tax for the period and in the amount that ensure the payback period of investments made at the level of the average payback period in other industries. Reduction of prices for gas transportation services relative to those established in the current period for consumers creating new technological capacities. Grace period – 1-3 years
State regulation and pricing features The specifics of fixed assets relative to duration of service life	Development and implementation of formation and attraction investments mechanisms	Changing the cost structure of gas for end users by increasing the share of gas transportation in the cost of gas for end users. Planning of activities aimed at financing the construction of industrial facilities that consume natural gas. Development of a subsidy mechanism to compensate for part of the costs in the introduction of new technologies used in the operation of gas pipelines
Insufficient level of personnel qualification and insufficient level of in-house science development	Personnel training and information technology development	Automation of learning process. Creation of new training simulators. Creation of a single information technology space through the introduction of an electronic communication system

Table 6. Matrix "Factors – Goals – Strategic Innovation Initiatives" of GDO as part of the processes for improving the QMS

assessment and ranking of risk factors for innovation and investment (II) activities of GDO as part of the improvement processes of the QMS will make the procedure for selecting strategic innovative decisions more objective. The implementation of the proposed methodology and the implementation of monitoring and evaluation procedures on its basis will make it possible to determine the possible results and consequences management decision more systematically and comprehensively and thereby increase the effectiveness of the QMS and the effectiveness of the strategic planning of innovative and investment activities of the GDO.

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The Relationship between Experiential Marketing and Determinants of Quality Service in the Banking Market

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Abstract

The purpose of this manuscript is to analyze the relationship between experiential marketing and some of the determinants of loyalty in the banking market. The banking market has undergone a number of changes due to growing competitiveness, advancing technologies and increasing consumer choice, influence and intervention, making it necessary to focus on new marketing strategies designed to create profitable, long-term relationships that target consumer loyalty. With regard to the methodology, a descriptive research with a quantitative approach was chosen. Data collection was performed through the application of an online questionnaire to a non-probabilistic convenience sample, reaching 211 valid answers. The main results point to the existence of a relationship between the participation in experiences (experiential marketing) and some of the determinants of loyalty, highlighting the experiences related to technology, the bank's agency internal environment and product and service experimentation for a certain time at no charge. From an interdisciplinary perspective, this manuscript presents contributions to banking management and marketing. The work proposed here is expected to be an aid instrument for a further promotion of loyalty. Experiential marketing can be a strategy that leads to greater loyalty in the banking market.

Keywords: banking; experiences; loyalty; experiential marketing.

1. Introduction

With increasing competitiveness, advancing technologies and increasing consumer choice, influence and intervention, it is necessary to focus on new marketing strategies aimed at creating profitable, long-term relationships that target consumer loyalty. The concepts of traditional marketing, based on product and service characteristics, are no longer sufficient in the highly competitive market in which we live. According to Nordström and Riddestrale (2001: 32) "the society of excess has an excess of similar companies employing similarly trained people with similar ideas that produce similar things for similar price and similar quality in a universe of similar companies in an increasingly diverse society, the customer wants to be unique". Therefore, it is clear that consumers are increasingly demanding and less sensitive to the classic variables of marketing mix, looking for a service that meets their needs and wants. Souki (2006) states that in a competitive environment it is inadmissible to maintain the same service standards that worked in the past and that it is essential to filter and process business data, with the purpose of constantly improving customer service. Thus, the trend of new marketing strategies is to focus not only on interactions between seller and buyer, but on relationships that involve sensations and experiences, encompassing the psychological aspect of the consumer. When a company builds this kind of relationship targeting the emotional side as well, loyalty becomes effective. The big challenge will be to create customer value in a way that makes him/her loyal to the company.

In this sense, a new facet of marketing emerges, experiential marketing, which seeks a more active conception of the consumer in the creation of value, where there is a relationship of

emotions, feelings and senses. Zarantonello and Schmitt (2010) state that experiential marketing emerges precisely for this, as a new tool to delight, attract and retain customers by creating memorable experiences. Therefore, Kotler (2010) states that providing consumer experiences in the buying process has become the key to attracting and retaining customers in the current century, as there has been an evolution in marketing thinking, with the focus shifting from product to brand management and its values. Nowadays, the consumer is not only looking for benefits and solutions, but also wants to have contact with the product, the brand and the experience (Sousa & Rodrigues, 2019). In the banking sector this situation is highly evident, as consumers of banking services are becoming increasingly savvy and demanding. They seek to deal with banks that offer something beyond products and services, something that makes them feel confident, satisfied and that impacts the decision to stay connected to the institution. It is well known that the banking sector has a highly competitive market and, due to this, has been a pioneer in implementing strategies aimed at creating a lasting relationship with customers. Holanda and Coelho (2007) argue that banks should aim to win customer loyalty and seek a lasting relationship that is appropriate for both parties, both the financial institution and the customer, creating value for both. They also argue that not all customers seek long-term relationships, but every business needs a portion of loyal customers for the business to be sustainable. Thus, the definition of the theme of this study was based on the fact that experiential marketing is pointed as a differentiating element for companies in the process of value creation and loyalty generation. The banking sector was also chosen for analysis in this study as it is a service, usually long term, being a privileged

sector for the use of experiential marketing. Thus, this study aims to understand the relationship of experiential marketing and consumer loyalty in the banking sector.

2. Consumer Loyalty

In recent times, organizations have been trying to understand customer needs and wants and this has been because the customer has taken a central role in the buying and selling process (Allen, Reichheld, and Hamilton, 2005). "Today's customers are harder to please. They are smarter, more price conscious, more demanding, forgive less and are approached by more competitors with equal or better offers" (Kotler, 2000: 69). According to Oliver (1999), this understanding is becoming increasingly complex because currently the trend is the decline of loyalty, being a great challenge to develop a strategy aimed at loyal consumers.

According to Christopher (1999), the strength of the relationships that each company maintains with its customers is the most valuable asset of any business organization. Thus, this author reinforces the need for companies to develop strategies aimed at achieving consumer loyalty. Reichheld (1996) emphasizes that companies that are likely to succeed are those that seek and cultivate customer loyalty, employee loyalty, and investor loyalty. For Anderson, Fornell and Lehmann (1994), the costs of attracting new customers are much higher than the costs of retaining existing customers, so building and maintaining loyalty should be a strategic priority for the company. For these authors, customers are a company's primary source of income, and business growth, along with success, depends on the company's ability to attract and retain customers. In the same vein, Reichheld (1996) also mentions that customer loyalty is extremely important to the company's success and is most often achieved through customer satisfaction. The best marketing strategy for a company is to generate customer value and develop customer loyalty. Oliver (1999: 35) argues that "for a consumer to become loyal, he or she must believe that a company or its service continues to offer the best alternative to consume". Thus, companies need to take actions that make consumers sure they are choosing the best alternative. Rowley and Dawes (2000) also support the idea above, stating that consumers are only willing to be loyal if they understand that the company is really the best option on the market. For Lovelock and Wright (2002), loyalty can be linked to the fact that the customer wants to stay in a relationship with a company for a long period, conducting business transactions (buy and repurchase) in an exclusive way, and recommending the brand to other people. Authors Jones and Sasser (1995) argue that the key to good financial performance over time in an organization is customer loyalty.

Thus, the key factor in achieving loyalty is to treat consumers with respect, as consumers fail to engage with companies for various reasons such as lack of respect, care and commitment. Dick and Basu (1994) argue that loyalty has two dimensions: a behavioral dimension and an attitudinal one. Behavioral loyalty is the frequency of repurchases, while attitudinal loyalty is the consumer's commitment to the brand (Sousa & Alves, 2019). The authors state that what determines the degree of loyalty is the intensity of the attitude and the frequency of repurchase, and propose the following typology of loyalty:

	Repurchase	
	High Strong	Low
Attitude	True Loyalty	Latent Loyalty
Weak	Spurious Loyalty	No Loyalty

Picture 1. Typology of Loyalty
Adapted from Dick and Basu (1994)

- ❑ True Loyalty: high standard of repurchase and strong relative attitude;
- ❑ Latent Loyalty: low repurchase pattern and strong relative attitude;
- ❑ Spurious Loyalty: High repurchase standard and weak relative attitude.

Bothe (1996) proposes a seven-step roadmap for achieving and maintaining customer loyalty and suggests an audit to evaluate effectiveness at each step. First, the commitment and involvement of senior management is required; subsequently internal analysis of the company, verifying the degree of commitment in relation to the pursuit of loyalty; the third step involves defining customer needs and requirements; after this stage it is necessary to analyze the market and evaluate the ability to compete with competitors; the fifth step suggested is the measurement of customer satisfaction and loyalty to further analyze the information gathered; finally, the author suggests that after all the steps, it's important to be carried out a survey of all problems and possible ways of solving, always working with focus on continuous improvement. Regarding the phases of consumer loyalty, Oliver (1999) points out that loyalty is formed by four phases: cognitive loyalty, affective loyalty, conative loyalty and action loyalty; and the authors Bonfim, Costa, Freire, Moreira and Oliveira (2008: 29) present a summarized form of these, as shown in the table below:

Phases	Characteristics
Cognitive Loyalty	Based only on beliefs related to the brand
Affective Loyalty	Based on accumulated satisfaction from repeated purchases and uses, representing the hedonic dimension
Conative Loyalty	Represented by the volatility of buying
Action Loyalty	Characterized by positive experiences, which generate a desire to overcome possible and unexpected difficulties in the act of buying

Table 1. Loyalty Phases
Adapted from Bonfim, Costa, Freire, Moreira e Oliveira (2008)

The phase of cognitive loyalty is characterized by the influence of uniquely functional attributes and characteristics of brands, where the consumer identifies (Macedo & Sousa, 2019), comparing to other alternatives in the market, which product / service of a brand will better meet their needs and satisfy their will. This is the initial phase of loyalty and if the consumer is not satisfied, it will not progress to the next phase (Oliver, 1997).

In the second phase, the affective loyalty, the consumer gets more involved with the brand, unlike the previous phase where it seeks only to meet their needs. He chooses to know and engage with the brand because of the successive experiences of satisfaction. However, consumers are still not totally loyal and may feel the need to know other brands if they are not satisfied (Oliver, 1997).

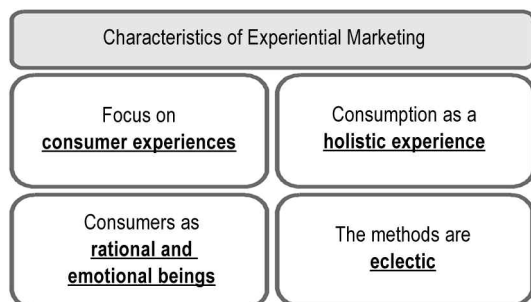
According to Oliver (1997) during the phase of conative loyalty, consumers show willingness and motivation to continue buying products and services from the same brand, due to the opportunity to repeatedly experience positive brand-related experiences (Silva et al., 2019).

Finally, the phase of action loyalty is defined by true consumer loyalty, as motivation and purchase intent are actually realized, turning into buying action. At this stage, the consumer has several options in the competition, but rejects and remains firm in buying the brand (Oliver, 1999). Oliver (1999) points out that the fragility of consumer loyalty tends to diminish as the consumer evolves from cognitive loyalty to the other phases, reaching the last phase which is action loyalty, because in this last phase the commitment is higher, being represented by the act of repurchase.

3. Experiential Marketing

The emergence of experiential marketing, according to Schmitt (2002), was due to three major developments in the

business field: the omnipresence of information technologies, brand supremacy, and the ubiquity of communications and entertainment. For Rachna and Vishal (2011: 2), experiential marketing “is about the difference between telling people about the characteristics of goods and services and letting them experience the benefits”. Kemp and Murray (2007) conceptualize experiential marketing as a marketing attempt to engage consumers in memorable ways through organized experiences around products and services, hoping to achieve positive brand emotions and to make those experiences and emotions drive consumption. For Williams (2006), experiential marketing turns a product or a service into a set of tangible, physical and interactive experiences. These experiences make consumers feel part of the offer presented by the organization. Schmitt (2002: 41) states that the basis of experiential marketing is the management of sensations and emotions through the creation of stimuli during the buying process (before, during and after the purchase). These “stimuli are created for the senses, feelings and mind of the consumer”. Smilansky (2009) defines experiential marketing as a process that identifies and satisfies consumers’ needs and wants in a cost-effective manner, engaging them through an open two-way communication, where brand and audience value can be created. For Schmitt (2002), the fundamental objective of experiential marketing is the creation of holistic experiences for consumers, thus gaining the feeling, thinking, acting and identifying of each customer, since nowadays customers want products, communications and marketing campaigns that stimulate their senses, move their emotions and their mind (rational and emotional) and that can be incorporated into their lifestyle. For him, customers want to live experiences and are willing to pay for them, and the ultimate goal of experiential marketing is to make these experiences complete. For Olorunniwo, Maxwell, Hsu-dan and Goddwin (2006), the main objective of experiential marketing is to provide consumers interaction and connection with the brand through their participation in memorable meetings. According to Bezzera and Covaleski (2014), experiential marketing has been seen by many marketing specialists as the new direction and paradigm of the sector, as it seeks to work all the points of connection and contact between brands and consumers, aiming to create experiences that contribute to a more lasting relationship and interaction between them. Therefore, also social marketing has been highlighted by its impact on social issues in the areas of public health, safety, and protection of the environment and communities (Sousa & Soares, 2019) and experiential marketing has four basic characteristics that differentiate it from traditional marketing practice (Schmitt, 2002), as shown in the following picture:



Picture 2. Basic characteristics of experiential marketing
Adapted from Schmitt (2002)

It is also important to highlight the differences in innovation in organizations, as innovation is totally interconnected with the way marketing works. For Prahalad and Ramaswamy (2003), the next innovation practices should shift the focus of products and services to experiential environments. For these authors traditional innovation is centered on the company and products, and its assumptions are fundamentally different from the innovation of experience.

4. Methodology

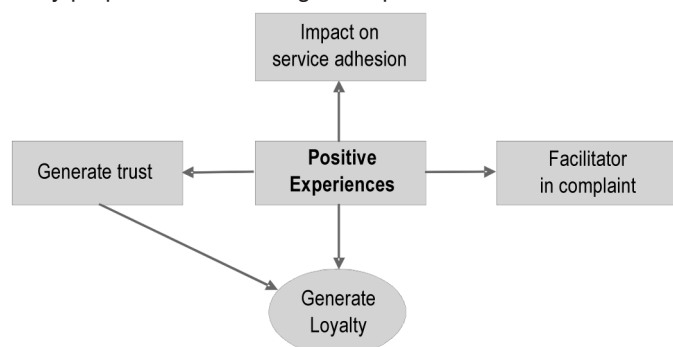
To achieve the goals of this paper, some research questions are presented:

- ❑ Is participation in experiments related to important factors to generate consumer's trust in the bank?;
- ❑ Does participation in experiments impact consumer decisions on banking service adhesion?;
- ❑ Can participating in experiments positively contribute to bank consumer complaint management?;
- ❑ Does participation in experiments impact the consumer's decision to recommend the bank?;
- ❑ Does participation in experiments relate to bank consumer loyalty?

Some hypotheses of investigation are also presented. Work hypotheses constitute the central axes of an investigation, they are presented as propositions that answer the starting question. In this way, research hypotheses play a key role in research. Thus, the research hypotheses developed for this investigation are:

- ❑ H1: Participation in experiments is related to important factors to generate consumer's trust in the bank;
- ❑ H2: Participation in experiments impacts consumer decision-making on banking services adhesion;
- ❑ H3: Participation in experiments can contribute positively to consumer bank complaint management;
- ❑ H4: Participation in experiments impacts the decision of the consumer to recommend the bank;
- ❑ H5: Participation in experiments is related to bank consumer loyalty.

Incorporating the hypotheses defined above, the present study proposes the following conceptual model:



Picture 3. Proposed Investigation Model

In this model we present the relationships between the variables under study, aiming to verify the impact of participation in experiences in the generation of trust, in the adhesion of services and products, in the management of complaints, in the bank's recommendation and also in loyalty. The elaboration of the questionnaire was based on the literature review on the theme taking into account the research objectives, as well as the research problem and the research questions. Thus, a questionnaire was designed to meet the proposed objectives, consisting of three parts:

1. Introduction of the questionnaire;
2. Application of the questionnaire: Set of mostly closed questions, applied in Likert scales and also nominal scales, relating to experiential marketing in the banking sector;
3. Characterization of the respondent.

Taking into consideration the objectives mentioned for this research, the literature review was collected and organized, relating it to the questionnaire, in order to be able to justify all the questions of the questionnaire with the literature and its authors.

Participation in Experiments
To study this variable it will be analyzed the participation in banking experiences as: Participation in event; Experimenting products or services for a certain period of time at no cost; Be positively surprised by the response to a complaint; Visit to a bank branch with a charming internal environment; Be amazed by the internet banking and mobile services.
Important Factors for Building Trust
Regarding this variable it will be analyzed the degree of importance of some factors linked to the transmission of values and solidity, technological conveniences and personalized service, in the generation of confidence in the banking consumer.
Purchasing Services and Products
For the analysis of this variable it will be evaluated the propensity of adhesion of products and services when there are technological conveniences, personalized service and interpersonal relationships.
Complaint Management
To understand this variable it will be analyzed if the customer has already made a complaint to his main bank and which means generally uses to make it. It will also be examined the consumer's ability to condone an error of the institution when the resolution is made fairly and satisfactorily.
Factors for Bank Recommendation
To study the recommendation variable it will be analyzed the degree of importance of the following factors: Services and attendance. Prices and fees. Bank branch environment. Technological conveniences. Differentiated products.
Loyalty
Regarding the loyalty variable it will be analyzed in how many institutions the customer has account, the relationship time with his main bank and the differentiated banking segmentation.

Table 2. Variables in Study

Variables under Study	Authors	Questions of the Questionnaire
Participation in Experiments	Pine & Gilmore (1998); Schmitt (2002); Prahalad & Ramaswamy (2003)	13
Important Factors for Building Trust	Kotler, Hayes & Bloom (2002); Oliver (1990); Rich (2000); Kotler & Keller (2006)	9
Product and Service Adhesion	Kotler & Keller (2006); Farias (2006); Predagosa & Correia (2006); Rich (2000)	8
Complaint Management	Kotler (2000); Dominguez (2000)	10,11 & 12
Bank Recommendation	Sirdeshmukh, Singh & Sabol (2002); Gastal (2005).	14
Loyalty	Oliver (1999); Reichheld (1996); Kotler (2006).	1,3 & 5

Table 3. Variables studied and analyzed in the questionnaire

After collecting the statistical data, it was validated and edited, then passed on and processed by the GNU PSPP statistical software. Its various functionalities were used to perform statistical analysis that helped in the interpretation of the data.

It was performed a descriptive analysis of the data and then the factorial analysis along with the hypothesis tests, through the use of Mann-Whitney and Chi-Square and the discussion of the results obtained, based on the available theory and the research hypotheses that were formulated. It is worth mentioning that the factorial analysis aims to identify a set of factors, reducing the size of the data, but without losing information. The extraction of the values was performed through the rotated component matrix and the Varimax method, in order to maximize the variation between the values of each main component.

5. Analysis and discussion of results

This section concerns the analysis and discussion of the results obtained in the study. After collecting data, each questionnaire was individually analyzed to see if there were any problems with the answers. The analysis of the results was performed with the aid of the GNU PSPP statistical software. The sample was characterized and then analyzed by means of descriptive statistics (mean and standard deviation). Other analyzes were carried out: factor analysis, Mann-Whitney and Chi-square hypothesis tests.

A large proportion of respondents are in the 25-34 age

group, with the majority (54%) being up to 34 years old and only 17% being over 45 years old. Most respondents were females (133) corresponding to 63.0% of the total, and males had 78 respondents (36.9%). Regarding the level of education, it appears that most respondents have academic qualifications at the postgraduate / lato sensu level (100; 47.3%), followed by higher education / Degree (80; 37.9 %), only 16 (7.5%) have master's degree, 11 (5.2%) have high school, 3 (1.4%) doctorate and 1 (0.4%) have elementary school. Thus, it was found that the educational level is high, where most respondents have higher education and postgraduate (85.3%).

Regarding the professional occupation of the respondents, a large part is a public sector employee (76; 36.0%) followed by private sector employees (67; 31.7%). Only 2.3% of respondents refer to people who are not engaged in any kind of activity, so they are unemployed while 6.6% are students.

Regarding the average monthly income, one can conclude that most respondents receive over R \$ 3,000.00. Fifty seven participants (27.1%) receive between R \$ 3,001.00 and R \$ 6,000.00, 72 (34.1 %) receive between \$ 6,001 and \$ 10,000, and 43 (20.3%) receive a value greater than \$ 10,000. Considering that the minimum wage in Brazil was R \$ 954.00, at 01/01/2018, most respondents receive above 3 minimum wages.

In the first question, we wanted to know how many banking institutions the participant has account with. The results showed that 90 (42.1%) of respondents have an account in 2 banking institutions, and very close to this number, 89 (42.1%) people answered that they have an account in only 1 banking institution, 26 (12.3%) answered that they have accounts with more than 2 banks and only 6 (2.8%) answered that they have accounts with more than 3 banks. As a result, approximately 85% of respondents have relationships with 1 or 2 banking institutions, not being exclusive to only one bank. After analyzing how many institutions respondents have an account with, it is important to know which is respondents' main banking institution, as well as the length of relationship with their main institution, and to analyze the approximate frequency of contact with their main bank taking into account various means of contact. It's also important to check which products participants have at their main institution and understand the reasons that made them a customer of this main institution.

Regarding the question about the main financial institution of which respondents are clients, it was found that Banco do Brasil is the main bank for most respondents (93; 44.08%), followed by

CEF – Caixa Econômica Federal and Cooperativa de Crédito, both with 33 respondents (15.6%). The fact that the first position is occupied by Banco do Brasil is not a surprise, as it is one of the largest banks in Brazil. The 8 institutions cited by participants are the main banks operating in Brasília. Banco do Brasil, Caixa Econômica Federal and Banco BRB – Banco de Brasília are public banks, with consolidated brands in the country. Credit unions are growing, gaining more space in the Brazilian banking market, the other banks are private and have a strong presence in the country.

Concerning the time of relationship with the main banking institution, most respondents have more than 5 years of relationship (167; 79.1%). Of the total respondents, 205 (97.1%) have more than two years of relationship with their main institution, thus reinforcing the idea presented in the theoretical framework that relationships with banking institutions are really long term. Regarding being part of some exclusive banking segmentation, only 66 (31.2%) of respondents said they are part of.

Respecting the approximate frequency of respondent's contact with the main bank, taking into account various means (personal contact, telephone access, call center and internet), it was found that only 14 (6, 6%) individuals do not use internet, while the vast majority of respondents (182; 86.2%) use it very often. Concerning personal contact, 109 (51.6%) do not use this mean to maintain contact with the bank, but 102 (48.3%) still use it at least once a month. Thus, it is clear that despite the evolution of technology and the possibility of relating to the bank only through digital platforms, there are still people who prefer to maintain the relationship with their bank through personal contact. Regarding the approximate frequency of contact through the branch phone and telemarketing, the numbers show very similar results, where more than 50% of respondents do not use these means to contact their main bank. Despite this, it is clear that these means cannot be ignored, since more than 76 (36%) of respondents use the telephone as a means of contacting the bank branch and 97 (45%) use telemarketing channels.

About the question that analyzes the products that respondents have in their main institution, it was found that the vast majority (200; 94.7%) have at least 1 product, and 127 (60.1%) have more than one product in its main bank, thus moving the main products in a single bank.

Of the 211 respondents, 174 (82%) have a credit card from their main bank, 107 (51%) have investments, while only 57 (27.0%) have any type of loan. It is believed that due to the economic crisis in the country, Brazilians decided to save, thus avoiding loans. Only 11 (5%) do not have any products in their bank, other than their own checking account. Regarding the question "sort by priority the reasons that made you a customer of your main bank", with the following five reasons as options: receiving salary, services and customer service, prices and fees, image and reputation and available technology, it was possible to make the following conclusions.

Regarding "receiving salary", the vast majority of respondents (137; 64.9%) chose this item as the first reason that made them customers of their main bank. In relation to the "services and customer service" motive, 62 (29.3%) mentioned it as the third reason that made them customers of their main bank, a figure very close to the 56 (26.5%) that indicated it as the second reason. Regarding the reason "prices and fees" it is possible to notice that 56 (26.5%) selected it as the third reason, but not far from this number, 51 (24.1%) describe it as the fifth reason. Regarding the "image and reputation" reason, it is important to mention that this item was selected as the first reason only by 9 (4.2%) of the participants, and 71 (33.6%) mentioned it as the fourth reason that made them customers of their main bank. Finally, referring to the "technological conveniences" reason, 55 respondents cite it as the fifth reason (26.0%), but 48 (22.7%) of the respondents mentioned it as the second reason that made them clients of their main bank, and thus the technology made available by financial institutions cannot be discarded.

Regarding the grievance experience, it was observed that over 54% (115) of respondents have already made a complaint at their main bank, 71 (36%) have never complained and 25 (11%) mentioned not remembering whether they have ever made a complaint. The Central Bank of Brazil provides information on bank complaint rates in Brazil and on the main reasons for bank complaints, so that both banks and clients can follow up.

With regard to condone an error by the banking institution when the problem is resolved fairly and satisfactorily, the vast majority of the participants (158; 74.8%) said they were able to condone, while only 17 (8.0 %) answered that they were not able and 36 (17.0%) chose the option "perhaps".

In the hypothesis tests, the relationship between the variables under study and the experiences lived by the participants was considered. The chi-square test was used to analyze the variables: important factors to trust the bank, complaint management, important factors to recommend the bank and loyalty. To analyze the variable "adhesion of services and products" it was used the Mann-Whitney test. Regarding the factor "technological conveniences", it can be seen that there are significant differences between the groups that already participated in experiences and the ones that did not ($\text{sig} < 0.05$), thus rejecting the null hypothesis.

Thus, those who have never been surprised by internet banking and mobile services are less likely to take into account technological conveniences at the time of joining services and products. Comparing the technological facilities with the other experiences: attending an event, visiting a bank branch with a delighting environment, experimenting products and services for a certain period of time at no cost and being surprised on how the bank responded to a complaint, the tests demonstrated that there are no significant differences between the groups who participated in these experiments and the ones that haven't participated ($\text{sig} > 0.05$). This way the null hypothesis is not rejected.

Similar results were found when comparing participation in the experiences with the factor of personalized attendance. The tests also did not show significant differences between the groups ($\text{sig} > 0.05$), which means that the consideration of the personalized attendance factor at the moment of adhesion of products and services is independent of the participation in experiments.

The Chi-Square Test was used to verify whether or not anyone who has participated in any banking experience considers the identified factors important for generating consumer trust in the bank. The test showed a significance level above 0.05 in all factors, thus stating that there are no significant differences between the groups, this is, the importance given to the identified factors to trust in the bank is independent of participation in experiences.

Regarding the analysis of the important factors to recommend the bank in comparison with the experiences lived by the participants, it was found that only in the case of the item "technological conveniences" there are significant differences in relation to the experience of being surprised by the internet banking and mobile services (significance level below 0.005), rejecting the null hypothesis. Thus, it can be concluded that those who have already been surprised by internet banking and mobile services take into account the technological facilities factor when recommending the bank to others. Concerning the analysis of condoning an error of the institution when the resolution of the problem is carried out fairly and satisfactorily, compared to the participation in experiments, it was found that those who have already been surprised by internet banking and mobile services and who have already visited a bank branch with a delighting internal environment found it more likely to condone a mistake on the part of the banking institution than anyone who has ever participated in these experiments.

Regarding the analysis of factors related to loyalty compared to the experiences lived by the respondents, it was found that most people who have been surprised by internet banking and

mobile services, those who have visited a bank branch with a delighting internal environment and those who are part of a bank segmentation reveal greater loyalty (significance level below 0.005), thus rejecting the null hypothesis, due to the significant differences between the groups.

It was also found that most people who have been surprised by internet banking and mobile services have long-term relationships with their main bank, with significant differences between groups, rejecting the null hypothesis.

6. Conclusions

The results presented above aim to analyze the relationship between experiential marketing and determinants of loyalty in the banking services market in Brasília-DF, verifying if the participation in banking experiences is related to important factors to generate trust in the banking consumer, if it impacts the decisions of adherence to banking services and products, if it can positively contribute to bank consumer complaint management, if it impacts on the consumer decision of recommending the bank and if it is related to bank consumer loyalty.

Through the data collected in the research it was possible to verify that in relation to the characterization of the respondents most are up to 35 years old; most are female; most have at least higher education level; approximately 68% of respondents are civil servants or private sector employees and approximately 80% have an average monthly income of up to R \$ 10,000.00.

Regarding the loyalty variable, most of the respondents have a banking relationship with up to two institutions, and from the total of participants, 205 (97.1%) have more than two years of relationship with their main institution, thus reinforcing the idea presented in the theoretical framework of the authors Colgate and Stewart (1998) that relationships with banking institutions are really long term, due to the continuous needs of banking transactions and due to the financial needs of the clients throughout their life cycle.

Another point that reinforces the theoretical framework is the highlighting of one of the consequences of loyalty: adherence to services and products, since 127 (60.1%) respondents have more than one product in their main bank, thus moving the main products in a single bank. Most respondents (182; 86.2%) frequently use the internet to maintain relationships with their main bank, but the use of personal contact and other means mentioned in the questionnaire cannot be ruled out, as there are still segments who use them to maintain relationships with the institution.

Therefore, as pointed out by Schmitt (2002), institutions need to be prepared to offer holistic experiences in all branches of consumer contact. It was also found that in relation to the reasons that made respondents become customers of their main bank, the vast majority pointed to receiving salary as the main reason. This can be seen as a business opportunity for banking institutions, as it is the customers who usually look for them, so banks can lessen the effort to attract customers and focus on the customer maintenance effort by winning and convincing them to maintain the banking relationship and not transfer the amounts to other institutions.

It's important to focus on innovative strategies aimed at customer enchantment and retention, as exemplified by the theoretical framework, and as Kotler (1998: 46) points out: "banks have learned that it is easy to attract people to their branches; hard is to make them loyal customers".

Regarding the complaint management variable, it was found that more than 54% of respondents have already made a complaint to their main bank and 74.8% are able to condone an error by the banking institution when the problem is resolved fairly and satisfactorily. Thus, one can realize the importance of complaint management, because when properly performed it is able to retain customers and turn dissatisfaction into satisfaction, making it an excellent business opportunity.

Regarding the variable "important factors for the generation of trust in the bank customer", it was found that the items related to the transmission of solidity, personalized service and the provision of clear explanatory information about products and services, both in paper and online, were pointed out as the most important.

Regarding limitations of the study, the first has to do with the fact that most respondents did not participate in many experiments, although the vast majority found important the factors related to experiential marketing for generating trust, service and product adherence and bank recommendation. Another limitation that can be pointed out refers to the use of a convenience sample, being restricted to bank customers in only one district of Brazil, which makes it difficult to generalize the results. Another point that can be highlighted concerns the type of questionnaire used, as well as the means for its dissemination. While one-on-one contact through a semi-structured interview could allow us to gather more in-depth data on bank customers' relationships with their institutions, on the other hand it would greatly lengthen the study over time and bring high costs to it. The choice of an online questionnaire, although limited, seemed to be the most viable.

With regard to the recommendations for bank marketing managers, it's assumed that it's very important to continually invest in experiential marketing strategies that are linked to the provision of services through internet banking and mobile, to create an attractive environment for bank branches and to continue to offer the ability to try services and products for a set period of time at no charge. For future studies it is recommended that in-depth studies be conducted on the impact of participating in banking experiments involving internet banking and mobile services, as this was one of the highlights of this study.

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Intellectual Property Implementation Strategies Aimed to improve the Quality and Create New Technologies in the Medical Field

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Abstract

This paper addresses issues about the relevance of the intellectual property in the international economic context, briefly examining the elements of intellectual property and a brief classification of intangible assets. The subject of the multitude of methods of valuing intangible assets, as well as the models and techniques for their recognition and measurement, which are determined by their complex character, is particularly diverse. A first objective of this paper concerns the analysis of the statistical situations regarding the intellectual property rights at international level, as well as different classifications by geographical area of the patent applications at European level filed with the European Patent Organization. The next point reached in this paper involves the analysis the companies' located EPO Member States taking into account the number of patents. Also, an analysis of the issue of patent statistics in the medical area was performed. In the last part of the paper were presented findings on the trends recorded in the studied fields as well as Romania's position in the world in the Intellectual Property field. The protection of intellectual property is imperative due to the opportunity to create new technologies and use them efficiently, which ensures a strategic advantage in the sense that the position of the state on the economic and political map of the world is determined.

Keywords: intellectual property; intangible assets; evaluation methods; statistical situations; EPO; trends.

1. The intellectual property importance in the international economic context

An essential element of cultural, social and economic development is intellectual property. Its components are constituted by the industrial property and by the copyright and related rights. Based on this aspect, it can be mentioned that the protection of intellectual property rights is of a major importance and the essential element resulted, constituting the protection of the product of human intelligence as well as, ensuring the benefit of the consumers of being able to use this product [Săvescu & Budală, 2008].

Figure 1 summarized the elements of intellectual property.

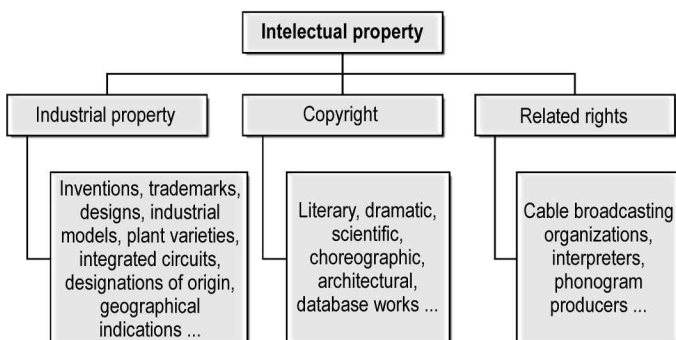


Figure 1. The components of intellectual property

"Intellectual property has the term of validity of a banana" – Bill Gates. Precisely for this reason, the protection of intellectual property is imperative because the opportunity to create new technologies and to use them effectively, provides a strategic advantage because the position of the state on the economic and political map of the world is determined. The arguments that support this assertion are primarily the progress and prosperity of the country, which is influenced by the creativity of its citizens, both in the technical and cultural areas. From the point of view of the legal protection of new creations, they encourage investments and lead to new innovations. Another argument is the promotion and protection of intellectual property that stimulates economic growth and at the same time leads to the creation of new jobs and creates new branches of activity, and implicitly improving the quality of life.

Regarding the knowledge society, the IP has a leading role to protect knowledge against alienation and illegal use, providing incentives to innovators in this way to generate new ideas and concepts.

Also, intellectual property is an indispensable attribute of market economy, and also a key driver of the world economy in the globalized trade.

Industrial sectors based on the protection of intellectual property rights are major contributors to the economy. Thus, a clear, robust and efficient regime of intellectual property rights is an essential condition for attracting foreign direct investments, promoting research and development and technology transfer.

Bill Gates stated that "The first rule of any technology used

in business is that the automation of an efficient operation will increase its efficiency. The second is that the automation applied to an inefficient operation will make it even more inefficient".

The Intangible Asset Research Center [Koh Winston & Poh Kam, 2005], proposes a classification of intangible assets presented in Figure 2.

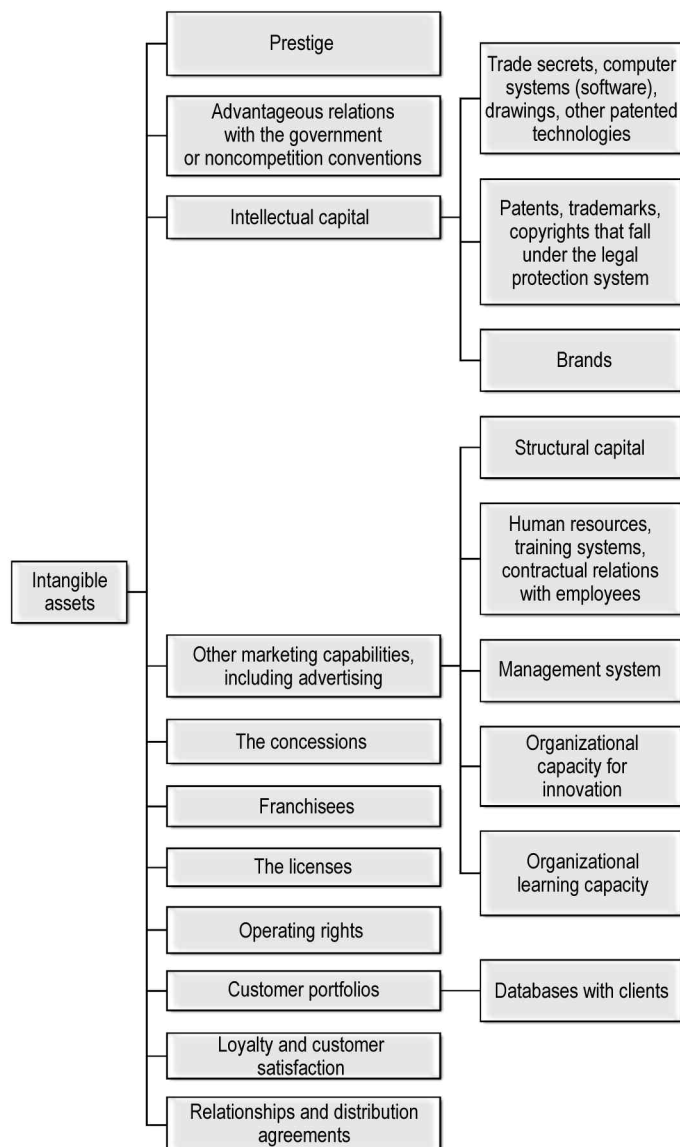


Figure 2. Classification of intangible assets according to Vincent Ross Institute of Accounting Research

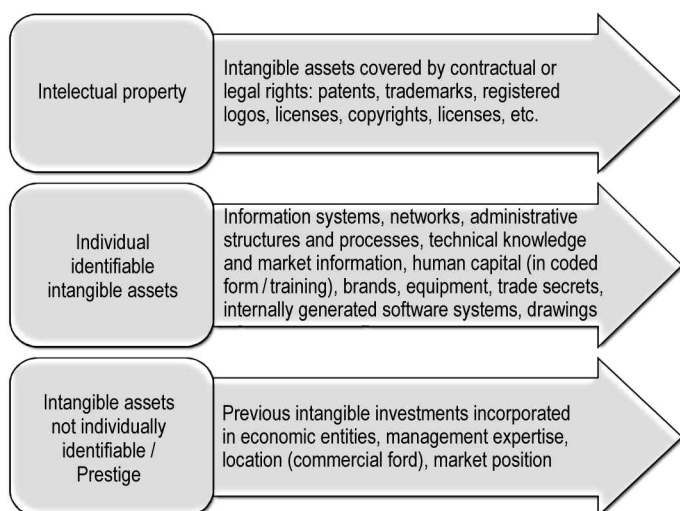


Figure 3. Subcategories of intangible assets

Intellectual capital involves a series of activities that have as a starting point the collection, coding and dissemination of information until the acquisition of new skills acquired through training and development, and even to the (re)design processes of a business.

Another definition of intellectual capital would be the sum of all the knowledge held by all persons in an economic entity and which gives that entity a competitive advantage on the market.

Another classification of intangible assets is made by Giovanni [Giovanni, 2005].

This classification of intangible assets comprises: the intellectual property, the individually identifiable intangible assets and the individually / separately identifiable intangible assets. The exemplification of these sub-categories is shown in Figure 3.

Henry Ford stated that "Failure is simply the opportunity to start over, this time with more intelligence".

The appearance of intangible assets usually occurs as a result of events that have already taken place and presents the main attributes presented in Figure 4.

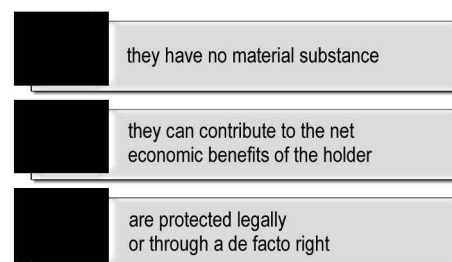


Figure 4. Attributes of intangible assets

Mihail Țițu says that "The invention does not have to stand in a drawer", and "An invention can be made not only by engineers".

A quantifiable value is required by the additional attributes of an intangible asset from the economic analysis perspective. Below are presented:

- ☐ generate a certain measurable amount of economic benefits for the owner / user;
- ☐ the possibility to increase the value of other associated assets; these could include all assets within the enterprise.

The requirements regarding the existence of an intangible asset are:

- ☐ it can be identified by a specific name;
- ☐ it is necessary to be subject to protection and legal existence;
- ☐ must be the subject of a private property right and it can be legally transferred;
- ☐ there must be a manifestation or evidence tangible to the existence of the intangible (contract, patent, etc.);
- ☐ to have appeared at a certain identifiable moment or as a result of an identifiable fact;
- ☐ to have a limited lifetime, which may disappear at an identifiable time or as a result of an identifiable fact.

2. Intangible assets and their evaluation

In the literature there are a lot of definitions of the intangible assets, according to the objective of each research.

Regarding the methods of valuing intangible assets, it can be mentioned that there are a variety of methods, models and techniques for their recognition and measurement, which are determined by their complex, special and diversified character. Depending on the scope of intangible assets, the valuation methods presented in figure 5 are mentioned.

The holistic method	The atomistic or partial method	Monetary and holistic methods	Non-monetary and atomistic methods
• IC-Index • Market-to-book value • Tobin's Q • VAIC • Knowledge Capital Earnings • Economic Value Added • Calculated Intangible Value • IAMV • AFTF	• Value Chain Score Board • Skandia Navigator • Balanced Score Card • Intangible Assets Monitor • Human Capital Intelligence • Citation-Weighted Patents • HRCA • Inclusive Valuation Methodology • Technology Broker TVC • The Value Explorer • Intellectual Assets Valuation	• Market-to-book value • Tobin's Q • Economic Value Added • Knowledge Capital Earnings (Lev B.)	• Skandia Navigator (Edvinsson&Malow) • Intangible Assets Monitor (Sveiby) • Balanced Score Card (Norton&Kaplan) • Value Chain Scoreboard (Lev B.)

Figure 5. Methods of valuation of intangible assets according to the scope

3. The situation of intellectual property rights at international level

Patents give the owners with an exclusive right to an invention, even if it is a product or a process, which aims to bring a new technical solution to solve a problem.

Figure 6 shows the classification by geographical area of the patent applications at European level filed with the European Patent Organization (EPO). The geographical origin of the files submitted is determined by the country of residence of the first applicant listed in the application form. For the realization of this graph, the information provided on the official websites www.epo.org and www.wipo.int was taken into account.

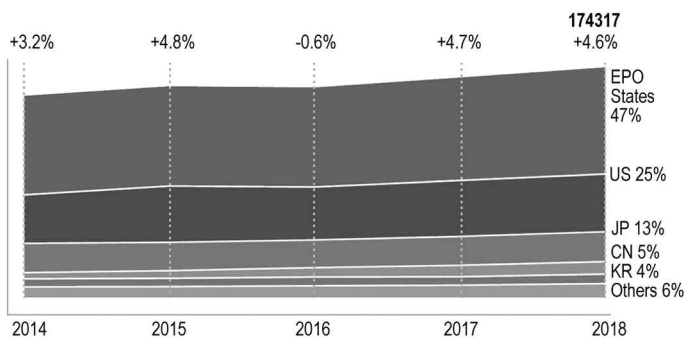
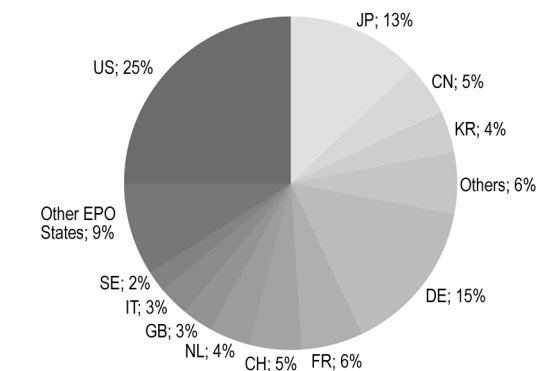


Figure 6. Situation by geographical area of patent applications at European level filed with EPO



Country	2018	017	Modifications
US	43 612	42 463	+2.7%
DE	26 734	25 539	+4.7%
JP	22 615	21 774	+3.9%
Other EPO States	15 165	14 474	+4.8%
FR	10 317	10 619	-2.8%
Others	9 925	8 766	+13.2%
CN	9 401	8 641	+8.8%
CH	7 927	7 354	+7.8%
KR	7 296	6 457	+13.0%
NL	7 140	7 043	+1.4%
GB	5 736	5 321	+7.8%
IT	4 399	4 360	+0.9%
SE	4 050	3 783	+7.1%

Figure 7. EPO statistics [Source: EPO, 21.1.2019]

One can observe an increasing tendency, from year to year, of the patent applications number in all the states, a small exception, making 2016 a slight decrease of 0.6% compared to 2015. But the situation from new is recovering in the coming years. It can be seen that the first place is the EPO applicant states with 47%, followed by the United States with 25% and then Japan with 13%.

Figure 7 shows the situation declared by the European Patent Organization regarding its 38 Member States, which includes the 28 states of the European Union. The situation of all the states presented with the highest number of the patent applications, is a favorable one for 2018, to the detriment of 2017. In all these cases, increase the patent applications number with percentages ranging from 0.9% to 13.2 %, with one exception – the case of France where a decrease of 2.8% is observed.

As a general finding following the analysis of the charts, the registration of patent applications at European level shows an increase compared to previous years with a total percentage of 4.6%, effectively consisting of a total value of 174317 applications.

4. Classification by companies taking into account the number of patents

Another aspect pursued in this case study concerns an analysis of the main applicants for patent applications at EPO.

Figure 8 shows the top 25 patent applicants [EPO, 21.1.2019].

Analyzing Figure 8, it can be observed that this ranking indicates the biggest applicants to the EPO during 2018, indicating their country of origin, with the mention of the 38 member states of the European Patent Organization, which includes the 28 EU states.

This statistic is based on the European patent applications that have been filed with the EPO. These include direct European and international applications that entered the European phase during the reporting period.

Therefore, the Siemens Company holds the first place in the ranking registering a total of 2493 patent applications, followed closely by Huawei with a total of 2485 patent applications, Samsung with 2449 patent applications and LG with 2376 patent applications.

Another analysis involves a breakdown using a significant sample of patent applications filed in 2018 by applicants located in EPO Member States comprising large enterprises, SMEs and individual inventors and universities and public research organizations (Table 1 and figure 9).

SMEs have been identified based on the European Commission definition of the SMEs (2003/361 / EC). According to this definition, an SME is an independent company with a number of up to 250 employees and a turnover of less than EUR 50 million and / or a balance sheet below EUR 43 million.

The detailed financial data and company ownership data from the Orbis BvD database were used to allow a strict application of this definition.

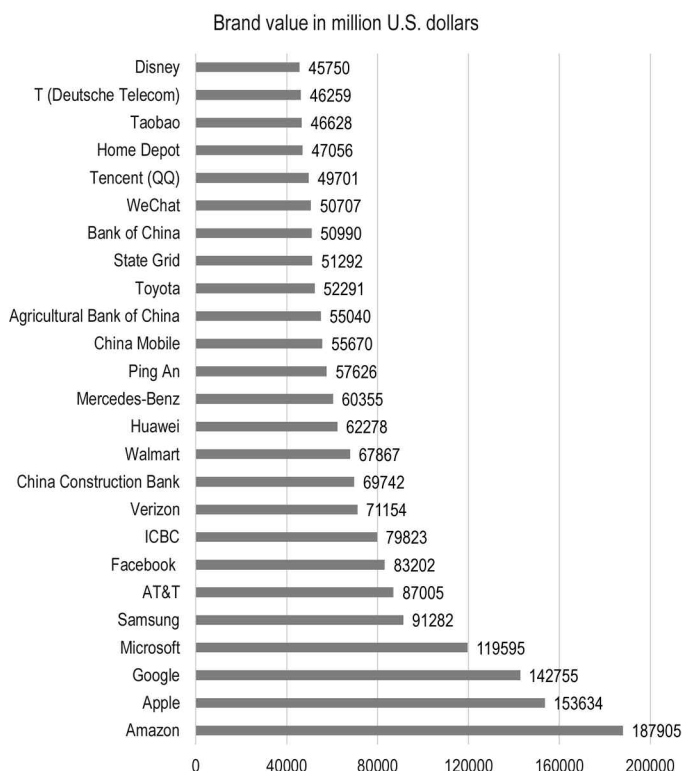


Figure 8. Top 25 applicants according to EPO statistics
[Source: EPO, 21.1.2019]

Data	2018
Large enterprises	71%
SMEs and individual inventors	20%
Universities and public research organizations	9%
Total	100%

Table 1. Breakdown of the level of patent applications according to the type of applicants in 2018

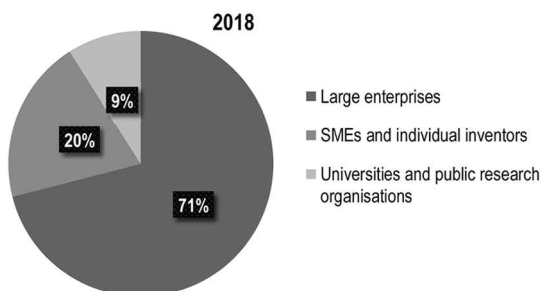


Figure 9. Breakdown of the level of patent applications according to the type of applicants in 2018

The category of universities and public research organizations includes technology transfer offices which, while registered as corporate entities, are clearly affiliated with a university or a public research organization.

In conclusion, this breakdown of patent applications from European countries shows that 71% of them were filed by large companies, 20% by SMEs and individual inventors and 9% by universities and public research organizations. This indicates that a significant proportion of the total EPO applicants are smaller entities.

5. Patent statistics in the medical area

The issue of patent statistics in the medical area was also analyzed. From figure 10 we can see the number of patents

granted by the European Patent Office in the period 2009 - 2018 in the field of medical technology. In 2018, over 9.3 thousand patents were granted in medical technology, the highest amount of time provided.

Regarding companies providing medical devices in 2019, they are classified according to their total revenues in billions of dollars (figure 11).

Figure 12 shows the distribution of patent registrations in the field of medical devices in France, from 2000 to 2010, by sector.

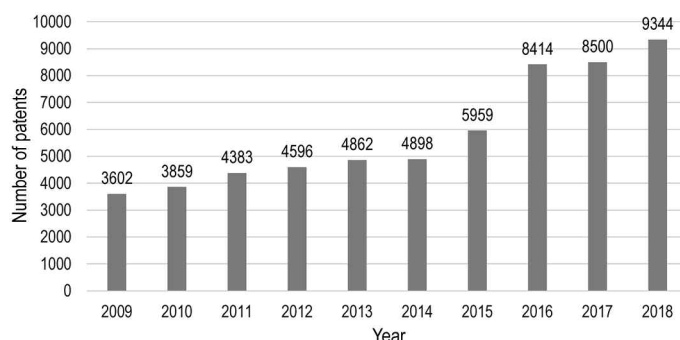


Figure 10. Patents granted in the medical area in 2009-2018
[<https://www.statista.com/statistics/999535/granted-patents-in-medtech-europe/>]

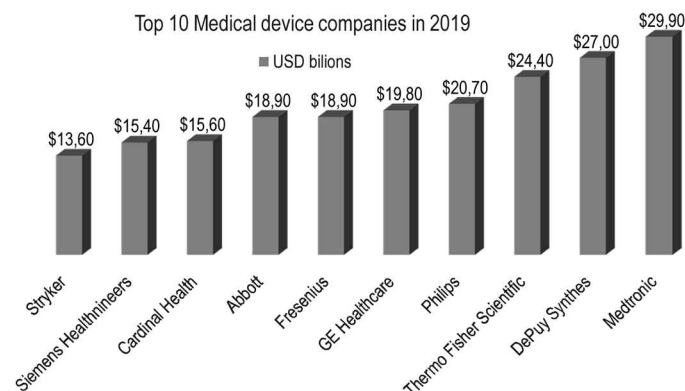


Figure 11.

Top of 10 companies providing medical devices in 2019
[<https://www.proclinical.com/blogs/2019-5/the-top-10-medical-device-companies-2019>]

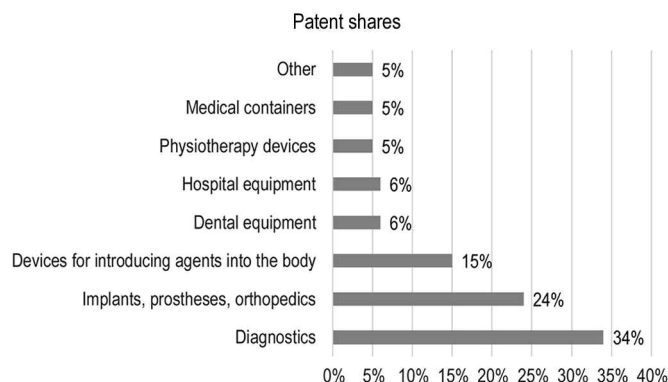


Figure 12. Patents in the field of medical devices in France, from 2000 to 2010
[<https://www.statista.com/statistics/767074/division-patents-devices-medical-sector-la-france/>]

During the decade, approximately 35% of the patents of French origin filed in France concerned diagnostic products, 24% concerned patents on implants and prostheses, 15% equipment mainly for dialysis, perfusion, reanimation, syringes, catheters, 6% dental equipment, 6% hospital equipment such as medical beds, operating tables, wheelchairs, 5% patents for psychotherapy devices, 10% medical containers and others.

The United States was the largest target market for medical devices, at almost 50% of the global market. These devices have destinations as varied as possible, so is the design and complexity. Therefore, the possibility of developing a patent strategy that is as efficient as possible, can be extremely valuable and, to the same extent, complicated.

Over patent trends, industry registrations rose dramatically (from about 22,400 in 2007 to about 34,400 in 2018) to 2015, after which registrations dropped (to about 10,400 in 2018) [https://www.ipwatchdog.com / 2019/05/08 / patented Trends-part-six-study medical-devices-industry-/ id = 108 972 /].

The largest relative growth of registrations corresponds to the cluster with portable devices, for which the registration of patents in 2018 was 359% higher than in 2007. The next significant increase was for the cluster of surgical devices, which registered an increase with 181%. At the same time, the support device group reached around 24,000 registrations in 2018.

Regarding the tendencies of patent applications from the cluster of assistive devices, the situation is presented as follows [https://www.ipwatchdog.com/2019/05/08/patent-trends-study-part-six-medical-devices-industry / id = 108 972 /]. Telehealth equipment has dominated record growth in this group, as its registrations have increased 2.5 times between 2007 and 2018. Telehealth innovations can promote the remote administration of healthcare. This technology can be very useful in remote areas and / or given to society at an accelerated rate. The global telemedicine market is estimated to have reached \$ 21.56 billion

in 2017 and will reach \$ 93.5 billion by 2026.

And last but not least, regarding patent applicants on medical devices according to the countries of origin, according to [https://www.ipwatchdog.com/2019/05/08/patent-trends-study-part-six-medical-devices-industry / id = 108972 /], the contribution of US applicants to US registrations in the medical device industry it decreased slightly (from 67% in 2007 to 62% in 2018). And this, although the US recordings had over 33% in the same period. The contribution of submissions from Chinese applicants, as well as what came from South Korean applicants, has more than doubled, despite the fact that the contributions remain small.

Thus, the medical device industry tends to include new and different types of technology. The devices that are patented no longer represent mere devices that need to be used, for example, in implants and surgeries. Rather, wearable devices predominate in the industry. The medical device industry has a very high market value, but it has a high potential cost of regulatory approvals. Patent tracking data is used as an indicator of the market movement and can be used to inform these decisions.

6. Romania's worldwide place in the Intellectual Property field. Increased relevance of Intellectual Property in the Romanian educational system

Although in Romania efforts are being made to converge with the direction established by the European Union according to the Washington – Tokyo – Seoul axis, it occupies a coda position among the 38 EPO states, having in 2017 a total number of 13 patents, and in 2018 – 9 patents.

The position of Romania vis-à-vis the other states among the patent applications is presented in table 2.

			Patents granted			Names as Contracting State	
	Patent holder's country of residence		2018	2017	Modification	Patents	Rate
1	FR	France	8 611	7 325	17.60%	126,924	99.50%
2	CH	Switzerland	4 452	3 929	13.30%	123,920	97.10%
3	GB	United Kingdom	3 827	3 116	22.80%	126,443	99.10%
4	NL	Netherlands	3 782	3 201	18.20%	124,210	97.30%
5	SE	Sweden	3 537	2 903	21.80%	123,928	97.10%
6	IT	Italy	3 446	3 111	10.80%	124,994	97.90%
7	DE	Germany	20 804	18 813	10.60%	127,357	99.80%
8	AT	Austria	1 655	1 465	13.00%	123,814	97.00%
9	FI	Finland	1 543	1 230	25.40%	123,800	97.00%
10	BE	Belgium	1 373	1 215	13.00%	123,810	97.00%
...	...	...	...	...	...	...	...
34	RO	Romania	9	13	-30.80%	122,948	96.30%
35	SM	San Marino	7	6	16.70%	107,288	84.10%
36	HR	Croatia	6	6	0.00%	114,871	90.00%
37	AL	Albania	0	0	-	101,224	79.30%
38	MK	North Macedonia, Republic of	0	1	-	110,164	86.30%
Sub-total of EPO states			57 906	50 680	14.3%		
Other countries of origin			69 719	54 955	26.9%		
Total			127 625	105 635	20.8%		

Table 2. Romania's position vis-à-vis other states in patent filing

As shown here, Romania occupies a laggard among the 38 states EPO, in 2017 a total of 13 patents and in 2018-9 patents.

Regarding how to carry out the transfer of knowledge by the sphere of research and development from universities to the industry, there are advantages, but certain problems should also be solved (table 3) [Bolocan & Munteanu, 2013].

Table 3.

Advantages and problems in the transfer of knowledge from the sphere of research-development (universities) to industry

Benefits:	
R&D sphere	Industry
Financing	Knowledge / expertise
Fame, prestige	Fame, prestige
Implementation of innovation	Development perspective (future)
Application of research results	Real research
Extension of the spectrum	Cost reduction (outsourcing)
More attractiveness	Higher sales and profits
Improvement in vocational training and research	
Problems:	
PI management	P rights
Organizational aspects	Organizational problems
Ethos and mission	Sales and goals (targets)
Culture and thought	Management and control
Financing	The problem of money
Loss of academic accents	Commercial competition

The goals of universities are usually much more complex than companies. As an example, public universities have responsibility for a wider range of stakeholders. Often, the policies of public universities are less flexible than private policies regarding patenting, licensing, start-up companies and other interactions with private companies [Siegel & Wessner, 2007]. Private universities can adapt much more easily to the incentives granted by the authorities in order to promote the licenses, which can be limited by the political pressures of the public universities. A study by Thursby [Thursby & Thursby, 2007, pp.39] looks at a number of central issues focused on university patenting and licensing, using an American data package obtained from the Association of University Technologies (AUTM), as well as from its own surveys carried out. The identification of the increasing tendency in the field of patenting and licensing by universities is parallel elsewhere. In the United Kingdom, for example, the patents issued by universities increased by 59%, and new licenses executed increased by 39% between 2001 and 2002 [Wright & Filatotchev, 2007].

But, right now, the problem is that the talented people are leaving Romania, and the real value is created elsewhere and captured by others. Currently, the reports and statistics produced at a global level converge in support of the theory that the human capital is a factor of economic growth [Țițu & Oprean, 2015]. Over time, researchers have highlighted the relevance of university education in human capital formation and economic growth. As an example, there are studies that have mentioned more pronounced growth in countries where the higher education system is well developed [Matton, 2006].

Training and education in the intellectual property field through the pre-university, university and post-university system should be carried out based on the following objectives:

- Increasing the level of knowledge of the field of intellectual property through the education system at all stages of training;
- Increasing the number of specialists with special training in the field of intellectual property by creating specializations in the field at the master's degree;
- Strengthening the capabilities of teachers in the field of intellectual property protection;
- Increasing the interest of the young student as well as raising awareness of the relevance of intellectual property;
- Cultivate the awareness of students of the importance of the intellectual product by organizing awareness activities in the field of intellectual property;
- Promoting the creativity of the young generation by supporting the research and innovation activity among the students;
- Modernizing and improving the performances regarding the elaboration, multiplication and distribution of educational and promotional materials in the field of intellectual property for students and student.

The knowledge and technology generated in universities and public research institutes can have a huge economic and social benefit.

7. Conclusions

Nowadays, maximizing the value of a business over time in the economic environment, remains the fundamental objective of any entrepreneur.

Economic entities pursue the efficient combination of the resources they have available – both tangible and intangible ones – with the purpose of producing and marketing goods or services, with the main objective of gaining an important part of the market, while increasing the profitability.

Intellectual property is an essential element of cultural, social and economic development.

The protection of intellectual property is imperative due to the fact that the opportunity to create new technologies and to use them efficiently provides a strategic advantage under the aspect that the position of the state on the economic and political map of the world is determined.

Intellectual property is an indefinite attribute of the market economy, and at the same time a key factor of the world economy in the conditions of globalized trade.

The role of intellectual property in the contemporary stage implies a basic concern in both developed and developing countries, in the sense of seeking solutions for both economic growth, development and competitiveness, as well as for employment increasing well-being.

Intellectual property rights are tools of marketing or management strategy, they are monopoly rights, which grant an exclusive right to the owner to use the object of protection and to prohibit its use by third parties, without having the right person's consent.

Intangible assets constitute invisible assets that include the competences of the employees, the internal structure and the external structure of an economic entity. The appearance of intangible assets usually occurs as a result of events that have already taken place and which have no material substance, can contribute to the net economic benefits of the holder and are protected legally or through a de facto right.

Patents give the owners an exclusive right over an invention, whether it is a product or a process, which aims to bring a new technical solution to solve a problem.

The registration of applications for patents at European level shows an increase in 2018 compared to previous years with a percentage of 4.6%, effectively consisting of a total value of 174317 applications.

71% of patent applications from European countries were submitted by large companies, 20% by SMEs and individual inventors and 9% by universities and public research organizations. This shows that a significant proportion of EPO applicants are smaller entities.

Regarding Romania, it occupies a leading position among the 38 EPO states, having in 2017 a total number of 13 patents and in 2018 – 9 patents.

The technological sector is one of those industries where the evolution happens with the speed of lightning. Companies focused on developing and marketing new technologies are reluctant to patent protection.

This is due to the slow patenting process related to the technological evolution.

However, this does not prevent technology companies from trying to protect their intellectual property or trying to prevent competitors from using their inventions. This is why large companies take an open position for patent licensing and grant licenses when the appropriate conditions are met.

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A Method for Finest Ward Selection for Healthcare-Facilities

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Abstract

Today's business leaders are increasingly forced to make quick and precise decisions. Making decisions is at the core of management. To make the correct and rational decisions, a manager has to gather as much information as possible to be able to choose from various options and their imaginable consequences. In the vital organizations such as, healthcare facility (HF) in every country, make a good and precise decision is so crucial. When the manager decides to collect/select wards for his/her HF, it is an important decision to select the finest wards. This decision needs a list of comprehensive and accurate managerial criteria. The processes which presented in this study can solve this issue. To show this, in a case study, it started with gathering criteria and the name of potential wards by modified nominal group technique through interview sessions with experts. Then, weighting the potential wards based on criteria by the viewpoints of experts through the Weighted Sum Method. Finally, the wards will be priorities based on which one has the best for the HF.

Keywords: healthcare facility; managerial criteria; modified nominal group technique; weighted sum method.

1. Introduction

Managers are saddled with the duty of leading their organizations to attain objectives and stated goals (Abubakar et al., 2019). This does not only need ability and versatility, but more adequate knowledge management with excellent decision-making (DM) (Abubakar et al., 2019). Healthcare facilities (HF) are the one of the important of organizations of the society and their manager has to make vital decisions in there. One of the important decisions in HFs is about layout of the building, especially ward selection/collection. In the inherently dynamic industry of healthcare design, collection of wards, construction, and organizations are to achieve balance between customer demands and the need to manage cost, schedule, and quality (Okada et al., 2017). The construction sector covers a wide span of projects from residential complexes to commercial buildings but HF projects have a special place in this basket (Barakchi, 2017).

The HF layout dilemma has received less attention in the literature compared to manufacturing facilities (Padgaonkar, 2004). In this study, the researchers have aimed to improve the HF layout-decision for maximise yield. Reviewing the existing literature and searching the scientific database of Scopus, in March 2019, reveals 4539 published articles since 1981 with the "healthcare" and "architecture" in their article title, abstract, or keywords. However, adding a new key word of either ward [department] selection [or collection], reveals a significant lack of literature in this field. A very same conclusion is achieved by searching other databases like Google Scholar or WOS.

HF designing can prove to be challenging for the architects (Alalouch et al., 2016). Elf et al. (2015) stated, one of the main challenges affecting the architects involves integrating the requirements of the future HF users with the current design-related decisions. Also, the management must encourage the

implementation of those design techniques which balance the effect of the specific, but local requirements with the general knowledge (Elf et al., 2015). The scientists consider the HF surroundings as healthy and safe, if they provide access to transport, better land usage, good architectural design strategies and policies, involve strategic planning, include collaborative designs, etc. (Zavadskas et al., 2017). Architects (considered to the key players in the HF designing process) have to often encounter numerous sources who present conflicting design criteria that lack understanding and a clear structure (Alalouch et al., 2016). The HF designing process must be simplified and made more accessible to the architects. However, no study has summarised the design criteria that can be solely controlled by the architects. A few of the general design criteria (called as the managerial decision criteria) based on literatures that must be considered while designing the HF buildings such as, cost (Nah and Osifo-Dawodu, 2007), customer satisfaction (Rivers and Glover, 2008), sustainability (Mohd Nawawi et al., 2013), construction and design standards (Alalouch, 2009), and safety (Joe et al., 2014). However, these criteria could be different for different HFs and their requirements. Hence, to make decision in order to upgrade HFs based on managerial criteria, choose the method among multiple-criteria decision making method (MCDM) is a suitable solution.

According to Ansah et al. (2015) and Almulhim (2014), MCDM is considered as one of the most popular DM branches of over the last thirty years, it has been used to solve decision problems given the existence of multiple alternatives and criteria. According to Mardani et al. (2015), the utilisation of MCDM may be considered as a way to handle complex problems by breaking down the problems into smaller portions. After considerations and judgements are made about the smaller components, the pieces are reconstructed so that an overall picture can be presented to the decision makers (Mardani et al.,

2015). One of the MCDM methods is Weighted Sum Method (WSM). The WSM is a broadly popular, widely known and practically used, and readily implemented subjective DM method (Chou et al., 2008, Sorooshian, 2017). WSM is defined in five step algorithmically by Sorooshian (2018).

On the other hand, NGT (nominal group technique) will be suggested by this research which is one of applicable group decision making (GDM) methods is an adaptation of the brainstorming wherein the DM group suggests their decisions separately (Sorooshian, 2017). This research uses the NGT along with the approaching experts with unbalanced expertise; this is modified NGT and introduced by Sorooshian (2018).

2. Methodology

According to Creswell (2014), a case study is a strategy of inquiry in which the researcher explores in depth a program, event, activity, process, or one or more individuals. In majority of

the cases, a case study method selects a minor geographical area or a very few individuals as the study subjects (Zainal, 2007). The case study is a popular and valid method to test DM process (Dehe and Bamford, 2015). Thus, if the process can be used on a case study and an outcome can be obtained, the process is assumed to be feasible. The case/HF will provide feedback about the quality of the outcome of the process. These process will be validated if can be executed and if they establish positive results and are satisfactorily accepted by the case (Anvari, 2012). After search and evaluate potential HFs to provide a practical validation of the proposed process, a HF confirmed to cooperate and be as a case study of this research. The same case and protocol as Parsia and Puteri (2019) used in their publication.

After collecting the matrices of every expert, the rank number of each expert is multiplied into the data of his/her matrix to run further calculations. The rank of every expert is tabulated in table 1 according to the HF head and manager. After obtaining the final approval, the experts are interviewed.

Categorization of experts	Code No.	Position	Duration of professional experience	Speciality	Ranking No.
Experts related to collecting management criteria	M1	Head of the HF	12 years	PhD in Anesthesia and Fellowship Specialist of ICU	3
	M2	Manager of the HF	15 years	PhD in Internal disease specialist	3
	M3	HF development committee coordinator	3 years	B.Sc in Engineering	2
	M4	HF quality improvement committee coordinator	7 years	M.Sc. of management	2
	M5	HF crisis and hazard committee authority	6 years	M.Sc. of management	2
	M6	Research coordinator	4 years	M.Sc. of Nursing	1
	M7	Training coordinator	4 years	B.Sc. of Nursing	1

Table 1. List of experts and their ranking based on unbalance expertise method

In the first interview the question asked from experts was: What ward(s) is (are) proposed to be added in HF?

After completing the criteria collection process, the overlapping data are identified and represented as one criterion. As to adding a ward in the HF, 15 criteria are collected. The final list is analyzed by experts during the interview to score the criteria

(second meeting) and then all experts approved the list.

In this part tried to describe managerial criteria for adding ward(s) which obtained from management experts of HF as a case study of this research. For analysis process each managerial criterion for ward selection [for upgrading of the HF] is named by C1, ..., C15, as shown in Table 2.

Code	Criteria
C ₁	The possibility of obtaining approval and government permissions to establish a new department
C ₂	Correspondence of the new department with the HF expertise and strategies
C ₃	Presence of an expert (physician) with expertise corresponding to the new department
C ₄	Presence of appropriate personnel count (nurse, paramedic, etc.) to provide appropriate services
C ₅	The high financial profitability of department
C ₆	Lowest expenses of equipment and establishment
C ₇	Lowest expenses of maintenance of the new department
C ₈	The demand for community and inpatients
C ₉	Availability of facilities, equipment and medication corresponding to the medical standards
C ₁₀	Correspondence of the new department with insurance laws
C ₁₁	Appropriate infrastructure condition for establishing a department
C ₁₂	Correspondence of construction conditions (architecture) of the new department with construction standards of hospital
C ₁₃	Effectiveness as to training enhancement in order to improve the domestic rank of hospital-based on MOH measures
C ₁₄	Physical conditions required for establishing a new department
C ₁₅	Improvement of the treatment process and service provision in the existing departments after adding a new department

Table 2. List of managerial criteria for re-architecting risky department from the HF

As shown in Table 3, thirteen potential wards where possible to be added to the HF according to the interviews conducted with the management group.

Name of potential wards to add	Name of potential wards to add
Peripheral vessels angiography	MRI
Ear, throat and nose surgeries	Eye surgery
Reconstructive surgery	Transplant
Surgery	Hand surgery
Obstetrics and Gynecology	Infection department
Chemotherapy	Psychology emergency
Rehabilitation and physical treatment	

Table 3. Potential wards

Next interview was run in every expert's place, based on the modified NGT. Each expert was required to weigh each criterion

from 0-100 in column "I" of Table 4 result of WSM matrix for adding wards. Then, asked from each expert to weight for each a potential ward to state the extent to which each criterion is present in the HF to add that ward. Complete presence is rated 100, while lack of presence is 0.

3. Results

After collecting WSM matrices, by considering unbalance expertise method, experts are assigned a rank based on their expertise (how skilled they are in management) and working experience. The assigned rank of each expert is multiplied into the matrix obtained from him/her. Then, the matrix average of all

collected matrices is obtained. The matrix average is applied to run the calculation through WSM method. WSM analysis is run on the average matrix. Table 4 shows the result of running WSM. Additionally, Figure 1 is comparing the obtained result

from the analysis.

Based on Figure 1, peripheral vessels angiography, MRI, surgery and reconstructive surgery wards are proposed by managerial experts to be added, respectively.

Managerial Criteria	Weight for each criterion "w"	Reconstructive surgery	Peripheral vessels angiography	MRI	Ear, throat and nose surgeries	Eye surgery	Surgery	Hand surgery	Obstetrics and Gynaecology	Rehabilitation and physical treatment	Transplant	Infection	Chemotherapy	Psychology emergency
C ₁	0.081833061	4.746314	8.019634	8.1833	0.490998	0.490998	4.90998	4.255316	1.309328	4.582648	0.327332	3.436986	6.873972	0
C ₂	0.078559738	7.54176	7.54176	7.22752	3.1424	3.45664	7.22752	6.2848	3.1424	5.65632	2.3568	2.98528	6.59904	0
C ₃	0.078559738	7.856	7.22752	5.18496	0.31424	1.41408	7.54176	6.91328	0.7856	4.7136	1.5712	5.97056	7.856	1.25696
C ₄	0.070376432	2.955792	4.92632	3.941056	0.281504	0.281504	3.5188	3.5188	0.422256	2.252032	0.563008	1.689024	3.5188	0.140752
C ₅	0.05400982	2.26842	3.13258	3.2406	3.34862	3.13258	3.45664	2.48446	2.05238	3.56466	3.56466	2.48446	2.80852	2.05238
C ₆	0.057283142	3.551546	3.551546	4.124376	3.780678	3.551546	4.124376	3.093282	2.635018	3.322414	3.322414	2.176754	2.635018	2.405886
C ₇	0.058919804	4.94928	5.3028	5.42064	4.47792	4.47792	5.18496	4.47792	4.59576	4.1244	2.71032	1.29624	1.7676	1.53192
C ₈	0.070376432	4.785568	6.052336	6.474592	2.81504	3.378048	5.207824	4.363312	2.955792	4.363312	2.955792	3.237296	3.659552	1.829776
C ₉	0.06710311	3.891974	3.891974	3.891974	4.02618	4.02618	5.636652	3.891974	4.294592	4.69721	4.428798	3.086738	4.02618	2.01309
C ₁₀	0.070376432	4.92632	5.207824	5.489328	4.081808	4.081808	5.63008	5.067072	4.92632	4.92632	4.644816	5.067072	4.504064	4.92632
C ₁₁	0.063829787	4.59576	4.85108	4.85108	3.44682	3.44682	4.85108	4.21278	2.93618	3.44682	3.44682	2.93618	5.36172	2.80852
C ₁₂	0.05400982	1.40426	3.67268	3.67268	1.6203	1.6203	1.94436	1.18822	1.18822	1.6203	1.40426	0.5401	1.29624	1.0802
C ₁₃	0.057283142	3.780678	4.00981	4.353508	2.405886	2.405886	4.811772	4.00981	1.947622	3.093282	1.71849	2.405886	3.093282	1.603924
C ₁₄	0.065466448	2.61864	4.189824	4.189824	2.094912	2.094912	2.225844	1.178388	1.440252	2.225844	1.833048	0.65466	1.833048	1.30932
C ₁₅	0.072013093	6.193118	6.193118	6.193248	3.744676	4.896884	6.049092	5.04091	3.888702	5.328962	3.024546	3.60065	4.896884	2.592468
Ws	-	66.06543	77.77081	77.15869	40.07198	42.75611	72.32074	59.98032	38.52042	57.91812	37.8723	41.56789	60.72992	25.55152

Table 4. WSM matrix for adding wards

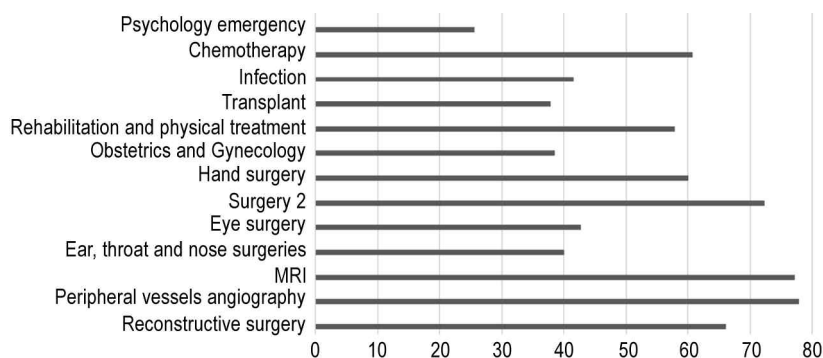


Figure 1. Result of WSM

4. Conclusion

According to Alalouch et al. (2016), the well-designed architectural buildings affect the recovery times of the patients and improve their satisfaction levels. A proper HF design has many advantages and helps in improving the patient health, increases the satisfaction levels of the staff and the patients, improves the delivery of medical care, and decreases the healthcare costs (Cunney, 2008). Many studies have proved that a faulty HF design increased the number of medical errors,

rates of infections, increased the injuries due to falls, decreased the patient recovery rate and led to a higher staff turnover (Reis and Chambers, 2009). It is really important for the manager of the HFs to select the best wards.

A case study verified the validity of hybridized Modified-NGT with WSM for solving the selection of wards for HFs. Therefore, the processes which are presented in this study can accelerate the evaluation process in the HF by owner or managers, the precision is increased, and any ambiguity is resolved in the authorities' decision-making process.

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Managerial Competences in Hotel Management in Kosovo

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Abstract

Management competencies are a key factor for creating effective and attractive hotel offer for hotels that will be competitive in the international tourism market. Managers, as holders of the entire process of planning, organizing, motivating and controlling of hotel activities have been placed in front of the challenge to productively use their knowledge, skills, attitudes and experiences in formulating effective development strategies that will enable realization of the objectives of the hotel.

Proceeding from this, the goal of the paper is through theoretical and empirical research is to consider the management skills as a factor for the development of the hotel running in Kosovo. In addition, by applying the techniques of surveying and depth interview of managers and surveys of employees and hotel guests will see the positives, but also the shortcomings of the hotel offer in terms of managerial competence. Based on the findings, recommendations will be given for improving management competencies and through them the hotel offer in Kosovo.

Keywords: managerial competencies; knowledge; skills; personal characteristics; innovation; tourism market; hotel offer; competitiveness.

1. Introduction

Kosovo, as a new state, after the difficult economic and political processes that it faced in the last century, found the first decade of this century with a large number of difficulties in the field of economy, health, education and tourism. When we are on the field of tourism Kosovo has started to be affirmed as a potential tourist market only after 1971, which is related with the construction of the Adriatic highway. Until then, tourism in Kosovo has not been developed. In that period the main concept was the development of local tourism. The neglect of tourism has influenced its economic and social development. Problems also existed in urban areas in relation to hotel accommodation facilities.

Today, tourism in Kosovo is characterized by continuous development and high sensitivity. Facing insecure factors, whether internal or external, touristic supply and hotel supply within it is oriented towards attracting the attention of the international tourist opinion in order to utilize the cultural and natural values in terms of tourism. As a sector of economy, the role and importance of tourism is widely accepted because it helps to increase gross domestic product, improve balance of payments, create new jobs, increase investment and promote development whether it is locally, regionally or nationally.

Previous researches show that there is a lot of advantages of Kosovo as a touristic destination such as natural and cultural values, the positive attitude of the population towards tourism, gastronomic services by offering traditional foods, the introduction of private colleges and universities in the field of tourism and hospitality, involvement in international organizations' projects to increase the capacity and quality of staff in the field of hospitality and tourism etc. But, on the other hand, there are a lot of researches that has noted a large number of weaknesses or disadvantages. As main weak points of tourism of Kosovo are: lack of public awareness of tourism and hotels as a source of welfare and development of their careers, lack of a national

tourism development program, poor quality of hotel and tourist services, lack of specialized staff and trained, low mobility of workforce in terms of tourism and hotels, but also the lack of competences of management staff in the field of tourism and hotels in Kosovo.

In the context of these conditions, hospitality in Kosovo may and should be managed strategically. A key role in defining and implementing strategies for the development of quality hotel offerings is the hotel management staff. With their skills and abilities, managers are a key factor in facing in a turbulent and troubled environment. This is confirmed by theoretical and empirical research in the field of management with its conclusion that managers are the most important and expensive source of modern enterprise (Kay & Russette, 2000).

2. Literature Review

Management skills include the knowledge and skills of the individual in the position of the manager, needed to carry out the managerial activities and tasks. Hotel managers, as well as managers in general, should possess the necessary skills to facilitate work with people around them, and at the same time help them to organize more efficiently, coordinate and control the work of subordinates in order to realize effectively the goals (Crawford & Nahmias, 2010). Depending on the managerial level in which they are located, managers must possess a certain level of skills. In literature the most widespread systematization of managerial skills is in technical, human and conceptual skills. Literature also includes the division of management skills into general, specific and key skills.

General management competences are skills that should possess each manager, in order to realize qualitative work, regardless of the managerial level in which it is located (Dhiman, 2012).

Special or specific managerial competences are required to

accomplish the standard performance for a concrete managerial position.

Main managerial competences are those skills that managers give great importance and which increase the efficiency of employees.

Successful conduct of business activities towards meeting the goals of the hotel is conditioned by the possession of a set of performances of the managers, which will advance managerial activity. The modern manager is challenged to effectively manage the hotel in turbulent and challenging conditions through coordination and orientation of the overall activity of all employees (Dhiman, 2012).

In order to reach the strategic hospitality objectives in a more effective way, the critical factors on managing team in literature are (Pirnar, 2015; Zehrer & Mössenlechner, 2009):

- ❑ Leadership – or possession of leadership skills as an important prerequisite, through which management will motivate and guide its employees to effective work.
- ❑ Trust – represents an important component for the establishment and maintenance of a successful relationship as well as cooperation between employees and management on the one hand, and the hotel and tourists on the other.
- ❑ Focusing on the same goal: The manager should clearly define the vision and goals of the hotel and encourage all employees to strive for a common goal. All employees or hotel work teams also work to meet individual goals and interests, and this is fine as long as they are positively related to hotel goals.
- ❑ Distributing and sharing knowledge throughout the hotel – the possession of individual knowledge and individual skills is of no relevance to the promotion of hotel performance, if it is not transmitted among other employees. The modern manager is distinguished from the ability to bring the best out of the individual and to motivate them to share their accumulated knowledge and experiences among other colleagues at the hotel.
- ❑ Mutual Respect – the manager is responsible for creating a climate of mutual respect among employees, respecting the responsibilities and duties of the individual's work, their attitudes, ideas and proposals, as well as evaluating their efforts towards fulfilling their work duties.
- ❑ Supportive relationships between specific management levels – to achieve high performance, manager levels need to communicate and help each other.
- ❑ The existence of a developed communication system – effective management means the existence of developed communicative skills, as well as the communication channels developed both inside and outside the hotel.
- ❑ Build and maintain a modernized internal information exchange system and record data that will increase managers' control and advance co-operation with staff.
- ❑ Building good interpersonal relationships – managers need to maintain good interpersonal relationships with employees as well as with other stakeholders.
- ❑ Equal Power Distribution – the modern manager performs equal distribution in the delegation of responsibility and power to coordinate the activities between the individual organizational units, but also among the employees who work in shifts.
- ❑ Provision of supportive administration – the existence of an effective registration system greatly supports the planning and control process.

2.1. Model of four pillars of managerial competences

According to this model, there are four pillars of managerial skills and performance, which are mutually dependent and cannot function without the other. They are (Kay & Russette, 2000):

Knowledge of the organization – Involves the development of knowledge and understanding of current policies and operational processes in order to see if the team's activities are effective and fit the organization's strategic goals. This includes skills that are related to the mission, vision, goals and procedures of the organization (Okumus & Yagci, 2006).

Leadership and Human Resource Management – Involves the ability to work with people, both within the organization as well as in establishing good relationships with clients and tourists (Gamage & Pang, 2003).

Particularly important are skills to guide employees, team building skills, problem-solving skills, skills to ensure worker efficiency, ongoing collaboration and staff communication, employee orientation, and feedback (Munar & Montaña, 2009).

Resource Management – Involves the conceptual skills of managers, respectively planning skills, the ability to organize enterprise processes, strategic goals placement, information management, and more (Crawford & Nahmias, 2010).

Communication efficiency – Involves the development of skills that will enable smooth and enjoyable interactions between staff and clients. This pillar contains the ability to effectively hold meetings, interpersonal collaboration, presentations, written communication, constructive meetings etc. (Phelan & Sharpley, 2012).

3. Methods in the Research and Analysis of the Results

In preparing of this research paper in the process of collecting, sorting and analyzing available data, have been used logical and scientific approaches (Cheung, Law & He, 2010). During this research the following methods that were used are:

- ❑ The quantitative and statistical method by which the obtained data are processed and the mutual dependence of the managerial skills and performance of hotels in Kosovo is determined;
- ❑ The descriptive method will be used to explain the findings through research materials and documents for the elaborated field;
- ❑ The interview technique of managers, employees and tourists using a structured questionnaire.

3.1. Analysis of the level of managerial competences in the hotel industry in the Republic of Kosovo

Although the natural and cultural values represent a qualitative basis for the development of different forms of alternative tourism in Kosovo, one of the important factors for the quality of the tourist offer is the managerial competences in the hotel capacities of the country. Organizational competence consists of the knowledge, skills, experiences, behaviours and processes necessary for the successful development of the hotel's activity as a whole. They are largely conditioned by the knowledge and skills of the staff they possess, and developing their skills. For that goal on this research we made a deep survey with managers and employees in 10 of the most important facilities in Kosovo.

In the research process were included also 30 managers from 10 hotels establishments and from different levels of management, Figure 1.

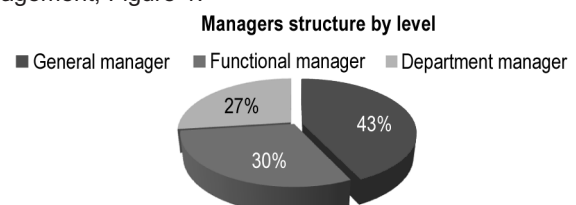


Figure 1. Structure of managers by management level

Half of them are aged between 30 and 40 years, showing the capacity of management staff to improve their knowledge and skills.

According to the degree of education, 46% of surveyed managers are expert professionals in the field of tourism and hospitality, but there is also a significant percentage (37%) of managers who are educated in natural sciences, Figure 2.

Managers structure by level of education

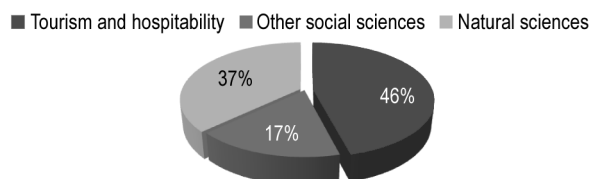


Figure 2. Managers structure by level of education

The analysis of responses shows that the majority (83%) of senior managers have high education, and from the interview conducted is informed that only 43% have expertise in the field of tourism and hotels, while one of the surveyed managers holds master degree in tourism.

From the completed survey and the interview conducted, it can be seen that 63% of managers are satisfied with the success of the hotel. But 30% of the managers decreed by achieving high results and their efforts to increase their offer's participation in the Western European market.

In order to identify the personal characteristics of managers in the hotel industry in Kosovo, they analyzed their attitude to the challenges faced. In addition, most of them, 47% analyze problems and seek solutions. On the other hand, 30% in emerging issues require new opportunities to promote the offer, Figure 3.

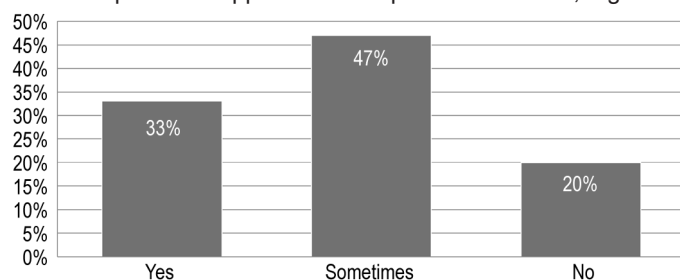


Figure 3. Existence of the professional mutual competitive climate of employees

Most managers, 73%, believe they are creative people. However, most managers have stated that they sometimes create a climate of mutual competition for employees in delivering ideas and creative solutions. The smallest is the percentage of those who permanently promote creativity in the hotel. This is also confirmed by the earnings of surveyed hotel workers.

Regarding the work atmosphere of hotels, most managers, respectively 63% think that in their hotels has a decent working climate, while 37% think it needs to be improved.

Towards this point, it should be noted that 40% of managers have stated that they only sometimes take part in resolving conflicts among employees, while only 27% always participate in the successful selection of conflicts within the hotel. The remaining 33% leave employees a certain period of time to

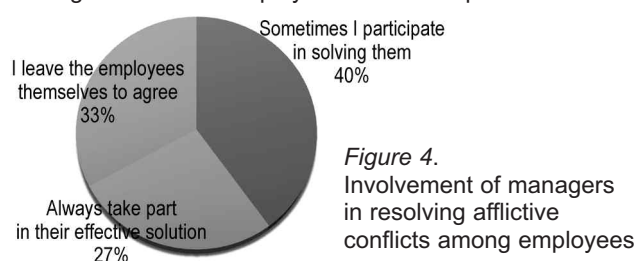


Figure 4. Involvement of managers in resolving conflicts among employees

solve the problem themselves, and then engage in solving the problem, Figure 4.

Most managers are delighted with the way they run the hotel business, but we cannot disregard the fact that 49% of managers who think that they are generally satisfied, but still have to invest in their skills, as well as the attitude of 5% of interviewed managers who are not satisfied with their work, Figure 5.



Figure 5. Level of satisfaction of managers from the way they manage the hotel

With regard to their activities to achieve advancement and development of managerial competencies, the analysis shows that managers refine their knowledge in several methods, including 17% permanently, 50% temporarily and 33% very rarely.

Most managers (37%), advance their knowledge and skills in their job mostly by trainers and trainings. Other method applied by managers according from the interview are internal trainings, even (36%) of managers have stated that. More than half of the respondents, 64%, develop through work in the workplace, while 54% apply rotation at work.

Almost one third (27%) of managers apply the development of their competences outside the workplace, most of them (87%) through participation in seminars, 62% attend courses, 75% are educated through problem solving, while 37% analyze cases. 23% of managers interviewed take care of advancing their competencies independently and individually, Figure 6.

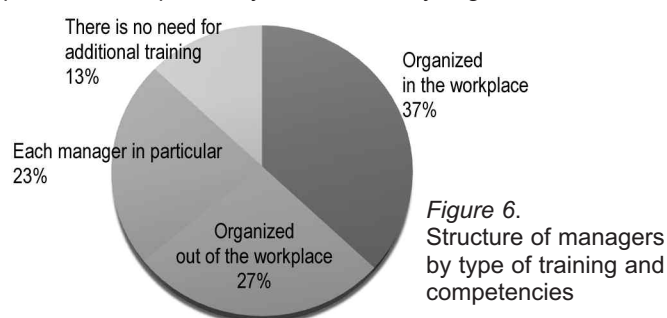


Figure 6. Structure of managers by type of training and competencies

In the question whether the employees in their hotels upgrade their skills, 70% of the respondents responded positively, 43% of managers stated that they organize training and development of employees through the transfer of experiences from other employees, 33% send employees to seminars, while 30% do not implement the employee's skills advancement, Figure 7.

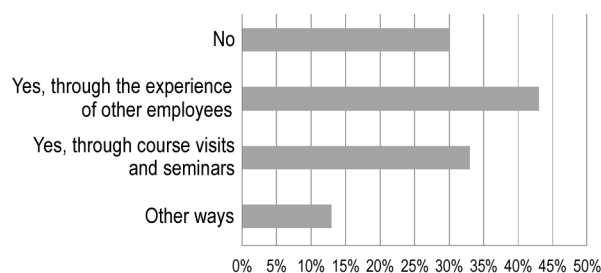


Figure 7. Structure of managers by investment in improving the skills of employees

From the research conducted through the survey and the interview it has been proved that the development and refinement of hotel staff is provided in different ways.

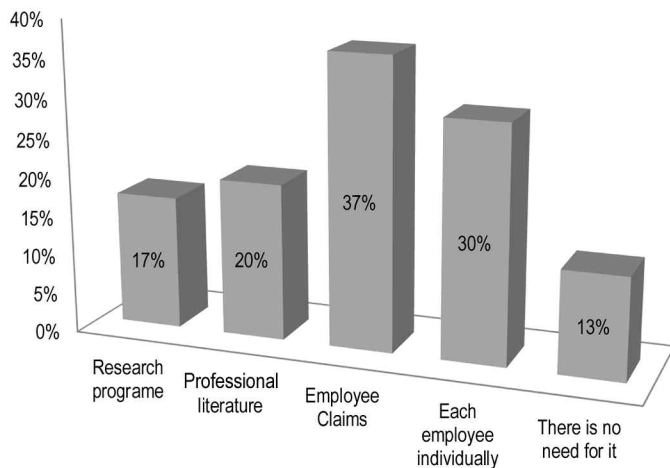


Figure 8. The way of ensuring the performance of the employees

The largest number of managers, 37%, organize training for the employees based on their requirements, while only 17% of managers apply training and development of hotel staff in plan. There is a large percentage of managers (30%) who think that employees themselves must deal with advancing their skills, while 20% of managers have stated that employees refine their skills by using professional literature. An important part of managers, even 13% think that there is no need for additional skills development with the justification that employees are quite upgraded in the work process.

In order to gain more information about the way of decision making in hotels, the managers was asked about the level at which decisions are made and what is the participation of employees in problem solving. From their responses to the survey and the interview, it can be noticed that decisions are brought by senior management, while the professional participation of other employees is extremely symbolic. Only 37% of managers have stated that decisions are made by the management team, while the rest of 63% stated that the main manager is the one who makes the decisions, and the team only applies them. Regarding the participation of employees with their professional suggestions in the formulation of decisions, especially in defining strategic directions of bid creation, managers have stated through interview that employees have little impact on this process.

So even though most managers (70%) stated that workers feel like important elements from the hotel's overall team, only 17% of managers accept employee suggestions if they are sound, 56% only sometimes admit professional suggestions, while the remaining 27% do not accept the professional opinions of employees.

Of particular interest in this study was to see how managers take the risk of making decisions. The vast majority of respondents stated that they avoid the risk, while 40% make a risk assessment and based on it make decisions. The rest are managers who risk without analysis and evaluation, Figure 9.

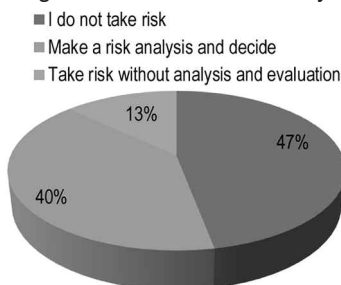


Figure 9. Structure of managers according to the level of undertaking the risk

In order to see the level of motivation that exists among the employees, within the framework of the survey, we asked the managers do they motivate their employees and how?

Most of the surveyed managers (43%) said that as a motivational tool for employees use salary increase, while the vast majority of managers (34%) believe that the workers for their work should receive a fixed salary. Only 13% of surveyed managers believe that establishing and maintaining a good interpersonal relationship climate is a tool that will result in greater motivation for employees. Improving working conditions as a factor for greater motivation and better employee performance is an option for only 10% of managers, Figure 10.

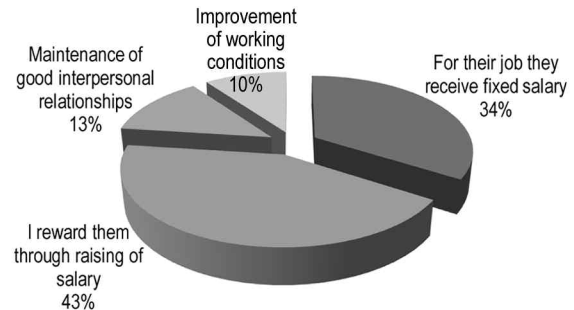


Figure 10. Managers structure according to the motivation of employees

From the managers' responses in relation to controlling hotel activities, all managers have responded that they supervise their employees during their activities.

When we asked the managers about how they check their employees at the hotel, most managers (93%) said they conduct surveys to their guest to see their level of satisfaction. 57% of managers stated that they did quality control through the realization of ISO standards, while checking by tracking the hotel's financial performance reports was the answer of 30% of the interviewed managers.

4. Conclusion and Recommendations

The majority of the managers of the hotel establishments have a higher education, but there is a relatively small number of professionals in the field of tourism and hospitality industry. There is a considerable number of managers that have a university degree in natural sciences, which presents a weakness, in terms of hospitality industry domain in Kosovo.

Most of the managers are aged between 30 and 40, a fact which enabled them to develop their competences in a permanent way.

Most of the managers (78%), are bilinguals, 51% of whom speak only one foreign language whereas the others speak two or more foreign languages.

The manager's vision is to penetrate/breakthrough in the newest marketplaces through innovations in the offerings.

However, most of the managers work on implementing the existing offer of the hotel (hospitality industry), but there is a very important group of the managers which bring about innovations in the hospitality industry offering.

Although managers believe that it is important for the employees to feel as a significant part of the hotel team, most of them rarely accept the opinions and professional views of the employees in the hotel, or (27%) do not include them at all in the company's creative process.

Taking in consideration the manager's high percentage of decision making, it can be concluded that hospitality industry in Kosovo, does not create an atmosphere of dividing and transferring/conveying the individual's knowledge, which makes it difficult to create a qualitative and attractive hospitality/hotel product.

It is worthy of noting that the majority of the surveyed managers, do not look at the new and challenging situations as an opportunity of the hotel's progress, rather as an obstacle in realizing the programs. They need to be well analyzed, before

finding a solution that could have a negative effect on the competitive advantages in the market. Every delayed reaction, foils the successful accomplishment of the hospitality/hotel performances.

Almost half of the managers have declared that they attempt to elude risky situations, namely, they are contented with the existing hospitality activities. 13% of the managers take risks, but they do not analyse and assess the risk, which is negative as well, since it leads to making fast and unwise decisions. On the other hand, 40% of the managers, initially assess the risk and then make a decision. This concluded that the entrepreneur abilities of the managers are not represented and developed in an appropriate manner.

A small percentage of group-decision making, as well as a small number of generating and using the creative ideas of the employees, states that the advantages of group work, which is very important especially in the area of hospitality industry, are not utilized.

Managers pay very little attention to improving their knowledge, abilities and experiences, i.e. their competences.

Managers, in terms of training and developing their competences, they tend to train more and gain experience in the workplace, mainly through the coaches. There's little training through seminars and courses, whereas exists a considerable percentage of the managers who develop their competences in an independent manner.

Concerning the assurance of developing the human staff in hotels, the number of the managers who in a planned way orientate the development of their employees is small, compared to the managers who complete trainings from time to time, with a request from their employees. A considerable number of managers think that extra training is not necessary for the employees, or that they need to perfect/improve their abilities by themselves.

The majority of the managers believe that knowledge should be perfected through experience of the other employees, whereas a smaller percentage believes that this might be adjusted through attending seminars and courses. Nevertheless, they fail to see the importance of constant knowledge training, but, think that sometimes a process of advancement ought to be organized.

From the answers of the managers, it can be concluded, that the hotel has a nice and peaceful working atmosphere, whereas the employees are satisfied with the rapport they have with their managers, and most of them, completely trust their managers.

Managers perform quality control mostly through the level of

guest satisfaction, but do not undertake risk. Most managers ignore the facts that lead to a lack of innovation and there is no variety of bidding, which suppresses the hypothesis that: Managers for the future of hotel supply think strategically.

There is a significant presence of lack of planned orientation for the development of managers and other employees at the hotels.

Based on this can be given these recommendations:

- ❑ To create a quality and attractive tourist product in Kosovo as a tourist destination that has potential for tourism development, it is necessary to develop a strong competition in the hotel business.
- ❑ Since knowledge is an important component of management, professional knowledge, visions, leadership, culture, competence, and team collaboration should be part of the knowledge management in hotels.
- ❑ Knowledge management in hotels in Kosovo is not implemented satisfactorily. Formal education needs to be constantly upgraded and modernized through various forms of training and development and implemented, supported by an appropriate organizational culture in which the free circulation of information and exchange of ideas between managers and other employees will be stimulated.
- ❑ Hotel managers should be aware of the importance and the necessity of organizing teamwork, as well as the creation of an atmosphere of mutual cooperation. Also they should share and expanse the knowledge among employees, encourage creative solutions of employees which will enable managers to get the best out of their employees.
- ❑ In order to be able to offer attractive offers in the international tourism market, managers need to think strategically for the creation of an innovative range of services that will fully satisfy the expectations of contemporary tourists.
- ❑ In order to be a successful leader, managers must be good motivators for employees, above all by meeting their material expectations.
- ❑ Hotel managers should plan to develop the skills of employees through different methods.
- ❑ To enable managers to meet the above mentioned suggestions, they must continually advance their competencies, respectively expand their knowledge and refine their skills.

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Determinants of Job Satisfaction and Performance of Auditors: A Case Study of Indonesia

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Abstract

Auditor performance is a very significant element for a public accounting firm. If the auditors are able to carry out their work according to the expectations, the service to the client will be maximized. The main purpose of this study is to analyze the factors (i.e., leadership style, job satisfaction, continuance, affective, and normative commitment) that affect job satisfaction and auditor performance. The sample is auditors who worked in a public accounting firm in Semarang. Data collection is conducted using a structured questionnaire, which is analyzed by applying multiple regression. The results of the study show that 1) leadership style has a positive effect on job satisfaction; 2) continuance and affective commitment have a positive effect on job satisfaction; 3) normative commitment has no effect on job satisfaction; and 4) job satisfaction has a positive effect on auditor performance.

Keywords: leadership style; organizational commitment; job satisfaction; auditor performance.

1. Introduction

The public accounting firm is an organization that aims to provide services to clients. The service is carried out by the auditor so that the auditor plays a very important role. Auditors are very valuable assets for public accounting firms. Partners of public accounting firms should create conditions to encourage their auditors to provide the best performance. It is possible for auditors to feel bored in conducting audit assignments. This feeling of saturation can result a decrease in auditor performance.

Auditors sometimes face difficult circumstances, specifically when the client will immediately issue audited financial. This condition causes the auditor feel a depressed position. However, auditors must be able to manage time well in order to carry out tasks according to audit standards and follow all stages of audit procedures. This is done because the auditor is required to make good professional considerations in order to be able to provide the right view in the assignment. The auditor should always remember that the views given will be used by users as a basis for making decisions. Therefore, auditors are required to work objectively in order to provide views that are appropriate to the clients.

Performance is a very important element for an auditor. Performance is often used as a basis for assessing the accuracy of auditors in carrying out audit assignments. Auditors who do not show good performance can receive sanctions and even losing their jobs. Conversely, if the auditor can carry out the work in accordance with the assignment, there will be wide opportunities to maintain membership in the organization. On the basis of good performance, auditors can also get the opportunity to be promoted to a higher level.

Several years ago, there were cases caused by violations of the code of ethics, audit standards and low auditor performance such as Enron and Anderson accounting firm, PT KAI, and BRI branch Jambi in 2010 that have an impact on the poor reputation of public accounting firms. On the basis of the explanation

above, this research is important to do to test various factors that influence auditor performance.

Job satisfaction is one of the factors that can influence auditor performance. The higher employee satisfaction to the work, the more it will affect the performance. When employees feel satisfied with their work, employees have positive thoughts about the work. This condition will encourage them to show the best performance. Some studies have found that job satisfaction has a positive effect on employee performance (Javed, 2014; Owusu, 2014, 2014; Robbins & Judge, 2013; Singh & Jain, 2013).

Leadership style is a factor that has an effect on job satisfaction. Leadership style is a way used by leaders to direct subordinates to achieve organizational goals. The more suitable of employee towards the leadership style, the more job satisfaction will be increased. Conversely, if the auditor feels uncomfortable to the leadership style, it will cause dissatisfaction with the job. Some studies find leadership styles have a positive effect on job satisfaction (Bateh & Heyliger, 2014; Joo & Ready, 2012; Long, Yusof, Kowang, & Heng, 2014; Mehrad & Fallahi, 2014; Siddiqui & Jamil, 2015; Sun, Gergen, Avila, & Green, 2016).

Another factor that can influence auditor job satisfaction is organizational commitment. Organizational commitment is defined as the relative strength of individual identification of the organization and its involvement in the organization (Parker & Kohlmeyer, 2005). Previous research examined the effect of organizational commitment on satisfaction by finding that organizational commitment has a positive effect on job satisfaction (Adekola, 2012; Anis, Rehman, Rehman, Khan, & Humayoun, 2011). Different results found that organizational commitment had no effect on job satisfaction (Gangai & Agrawal, 2014).

This study will examine the effect of three dimensions of organizational commitment (i.e., affective, normative and continuance) on job satisfaction. Affective commitment is related to emotional, identification, and employee involvement in an organization. Employees with high affective commitment, they

continue to join the organization because of the desire to remain a member of the organization (Tet & Meyer, 1993). Normative commitment is the feeling of employees about the obligations that must be given to the organization. Employees continue to join the organization because they think that is what they should do as employees; Continuance commitment is an employee's perception of the benefits of joining an organization and the losses that will be faced if leaving the organization. Employees need an organization because if they leave it, they will suffer losses.

Some studies that examine the effect of three dimensions of organizational commitment find that effective commitment, normative commitment, and continuance commitment positively influence auditor job satisfaction (Hadijah, 2012). However, Setiawan & Ghozali (2013) found that affective commitment only affects job satisfaction while the other two dimensions have no effect.

Based on the research and phenomena gap of the previous study, this research is important to investigate. The main purpose of this study is to examine the effect of (1) leadership style on job satisfaction, (2) affective commitment on job satisfaction, (3) normative commitment on job satisfaction, (4) continuance commitment on job satisfaction; and (5) job satisfaction on auditor performance.

2. Literature Review

2.1. Attribution Theory

Attribution theory states how a person explains the causes of the behavior of others and himself. The cause of someone doing something can be derived from internal (dispositional attribution) and external (situational attribution) (Luthans, 2005). Internal causes tend to lead to aspects of individual behavior or something that already exists in a person such as personal nature, self-perception, ability, and motivation. External causes are more directed towards the environment such as social conditions, social values, and community views. On the basis of the theory, the actions of an auditor to provide the best performance for the organization can be caused by the internal factors of the individual concerned and environmental factors.

2.2. Leadership Style

Leadership style is a way to influence others so that the person is willing to do the will of the leader to achieve organizational goals (Luthans, 2005). Robbins & Judge (2013) argue that leadership style is basically the embodiment of three components, namely the leader itself, subordinates, and situations in which the leadership process is realized. Starting from these thoughts, leadership styles can influence other people or groups to do work that has been set to the maximum in accordance with the goals of the organization. The organization will run well if the leader has the skills, and has skills such as technical skills, understanding of human and conceptual attitudes.

2.3. Organizational Commitment

Parker & Kohlmeyer (2005) define organizational commitment as the relative strength of individual identification of an organization and involvement in an organization. There are several approaches to the definition of organizational commitment, namely, approaches based on attitudinal commitment and behavioral based approaches (Meyer & Allen, 1991). Tet & Meyer (1993) describes the two approaches as follows. Attitudinal commitment focuses on the process of how a person thinks about his relationship with the organization or determines his attitude towards the organization. While behavioral commitment relates to the process in which individuals feel bound to a particular organization and overcome every problem they face.

Meyer & Allen (1991) formulated three dimensions of commitment in the organization, namely: affective, continuance, and normative. Affective commitment describes the emotional relationship of members to the organization, identification with the organization, and the involvement of members with organizational activities. Members of the organization with high affective commitment will continue to be members of the organization because they really have a desire for it. Continuance commitment to discuss awareness of organizational members will suffer losses if they leave the organization. Normative commitment describes the feeling of attachment to continue to be in the organization. Members of organizations with high normative commitments will continue to be members of the organization because they feel they should be within the organization (Meyer, Stanley, Herscovitch, & Topolnysky, 2002).

2.4. Job Satisfaction

Robbins & Judge, (2013) explain that job satisfaction describes whether or not someone likes the various dimensions of the work done. According to Davis & Newstorm (2006), job satisfaction is a set of feelings about whether or not employees work. Luthans (2011) defines job satisfaction as a happy emotional state or positive emotion that comes from evaluating one's work or work experience. According to Handoko (2011), job satisfaction is a pleasant or unpleasant emotional state in which employees view their work. Positive emotions a person has towards work are obtained from work experience. The pleasure felt by employees will have an effect on a positive attitude for these employees. If an employee feels satisfied at work, they will feel happy, safe and comfortable to keep working for the organization so that they can provide the best performance.

2.5. Auditor Performance

Mulyadi (2010) defines auditor performance as a public accountant who conducts objective audit assignments on the financial statements of another firm with the aim of determining whether the financial statements present fairly in accordance with generally accepted accounting principles, in all material matters, and results of operations firm. Blumberg & Pringle (1982) suggested that individual performance is a function of three dimensions, namely desire, capacity, and possibility. Desire is a motivator that encourages employees to perform tasks well within the organization. Capacity is the ability, skill, and energy that an individual has to carry out the work assigned to him. Meanwhile, it is likely a work environment factor that facilitates performance. Based on the basis of the definition, it can be concluded that when employees have the motivation to carry out the tasks carried out in the organization and the employee has the ability to carry out these tasks, a good performance will be created. Good performance will be maximized if facilitated by the organization.

3. Hypotheses Development

3.1. Leadership Style and Job Satisfaction

Leadership style is a way to influence others so that the person is willing to do the will of the leader to achieve organizational goals (Luthans, 2005). If employees feel that they are compatible with the leadership style, they can carry out their duties well so that employees become more pleased with the job. The feeling of this employee will give positive emotions to the work and have an impact on increasing job satisfaction. Several studies have found that leadership styles influence job satisfaction (Bateh & Heyliger, 2014; Fitriany, Gani, Siregar, Marganingsih, & Anggraita, 2011; Joo & Ready, 2012; Long et al., 2014; Mehrad & Fallahi, 2014; Siddiqui & Jamil, 2015; Sun et al., 2016; Wikaningrum, Udin, & Yuniawan, 2018). Therefore,

H1: Leadership style has a positive effect on job satisfaction

3.2. Affective Commitment and Job Satisfaction

Affective commitment describes the emotional relationship of members to the organization, identification with the organization, and involvement of members with activities in the organization (Meyer & Allen, 1991). Members of organizations that have high affective commitment will always try to maintain membership in the organization because they really want it. The auditor will reflect psychologically attachments to the organization that employs him by always being present in the office and happy to work. Auditors who have a high affective commitment tend to have a professional attitude and ultimately can increase job satisfaction. Some studies have found that affective commitment has a positive effect on job satisfaction (Hadijah, 2012; Setiawan & Ghozali, 2013). Therefore,

H2: *Affective commitment has a positive effect on job satisfaction*

3.3. Continuance commitment and Job Satisfaction

Continuance commitment related to the awareness of organizational members will suffer losses if they leave the organization. Members of the organization will always maintain their membership because they feel they need to be members of the organization (Meyer et al., 2002). Auditors with high continuance commitment will continue to maintain membership in the organization because they have the awareness that they will suffer large losses if they leave the organization. The higher the continuance commitment held by the auditor, the higher the perceived job satisfaction. Research conducted by (Hadijah, 2012; Setiawan & Ghozali, 2013) found that continuance commitment had a positive effect on auditor job satisfaction. Therefore,

H3: *Continuance commitment has a positive effect on job satisfaction*

3.4. Normative Commitment and Job Satisfaction

Normative commitment describes the feeling of attachment to continue to be in the organization. Individuals with high normative commitment will always try to maintain membership in the organization because they feel there is an obligation (Meyer et al., 2002). This feeling will motivate the auditor to behave well and take appropriate actions, fulfill obligations properly in the organization so that the auditor will be more satisfied with his work. The auditor believes that it has become the duty and obligation of an employee to remain loyal to the public accounting firm where they work. Auditor awareness of the responsibility for maintaining membership in the organization can result in the emergence of positive attitudes towards work so that job satisfaction will increase. Research conducted by Hadijah (2012); Setiawan & Ghozali (2013) found that normative commitment negatively affected job satisfaction. Therefore,

H4: *Normative commitment has a negative effect on job satisfaction*

3.5. Job Satisfaction and Auditor Performance

Job satisfaction is defined as a positive feeling in a job, which is the result of the evaluation of various aspects of the work done (Robbins & Judge, 2013). An employee who feels satisfied with his job must be a productive employee. Someone who is happy or satisfied with his job will have more work motivation, work harder, be more efficient in doing work and ultimately have better performance (Fitriany et al., 2011). If the employee is satisfied with his job, the employee is more positive about his job. This condition will cause employees to be more happy to do a good job and ultimately result in increased employee performance. However, if employees feel dissatisfied with their work, it will result in a decrease in employee per-

formance (Fitriany et al., 2011). Some studies have found job satisfaction has a positive effect on performance (Akbar, Udin, Wahyudi, & Djastuti, 2018; Fitriany et al., 2011; Khan, Nawaz, Aleem, & Hamed, 2012; Mahdi, Zin, Nor, Sakat, & Naim, 2012; Sutanto & Gunawan, 2013; Udin, Handayani, Yuniawan, & Rahardja, 2017). Therefore,

H5: *Job satisfaction has a positive effect on auditor performance*

4. Research Methods

4.1. Sample

The sample in this study was 82 auditors working in public accounting firms in Semarang. To determine the sample, this study uses a purposive sampling, with the criteria that the auditor has worked in a public accounting firm for 2 years. The reason for doing this criterion is that auditors who work less than two years do not have an attachment to a public accounting firm, so that commitment to the organization cannot be detected. Data collection is done using a questionnaire that is directly distributed to respondents.

4.2. Measurement

Consideration leadership style is measured by using instruments developed by (Gibson, Ivancevich, & Donnelly, 1996) namely supervisors who are close to subordinates, mutual trust between superiors and subordinates, superiors appreciate subordinate ideas, superiors appreciate criticism from subordinates, and superiors communicate open and pleasant with subordinates. *Affective commitment* is measured using instruments from (Meyer & Allen, 1991) namely happiness in the organization, pride in the organization, attachment to the organization. *Continuance commitment* is measured using instruments from (Meyer & Allen, 1991) namely attachment to the organization, ownership of the organization, dependence on the organization. *Normative commitment* is measured using instruments from (Meyer & Allen, 1991) namely commitment to the organization, loyalty to the organization, loyalty to the organization. *Job satisfaction* is measured using the job descriptive index instrument adopted from the job satisfaction survey by (Spector, 2001) namely salary, promotion, benefit, communication, and co-workers. *Auditor performance* is measured using instruments developed by (Kalbers & Fogarty, 1995).

4.3. Data Analysis

The collected data is first tested for validity by using factor analysis, while the reliability test is done by looking at the Cronbach alpha value. The next step to do the analysis is using multiple regression.

5. Results

Descriptions of respondents in this study are shown based on gender, work experience, and level of education.

Classification	Number of respondents	Percentage
Female	54	65.85
Male	28	34.15

Table 1. Gender of Respondents

Table 1 shows that the number of female respondents was 54 people or 65.85%, while male respondents were 28 people or 34.15%. From this description, it can be described that the female auditors who participated in this study were more than the male auditors.

Table 2 shows that there are 41 auditors have work experience of 2-5 years or 50%. Respondents with a work period of 6-9 years were 32 people or 39.02%. The respondents with a

work period of more than 10 years are 9 people or 10.98%.

Classification	Number of respondents	Percentage
2-5 years	41	50.00
6-9 years	32	39.02
> 10 years	9	10.98

Table 2. Work Experience of Respondents

Table 3 shows that respondents who have diploma education levels are 26 people or 31.71%. Undergraduate education level is 48 people or 58.54%, while respondents with S2 education level are 6 people or 7.32%, while the number of respondents who have S3 education level is 2 people or 2.43%. Based on the explanation, it can be seen that respondents with undergraduate education were the ones who participated most in this study.

Classification	Number of respondents	Percentage
Diploma	26	31.71
S1	48	58.54
S2	6	7.32
S3	2	2.43

Table 3. Educational Levels of Respondents

5.1. Analysis of Multiple Linear Regression

This study uses regression analysis to examine the effect of leadership style, affective commitment, continuance commitment, and normative commitment on job satisfaction and performance.

Variable	Coefficients Beta	T	Sig	Result
Leadership style	.311	2.903	.005	Accepted
Affective commitment	.157	1.909	.021	Accepted
Continuance commitment	.065	.911	.015	Accepted
Normative commitment	.611	8.343	.053	Rejected

Table 4. Hypothesis Testing of Model 1

Table 4 shows that leadership style, affective commitment, and continuance commitment positively influence auditor job satisfaction. The normative commitment has no effect on job satisfaction.

Table 5 shows that job satisfaction has a positive effect on auditor performance.

Variable	Coefficients Beta	T	Sig	Result
Job satisfaction	.206	4.107	.000	Accepted

Table 5. Hypothesis Testing of Model 2

6. Discussion

6.1. Leadership Style and Job Satisfaction

The test results show that the consideration leadership style has a positive effect on auditor job satisfaction. This can be explained if leaders are friendly, trust each other, respect subordinates, open and pleasant can have a positive effect on auditor job satisfaction. If the auditor feels suitable with the leadership style of his leader, they can carry out their duties properly so that the auditor has a sense of pleasure in carrying out his duties and has a positive perception on the job. The auditor's pleasure and positive thoughts on work will lead to increased job satisfaction. This is because the auditor performs tasks sometimes encountered obstacles, but if the leader gives full trust, respect, and communicate openly and pleasantly to the subordinates, the auditor can overcome these obstacles and finally be able to carry out their duties properly.

This finding supports attribution theory which states that a person's behavior will be influenced by internal and external factors. Leadership style is an external factor because it originates from outside the auditor, it turns out able to increase job satisfaction. If the auditor feels suitable with the leadership style of his superiors, it will cause the auditor to have the perception that the work carried out is fun so as to increase satisfaction with the job. The results of this study support research (Bateh & Heyliger, 2014; Fitriany et al., 2011; Joo & Ready, 2012; Long et

al., 2014; Mehrad & Fallahi, 2014; Siddiqui & Jamil, 2015; Sun et al., 2016; Yuniawan, Putri, and Udin, 2017) who find leadership style influences job satisfaction.

6.2. Affective Commitment and Job Satisfaction

The results of examining the effect of affective commitment on job satisfaction showed a positive effect. This finding shows that if auditors have a sense of happiness in the organization, pride in the organization, and attachment to the organization can affect auditor job satisfaction. The higher the feeling of happiness felt by auditors in the organization will result in more pleased with the work they have. The pride of an auditor joins the organization, and the more attached to the organization will lead to a positive perception of the work done. The auditor's happiness and pride at work will increase satisfaction with work. All these feelings will encourage an auditor to exert greater energy for the organization so that the perceived job satisfaction will be higher.

This finding supports attribution theory which states that internal and external factors can influence a person's behavior. Affective commitment which is an internal auditor factor is proven to influence auditor job satisfaction. If the auditor feels happy to be part of the organization, they will feel happy to carry out the work given to him and try to carry out the work with a sense of pride for the development of the organization resulting in an increase in auditor job satisfaction. These results support the research conducted by Hadijah (2012); Setiawan & Ghozali (2013) who found that affective commitment has a positive effect on job satisfaction.

6.3. Continuance commitment and Job Satisfaction

Based on the results of processed data, it can be seen that continuance commitment has a positive effect on auditor job satisfaction. When the auditor has a sense of attachment to the organization, has an organization, and there is a dependency on the organization will have an effect on job satisfaction. These feelings arise because of awareness of the loss that will be experienced when leaving the membership of the organization. This awareness will encourage the auditor to carry out the work that is his responsibility so that he does not suffer losses. When the auditor is able to do each assignment in accordance with the expectations of the firm will cause a sense of pleasure and positivity in the job.

This finding supports attribution theory which states that a person's behavior will be influenced by internal and external factors. Continuance commitment is an internal auditor factor that is able to increase auditor job satisfaction. The higher the awareness of an auditor to experience a loss when breaking away from the organization where they work will motivate the auditor to carry out the work properly so that auditor satisfaction will also increase. The results of this study support the research conducted by Hadijah (2012); Setiawan & Ghozali (2013) who found that continuance commitment had a positive effect on auditor job satisfaction.

6.4. Normative Commitment and Job Satisfaction

Test results show normative commitment does not affect auditor job satisfaction. This means that if the auditor persists in the firm simply because he feels it is an obligation alone does not affect the auditor's job satisfaction. Even though auditors are committed to the organization, loyal to the organization, and loyal to the organization, creative ideas are not created because they think they should do the work given by the firm.

This finding cannot support attribution theory which states that a person's behavior will be influenced by internal and external factors. Employees who value and identify organizational goals tend to have better performance than employees who only follow obligations. The results of this study support the research conducted by (Hadijah, 2012).

6.5. Job Satisfaction and Auditor Performance

The results of this study indicate that job satisfaction has a positive effect on auditor performance. Auditors who feel satisfied with their work will carry out their tasks more productively. An auditor who is happy or satisfied with his job will have more motivation to work harder, be more efficient and ultimately have better performance (Fitriany et al., 2011). If the auditor feels satisfied with his work, the auditor will be more positive in assessing his work. This will encourage the auditor to issue the best ideas in carrying out their duties. Thus the task can be done better and more effectively so that its performance will also increase.

This finding supports attribution theory which states that a person's behavior will be influenced by internal and external factors. Job satisfaction which is an internal auditor factor is proven to have a positive effect on auditor performance. Internal factors within the auditor will motivate the auditor to be more enthusiastic in working so that his performance will increase. This study supports the results of the study of Fitriany et al. (2011); Javed (2014); Owusu (2014); Singh & Jain (2013); Sulistiyani, Udin, and Rahardja (2018) which found that job satisfaction has a positive effect on employee performance.

7. Conclusion

The conclusions of this study are as follows: 1) leadership style has a positive effect on job satisfaction. This means that if a leader has friendliness attitude, respect for subordinates, open and pleasant can have a positive effect on job satisfaction; 2) Affective commitment has a positive effect on job satisfaction. If the auditor feels emotionally bound, happy, and proud of the public accounting firm will cause more satisfied with the job; 3) Continuance commitment has a positive effect on job satisfaction. If the auditor feels more loss if he has to leave the public accounting firm, he will encourage the auditor to work harder. This condition will result in a higher level of auditor satisfaction at work; 4) Normative commitment has no effect on job satisfaction. This finding indicates that if the auditor feels that carrying out the task only to abolish obligations, it will not have an impact on job satisfaction; 5) Job satisfaction has a positive effect on auditor performance. This finding implies that the higher auditor satisfaction with the work will impact on increasing enthusiasm in work so that the auditor performance will be higher.

The limitation of this study is no interviews were conducted to the respondents so that the respondents' background in choosing answers could not be clarified. Researchers also have not included all variables that influence job satisfaction. Based on this, further research can add other variables that might influence work satisfaction such as culture, training, and task complexity.

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Using Structural Equation Modeling Approach to Investigate the Impact of Technological Factors on User Satisfaction

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Abstract

The objectives of this study were to identify the impact of technological factors on user satisfaction, and to test the proposed model. Data were collected quantitatively from employees working in two telecommunication companies in Yemen. 202 completed questionnaires were received. Data analyzed by using SPSS statistical program. In addition, the model was tested with structural equation modeling techniques using Amos software. The findings showed that technological factors (information quality, and service quality) impacted on user satisfaction. The findings of this study may be helpful to organizations, where organizations can utilize this model for successful adoption of technology towards improving user satisfaction.

Keywords: technological factors; user satisfaction; structural equation modeling; Yemen.

1. Introduction

There are a lot of organizations in Yemen that used technology to increase the user satisfaction and improve the individual performance. The use of technology has become necessary for any organization to improve the efficiency and productivity. According to Alqaatary & Kadam [1] the financial institutions in Yemen are investing in technology because they anticipate reductions in costs through streamlining transactions processing and eliminating errors, as well as providing better service to their customers and attracting new customers by offering new products and services. According to Al-Mamary et al. [2] organizations in Yemen invest in information technology and systems because they provide economic value to the business. While recognizing the importance of the technology in the organization, the majority of Arab countries in Middle East and underdeveloped countries are still dealing with issues in adopting the technologies. According to Al-Mamary et al. [3] the technology one of the most important tools in Yemeni organizations, which aims to provide quality information to users, to assist in increase the user satisfaction.

User satisfaction is the terminology used to describe whether users are happy, contented and fulfilling their desires and needs at work [4]. Petter et al. [5] defined the user satisfaction as user level of satisfaction with the information systems. According to Hasan et al. [6] satisfaction is the degree to which a user believes that the system and the information available to them meet their requirements. According to Sageer et al. [4] the factors that affect on user satisfaction are organization development factors, Job security factors, Work task factors, Policies of compensation and benefit factor and opportunities which give satisfaction to user such as promotion and career development also has been described. According to Al-Mamary et al. [7] the factors that affect on user satisfaction are technological factors (system quality, information quality, service quality), organizational factors (top management support, training), and people factors (computer self-efficacy, and experience).

Wu & Wang [8] & Al-Mamary et al. [9] supported that the system quality, had a significantly positive influence on user satisfaction. Iivari [10] supported that the perceived system quality is a very significant predictor of user satisfaction. In addition, Urbach et al. [11] supported that the information quality had a positive influence on user satisfaction. Petter & Fruhling [12] supported that the information quality was positively associated with user satisfaction. Ainin et al. [13] supported that there was a significant relationship between information quality and user satisfaction. Moreover, Lin [14] supported that the service quality positively affected user satisfaction. Wang [15] supported that the service quality would positively affect user satisfaction. Brown & Jayakody [16] supported that the service quality had a positive effect on user satisfaction. Teo et al. [17] supported that the service quality was positively associated with satisfaction.

The problem of this study is that the majority of Arab countries are still dealing with issues related to technology adoption and success factors. Thus, the organizations should to identify the technological factors that affect on user satisfaction to improve the efficiency, productivity and the performance in general. Terms that identify the factors accurately, will have positive role on user satisfaction and successful adoption of technology in Yemeni organizations in general.

Based on the overview of the study, three research objectives are formulated that are described as follows: RO1. To investigate the relationship between system quality and user satisfaction. RO2. To investigate the relationship between information quality and user satisfaction. RO3. To investigate the relationship between service quality and user satisfaction.

The model that present relationship between system quality, information quality, and service quality with user satisfaction is well-known. But, to determine the generalisability of the research model, further empirical studies in other geographical locations (e.g., Yemen, Malaysia, United Kingdom, United State, and Australia) and cultural (e.g., Arabic culture, Eastern, Western and Japanese culture) contexts are required to establish whether the research constructs in the model vary

across countries and cultures. In other words, model testing with different data set across countries is needed before generalization of the results can be widely accepted. This study tests the relationship between system quality, information quality, and service quality with user satisfaction in context of Yemen.

2. Literature Review

2.1. Technological Factors

Delone and McLean IS success model is one of the most widely applied model in field of information systems success. This model focuses on the technological factors and its impact on use of technology and user satisfaction.

In addition, TOE framework also focused on technology factors, but these factors are not consistent with the other researchers. Most of researchers mentioned that, technology factors can be related to the system quality, information quality and service quality.

In summary, the IS success model has been cited in thousands of scientific papers. Based on citations, this theory is considered to be one of the most influential theories in the field of information systems.

Therefore, this study adopted the technological factors that mentioned in Delone and McLean model, namely system quality, information quality, and service quality.

2.1.1. System Quality

DeLone & McLean [18] defined system quality as measures of the information processing system itself in evaluating the contribution of information systems to the organization. Petter et al. [19] defined system quality as the desirable characteristics of an information system.

2.1.2. Information Quality

Petter et al. [19] defined information quality as the desirable characteristics of the system outputs. DeLone & McLean [18] defined information quality as measures of information system output rather than measure the quality of the system performance.

2.1.3. Service Quality

Petter et al. [19] defined service quality as the quality of the support that system users receive from the IS department and IT support personnel.

2.2. User Satisfaction

According to Su et al. [20] user satisfaction is measuring the consequences of users' response by using the output information of system. According to Halawi et al. [21] user satisfaction refers to the recipient response to the use of the output of IS.

2.3. Conceptual Model

Based on the previous researches which showed the influence of system quality, information quality, and service quality on user satisfaction, the researcher build the research model as follow.

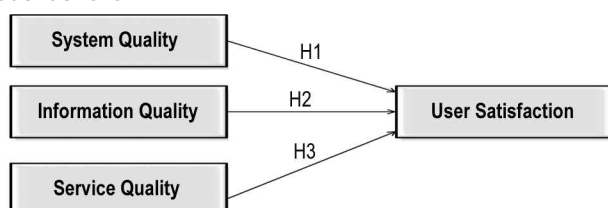


Figure 1. Research Model

In Figure 1 the researcher assumes that system quality, information quality, and service quality effect on user satisfaction. These hypotheses are also supported by other researchers like:

Park et al. [22] supported that the system quality has a positive influence on user satisfaction. Urbach et al. [11] supported that the system quality has a positive influence on user satisfaction. Petter and Fruhling [12] supported that the system quality is positively associated with user satisfaction. Ainin et al. [13] supported that the system quality will have a significant, positive relationship with user satisfaction level.

In addition, Landrum et al. [23] supported that the information quality was positively correlated with user satisfaction. Petter and McLean [24] supported that there is a significant, positive relationship between information quality and user satisfaction. Lee and Yu [25] supported that the information quality would positively affect user satisfaction. Park et al. [22] supported that the information quality had a positive influence on user satisfaction. Chen [26] supported that the information quality is positively associated with satisfaction. Urbach et al. [11] supported that the information quality had a positive influence on user satisfaction. Petter and Fruhling [12] supported that the information quality was positively associated with user satisfaction.

Moreover, Khayun and Ractham [27] supported that the perceptions of service quality had positive influence on user satisfaction. Lin and Lee [28] supported that the service quality had a positive influence on user satisfaction. Lin [14] supported that the service quality positively affected user satisfaction. Wang [15] supported that the service quality would positively affect user satisfaction. Brown and Jayakody [16] supported that the service quality had a positive effect on user satisfaction. Teo et al. [17] supported that the service quality was positively associated with satisfaction.

Based on the previous researchers, the hypotheses are stated as follows:

H1 – There is a positive relationship between system quality and user satisfaction.

H2 – There is a positive relationship between information quality and user satisfaction.

H3 – There is a positive relationship between service quality and user satisfaction.

3. Methodology

3.1. Instrument Design and Measures

The questionnaire developed in this study based on the literature review. The questionnaires are divided into 5 parts with a total of 33 questions. The questionnaire in section A is about

Concepts	Items	Sources
System Quality	1. Ease of use 2. Ease of learning 3. System reliability 4. Response time 5. System flexibility 6. Sophistication 7. Intuitiveness	Petter et al. [19] & Al-Mamary et al [29]
Information Quality	1. Relevance 2. Understandability 3. Accuracy 4. Conciseness 5. Completeness 6. Timeliness 7. Usability	Petter et al. [19] & Al-Mamary et al [29]
Service Quality	1. Responsiveness. 2. Accurate service. 3. Reliability. 4. Technical competence. 5. Empathy of the personnel staff. 6. Assurance.	& Petter et al. [19] & Al-Mamary et al [29] & Delone & Mclean [30] .
User Satisfaction	1. The system meets our needs. 2. Satisfied with the system efficiency. 3. Satisfied with the system effectiveness. 4. The system is successful. 5. The system meets our expectations. 6. Overall, we satisfied with the system.	Seddon & Kiew [31] & Palvia [32]

Table 1. Items that Used to Measure the Variables

demographic of respondent. The questionnaire in section B is about system quality. The questionnaire in section C is about information quality. The questionnaire in section D is about service quality. Lastly, the questionnaire in section F is about user satisfaction. The items that used to measure each of the latent variables in the study are summarized in table 1.

3.2. Data Analysis Method (Quantitative Method)

The quantitative method is applied to collect all data for this study which is known as survey approach. According to Lavrakas [33] a survey is a research method used by social scientists to empirically and scientifically study and provide information about people and social phenomena. A survey is a means of gathering information about the attitudes, behaviors, or the opinions of a large group of people, referred to as a population.

Data was analyzed by using the appropriate descriptive analysis. Descriptive analysis allows for the demographics of the respondents to be detailed. This study uses frequency, percentages, means and standard deviations for the dependent and independent variables. While validate to model using structural equation modeling techniques. The proposed research model was analyzed using AMOS Graphics software. According to Awang [34] AMOS (Analysis of Moments Structures) is one of the newest software developed and available in the market which enables researchers to model and analyze the inter-relationships among constructs having multiple indicators effectively, accurately, and efficiently.

3.3. Reliability

According to Hair et al. [35] reliability is an assessment of the degree of consistency between multiple measurements of a variable. Reliability extent to which a variable or set of variables is consistent in what it is intended to measure. In this study the reliability was measured by applying the Cronbach's alpha test to the overall measure. Cronbach's Coefficient Alpha is method used to measure the reliability between various questionnaires items. The generally agreed upon lower limit for Cronbach's alpha is 0.70, although it may decrease to 0.60 in exploratory research. Table 2 shows the reliability for each variable.

Item	Cronbach's Alpha	No. of Items
SysQ	0.846	7
IQ	0.881	7
SerQ	0.917	6
US	0.930	6

Table 2. Testing Reliability Result

4. Results

4.1. Demographic Profiles

Table 3 shows the following: 50% of the respondents from Yemen mobile company, 50% from Sabafon company. 48% of the respondents from information system department, 32.7% from customer service department, 7.9% from accounting and finance department, 6.9% from human resource department, and 4.5% from marketing and sales department. 83.2% of the respondents are male, and 16.8% are female. 47.5% of the age of the respondents less than 30, 48.5% between 30 and 40, 4.0% between 40 and 50. 1.0% of the respondents have high school, 5.4% have diploma, 85.1% have bachelor degree, 7.9% have master degree, and 0.5% have PhD. 26.7% of the respondents are administrative staff, 35.6% are technical support staff, 6.4% are heads of departments, 2.5% are managers, and 28.7% from another position. 17.3% of the respondents working experience less than 2 years, 24.3% working experience between 2 and 4 years, 23.3% working experience between 4 and 6 years, 15.3% working experience between 6 and 8 years, and 19.8% working experience above 8 years.

		Frequency	Percent
Company	Yemen Mobile	101	50.0
	Sabafon	101	50.0
Department	Information Systems/ IT	97	48.0
	Customers Service	66	32.7
	Accounting and Finance	16	7.9
	Human Resource	14	6.9
	Marketing and Sales	9	4.5
Gender	Male	168	83.2
	Female	34	16.8
Age Group	Less than 30	96	47.5
	30 less than 40	98	48.5
	40 less than 50	8	4.0
Education	High School	2	1.0
	Diploma	11	5.4
	Bachelor	172	85.1
	Master	16	7.9
	PhD	1	0.5
Designation	Administration Staff	54	26.7
	Technical Support Staff	72	35.6
	Head of Department	13	6.4
	Manager	5	2.5
	Others	58	28.7
Working Experience	Less than 2	35	17.3
	2 - less than 4	49	24.3
	4 - less than 6	47	23.3
	6 - less than 8	31	15.3
	Above 8	40	19.8

Table 3. Demographic Profiles

4.2. Measurement Model

Measurement model is a structural equation modeling (SEM) model that specifies the indicators for each construct and enables an assessment of construct validity. It is the first step in a complete structural model analysis [35]. According to Tabachnick & Fidell [36] structural equation modeling combines factor analysis, canonical correlation, and multiple regression. Like factor analysis, some of the variables can be latent, whereas others are directly observed. Like canonical correlation, there can be many IVs and many DVs. According to Hair et al. [35] structural equation modeling can examine a series of dependence relationships simultaneously. This study used confirmatory factor analysis. Only the factors with high loading used. This process will increase the probability to perform a good fit model when undergo the SEM analysis.

Hair et al. [35] recommend the use of at least three fit indexes by including at least one index from each category of model fit. The three fitness categories are absolute fit, incremental fit, and parsimonious fit. Table 4 shows the fitness index.

Name of Category	Name of Index	Index Full NAME
	GFI	Goodness of Fit Index
	RMSEA	Root Mean Square of Error Approximation
Parsimonious fit	Chisq/df	Chi Square / Degree of Freedom
Incremental fit	NFI	Normed Fit Index
	CFI	Comparative Fit Index
	TLI	Tucker-Lewis Index

Table 4. The Fitness Indexes

Name of Index	Level of Acceptance / Adopted	Index Value	Comments
Chisq/df	chisq/df < 5.0 / [34]; [37]	2.442	The required level is achieved
TLI	TLI >= 0.9 means satisfactory fit / [34]; [37]; [38];	0.865	The required level is not achieved
CFI	CFI >= 0.9 means satisfactory fit / [34]; [35]; [37].	0.878	The required level is not achieved
NFI	NFI >= 0.9 means satisfactory Fit / [34]; [37]. 0.8 < NFI < 0.9 means acceptable fit / [37]; [38].	0.812	The required level is achieved
GFI	GFI >= 0.9 means satisfactory fit/ [34]; [35]; [37]. 0.8 < GFI < 0.9 means acceptable fit / [37]; [38]; [39].	0.788	The required level is not achieved
RMSEA	RMSEA < 0.08 / [34]; [37].	0.085	The required level is not achieved

Table 5. The Improved Fitness Indexes for All Constructs Simultaneously (Initial CFA model)

In this study, the CFA model did not fit well. The NFI, CFI, GFI, and TLI not achieved the required level. The fitness indexes for the initial CFA model shows in Table 5. In addition, the initial CFA model is depicted in Figure 2.

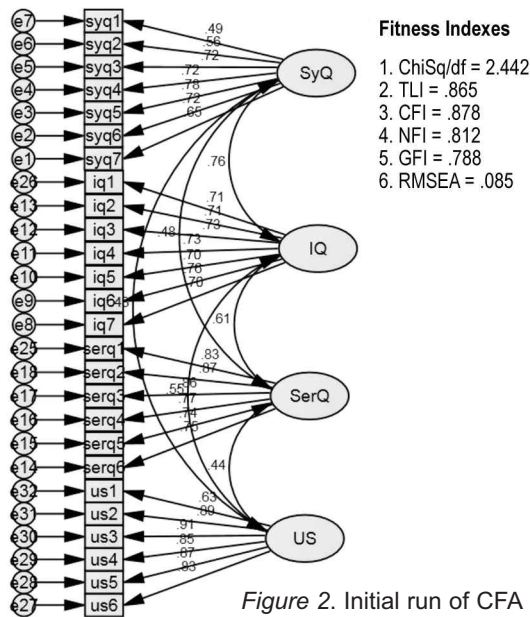


Figure 2. Initial run of CFA

Given the fact that the goodness of fit indices of the initial run of CFA were not within the recommended level, so will delete the problematic items. According to Awang [34] factor loading value should be greater than 0.6. Thus, after dropping these problematic items, the measurement model was re-run. Final CFA model is depicted in Figure 3.

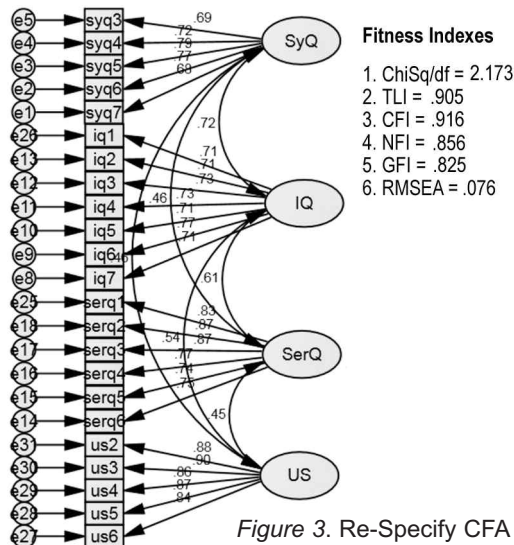


Figure 3. Re-Specify CFA Model

Name of Index	Level of Acceptance / Adopted	Index Value	Comments
Chisq/df	chisq/df < 5.0 / [34]; [37]	2.173	The required level is achieved
TLI	TLI >= 0.9 means satisfactory fit / [34]; [37]; [38].	0.905	The required level is achieved
CFI	CFI >= 0.9 means satisfactory fit / [34]; [35]; [37].	0.916	The required level is achieved
NFI	NFI >= 0.9 means satisfactory Fit / [34]; [37]. 0.8 < NFI < 0.9 means acceptable fit / [37]; [38].	0.856	The required level is achieved
GFI	GFI >= 0.9 means satisfactory fit/ [34]; [35]; [37]. 0.8 < GFI < 0.9 means acceptable fit / [37]; [38]; [39].	0.825	The required level is achieved
RMSEA	RMSEA < 0.08 / [34]; [37].	0.076	The required level is achieved

Table 6. The Improved Fitness Indexes for All Constructs Simultaneously (Re-Specify CFA model)

The CFA model well . The Chisq/df, NFI, CFI, GFI, TLI, and RMSEA achieved the required level. The fitness indexes for the re-specify CFA model shows in Table 6.

4.3. Reliability and Validity of a Measurement Model

In this study, construct validity examined by analysing both convergent validity and discriminant validity. According to Pallant [40] the construct validity is explored by investigating its relationship with other constructs, both related (convergent validity) and unrelated (discriminant validity). According to Hair et al. [35] AVE should be .5 or greater to suggest adequate convergent validity, and AVE estimates for two factors also should be greater than the square of the correlation between the two factors to provide evidence of discriminant validity [35]. According to Fornell & Larcker [41] if the AVE is higher than the square of the correlation coefficient among the constructs, it can be asserted that discriminant validity is satisfied.

In addition, in this study the reliability assessed through internal reliability (Cronbach alpha >= 0.70), and construct reliability (CR >= 0.70). Table 7 shows the measures of validity and reliability of a measurement model.

Construct	Item	Factor Loading	Cronbach Alpha (>= 0.7)	CR (>= 0.7)	AVE (>= 0.5)
SyQ	syq3	0.688	0.850	0.852	0.536
	syq4	0.724			
	syq5	0.787			
	syq6	0.772			
	syq7	0.685			
	iq1	0.707			
	iq2	0.708			
IQ	iq3	0.734	0.881	0.884	0.521
	iq4	0.725			
	iq5	0.705			
	iq6	0.766			
	iq7	0.705			
	serq1	0.831			
	serq2	0.875			
SerQ	serq3	0.865	0.917	0.917	0.650
	serq4	0.768			
	serq5	0.736			
	serq6	0.750			
	us2	0.883			
	us3	0.904			
	us4	0.857			
US	us5	0.870	0.939	0.940	0.758
	us6	0.837			

Table 7. The Confirmatory Factor Analysis (CFA) Report Summary for all Constructs

The diagonal values (in bold) are the square root of AVE while other values are the correlation between the respective constructs. The discriminant validity is achieved when a diagonal value is higher than the values in its row and column [41]. Table 8 shows the discriminant validity.

Construct	SyQ	IQ	SerQ	US
SyQ	(0.732)			
IQ	0.719	(0.722)		
SerQ	0.463	0.614	(0.806)	
US	0.455	0.545	0.450	(0.870)

Table 8. Discriminant Validity Index Summary

4.4. Structural model

Structural model is set of one or more dependence relationships linking the hypothesized model's constructs. The structural model is most useful in representing the interrelationships of variables between constructs [35].

The structural model did not fit well. The NFI, CFI, GFI, and TLI not achieved the required level. The fitness indexes for the initial structural model shows in Table 9.

After dropping the problematic items, the structural model was re-run. Final structural model is depicted in Figure 5.

Chisq/df	chisq/df < 5.0 / [34]; [37]	2.442	The required level is achieved
TLI	TLI >= 0.9 means satisfactory fit / [34]; [37]; [38];	0.865	The required level is not achieved
CFI	CFI >= 0.9 means satisfactory fit / [34]; [35]; [37].	0.878	The required level is not achieved
NFI	NFI >= 0.9 means satisfactory Fit / [34]; [37]. 0.8 < NFI < 0.9 means acceptable fit / [37]; [38].	0.812	The required level is achieved
GFI	GFI >= 0.9 means satisfactory fit/ [34]; [35]; [37]. 0.8 < GFI < 0.9 means acceptable fit / [37]; [38]; [39].	0.788	The required level is not achieved
RMSEA	RMSEA < 0.08 / [34]; [37].	0.085	The required level is not achieved

Table 9. Goodness of Fit indexes for the Initially Proposed Structural Model

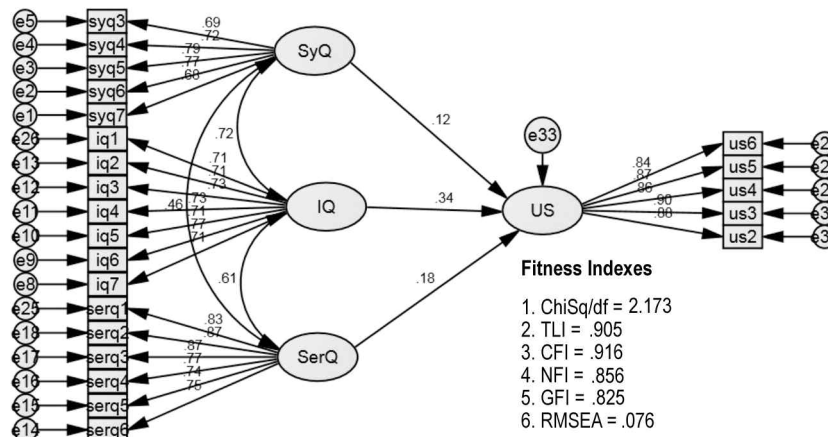


Figure 5. Revised structural model

The fitness indexes for the revised structural model shows in Table 10.

Chisq/df	chisq/df < 5.0 / [34]; [37]	2.173	The required level is achieved
TLI	TLI >= 0.9 means satisfactory fit / [34]; [37]; [38];	0.905	The required level is achieved
CFI	CFI >= 0.9 means satisfactory fit / [34]; [35]; [37].	0.916	The required level is achieved
NFI	NFI >= 0.9 means satisfactory Fit / [34]; [37]. 0.8 < NFI < 0.9 means acceptable fit / [37]; [38].	0.856	The required level is achieved
GFI	GFI >= 0.9 means satisfactory fit/ [34]; [35]; [37]. 0.8 < GFI < 0.9 means acceptable fit / [37]; [38]; [39].	0.825	The required level is achieved
RMSEA	RMSEA < 0.08 / [34]; [37].	0.076	The required level is achieved

Table 10. Goodness of Fit indexes for Revised Structural Model

Table 11 shows the summary of hypotheses testing

Path	Critical Ratios	p-value	Result
SyQ→US	1.143	0.253	Not supported
IQ→US	2.755	0.006	** Supported
SerQ→US	2.097	0.036	* Supported

Note: * p < 0.05; ** p < 0.01; *** P < 0.001 ; SyQ=System Quality; IQ=Information Quality; SerQ=Service Quality; US=User Satisfaction.

Table 11. Summary of Hypotheses Testing

The research findings in this study indicate that system quality (CR= 1.143, p = 0.253 > 0.05) is not significant to user satisfaction. Hypothesis H1 is not supported.

This result contradict the findings from previous studies (Petter & McLean, [24]; Park et al., [22]; Chen, [26]; Urbach et al., [11]; Petter & Fruhling, [12]; and Ainin et al., [13]), in which

these researchers indicates that, the higher levels of system quality are positively associated to higher levels of user satisfaction.

In addition, the research findings in this study indicate that information quality (CR= 2.755, p = 0.006 < 0.05) is found to have a significant and positive relationship with user satisfaction, in support of hypothesis H2. This result is consistent with the past studies (e.g., Lee & Yu, [25]; Park et al., [22]; Chen, [26]; Urbach et al., [11]). That indicates that, the higher levels of information quality are positively associated to higher levels of user satisfaction.

Moreover, the research findings in this study indicate that service quality (CR= 2.097, p = 0.036 < 0.05) is found to have a significant and positive relationship with user satisfaction, in support of hypothesis H3.

This result is consistent with the past studies (e.g., Petter and Fruhling, [12]; Khayun and Ractham, [27]; Brown and Jayakody, [16]; Teo et al., [17]). That indicates that, the quality of service is positively associated to levels of user satisfaction.

5. Conclusion

The purpose of this study was to evaluate the impact of technological factors on user satisfaction. Data was collected using a survey questionnaire. The proposed model was tested using AMOS. This study found that there are positive relationship between information quality, and service quality with user satisfaction. The overall goodness-of-fit indices of the model provide statistical evidence to generalisability of the model in telecommunications companies in Yemen.

Acknowledgements

The author is grateful to University of Hail for supporting this research.

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Board Quality, Audit Quality and Economic Firm Value: The Case of Manufactured Saudi's Listed Companies

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Abstract

This study aims to investigate the relationship of board quality, audit quality and audit report lag on firm performance of manufactured Saudi's listed companies. The framework of the study is developed based on the predictions of agency theory and resource dependence theory that board quality, audit quality and audit report lag are associated with the firm performance. This study used 180 observations for the periods ranging from 2015 to 2017. The board quality is measured by two independent variables; board size and board meetings, audit quality is measured by the auditor brand name, the audit report lag is measured by the year- end to the date of the auditor's report, and firm performance is measured by the ROA and ROE. Using the pooled OLS Regression, the results show that out of four hypothesized independent variables, only audit quality has a significant and positive association with firm performance and audit report lag has a negative and significant association with firm performance. Importantly, the study suggests that regulators, especially Saudi stock exchange, should mandate companies to disclose all relevant information related to board and audit in a transparent and timely manner, and increase law enforcement to enhance good corporate governance practices. For companies, this study proposes that they should emphasize more on enhancing the role and the quality of their board of directors and the audit quality issues, as this enhancement may positively influence their performance.

Keywords: board quality; audit quality; economic firm value; Saudi Arabia.

1. Introduction

Poor corporate governance is one of the reasons for the global financial crisis (Kao, et al., 2019). The occurrence of corporate misdoings, unethical procedures and management excesses that resulted in collapses of a number of large companies such as Enron, WorldCom, Global Crossing, Adelphia Communications, Tyco and Werox have made call for examining the corporate governance practices (Porwal & Kumar, 2003; Teng et al., 2011). It is well documented that corporate governance mechanisms resolve conflicts of interest between shareholders and managers that, in turn, may enhance firm performance (Cubbin & Leech, 1983; Aydin et al., 2007; Karpovich & Rymanov, 2018). Outstandingly, addressing the issues arising from the crises and alignment of shareholder, lowering of conflicts of interest or management interests, there has been proper documentation of corporate governance which will in turn improve the firm performance (Al-Abbas, 2008; Al-Hamidy, 2010; Al-Hussain, 2009; Al-Moataz & Basfar, 2010; Al-Twaijry, 2007). The emphasis of lender, regulators, investors, and other stakeholders in the present business market has increasingly been on the corporate governance.

The structure of corporate governance focuses on the distribution of responsibilities and rights of various participants in the firm for instance, managers, board of directors, shareholders and other stakeholders, as well as the statement of the

procedures and rules with respect to the decisions made on the affairs of the firm. Similarly, corporate governance correspondingly offers the structure by which the firms follow in order to set its objectives, monitor performance, and achieve the objective. Thus, firms which ensure good corporate governance in their can be referred as companies having well-protected and defined shareholder rights, increased transparency and disclosure levels, an empowered board, and a solid regulatory environment. More essential is the fact that there is proper alignment of company's interests with those of the shareholders (Hawkamah & IFC, 2008). Moreover, the association of corporate governance and firm performance is important to formulate efficient management and public regulatory policies (Kao, et al., 2019).

The board of directors plays a vital role in corporate governance; its main responsibility is to endorse the strategy of the organization, remunerate senior executives, appoint, supervise, and develop directional policy and to ensure organization's accountability to its shareholders, authorities and other stakeholders. Board of directors is deemed as one of the important corporate governance internal mechanisms. Further, the board members can play effective monitoring and control roles due to the separation of the ownership and control (Jensen & Meckling, 1976). Several studies examined the association of board structure on firm performance (Vafeas & Theodorou, 1998; Hossain et al., 2001; Peng, 2003; Haniffa & Hudaib, 2006; Boone et al.,

2007; Coles et al., 2008; Eisenberg et al., 1998; Larmou & Vafeas, 2008; Lipton & Lorsch, 1992; Yermack, 1996). These extant studies' results are conducted in developed and highly developing countries and their results are still mixed and inconclusive. Thus, the objective of this study is to examine the associations of board quality (e.g., board size and board meetings) with firm performance among manufactured listed companies in Saudi Arabia for the period ranging from 2015 to 2017.

Another important corporate governance mechanism that has been found to be associated with firm value is audit quality (Aljifri & Moustafa, 2007). This association is predicted by agency theory and information suppression hypothesis (Jensen & Meckling, 1976; Fama & Jensen, 1983). It is suggested that the higher audit quality may control opportunistic management behaviors, reduce agency costs and, consequently, increase the firm value in the marketplace (Grayson, 1999). In addition, it is well-established that audit information is transferred to the market via audit reports (Dopuch et al., 1986; Lai et al., 2005) which, consequently, could create a market reaction (Chambers & Penman, 1984). Afify (2009) documents that audit report lag may indicate to audit efficiency. Further, the relevancy and reliability of financial information could be reflected by the timeliness of financial reports. Importantly, the relevancy of financial information may become less with the passage of time (Lawrence & Glover, 1998; McGee & Tarangelo, 2008). The timeliness of financial reports could identify the degree of transparency of financial information and good practices of corporate governance (Prickett, 2002; Kulzick, 2004; McGee & Yuan, 2008) which, in turn, may influence the firm performance.

The significance of this study can be of both theoretical and practical perspectives. In terms of the theoretical perspective, this study contributes to the body of knowledge in firm value, board quality and audit quality since there is a lack of this type of studies in Saudi setting. Therefore, the results of this study would contribute to the agency theory and resource dependence theory as a piece of evidence supporting these theories in different contexts with recent data. With regard to the practical perspective, the results of this study may be used by companies' managements or related parties as an input to increase their firm values. Further, several stakeholders such as auditors, stock market, financial analysts, government and students may use the results of this study as an evidence for several purposes as needed.

The rest of the paper continues as follows. The next section briefly discusses the literature review and hypotheses development. The third section describes the research design and methodology. The empirical results and discussions of the study are reported in the fourth section while in the final section, conclusions and implications are drawn.

2. Literature Review and Hypotheses Development

Board size which is the number of the board members sitting on the board is an important factor in the effectiveness of board quality. In the perspective of agency theory, board of directors oversees and directs the management activities on behalf of the shareholders. In order for this to be carried out effectively, there should be an adequate number of members sitting on the board. Ogbechie et al. (2009) argue that the board size should be of a total of five to fifteen members. Since board of directors is a decision-making group, its size may affect its effectiveness and, consequently, may influence the decision-making process (Harford et al., 2008; Dwivedi & Jain, 2005). Board size is one of the key characteristics influencing firm performance examined by the previous research (Boone et al., 2007; Coles et al., 2008; Eisenberg et al., 1998; Larmou & Vafeas, 2008; Lipton & Lorsch, 1992; Yermack, 1996). Resource Dependence Theory suggests that larger boards are more efficient than smaller ones. This is

because large number of board member as observers means better management monitoring (Pfeffer & Salancik, 1978; Pearce & Zahra, 1992). The resource dependence theory agrees with the perception that to the external environment companies are afforded connections to access required resources. With regard to this theory, there is diversity in relation to members' skills, backgrounds, and expertise in larger board of directors' size, that can produce an increased wealth of ideas that can generate increased monitoring and controlling functions which, in turn, may affect corporate's performance levels (Abdelsalam et al., 2008; Dalton et al., 1999; Sadalia, et al., 2019). The board size affects its general capacity to function effectively, with smaller boards, which are often viewed to be less effective with respect to acquiring external funding, their budget leverage and amount from an environment that is consequently related through increased degrees of firm performance, as mentioned by Alexander et al. (1993); Goodstein et al. (1994); and Pfeffer (1972). Further, previous research has provided a positive relationship between board size and firm value such as Bhatt and Bhattacharya (2017), Muller-Kahle et al. (2014), Coles et al. (2008), and Rodriguez-Fernandez et al. (2014), Kyereboah-Coleman and Biekpe (2005), Sheikh and Wang (2012) Mishra and Kapil (2017) Adams and Mehran (2005), Dalton and Dalton (2005), Zahra and Pearce (1989) and Pfeffer (1972). Therefore, there is a positive anticipated indicator of the impact of size of board of directors on firm performance depending on the extant research direction. In support of this, Dalton et al. (1999) meta-analysis is considered to agree with the perception that board size could be positively linked with firm performance. For the case of local studies in the setting of Saudi, Al-Abbas (2008) and Al-Ghamdi (2012) identified a link between larger board of directors with those with lesser earnings management in Saudi-listed companies. In regard to GCC countries, the board size of various companies lies between 8.5 in Qatar and 6.7 in the UAE (Binder, 2009). Saudi Code of Corporate Governance stated that board of directors should consist of three to eleven members. Based on the above discussions, the following direct hypothesis is stated:

H₁: There is a positive relationship between board size and firm value.

Board meeting time is an important event that enhances the quality of the board. According to the agency theory, company boards display a greater capability when it comes to monitoring, advising, and disciplining management; hence, enhancing the performance, especially if the frequency in board meetings is high (Vafeas, 1999; Jensen, 1993; Lipton & Lorsch, 1992). It is argued by Jensen (1993) that boards are required to be more active in the presence of problems and conducting meetings on a frequent basis. Letendre (2004) indicated that board should frequently review the performance besides spending more time discussing issues at hand in depth. Brick and Chidambaram (2010) documented that one of the important board's oversight function is the board activity. An empirical study carried out by Vafeas (1999) on 307 companies that were listed within the period 1990-1994 in the USA agree with the argument that, after the occurrence of a crisis, the boards should have meetings more frequently, as it would improve their performance. Additionally, Karamanou and Vafeas (2005) reported that the effect of having board meetings on firm performance may differ with relation to firm-level characteristics as well as legal and institutional practices and country-specific CG. Lipton and Lorsch (1992) indicated that a lack of time to complete board duties is considered one of the main factors decreasing the board effectiveness which affect inversely achieving the shareholders' interests. A local study conducted by Al-Ghamdi (2012) reported that there existed a negative relationship between management of earnings and board meetings in Saudi Arabia. The finding supports the notion that increasing the board meetings frequency leads to increase in the level of monitoring. Based on the above discussions, the following direct hypothesis is stated:

H₂: There is a positive relationship between board meetings and firm value.

The relationship between firm performance and auditor type has been predicted through information suppression hypothesis and agency theory (Jensen & Meckling, 1976; Fama & Jensen, 1983). It is proposed that increased audit quality could lower agency costs, regulate opportunistic management behaviors; hence, grow the value of the firm in the marketplace (Grayson, 1999). In line with this coincidence, several empirical studies reported a positive association between audit quality and firm performance (Kao et al., 2019; Aljifri & Moustafa, 2007; Fan & Wong, 2005). Based on the above discussions, the following direct hypothesis is stated:

H₃: There is a positive relationship between audit quality and firm value.

Audit report is identified among the essential elements determining the timeliness of earning announcement (Givoly & Palmon, 1982; Ashton et al., 1987). It is a fact that audit information is passed to the market through audit reports (Dopuch et al., 1986; Lai et al., 2005) that in turn, could generate a market reaction (Chambers & Penman, 1984). Afify (2009) documents which audit report lag may prove to be efficient in the audit. Furthermore, the timeliness of financial reports may prove the reliability and relevance of financial information. Significantly, with the passage of time, the financial information relevancy may decrease (Lawrence & Glover, 1998; McGee and Tarangelo, 2008). Prickett (2002) and Kulzick (2004) claim that the financial reports timeliness could determine the transparency level of good practices and financial information of corporate governance (McGee and Yuan, 2008). Chahine and Tohme (2009) reports that in emerging economies the regulatory bodies are not as efficient as those in Western developed countries. This condition leads to an increasing degree of consideration to the delay in audit report in countries in which other non-financial statements for example, media releases, news conferences, and financial analysts' predictions are yet to develop properly (Khasharmeh & Aljifri, 2010). Specifically, because making of strategic decisions depend on the audit report, when the issuance of such report delay it inversely influences the value of the firm. Following the discussions above, this study claims that there exists an adverse link between firm performance and audit report lag. There exists scanty information on the link between audit report lag and firm performance in the firm performance literature review. Based on the above discussions, the following direct hypothesis is stated:

H₄: There is a negative relationship between audit report lag and firm value.

3. Research Design and Methodology

3.1. Sample and Data

The data regarding the BD_SIZE, BD_MEET, LAG, AUD, LASSET, LEV, AGE and FV are hand-collected from the annual reports of the manufactured listed companies in Saudi Stock Exchange (Tadawul) for the period ranging from 2015 to 2017 as depicted in Table 1. Excluding outliers and incomplete data, the sample size was reduced to 180 observations as a final sample eligible for inclusion in the analysis of firm value model.

Total observation	201
Observations discarded (outliers) and incomplete data	(21)
Final sample	180

Table 1. Analysis of the sample

3.2. Model Specification

The economic model is used to develop a model of BD_SIZE, BD_MEET, LAG, AUD, LASSET, LEV, AGE and FV.

The variables proposed for inclusion in the model captures differences in the costs of agency relationships. Since the dependent variable is a continuous, metric scale measurement, to estimate this model, Multivariate Analysis is applied using pooled OLS regression. The functional equation of the pooled OLS regression model is utilized to determine the extent of the association of each of the independent variables on the CS.

$$FV (ROA \& ROE) = \beta_0 + \beta_1 BD_SIZE + \beta_2 BD_MEET + \beta_3 AUD + \beta_4 LAG + \text{Control Variables} + e \dots (1)$$

Where:

FV	=	Firm value (ROA & ROE)
BD_SIZE	=	Board size
BD_MEET	=	Board meetings
AUD	=	Audit quality
Lag	=	Audit report lag
Control Variables	=	Firm size, leverage, and firm age
e	=	error term

Since the pooled OLS regression is used to test the hypotheses, outliers are detected and handled, assumptions of multicollinearity, normality, heteroscedasticity, linearity and autocorrelation are also evaluated.

We also control for the effect of three agency-related variables found by the related literature for their potential confounding effect on the FV. It is expected that FV to be positively associated with firm size. Since larger firms have economies of scale, market power, and the skills of staff, they are identified to be more effective than smaller ones (Helmich, 1977; Kumar, 2004). Similarly, Haniffa and Hudaib (2006) confirmed that because larger firms have great availability of analysts focused on the firm performance; hence, they are always under much pressure to produce good results. Furthermore, Pfeffer and Salancik (1978) reported that larger organization have greater influence on the work environment than smaller ones. This condition favor access to fundamental constituencies and larger resources so that outside consultants are involved for support and enabling the planning of succession. Aljifri and Moustafa (2007), Kumar (2004) confirmed that there is a positive connection between firm size and financial performance. Therefore, there is a positive expected indicator for the firm size impact on financial performance.

Concerning firm leverage, according to the agency theory, the debt financing efficiency is better than application of equity in financing (Jensen & Meckling, 1976). Myers (1990) showed that using debt to finance projects forms an incentive for managers to be careful with the expenditure of free cash flows; hence, motivating them to increase their companies' performance. Therefore, there exists an increased degree of market control over the managers' actions. Grossman and Hart (1982) suggest that the insight of the managers on using their companies as debt security ensures they apply fewer privileges and ensures that they work towards improving their efficiency in order to evade losing control and consequently bad reputation and bankruptcy. Alternatively, Stiglitz and Weiss (1981) recognized that debt financing might encourage engagement of limited-liability shareholders in high-risk projects, that would in turn destroy the company's profitability. Empirically, past studies had contradictory findings. For example, some investigations documented the presence of substantial negative relationship between profitability and firm debt (Mishra & Kapil, 2017; Bhatt & Bhattacharya, 2017; Dowen, 1995; McConnell & Servaes, 1995; Short & Keasey, 1999; Weir et al., 2002; Haniffa & Hudaib, 2006; Aljifri & Moustafa, 2007). On the other hand, Hurdle (1974) reported that firm leverage is positively associated with profitability. While Al-Matari et al. (2012) reported an irrelevant link between firm performance and firm leverage in Saudi Arabia.

As for firm age, the firm's age is an essential aspect of development of the firm, unpredictability of business growth and firm dissolution likelihood (Evans, 1987a). The relationship between firm age and firm performance is properly documented, with some research using age as a proxy for the firm's experience which they have attained through years of operation

(Geroski, 1995). Following growth of firm age, the management need to gather more understanding of their skills and abilities over time (Stinchcombe, 1965; Evans, 1987b). Undeveloped firms are more susceptible with firm age predicted to last only in a period of 5 to 10 years, as Ward and Mendoza recorded (1996). The key elements with regard to the developed approaches, routines, and organizational norms in older firms limits the transformation of entrepreneurial activities and actions into positive performance results. This means that in overpowering age-related contextual aspects, longer-established entities might

encounter problems, irrespective of their strategy-making approach implementation which would otherwise drive the achievement of positive firm development. Bhatt and Bhattacharya (2017) and Palaniappan (2017) reported a positive association between firm age and firm performance. In this investigation, it was identified that there existed a positive connection between firm age and firm performance, evaluated as the sum of years after the development of the company.

As for the measurements of the variables, Table 2 exhibits the dependent, test and control variables' measurements.

Variables	Acronym	Operationalization	Coefficient Predictions
			Pooled OLS
Dependent Variable			
Firm Value	ROA	Net income divided by book value of total assets	d.v
Firm Value	ROE	Net income divided by book value of total equity	d.v
Test Variable			
Board size	BD_SIZE	the total number of directors sitting on the board	+
Board meetings	BD_MEET	the number of board meetings during the year	+
Audit quality	AUD	"1" if an auditor is a Big 4, "0" otherwise	+
Audit report lag	LAG	A number of calendar days from fiscal year- end to the date of the auditor's report	-
Control Variables			
Firm Size	LASSET	log ₁₀ of total assets	
Firm Leverage	LEV	long term debt-to-total asset ratio	
Firm Age	AGE	the number of years since the company was established	

Note: d.v. – dependent variable

Table 2. Summary of the Operationalization and the Expected Sign of the Research Variables

4. Empirical Results and Discussions

Table 3 shows the descriptive statistics of the variables. It depicts the mean, standard deviation, minimum and maximum of each variable in the sample data set.

	Mean	Minimum	Maximum	Std.Deviation
ROA	0.51	-0.78	0.075	0.07
ROE	0.07	-11.99	29.80	0.13
BD_SIZE	8	5	15	1.648
BD_MEET	5	2	22	2.315
LAG	55	9	159	23.200
Control variables				
LASSET	7769005074	93467447	97073302267	15718467531
LEV	0.4374	0.02	8.90	0.65971
FIRM_AGE (years)	27.81	2	62	14.40
AUD	Big 4 87 (48.1%)	Non-Big 4 93 (51.9%)	Total 180 (100%)	

Table 3. Descriptive statistics (N = 180)

Table 3 displays that there is a significant range of variation among the considered sample of this study. It is shown that the range of ROA is from -0.78 to 0.075 with an average of 0.51 and

a standard deviation of 0.07. The mean of ROE is 0.07 with a maximum of 28.80 and a minimum of -11.99 and a standard deviation of 0.13. As the for hypothesized variables, Table 3 illustrates that the range of BD_SIZE is from 5 to 15 with an average of 8 and a standard deviation of 1.648. The mean of BD_MEET is 5 with a maximum of 22 and a minimum of 2 and a standard deviation of 2.315. As for the AUD, 48.1% of the manufactured Saudi companies are audited by Big 4 audit firms and 51.9 are audited by non-Big 4 audit firms. Regarding LAG, the mean is 55 with a maximum of 159 and a minimum of 9 and a standard deviation of 23.200. With respect to the control variables, the mean of LASSET is S.R 7769005074 with a maximum of S.R 97073302267 and a minimum of S.R 93467447 and a standard deviation of S.R 15718467531. The LEV ranges from 0.02 to 8.90 with an average of 0.4374 and a standard deviation of 0.65971. The range of FIRM_AGE is from 2 to 62 with a mean of 27.81 and standard deviation of 14.77.

As shown by Table 4, the correlation matrixes verify that no multi-collinearity exists among the variables, as none of the variables correlates above 0.90. All the variables have a correlation of equal to or less than .574.

	BDE_SIZE	BDE_MEET	AUD	LAG	LASSET	LEV	FIRM_AGE
BD_SIZE	1						
BD_MEET	-.174	1					
AUD	.276	.065	1				
LAG	.022	.039	-.010	1			
LASSET	.342**	-.008	.329**	-.107	1		
LEV	0.020	.025	.329**	.175*	.116	1	
FIRM_AGE	.079	.205**	.005	.066	-.181*	.061	1

Table 4. Correlation matrix of independent variables (N = 180)

Pooled Ordinary-Least Square (OLS) was used to evaluate the level of effect of the hypothesized variable on the firm value using SPSS. Tables 5 and 6 report the estimated model coefficients, the associated significant test results, the adjusted R²s and the F-values for the firm value models. In particular, Tables 5 and 6 portray the results of the Pooled OLS regressions for each of the two firm value models. The F-values for each of the two models are statistically significant at the 1% level, indicating that the overall model can be interpreted. The adjusted R²s for the ROA and ROE models are 23.6% and 19.10%, respectively. The statistics show that the ROA model

has explained 23.60% of this variance and the ROE model has explained 19.10% of the total variance in the firm value. This indicates a moderately good fit of the each of the two firm value models.

Tables 5 and 6 display that BD_SIZE has insignificant association with FV. This result inconsistent with the prediction of the agency theory, resource dependence theory and the previous studies such as Bhatt and Bhattacharya (2017), Muller-Kahle et al. (2014), Coles et al. (2008), and Rodriguez-Fernandez et al. (2014), Sheikh and Wang (2012) Mishra and Kapil (2017) Yasser et al. (2017). Thus, H₁ is rejected.

Variables	Expected Sign	Coef.	t	P> t
Hypothesized Variables				
BD_SIZE	+	0.080	1.082	0.281
BD_MEET	+	0.059	1.082	0.394
AUD	+	0.325	4.564	0.000
LAG	-	-0.280	-4.195	0.000
Control Variables				
LASSET		-0.158	-2.068	0.040
LEV		-0.080	-1.195	0.234
FIRM_AGE		0.218	3.107	0.002
Adjusted R ²	23.6			
Model F-stat.	8.990			
P-value	0.000			
No. of Observations	180			

Bold = significance at 1%, 5% and 10% (one-tailed significance)

Table 5. Pooled OLS Analysis Results–ROA

Variables	Expected Sign	Coef.	t	P> t
Hypothesized Variables				
BDE_SIZE	+	0.093	1.224	0.223
BDE_MEET	+	0.032	0.456	0.649
AUD	+	0.335	4.574	0.000
LAG	-	-0.279	-4.067	0.000
Control Variables				
LASSET		-0.154	-1.953	0.052
LEV		0.143	2.075	0.040
FIRM_AGE		0.148	2.049	0.042
Adjusted R ²	19.10			
Model F-stat.	7.094			
P-value	0.000			
No. of Observations	180			

Bold = significance at 1%, 5% and 10% (one-tailed significance)

Table 6. Pooled OLS Analysis Results–ROE

As for the association of *BD_MEET* and *FV*, an insignificant association was documented for the both ROA and ROE models. This result is inconsistent with the prediction of the agency theory the empirical findings of Vafeas (1999) and Karamanou and Vafeas (2005). Thus, H_2 is rejected.

With regard to the relationship between *AUD* and *FV*, a positive association was documented for the both ROA and ROE models (p -value < 0.000, one-tailed significance). This result is in line with the prediction of the agency theory suggesting that audit quality could lower agency costs, regulate opportunistic management behaviors; hence, grow the value of the firm in the marketplace. Moreover, this result is consistent with the empirical research of (Kao et al., 2019; Aljifri & Moustafa, 2007; Fan & Wong, 2005). Therefore, H_3 is accepted.

As for the association of *LAG* and *FV*, a negative association was reported for the both ROA and ROE models (p -value < 0.000, one-tailed significance). This result is consistent with the claims of several studies such as Lawrence and Glover (1998), McGee and Tarangelo (2008), Prickett (2002), Kulzick (2004), McGee and Yuan (2008), Chahine and Tohme (2009), and Khasharmeh and Aljifri (2010). Thus, H_4 is accepted.

5. Conclusions and Implications

This study aims at examining the relationship between board quality (board size and board meetings), audit quality and audit report lag with firm performance among manufactured Saudi's listed companies for the period ranging from 2015 to 2017. Using a sample of 180 observations, the framework of this is developed testing four hypothesized variables.

In the context of Saudi Arabia, *BD_SIZE* is insignificantly associated with *FV*. This result inconsistent with the prediction of the agency theory, resource dependence theory and the previous studies such as Bhatt and Bhattacharya (2017), Muller-Kahle et al. (2014), Coles et al. (2008), and Rodriguez-Fernandez et al. (2014), Sheikh and Wang (2012), Mishra and Kapil (2017), Yasser et al. (2017). Moreover, *BD_MEET* has an insignificant association with firm performance. This result is

inconsistent with the prediction of the agency theory the empirical findings of Vafeas (1999) and Karamanou and Vafeas (2005).

With regard to the relationship between audit quality and firm performance, a positive association was reported. This result is in line with the prediction of the agency theory suggesting that audit quality could lower agency costs, regulate opportunistic management behaviors; hence, grow the value of the firm in the marketplace. Moreover, this result is consistent with the empirical research of (Kao et al., 2019; Aljifri & Moustafa, 2007; Fan & Wong, 2005). As for the association of audit report lag and firm performance, a negative association was reported. This result is consistent with the claims of several studies such as Lawrence and Glover (1998), McGee and Tarangelo (2008), Prickett (2002), Kulzick (2004), McGee and Yuan (2008), Chahine and Tohme (2009), and Khasharmeh and Aljifri (2010).

One important implication of these findings relates to the issue of firm value in Saudi Arabia. Saudi government, stock market, and accounting and auditing regulators would gain new insights from this study in terms of the extent to which regulations, laws, codes of corporate governance, decrees, and resolutions are implemented by companies especially those related to social and environmental issues. Further, the findings of this study will be useful to regulators in deliberating policies on issues related to corporate governance and performance issues in order to preventing the society and environment impair. One possibility is to make it mandatory for companies incorporating in Saudi Arabia to disclose in their annual reports their corporate governance information in a manner to determine the direction of future governance policies for Saudi corporations. Thus, regulators would be able to decide when and how corporate governance, accounting, and auditing practices are being carried out in Saudi setting. Moreover, the findings of this study may serve to enhance the financial performance, corporate governance by the management and shareholders. The significance of enhancing financial performance by better practices of corporate governance. It has not been considered a suitable practice for listed firms which weak internal system of corporate governance to enhance the financial performance. In this environment, the shareholders who control the listed firms have the tendency of depriving the private benefits of exploiting small shareholders. Investors and financial analysts depend on audited financial statements to make decisions related to investments in Saudi market. Accordingly, increased understanding and prediction of companies' events are important to this user group. Furthermore, the results of this study will be of interest to researchers and the academic community, due to a lack of a formal research body addressing the issues of firm value and performance in the Saudi Arabia. Therefore, this study will provide them with substantial information about issues in the market of the Saudi Arabia, as well as premise data in the future. This study contributes to the body of knowledge and the growing empirical literature about firm value, and encourages further research on such association.

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Experimental Marketing and Service Quality for Railway Customer Satisfaction

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Abstract

This research aims to investigate the influence of marketing experience and service quality on railway customer satisfaction. This type of research is explanatory research. The population in this research is all consumers who use the Mutiara Timur railway in DAOP IX Jember. The sampling technique used in this study was purposive sampling by considering certain criteria in taking a sample of 250 respondents. The research hypothesis is experiential marketing that prioritizes service quality in Railroad transportation services, and service quality influences customer satisfaction in Railroad transportation services. The results of this study are experimental marketing which has a significant effect on railroad consumer satisfaction and service quality has a significant effect on the satisfaction of railroad consumers.

Keywords: experiential marketing; service quality; customer satisfaction.

1. Introduction

Transportation industry in Indonesia increases every year as the population continues to grow. The increasing number of inhabitants means that the higher the need, the transportation is one of the facilities for community activities both in work, school, industry, trade and much more can be done by transportation. Classical problems such as congestion, higher accident rates and frequent traffic violations, even criminal acts in transportation reflect that transportation does have problems for the Indonesian nation. The consumption of transportation services is higher with the presence of transportation service providers in Indonesia. Transportation in Indonesia consists of three types, namely land transportation, sea transportation, air transportation and river transportation. One of the most popular land transportation equipment is the railway. Deputy head of the Central Statistics Agency in the field of Production Statistics Adi Laksmmono said, railway passengers rose 0.37% from December 2013 to January 2014 or became 20.9 million passengers. Railway freight transportation rose 2.85% from 2.2 million tons in December 2013 to 2.3 million tons in January 2014. (<http://info-tiketkai.blogspot.com>). Consumers use railway transportation in addition to timeliness, also pay attention to safety and comfort.

PT Kereta Api Indonesia (KAI) is a provider of land transportation services, which provide many facilities for consumers. Jember Station is an operational area of DAOP IX Jember. The Jember region is a potential area in the service business. The need to use the right strategy in achieving customer satisfaction from improving service quality. In marketing companies engaged in service quality services need to be considered, one of which is safety which is an important factor for the transportation business. In fact, in the field, there is often a lack of good service quality seen from the large number of traffic accidents, especially those experienced by railways. The

quality servants provided by PT KAI are considered by consumers to be superior in terms of cleanliness and order in both business and executive classes. Attention is not only on railway facilities, but on waiting stations, namely stations and reservation systems that have many choices.

In the face of competition, marketers pay attention to the business strategies that will be applied, in general marketers have the desire to maintain their customers. Strategies that touch someone's emotional approach are considered very effective because changes can occur in the interests or tastes of the customer. Business strategies applied by the marketing department in the service sector one of which is experiential marketing or commonly called the marketing approach based on consumer experience gained when enjoying these services. The application of experiential marketing on the East Pearl DAOP IX Jember railway can be seen from the facilities and services provided. Using five dimensions of the marketing experience itself, namely feel, sense, think, act, and relate. These five dimensions are used as strategies that can be applied to the eastern pearl railway. Experiential Marketing is a marketing concept that aims to form loyal customers by touching their emotions and giving a positive feeling to Kertajaya's products and services (2004). This theory is supported by research conducted by Lee (2008) where Marketing Experiences have a significant positive effect on consumer satisfaction in several shopping centers such as Carefour, Geant RT-Mart in Tainan. Research by Silky and Jain (2014) which aims to determine the use of experiential marketing and to know issues when experiential marketing is applied in India. The results of the research are the fact that experiential marketing involves consumers and encourages them to be involved in brand development. Consumers can evaluate a product or service using the experience gained.

Service quality in service companies and products has an important role, the need to improve service quality affects the

company. Consumers feel the quality of service to meet expected perceptions, customer satisfaction can be achieved because the quality of service is perceived as expected. Parasuraman (2005) explains the quality of services can be seen from five dimensions, among others: physical evidence, reliability, responsiveness, assurance, and empathy. The results of the study by Aryani and Rosinta (2010) showed that the five dimensions of service quality proved to have a significant effect on customer satisfaction. This is evident from the results of the study which shows that 72.9% of customer satisfaction variables can be explained by service quality variables, while the remaining 27.1% is influenced by other factors outside the service quality variable. According to the study of Quyet et al (2015), it shows that Reliability, Response, Assurance, and Empathy have a significant effect on customer satisfaction. These results imply that service quality plays an important role as a driver of higher customer satisfaction in hotel services.

With the changing needs, consumers are more selective in choosing products or services to be chosen to fulfill their expectations. The increasing number of needs causes consumers to be more complex in choosing. Changes in behavior also appear in the use of transportation. The increasing use of land transportation is ineffective due to overcrowding of the highway. Seeing the number of land transportation accident rates that increase from year to year. The government hopes that the use of private transportation will shift to public transportation, especially in land transportation. Many offers are given by public transportation providers. Create increasingly high competition in public transportation companies. Business managers must reduce their strategies in the face of competition to survive even though there are competitors in other transportation fields. Increasing quality of servants in the field of transportation so that consumers have many choices as needed. Each transportation has different characteristics, in terms of services, facilities provided, special programs that will attract consumers. Company managers must know what consumers want, so that consumers continue to use the same services. The large number of competing public transportation shows the fact that consumers prefer complete facilities, a comfortable, quality place, and good service. Offers that are given to influence customers, need to understand consumer interest related to satisfaction that will be achieved in relation to the quality of service needs to be identified through research activities.

2. Literature Review

2.1. Experiential Marketing

Experimental marketing according to Hamzah (2007) states that marketers offer products or services by stimulating the emotional elements of consumers that produce various experiences for consumers. Touching the heart, and stimulating the consumer's mind so that it can create experiences within the consumer which eventually become something that can be remembered and told to those closest to Schmitt (1999) Experimental Marketing has four characteristics which consist of: a) Focus on Customer Experience; b) Examining the Consumption Situation; c) Customers Are Rational and Emotional Animals; d) Methods and Tools are eclectic. One of the core experiential marketing is the creation of different types of experiences from customers. This type of experience can be called the Experiential Moduls (SEM) Strategy. SEM in it consists of sensory, affective, cognitive experience, physical experience and lifestyle, and experiences of social identity resulting from reference groups or cultures (Schmitt, 1999).

2.2. Service Quality

Quality is a dynamic condition that relates to products, services, people, processes and environments that meet or exceed expectations (Tjiptono, 2004). So that it can be concluded that

service quality as an effort made by the company in meeting the needs, desires, and expectations of consumers as a step to achieve customer satisfaction. According to Sunarto (2013) identified seven basic dimensions of quality, namely: a) Performance; b) Employee Interaction; c) Reliability; d) Endurance; e) Time and comfort provisions; f) Aesthetics; g) Brand awareness. Whereas in the opinion of Parasuraman et al (1985) there are five dimensions of service quality, namely a) Tangibles; b) Reliability; c) Responsiveness; d) Assurance; e) Empathy.

2.3. Customer Satisfaction

Consumer satisfaction needs attention to the response of a product or service offered, basically satisfaction is the goal of the company. How much customer satisfaction has an impact on the company, if the kepuasan is at a high level will provide benefits for the company, possibly enjoying the same product or service again. But if the level of satisfaction is low then the company will be threatened with losing consumers, because dissatisfaction will encourage consumers to move products or services to other companies that are more biased to meet the expectations of consumers. In the opinion of Kotler (2002) satisfaction is the level of one's feelings after comparing performance or the results he feels compared to his expectations. It can be concluded that the definition of customer satisfaction is consumer behavior that is shown from a response to a product or service by comparing what is felt when consumers enjoy the expectations that consumers want. Tjiptono (2004) suggests that the satisfaction maker consists of: a) Conformity of expectations; b) Interest in revisiting; c) Willingness to recommend.

3. Methodology

The population in this study are consumers who use the Mutiara Timur train in DAOP IX Jember. The sampling technique used was purposive sampling where the sample was selected using criteria. The sample criteria are respondents who have enjoyed the Mutiara Timur train which has a minimum age of 15 years. The sample used in this study amounted to 250 respondents. This study uses multiple linear analysis with a confirmatory approach and uses the AMOS program (Analysis of Moment Structures).

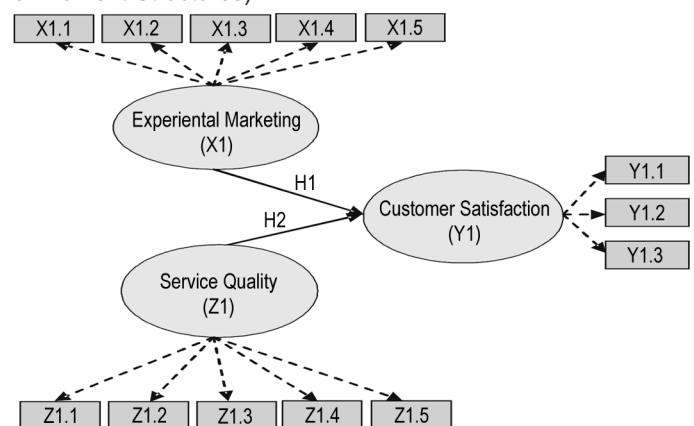


Figure 1. Conceptual framework

4. Result and Discussions

4.1. Effect of Experiential Marketing on Consumer Satisfaction

The results showed that Experiential marketing had a significant influence on consumer satisfaction. This means that the better experiential marketing regarding the design of eastern pearl train locomotives, train services, the price of tickets offered varies, information about trains that can be easily obtained

through internet media, and creating a sense of pride towards consumers, the better customer satisfaction train eastern pearl fire executive class at DAOP XI Jember. The results of this study support the theory put forward [15] which states that customer experience and management of experience at each touch point are important parts in shaping and increasing customer loyalty. The results of other studies are in line with the findings of research conducted by [16] which states that experiential marketing encourages customer satisfaction through the emotional and functional values provided by the company.

4.2. Effect of Service Quality on Consumer Satisfaction

The results show that service quality has a significant influence on customer satisfaction. This means that the better perceptions of service quality regarding eastern pearl train employees respond well to passenger problems, eastern pearl train employees perform services well, eastern pearl trains pay attention to the completeness of facilities, employees of eastern pearl trains serve with non-discrimination, employees of the eastern pearl train responds to passenger complaints well. Service quality in this study was measured by five indicators which included tangibles of physical evidence, reliability of reliability, responsiveness of responsiveness, assurance of assurance, empathy attention. The results of this study are similar to the results conducted by Quyet et al (2015) where the results of his research explain that service quality has a significant effect on customer satisfaction and as a driver of higher customer satisfaction levels in hotel services. By focusing on empathy, Reliability, Responsiveness, and Assurance to achieve a high level of customer satisfaction that leads to customer loyalty and business profit. According to the results of the study also conducted by Ariyani, et al. (2010) showed that the five dimensions of service quality proved to have a significant effect on customer satisfaction.

5. Conclusion

Experimental marketing has a significant positive effect on consumer satisfaction of the East Pearl DAOP IX Jember train. Consumers feel firsthand the experience of using Mutiara Timur railroad transportation as seen from the design of eastern pearl train locomotives, train services, the price of tickets offered varies, information about trains that is easily available through internet media. Service Quality has a significant positive effect on consumer satisfaction DAOP IX Jember East Pearl Railway. This is felt through the services of eastern pearl train employees

in responding to both passenger complaints and employees paying attention to the completeness of facilities. Subsequent research with the same theme may be able to add other variables such as customer value, price in achieving a customer satisfaction.

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Using Quality Risk Management in Pharmaceutical Industries: A Case Study

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Abstract

Patient safety is a matter of increasing concern and is a subject of continuous academic attention and public attention. To ensure that drug product is safe, the Quality Risk Management-(QRM) approach application on the drug will provide the safety for drug and protect it from hazards during the production process. In this paper, we try to describe the four processes of (QRM); they quality risk assessment, quality risk control, quality risk communication and quality risk review. The main aim of this paper is to mitigate the risks of production in (Al-Hokamaa company), and aware of the expected evolution in ensuring drug products originated processes are safe, and to show which role they should play in this development, according to the technique Failure Mode and Effective Analysis-(FMEA) used in the analysis and risk assessment, initial results show risks reduction and process improvement.

Keywords: quality risk management; QRM; risk mitigation; quality risk assessment; case study.

1. Introduction

In the pharmaceutical industry, products and processes are associated with risks. To maintain product quality throughout the product life-cycle, too much time and resources should be allocated. Quality risk Management – QRM is one of the modern approaches in process quality management. This provides significant benefits in identifying the critical risks and ensuring control over them. By focusing on the products and processes, the pharmaceutical industry can make sure that it applies the right resources in the right place at the right time to improve the quality of products and processes.

According to (Gray *et al.*, 2011) Quality risk is the failure of the manufacturing organization to apply its good manufacturing practices, which will be reflected in conformity with the quality characteristics of the product, and organizations profit (Kaya and Özer, 2009) Risk management is a tool to assist the organization in understanding and assessing potential risks and taking advantage of opportunities arising from them (Staniec, 2011). This practice has grown and developed over the past six decades (McShane, 2018), in the pharmaceutical industry, risk management is a part of the pharmaceutical industry, provided through ISO13485 as a risk management specification throughout the product life cycle (Lotlikar, 2013). In the early 21st century, a change in regulations that led to a shift in the concept of product quality evoked technological development in the pharmaceutical product industry. As a result, a new vision emerged to ensure product quality, and focused on an integrated approach of quality risk management (Mohammed-Ziegler *et al.*, 2014), In November 2005, the International Conference on Harmonization published-(ICH)-Q9 QRM Guidelines (ICH, 2005) and adopted in the United States, the European Union, and Japan. I have given ICH-Q9 the global character of this initiative and its implementation around the world for many evidence related to quality management (Botet, 2012).

In this study, we tried to apply the QRM stages in the Al-Hokamaa company, for risks reduce levels and improved product quality. These are essential in the pharmaceutical industry, which includes a series of complex and accurate processes in manufacturing processes, Any error in this process makes the product unacceptable and illegal and affects the health of the patient. The research sought to analyze the risks in this industry.

2. Quality risk management – Overview

Quality risk management has become the critical issue of quality management at many functions at manufacturing ones, it is a project management tools and a key part of quality by design, ICH Q9 introduced guidance for QRM which was adopted in November 2005 (Vesper and O'Donnell, 2016).

However O'Donnell and Greene (2007) developed a practical QRM method to facilitate compliance with EU Good Manufacturing Practices – (GMP) requirements and guidance of ICH Q9, the researcher called for further work to promote the continued development of QRM methodologies and approaches within the (GMP) environment to reduce and manage the risks posed by medicines to patients. In 2008, Frank *et al.* (2011) showed the efforts of risk management working group to assemble industry case studies for the purpose of advancing the understanding and application of ICH Q9, which was composed of eight representatives of industry and US-FDA. They showed the need to choose the appropriate risk method for the targeted need, taking into account complexity and risk involved for the specific subject of concern and that it is important to pre-define the potential resulting risk categorizations to not be influenced by the assessment results in defining appropriate response actions.

In 2013, the practical ways to analyze the risks to quality

system were described by Lotlikar MV who provided guidance along the way to achieve effective quality management and compliance through QRM, the paper concluded that when applying risk management to pharmaceutical industry it will reduce the number of threats or minimize their impact through the consistent use of the tools/methods and periodic review, the output of the risk management supports the organization to meet the defined goals towards protection of public health (Lotlikar, 2013).

As Muhammad and Rehana (2014) proved that QRM improves risk awareness and speeds up detection of potential issues using quality data to manage product quality, manufacturing processes and compliance within a risk based Quality Management System, the final object will ensure the high quality of the drug product to the patient.

According to Haleem *et al.* (2015), risk Management is a critical quality topics gained the special concern in chemical and pharmaceutical quality assurance, they invited both managers at the pharmaceutical industry and literature to focus on the adoption of practices like lean manufacturing, Six Sigma and total quality management into the pharmaceutical industry to minimize the probability of QRM.

Kumar and Jha (2018) admitted that there are cases of unresolved customer complaints and batch failures originated because of inadequacies during distribution of pharmaceutical Products, they introduced a model to reduce the product rejection using Risk Priority Number (RPN), then they called for a mechanism for quality risk management during pharmaceutical distribution to accomplish customer satisfaction without apprehension of drug regulatory actions because of quality risk.

According to these previous views, which focused on the application of quality risk management in the pharmaceutical industry, so this paper we try to focus on the stages of applying quality risk management in the most hazardous industries.

2.1. Quality Risk Management – The Define

The Quality Risk Management – QRM is a systematic process for the assessing, controlling, communicating and reviewing of risks to the quality of the drug production (Kumar and Jha, 2018), it is a method to support quality management decisions based on facts (Sonali Mahaparale, 2016), and it meets regulatory requirements in the validation process that drug manufacturing processes confirm the highest quality levels (Castillo *et al.*, 2016). This issue needs a series of sequential and scientifically designed steps to organize managing quality risk. These steps include the following (Dahiya *et al.*, 2009), (Bhattacharya, 2015):

- Identify the potential problem or risk.
- Data collection on risks and their impact and severity on the customer.
- Identify decision-makers, how they use information, and how they benefit from evaluation results.
- Define a schedule and deliverables and an appropriate level of decision-making for the risk management process.

2.2. Quality Risk Management Process

The quality risk management process involves four main stages, beginning with the risk assessment and ending with the review to determine the extent to which these risks affect the production process and where the efforts required for improvement are concentrated, and the steps of the quality risk management process, includes the following stages: (Food and Administration, 2006), (Bouwman-Boer *et al.*, 2015), (William and Fernando, 2016), (Claycamp, 2007), (Balmoş and Lazăr, 2013), (Little, 2013)

1. Quality Risk Assessment.
2. Quality Risk Control.
3. Quality Risk Communication.
4. Quality Risk Review.

2.2.1. Quality Risk Assessment

Risk assessment is the first stage in the (QRM) process and includes risk identification, risk analysis, and risk evaluation. It conducts risk assessments based on historical data, analytical methods (Mire-Sluis *et al.*, 2010). There are actions to the risk assessment process (Gopinath *et al.*, 2010):

- A team of qualified experts should perform risk assessments from a variety of disciplines such as engineering, quality assurance, validation, and manufacturing, facilitated by someone familiar with the risk assessment process.
- We should answer fundamental questions in the risk assessment: What might go wrong? What is the probability that something will go wrong? What are the consequences or severity?
- Optimal selection of risk assessment tools.
- Systematic identification of hazards (risk identification)
- Estimation of the risk associated with the identified hazard.
- Comparison of the identified and analyzed a risk against pre-determined criteria (risk evaluation)

Quality Risk Identification: is a core component of the QRM process (Noordhuizen, 2008), It refers to the risk sources on the basis on the Users feedback information for quality risk, and thus helps in using statistical tools and analyzes appropriate to the information of risk sources (Qing *et al.*, 2014).

Quality Risk Analysis: This phase helps to assess the relationship between the system and patient safety quantitatively, and build a strategy for continuous improvement of quality, by identifying the strengths and weaknesses of the manufacturing process and thus selecting the most appropriate improvements (Bonnabry *et al.*, 2008).

Quality Risk Evaluation: This is the quantification of risk through data and information on variables analyzed using analytical tools at this stage. Risks are expressed quantitatively using the numerical probability or risk expression using a qualitative description (e.g., high, medium, low) (Mukharya *et al.*, 2013).

2.2.2. Quality Risk Control

The decision to reduce or accept risks (WHO, 2013). The aim of this step is to identify the activities necessary to reduce risks and to decide at this stage on the levels of risk to be accepted or rejected and what it can do to reduce these risks.

Risk reduction: The activities necessary to mitigate damage and the likelihood of occurrence (Muhammad and Rehana, 2014). In this step, it directs activities to conform to quality requirements.

Risk acceptance: A decision of accepting the risk. If the risk is consistent with acceptable levels (Sivadasu *et al.*, 2017), the decision will be correct, and the quality risk management practices may not eliminate the risks. Here, there may be a wrong decision to accept the risk, which is higher than acceptable levels (Waldron, 2017).

2.2.3. Quality Risk Communication

It is the exchanging of information with stakeholders about the specific and potential risks and how they have been controlled (Nosal and Schultz, 2008), this communication may be formal or informal.

2.2.4. Quality Risk Review

It is the periodic and continuous review of QRM practices (Nayak *et al.*, 2016), this step involves reviewing the previous stages and directing them to focus on quality, and continuous review and evaluation (feedback) to determine the extent to which the desired objectives (outputs) are achieved and to make necessary adjustments in any or all elements of the system, when information is received from customers or stakeholders.

3. Material and Methods

The QRM program took from 12 to 13 weeks in the pharmaceutical plant. A team of experts was formed to describe and identify the risks, based on the technique of brainstorming and fishbone. We selected the tablet production line to implement the QRM, and it is one of the modern and important lines within the company. The process of tablet production is carried out in five sequential stages: beginning with the Parting phase and ending with the packaging phase. It identified risks, impacts and detection procedures at each stage of production.

3.1. Select project and team formation

QRM team has knowledge of QRM practices. They have the skills to analyze and assess risks. For this, the team included (Chairman of the company, Quality Manager, Production Manager, Quality Control Manager and tablets Production Manager).

3.2. Choose a data analysis tools

We have relied on the status of (FMEA) as a key tool in the identification, severity, impact and detection of risk. In this research, we found that it is best to use this tool to assess and determine the risks of the quality of the pharmaceutical industry because of the benefits of this method in calculation risks and severity (Mariajayaprakash, and Senthilvelan, 2014). So the FMEA is implemented by defining the steps in a complex process and then determining the failure patterns for each step, according to use Ishikawa diagram, we therefore worked on the following steps:

- (1) describe and identify the steps involved in the pharmaceutical pill industry.
- (2) highlight potential risk factors at each step.
- (3) explain and simplify the causes of failure at every step.
- (4) determine the severity of the effects of potential failure.
- (5) Start an assessment process for the risks, severity, and opportunities for recurrence.

and the Risk Priority Number – (RPN) calculate based on (FMEA) which is an important tool for analyzing and evaluating risks and identifying the areas that have the most impact on the process (Crites and Kittinger, 2009), calculate by the following equation:

$$RPN = (O \times S \times D)$$

(O) the harmful event or hazard, the cause, the likelihood of occurrence of risk, (S) the severity of the effects of the event, (D)

the detectability of the cause of the event. By extrapolating data and information on quality risk (Adar *et al.*, 2017).

It identifies and evaluates these three risks the degree based on a 10-point scale for each risk, with (1) being lowest and (10) being highest (Vincent and Honeck, 2004). For the calculation of RPN, in this study we will adopt the following measures:

O: From (1-2) Very Low, (3-4) Low, (5-6) Moderate, (7-8) High, (9-10) Very High.

S: From (1-2) Very Low, (3-4) Low, (5-6) Moderate, (7-8) High, (9-10) Very High.

D: From (1-2) Very Low, (3-4) Low, (5-6) Moderate, (7-8) High, (9-10) Very High

Risk can also be expressed by the number and color code in the matrix which determines the level of risk in this study, as showed, the Green from 1 to 14 (the low risk area appears), the Yellow from 15 to 39 (the medium risk area appears) and the Red from 40 to 100 (the high risk area appears), see Figure 1.

		Occurrences									
Severity		10	20	30	40	50	6	7	80	90	100
	9	18	27	36	45	54	63	72	81	90	
	8	16	24	32	40	48	56	64	72	80	
	7	14	21	28	35	42	49	56	63	70	
	6	12	18	24	30	36	42	48	54	60	
	5	10	15	20	25	30	35	40	45	50	
	4	8	12	16	20	24	28	32	36	40	
	3	6	9	12	15	18	21	24	27	30	
	2	4	6	8	10	12	14	16	18	20	
	1	2	3	4	5	6	7	8	9	10	

Figure 1. Matrix of risk

3.3. Data Collection

Given that the process selected and studied was new, and the lack of historical data of statistical significance for deviation indicators (quality risk), the direct estimation of severity, occurrence and detection was based on extrapolating the opinions of experts working in the tablets production line, and determine the scale (1-10) in estimating indicator levels. (See Table 1) (Mollah *et al.*, 2013). We used the brainstorming to generate ideas about potential risks at each stage and using a fishbone or Ishikawa diagram to explain the causes of each hazard.

No.	Severity of failure	No.	Occurrence of cause	No.	Detectability of cause	
10	Injure to the customer or employee	10	At least once a day	10	No detection of cause or failure	Bad
9	Illegal	9	More than once a week	9	Occasional test or inspection	
8	Complete loss of performance and	8	Once per week	8	Systematic sampling and inspection of units	
7	Extreme Customer dissatisfaction	7	Once per month	7	Manual inspection of all units	
6	Partial loss of performance and	6	Once every 3 months	6	Manual inspection with mistake proofing	
5	Customer complaint	5	Once every 6 months	5	Statistical monitoring of process	
4	Minor loss of performance and	4	Once per year	4	Statistical monitoring for to out-of-control conditions	
3	Minor nuisance	3	Once every 1-3 years	3	Above and 100% inspection surrounding out of control	
2	Noticeable with no effect on performance	2	Once every 3-6 years	2	All units are automatically inspected	
1	Unnoticeable: no effect on performance	1	Once every 6-100 years	1	the defect is obvious and can be kept from customer	

Table 1. The scale of Severity, Occurrence, and Detection approved in the research

3.4. Risk Assessment and priority number account

According to the FMEA analysis, there is a high, medium and low risk in the production stages. The analysis revealed that a high risk of a red color in the preparation stage. it's a high risk, and it is not allowed. The medium risk of the yellow color was at the stage parting, coating and packaging, as for the stage of pressing, the risk was low and green color. Table 2,3,4,5,6 presents an FMEA model for each of these stages, showing red, yellow and green areas. Showing the importance of intervention to carry out the treatments. The improvement procedure was identified by the experts. The improvement was oriented towards the elements of the process (worker, machine, material,

manufacturing system, and management). The aim of the improvement was to improve quality by reducing risk.

4. Results Analysis and discussion

4.1. Results Analysis

We will try to present the results of our research for every stage of production stages:

Parting stage: determined two failures potential by the experts in the stage, which have potential effects on the effectiveness of the drug which means the level of quality is low, and the level of risk in was the yellow color which is a medium level,

N.	Potential Failure Mode	S	Potential Causes	O	Current Controls	D	RPN	Actions Recommend	S	O	D	RPN
1	Little weight of the active ingredient leads to an error in the manufacturing process	10	Non-calibration	7	proper	3	210	Continuous training	10	5	3	150
			The weight is not real because of humidity	5	Storage is not good	2	100	Improve the environment for storage		4	2	80
			Volatilization of material because of ventilation devices	5	The speed of the air from the ventilators strong	4	200	Periodic calibration		4	3	120
2	Mixing materials lead to a similar tablet ineffective	10	There are no cards label handling on the container and the bag	7	Prepare	5	350	Continuous training	10	6	4	240
					Factor control and inspection	4	280	Emphasis on handling cards			4	240
					Store worker	3	210	Continuous training			3	180
Total RPN							1350					1010

Table 2. The FMEA analysis activity for parting stage

the degree of (RPN) it was equal (1350) degree out of index value, and after implementing the required improvement, the degree of (RPN) is dropped into (1010) degrees, in percent of improvement (74.8%). This means that the improvements dropped (340) degrees of RPN index, (see Table 2), with stay the yellow color the main highlight color, but at the lowest level for it.

Preparation stage: they determine it by three cases of potential failure by the experts in production stage, those lead to high-quality risk. The degree of RPN was (2780) on the index scale, and this is the highest degree for risk calculated in these stage (the level of risk in this stage was the red color). This

means that the risks are strong and unacceptance. The cause of the high level of risk this stage resulted from critical stages in production of medicine and require special attention of employees and continuous follow-up of management, at implementing continuous improvement to variables in this stage, the degree of (RPN) dropped in to (1245) degrees with the percent of improving reached (44.7%). This means that (1535) degrees out of index value RPN dropped in this stage, which indicates the amount of improvement that has been achieved. This result supports the level of risk it moves which from red to yellow (see Table 3).

N.	Potential Failure Mode	S	Potential Causes	O	Current Controls	D	RPN	Actions Recommend	S	O	D	RPN
3	High humidity in powder lead to adhesion part of the tablet in the form of Bottoming	10	Increase the amount of water	7	prpeare	8	560	Continuous training	10	6	4	240
			Drying for a few powder	6	Drying Oven And drying agent	8	480	Periodic calibration		6	5	300
4	powder is wet leads to Volatilization part of the article during the pressing	10	Increase drying time	7	drying worker	8	560	Continuous training	10	5	4	200
			Increase drying time.	7	The drying agent Record	4	280	Continuous training		6	3	180
			Lack of moisture during the milling	8	Drying Oven	5	400	Periodic calibration		4	5	200
5	Blending incomplete	9	Changes in the size of a grain of raw materials	7	It measures Size but is unacceptable	8	504	Continuous training and the need to control worker	9	5	5	225
Total RPN							2780					1245

Table 3. the FMEA analysis activity for Preparation stage

Pressing stage: At this stage, we identified four potential cases of failure, but it was with simple or weak risk, and their effect on product quality was low, where The degree of (RPN) before the improving reached (1293) and represented in the green color omental the levels of risks, though, This degree represents a certain level of risk and needs reduction to prevent occurrence in the operation, after making the required improvement, the degree of (RPN) dropped in to (1004) degree in the index value, with improvement percent reached (77.6%) this means that the amount of drop is (289), (see Table 4).

Coating stage: At this stage, we identified five cases potential for failures, including medium and a low of risks, and that was with yellow and green color analyzing the causes of these risks, it is showed that management of a company depended on machines needing trained of skilled workers on how this machines work The direction of management is to depend on raw material with bad quality caused which raise the scale (RPN) which will reach (1644) degrees, and when the experts implement the issues of continuous improvement on this stage, the degree of (RPN)) dropped about (339) degrees to

Table 4.
FMEA analysis activity
for Pressing stage

N.	Potential Failure Mode	S	Potential Causes	O	Current Controls	D	RPN	Actions Recommend	S	O	D	RPN
6	High humidity in the powder causes adhesion of part of the material in the mold	7	Drying for a few powder	8	Bottoming factor	1	56	Periodic calibration	7	7	1	49
			Increased pressure in the pressing device	5	prepare	1	35	Continuous training		5	1	35
7	Increase the flow of powder lead to increased in the tablet's size	10	10 non-support machine calibrated	5	a visual inspection of the amount of material	1	50	Seen need to factor control	10	5	1	50
8	powder lack of flow leads to the Small size of the tablet	8	Little weight to the tablet leads to a small amount of the active ingredient	5	Machine operator & a visual inspection of the amount	2	80	Seen need to factor control	8	5	2	80
9	An increase in pressure leads to a very dense disk	10	Pressure is not correct to force	8	Operator entry and check	2	160	Continuous training	10	5	2	100
			Equipment malfunction	8	Fill depth	4	320	calibration and maintenance		7	4	280
			Double powder flow	3	Visual inspection	2	60	Monitor prior step: blending		3	2	60
10	decrease in pressure leads to brittle and weak tablet	7	pressure is not correct to force	8	Operator entry and check	4	224	Continuous training	7	6	3	126
			Equipment malfunction	8	Fill Depth Gauge Annual Calibration	4	224	calibration and maintenance		5	4	140
			Double powder flow	3	Visual inspection	4	84	Monitor prior step: blending		3	4	84
Tota RPN							1293				1004	

Table 5.
FMEA analysis activity
for Coating stage

N.	Potential Failure Mode	S	Potential Causes	O	Current Controls	D	RPN	Actions Recommend	S	O	D	RPN
11	low temperature leads to tablet adhesion and deformation of the outer shape	7	the low temperature of device (Pan)	5	pan &factor pan	6	210	calibration and training	7	5	5	175
12	high temperature leads to the cohesion of the paste on tablet	9	high temperature in a Siding	5	pan &factor pan	6	270	calibration and Continuous training	9	5	4	180
13	A decrease in the material's quality leads to a colorful color is not required for the tablet	9	Origin is not good for the colored material	3	Supplier	7	189	evaluate Supplier and manufacturer	9	3	5	135
					Manufactur er	5	135				5	135
14	Low percentage of polished material (Polyethylene) lead to the emergence of non-gloss in the tablet	5	Low proportion of material polished	3	Siding factor	7	105	Continuous training	5	3	7	105
			Origin is good	3	Factor inspection	6	90			3	6	90
			Short time, rotation of the tablet in the polishing machine	6	Supplier material	5	150	evaluate equipped		5	5	125
15	Not dry the tablet inside the oven Siding (selling hardener tablet) leads to break the tablet in pan	9	The lack of a drying oven inside (Selling)	5	Operator drying	4	180	Continuous training	9	4	4	144
					Siding and oven drying	7	315	Periodic calibration			6	216
Total RPN							1644					1305

become (1305) degree, with the percent of improving reached (79.3%). The improvement that happened in this stage moved the level of risks from yellow to a green color, (see Table 5).

Packaging stage: At this stage, there are three cases of failure should be paid that most were in yellow color, and this show the existence of medium risks, attention these cases have no effect on the health of the patient, but occurrence is high, this lead to the high degree of (RPN) that reached (1375). The review on the causes of this level of risk, shown that the employees do not have the responsibility of high attention they the importance of packaging of package operation, and its role in product quality, also not they complete the work of periodic maintenance of the machines, which leads to high risk in this stage. After continuous improvement and training for workers, the degree of (RPN) dropped into (688), so the amount of

reduction is about (686) degrees from risks, and this shows that the percent of improvement was (50.1%), which that shows the level of risk moved from yellow to green color, (see Table 6).

Finally, we can preview results of our research in Table 7, which shows the numbers of (RPN) before and after the improvement and how to focus on high and medium risk levels (red and yellow color), by looking to the numbers of (RPN). We can notice the total before improving the operation which reached (8442), and the numbers of (RPN) notice the total after the improvement which reached (5253), we found that (3189) degree of risks are dropped, and this shows that total percent of operation improving reached (62.2%). Through three months we completed the work, and we achieved the required improvements on the operation, (see Table 7).

N.	Potential Failure Mode	S	Potential Causes	O	Current Controls	D	RPN	Actions Recommend	S	O	D	RPN
16	The emergence of a shortage in the number of tablets inside Shit lead to unacceptable product	7	The presence of powder during packaging	8	Operator Packing	4	224	Continuous training	7	5	4	140
			Increased tablet weight and size	7	Factor inspection	4	196	5		3	105	
			Not to sift meal	7	Factor preparation	2	196	Worker control		6	2	84
17	Number not appear the meal and expiry date	9	Packaging machine (template numbers) is not good	7	Machine operator	5	315	Periodic calibration	9	5	3	135
					Periodic maintenance of the machine	4	252				3	135
18	Shit derailment during packing	3	Packaging machine (template pressing)	8	Operator Packing	4	96	Continuous training	3	5	3	45
					Periodic maintenance	4	96	Periodic calibration			3	45
Total RPN							1375					689

Table 6. FMEA analysis activity for Packaging stage

Process step	RPN	Before improvement			RPN	After improvement		
		Green	Yellow	Red		Green	Yellow	Red
Parting	1350		x		1010		x	
Preparation	2780			x	1245		x	
Pressing	1293	x			1004	x		
Coating	1644		x		1305	x		
Packaging	1375		x		689	x		

Table 7. Total RPN for process

4.2. Discussion

Despite the complex dynamic environment, this influences politics, and technical leads to an application by the recent program at sector quality risk of pharmaceutical products industry at Iraqi Medicines Company. In this research, we attempted by applying a program of quality risk management as one of medicines factory in Mosul city. In this research, we have reached, that adopting QRM can be considered needing to obligation higher manage by applying requirements of safety quality in drug products, Moreover, need to train working groups at concepts of quality risk management, including essential tools toward analysis and measure of risks. This study has applied in Al-Hokamaa Company. This study contributes to the correct and successful applying of the quality risk management program.

After continuous review of the causes of the emergence of the risks, it turned out that most of the problems following the emergence of risks, during the different stages of production focused on the lack of control of the machines, before operating on a particular medicine (pill tablet) as each medicine or powder medication, that needs to set Calibration regarding the machine,

Before starting production, each type of medicine lack to change the amount of force or pressure in the compressor. Additionally, the company depends on two factors, that change continuously. This change led to the worker no knowledge of the details of the production process along with the needs of each stage. The company's management has been weakly treated, that caused high-quality risks subsequently.

The correct use of FMEA technology has been very successful and effective in improving quality levels by reducing defects and / or risks in the production process, and the Al-Hokamaa company has benefited from the application of this technique as part of the techniques used in quality risk management.

Experts team has worked on Identifies potential failure modes in the drug production process, evaluating the potential impacts on the health of the customer, and then working on the corrective measures required in the process and returning them to the correct situation. QRM's contribution has been significant in reducing the risk of quality of pharmaceutical products in the Al-Hokamaa company. The QRM team has been required to move from the high-risk level, that includes red color to medium

and low risk, that comprise yellow and green colors individually, all these colors will do the process of detection, impact, and therefore, the team focused on the achievement of the causes of risk at each stage of productivity. Hence, all improvements were carried out over a period of (11) weeks. We made the reassessment of the risk, that became a low-risk level, changing from the old level, because of the shift from a high RPN at (8442) to a new low RPN at a total value of (5253), that referred to the real reduction and actual of the level of risk. This study achieved both stages of medium risk and three stages of low risk, following a stage of high risk and three stages, including medium risk and low risk.

3. Conclusion

Many level of risks of Drug products hazarded can allow which to unusual of the themes, because of inaccessibility at ideal circumstances of production; while other risks are by including enormous risks. These high risks are very unacceptable because of their significant effects on quality level including patient safety; Other limitation of risks level, along with

happening and repeating reducing, besides, affecting level lead to building a high-quality level moreover getting of patient health. These regarded as the critical aims of drug companies.

It can consider risks estimation to be critical in the pharmaceutical industry, because of mistakes in pharmaceutical processing, which can regard as very dangerous to sick life. Therefore, we need in this study an international identification organization for both essential risks analysis and estimation as a helpful tool for improving products quality, risk evaluation face several challenges relates to practical application, including adapting new production processes, either included the essential framework relating human element and refuse or accept risks standards. Till now, nobody delimitation. This research consider as the first attempts to applicate quality risk management program in Iraqi pharmaceutical industry.

We have investigated procedures of determination, analysis, measuring affecting the quality of the product, based on the steps and phases of quality risk management, and using some risk analysis and identification techniques, it provides both researchers and companies basic knowledge and correct practices to address risks, via reducing its impact along with facing it in future.

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An Examination of Audit Delay: Testing Several Factors of Banking Issuers as Implement Global Reporting Initiative (GRI) General Disclosures Section Reporting Practice

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Abstract

The purpose of this research was to determine several factors of Audit Delay on Banking Issuers among others the effect of loan proportion, company age, Public Accounting Company size, company size, auditor switching and auditor opinion on audit delay. This research used purposive sampling technique which obtained the data from 30 samples of service companies with 270 observation data as an analysis unit (30 x 9 years). The sample used in this research was from 2008 until 2016. The statistical application used in this research was different from other researches. Specifically, this research used Eviews. This research found that the effect of auditor switching variable had a significant effect on partial audit delay. Other variables, like company size, loan proportion, company age, Public Accounting Company size (KAP), auditor opinion and subsidiaries did not significantly influence partial audit delay. Company size, loan proportion, company age, KAP size, auditor opinion and subsidiaries simultaneously influenced the audit delay.

Keywords: loan proportion; company age; public accounting company size; company size; auditor switching; auditor opinion; subsidiaries; audit delay.

1. Introduction

The goal of most companies is to maximize profits, although there are companies that operate with the objective in addition to maximizing profits (Husted and De Jesus, 2006). To achieve these objectives, companies sometimes require capital assistance from investors and creditors. Therefore, in order for investors and creditors to invest, companies should be able to convince them that their company is feasible and able to be given a loan, or act as a place to invest. It can be reflected in the financial statements made by each company. In addition, the financial statements can be used as a basis for taking a decision. The general purpose of financial reporting is to provide financial information about the reporting entity that is useful to stakeholders in making decisions about the provision of resources to the entity. But in fact, there are still many companies that late in submitting audited financial statements. Indonesia Stock Exchange (IDX) Report (2017), had listed 70 issuers who were late in submitting audited financial statements of 2016 for the first three months of 2017. Based on the information, the deadline of the submission of financial statements to the stock exchange researchcity for the first quarter or as of March 2017 was by the end of April 2017. IDX itself has given the first warning to the issuers that were not obedient. Advanced warning was in the form of sanctions/penalties and suspension. In addition, if there were issuers who did not meet the obligations that had already existed in the rules, such as reporting and others, then the shares of the issuers could also be frozen. IDX also had suspended companies that did not meet the amount of shares in circulation (free float). Therefore, from the background of the problems mentioned here, then the problem of this research is whether the loan proportion, company age, KAP size, company size, auditor switching, auditor opinion and

subsidiaries simultaneously and partially affect the audit delay at service companies listed in Indonesia Stock Exchange. Based on the Research of Che-Ahmad and Abidin (2008) used 343 companies listed in Malaysian Stock Exchange in period of 1993 as the research sample. Independent variables used in this research were company size, industry classification, leverage, auditor company type, profitability, auditor opinion, client complexity, total of inventories & receivables, ownership of director share, and auditor switching. On the other hand, the dependent variable for this research was audit delay. The hypotheses were tested by using multiple linear regression models. The results showed that several variables, namely: inventories & receivables, auditor company type, client complexity, and auditor switching had a significant effect on audit delay. On the other hand, company size, auditor opinion, ownership of director share, industry classification, profitability, and leverage had no significant effect on audit delay. Chen et al (2018) find the result of this research showed that auditor switching significantly influenced audit delay. Meanwhile, auditor reputation, auditor opinion, and duration of time of assignment had no effect on audit delay. Chiu et al., (2018) find the results showed that company size and size of Public Accounting Company negatively affected audit delay. Meanwhile, profitability, leverage, and auditor opinion did not affect audit delay. In sum, there were a large number of researchers who conducted a research on audit delay as a dependent variable, with various independent variables, either partially or cumulatively. Durrant (2019) examines profitability factors, financial conditions, client complexity and modification of audit opinions can increase the delay of audit reports. For high profitability, the higher audit delay occurs. The slowness of the audit report will be reduced by the increasing size of the client.

Reports on audit results support Sustainability reports based

on the GRI Standard can be used to measure organizational performance in relation to laws, norms, codes, performance standards and voluntary initiatives; demonstrate the organization's commitment to sustainable development; and compare organizational performance over time (Afify, 2009, Chen et al., 2015 and Haque, 2015). Mock et al., (2012) state that a systematic approach to sustainability reporting helps (1) Improve sustainability performance, (2) improve risk management and investor communication, (3) involve stakeholders and improve stakeholder relations, (4) motivate and involve employees, (5) build credibility as a committed and effective corporate citizen, (6) strengthening internal data management and reporting systems, (7) improving sustainability strategies and selecting performance indicators and targets and (8) benchmarks for sustainability of performance against oneself and others. GRI was formed by CERES (Coalition for Environmentally Responsible Economics) with support from the United Nations Environment Program (UNEP) in 1997. The Global Reporting Initiative (GRI) is a non-profit organization that develops economic, environmental and social sustainability. The vision of GRI is a sustainable global economy where organizations manage economic, environmental and social performance, as well as the impact of transparent responsibilities and reporting. While the mission of GRI is to create sustainability reporting standards by providing guidance and support to organizations. Therefore, GRI presents a comprehensive sustainability reporting framework for all companies and organizations that are widely used throughout the world. GRI provides guidance on organizational reporting towards a sustainable global economy. A sustainable global economy must combine long-term profitability with social justice and care for the environment (Nikolaeva & Bicho, 2011). This means that the intended sustainability includes performance in the economic, environmental, social and governance fields. The GRI sustainability reporting framework allows all companies and organizations to measure and report on their sustainability performance.

Motivation of researchers conduct tests to prove Signaling Theory where Audit Delay will be responded to if there is a large proportion of loans. Banking issuers are highly likely to have an audit delay due to the important factor in the ratio of Loan Deposits to Ratio. Banking issuers always have a high LDR. This is because the loan tenure is always long term. In funding banking issuers with long tenors such as bonds are intentionally carried out to maintain a net stable funding ratio (NSFR) above 100%. Based on data from the Indonesian Deposit Insurance Corporation (LPS) in 2018, the credit to deposit ratio (LDR) ratio shows an upward trend to 91.43%. This figure shows an increase from the end of 2017 period until the first quarter of 2018 which is at the level of 89.6%. Until the end of the year, LPS estimated that the LDR would still be in the range of 91.2%. This is because the rate of credit growth is much higher along with the demand for credit which is still quite large. The Accounting Office will take a long time to make a decision on the management of funds and the correct accounting records so that to ensure that this still affects going concern. The company's ability to fulfill its obligations both long-term obligations and short-term obligations affect the audit process.

2. Literature Review

2.1. Signalling Theory

According to Morris (1987), signalling theory was a signal or action taken by the company management which was based on more complete and accurate information about the company's internal data and future prospects of the investor. Therefore, managers were obliged to give a signal about the condition of the company to stakeholders. The signal can be given through the disclosure of accounting information such as the publication of financial statements.

2.2. Audit Delay

Audit delay occurs due to delayed publication of audited financial statements. Other researches refer this term as audit report lag. Actually, the essence or the meaning of these terms are just the same. The term is mentioned in Lai and Cheuk (2005), who stated that *"An audit report lag or audit delay is a period from a company's year end date to the audit report due"*. This is in line with Canter et al (2007), who stated that: *"Auditors' report lag is the open interval of number of days from the year end to the date recorded as the opinion signature date in the auditor's report"*. Audit delay is the length of time the completion of the audit process is measured from the closing date of the financial year to the completion of the audited report by the auditor. Settlement time can be measured by the number of days. The number of days can be calculated from the closing date of the company's financial year minus the date of issuance of the audited report. Audit delay is very important for an investor who will invest in certain companies, this has an impact on the quality of a company.

2.3. Loan Proportion of A Company

The researcher used the solvency ratio (business and financial risk analysis) to illustrate the proportion of company loan by using secondary data derived from the company's financial statements. The higher the value of a ratio, then the condition of the company shows that there are more capital that is derived from loan, thus, justifies the condition where there is an emergence of a doubt about a company that will be able to pay off its loan. Zhang (2018) also used solvency calculation by using total loan that was divided by total assets.

2.4. Company Age

The age of the company could also reflect the impact on the quality of accounting practices in the context of the speed of time of publication (Okoye and Iidowu, 2018). The older the age of companies, the more likely they were to have a strong internal control procedures because their internal auditors were experienced. Thus, it was expected that older companies had smaller control flaws that could lead to reporting delays. Similarly, younger companies were more vulnerable to failure and had less experience with accounting controls.

2.5. Public Accounting Company (KAP) Size

Public Accounting Company (KAP) size is an emergence of a quality assessment because it is done by qualified internal and external auditors against the financial statements. The determination of a qualified audit can be seen from various angles. Beck et al (2018) revealed that audit quality could be seen from several aspects, one of which was from Public Accounting Company size. If KAP which audited the company was a big KAP (*Big 4 accounting firms*), it was believed to provide better quality than small KAP (*Non-Big 4 accounting firms*). It was because audit quality was the probability where an auditor could find and report about a violation in the accounting system of the audited party.

2.6. Company Size

The size of the client company that are audited by the auditor consists of both large and small client companies. The size of companies which explained about 4 types of company size that could be assessed from the amount of sales and assets owned by the company (Yeh et al., 2018). If the size of the company was associated with agency theory, then with the existence of a large company size, it allowed for a broader disclosure of information so that the signaling theory could be implemented by the company.

2.7. Auditor Switching

Auditor switching is a change of auditor that occurs in the audited company. Although there is no change of *Public Accounting Company*, the change of auditor may happen. The change can be caused by several factors, both from internal and external factor which is private for the auditor itself. However, the change of the auditor may have an effect on the implementation of the audit. Parker et al (2018), stated that the audit period affected the asymmetry information. Asymmetry information that could lead to agency problems could be overcome by preventing the occurrence of audit delay.

2.8. Auditor Opinion

Auditor opinion is the result of auditor observation on the company's operational activities which have material value. The results of the auditor's opinion are listed in the audit report. Therefore, audit report is a tool used by the auditor as a written statement of the conclusions about the audited financial statements to the concerned parties. In addition, according to Salehi et al., (2008), the opinions of auditors were divided into five classifications, namely:

1. Unqualified Opinion
2. Unqualified Opinion report with Explanatory Language
3. Unqualified Opinion report without Explanatory Language
4. Qualified Opinion
5. Adverse Opinion

Audit opinion is the auditor's statement on the fairness of the financial statements of the audited entity. Fairness concerns materiality, financial position, and cash flow. Audit opinion is used by users of financial statements in making decisions for the survival of the company. The auditor's job is to examine financial statements whether they are in accordance with the presentation with applicable accounting standards and compliance with policies.

2.9. Subsidiaries

The number of subsidiaries is one of the determinants of complexity in carrying out the audit process. According to Viet et al., (2018), there was a strong linkage that indicated that a growing number of branches would prolong an audit result. Unlike Bratten et al., (2019) research results showed that subsidiaries had no effect on audit delay. Therefore, the researchers are interested to investigate further about the influence of subsidiaries on audit delay.

3. Research Methods

3.1. Type of Research

This research used descriptive statistical research. This research would use data from companies listed in Indonesia Stock Exchange. The variables used in this research consisted of the dependent variable, that was audit delay, and 7 (seven) independent variables, namely: loan proportion, company age, KAP size, company size, auditor switching, auditor opinion and subsidiaries.

3.2. Location, Time of Research, and Research Schedule

This research used 9 years of financial statements data from 30 service companies in Indonesia Stock Exchange (IDX) that was expected to make a reference for the object of the research, especially in the field of audit.

3.3. Population, Research Sample and Data Collection Method

There were 61 service companies except for banking listed on IDX. Therefore, the researcher conducted purposive sampling. The specific criteria used by the researcher, as follows:

1. Service companies which were engaged in media and other services, except banking services. The main reason the researcher did not use banking services company was because the completion of audit results was done more quickly and was mandatory to be prioritized in audit implementation, when compared to other service companies.
2. Service companies listed on the Indonesia Stock Exchange (IDX) in 2008 to 2016 and the companies were not delisted.
3. Companies which submitted their full financial report from 2008 to 2016.
4. Companies which published a complete independent audit report from 2008 to 2016.

3.4. Identification of Research Variables

The operationalization of the variables is in the following Table 1 as a follows:

Variables	Indicators	Scale
Audit Delay	Audit Delay = date of audit report-date of financial report	Ratio
Loan Proportion	Loan Equity = Total of Loan/Total of Equity	Ratio
Company Age	Duration of the establishment of the company	Ratio
KAP Size/ affiliates and Non affiliates greater	KAP Big 4 = 1 ; KAP Non Big 4 = 0	Dummy
Company Size	Szlit = Log Assets	Ratio
Auditor Switching	There was no switching = 0 ; There was a switching = 1	Dummy
Auditor Opinion	Unqualified opinion = 1; qualified opinion = 0	Dummy
Subsidiaries	Total of Subsidiaries	Ratio

Table 1. Identification of Research Variables

4. Result and Discussion

4.1. Result

4.1.1. Descriptive Analysis

The results of the descriptive statistics of this study are presented in Table 2.

According to Table 2, it was known that the minimum value of Audit Delay (Y) was 17, while the maximum value of Audit Delay (Y) was 239. The average value of Audit Delay (Y) was 79.6815, while the standard deviation value of Audit Delay (Y) was 18.3508. The minimum value of Loan Proportion (X1) was 0.0106, while the maximum value of Loan Proportion (X1) was 15.9948. The average value of Loan Proportion (X1) was

Variables	Min	Max	Mean	Std.
Audit Delay (Y)	17	239	79.6815	18.3508
Loan Proportion (X ₁)	0.0106	15.9948	0.9490	1.3217
Company Age (X ₂)	4	48	24.1333	11.1764
KAP Size (X ₃)	0	1	0.3259	0.4696
Company Size (X ₄)	19.18	30.65	27.0400	1.9438
Auditor Switching (X ₅)	0	1	0.4185	0.4942
Auditor Opinion (X ₆)	0	1	0.6296	0.4838
Subsidiaries (X ₇)	0	38	6.456	6.5421

Table 2. Result of Descriptive Analysis
Sources: Eviews Result (2018)

0.9490, while the standard deviation of Loan Proportion (X1) was 1.3217. It was known that the minimum value of Company Age (X2) was 4.0000, while the maximum value of Company Age (X2) was 48.0000. The average value of Company Age (X2) was 24.1333, while the standard deviation value of Company Age (X2) was 11.1764. The minimum value of KAP Size (X3) was 0.0000, while the maximum value of KAP Size (X3) was 1.000. The average value of KAP Size (X3) was 0.3259, while the standard deviation value of KAP Size (X3) was 0.4696. The minimum value of Company Size (X4) was 19.1800, while the maximum value of Company Size (X4) was 30.6500. The average value of Company Size (X4) was 27.0400, while the standard deviation value of Company Size (X4) was 1.9438. It was also known that the minimum value of Auditor Switching (X5) was 0.0000, while the maximum value of Auditor Switching (X5) was 1.0000. The average value of Auditor Switching (X5) was 0.4185, while the standard deviation value of Auditor Switching (X5) was 0.4942. The minimum value of Auditor Opinion (X6) was 0.0000, while the maximum value of the Auditor Opinion (X6) was 1.000. The average value of Auditor Opinion (X6) was 0.6296, while the standard deviation of the Auditor Opinion (X6) was 0.4838. The minimum value of Subsidiaries (X7) was 0.0000, while the maximum value of Subsidiaries (X7) was 38. The average value of Subsidiaries (X7) was 6.455, while the standard deviation value of Subsidiaries (X7) was 6.542.

4.2. Classical Assumption Test

4.2.1. Normality Test

The results of normality testing are found in the following Figure 1.

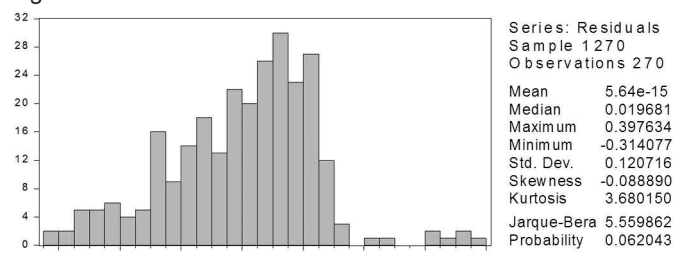


Figure 1. Result of Normality Test By using Eviews
Sources: Eviews Result (2018)

According to Figure 1, it was known that the probability value of J-B statistic was 0.062043. Because the probability value of p was 0.062043, or was greater than the level of significance, of 0.05, it meant that the assumption of normality was met.

4.2.2. Multicollinearity Test

The results of testing the classical assumption of The Multicollinearity test are in the following Table 1 as a follows:

	X ₁	X ₂	X ₃	X ₄	X ₅	X ₆	X ₇
X ₁	1.000000	-0.077854	-0.197292	-0.114865	0.011582	-0.011621	-0.098445
X ₂	-0.077854	1.000000	0.049771	-0.038224	-0.024273	0.111606	-0.086097
X ₃	-0.197292	0.049771	1.000000	0.315810	0.018747	0.042423	0.257638
X ₄	-0.114865	-0.038224	0.315810	1.000000	0.055197	-0.092556	0.568915
X ₅	0.011582	-0.024273	0.018747	0.055197	1.000000	-0.064492	0.105227
X ₆	-0.011621	0.111606	0.042423	-0.092556	-0.064492	1.000000	-0.113277
X ₇	-0.098445	-0.086097	0.257638	0.568915	0.105227	-0.113277	1.000000

Table 3. Result of Multicollinearity Test
Sources: Eviews Result (2018)

Based on Table 3 the multicollinearity test results, it could be concluded that there were no symptoms of multicollinearity between independent variables. It was because the value of correlation between independent variables was not more than 0.9 (Aljandali and Tatahi, 2018).

4.2.3. Heteroscedasticity Test

The results of testing the classic assumption of the Heteroscedasticity Test with Breusch Pagan Methods (Choueiry & Salameh, 2019) are in the following Table 4:

F-statistic	0.659675	Prob. F(7,262)	0.7061
Obs*R-squared	4.676304	Prob. Chi-Square(7)	0.6994
Scaled explained SS	5.900745	Prob. Chi-Square(7)	0.5514

Table 4. Result of Heteroscedasticity Test with Breusch Pagan
Sources: Eviews Result (2018)

Based on the Table 4 the value of Prob Obs * R-Squared was 0.5514 > 0.05, which meant that there was no heteroscedasticity.

4.2.4. Autocorrelation Test

The results of testing the classic assumptions of the Autocorrelation Test with Durbin Watson Methods are in the following Table 5.

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 03/12/18 Time: 06:30
Sample: 1 270
Included observations: 270

Log likelihood	628.8841	Hannan-Quinn criter.	-4.556328
F-statistic	0.659675	Durbin-Watson stat	1.840772
Prob(F-statistic)	0.706103		

Table 5. Result of Autocorrelation Test with Durbin Watson
Sources: Eviews Result (2018)

Based on the Table 5, the value of the Durbin-Watson statistic was 1.840772. Remember that since the Durbin-Watson statistic value lied between 1 and 3, or $1 < 1.840772 < 3$, then non-autocorrelation assumptions were met. In other words, there were no symptoms of high autocorrelation in residuals.

4.3. Model Selection Test

To determine the best estimation model, it was necessary to conduct Chow Test, Hausman test or Lagrange Multiplier test. Firstly, chow test was performed to choose the common effect or fixed effect. If the best score was on a common effect then the test would be stopped. However, if the best score was on fixed effect, then the test would continue with hausman test to select the model between Fixed Effect and Random Effect. If the best score was on Fixed Effect, then the test would be stopped (Aljandali and Tatahi, 2018). On the contrary, if the best score was on Random Effect, then the test would continue with lagrange multiplier test to choose between Random Effect and Common Effect. The basis of decision making was done if the probability value was $\leq \alpha$, it meant that the best method used in this analysis was the method of Fixed Effect. And in contrast, if the probability value was $> \alpha$, then it meant that the best method that could be used in this research was the method of Common Effect (Chow test) /random effect (Hausman test).

4.3.1. Chow Test

Below are the hypotheses to be tested:

H_0 : Common effect model is better than fixed effect model.

H_1 : Fixed effect model is better than common effect model.

Thus the result of Chow Test can be seen in the Table 6.

Based on the results of the Chow test in Table 6, it was known that the probability value was 0.0000. Since the probability value was $0.000 < 0.05$, the estimation model used was the fixed effect model.

Redundant Fixed Effects Tests
Pool: HAUSMAN TEST
Test cross-section fixed effects

Effects Test	Statistic	d.f.	Prob.
Cross-section F	3.261016	(29,233)	0.0000
Cross-section Chi-square	91.978654	29	0.0000

Table 6. Result of Chow Test
Sources: Eviews Result (2018)

4.3.2. Hausman Test

Below are the hypotheses to be tested:

H_0 : Random effect model is better than fixed effect model.

H_1 : Fixed effect model is better than random effect model.

Thus the result of Hausman Test show in the Table 7 below:

Correlated Random Effects - Hausman Test

Pool: HAUSMAN TEST

Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	6.057828	7	0.5330

Table 7. Result of Hausman Test
Sources: Eviews Result (2018)

Based on the result of Hausman test in the Table 7 above, it was known that the probability value was 0.533. Because the probability value was $0.533 > 0.05$, the estimation model used was the fixed effect model.

4.4. Hypotheses Test

In testing the hypothesis, coefficient of determination, simultaneous influence test (F test), and partial effect test (t test) will be analyzed. The statistical values of the coefficient of determination, F test, and t test were presented in Table 8 as a follows:

Dependent Variable: Y?

Method: Pooled Least Squares

Date: 03/12/18 Time: 06:21

Sample: 2008 2016

Included observations: 9

Cross-sections included: 30

Total pool (balanced) observations: 270

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	4.363225	0.149217	29.24089	0.0000
X1?	0.002035	0.005703	0.356895	0.7215
X2?	0.004560	0.003504	1.301292	0.1944
X3?	-0.032252	0.027465	-1.174281	0.2415
X4?	-0.004868	0.006673	-0.729515	0.4664
X5?	0.032446	0.014392	2.254491	0.0251
X6?	0.012753	0.015377	0.829308	0.4078
X7?	0.003056	0.004363	0.700308	0.4844
R-squared	0.347181	Mean dependent var		4.374406
Adjusted R-squared	0.246316	S.D. dependent var		0.124558
S.E. of regression	0.108135	Akaike info criterion		-1.484185
Sum squared resid	2.724501	Schwarz criterion		-0.991068
Log likelihood	237.3650	Hannan-Quinn criter.		-1.286171
F-statistic	3.442038	Durbin-Watson stat		1.884918
Prob(F-statistic)	0.000000			

Table 8. Result of Hypotheses Test with Fixed Effect
Sources: Eviews Result (2018)

The test results in Table 8 show that only the Auditor Switching variable (X_5) has a significant effect on Audit Delay (Y), while the other variables have no significant effect. Based on Table 8, it was known that the value of coefficient of

determination (Adjusted R-squared) of $R^2 = 0.34718$. This value can be interpreted as loan proportion, company age, KAP size, company size, auditor switching and auditor opinion that were able to influence/ explain audit delay simultaneously or jointly, equal to 34.71%, and the rest of 65.29% was influenced by other factors.

4.4.1. Simultaneous Effect Significance Test

F test aimed to examine the effect of independent variables simultaneously on the dependent variable. Based on Table 8, the value of Prob (F-statistics) was known, that was $0.000 < 0.05$. It can be concluded that all independent variables, namely loan proportion, company age, KAP size, company size, auditor switching, auditor opinion and subsidiaries simultaneously and significantly influence the variable of audit delay.

4.4.2. Regression Equation of Panel Data and Significance of t Test

Based on the Table 8, it was known the regression equation of panel data, as follows:

$$Y = 4.36 + 0.002X_1 + 0.004X_2 - 0.03X_3 - 0.04X_4 + 0.03X_5 + 0.012X_6 + 0.003 + e \quad (1)$$

Based on Table 8, it was known that:

1. The coefficient value of the independent variable of loan proportion was 80.15, which was positive. From the value, it can be interpreted that variable of loan proportion had a positive effect on audit delay variable. The probability value of loan proportion variable was 0.7215, that was < 0.05 , hence, loan proportion variable had no significant effect (statistically) to audit delay variable, at 5% significance level.
2. The coefficient value of company age was 0.004, which was positive. From the value, it can be interpreted that variable of company age had positive effect to audit delay variable. The probability value of company age variable was 0.1944, that was > 0.05 , then the company age variable had no significant effect (statistically) on the audit delay variable, at the 5% significance level.
3. The coefficient value of KAP size was 0.03, which was negative. From the value, it can be interpreted that variable of KAP size had a positive effect on audit delay variable. It was known that the probability value of KAP size variable was 0.2415, that was > 0.05 , then variable of KAP size had no significant effect to audit delay variable, at 5% significance level.
4. The coefficient value of company size variable was -0.004868, which was negative. From the value, it can be interpreted that variable of company size negatively affected audit delay variable. It was known that the probability value of company size variable was 0.4664, that was > 0.05 , hence company size variable had no significant effect to audit delay variable, at 5% significance level.
5. The coefficient value of auditor switching variable was 0.032, which was positive. From the value, it can be interpreted that variable of auditor switching positively affected audit delay variable. The probability value of the auditor switching variable was 0.0251, that was < 0.05 , then the auditor switching variable had significant effect on the audit delay variable, at the 5% significance level.
6. The coefficient value of auditor opinion was 0.012, which was positive. From the value, it can be interpreted that variable of auditor opinion had positive effect on audit delay variable. The probability value of auditor opinion was 0.4078, that was > 0.05 , then the auditor opinion variable had no significant (statistically) effect on the audit delay variable, at the 5% significance level.
7. The coefficient value of the independent variable of subsidiaries was 0.003, which was positive. From the value, it can be interpreted that the variable of subsidiaries had positive effect to audit delay variable. The probability of subsidiaries variable was 0.4844, that was > 0.05 , hence the

variable of subsidiaries had no significant effect to audit delay variable, at 5% significance level.

4.5. Discussion

4.5.1. Loan proportion, company age, KAP size, company size, auditor switching, auditor opinion and subsidiaries simultaneously influenced audit delay

Based on the results of the research, remember that all independent variables, namely loan proportion, company age, KAP size, company size, auditor switching, and auditor opinion simultaneously and significantly influenced the audit delay variable. It was shown through the result of probability value (F-statistics), that was $0.00000 < 0.05$. Influenced simultaneously indicated a tendency of audit delay when all independent variables provided an effect that supported the occurrence of delay in the submission of audit report.

4.5.2. The influence of loan proportion on audit delay

Loan proportion that was an internal factor negatively affected audit delay. The greater the company's loan, the smaller the company's liquidity ratio. The external auditor was obliged to examine the source of capital funds from the inloaned financing, as well as loans from various parties. Due to the large loan, it gave the impression of bad financial management by the management. Therefore, file-checking would need a long period of time to be completed. The external auditor alone took more time to make decisions on the correct financial management and accounting records in the company so as to ensure the company was still going concern. This is in line with the research of Akins et al., (2017), it was shown that the company's ability to meet its obligations (both long-term obligations and short-term obligations) affected the audit process. The results of previous research showed a positive influence on audit delay.

4.5.3. The influence of company age on audit delay

Company age was an internal factor that negatively affected the audit delay. The longer a company stood, the company already had accounting records that had been complied with the applicable requirements of Accounting Standard. Then it was also reversed to the management of the company's accounting information system and management. The longer the company stood, the more complex the enterprise data would be. But along with the development of the company itself, the company period stood to form periodic checks and improvements in the pattern of recording as well. In addition, companies that were aged 1-5 years also did not necessarily manage and arrange the financial reports and files well. Due to the possibility of keeping pace with the start up of the newly established company, there was usually a possibility of incorrect recording and accounting information systems within the company that were not well structured. However, it could be corrected by consultation with external auditors in improving the management of the company itself. The result of this research was in line with the result of the research of Abernathy et al., (2017) which found empirical evidence that company age had significant effect to audit delay. Similarly, a research conducted by AbbasZadeh (2017) found empirical evidence that the age of the company affected the audit delay.

4.5.4. The influence of Public Accounting Company size on audit delay

Public Accounting Company size was an external factor that negatively affected audit delay. The Public Accounting Company size was seen from the Big Four or Non Big Four can not determine how long the auditor took time in reviewing the company's financial statements. The professional level of an auditor was not judged by how soon or later in giving an audit result. But from how accurate the results were, and that the

results can be held as a reference for decision-making. However, auditors who came from Big four was often considered as auditors that would provide faster audit results. But in reality, large companies that used auditors from the Big Four were likely to produce quick audit results because of audited targets that would be published to stock exchange. But back again to how complex the company was being audited and members of the external auditors who took to the field. Small and medium companies often use non-Big Four, but it did not allow external auditors to quickly provide audited results because the results were still dependent on supporting data from the company and its complexity. The results of this research were in line with the results of research by Aobdia & Shroff (2017), George and Wallio 92017), Lambert et al., (2017) and Meckfessel & Sellers (2017).

4.5.5. The influence of company size on audit delay

Company size that was the internal factor negatively affected the audit delay. The larger a company was managed, the more the company's management grew. Therefore, the composition of company management and committee affected the company in the preparation of financial statements. The external auditor who audited the company would certainly take extra time to check the company file. The file may be from the company's bank cash, corporate licenses, and company production report data. This was in line with the research results of Bailey et al., (2017), Cular (2017), Gross et al., (2017) and Turki et al., (2017) where the size of the company did not significantly affect the audit delay.

4.5.6. The influence of auditor switching on audit delay

Auditor switching was an external factor that gave a positive influence on audit delay. Auditor switching occurred due to the replacement of external auditors auditing the company, either due to the expiry of the contract period of the auditor as well as the displacement of duties and resignation. However, the change of the external auditor had no effect on the duration of the audit result. Usually, the replacing auditor would first review through the previous external auditor.

4.5.7. The influence of auditor opinion on audit delay

Auditor opinion was an external factor negatively affected audit delay. The results showed no direct effect on audit delay itself. Both qualified and unqualified opinions must be reviewed again. Although the results of the collected data showed more qualified opinion that required a longer audit period than the average unqualified opinion decision making. Due to the function of external auditors that was not just to provide the results of the audit, but also as a place of consultation and revamping the presentation of appropriate financial statements. Auditors also allowed for transparency of data and company files for review. Therefore, there was no data that was limited by the company. The result of this research was similar to Habbash and Alghamdi (2017), where the audit opinion variable had no effect on audit delay.

4.5.8. The influence of subsidiaries on audit delay

The number of branches did not indicate any effect on audit delay because the number of branches of the company would be audited by different auditors with different cases and closing audit results.

5. Conclusion and Suggestion

5.1. Conclusion

1. Variable of loan proportion, company age, company size, KAP size, auditor opinion and subsidiaries had no significant

effect on partial audit delay.

2. Auditor switching variable significantly influenced partial audit delay.
3. Variable of loan proportion, company age, company size, KAP size, auditor switching, auditor opinion and subsidiaries simultaneously influenced the audit delay.

5.2. Limitation of Research

1. This research only used service companies as sample of research. Thus, the sample of the companies can not represent the entire company in Indonesia.
2. Period of time taken in this research was only in 2008-2016. So the condition can not be generalized for the results of existing research.
3. There were only 7 variables used in this research, which consisted of five independent variables; loan proportion, company age, company size, KAP size, auditor switching and auditor opinion (independent variable) and audit delay (dependent variable). Therefore, the independent variables were not able to explain the overall impact on the disclosed audit delay.

5.3. Suggestions

1. Future researchers should use a larger sample of companies and not limited only to the service sector.
2. For future researchers, items affecting social responsibility should be constantly updated in accordance with the con-

ditions of society and applicable regulations. It may be done by involving social activists and authorities concerned with social problem.

3. Further research should use other independent variables in doing research so that independent variables are able to explain the dependent variable.

Suggestions that can support auditors, investors, and further researchers:

1. It is suggested for both external and internal auditors to minimize the audit delay. So that efficiency and effectiveness can be achieved jointly by the company itself as a cost and time for the auditor itself.
2. For audit delay testing, it is necessary to consider Global Reporting Initiatives (GRI) section General Disclosure of reporting practice.
3. It is suggested for investors that audited financial statements that become a reference decision-making can also be applied with real state of the real economy and supported by the price of traded shares. Because investors have to be observant in investing their assets, caution must be applied as well.
4. It is suggested for the next researcher that for further research is not limited to only six variables. But also included variables that are rarely studied by other researchers. So the research on audit delay will continue to be an important consideration for the audit world in order to reduce the duration of audit results issued by the external auditor itself.

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Development of Risk Management Model in Maritime Industry

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Abstract

Sea transportation is a sector that is closely related to the livelihoods of many people, where sea transportation has a vital role in its relationship with other sectors in improving the welfare of the community. Besides that, the sea transportation sector plays a vital role as a means for the development of the maritime industry in meeting basic needs, namely accessibility for an irreplaceable society. The maritime industry engaged in the shipping industry is a regulatory intensive industry. Business activities The maritime industry involves many stakeholders including flag states, ship owners, ship operators, coastal states, cargo owners, shipyards, shipyards and ship crew. Apart from being solid, this regulation is dynamic, vulnerable to change in order to answer and adjust the times and demands of society. The purpose of this paper is to develop a risk management model in managing the maritime industry. Changes to maritime regulations discussed are changes in regulations sourced from mandatory IMOs on major international conventions including SOLAS on ship safety, MARPOL with regard to the environment and STCW with regard to ship crews. Risk assessment is conducted to determine the level of risk and mitigate risks from regulatory changes.

Keywords: maritime industry; process management risk; shipping industry; IMO, SOLAS, MARPOL.

1. Introduction

Today's maritime development is very influential on global economic growth which indirectly drives industry and trade to increase over time. The majority of world trade commodities that move from one country to another include shipping transportation (International Chamber of Shipping, 2015). The volume of world commodity trade which is increasing every year is one of the triggers for the increasing volume of world trade transported by sea. Along with the development of the times, the demand for quality, safety, environment and security of sea transportation has also increased (Ragazzi et al., 2017). The shipping industry plays a very important role in world commodity trade. However, shipping is an industry full of changes in regulations with IMO as an international body that shelves it. Changes in maritime regulation are international agreements aimed at increasing the level of safety and prevention of environmental pollution. The emergence of changes or additions to maritime regulation is closely related to major events. The event of the sinking of the Titanic in 1912 became the forerunner of the birth of the international convention SOLAS (Safety of Life at Sea) in 1914. SOLAS is considered the most important international convention of other conventions especially those related to safety (IMO, 2016). However, along with the growth of the shipping industry in the 1960s, a new problem arose, namely the spill of 120,000 tons of oil known as the Torrey Canyon event in 1967. In response to this event, IMO issued an international convention that regulates pollution prevention against environment, namely MARPOL 73/78. But a few years later in March 5 1978, the Exxon Valdez incident that ran aground in the waters of Alaska Prince William Sound also caused a spill of 10 million gallons of crude oil and polluted the sea. This event became the forerunner to the birth of a double hull regulation. This regulation requires that all vessels measuring more than 5000 DWT have a double hull construction. Several years later, namely in the

1990s IMO also issued a regulation governing ship safety management, namely the ISM Code. The September 11, 2001 terrorist attacks also became the forerunner to the birth of regulations on security at the port, namely ISPS Code. The ISPS Code became mandatory and amended under the SOLAS convention in 2002. In the past 26 years IMO has issued many maritime regulations and it cannot be denied that regulatory changes have an impact on decreasing the rate of ship accidents (Eliopoulou & Papanikolaou, 2007). The large number of regulatory changes or the number of additional regulations pose a risk, especially when regulation is considered excessive and that also means increasing costs for a small and limited benefit. (Viertola & Storgard, 2013).

For ship owners or ship operators to be able to do business well, expect that they can carry out business activities in a stable regulatory environment (Karahalios, 2015). This is very reasonable so that business activities carried out have certainty and do not experience turbulence due to changes in regulation. Research conducted by (Knapp & Franses, 2009) shows that maritime regulation issued by IMO in the period 1912-2006. Some previous studies have stated that the maritime industry is over regulated and is the industry that has the most regulations (Karahalios 2015; Alderton & Leggate 2005) when compared to other industries although many agree that IMO can improve safety standards in the sea with apply these regulations. However, regulatory changes have resulted in additional costs for ship owners or operators. These costs are included in the implementation costs to meet regulatory requirements. As a result, shipowners will usually face a conflict of interest between consumers and their market share. The shipping industry requires more capital budget due to aging of the fleet and the higher requirements for ship safety standards (Albertjin et al., 2011). Therefore, it can be said that the willingness of ship owners to implement regulatory changes depends on the benefits and benefits that can be achieved. (Karahalios, 2015).

The maritime industry is a complex industry and consists of many actors that are interrelated with each other. According to Karahalios (2015) the stakeholders in the maritime industry include flag state, coastal state, classification society, P & I Club, ship operator, insurance, marine consultant, shipyard and cargo owner. This paper aims to develop a risk management model in the management of the maritime industry by linking various changes in maritime regulations sourced from mandatory IMOs to major international conventions including SOLAS on ship safety, MARPOL relating to the environment and STCW relating to the crew ship.

2. Development of Global Business and Maritime Industry

In the industrial sector, risk assessment has become a common thing. The shipping industry is growing very rapidly and is able to facilitate transportation of supply and demand of world commodities such as basic materials, industrial materials, finished products and even in meeting transportation needs for passengers, vehicles and livestock. World economic growth is strongly influenced by shipping industry. This growth is proportional to the rate of growth in the number of ships, ship size and more efficient ship design. This growth rate is caused by several factors. The first factor is the discovery of new mineral sources in all parts of the world, this greatly affects the increasing volume of cargo traded. The second factor is the advancement of technology and the development of increasingly advanced vessels resulting in faster and more efficient delivery times. The last factor is the increasingly consumptive lifestyle of society which results in an increase in the number of requests for goods and services. Cargo transported can be classified into several types, namely, liquid bulk, dry bulk, general cargo, container cargo. There are also types of cargo that require special handling, including natural gas, refrigerated cargoes, automobiles, forest products and livestock.

In the shipping industry, shipowners agree to charters. The agreement was signed on a cooperation contract. The cooperation contract depends on the need for how long the ship tenant uses the service to deliver the cargo. The types of cooperation contracts in shipping tankers consist of five types, namely Voyage Charter contracts, Contract of Affreightment (CoA), Trip-Charter contracts, Time-Charter contracts and Bareboat or demise Charter contracts. Before signing a cooperation contract, both parties negotiate first, the negotiation method can be directly or through a broker. In the cooperation contract contains the duration of 40 boat rentals, the type and number of cargo to be transported, the payment method and the most important is freight. The amount of freight paid is usually calculated according to the amount of cargo (USD/ton) or boat rental per day (USD/day).

3. Maritime Regulation

Maritime regulation is one of the products produced by regulators that are under the supervision of the United Nations. In 1982 the UN issued the UNCLOS 1982 convention (United Nations on the Law of the Sea) which became the embryo of the birth of IMO (International Maritime Organizations) and ILO (International Labor Organizations). IMO has the task of regulating safety and prevention of marine pollution by ships, while the ILO issues regulations on workers on board. These two organizations issued an international convention which would subsequently be determined whether it would apply as an international regulation or not all depends on 166 member countries when approving the convention. Some key statutes in the maritime industry are SOLAS, MARPOL and ISM Code. Safety of Life at Sea (SOLAS) is a statute issued by IMO to regulate safety regulations at sea. The safety regulations aim to

improve the safety of ship crews, passengers and ships. All countries including IMO members must adopt SOLAS for ships with the state flag. SOLAS consists of 12 chapters. SOLAS is a very important provision, perhaps even the most important because it deals with the safety of merchant ships and also the oldest. In the first version it was approved by 13 countries in 1914, namely after the events of the sinking of the Titanic in 1912.

Marine Pollution (MARPOL) is a statute issued by IMO to regulate pollution and pollution that occurs in the sea by ships. This regulation contains requirements, procedures and equipment that must be owned by the ship in order to prevent pollution and pollution in the sea by the ship. Apart from the rules and statute above, IMO also issued many other rules called code. The code contains practical standards and international implementation to organize a field more specifically. An example of a Code that has been issued by IMO is the ISM Code and ISPS Code. International Safety Management (ISM) Code is an international standard of safety management in ship operations and efforts to prevent/control environmental pollution in accordance with the awareness of the importance of human factors and the need to improve ship operational management in preventing ship, human, cargo/property and property accidents. and preventing pollution of the marine environment, IMO issued a regulation on ship safety management & protection of the marine environment known as the International Safety Management (ISM Code) which was also consolidated in SOLAS.

Basically, the Code uses a risk management approach to ensure the safety of ships and port facilities and, to determine what security measures are appropriate, risk assessment must be carried out in each particular case. The purpose of this Code is to provide a standard, consistent framework for evaluating risk, allowing the Government to compensate for changes in threats by changing the value of vulnerability in ships and port facilities through the determination of appropriate levels of security and appropriate security measures. All countries that adopt SOLAS must comply with the Code above.

SOLAS and MARPOL have become one of the biggest conventions that greatly impact the development of regulations in the maritime field. After the convention has been approved and signed and implemented, countries are obliged to ratify the convention and apply it in their countries. Countries that have ratified international conventions are commonly called maritime states. Maritime states have two functions, the first function is as flag states, functions as coastal states. For example, Indonesia as a flag state is responsible for all ships registered in the country (Indonesian flag), while functions as a coastal state, Indonesia serves as law enforcement for all ships sailing or anchoring in Indonesian waters. Another actor in the maritime industry is classification society. Each flag country generally has its own classification body. Classification bodies are bodies that issue technical advisers. IACS is the association of world class (non-governmental) bodies recognized by IMO and has functions to make technical procedures and implementation of statutes made by IMO.

In conducting ship surveys and inspections, the classification body assigns tasks to class surveyors who descend directly to the field to carry out inspections and surveys on ships, the oil & gas industry etc. In this case, a surveyor is required to understand the class requirements, rules of the class, and statutes that are agreed upon by IMO. Each classification body has standards that differ from one class to another. Bureau Veritas is a classification body that is a member of the IACS and recognized by its existence by IMO. Bureau Veritas has rules called BV rules. Rules are technical standards, also called guidelines used by a conveyor in conducting surveys and inspections. Ships that want to be certified by the classification body are required to follow the requirements contained in these rules. Rules include technical standards for shipbuilding, ship inspection, inspection procedures and others.

4. Business Perspective of Maritime Regulation

Shipping industry is a big and very important business. Its contribution to transportation and world trade greatly helped support the growth of the world economy. This is because transportation costs are much cheaper when compared to other transportation modes. At present shipping contributes to 90% of the world trade market (Albertjin et al. 2011). Ships are a very promising asset in this industry, in 2015 the cost of VLCC shipbuilding ranged from 96 million USD. While the cost of constructing new vessels for Aframax and Suezmax was 53 million USD and 65 million USD respectively. Moreover, annual income from shipping industry reaches 500 trillion USD per year from freight (rental/transportation costs), this value represents 5% of the total economic value of the world (Albertjin et al. 2011). This shows that the shipping industry has a huge impact on the global economy. However, shipping industry is also a very risky business. The risks in the shipping industry are all uncertainties that can cause potential business value and profit to decline. However, the problem is how to identify possible risks.

Shipowners, such as business actor in general, argue that regulations tend to conflict with their initial goals in business, namely to get profits from their investments (Stopford, 2009). Fayle in the 1930s put forward a paper containing that in their efforts to improve both safety standards and working standards for floating conditions, the Board of Trade often placed themselves, during the last quarter of the 19th century, at odds with shipowners. They are considered to hinder the development of the shipping industry by laying down hard-and-fast rules that apply even to all small minority industries, and hinder British Shipping in international trade, by imposing exemptions on some foreign ships, even in British ports.

Regulatory perspective related to shipping company, IMO and flag state. According to the ISM definition the company code is any other owner or organization or individual such as a manager (manager) or tenant of 51 empty vessels (bareboat charterer), who has accepted the responsibility of managing the ship from the ship owner and the party accepting the responsibility agreed to take over all the duties and responsibilities provided by the ISM Code. IMO (International Maritime Organization) is a world organization formed by the United Nations and has a function to deal with maritime issues (make regulations) and has almost all maritime countries in the world. The main objective of the IMO is to provide a means for collaboration among its member countries in making government regulations and their implementation technically that concern the international shipping world. In addition, it also encourages and provides facilities to its member countries to adopt the highest standards which can be implemented in matters relating to maritime safety, efficient navigation and prevention and supervision of marine pollution from ships. In carrying out its functions and duties IMO has issued several regulations in the maritime field including the IMO Conventions and IMO Codes. IMO Conventions are divided into three types, namely conventions on safety, conventions on Marine Pollution and Liability and Compensation.

In the context of Flag State, a ship is a unique part of a country, therefore all state regulations/laws whose flags are flown on the ship are valid on that ship and also for the captain, the crew working on the ship and passengers who on it. In addition to national regulations/laws from flag ship countries, if the vessel is located or sailing in international waters, international regulations/laws apply to that vessel. The management of the ship with the approval of the ship owner has the authority to determine which flag will be used on its ship or ships in its fleet (may use more than one flag, for example, one Indonesian-flagged ship, another Singapore or Panama flag and so on).

5. Risk Management in the Shipping Industry

Risk is an opportunity for loss or destruction. According to Sunaryo (2007), everyone is aware that the world is full of

uncertainty which causes risks which are detrimental to interested parties, especially the business world. The topic of risk management became prominent after many events that could not be anticipated and caused losses to the company. Every company must experience and bear risks, including business risks, workplace accidents, natural disasters, theft and bankruptcy. Today, making companies carry out a risk management process expects business decisions that have potential risks of less value and expect maximum profits. Here are some of the most common notions of risk:

a) Risk as a Hazard

Most people assume that risk has the same meaning as hazard. In the context of safety, hazard can mean hazards that may occur to humans, damage to equipment or pollution to the environment.

b) Risk as a Chance of meeting with an unwelcome outcome

Definition of risk that is also popular, namely, risk is all that can cause uncertainty or have a negative impact on the business. One example is investment decisions that do not diversify can be defined as risks.

c) Risk as Uncertain decision

Risk definition can also be interpreted as something to express uncertainty in decision making. For example, an attacker who says "I will take the risk" means revealing that the decision to be taken by the speaker has the possibility of not being in accordance with the desired results.

d) Risk in the technical definition

Ben-Azher (2008) explains the terminology of risk is the multiplication between the probability of failure and the impact of failure. Risk is the multiplication value between consequences and frequency. Consequences show how much impact is caused while frequency is how often or the chance of an unwanted event.

According to Darmawi (2006), risk management is related to the functions of other companies, including: accounting, finance, marketing, production, personnel, engineering and maintenance functions, because those parts create risks that have a significant impact. Business people cannot avoid the risk completely but can manage risk as a way to reduce the potential risk. Risk management is an interesting topic for research because there are many events that cause losses to the company (Popa & Gulie, 2018). Some of the advantages of implementing risk management can prevent companies from failing, risk management directly supports the increase in company profits, because profits can be increased by reducing expenses, risk management can contribute indirectly to company profits.

6. Impact Area of Maritime Regulation Changess

According to Leggate et al. (2005) that the impact of changes in maritime regulation can be classified according to the impact area. Impact area is a type of influence/impact caused by changes in maritime regulation. From the regulation change data, an analysis was carried out to determine the impact area. Impact area due to changes in maritime regulations consists of Ship Instruments (Ship Instrument/Construction), Ship Operations (Ship Operation), Ship Cargo (Ship Cargo), Crew (crew/person onboard), Environment (Environment), and Security (Security).

a) Ship Instruments

Changes in maritime regulations are very closely related to changes in ship construction or the addition of tools (instruments) on ships. IMO issued several international conventions that regulate this matter, for example, SOLAS (International Convention for Safety of Life at Sea, 1974) requires minimum standards of ship construction strength and safety equipment such as fire suppression equipment, navigation equipment, safety equipment and radio equipment that must be on board. In addition, SOLAS also requires regular ship surveys and is approved by flag states by

issuing a certificate of compliance. COLREG (Convention on International Regulation for Preventing Collision at Sea, 1972) regulates the requirements for the basics of shipping lines to avoid collisions between ships. Load Line (International Convention on Loadlines, 1966) regulates the minimum height of the ship's hull (freeboard) according to the shipping lane and season. The Classification Board also has its own standards which regulate the technical issues of ship design, construction and maintenance. Although not all regulations are mandatory, these changes in regulation are considered financial pressure for shipowners (Leggate et al., 2005).

b) Ship Operations

In the last few years ISM (The International Safety Management Code, 1993) has a significant influence on how shipping companies share responsibility between ship owners and company management, of course this also influences how companies operate ships. Every company must have a ship operating certificate obtained by conducting regular audits and reports to ensure the safety management system (SMS) is implemented properly.

c) Shipload

Cargo or ship cargo such as crude oil chemicals and other dangerous cargo must be regulated because it is very dangerous to safety and the environment. Regulations that require cargo or cargo are related to damage and losses that may be caused. The parties that regulate ship load requirements are mostly carried out by companies and Protection and Indemnity Powers that issue Carriage of Cargo By Sea regulations, one of which is the Hague Rules, Hague Visby Rules and Hamburg Rules.

d) Crew on board

The regulation governing the requirements of the crew is STCW (International Convention on Standards of Training, Certification and Watchkeeping for Seafarers, 1978/1995). This regulation not only regulates the minimum qualifications of the crew/crew but also regulates the institution entitled to issue training certification for the crew. Meanwhile regulations governing workers' rights and company obligations are regulated in the MLC (Maritime Labor Convention, 2006). MLC is a new regulation in the ratification process. Previously the regulation that regulated was the ILO (International Labor Organization, 1919), but for reasons that hunting on the sea (ship crew) must be distinguished from other workers, then ILO regulations were no longer applied to the crew ship crew. The MLC rules are governed by (a) Minimum age of crew/crew, (b) Health requirements, (c) Regulations on employment contracts, (d) Social security for crew/crew, (e) Minimum working hours, (f) Standards for food & crew/crew accommodation, (g) Training and facilities for crew/crew, (h) Safety procedures, work procedures, and work accident procedures, etc. Every flag state that ratifies must conduct a regular survey to ensure that the regulatory requirements are properly implemented.

e) Environment

Maritime transportation is the most environmentally friendly transportation mode compared to other transportation modes (Leggate et al., 2005). MARPOL (International Convention for the Prevention of Pollution from Ships, 1973/1978) is a maritime regulation that regulates requirements to prevent pollution of the environment. MARPOL only regulates the prevention of pollution from ship loads such as oil, chemicals, dangerous cargo, ship waste, garbage, atmospheric pollution and other pollution which requires tankers to have a double hull. At present the pollution originating from the ship's ballast water organisms is the focus of the regulators and becomes the forerunner to the birth of the BWM Convention (Ballast Water Management).

f) Security

Problems that are regulated in security are related to pirate activity and terrorism. The terrorist incident on September 11, 2001 was the forerunner to the birth of the ISPS Code

(International Ship and Port Facility Security Code) in July 2004. The Lyold List in 2002 noted that losses resulting from piracy were more than 25 billion USD and the costs needed to increase security container load of 5-10 USD. ISPS Code regulates security requirements on board, port (Port Facility Security Assessment) and government obligations in implementing these regulations. Changes in maritime regulation can have an impact on one or more impact area, for example, the addition of safety equipment regulated in the SOLAS IIFSS Code requires the addition of a device in the form of a breathing apparatus in the ship, when viewed from the impact area, this regulation results in an impact on the Ship instrument/construction. Whereas in the changes to the regulation of MARPOL Annex II of the MEPC.118 document (52) which regulates the requirements for tank emptying and the minimum requirements for disposal of oil waste as far as 12nm from the nearest land edge, this regulation change has an impact area on the vessel instrument, and vessel operations. Whereas in the regulation of STCW Code Training for Gas Fuelled Ships, it requires the crew to conduct additional training to improve the qualifications of operating tankers using gas fuel.

7. Determinants of Risk Management Model

Risk in technical definition is the multiplication value between consequences and frequency. For example, the risk of a ship experiencing collision in a solid shipping lane can be defined as one of the possible hazards, the consequence is how much damage or loss due to the collision, while the frequency is the chance of collision in these conditions. Assessment of these consequences can be carried out quantitatively and qualitatively depending on the availability of data and other factors. Risk analysis is more difficult to measure, considering that there are several valuation parameters that do not have uniform possibilities and have an impact on the increasingly complex risks that can be caused. Some elements such as time, resources, and human errors make risk management more difficult and more complex. If divided risk analysis consists of three main components, namely: (1) risk management, (2) risk assessment and (3) ways of communicating risk. At the same time, these three components must be able to be in harmony with the three principles regarding the components of a disaster, namely: (i) opportunities to occur, (ii) consequences caused, and (iii) impacts caused.

The development of risk analysis has undergone a significant improvement process at which time risk analysis was limited to the scope of operations and evaluation of the port business. But, at this time it has shifted to long-term corporate planning. These differences in characteristics must be understood by managers and also on policy makers to form a team that will identify and assess the possibility of risk occurrence. In addition, a commitment from the port authority is needed to identify, monitor and prevent disasters that can occur in order to carry out a continuous improvement process. In the risk analysis process must pay attention to the port authority and workers at all levels. The port assessment process will involve communication from internal and external parties in order to exchange information about port clients, security costs and supply chain partners.

Risk management measures, monitors and controls important decision making processes. This goes hand in hand with the method of conducting risk assessments and how to deal with the risks themselves. In reality, there are five elements in terms of risk management which involve several adjustments in it such as: (i) risk aversion, (ii) risk mitigation, (iii) risk acceptance, (iv) risk delegation, and (v) division risk. All of which can be submitted to third parties or other organizations affiliated with the company by facilitating in terms of finance, technical, operations or other forms. The components of risk analysis can be simplified as in Figure 2.

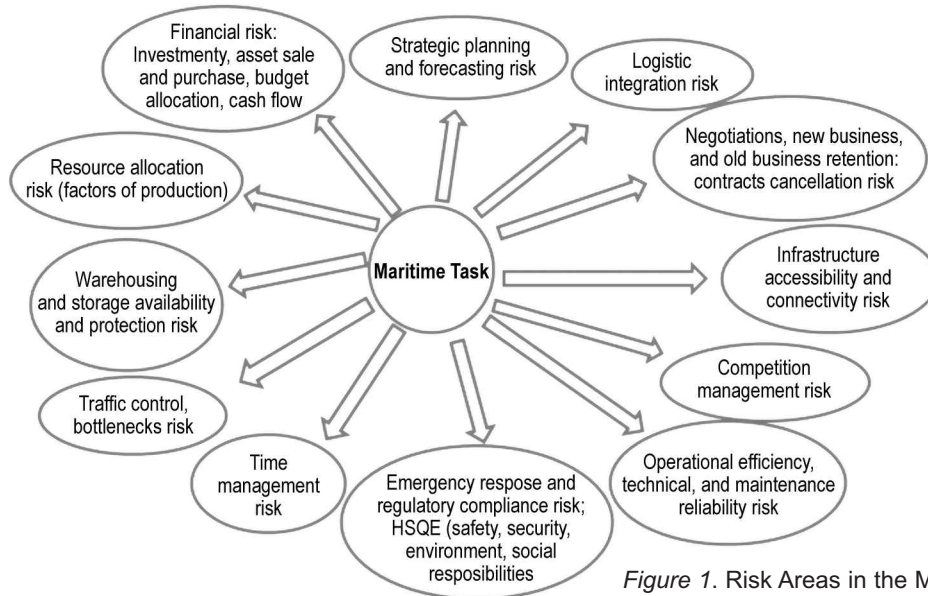


Figure 1. Risk Areas in the Maritime World
(Source: Burns, 2015)

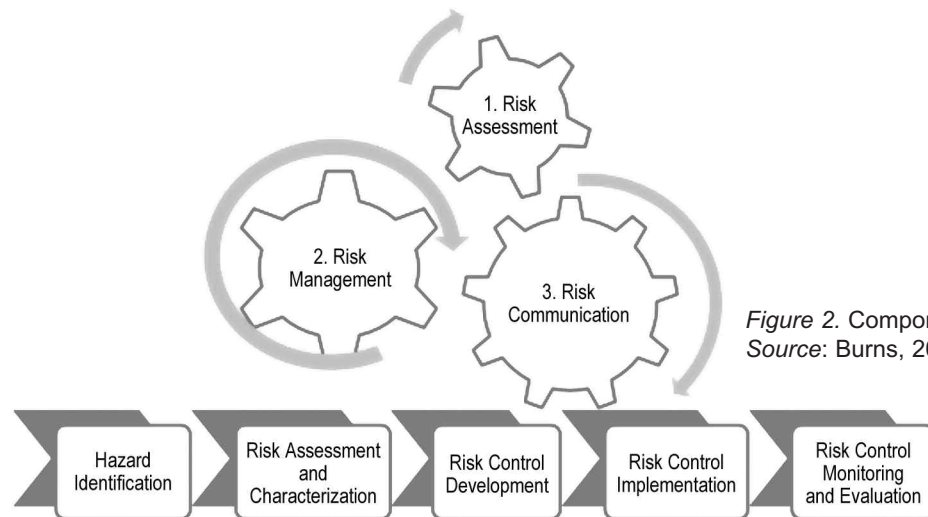


Figure 2. Components of Risk Analysis
Source: Burns, 2015)

There are three main components that are interconnected with each other where risk assessment has a direct impact on risk management. This applies also to how to communicate the risks that will be faced to policy makers. The steps regarding risk management are as follows:

- Identification of hazards: the initial process must be done by identifying what things can cause a disaster, whether it comes from material, tools or people.
- Risk assessment and grouping: identified risks are grouped by character or other assessment parameters such as: the impact, time needed for the handling process and also how many parties need to be involved in it.
- Development of risk control: at this stage the risks that already exist and have been obtained ways to handle them are carried out in the development process in order to prevent it. This aims to ensure that in the future the existing risks can be dealt with more quickly and precisely.
- Implementation of risk control: the use of the right method after an in-depth analysis must be implemented on the method itself. This aims to determine the extent to which the method developed is able to handle the risks that exist.
- Monitoring and evaluation: at this stage supervision activities are carried out on the possibility of the emergence of risks and evaluating any changes in trends from risk.

In general the maritime industry divides the worst risks into four categories including:

- Strategic, the process of what steps will be taken in the long term.

- HSQE (health, safety, quality and environmental), focusing on health, safety and concern for the environment.
- Operational, focus on port operations efficiently, technical matters and readiness in handling risks.
- Financial, discusses investment, banking, debt, inflation, exchange rates, sale and purchase of assets, allocation, and financial arrangements and other economic aspects.

8. Maritime Industry Risk Management Model

From the reviews and various considerations of regulation and statutory and risk considerations for the shipping business, a risk management model design in the maritime industry can be arranged as an ingredient in developing risk management models in the maritime industry.

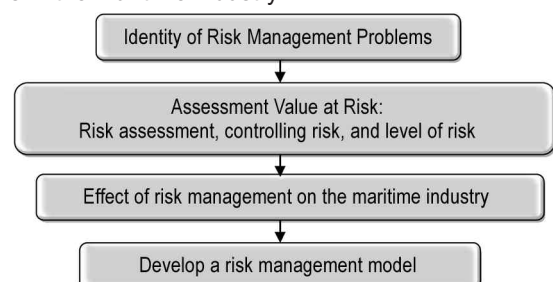


Figure 3. Design of the Maritime Industry Risk Management Model

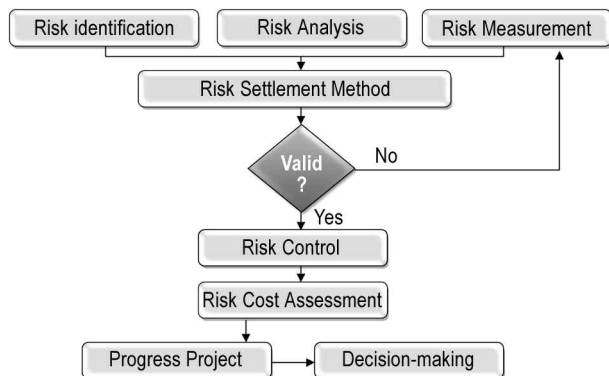


Figure 4. Maritime Industry Risk Management Model

9. Conclusion

The maritime industry is full of regulatory changes, this is considered by decision makers to be a disruption to the continuity of the maritime industry. Changes in IMO regulation are regulatory changes that often make changes. Hence, a risk assessment is needed for changes to these regulations so that decision makers can prepare themselves to implement compliance strategies so that their business continues. The average financial impact is a consequence of changes in maritime regulations. After conducting a risk assessment of the impact of changes in regulation, it can be concluded that the investment caused due to the implementation of regulation changes per year is in the moderate category. The value of compliance costs issued by decision makers to implement these regulatory changes cannot be reduced, because the value of a tool or modification of its properties is fixed. With the impact of changes in maritime regulations that have the potential to pose a risk or financial consequence to the survival of the maritime industry, a risk management model in the maritime industry can be arranged that can be used by decision makers in determining the direction of the policy to be taken.

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Building Customer Satisfaction through Perceived Usefulness

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Abstract

This research tests the importance of perceived usefulness and customer satisfaction concepts in driving the continuance intention. The sample in this research is customers who buy Samsung smartphone product in Indonesia amounting to 270 respondents. They are taken using purposive sampling. The research results provide an empiric evidence that confirmation has significant influence on perceived usefulness. Confirmation has significant influence on customer satisfaction. Perceived usefulness has significant influence on customer satisfaction. Customer satisfaction has significant influence on continuance intention.

Keywords: confirmation; perceived usefulness; customer satisfaction; continuance intention.

1. Introduction

The increasingly rapid development of information technology for the last few years has led to customer's behavior pattern shift (Labrecque, von dem Esche, Mathwick, Novak, & Hofacker, 2013). The study conducted by Pentina, Amialchuk, and Taylor (2011) explains that such shift occurs among others in global economic scope as a result of growth recession in economic sector at global level, which further affects the strategy employed by manufacturers. Furthermore, it is also explained that the increasingly demanding customer behavior requires manufacturers to save through good sales model empowerment, which involves turning goods into commodity, fragmenting markets, and intensifying competition. This pattern is then utilized by manufacturers in choosing a unique strategy and opportunity to play the main role in global market by providing strategic locations, information-rich services so that they can control the customers.

Customers want better services than what the company offers. As a consequence, customer satisfaction becomes a key to business organizations in attracting customer's interest to purchase and loyalty which eventually will increase the company's product sales (Alex, 2006; Anderson & Sullivan, 1993; Chang, Kim, Kim, & Park, 2011). Customer satisfaction concept has widely been studied by previous researchers. A research conducted by Lien, Wen, and Wu (2010) explains the importance of customer satisfaction in increasing the repurchase intensity for customers. Customer satisfaction in that research is found to be influenced by perceived value and service quality with electronic model (e-service quality).

Nejatian, Sentosa, Piaralal, and Bohari (2011) suggest that the business environment has shifted from *product-centric* (oriented to product) to *customer-centric* (oriented to customers). Customer relationship management as a customer-oriented business approach is viewed as one strong capability in an organization which helps them change their strategy in a customer-oriented environment. Business organization tries its best in maintaining customers in the midst of increasingly tighter competition and higher costs if the organization finds new customers rather than maintaining their existing customers.

Customers in making their purchase are influenced by their perception (Alex, 2006). The perception that customers have to a product will form a preference. Customer's preference can mean likeness, choice or something that a customer prefers. Customer's preference has something to do with their expectation of a product they like (Sanyal & Hisam, 2016).

This research tests the importance of perceived usefulness concept and customer satisfaction concept in driving customer's interest to purchase. It is important for customers to note that a purchase can be planned in a sense that even if the definite intention is not stated verbally or in writing in a shopping list, and it is also influenced by their preference.

2. Theoretical Basis and Hypothesis Development

2.1. Influence of Confirmed Use on Perceived Usefulness

The ECM (Expectation-Confirmation Model) which is developed by Bhattacherjee (2001) in general shows the relationship between variables as follows: *Confirmation* (experience in using the product) has positive influence on the formation of perception towards the usefulness they experience (*Perceived Usefulness*).

Bhattacherjee (2001) argues that perceived usefulness can be adjusted by confirmation, particularly when the initial user's perceived usefulness is unclear or inconcrete since the individual is unsure of what is to expect from the use of an IT. In other words, confirmation will tend to increase perceived usefulness and disconfirmation will lower perceived usefulness. The influence of confirmation on perceived usefulness is confirmed by the studies conducted by Larsen *et al.*, (2009), Kim, (2010), Lee *et al.*, (2011), Hung *et al.*, (2012) and Hsia Hsu *et al.*, (2013) which find that the influence of confirmation on perceived usefulness is positive and significant.

Based on the elaboration above, the hypothesis in this research is:

H1: Confirmed use has positive influence on perceived usefulness

2.2. Influence of Confirmed Use on Customer Satisfaction

Bhattacharjee (2001) suggests that certain level of user's confirmation and perceived usefulness (post-receipt expectation) are the two determinant factors of satisfaction. Confirmation is correlated positively with IT use satisfaction because confirmation is defined as the achievement of benefit expected by users through their experience in using certain IT (or otherwise if disconfirmation). The influence of confirmation on satisfaction is confirmed by the studies conducted by Larsen *et al.* (2009), Kim (2010), Hung *et al.* (2012) and Hsia Hsu *et al.* (2013) find that the influence of confirmation on satisfaction is positive and significant.

Meanwhile, other studies find that customer's concern when they buy a product also needs to be re-confirmed on the product service (Kwon & Lee, 2003). Furthermore, Kwon and Lee (2003) also observe the correlation between confirmation and customer's shopping behavior and concern on online payment safety. Customers with positive attitude towards online shopping does not seem to concern with payment safety.

Meanwhile, Johnson *et al.*, (2005) explain that customer's knowledge and experience influence their decision to purchase goods online. The amount of money spent in that online purchase motivates retailers to understand customer's shopping habit and wishes.

Based on the elaboration above, the following hypothesis can be developed:

H2: Confirmed use has positive influence on customer satisfaction

2.3. Influence of Perceived Usefulness on Customer Satisfaction

Customer's perception on their satisfaction when they make a purchase of a product is varied and related to their attitude towards shopping (Kwon & Lee, 2003). Furthermore, Kwon and Lee (2003) also observe the correlation between perceived attitude towards shopping and concern on their payment safety. Customers with positive attitude seem to be less concern about the payment safety.

Several previous researchers test the influence of perceived usefulness on satisfaction and find that perceived usefulness has positive and significant influence on customer satisfaction (Hsin Chang & Wang, 2011; Hung, Chen, & Huang, 2014; Lee, 2011). Kuo, Hu, and Yang (2012) explains that the intention of repurchasing is a process by which the customer is willing to buy the same product or service which can simply and objectively observed from past purchasing behavior as a predictor for future purchasing.

Studies on the perception to online shopping conducted by Xu and Paulins (2005) find that the role played by customer's behavior in using the internet which is combined with the currently developing market power and the possibility to develop customer's loyalty are interesting for study in customer groups and their behavioral intention in online shopping. Johnson *et al.*, (2005) explains further that customer's knowledge and experience influence their decision to buy goods online, the amount of money spent in that online purchasing motivates retailers to understand customer's shopping habit and wishes.

Based on the elaboration above, the following hypothesis can be developed.

H3: Perceived usefulness has positive influence on customer satisfaction

2.4. Influence of Customer Satisfaction on Continuance Intention

Fang, Chiu, and Wang (2011) in their research find that repurchase intensity is influenced by *trust*, *satisfaction* and *net benefit*. These three factors give positive influence on *repur-*

chase intention. The same results are obtained by Bijmolt, Huizingh, and Krawczyk (2014) who find that customer satisfaction gives positive influence on customer's purchasing behavior.

Meanwhile, Zboja and Voorhees (2006) test the influence of satisfaction and trust on customer's repurchase intensity and find that there is a positive influence of the satisfaction of customers who buy electronic and computer products on their repurchase intensity. Similar results are also obtained by Ryu, Han, and Jang (2010) who find that hedonic value has positive, significant influence on behavior intensity, hedonic value has positive, significant influence on customer satisfaction, utilitarian value has positive influence on behavior intensity and customer satisfaction has positive, significant influence on customer's behavior intensity.

Customer satisfaction also positively and significantly influences customer's repurchase intensity (Lin & Lekhawipat, 2014). Furthermore, in that study it is explained that the determinant factor of customer's repurchase intensity consists of customer experience, expectation and satisfaction. However, out of these three factors, customer expectation is the faktor most dominantly influencing their repurchase intensity.

The correlation between customer satisfaction and repurchase intensity have been widely studied within the scope of varied respondents such as Wang and Po-Lo (2002) who find that *service quality, customer value and customer satisfaction* have strong correlation with purchase intention in telecommunication industry. Furthermore, (Wang & Po-Lo, 2002) also explain the importance for an organization to focus on satisfying and caring for their customers.

Customer perception and satisfaction are the basic competitive advantages and creation of values experienced by customers (Nagy & Kacmar, 2013). Moreover, the essence of customer value creation in the context of new organization development is defined by customer perception and satisfaction (Hills & LaForge, 1992). Companies should understand how the organization plays an important role in their ability to manage customer perception and level of satisfaction in the effort of creating values and ensuring customer satisfaction.

Based on the elaboration above, the following hypothesis can be developed:

H4: Customer satisfaction has positive influence on continuance intention.

3. Research Design

The design used in this study is developed to build an empirical model which is based on in-depth theoretical review regarding the correlation between *Confirmation, Satisfaction, Perceived Usefulness*, as well as how they can produce increased Continuance Intention. As to its type, this study can be classified as *fundamental research*.

3.1. Research Sample

This study will be tested to customers who choose a mobile phone product, in this case those who choose to use Samsung mobile phones in Surakarta area. The sample studied amounts to 270 respondents. The sample taken is 270 respondents based on the reference by multiplying 5 to 10 times the number of parameters being estimated (Ferdinand, 2014). The sample is taken using *purposive sampling*, the sampling which is based on certain objective in choosing the research sample.

3.2. Operating Definition, Scale and Measure

The data in this research are collected by distributing questionnaire in person to respondents (personally administered questionnaires) because the determined sample is accessible personally and they are easy to meet since they reside in the local area.

The questionnaire used as the instrument for collecting data contains question items which are developed to measure the research variables. The measurement scale used for each variable is the interval one. The score range used is from scale 1 (strongly disagree) to scale 7 (strongly agree).

The measurement instruments and indicators above con-

stitute the variables consisting of confirmed use which is measured using interval scale, i.e. scale 1-7. The perceived usefulness variable is measured using interval scale, i.e. scale 1-7. The customer satisfaction variable is measured using interval scale, i.e. scale 1-7. The continuance intention variable is measured using interval scale, i.e. scale 1-7.

Operating definition	Indicator	Source
Confirmed use is the customer's attempt to strengthen and ensure their purchasing or cancelation decision of a product by verifying to those who have used the product.	- Testimony confirmation of customer's personal acknowledgment. - Confirmation by expressing positive attitude to the product/services. - Confirmation through response to other customers by requesting further evidence. - Confirmation to customers with a response which confirms the approval of product purchase.	Kuo et al. (2012), (Wang & Po-Lo, 2002) and (Bansal, Taylor, & St James, 2005)
Perceived usefulness is to what extent an individual believes that using a product will make it easier for them to finish their job.	- The ease to use applications. - Perceived value of product. - Perceived price of product. - Perceived technology used.	Larsen et al., (2009), Kim, (2010), Hung et al., (2012)
Customer satisfaction is the level of what customer feels after comparing what he/she receives and what he/she expects.	- Fulfilled expectation. - Telling the positives of the product. - Willingness to recommend to others. - Fewer complaints delivered. - Boasting of product's added values.	Kotler, (2005), Gasperz, (2005), and Oliver (2007)
Continuance intention is customer's expectation of the results they achieve as a result of purchasing activities of products.	- Loyalty to brand. - Intention to continue to choose the product. - Repurchase intensity. - Guaranteed quality.	Zboja and Voorhees (2006) and Nagy and Kacmar (2013).

Table 1. Operating Definition, measurement and indicator of variables
Source: from various literatures

3.3. Research Instrument Testing

The validity and reliability tests in this research are conducted using loading factor and cronbach alpha value. The calculation results can be seen in the following table.

Based on table 2 in the validity and reliability tests, it can be explained that the loading factor values for all constructs, i.e.

confirmed use, perceived usefulness, customer satisfaction and continuance intention are > 0.6. Thus, it can be concluded that the indicators in all constructs can explain the instruments studied. Results of reliability test also shows that the cronbach alpha value > 0.6, thus it can be said that the four constructs, namely confirmed use, perceived usefulness, customer satisfaction and continuance intention have good reliability.

Variable and Indicator Measurement scale using Likert Scale 1 - 7	Standardized factor loading
Confirmed use (Cronbach's α =0.839)	
• Testimony confirmation of customer's personal acknowledgment (kp1).	0.787
• Confirmation by expressing positive attitude to the product/services (kp2).	0.739
• Confirmation through response to other customers by requesting further evidence (kp3).	0.751
• Confirmation to customers with a response which confirms the approval of product purchase (kp4).	0.733
Perceived usefulness (Cronbach's α =0.895)	
• The ease to use applications (pm1).	0.860
• Perceived value of product (pm2).	0.866
• Perceived price of product (pm3).	0.730
• Perceived technology being used (pm4).	0.851
Customer satisfaction (Cronbach's α =0.916)	
• Fulfilled expectation (kpg1).	0.826
• Telling the positives of the product (kpg2).	0.906
• Willingness to recommend to others (kpg3).	0.784
• Fewer complaints delivered (kpg4).	0.894
• Boasting of product's added values (kpg5).	0.839
Continuance intention (Cronbach's α =0.888)	
• Loyalty to brand (nmp1).	0.838
• Intention to continue to choose the product (nmp2).	0.744
• Repurchase intensity (nmp3).	0.818
• Guaranteed quality (nmp4).	0.861

Table 2. Validity and Reliability Tests of Research Instruments

4. Results of Research Hypothesis Testing

The testing of hypotheses for this empirical research uses *Structural Equation Modelling* (SEM) approach in a structural (tiered) equation model measurement. The testing of reflective indicators in forming a construct is done by testing the parameters to reach the ideal *goodness of fit* value degree. The testing results show that the *goodness of fit* criteria have been fulfilled, such as *Chi-Square* at 99.283. The probability value is 0.852. The two assumptions are met. The GFI value is 0.957, indicating that these values have passed the predetermined cut-off. This indicates that the research model is accepted and meets the predetermined (standard) criteria.

The results of test using structural equation modelling (SEM) to test the relationship of confirmed use with perceived usefulness dan customer satisfaction constructs in full model can be seen in the figure 1.

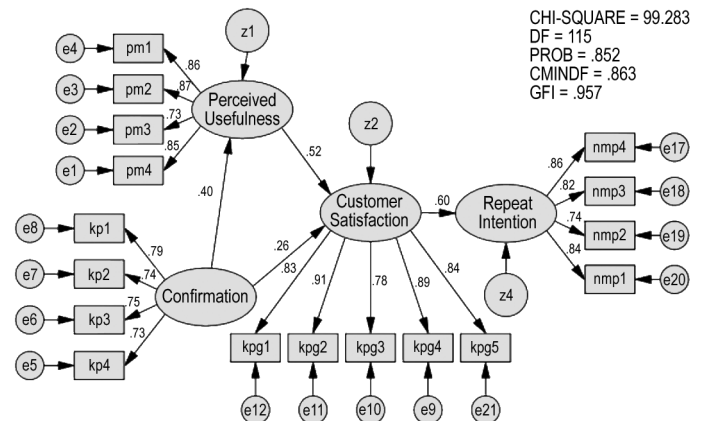


Figure 1. The Result of Hypothesis Testing Model

Based on the statistic calculation above, it can be explained that the calculation results below indicate that the *standardized path coefficients* values influence confirmed use, perceived usefulness, customer satisfaction and continuance intention. These results are also shown in Table 3, which form the 4 hypotheses. The testing of four hypotheses developed in this research is made to figure out the influence of confirmed use on perceived usefulness, the influence of confirmed use on customer satisfaction, the influence of perceived usefulness on customer satisfaction and the influence of customer satisfaction on continuance intention.

The testing of the first hypothesis in this research explains the influence of confirmation on perceived usefulness. The testing results statistically show that the t value and probability of numbers depict the positive and significant influence of confirmation on perceived usefulness as shown by t-statistic value at 5.499 with a significance value of 0.000. Judging from this calculation result, it is clear that hypothesis 1 is confirmed.

The testing of the second hypothesis explains the influence of confirmation on customer satisfaction. The testing results

statistically shows that the t value and probability of numbers depict the positive and significant influence of confirmation on customer satisfaction as shown by t-statistic value at 4.157 with significance value of 0.000. Judging from this calculation result, it is clear that hypothesis 2 is confirmed.

The testing of the third hypothesis explains the influence of perceived usefulness on customer satisfaction. The testing results statistically shows that the t value and probability of numbers depict the positive and significant influence of perceived usefulness on customer satisfaction as shown by t-statistic value at 8.244 with significance value of 0.000. Judging from this calculation result, it is clear that hypothesis 3 is confirmed.

The testing of the fourth hypothesis explains the influence of satisfaction on continuance intention. The testing results statistically shows that the t value and probability of numbers depict the positive and significant influence of customer satisfaction on continuance intention as shown by t-statistic value at 9.533 with significance value of 0.000. Judging from this calculation result, it is clear that hypothesis 4 is confirmed.

Hypothesis		Standardized path coefficients	t value	Prob.	Result
H1	Confirmation → Perceived usefulness	0.500	5.499	0.000	Accepted
H2	Confirmation → Satisfaction	0.359	4.157	0.000	Accepted
H3	Perceived usefulness → Satisfaction	0.569	8.244	0.000	Accepted
H4	Satisfaction → Repeat intention	0.460	9.533	0.000	Accepted

Note: *Significant at $p \leq 0.05$; if $(t) \geq 1.96$

Table 3. The result of Path Analysis

5. Discussion of Research Result and Conclusion

The interesting findings in the testing of each hypothesis in this research can be explained as follows:

- The first hypothesis is confirmed, i.e. confirmation has positive, significant influence on perceived usefulness. This finding confirms the research conducted by Larsen *et al.*, (2009), Kim, (2010), Lee *et al.*, (2011), Hung *et al.*, (2012) and Hsia Hsu *et al.*, (2013) which finds that the influence of *confirmation* on *perceived usefulness* is positive and significant.
- The second hypothesis is confirmed, i.e. confirmation has positive, significant influence on customer satisfaction. This finding confirms the research conducted by Larsen *et al.* (2009), Kim, (2010), Hung *et al.* (2012) and Hsia Hsu *et al.* (2013) which concludes that the influence of *confirmation* on *satisfaction* is positive and significant.
- The third hypothesis is confirmed, i.e. perceived usefulness has positive, significant influence on customer satisfaction. This finding confirms the previous research which defines repurchase intention as a process by which customers are willing to buy the same product or service which can simply and objectively observed from past purchasing behavior as a predictor for future purchasing (Hsin Chang & Wang, 2011; Hung *et al.*, 2014; Lee, 2011).
- The fourth hypothesis is confirmed, i.e. customer satisfaction has positive, significant influence on continuance intention. This finding confirms the research conducted by Fang *et al.* (2011) who find that repurchase intensity is influenced by *trust*, *satisfaction* and *net benefit*. Similar results are obtained by the study conducted by Bijmolt *et al.* (2014) who find that customer satisfaction gives positive influence on customer purchasing behavior.

6. Recommendation

Results of this study show the empiric evidence of the influence of conformation, perceived usefulness, and customer

satisfaction on continuance intention. In line with the research objective above, in previous studies it is explained that customer satisfaction plays an important role as an intervening variable in the relationship between confirmation and continuance intention.

Theoretically, the results of this research contribute to the theory of customer behavior developed by Arndt, Solomon, Kasser, and Sheldon (2004) who explains that customer behavior is a study which includes the process when a certain individual or group purchase, use or manage products, services, ideas or experiences to fulfill their needs and desires. Another contribution in this theory is about customer's character diversity which involves all individuals from different ages, cultural, educational, socio-economic backgrounds. Therefore, it is important to see the factors which influence them in deciding to continue the purchase.

From the results of this study, a recommendation can be made for future research. The recommendation deals with other efforts one could do to maintain their customer loyalty, i.e. lending an ear for customer's complaints and expectations. Customers generally always want to be served better. Another finding also shows that customer trust to company's service reflects their royalty.

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Tourism Product in the Function of Improving Destination Competitiveness: Case of Vrnjačka Banja, Serbia

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Abstract

The tourism product of a destination makes the basis of its competitiveness. Vrnjačka Banja is the most famous spa in Serbia, with numerous facilities intended for tourists' rest, preservation and improvement of health, cultural-entertainment and sports-recreational activities. The purpose of this paper is the analysis of domestic and foreign tourists' ratings of key elements of the tourism product of Vrnjačka Banja. The empirical research, with a sample of 304 tourists, showed that Natural beauty is the highest ranked element of the tourism product of Vrnjačka Banja, while Larger swimming pools with amusement facilities is the element which the tourists would like Vrnjačka Banja to have, and hence it requires special attention in the future.

Keywords: tourism product; tourism destination; competitiveness; tourism market; Vrnjačka Banja.

1. Introduction

The development of modern Vrnjačka Banja started on 14 July 1868, by establishing "The Founding Endowment Association of Hot Mineral Water in Vrnjci", which represents the organized beginning of tourism development in this spa. Today, 150 years later, Vrnjačka Banja is the largest and most famous spa in Serbia and one of the most famous spas in the region. Thanks to its healing mineral waters, natural beauty, cultural-historical heritage and a long tradition in spa tourism, Vrnjačka Banja dominates by the scope of its tourist turnover and has the status of the national leader in the field of spa tourism (Hrabovski Tomić & Milićević, 2012). Climate, thermal-mineral waters, parks and forests are not only natural resources but also, when Vrnjačka Banja is in question, irreplaceable economic resources. However, in today's tourism, it is not enough.

Out of the total number of tourists who visited Vrnjačka Banja in 2017, foreign tourists made only 17%, while the average length of stay of tourists was about 3 days (Statistical Office of the Republic of Serbia, Municipalities and Regions of the Republic of Serbia, 2018). Considering that in the fifties of the last century the average length of stay of tourists in Vrnjačka Banja was 20 days, in the seventies about 9 days, in the nineties about 7 days (Municipality of Vrnjačka Banja, 2013), there is an impression that Vrnjačka Banja is stagnating more and more, which is the consequence of its insufficiently attractive tourism product, but also of the insufficient awareness of modern trends on the tourism market. Although Vrnjačka Banja offers a wide range of different elements of its tourism product, new, modern and attractive facilities as well as the supply in line with contemporary trends on the health tourism market are necessary. In

order to be competitive, a spa must follow trends on the tourism market and changes in the competitive environment, and innovate its product accordingly. For the purpose of improving its competitiveness, the tourism product of Vrnjačka Banja must be enriched with various spa & wellness, sports-recreational and cultural-entertainment elements. The aesthetic arrangement of the spa area (parks, pedestrian paths, places for "relaxed" free time, etc.) is also necessary (Milićević, 2015).

According to Kozak and Rimmington (1999), tourism destination competitiveness can be evaluated quantitatively and qualitatively. Quantitative indicators may be the data about the tourist turnover at the destination, i.e. the number of tourists, tourist consumption, etc., while qualitative indicators refer to how tourists evaluate different elements of the tourism product of a destination by comparing them to the elements in some other destinations they have visited (Zečević, 2011).

Special attention in this paper is directed toward the analysis of domestic and foreign tourists' ratings of key elements of the tourism product of Vrnjačka Banja. The starting point of the research is the assumption that the tourists who gave a higher score to the elements of the tourism product of Vrnjačka Banja are recorded as those with a higher number of tourist arrivals. The comparative method and the ANOVA test are applied in the paper. The comparative method is used for comparing domestic and foreign tourists' turnovers as well as for comparing their ratings of elements of the tourism product of Vrnjačka Banja. ANOVA is applied for the purpose of establishing differences which relate to the domestic and foreign tourists' ratings of elements of the tourism product.

The following hypotheses are set in the paper:

H1 – There is a statistically significant difference between

domestic and foreign tourists' ratings of key elements of the tourism product of Vrnjačka Banja.

H2 – The tourists (domestic or foreign) who gave higher scores to the key elements of the tourism product of Vrnjačka Banja are recorded as those with a higher number of tourist arrivals.

The research in this paper provides a basis for understanding the importance of elements of the tourism product of a destination and examines the relationship between the scores given to these elements and the competitiveness of Vrnjačka Banja as a tourism destination on the domestic and international markets.

2. Overview of literature

The product in tourism implies numerous elements: travelling, accommodation and food services, but also natural beauty, blue sea, mountain landscapes, cultural-historical heritage, kindness of tourist employees, etc. (Bakić, 2010). There are numerous definitions of the tourism product (Sedmak & Kociper, 2017). Product development is a prerequisite for satisfying tourists' changing demands and insuring the long-term profitability of the industry (Smith, 1994), i.e. tourism destination.

Medlik and Middleton (1973) conceptualize tourism products as a bundle of activities, services, and benefits that constitute the entire tourism experience. The tourism product can be observed as an individual (partial) product as well as an integrated (united) product (Bakić, 2010; Uskoković, 2000). The partial tourism product is a product of only one producer on the side of the tourism supply (e.g. hospitality or transportation company). The integrated tourism product is a sum of different partial products. The integrated product refers to the establishing of a product at the level of tourism destination, whose framework is an appropriate combination of tangible and intangible elements used to satisfy tourists' needs. Having in mind that the tourists' perception of the destination product is most important, the united tourism product of a destination would, therefore, be a sum of the basic elements that make a combination of attractive, receptive and communicative elements on the side of tourist supply, which can satisfy the needs and requirements on the side of tourist demand, which choose and shape those elements independently. Hence, every tourist shapes his/her own tourism product at a destination, according to his/her own needs and wishes. The basis of such a product is experience, i.e. the experiences a tourist gains during his/her stay at a destination (Murphy et al., 2000; Konecnik & Gartner, 2007; Bakić, 2010; Popesku, 2011).

According to The World Tourism Organization (UNWTO, 2007), the destination product is the combination of elements that creates the total experience which can be offered to potential customers. The destination experiences include intangible features (unique happenings, sights and scenes, environmental quality, service levels, people friendliness, etc.) as well as tangible elements, such as public infrastructure, private products and services, public attractions and services, community lifestyles, attractions and services. One weak element in the combination of product components is capable of reducing overall customer satisfaction significantly. A seamless approach to delivering quality is essential. Based on the above, destination product is a combination of elements which represents the core of the destination marketing mix and creates an overall visitor experience including emotional aspects for the potential customers (UNWTO, 2016). In scientific literature, tourist satisfaction has been identified as an important concept in establishing the performance of different destinations (Opačić & Banda, 2017). Many studies analysed tourist evaluation of destination elements to understand their satisfaction and/or destination performance, while, some others focused on tourists' overall satisfactions with the destination as a whole (Nghiem-Phú, 2018).

The tourism product of a destination is a total (composite) product composed of a certain number of constitutive elements (Middleton & Clarke, 2001; Bakić, 2005; Popesku, 2011):

- ❑ Attractive elements, which imply a mix of natural and social elements (cultural-historical heritage, anthropogenic factors).
- ❑ Communicative, i.e. accessibility elements, which imply geographic distance (destination's distance from the emitting markets) and economic distance (cost of travelling to the destination). The accessibility also implies the level of total development of traffic infrastructure.
- ❑ Receptive elements, i.e. the conditions for the stay of tourists (services of accommodation, food, entertainment, fun, etc).

According to Zečević (2011), the number of destinations that offer their tourist product on the market is growing, leading to the intensification of competition. Efforts to be better than the competition have highlighted the issue of destination competitiveness as crucial in modern tourism. Thus, in order to create and improve the competitiveness of a destination, it is extremely important to have a concept of an integrated tourism product, i.e. destination product, since automatic establishing of harmony among different elements of the tourism product cannot be expected because there are different owners of accommodation, transport and attractions who often have opposite goals and interests (Kušen, 2002). Therefore, the creation of an integrated tourism product is a complex task due to the existence of a large number of participants, i.e. holders of tourism supply, whose partial products, as well as interests, should necessarily be coordinated and harmonized (McCabe et al., 2012). If a destination as a whole is not competitive and attractive, the number of visitors will be low, which cannot be compensated by the competitiveness of individual companies at a destination (Sedmak & Kociper, 2017).

Addressing the issue of destinations' competitiveness is based on the fact that the experience gained by tourists at a destination is a fundamental product in tourism (Pavlović et al., 2016; Popesku & Pavlović, 2013). To achieve a competitive advantage, any destination must ensure that its overall attractiveness and the tourist experience must be superior to those of many other destinations (Dwyer et al., 2004). Therefore, destination competitiveness could be associated with the ability to deliver an experience that is more satisfying than that offered by other destinations (Vengesai, 2003).

According to Buhalis (2000), destination products have to be created in a way that assures the destination's long-term competitiveness and prosperity. Tourism product development should follow the key principles of sustainable tourism development and improving destination competitiveness by (UNWTO, 2011):

- ❑ being authentic and indigenous reflecting the unique attributes of the destination;
- ❑ having the support of the host community;
- ❑ respecting the natural and socio-cultural environments by not damaging these in any way;
- ❑ being differentiated from competitors, avoiding 'me too/copy cat' developments;
- ❑ being of a sufficient scale to make a significant economic contribution, but not so large as to create high economic leakage.

3. Analysis of the competitiveness of Vrnjačka Banja on the tourism market

The competitiveness and success of a tourism destination is most often measured by quantitative indicators, such as the number of domestic and foreign tourists, number of overnight stays, as well as the average length of stay of tourists (Miličević & Podovac, 2013).

Vrnjačka Banja has been the leader in Serbian tourism for

years. The record year of tourist turnover in Vrnjačka Banja was 1985, when there were 1,642,097 overnight stays. The average length of stay of tourists in those years was 9 days (Municipality of Vrnjačka Banja, 2013). Today, it occupies the first place among the spas in Serbia at the same time being the second most visited tourist destination in Serbia, immediately after Belgrade (Figure 1), which shows its great significance for tourism in the whole country.

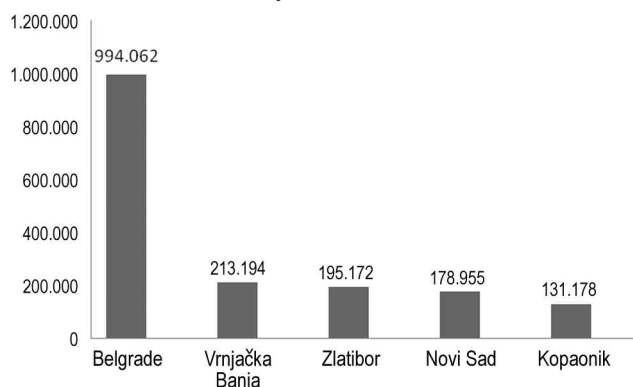


Figure 1. The most visited tourist destinations in Serbia (number of tourists in 2017)

Source: Statistical Office of the Republic of Serbia, Municipalities and Regions of the Republic of Serbia, 2018

Year	Number of tourists			Number of overnight stays			Average number of overnight stays	
	All	Domestic	Foreign	All	Domestic	Foreign	Domestic	Foreign
2013	156,240	135,162	21,078	594,804	531,574	63,230	3.9	3.0
2014	146,756	123,155	23,601	497,893	431,455	66,438	3.5	2.8
2015	175,153	146,208	28,945	562,862	481,150	81,712	3.3	2.8
2016	202,820	163,997	38,823	677,690	573,394	104,296	3.5	2.7
2017	213,194	176,202	36,992	701,622	603,279	98,343	3.4	2.7

Table 1. Number of tourists and overnight stays in Vrnjačka Banja, 2013-2017

Source: Statistical Office of the Republic of Serbia, Municipalities and Regions of the Republic of Serbia, 2014-2018

4. Analysis and interpretation of results of the survey carried out among the tourists of Vrnjačka Banja

As tourists' perception of a destination product is most important for the destination, the aim of the research carried out was to establish domestic and foreign tourists' ratings of key elements of the tourism product of Vrnjačka Banja, perform a comparative analysis of the scores and discover the elements that are most important to tourists as well as new elements which the tourists would like Vrnjačka Banja to have as its priority. The survey process was applied. The survey was designed in such a way as to include a written questionnaire with 8 questions, in Serbian and English.

The survey research was carried out in the period from 01.07. to 31.08.2018, i.e. in the period of the peak season, when numerous entertainment and cultural manifestations are organized in Vrnjačka Banja. The distribution of the questionnaire was done by the employees of the Info-Centre of the Tourist Organization of Vrnjačka Banja, hotel Merkur (hotel with medical offer), hotel Solaris Resort (hotel with spa & wellness offer), hotel Breza (hotel with a long tradition) and hotel Zepter (hotel with congress facilities). Adequate mathematical-statistical procedures with the software for statistical analysis – SPSS 19.0 for Windows were used for data procession.

The survey covered 304 respondents, i.e. 157 (51.6%) domestic and 147 (48.4%) foreign tourists in Vrnjačka Banja. The research showed that out of the total number of foreign tourists covered by the survey, most of them came from Russia (24.5%), then from Cyprus (18.4%), France and Great Britain (8.8% per each). In the group *Other* (22.4%) there are tourists who came from Australia (3 tourists), Canada (3 tourists), Finland (3 tourists), Sweden (2 tourists), Ireland (2 tourists),

However, although Vrnjačka Banja is among the most visited tourist destinations in Serbia, the destination management of this spa cannot be satisfied. Namely, domestic tourists are dominant in the structure of the tourist turnover of Vrnjačka Banja. Out of the total of 213,194 tourists who visited it in 2017, 176,202 of them were domestic tourists, and only 36,992 (17%) foreign ones, which indicates that the tourism product of Vrnjačka Banja is not competitive on the international market. The destination management of Vrnjačka Banja must constantly improve the elements of the tourism product for the purpose of acquiring a better competitive position on the tourism market.

Besides, the average length of stay of tourists is very short. In 2017, domestic tourists stayed, on average, for 3.4 days, and foreign ones 2.7 days (Table 1). These data also confirm that Vrnjačka Banja still does not have a sufficiently attractive tourism product, which will make tourists stay longer.

The months with the largest number of visitors are July and August, followed by May and October (because of congress events), as well as the period of New Year and Christmas holidays, while all the other ones are extremely poorly visited, which indicates pronounced seasonality as a direct consequence of the insufficiently competitive tourism product of Vrnjačka Banja (Miličević & Podovac, 2013). A small number of foreign tourists and the insufficient occupancy of capacity, which results in a low level of economic efficiency and profitability of the tourism product, show that the tourism of Vrnjačka Banja needs a new development concept.

Belgium (2 tourists), Spain (2 tourists), etc. As for the domestic market, there are tourists from different regions in Serbia: from Belgrade (17.8%), Novi Sad (11.5), Niš (7%), Novi Pazar (6.4%), etc. The data about the main characteristics of domestic and foreign tourists are shown in Table 2.

Comparative analysis		Domestic tourists	Foreign tourists	Total number of tourists	%
Sex	Male	74	70	144	47.4
	Female	83	77	160	52.6
Age	Under 30	53	31	84	27.6
	31-50	76	59	135	44.4
	51-60	22	27	49	16.1
	Over 60	6	30	36	11.9
Qualifications	No qualifications	2	3	5	1.6
	Secondary school	25	48	73	24.0
	University	130	95	225	74.0
	No response	0	1	1	0.4
Number of arrivals to Vrnjačka Banja	First time	10	101	111	36.5
	2-4 times	58	30	88	28.9
	5 times and more	88	14	102	33.6
	No response	1	2	3	1.0
Who did you come to Vrnjačka Banja with?	Alone	67	22	89	29.3
	With a companion	64	63	127	41.8
	Family with children	22	43	65	21.4
	No response	4	19	23	7.5

Table 2. Comparative analysis of the main characteristics of domestic and foreign tourists in Vrnjačka Banja

As for the composition of the sample, the participation of women (52.6%) and men (47.4%) is relatively equal. According to the age, the most numerous group of surveyed tourists (135 of them, i.e. 44.4%) is the one at the age 31-50. As for education, as many as 74% of the surveyed tourists have

university level qualifications. As for the frequency of arrivals, 36.5% of the respondents come *for the first time*, 28.9% have been to Vrnjačka Banja 2-4 times, and as many as 33.6% of the respondents have been to this spa *5 times and more*. The results show a higher degree of satisfaction and loyalty among domestic tourists because most of them have stayed several times in Vrnjačka Banja. However, the results indicate that the largest number of foreign tourists (101) are *for the first time* in Vrnjačka Banja. Most tourists mainly come *with a companion* (41.8%).

The fact that some respondents circled several responses out of 7 suggested ones to the question *What is your reason for coming to Vrnjačka Banja?* shows that tourists practise a combination of several different services and programmes during their stay. The respondents stated the following main reasons

for their coming: *Rest* (27%), *Business reasons* (21.4%), a combination of *Health-related reasons and rest* (11.5%), *Health-related reasons* (6.3%), *Entertainment and fun* (5.6%), a combination of *Health-related reasons, spa & wellness services and rest* (3.6%), etc. A high percentage of Business reasons is the result of a large number of manifestations in Vrnjačka Banja in that period (participants in various manifestations, conferences, etc.).

A Likert scale was applied for *Rating of key elements of the tourism product of Vrnjačka Banja*. This scale gave the tourists the possibility to use the scores from 1 to 5 (1 = the lowest score, 5 = the highest score) to evaluate key elements of the tourism product of Vrnjačka Banja. Based on the obtained responses, the mean scores for 14 key elements of the tourism product of Vrnjačka Banja were calculated (Table 3).

		N	Min. score	Max. score	Mean	Std. deviation
1	Natural beauty	254	2.00	5.00	4.5827	.56849
2	Hospitality	252	2.00	5.00	4.5119	.60858
3	Health-related offer	234	2.00	5.00	4.3077	.64803
4	Cultural-entertainment offer	235	2.00	5.00	4.2298	.69057
5	Accommodation	238	1.00	5.00	4.1050	.87722
6	Spa & wellness offer	233	2.00	5.00	4.1030	.84468
7	General cleanliness and regulation of the spa	243	1.00	5.00	3.9753	.81274
8	Diversity and quality of offer	249	1.00	5.00	3.9679	.82243
9	Sports-recreational offer	232	1.00	5.00	3.8060	.86358
10	Children's activities	225	1.00	5.00	3.7822	.93142
11	Prices	251	1.00	5.00	3.5139	1.40385
12	Transport accessibility	238	1.00	5.00	3.7185	1.03144
13	Local tourist information and signalization	239	1.00	5.00	3.4686	1.20139
14	Other	24	3.00	5.00	4.3333	.76139

Table 3. Tourists' rating of key elements of the tourism product of Vrnjačka Banja

After the analysis, it can be concluded that all offered elements of the tourism product of Vrnjačka Banja obtained quite high scores by domestic and foreign tourists. The highest scores were given to the elements *Natural beauty* (4.58) and *Hospitality* (4.51), while the element *Local tourist information and signalization* had the lowest average score 3.47. It is interesting that within *Other* the surveyed tourists stated the following: *Peace, Silence, Kindness, Park lighting, Good restaurants, etc.*, and rated this category by giving it a quite high average score (4.33).

The continuation of the paper presents the comparison of domestic and foreign tourists' ratings of key elements of the tourism product of Vrnjačka Banja through the analysis of variance between the groups, i.e. by using the ANOVA test, which showed qualitative differences in the mean scores of the stated elements (Table 4).

Out of the total of 14 key elements of the tourism product of Vrnjačka Banja rated by domestic and foreign tourists, only the elements *Children's activities* and *Cultural-entertainment offer* have a difference between domestic and foreign tourists' mean scores which is not statistically important ($p \geq 0.05$). The mean score for the key elements of the tourism product of Vrnjačka Banja ranges between 2.78 and 4.71. The measure of variability, i.e. deviation from the mean score expressed through the standard deviation indicates that the tourists' ratings within certain groups are coordinated to a large extent.

This comparative presentation proves that it is not enough to calculate only the mean scores for the key elements of the tourism product of Vrnjačka Banja rated by the tourists within the survey, but it is also necessary to compare the qualitative difference between the mean scores (perception of the concrete element of the tourism product). It can be concluded that both domestic and foreign tourists put *Natural beauty* first, but they still do not give equally high scores to this element, and the ANOVA test notes that difference as statistically important if these two disjunct groups of tourists are compared. Namely, although foreign tourists give *Natural beauty* a very high score (4.71) and consider that element of the tourism product of Vrnjačka Banja as "extraordinary", domestic tourists do not take

it in the same way (4.42). The results of the analysis show that there is a statistically important difference between domestic

	Tourists	N	Mean score	Std. deviation	Significance (p)*
Natural beauty	Foreign	140	4.7143	.51294	.000
	Domestic	114	4.4211	.59340	
Diversity and quality of offer	Foreign	138	4.1014	.76692	.005
	Domestic	111	3.8018	.86150	
Health-related offer	Foreign	127	4.3937	.68031	.025
	Domestic	107	4.2056	.59460	
Spa & wellness offer	Foreign	125	4.3600	.73397	.000
	Domestic	108	3.8056	.86962	
Sports-recreational offer	Foreign	127	3.9685	.85391	.001
	Domestic	105	3.6095	.83775	
Children's activities	Foreign	120	3.8750	.92184	.110
	Domestic	105	3.6762	.93537	
Cultural-entertainment offer	Foreign	127	4.2362	.72874	.876
	Domestic	108	4.2222	.64610	
Transport accessibility	Foreign	126	3.4841	1.14357	.000
	Domestic	112	3.9821	.81630	
Local tourist information and signalization	Foreign	127	3.6850	1.13879	.003
	Domestic	112	3.2232	1.22812	
Accommodation	Foreign	128	4.2500	.83241	.006
	Domestic	110	3.9364	.90135	
Hospitality	Foreign	139	4.6259	.61707	.001
	Domestic	113	4.3717	.57000	
General cleanliness and regulation of the spa	Foreign	131	3.8702	.88053	.026
	Domestic	112	4.0982	.70978	
Prices	Foreign	138	4.1159	.88847	.000
	Domestic	113	2.7788	1.56259	

*if $p < 0.05$ the results are statistically significant, if $p \geq 0.05$, the results are not statistically significant

Table 4. Comparative presentation of domestic and foreign tourists' ratings of key elements of the tourism product of Vrnjačka Banja – ANOVA test

and foreign tourists' ratings of key elements of the tourism product of Vrnjačka Banja, except for the elements *Children's activities* and *Cultural-entertainment offer*.

The average score given by domestic tourists to the key elements of the tourism product of Vrnjačka Banja is 3.86, while the one given by foreign tourists is 4.13. Based on the above mentioned, it can be concluded that there is a statistically important difference between domestic and foreign tourists' ratings of key elements of the tourism product of Vrnjačka Banja, which confirms hypothesis H1. At the same time, the results of the research show that foreign tourists gave higher scores to most of the key elements of the tourism product of Vrnjačka Banja, although the recorded number of foreign tourists and their overnight stays is considerably smaller in relation to domestic tourists. This indicates that hypothesis H2 is not proved.

As for the question *Which element of the tourism product would you like Vrnjačka Banja to include in its offer?*, 51% respondents think that it should have *Larger swimming pools with amusement facilities*, then more *Animations for tourists* (40%), more *Swimming pools with thermal mineral water* (33%), *Richer sports-recreational offer* (31%), more *Manifestations* (27%), etc. If the responses provided by domestic and foreign tourists are compared, the following results are obtained: Vrnjačka Banja lacks *Larger swimming pools with amusement facilities* most, and both domestic (55%) and foreign (46%) tourists agree upon it. In the second place, according to the domestic tourists' scores (43%), Vrnjačka Banja lacks *Animations for tourists*, while according to the foreign tourists' scores (41%) this place is occupied by *Accompanying tourist offer* (Rent-a-car, Casino, etc.), which domestic tourists put in the last place (10%). These results show that the destination management should direct all its activities toward the creation of new elements of the tourism product and the improvement of the quality of the existing ones, so that Vrnjačka Banja could enhance its competitiveness on both domestic and foreign tourism markets.

5. Concluding remarks

Based on the hypotheses set, the paper presents the analysis of domestic and foreign tourists' ratings of key elements of the tourism product of Vrnjačka Banja by using the ANOVA test. Although both domestic and foreign tourists gave the highest scores to the element *Natural beauty*, the mean scores given to the mentioned element show a significant statistical difference ($p < 0.05$). The same holds for most elements of the tourism product of Vrnjačka Banja evaluated within the survey. Namely,

out of the total of 14 key elements of the tourism product of Vrnjačka Banja, the difference between mean scores given by domestic and foreign tourists is not statistically important only in two elements (*Children's activities* and *Cultural-entertainment offer*), while it is statistically important in all other elements (12). On the basis of that, it can be concluded that the first hypothesis is confirmed. It is this difference in the rating of key elements of the tourism product that can help the destination management to devise further marketing strategies for the improvement of competitiveness of Vrnjačka Banja on both domestic and international tourism markets.

The paper also examines whether the tourists who gave higher scores to the key elements of the tourism product of Vrnjačka Banja are recorded as those with a higher number of tourist arrivals. Although the results of the research show that foreign tourists gave higher scores to as many as 12 out of 14 key elements of Vrnjačka Banja in relation to domestic tourists, they are still recorded with a considerably smaller number of tourist visits, i.e. lower participation in the total tourist turnover of Vrnjačka Banja (only 17%). On the basis of that, it can be concluded that the second hypothesis is not confirmed.

Regardless of its leading position in the tourism of Serbia, Vrnjačka Banja has an extremely small number of foreign tourists, insufficient occupancy of accommodation capacity, pronounced seasonality, etc. Such results are the consequence of an inadequate tourism product and insufficient awareness of modern trends on the tourism market. Foreign tourism must be one of the priority directions in further development of Vrnjačka Banja. The tourism product should constantly follow the needs of modern tourists. In order to enhance its competitiveness on the tourism market, before all – the foreign one, it is necessary for Vrnjačka Banja to create an attractive tourism product in accordance with modern requirements of the demand. Some of the new elements of the tourism product of Vrnjačka Banja should certainly be larger swimming pools with amusement facilities, animation for tourists, more swimming pools with thermal mineral water, new sports-recreational facilities, etc.

Enrichment of the tourism product of Vrnjačka Banja with new, attractive elements would result in an increased number of tourists (especially foreign ones) and overnight stays, i.e. increased average length of stay, which would influence the prolongation of the tourist season and better occupancy of accommodation capacity, which is, generally, the goal of every tourism destination. Constant changes on the tourism market require that the destination management invest continuous effort in the creation of an attractive tourism product so that Vrnjačka Banja could improve its competitiveness on the tourism market.

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Measuring the Impact of Green Behavior on Employee Performance

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Abstract

The decline in environmental quality is a global issue today, the biggest contributor to environmental degradation is industrial waste. For this reason, this study aims to measure the green behavior of industrial employees and their impact on employee performance. This research is very important role in developing a conceptual and practical model in improving employee performance based on green behavior. This research uses quantitative methodology through a structural equation model approach. Primary data were obtained from industrial employees by distributing a list of structured questions with purposive sampling. The results of this study found that there was a significant relationship between organizational culture and green behavior, a significant relationship between leader support and green behavior, a significant relationship between leader support and employee performance, and a significant relationship between green behavior and employee performance. Green behavior of employees can be a solution in improving employee performance while helping to deal with the adverse effects of climate change. This research model can contribute to the development of the concept of green behavior and for managers to be used as a reference in making decisions on employee behavior engineering towards green behavior.

Keywords: organization culture; leader support; green behavior; employee performance.

1. Introduction

Climate change is a situation that requires responsible action from every human being so that future generations will receive natural inheritance that remains sustainable and livable. Companies run their business in a way that will help them to survive in a long time period. To remain sustainable, companies must operate their business competitively (Peranginangin, 2015; Porter, 1985). Green behavior is one important measure required to increase company competitiveness (Kurland & Zell, 2011).

In current days, anyone in company is required to conduct green behavior. It is believed that green behavior will produce positive impact on individual performance and company performance at long term perspective (Norton, Zacher, & Ashkanasy, 2014). Employee's green behavior can create green relationship between employees and customers, and this relationship has many forms such as paperless communication, saving electricity, using air conditioners as needed, efficient use of water, and others. Social exchange theory has said that individual behavior has four propositions, namely, success proposition, stimulus proposition, derivation-satiation proposition, and value proposition (Emerson, 1976). Employee performance is always determined by employee's cognitive capability (Brown, Lent, Telander, & Tramayne, 2011) and employee's accountability quality on company (Setiawan, Rahardian, Novela, Utami, & Peranginangin, 2019).

Based on the description above, a determinative model is then developed to improve employee performance. This model should have made a very significant contribution to the development of knowledge concerning with a futuristic green behavior. This research is also suggesting a change on the existing business model, and the change is involving the addition of green behavior into the model to guide company to produce environmentally friendly business.

2. Literature Review

2.1. Employee Performance

Optimum employee performance is always the goal of the companies when they make investment on human resource. Employee performance is a quantitative review on employee's work outcome, and it is done by conducting an objective scrutiny on employee's personal data and productivity (Sisinacki, Dobis, & Sisinacki, 2017). Optimum employee performance can only be produced with an optimum company strategy, and the outputs of this optimization may include increased productivity, less error, good cooperation, and achievement of company targets (Neely, Richards, Mills, Platts, & Bourne, 1997; Peranginangin & Kusumawardhani, 2018).

Previous studies (Bose, 2018; Pradhan and Jena, 2017) have proposed that employee performance should be measured on task performance, adaptive performance, and contextual performance. Task performance is explained by some capabilities such as capability to produce work at high quality, capability to work without supervision, capability to finish work on time, and capability to handle multiple assignments. Capabilities that shape adaptive performance are capability to adapt with the change, capability to accept work flexibility, capability to adjust to organizational change, and capability to respond critics in pleasant words. Contextual performance is understood through capability to handle extra responsibility, capability to communicate effectively, capability to help coworker, and capability to produce good coordination with colleagues.

2.2. Green Behavior

Green behavior is the manifestation of promotive and preventive actions toward environmental management (Zoogah, 2011). Actions included in promotive green behavior are integrative orientation, creativity, and dare to take the risks for

environmental management. Preventive green behavior consists of some actions such as protecting environment, ensuring security of the environment, and being responsible in environment management.

Young et al. (2013) found that green behavior has brought a positive impact by producing sustainable performance either in individual, employee and organizational levels. Green behavior derives from green norm developed by employee as a part of organization, and also from green conviction initiated by employee as a person (Chou, 2014).

2.3. Organizational Culture

Organizational culture is a set of mentalities shown by employees to be used as their identity as a part of organization and as a person. Organizational culture is also employee's frame of thought that guides them in how to think and behave in organization. Organizational culture develops as employee's identity when employees interact with other persons inside and outside organization (Fernandez, Junquera, & Ordiz, 2010). A study by Chen (2011) has indicated that organizational culture is significantly impacting performance. Other study done by Kucukoglu and Pinar (2018) has found that organizational culture plays important role in developing employee's green behavior and in improving employee performance.

In regard of above description, some hypotheses are proposed, which are stated as following:

H1: Higher level of organizational culture is associated with higher level of employee performance.

H2: Higher level of organizational culture is associated with higher level of green behavior.

2.4. Leader Support

Leader's role in supporting green behavior initiation is truly vital. Kim, Kim, Han, Jackson, and Ployhart (2014) asserted that leader support has a significant impact on both initiation of green behavior and improvement of work performance of team members. Leader support can be created through commands and full patronage given by leader for the members (Norton, Parker, Zacher, & Ashkanasy, 2015).

Leader support is actualized in many forms such as giving trust in work team, building a motivating communication, being role model, requesting to employees' assistance for creative solution, giving reward for achievement, and providing practice model as guidance (Dunst, Bruder, Hamby, Howse, & Wilkie, 2018). Leader support can significantly improve employee performance.

Following up the above description, few hypotheses are generated, which are written as following:

H3: Higher level of leader support is associated with higher level of green behavior.

H4: Higher level of leader support is associated with higher level of employee performance

H5: Higher level of green behavior is associated with higher level of employee performance

Knowing all hypotheses above, a research model is constructed, which is displayed as following:

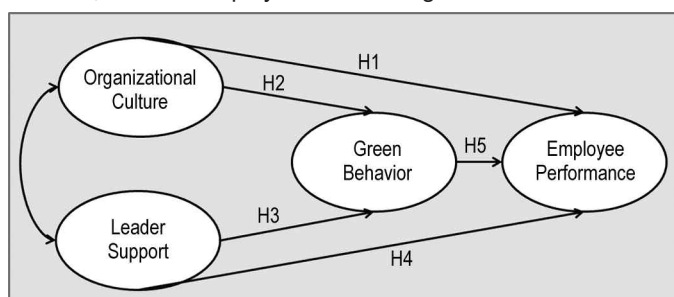


Figure 1. Proposed Model

Source: Model is created for this research (2019)

3. Research Methodology

3.1. Research Object and Analysis Unit

The object of this research, which is also the analysis unit of research, was the employees of textile factories in Indonesia. Survey was conducted by disseminating questionnaires, and sample was determined by purposive sampling method with criteria (Sekaran & Bougie, 2016). There were 250 questionnaires distributed to respondents, and the criteria of sample determination was that sample size must be five times of number of parameters, which must be 100 samples minimally (Hair, Black, Babin, & Anderson, 2014).

3.2. Analysis Technique and Model Testing

Method of analysis was quantitative. Research model was tested with Structural Equation Modeling (SEM) facilitated by software of Statistical Product and Service Solutions (SPSS) and Analysis of Moment Structures (AMOS) (Arbuckle, 2014). Research model comprised two endogenous variables and two exogenous variables. The validity and reliability of research data were tested using construct reliability and convergent validity. Construct validity is considered good if its cut-off value is ≥ 0.70 , whereas convergent validity is determined by firstly calculating Average Variance Extracted (AVE) and then considered good if its cut-off value is ≥ 0.50 (Tabachnick & Fidell, 2007).

The compatibility of theory and field condition of the model was ensured by implementing goodness-of-fit index test. Criteria of this compatibility include low chi-square, goodness-of-fit (GFI) index approximate to 0.90, probability level close to 0.50, CMIN/DF below 2, CFI approximate to 0.95, TLI that closes to 0.95, and RMSEA below 0.08 (Hair, Black, Babin, & Anderson, 2010; Hu & Bentler, 1998).

4. Data Analysis and Model Testing

Data of respondents will be described in some words. With respect to gender, of 225 questionnaires collected, there were 119 questionnaires, or 53%, sent by male respondents compared to 106 questionnaires, or 47%, given by female respondents. Regarding to marital status, 114 respondents, or 64%, were married, while the remaining 81 respondents, or 36%, were single. In relation with education level, there were 72 respondents, or 32%, graduated from senior high school, whereas the remaining 153 respondents, or 68%, have graduate degree.

4.1. Validity and Reliability Testing

Both validity and reliability of the constructs were measured using results of data processing on standardized factor loading. A construct is said to be valid only if the rate of average variance extracted (AVE) is ≥ 0.50 , and a construct is considered reliable if the rate of construct reliability is ≥ 0.70 . Data of average variance extracted and construct reliability have been processed, and the results are displayed in the table 1.

Table 1 shows that factor loading rates of research variables, which respectively are Organizational Culture, Leader Support, Green Behavior, and Employee Performance, are seemingly very good and therefore, it can be said that all indicators of each variable are indeed the reflection of each variable.

In sequence, the convergent validity rates of Organizational Culture, Leader Support, Green Behavior, and Employee Performance are 0.521, 0.698, 0.843, and 0.750. All variables in research model have cut-off value ≥ 0.50 and therefore, the variables are said to be valid.

Meanwhile, the construct reliability rates of Organizational Culture, Leader Support, Green Behavior, and Employee Performance, in sequence, are 0.830, 0.935, 0.955, and 0.914. All these rates are above 0.70 and therefore, it can be said that all research variables are reliable.

No.	Variable/Indicator	Std. Factor Loading (Lambda Value)	Convergent Validity (AVE) ≥ 0.50	Construct Reliability ≥ 0.70
1	Organizational Culture			
	X1	0.676		
	X2	0.685	0.521	0.830
	X3	0.798		
	X4	0.684		
	X5	0.670		
2	Leader Support			
	X6	0.748		
	X7	0.830	0.698	0.935
	X8	0.919		
	X9	0.919		
	X10	0.917		
3	Green Behavior			
	X11	0.968	0.843	0.955
	X12	0.959		
	X13	0.903		
	X14	0.837		
4	Employee Performance			
	X16	0.842		
	X17	0.896	0.750	0.914
	X18	0.859		
	X19	0.783		
	X20	0.738		

Table 1. Construct Reliability & Convergent Validity
Source: Result of data processing (2019)

4.2. Goodness-of-Fit Index

Data of goodness-of-fit index have been processed and the results are presented in the following table:

No.	Goodness-of-Fit Indices	Result	Goodness-of-Fit
1	Chi-square	655.306	Marginally Fit
2	Prob	.0001	Fit
3	GFI	0.734	Marginally Fit
4	AGFI	0.659	Marginally Fit
5	CFI	0.856	Fit
6	TLI	0.833	Fit
7	RMSEA	0.128	Fit
8	CMINDF	3.996	Fit

Table 2.
Goodness-of-Fit

Source: Result of data processing (2019)

Pursuant to the table of goodness-of-fit above, model compatibility is found. Research model has met the criteria required by Structural Equation Modeling, and this fulfillment is then verified with Analysis of Moment Structures.

4.3. Hypothesis Testing Result

If the assumptions required by Structural Equation Modeling are already fulfilled, full model is then tested using a software of Analysis of Moment Structures (AMOS). Result of the test is depicted as following (Figure 2):

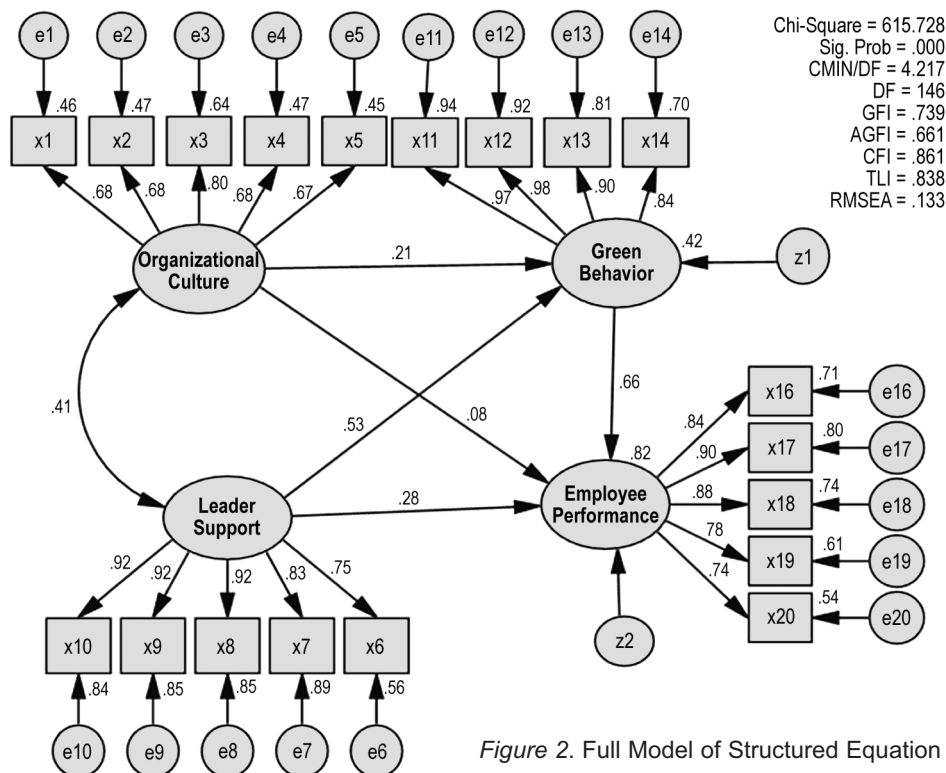


Figure 2. Full Model of Structured Equation Modeling

As shown in the figure above, the correlation of two exogenous variables, precisely Organizational Culture and Leader Support, has a rate of 0.41. The following table 3 is presenting the result of Regression Weights in Structural Equation Modeling.

Based on what is shown in Table 3, first hypothesis stating that higher level of organizational culture is associated with higher level of employee performance is rejected. Second hypothesis, which says that higher level of organizational culture is associated with higher level of green behavior, is accepted

and resided at significant category. Third hypothesis, which proposes that higher level of leader support is associated with higher level of green behavior, stays in very significant category. Fourth hypothesis proposing that higher level of leader support is associated with higher level of employee performance is accepted and stood at very significant category. Fifth hypothesis asserting that higher level of green behavior is associated with higher level employee performance is accepted and occupying very significant category.

No.	Hypothesis	Estimate	S.E	C.R	P	Result
1	Organizational Culture $\rightarrow$ Employee Performance	.085	.051	1.656	.098	Rejected
2	Organizational Culture $\rightarrow$ Green Behavior	.274	.099	2.765	.006	Accepted
3	Leader Support $\rightarrow$ Green Behavior	.770	.112	6.894	***	Accepted
4	Leader Support $\rightarrow$ Employee Performance	.314	.067	4.658	***	Accepted
5	Green Behavior $\rightarrow$ Employee Performance	.498	.047	10.701	***	Accepted

Table 3. Result of Regression Weights in Structural Equation Modeling
Source: Result of data processing (2019)

5. Conclusion and Suggestion

Result of research so far shows that green behavior has the greatest contribution to the improvement of employee performance, and the second place is held by leader support. Therefore, green behavior is indeed truly important for the employees. If the leader is dynamic and supportive, then employee performance is easily achieving company targets.

It can be said that result of this research has provided meaningful contribution to the body of knowledge by giving a review on how to improve employee performance through green behavior. Managers can use this research to guide them in

setting policies. One example of relevant policy is how to produce green behavior that consistently and simultaneously covers all company lines. Despite this benefits, this research has few limits. Only three variables are used by this research to explain the improvement of employee performance. Researcher, in the other hand, knows that there are many other variables that can affect employee performance improvement. Research object is limited only to employees of Indonesian companies. Further research needs to use other country or state as a context to ensure that the current model can be generalized. Next research must involve other variables in order to obtain more holistic results.

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Trends and Regularities of the Development of Regional Markets of Agricultural Products in the Russian Federation

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Abstract

Currently, there is an objective need for a wider application of forecasting methods and tools in the development of regional development strategies and programs. Regional planning and forecasting is a separate form of economic work aimed at achieving a specific goal, which should be addressed by specialized structures and bodies. In practice, when developing regional strategies and development programs among forecasting methods, the most widely used group of genetic extrapolation methods that allow you to transfer the trends of economic phenomena and processes identified in the past and present to future periods.

Keywords: forecasting; agriculture; livestock.

1. Introduction

Currently, there is an objective need for reforming regional forecasting in the direction of increasing the independence of the regions when developing strategies and programs for their development. Strategic plans should, first of all, contain information relevant to the socio-economic development of this particular region, and not average Russian indicators. For this purpose, it is necessary to separate the process of collecting the necessary data and the process of regional planning itself, since the monitoring process is quite capacious and costly, predictive indicators largely depend on the reliability and completeness of information (Dzhukha et al., 2017). At the same time, structures and bodies should be engaged in forecasting regional development, the work of which can be fully provided with information. In addition, regional planning and forecasting is a separate form of economic work aimed at achieving a specific goal (Galazova et al., 2018).

Regional forecasting should be based on a comprehensive presentation of the real situation in the region, since only on this basis it is possible to develop effective adequate solutions for its economic development.

One of the basic principles of forecasting is a systematic approach, which assumes that the development object is interconnected with the level of resource supply, the main activities, as well as interaction with the external environment.

Another general forecasting principle is the principle of complexity, which consists in building a system of basic indicators covering all areas of regional development (Gorbunov et al., 2019). To a greater extent, this principle is applied when

planning resource support for regional development, in which it is necessary to take into account the ratio of material, financial, labor, production, natural and other types of resources.

The principle of focus means that the direction of development should be clearly focused on the main goal, and all tactical measures should contribute to its achievement.

The essence of the integrity principle is that the indicators and factors used in planning and forecasting must be interconnected and they must be developed in accordance with the goal setting of the strategic plan. (Kiseleva et al., 2017; 7, Kuzminov et al., 2018)

Integrity is necessary in coordinating and integrating the actions of all functional units that will ensure the fulfillment of planned tasks.

The principle of the methodology is due to the fact that both planning and forecasting should be carried out clearly in accordance with the methodological recommendations indicated either in the program itself or in the instructions of the relevant departments. (Kuzminov et al., 2018) The peculiarity is that all the positive achievements of previous regional development programs are taken into account.

The principle of the effectiveness of strategic planning is due to the fact that the goals of strategic planning and forecasting are considered achieved only if the costs incurred to achieve them are lower than the results obtained.

Any strategic plan should also be based on the principle of profitability (savings), based on the fact that the achievement of goals should be accompanied by the saving of all resources, and their necessary volume should be indicated in advance in the program. (Kiseleva et al., 2017; Tatuev, 2010)

The principle of temporary coordination is also the basic principle, since the implementation of the planned activities indicated in the strategy should be strictly regulated by time intervals.

The principle of permanence means that at any stage of the practical implementation of the regional development strategy, methods and measures must be constantly adjusted in accordance with the changing internal and external conditions of the regional economy. The adjustment should be carried out at the stages of control points of the strategic plan.

The principle of reliability is due to the fact that the basic indicators of strategic planning will be more accurate the more accurate the data on available resources in the region (Ashkhotov et al., 2018).

The principle of informativeness consists in the need to create a system of information support for the process of planning decisions. Compliance with this principle creates the prerequisites for increasing the validity and efficiency of planning decisions, as well as monitoring and monitoring their implementation.

The principle of balancing is more applicable to forecasting, as it implies an optimal combination of different types of forecasts: normative, tactical, strategic and others. While in planning this principle to a greater extent means the coordination of all parts of the strategic plan.

The principle of adaptability was introduced into strategic planning in view of the rapid pace of transformation of the global environment, and therefore the adopted plans must allow for some amendments and additions.

The presented systematization of principles is basic, because depending on the situation, the number of these principles can be expanded and supplemented, as well as a combination of these principles can be modified. The presented system of principles is interconnected, that is, non-compliance with one principle will inevitably entail a non-compliance with another (Litvinova et al., 2017; Tatuev, 2011).

The main problem of the current stage of development of

spatial socio-economic systems is their lack of knowledge and the absence of science-based strategic programs. At the same time, forecasting methods play an important role in developing such regional development strategies (Yarychiv, 2019).

2. Methodology

At present, when developing fundamental documents, such as strategies, programs, etc., setting priorities for further regional development of systems of various levels for the long term, often when determining planned estimates of key indicators and indicators, based on the opinions of experts or trends of recent years, as a rule, from a certain kind of assumptions about the uniformity of their change (increase or decrease) during the study period. It is impossible to take into account the results of analytical studies and not to reckon with the opinion of specialists in the corresponding fields, but at the same time, in our opinion, the possibilities of formalized methods of modeling and forecasting should be used more in practice. It is the results of scenario forecasting that should be, along with the analytical core for the subsequent expert evaluation of specialists.

In our opinion, the econometric approach deserves special attention, allowing to take into account to a certain extent the diversity and degree of influence of individual conditions and factors on the change in key indicators of the socio-economic development of individual territories in the planning period. Thus, the improvement of strategic forecasting tools is due to the need to use, along with expert assessments, formalized forecasting methods to clarify the main indicators of the Stavropol Krai State Program "Agricultural Development".

In general terms, the content of the proposed methodology of econometric modeling and forecasting the development indicators of the livestock industry in the Stavropol Krai can be represented in the form Figure 1.

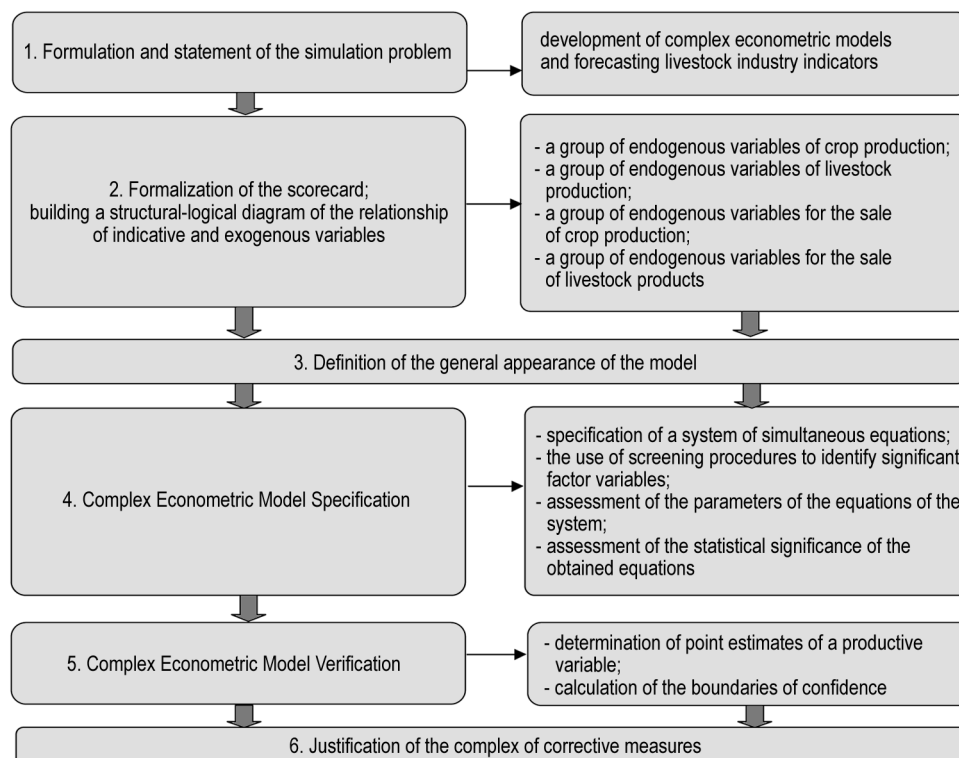


Figure 1. Methodology of econometric modeling and forecasting development indicators of the livestock industry in the Stavropol Krai

In accordance with the described algorithm (Figure 1), after the main goal of the proposed methodology is formulated – the construction of a comprehensive econometric forecasting model for the development of the livestock industry for simulation and

forecasting in future periods in accordance with the identified correlation relationships depending on the prevailing operating conditions and features of regional development, it is necessary to formalize the system of indicators used, in accordance with

which I will identified endogenous and exogenous variables regression equations.

It is advisable to parameterize the presented regression dependences to obtain objective results on the basis of systems of simultaneous equations (structural form of a complex econometric model), which must be built separately for each of the considered types of livestock products.

The equation obtained as a result of the selection of significant factor variable models of mutton meat production has a structural form and is given below:

$$Y_{a12} = 11,34 + 0,001 \cdot Y_{a1} + 0,084 \cdot Y_{a8} - 0,008 \cdot Y_{a14} - 0,001 \cdot X_5$$

($R^2 = 0,946$; $\hat{S} = 12,52$; $F = 56,7$; $\text{Sig.} = 0,002$)

Y_{a12} – mutton meat production;

Y_{a1} – grain production;

Y_{a8} – gourds production;

Y_{a14} – egg production;

X_5 – fixed investment.

The value of the Fisher's F -test, characterizing the ratio of factor and residual variances, allows us to conclude that the obtained model for the production of mutton meat is statistically significant. The value of the multiple determination coefficient shows that the production of mutton meat by 94.6% was explained by a variation in the factors included in the model.

The equation obtained by selecting the significant factor variables of the beef meat production model is shown below:

$$Y_{a10} = 30075,08 - 78,77 \cdot Y_{a4}$$

($R^2 = 0,75$; $\hat{S} = 30,38$; $F = 15,03$; $\text{Sig.} = 0,012$)

Y_{a4} – potato production in all categories of farms, thousand tons;

Y_{a10} – beef meat production in agricultural enterprises, tons.

The statistical significance of the obtained regression models is checked using the Fisher's

F -test. So, from the data given by the model, it follows that the ratio of factor and residual variances is at the level of 15.03, which indicates a high statistical significance of the obtained equation.

The significance of the F -test (Sig.) shows the probability of an error at which it is permissible to reject the null hypothesis and accept the alternative. Thus, we can conclude that all the equation obtained at this stage is quite significant.

A measure of the effectiveness of the obtained regression models is the multiple coefficient of determination (R^2), which characterizes the degree of accuracy with which the obtained regression equation approximates the initial data. The value of the multiple determination coefficient indicates that the volumes of beef meat production by agricultural organizations of the Stavropol Krai were explained by 75% as a variation of the factors included in the model.

The equation obtained as a result of the selection of significant factor variables for the production of pork meat has a structural form and is given below:

$$Y_{a11} = 56379,54 - 0,582 X_{a11}$$

($R^2 = 0,71$; $\hat{S} = 184,3$; $F = 12,25$; $\text{Sig.} = 0,017$)

Y_{a11} – pork meat production in agricultural enterprises, tons;

X_{a11} – the profitability (loss ratio) of the gain of pigs, %.

3. Results

The results of forecasting the production volumes of the main types of livestock products must be taken into account when extrapolating the sale of meat products, within the framework of the integrated econometric model developed for this purpose.

The system obtained as a result of the selection of significant factor variables for the models of production and sale of mutton meat has a structural form and is given below:

$$\begin{cases} Y_{a12} = 11,34 + 0,001Y_{a1} + 0,084Y_{a8} - 0,008Y_{a14} - 0,001X_5 & (A) \\ (R^2 = 0,946; \hat{S} = 12,52; F = 56,7; \text{Sig.} = 0,002) \\ Y_{b12} = -8,46 + 0,002Y_{b1} - 0,1Y_{b4} + 0,199Y_{b5} + 2,815Y_{a12}^* & (B) \\ (R^2 = 0,86; \hat{S} = 46,9; F = 10,84; \text{Sig.} = 0,004) \end{cases}$$

The significance of the F -criterion allows us to conclude that the models obtained at this stage are the most significant. A generalizing qualitative characteristic of the regression models is the index of multiple determination, which shows the share of variation of the trait, which was explained by means of factor variables included in the model. The greatest value of the multiple coefficient of determination was obtained at this stage for equation A, in accordance with it the volumes of meat production of mutton by agricultural organizations of the Stavropol Krai were explained by 94.6% as a variation of the factors included in the model. In turn, sales volumes are explained by the action of factors selected in model B by 86% (Figure 2).

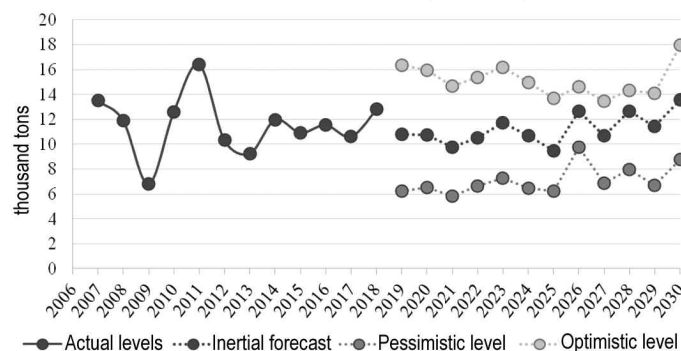


Figure 2. Forecast for the sale of mutton meat by agricultural producers of the Stavropol Krai for 2019-2030, thousand tons

The sales volume of lamb meat under the inertial scenario by 2023 will amount to 11.7 thousand tons. In 2025, a decrease in sales volumes of mutton meat is projected to 9.5 thousand tons, and then growth will follow, which by 2030 will ensure sales of mutton meat by agricultural organizations of the Stavropol Krai at the level of 13.6 thousand tons. At the same time, an optimistic scenario allows predicting the volume of sales at the level of 18 thousand tons in 2030, and the pessimistic scenario – 8.8 thousand tons (Figure 2).

An assessment of the forecast values of the price of mutton meat, implemented through all channels, allows us to conclude that a steady increase in prices is expected, which will lead to a value of 366.6 rubles. per 1 kg in 2030. At the same time, using seasonality indices to assess the dynamics of market conditions allows us to establish that the highest price is expected in October and the lowest in January (Figure 3).

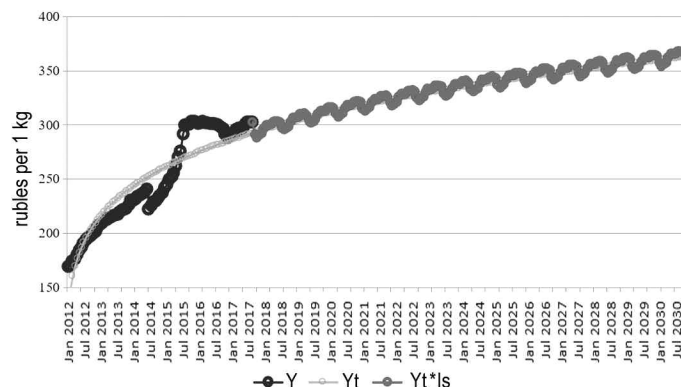


Figure 3. Forecast for the price of mutton meat, rubles. for 1 kg

The system obtained as a result of the selection of significant factor variables for the models of production and sale of beef meat has a structural form and is given below:

$$\begin{cases} Y_{a10} = 30075,08 - 78,77Y_{a4} & (A) \\ (R^2 = 0,75; \hat{S} = 30,38; F=15,03; \text{Sig.}=0,012) \\ Y_{b10} = 9187,62 + 0,312Y_{a10}^* & (B) \\ (R^2 = 0,788; \hat{S} = 85,03; F=18,63; \text{Sig.}=0,008) \end{cases}$$

The significance of the F -criterion allows us to conclude that the models obtained at this stage are the most significant. The highest value of the multiple determination coefficient was obtained at this stage for equation B, in accordance with it the volumes of sales of beef meat by agricultural organizations of the Stavropol Krai were explained by 78.8% as a variation of the factors included in the model. In turn, production volumes are explained by the influence of factors selected in model A by 75%.

Inertia scenario sales volumes of beef meat are slightly lower than production volumes and average 11.3 thousand tons for the period 2019-2030. The optimistic scenario allows predicting the sales volume at the level of 14.2 thousand tons in 2030, the pessimistic scenario – 7,6 thousand tons (Figure 4).

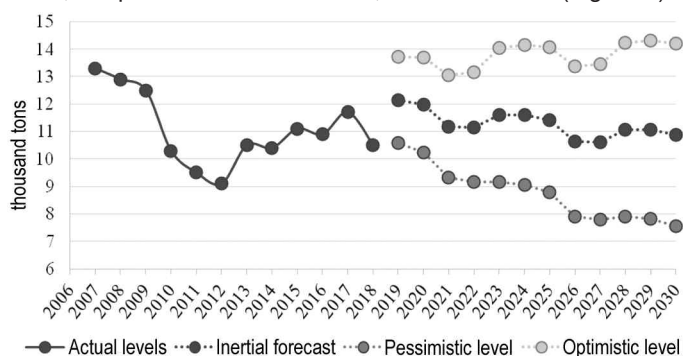


Figure 4. Forecast for the sale of beef meat by agricultural producers of the Stavropol Krai for 2019-2030, thousand tons

Evaluation of the forecast values of the price of beef meat, implemented through all channels, allows us to conclude that a steady increase in prices is expected, which will lead to a value of 410 rubles per 1 kg in 2030. The results of using the index method in assessing seasonal fluctuations indicate that the highest price is expected in October and the lowest in June (Figure 5).

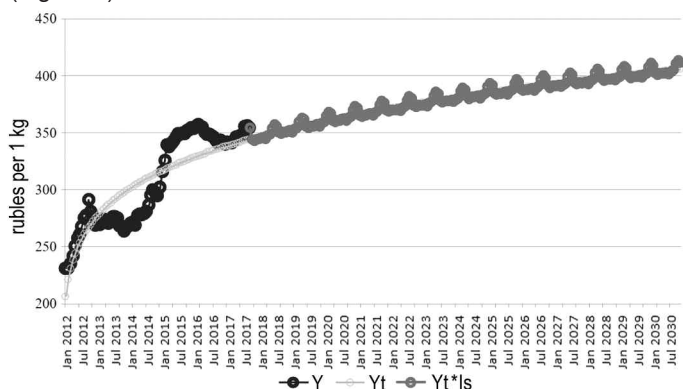


Figure 5. Forecast for the price of beef meat, rubles for 1 kg

The system resulting from the selection of significant factor variables for the production and sale of pork meat has a structural form and is given below:

$$\begin{cases} Y_{a11} = 56379,54 - 0,582X_{a11} & (A) \\ (R^2 = 0,71; \hat{S} = 184,3; F=12,25; \text{Sig.}=0,017) \\ Y_{b11} = 64719,86 - 1,527X_{a4} - 0,969Y_{a11}^* & (B) \\ (R^2 = 0,929; \hat{S} = 215,8; F=26,09; \text{Sig.}=0,005) \end{cases}$$

The significance of the F -criterion allows us to conclude that

the models obtained at this stage are the most significant. The highest value of the multiple coefficient of determination was obtained at this stage for equation B; in accordance with it, the sales volumes of pork meat by agricultural enterprises of the Stavropol Krai were explained by 92.9% as a variation of the factors included in the model. In turn, production volumes are explained by the action of factors selected in model A by 71%. (Rossinskaya et al., 2019)

The sales volume of pork meat under the inertial scenario by 2024 will amount to 25 thousand tons. In 2025, sales of pork meat are forecast to decline to 23.7 thousand tons, and then progressive growth will follow, which by 2030 will ensure the sales of pork meat by agricultural organizations of the Stavropol Krai at 33.3 thousand tons. At the same time, an optimistic scenario allows predicting the sales volume at the level of 39.4 thousand tons in 2030, and the pessimistic scenario – 22.1 thousand tons (Figure 6).

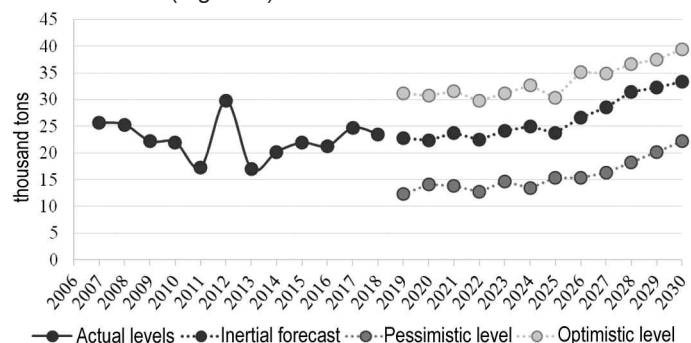


Figure 6. Forecast for the sale of pork meat by agricultural producers of the Stavropol Krai for 2019-2030, thousand tons

Evaluation of the forecast values of the price of pork meat, implemented through all channels, allows us to conclude that their steady growth is expected to reach 461 rubles. per 1 kg in 2030 (Figure 7).

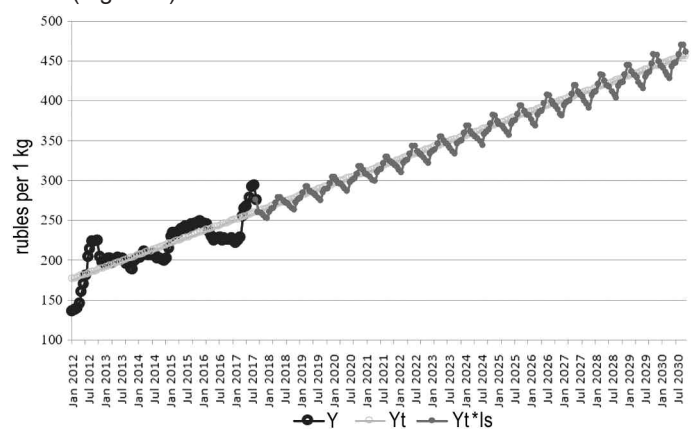


Figure 7. Price forecast for pork meat, rubles. for 1 kg

In modern conditions, regional development strategies and programs are mainly based on the application of forecasting methods. Among them, with regard to predicting the conditions for the development of regions, a group of genetic extrapolation methods can be applied with success, which are focused on extrapolating the once existing conditions of socio-economic processes for the coming periods. [Galazova et al., 2018; Yarkova et al., 2013)

The sphere of agricultural production is traditionally the leading one in the economy of the Stavropol Krai. Agriculture forms from 10 to 15% of the gross regional product, accumulates 16-13% of the total investment and provides employment with 17.3% of the population of the region.

Having significant economic potential, the region has the ability to solve not only regional, but also federal tasks of

providing the population with food. The Stavropol Krai produces about 9% of grain, 6% of sunflower, 5% of sugar beets, takes the 2nd place in the country in the production of wool. According to various ratings, it is one of the most effective subjects of the Federation for the production of agricultural products. (Bogoviz et al., 2018; Yarkova, 2019)

4. Conclusion

As a result of the study, a methodology for predicting the production and sale of the main types of livestock production in the region was proposed and tested.

The models we have constructed for the production and sale of the main types of livestock products by agricultural producers in the Stavropol Krai should be considered as a tool for making managerial decisions aimed at improving economic relations, as well as ensuring the greatest effectiveness of the implemented program activities in the region. However, in order to obtain re-

liable modeling and forecasting results, the constructed systems of equations and the forecasts obtained on their basis need to be periodically adjusted and supplemented taking into account changing conditions.

To ensure sustainable development of local agricultural markets in modern conditions, we propose:

1. Apply the proposed methodology of econometric modeling and forecasting livestock production in the region.
2. To use in practice integrated econometric models of production and sales of the main types of livestock products in the Stavropol Krai in order to predict the levels of the presented indicators within the framework of various development scenarios.
3. Based on the current monitoring of the implementation of state strategic programs for the development of the agro-industrial complex, apply within the framework of the region's economy a set of corrective measures to achieve indicative levels of development of the industry fixed by federal and regional strategic programs.

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Determination of Nutritional and Mineral Composition of Carrot and Pepper Wastes

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Abstract

The purpose of the present work was to determine the nutritional and mineral composition of carrot and pepper wastes. The carrot and pepper wastes were characterized by the following parameters: free fat (<0.01% in both wastes tested), crude protein (1.52% and 0.75%, respectively in carrot and pepper waste), total dietary fibre (6.34% and 1.48%, respectively), digestible carbohydrates (8.8% and 4.3%, respectively), total sugars (7.22% and 3.29%, respectively), reducing sugars (5.24% and 2.93%, respectively), water content (81.2% and 93.2%, respectively), dry matter (18.8% and 6.8%, respectively), total ash (2.11% and 0.26%, respectively in carrot and pepper waste). In both wastes tested, the potassium element had the highest amount (10715 mg/kg in carrot waste and 1626 mg/kg in pepper waste). Compared to pepper waste, carrot waste was also characterized by a higher content of the following elements: Na (651 mg/kg), Mg (422 mg/kg), Al (3.65 mg/kg), P (1020 mg/kg), S (284 mg/kg), Ca (1234 mg/kg), Mn (2.59 mg/kg), Fe (5.98 mg/kg), Cu (2.56 mg/kg), Zn (5.01 mg/kg). Boron content was only found in carrot waste (5.02 mg/kg). In pepper waste, boron was below 0.10 mg/kg. In both samples tested, Cr, Se, Mo were below the detectable minimum (<0.05 mg/kg).

Keywords: carrot waste; pepper waste; nutritional composition; mineral composition.

1. Introduction

In the work by Chantaro, Devahastin & Chiewchan (2008), the feasibility of using carrot peels as a starting raw-material to produce dietary fibre powder was investigated. Garcia et al. (2011) developed a microbial community suitable for anaerobic digestion of carrot pomace from inocula obtained from natural environmental sources. In the works by Dhanalakshmi Sridevi & Ramanujam (2012a, 2012b), vegetable wastes including carrot wastes were used as a substrate to obtaining of biogas in the anaerobic digestion process. Hernández-Ortega et al. (2013) used carrot pomace dried in oven (microwave or conventional) as an ingredient in cookies to increase fibre and phytochemical content. According to Sharoba, Farrag & Abd El-Salam (2013), carrot pomace, orange waste, potato peels and green pea peels could be used as a starting raw material to produce dietary fibre powders. Di Donato et al. (2014) studied a possible strategy of valorization of some crop residues and agro-industrial wastes, including carrot selection residues. According to Park et al. (2015), phenolics, followed by oxygenates and acids were the main product species in the bio-oil produced from the non-catalytic pyrolysis of waste red pepper stems. Maia & de Moraes (2016) investigated the kinetic parameters of thermal degradation of red pepper waste as solid biofuel. Sandoval-Castro et al. (2017) investigated the effects of the scalding process on hydrophilic compounds, phenolic, ascorbic acid and capsaicinoids contents and antioxidant activity of industrial Jalapeño pepper byproducts. Díaz et al. (2017) treated vegetable supermarket wastes, including pepper, by various hydrolysis procedures with the aim to maximize the amount of fermentable sugars. In their work, Zambelli et al. (2017) developed a mixture from industrial byproducts of broccoli and carrot and applied it in bread food matrix.

Otoni et al. (2018) produced biodegradable biocomposites based on carrot minimal processing waste and containing hydroxypropyl methylcellulose and high-pressure microfluidized cellulose fibres. Ahmed S., Ahmed A. & Rafat (2018) derived porous activated carbon from rotten carrot employing chemical activation with zinc chloride (ZnCl_2). Varanasi et al. (2018) produced nanofibres from carrot residues entirely by mechanical treatment, without any chemical bleaching or oxidizing reagents. According to de Carvalho Eufrazio Pinto et al. (2019), biochar produced from carrot residue impregnated with Mg is a good material for environmental purposes and for phosphorus reuse in agriculture. In the work by Clementz et al. (2019), three processes of extraction of valuable by-products from carrot discards were developed. Fiasconaro et al. (2019) studied the effect of soil amendment with a K-rich carrot compost (obtained by aerobic co-processing of carrot wastes from packing plants) on pepper plant physiology and fruit quality under drought. In order to develop a model for food waste composting, the physico-chemical characteristics of fruit and vegetable waste, including carrot waste, were determined in the work by Ghinea et al. (2019). Vulić et al. (2019) encapsulated red pepper waste, a by-product of vegetable processing industry, in whey protein and evaluated the bioavailability and bioactivity of encapsulated phenolics and carotenoids from red pepper waste.

The purpose of the present work is to determine the nutritional and mineral composition of carrot and pepper wastes with a view to their further investigation.

2. Materials and Methods

Damaged, rotten, non-edible parts of carrot and pepper considered as wastes were used as experimental material in this

research. The samples were collected from the local market and were tested in the SGS Bulgaria Ltd, Laboratory Varna. Carrot and pepper wastes were examined for the parameters as followed: free fat (BDS 6997:1984), crude protein (BDS ISO 1871:2014), total dietary fibre (AOAC 985.29:1986), digestible carbohydrates (VLM 106:2012), total sugars (BDS 7169:1989), reducing sugars (BDS 7169:1989), water content (ISO 1026:1982), dry matter (ISO 1026:1982), total ash (BDS 7646:1982), mineral content (VLM 40:2009). In the work by Baloch, Xia & Sheikh (2015), methodologies described in details were presented.

3. Results and Discussion

In Table 1, the nutritional composition of carrot and pepper wastes studied in this work was presented.

Parameter, %	Carrot waste	Pepper waste
Free fat	<0.01	<0.01
Crude protein	1.52 ± 0.15	0.75 ± 0.15
Total dietary fibre	6.34 ± 0.50	1.48 ± 0.20
Carbohydrates (digestible)	8.8 ± 1.8	4.3 ± 0.9
Sugars (total)	7.22 ± 0.25	3.29 ± 0.25
Sugars (reducing)	5.24 ± 0.25	2.93 ± 0.25
Water content	81.2 ± 0.3	93.2 ± 0.3
Dry matter	18.8 ± 0.3	6.8 ± 0.3
Total ash	2.11 ± 0.06	0.26 ± 0.01

Table 1. Nutritional composition of carrot and pepper wastes

The amount of free fat in both wastes tested was less than 0.01%. In carrot waste, the amount of crude protein (1.52%) was twice as high as in pepper waste (0.75%). Total dietary fibre was significantly more prevalent in carrot waste (6.34%) compared to pepper waste (1.48%). The amount of digestible carbohydrates also predominated in carrot waste (8.8%), which was about twice as much as in pepper waste (4.3%). Carrot waste was also richer in total sugars (7.22%) and reducing sugars (5.24%) than pepper waste (3.29% total sugars and 2.93% reducing sugars, respectively). Carrot waste had lower water content (81.2%) and higher dry matter content (18.8%) than pepper waste (93.2% water content and 6.8% dry matter content, respectively). Total ash content was more prevalent in carrot waste (2.11%) compared to pepper waste (0.26%).

In the work by Chantaro, Devahastin & Chiewchan (2008), could be found results for the proximate chemical composition of carrot peels (fresh, blanched, unblanched). Hernández-Alcántara, Totosaus & Pérez-Chabela (2016) obtained 52.00% total dietary fibre content in carrot bagasse. Our results could be compared with the values obtained by Shyamala & Jamuna (2010) for moisture (84.23%), protein (6.21%), carbohydrate (32.22%), ash (5.78%) content of carrot pulp wastes. The results obtained by Dhanalakshmi Sridevi & Ramanujam (2012a, 2012b) for moisture content (89.9%), carbohydrate (5.6%), fat (0.2%), protein (0.6%) of carrot waste could be also compared to our results (Table 1).

In the work by Sharoba, Farrag & Abd El-Salam (2013), values for the proximate chemical composition of carrot pomace (4.61% moisture, 7.29% total ash, 1.75% total fat, 10.06% total protein, 69.85% total dietary fibre) were presented. According to Ravi et al. (2018), carrot waste was characterized with the following nutritional values: 10.20% water, 9.25% crude ash, 9.85% crude protein, 1.50% crude fat, 9.05% crude fibre. In the work by Clementz et al. (2019), results for the chemical composition of carrot discards (including carbohydrates, fats, protein, ash, carotens, fibre, Ca, P, Fe) could be found. Szymańska-Chargot et al. (2017) obtained 13.10% dry matter content in carrot pomace.

In Table 2, the mineral composition of carrot and pepper wastes researched in this work was presented.

In both wastes tested, potassium had the highest content. The potassium content in carrot waste (10715 mg/kg) was more

than 6 times higher than that of pepper waste (1626 mg/kg). In carrot waste, the second content element after potassium was calcium (1234 mg/kg). Carrot waste was about 10 times richer in calcium than pepper waste (119 mg/kg). Phosphorus was the third element in carrot waste (1020 mg/kg). In pepper waste, the second content element after potassium was phosphorus with value 208 mg/kg.

Carrot waste was also richer in Na (651 mg/kg) and S (284 mg/kg) compared to pepper waste (19.4 mg/kg and 159 mg/kg, respectively sodium and sulfur content). The amount of magnesium also prevailed in carrot waste (422 mg/kg) compared to pepper waste (100 mg/kg).

Boron content was only found in carrot waste (5.02 mg/kg). In pepper waste, boron was below 0.10 mg/kg. In both samples tested, the elements chromium, selenium, molybdenum were below the detectable minimum (<0.05 mg/kg).

Parameter, mg/kg	Carrot waste	Pepper waste
B	5.02 ± 10 rel.%	<0.10
Na	651 ± 5 rel.%	19.4 ± 10 rel.%
Mg	422 ± 5 rel.%	100 ± 10 rel.%
Al	3.65 ± 10 rel.%	0.90 ± 15 rel.%
P	1020 ± 5 rel.%	208 ± 5 rel.%
S	284 ± 5 rel.%	159 ± 5 rel.%
K	10715 ± 5 rel.%	1626 ± 5 rel.%
Ca	1234 ± 5 rel.%	119 ± 5 rel.%
Cr	<0.05	<0.05
Mn	2.59 ± 10 rel.%	1.43 ± 10 rel.%
Fe	5.98 ± 10 rel.%	3.05 ± 10 rel.%
Cu	2.56 ± 10 rel.%	0.55 ± 15 rel.%
Zn	5.01 ± 10 rel.%	1.03 ± 10 rel.%
Se	<0.05	<0.05
Mo	<0.05	<0.05

Table 2. Mineral composition of carrot and pepper wastes

Carrot waste had also higher aluminum content (3.65 mg/kg) than pepper waste (0.90 mg/kg). In addition, the content of Mn (2.59 mg/kg), Fe (5.98 mg/kg), Cu (2.56 mg/kg) and Zn (5.01 mg/kg) was higher in carrot waste compared to pepper waste (1.43 mg/kg Mn, 3.05 mg/kg Fe, 0.55 mg/kg Cu and 1.03 mg/kg Zn, respectively).

According to Asquer, Pistis & Scano (2013), potassium had also the highest content in carrot and pepper wastes. Kuppasamy, Venkateswarlu & Megharaj (2017) also reported that the element with the highest content in carrot pulp was potassium.

Asquer, Pistis & Scano (2013) reported that wastes from pepper were richer in K than carrot wastes. According to Asquer, Pistis & Scano (2013), carrot wastes were richer in Ca, Na, Mg, compared to pepper wastes. Values for the content of Fe, P, Ca in the carrot pulp wastes were reported also in the work by Shyamala & Jamuna (2010).

According to the results for the mineral composition of carrot peels, obtained by Khattak & Rahman (2017), the content of the elements decreased in the following order: K>P>Na>Mg>Ca>Fe>Zn>Mn.

4. Conclusions

The nutritional and mineral composition of carrot and pepper wastes were determined in this research with a view to their further investigation. The amounts of crude protein (1.52%), total dietary fibre (6.34%), digestible carbohydrates (8.8%), total sugars (7.22%), reducing sugars (5.24%), dry matter (18.8%) and total ash (2.11%) were higher in carrot waste compared to pepper waste. The amount of free fat in both wastes examined was less than 0.01%. In both samples tested, the elements chromium, selenium, molybdenum were below the detectable minimum (<0.05 mg/kg). Boron content was only found in carrot waste (5.02 mg/kg). In pepper waste, the boron element was below 0.10 mg/kg. Potassium was the highest in both wastes

tested. In carrot waste, the first five elements of decreasing content were as follows: K (10715 mg/kg), Ca (1234 mg/kg), P (1020 mg/kg), Na (651 mg/kg), Mg (422 mg/kg). The first five elements in pepper waste were: K (1626 mg/kg), P (208 mg/kg), S (159 mg/kg), Ca (119 mg/kg), Mg (100 mg/kg).

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Purchase Decision: Dilematically between Trust and Perceived Risk for Consume

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Abstract

The study was conducted to determine the relationship of trust and perceived risk in business to business purchasing decisions of farmers. This research focuses on the prediction of the relationship between variables in the structural model so that the analytical tool uses Generalized Structured Component Analysis (GSCA) analysis. The research method uses multistage stratified, non-probabilistic, and convenience sampling methods. The research sample of 261 using a questionnaire was given to farmers in Kediri, Blitar, and Malang Districts. The results of the study, the relationship of COO (Country of Origin) in trust mediation has a significant and positive effect on purchasing decisions, the COO relationship in perceived risk does not have a significant and positive effect on purchasing decisions, the familiarity relationship in trust mediation has a significant and positive effect on purchasing decisions, familiarity in mediation perceived risk no significant and positive effect on purchasing decisions, world mindedness relations in trust mediation have a positive and significant effect on purchasing decisions, world mindedness relationships in mediation perceived risk has no significant and significant effect on purchasing decisions. While trust has a significant effect on purchasing decisions and perceived risk influences decision making.

Keywords: country of origin; familiarity; world mindedness; purchasing decisions; trust and risk.

1. Introduction

The competition of national veterinary medicines in Indonesia with veterinary medicines from several other regions, especially with European and American veterinary drug producers, is interesting to study. The Government of Indonesia has issued Law Number 18 the Year 2009 juncto Number 41 the Year 2014 concerning Animal Husbandry and Health, which states that the supply of veterinary medicines is carried out by prioritizing domestic production, this aims to reduce dependence on imported products (Fari, 2018). However, imported medicinal products from Europe and America entering Indonesia are still quite high, with the growth of 4.53% per year (<https://kemenperin.go.id>, 2019). During this time, many consumers who prefer imported drug products due to the perception of the quality of imported drug products that are considered better than local drugs. Drugs are products with special technical specifications, so consumers need a belief in drug products with reliable quality in their purchasing decisions.

Country of Origin (COO) (Woo, 2019; Semaan et al., 2019; García-Gallego and Mera, 2017) is a perception, preference, and individual attitudes that concern consumers about products produced by a country. The country of origin effect (Coudoumaris, 2018; Andéhn and Decosta, 2018) influences the quality of consumers and brands to be chosen (Schiffman and Kanuk, 2007) and this phenomenon is referred to as "foreign-made in" (receptive to the effects of COO). Gurhan-Canli and Maheswaran (2000) propose, therefore, that when consumers consider a low-involvement product, COO image is likely to be an important part of the information on which they base their product decisions. Verlegh et al. (2005, p. 128) conclude that: "country-of-origin has a greater impact on product evaluations

when consumers are less motivated to process available information, for example when involvement is low." On the other hand, some researchers argue that country-of-origin image is stronger in high involvement contexts (Ahmed and d'Astous, 1999; Ahmed et al., 2002a,b, 2004). However, recent research (Josiassen et al., 2008) has confirmed that for the general consumer, country-of-origin image has a stronger effect on product evaluations when the consumer is less involved. Young consumers have a tendency towards higher product involvement than older consumers do (Strizhakova et al., 2008) and this study suggests that a differential effect of product involvement can be confirmed among young Australian consumers. In addition to country of origin (Woo, 2019), other variables can also influence purchasing decisions on imported products, namely familiarity and world mindedness. Familiarity reflects the ability of consumers to recognize certain brands and relate them to the categories of products based on their experience, both directly and indirectly (Jime'nez and Martin 2010). Meanwhile, world mindedness (Riefler and Diamantopoulos, 2009) is a behavior in which a person's perception will be influenced by a liking or image of various globally-oriented values. Purchasing imported products by consumers is often due to a better perspective or representation of foreign-made products.

Consumer perceptions of the country of origin, familiarity, and world mindedness towards purchasing decisions still occur inconsistently. Differences in the results of existing research, resulting in research gaps so that researchers enter trust as a mediating variable to fill the research gaps. This is based on the existing conditions that consumers in the purchase decision process will consider various product alternatives to form a trust (Chiu et al., 2012; McCole et al., 2010; Benedictus et al., 2010; Jime'nez and Martin, 2010; Chang and Chen, 2008; Elliott and

Yannopoulou, 2007) on their purchasing choices.

Meanwhile, the variable perceived risk (Chang and Chen, 2008; Kim et al., 2008) as a variable that also mediates the influence between the country of origin, familiarity, and world mindedness on purchasing decisions. As a result of the purchase risk will have a detrimental effect on consumers, for example, physical, financial, functional, and social and psychosocial losses (Assael, 1995; Umar, 1999; Johansson, 2000; Peter and Olson, 2010; Solomon, 2011). Therefore, this study seeks to examine the relationship of perceived risk with trust because both have a mutually influential relationship (Chang and Chen, 2008). Thus, the results of the analysis of this study will be able to give an idea whether in purchasing decisions for imported veterinary medicines, farmers are more influenced by trust in their products or because they choose safety from the continuity of their business so that they consider the risk element of purchasing products. Based on the description of the relationship between these variables, this study aims to examine the mediating role of trust and perceived risk between the country of origin, familiarity, and world mindedness towards business to business consumer buying behavior.

Based on the understanding that has been found, this research was conducted to determine the relationship of the country of origin, familiarity, world mindedness to purchasing decisions through trust and risk felt by farmers in Kediri, Blitar, and Malang districts.

2. Literature Review

2.1. The relationship between country of origin is mediated by Trust towards the decision to purchase imported drug products, and the country of origin relationship is mediated by the perceived risk of the decision to purchase imported drug products

Purchases on specified products such as luxury products or products that have special specifications are often influenced by consumers' image of the product itself, which is usually associated with the country of manufacture of the product (Jaffe and Nebenzahl, 2001), this is better known as the country of origin. The COO effect (Godey et al., 2011; Chang and Chen, 2008; Abedniya and Majid, 2011; Josiassen, 2010; Jime'nez and Martin, 2010) also influences how consumers judge the level of quality and brand to be selected (Schiffman and Kanuk, 2007). Another alternative to the impact of these conditions, consumers more often decide on purchases based on trust that is built through the personal relationship of consumers with marketers of a product, so it has a relationship with the COO effect on product quality (Laforet and Chen, 2012; Jime'nez and Martin, 2010; Lee et al., 2009; Ahmed and d'Astous, 2008; Elliott and Yannopoulou, 2007). Research Liu et al. (2012) that although the perceived risk is insignificant does not mean consumers do not consider risk. However, consumers believe more in the values and benefits obtained from purchasing products, and it is logical if the country of origin does not significantly influence the perceived risk and purchasing decisions of imported animal medicines (Hong and Yi, 2012; Kim et al., 2008; Chang and Chen, 2008).

H1: Relationship of the country of origin in Trust mediation towards Purchase Decision of imported drug products

H2: The relationship of the country of origin is mediated by the perceived risk of purchasing decisions of imported drug products.

2.2. The relationship between familiarity is mediated by trust towards the decision to purchase imported drug products, and the relationship between familiarity is mediated by perceived risk to the decision to purchase imported drug products

Familiarity (Chiu et al., 2012; Laforet and Chen, 2012; Benedicktus et al., 2010; Jime'nez and Martin, 2010; Kim et al.,

2008) shows the ability of consumers to recognize products based on knowledge and experience those who later become habitual in the purchase and use of the product. The results of this study support the results of a study conducted by Chiu et al. (2012), and Benedicktus et al. (2010) that familiarity on online products has a positive effect on trust and purchasing decisions (Chang and Chen, 2008). In addition, this study reinforces the findings of Herrera and Blanco (2011) that the familiarity of food products in consumers in Spain is positively related to consumer confidence. While the findings of Jime'nez and Martin (2010) state that the more positive the COO and consumer familiarity can have an impact on higher consumer confidence. The familiarity of farmers with imported animal medicines empirically there is not enough evidence that familiarity influences perceived risk and purchasing decisions (Dursun et al., 2011; Kim et al., 2008). This shows the risk that farmers are worried about buying imported veterinary medicines is less likely to occur if farmers are confident and prove the quality of their products.

H3: Relationship between familiarity is mediated by trust and the decision to purchase imported drug products.

H4: Relationship between familiarity is mediated by the perceived risk of purchasing decisions on imported drug products.

2.3. The trust mediates the relationship between world mindedness on the decision to purchase imported drug products, and the relationship between world mindedness is mediated by perceived risk and the decision to purchase imported drug products

Worldmindedness is a perspective or value orientation for someone. Individually the characteristics of world mindedness indicate an interest in seeing/valuing more than the spirit that exists in a consensus that is built worldwide (Samiee, 1994; Han, 1988; Shimp and Sharma, 1987). The results of previous research revealed that world mindedness has a positive relationship with the decision to purchase foreign-made products (Lee et al., 2009; Riefler and Diamantopoulou, 2009). Respondents' assessments relate to world mindedness, which is reflected based on the perception that interest in imported drug products can lead to reduced consumer consideration of perceived risk in purchasing decisions (Hong and Yi, 2012; Kim et al., 2008; Chang and Chen, 2008). This means that farmers choose animal medicines that are in great demand by the majority of farmers. They assume that animal medicines that are widely recommended by livestock groups minimize the possibility of unwanted risks.

H5: The relationship between world mindedness is mediated by trust towards the decision to purchase imported medicinal products.

H6: The relationship between world mindedness is mediated by perceived risk and the decision to purchase imported drug products.

2.4. The relationship between consumer confidence and perceived risk is reciprocal

Buttle (2004) states that trust is more focused on others who trust each other. Based on an empirical study of trust is the full confidence of one party to another party that is trusted to form a set of transaction beliefs primarily related to the benevolence, competence, and integrity of the other party (Chiu et al., 2012; Benedicktus et al., 2010). The occurrence of a purchase transaction agreement is also based on the existence of consumer confidence in the product to be purchased. Several research results can prove that the higher the consumer's trust in the attributes of the product to be purchased will influence the purchasing decision (Chiu et al., 2012; McCole et al., 2010; Benedicktus et al., 2010; Jime'nez and Martin, 2010; Chang, and Chen, 2008; Elliott and Yannopoulou, 2007).

Perceived risk is an unexpected consequence of a product that consumers want to avoid when consumers buy and use a product. In general, consumers consider the risk of purchasing

during a complex buying decision process with a high level of involvement. The results of the study (Chang and Chen 2008; Kim et al. 2008), empirically perceived risk has a relationship with trust and purchasing decisions. Furthermore, vice versa, perceived risk has a relationship in influencing trust in purchasing decisions, so the results of research by Chang and Chen (2008) are the basis for the consideration of this seventh hypothesis.

3. Methodology

The study uses multistage stratified, non-probabilistic sampling, and convenience sampling methods. Data collection techniques were carried out using questionnaires given to respondents. The research sample was distributed as many as 300 questionnaires by breeders in Blitar, Kediri, and Malang Regencies. This research focuses more on the prediction of the relationship between variables in the structural model so that the analytical tool used is the Generalized Structured Component

Analysis (GSCA) analysis. The GSCA model is evaluated in three stages (Ghozali, 2010), namely (1) evaluation of the outer model, by looking at convergent validity, discriminant validity, composite reliability, and average variance extracted. (2) evaluation based on the structural model (inner model) by looking at the path coefficient from exogenous to endogenous variables and seeing the significance value. (3) the overall goodness of fit model, which looks at the overall feasibility of the model using the FIT, AFIT, GFI, and SRMR tests (Solimun, 2012).

4. Results and Discussion

4.1. Pathway Coefficient Testing and Research Hypothesis

The results of direct influence testing and the coefficient of influence of variables between the country of origin (C), familiarity (F), worldmindedness (W), trust (T), perceived risk (P), and purchased decision (PD) details are presented in Table 1.

Path coefficient Direct Effect					Hypothesis and Coefficient Testing of Mediation Influence Pathways							
Direct influence	β	C.R	p-value	Test result		Effect of Mediation Variables			β	Mediation	Result	
Country of origin → Trust	0.284	2.69*	0.01	Significant	H ₁	C	→	T → PD	0.217	Complete	Significant	
Country of origin → Perceived risk	0.309	1.46	0.15	Not significant	H ₂	C	→	P → PD	0.057	Non-mediation	Not significant	
Country of origin → Purchased decision	-0.175	0.88	0.38	Not significant	H ₃	F	→	T → PD	0.202	Complete	Significant	
Familiarity → Trust	0.265	4.05*	0.00	Significant	H ₄	F	→	P → PD	-0.024	Non-mediation	Not significant	
Familiarity → Perceived risk	-0.119	0.89	0.38	Not significant	H ₅	W	→	T → PD	0.153	Complete	Significant	
Familiarity → Purchased decision	0.000	0.00	1.00	Not significant	H ₆	W	→	P → PD	-0.059	Non-mediation	Not significant	
Worldmindedness → Trust	0.201	2.43*	0.02	Significant	H ₇	Reciprocal influence			β	p-value	Result	
Worldmindedness → Perceived risk	-0.296	2.03*	0.05	Significant								
Worldmindedness → Purchased decision	0.129	1.04	0.30	Not significant		H _{7a}	T	→	P	0.886	0.000	Significant
Trust → Perceived risk	0.886	4.05*	0.00	Significant		H _{7b}	P	→	T	0.314	0.000	Significant
Trust → Purchased decision	0.763	3.12*	0.00	Significant	Noted: C = Country of origin; F = Familiarity; W = Worldmindedness; T =Trust; P = Perceived risk and PD = Purchased decision							
Perceived risk → Trust	0.314	3.73*	0.00	Significant								
Perceived risk → Purchased decision	0.200	1.07	0.29	Not significant								

4.5. H4: Relationship between familiarity is mediated by perceived risk to Purchase Decision of imported drug products

The results showed that the relationship of familiarity in mediating perceived risk did not significantly influence the purchase decision (Purchase Decision) of imported drug products. The findings state (Dursun et al., 2011; Kim et al., 2008), this shows the risk of being worried by farmers in buying imported animal medicines is less likely to occur if farmers are confident and prove the quality of their products. The prediction of why the familiarity in this study is more directed to the closeness of the breeders with their salesperson because veterinary medicine products are very specific products, and the form of marketing used is business-to-business. These conditions require producers to apply different marketing strategies in accordance with existing product specifications so that the recruited salespeople must also have expertise in the field, for example, veterinarians or animal husbandry graduates. The ability of salespeople to provide information and also education through the products they bring will have an impact on the belief (Lee et al., 2009) of farmers to make purchasing decisions.

4.6. H5: The relationship between world mindedness is mediated by trust in the purchase decision of imported drug products

The results showed that the relationship world mindedness in the mediation of trust significantly influences the purchase decision (Purchase Decision) imported drug products. World-mindedness is formed from a phenomenon that occurs due to globalization and the high adoption of sophisticated information technology and communication technology (Riefler and Diamantopoulus, 2009). The results of testing the data show that world mindedness has a positive and significant effect on trust and purchasing decisions (Lee et al., 2009). Nevertheless, directly the high world mindedness of farmers could not increase the decision to purchase imported animal medicines (Sunardi, 2009). Trust is proven as a mediating variable that is influenced by world mindedness in the decision to purchase imported animal medicines.

4.7. H6: The relationship between world mindedness is mediated by perceived risk and the purchasing decision (Purchase Decision) of imported drug products

The results showed that the relationship world mindedness in the mediation of perceived risk did not significantly influence the purchase decision (Purchase Decision) of imported drug products. The research findings show that world mindedness either directly or through the mediating role of perceived risk influences purchasing decisions. Respondents' assessments relate to world mindedness, which is reflected based on the perception that interest in imported drug products can lead to reduced consumer consideration of perceived risk in purchasing decisions (Hong and Yi, 2012; Kim et al., 2008; Chang and Chen, 2008). This means that farmers choose animal medicines that are in great demand by the majority of farmers. They assume that animal medicines that are widely recommended by livestock groups minimize the possibility of unwanted risks. An important perceived risk for breeders is a psychosocial risk, which is a feeling of insecurity when farmers use products that are not recommended by livestock groups.

4.8. H7: The relationship between consumer trust (trust) and the estimated risk (perceived risk) is reciprocal

4.8.1. H7a: trust influences the perceived risk in making decisions about the purchase of imported drugs

The results showed that the relationship of trust had a significant effect on purchasing decisions (Purchase Decision)

of imported drug products. The test results prove that trust and perceived risk influence each other significantly so that the relationship between the two variables is reciprocal. Although influencing each other, the influence of trust on perceived risk has a more significant coefficient than the effect of perceived risk on trust (Chang and Chen (2008). The results of Chang and Chen's (2008) research illustrate that trust directly has a positive and significant impact on purchasing decisions when trust is mediated by risk, the trust will have a negative and significant impact on purchasing decisions Chang and Chen can also prove that trust and risk have a significant non-recursive relationship.

4.8.2. H7b: perceived risk influences trust in the decision to purchase imported drugs

The results showed that the relationship of perceived risk significantly influences purchasing decisions (Purchase Decision) imported drug products. The relationship of trust and perceived risk, which is proven reciprocal, strengthens the results of research conducted by Chang and Chen (2008) to be an interesting finding. Baeur introduced the first perceived risk in 1960 in the American Marketing Association (Chen, Hui, and Wang, 2011). The more accurate information that is a reflection of trust, the more clear knowledge about the advantages and risks involved in the purchase and use of veterinary medicinal products. (Jannis and Mann 1977) stated that one would carefully consider relating to decision making to anticipate dissatisfaction. Accurate information from various sources can prevent the emergence of regret and dissatisfaction due to purchasing decisions. The anticipation of regret in purchasing is positively related to purchase involvement (Chen, Hui, and Wang, 2011).

5. Implications and Conclusions

The government must enforce Act Number 18 of 2009 concerning Animal Husbandry and Health and Act Number 41 of 2014 concerning Amendment of Act Number 18 of 2009. This will foster the growth of local animal drug companies so that it will reduce dependence on products import. These findings provide an illustration for the government, various associations, and marketers of veterinary medicines to focus more attention on indicators of veterinary drug purchases because of farmers' belief in the quality of veterinary medicines. The government can conduct experiments raising chicken farms using local animal medicine products, a concrete example of this success can change farmers' perceptions that still tend to be "imported minded".

The Indonesian Veterinary Medicine Company Organization (ASOHI) is expected to be able to provide knowledge to farmers to have more confidence in using local veterinary medicines. ASOHI, as an association that houses animal medicines, can continue to monitor the improvement and stability of the quality of local animal medicines so that farmers can switch to using local animal medicines.

For businesses and veterinary drug producers, attractive quality and packaging/design are seen as important in reflecting COO, while familiarity is more dominantly reflected by product knowledge. It is hoped that veterinary drug producers should focus more attention on these indicators, but still improve and improve indicators that are perceived poorly according to farmers such as after-sales service of imported veterinary medicines is better than local drugs, purchase of imported veterinary medicines because of procedures Easier payment transactions and countries of origin for imported veterinary drug products are only one reason for buying drugs.

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Quality of Medical Services of Primary Health Care Centers at Airports – Using Binary and SWOT Analysis

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Abstract

The study is an attempt to identify the status of the medical services provided by the primary health care centers at airports by travelers making the majority of them vulnerable to disease infection and epidemics. The study follows the descriptive analysis approach of the data collected from interviews and medical records of illness travelers in addition to records of the nursing staff at the primary health care center of local airport. Coding has been implemented using the logical analysis of the binary system. The analysis follows the SWOT approach. Study revealed that only four employees are supposed to provide medical care to approximately 20000 passengers a week without having the minimum primary health safety standards including the newly established center. The study proves the low-quality medical services and the high medical risks. Moreover, it suggested some recommendations.

Keywords: quality; medical services; primary health care centers; airports; binary system; SWOT.

1. Introduction

Primary health care centers (PHCC) are one of the most important steps for patients' medical treatment being critical in diagnosing the patients' health and identifying the critical cases. Several medical procedures are implemented at PHCC before referring patients to the relevant clinic like monitoring blood pressure, heart rate, temperature, concentration, equilibrium, nausea, critical and urgent cases, in addition to several laboratory tests such as blood chemistry, radiography and other relevant procedures that vary from normal to urgent. Because they are equipped with a critical infrastructure, equipment, expertise, and skills, every PHCC has its own distinctive features that could resemble other centers in terms of patients and the community. In other cases, some PHCC's have unique distinctive features in terms of its geographical location, type of patients, and the way they communicate with other various medical institutions in the local and regional environment. The primary health care center at Arar Airport is characterized by providing its capabilities for treating patients, evacuating wounded and injured people, and handling critical cases under normal and adverse weather conditions. Therefore, this study seeks to identify the status of PHCC in Arar Airport in an attempt to identify strengths, weaknesses, opportunities for improvement and threats. The study's recommendations focus on identifying the best practices that could improve the center by providing high-quality health services.

2. Materials

The World Health Organization (WHO) has defined the concept of primary health care as a link between the doctor and the community being associated with the medical issues of a society and its various sectors (Organization, 2010). Several medical entities have attempted to benefit PHCC in the medical

sector where PHCC has been defined as part of the medical service managed from within the community itself and has been considered as the primary point of contact for the individual. Throughout the country, there are several terms used to refer to PHCC most prominently of which are: medical center, a family medicine center, a family health center, and general practitioner surgical center while the official term is the primary health care center. This term indicates that this is often a site that hosts not only doctors but also other medical specialties such as nurses and psychologists. The PHCC is the place where most health-care consultations and referrals are initiated. Moreover, it is the place where treatment starts. Even when patients are transferred to specialists elsewhere for medical care (often a hospital), the general practitioner is normally kept well updated about the development of the medical care and is regularly sent a report about the patient even when the patient is discharged (Limited., 2018). PHCC is the first point for health care for most people and is mainly staffed by general practitioners, taking into account that pharmacists, ophthalmologists, and dentists are also primary health care providers (Bristol, 2018). The Saudi Central Board for Accreditation of Healthcare Institutions (CBAHI) has set 23 interdependent standards for determining the extent to which health care centers achieve quality and health care accreditation (CBAHI, 2018). Langford and Higgs (2006) stressed the importance of implementing measuring tools that fundamentally support the role of providing health care and reducing healthcare inequalities among patients, which require considering that each particular area has certain distinctive features in the bidirectional data collection process by patients and managers. It is a common alternative method that contributes to estimating medical needs and the ability to meet them using Spatial Interpolation Technique. In their study, they have shown the implications of adopting different spatial representations of the population on the modeling results to achieve healthcare services. Moreover, the study findings indicated that the implemented dissymmetric model produces

lesser access levels than the standard form. More importantly, the difference is spatially disproportionate, suggesting that healthcare services in the rural areas are less than in the urban areas. Nilsen et al. (2006) attempted to identify the extent to which interventions for alcohol abuse prevention have succeeded in the PHCC environment. To this end, the study followed the method of analyzing the theoretical findings of Medline, Cinahl, PsychLIT, and Cochrane based on the primary health care statistics collected from 11 studies on 921 general practitioners, 266 nurses, 88 medical students, and 44 non-physicians from Europe, the United States of America, and Australia. Based on the key results metrics in using materials, categorization and the rate of short intervention intervals, researchers have found that intervention is generally more effective (using materials, screening, and short intervention rates) comparing with the intensity of intervention, i.e. the amount of training and/or the support provided. However, overall effectiveness has been little, but the studies conducted were variant, not scientifically accurate enough, and have applied very short follow-up intervals to provide accurate outcomes. This calls for further identification of the PHCC characteristics and the type of service provided to determine how to properly measure their performance. In his study, Lazenbatt and Freeman (2006) attempted to report on the self-reporting ability and behavior of primary health care professionals in Northern Ireland to identify the physical abuse of children patients. The study's secondary objective was to assess the educational and training needs of such professionals in the primary health care centers. The study revealed that professional concerns, anxiety, and lack of knowledge act as barriers to reporting and self-reporting, and that there is a need to provide more education and training support to primary health care professionals. According to Davies et al. (2018), the number of elderly people who are increasingly suffering from the quality of hospital services is increasing because of the clinical therapists' tendencies to apply a more holistic approach in treating the patients, which has caused frailties in the primary health care environment. By reviewing the literature on whether the frailties assessment of primary health care centers may reduce the utilization of unscheduled secondary care, researchers followed an approach that consists of extracting the relevant data after the iterative examination of titles, abstracts and full texts to identify studies on developing the primary health care or community healthcare which assess the impact of frailties on the utilization of unscheduled secondary care during the period between January 2005-June 2016. The review was conducted on 11 studies 9 of which were observational, and one was based on clear medical evidence and one was a predictive study. Eight out of nine reviewed studies reported a positive correlation between the utilization of frail and secondary healthcare. The review concluded that elderly patients are likely to be hospitalized in a primary health care status to benefit from the observation-based health diagnostic treatment but no firm findings can be drawn on the appropriate tools for identifying and managing treatment of frail elderly persons who are at risk of being hospitalized. Winters et al. (2018) conducted a study on the challenges faced by illegal migrants particularly accessing healthcare services in many European countries. The study is a systematic review of the academic literature on the utilization of health care services by illegal immigrants in Europe. The study followed various systematic methods for searching the databases of EMBASE, Medline, Global Health and Cinahl Plus to identify studies on quantitative, qualitative and hybrid methods published in 2007-2017. The study revealed several findings most importantly retrieving 908 articles and excluding duplicate subjects. The outcome was 531 academic articles. After examining the titles, abstracts and full texts in accordance with the pre-established inclusion and exclusion criteria, 29 articles were included in the review. In general, quantitative studies have shown a shortage in the various health care services rendered to illegal immigrants. Qualitative Studies

indicated that even if healthcare service is provided, it is often inadequate because the majority of migrants have legal problems that compel them not to disclose their medical history and health problems. The study concluded that although it was difficult to generalize the results of the studies because of several methodological differences, it provides a further evidence that illegal immigrants in Europe face particular problems in accessing healthcare services. The scientific study of Cesur et al. (2017) investigated the impact of free public primary health care provided to the public on the population based on analyzing the age-related mortality rates with an emphasis on a countrywide Family Medicine Program implemented in Turkey. Launched in 2005, the FMP is based on assigning a family medicine doctor for each Turkish citizen to provide a wide range of free primary healthcare services. Furthermore, these services are provided by family health centers, located at a walking distance within the neighborhoods to be close to patients. To determine the negative impact of FMP, the variation in the date of its distribution across governorates has been calculated. Our estimates indicate that FMP could decrease the mortality rate to 25.6% among infants, 7.7% among the elderly, and 22.9% among children within 1-4 age bracket. These estimates can be interpreted into 2.6, 1.29, and 0.13 mortality cases among infants, the elderly and children aged 1-4, respectively. Moreover, the effect seems to increase over time. We also show evidence that indicates that the FMP has contributed to achieving an equal mortality rate in all provinces. Finally, our calculations indicate that each family medicine doctor saves about 0.15, 0.46, and 0.005 lives among infants, the elderly and children aged 1-4 per year for each province. According to Bitton et al. (2017), primary health care (PHCC) by the beginnings of the Twentieth Century has been recognized as an essential component of effective health systems, however, despite remarkable medical progress, there is still a significant gap between the needs of individuals and communities, and the quality and effectiveness of health care provided to patients. Due to this development, an international consortium has established the Primary Health Care Performance Initiative (PHCPI) to boost the improvements in the level of primary health care provided, and the desired outcomes in the low and middle-income countries through sharing the best-applied models of assessing the performance and applying the best health practices. Accordingly, PHCPI developed a framework to define the relationship between the level of main income, manpower and service input provided to patients and their relationship to basic health care functions in terms of healthcare service provided starting from the initial contact between the patient and the physician, the comprehensiveness, coordination, and continuity of the treatment mechanisms, and to what degree the customer is considered as the focus of the medical treatment. Despite it is in the initial phase of implementation, the consortium's PHCPI regulatory framework has provided more effective evaluation guidelines by identifying strengths and remedial action for the gaps in the primary health care delivery through a core set of 25 key indicators (vital indicators). The further step is combining the best practices that promote the development of high-quality primary health care systems and to ensure identifying opportunities for improvement and sharing them with low-income and high-income countries. The framework has also provided benchmarking and improvement approaches for countries and their implementers as well as tools to assess the status of the health care delivery system and to determine where knowledge and learning can be transferred across countries by accelerating improvements in the quality of health care and effectiveness of the initial phase. The framework has implemented (SWOT); however, it has established a clear, normal mechanism for the provision of health services. Qatari and Haran (1999) has attempted to identify the primary health care components that cause the greatest anxiety to service users and the social, demographic, and other factors associated with the satisfaction of the customers of the primary health care

centers. To collect data from a random sample of heads of families, the study conducted interviews with well-trained accountants. The interviews questions measured to what extent patients and their families are satisfied with the preparations, equipment, and services of the primary health care centers located in the city of Qatif in the eastern region of Saudi Arabia using Likert Pentagram. The sample consisted of 802 families representing a randomly selected 838 families from the housing lists of primary health care centers in the Governorate of Qatif. 40 samples were rejected because they were not filled in, and 9 of which were declined by respondents. The remaining questionnaires from the interviewed heads of families were 789. The study measured variables such as the infrastructure of the area, confidentiality measures, and the environmental structure being the issues that concern to primary health care customers. The factors that indicated the greatest correlation with the high level of satisfaction were the quality of the building of the primary health care centers i.e. whether it is specifically built as health care centers of just a leased public property, the writing and reading skill levels of the head of the heads of families to identify the level of literacy, and the extent to which the health care centers are visited. Surprisingly, age did not indicate any correlation when other characteristics of the participants were modified. Gender was less significant compared to other studies. The study concluded that although the regular use of the primary health care centers usually indicates the highest accuracy in measuring the degree of satisfaction of the various variables of the study, socio-demographic factors have played additional roles in measuring the degree of satisfaction taking into consideration that each variable has a critical role in measuring one or more elements of satisfaction and all of them. Al-Ahmadi and Roland (2005) tried to highlight the role of primary health care centers in Saudi Arabia, as their quality is unknown to the public although they have a critical role in the Saudi health strategy. The study provided an overview of the quality of the primary health care sector in Saudi Arabia, and identified factors impeding quality with an aim to determine how to improve the quality of Saudi primary healthcare services. following a systematic theoretical review of the previous studies and research, data were extracted from studies, articles and published research about the quality of healthcare services in Saudi primary health care centers and about barriers to a high-quality healthcare. More than 120 studies were reviewed 31 of which have met the comprehensive criteria of survey and review. The studies reviewed were diversified in terms of their approaches and focus. The quality components were reviewed in terms of accessing clinical, personal care, and their effectiveness. The study reported the quality and effectiveness of service delivered to patients such as vaccination, maternal healthcare, epidemic disease control, how to report poor application, treatment and effectiveness of chronic disease management programs, patterns description, and health care education, and patterns of referral, and some aspects of personal care, including those factors associated with language barriers. The study then determined a number of factors explaining whether a high-quality health care had already been provided or not. These factors included administrative and management factors, the implementation of evidence-based practices, professional development, the use of referrals to additional healthcare, and organizational culture. The review and analysis revealed that there was a fundamental difference in the quality of Saudi primary healthcare services. In order to improve quality, there is a need to improve the management and organization of primary healthcare services, as well as the professional development strategies to improve staff knowledge and skills. A study was conducted by Almalki et al. (2012) to investigate the role of the nursing system in providing primary healthcare services. The study revealed that the Quality of Work Life (QWL) affects the commitment of health professionals, including nurses. However, the documented information on QWL and the professional rotation of primary health care nurses

are limited. The study is an attempt to examine the relationship between the QWL and interest of nurses in career turnover or to leave work in the primary health care sector of Saudi Arabia. The study data collection tools were a survey model of Brooks about the quality of the nursing work life, the turnover of expected improvement, and the demographic database. The survey was distributed among the study sample, which included 508 nurses from the primary health care team in the Jazan region of Saudi Arabia. the percentage of questionnaires that have achieved the required rate was ($RR = 87\%$).The descriptive statistical analysis was conducted on the study sample using T-test, ANOVA, the single variable -based general linear model (GLM), the multiple standard regression, and the structural hierarchy regression using Windows SPSS v17. The results indicated that the respondents were dissatisfied with their working life and approximately 40% of whom have the intention to go for employment turnover of their current primary health care centers. Employment turnover was significantly associated with QWL based on the multiple standard regression. 26% of the variation in the turnover due to QWL was interpreted based on an alpha variable with less than 0.05 and $P < 0.001$, with $R^2 = .263$. The additional analysis using the Hierarchical Multiple Regression indicated that the total variation explained by the model as a whole (demographics and QWL) was 32.1%, and $p < 0.001$. This has explained the estimated 19% of the additional QWL variation in the nurses' intention to go to employment turnover area, after controlling the demographic variables. The study concluded that the quality of the working environment, which contributes to preserving a healthy working life for nurses working in primary health care centers, is critical in ensuring their job satisfaction which in turn will ensure the quality of healthcare services provided to patients and will reduce nurses' turnover and the improve productivity and the nursing care performance. A research conducted by Walston et al. (2008) revealed that many countries are now struggling to provide high-quality and high-cost primary healthcare services to their citizens. Saudi Arabia has suffered from high costs of medical treatment as well as concerns about the quality of its public health care centers in which billions of dollars were spent in addressing issues such as restructuring the health care system, privatizing public hospitals, introducing health insurance coverage for both expat and local workers in addition to influential changes to identify the challenges associated with a radically changing health care system in the country. This has made the health care system of the Kingdom of Saudi Arabia a unique case in the Middle East in its shift towards more reliance on the private sector to assist the Saudi government in rapidly overcoming the costly and the low-quality healthcare services in addition to smoothing the bureaucracy of the administrative processes of healthcare services by discussing the health care system and the various challenges associated with the future changes. Jannadi et al. (2008) introduced an overview of the Saudi Arabia health care system, its organizational structure, and services to define some of the future challenges in terms of economic and human requirements to meet the growing needs of the population due to the spread of communicable diseases. The study indicated that over the past few decades, the Saudi health care system has undergone a rapid expansion and modernization while providing healthcare services through the three entities: the Ministry of Health, the public health care centers, and the private health care centers. The Ministry of Health is the largest healthcare service in the kingdom in which there a large number of healthcare facilities distributed throughout the country. The Saudi health care system is trying to provide high-quality services, but it faces a range of complex, medium to long-term challenges. The findings concluded that these challenges include ensuring a sustainable funding system to cover the cost of medical expenditures and labor force planning and supply issues, including high-quality training for adequate numbers of local health care professionals and qualified national human resources to minimize the excessive

reliance on expat labor. Reorganizing the healthcare services to effectively respond to the demographic patterns and the various diseases, and the continuity of adequate healthcare services annually for more than 2 million pilgrims from around the world during the Hajj season.

3. Study Methodology

The study followed the analytical descriptive approach by identifying and analyzing the characteristics of the primary health care centers, in accordance with the following criteria:

1. Reviewing previous studies.
2. Summarizing the results and matching them with the status of Airport PHCC.
3. Collecting data from the study sample through the study data collection tool.
4. Analyzing data and comparing them with the results of previous studies.

3.1. Study Community

The study community consists of two parts:

1. Directors of health centers in the Northern Border Region.
2. The managers of the sectors that includes such primary medical centers.

3. Patients of the primary health care centers

3.2. Study Sample

The study sample consists of:

1. Directorate of the Arar Airport PHCC.
2. Directorate of Arar Airport in the northern border Region.

3.3. Study Instrument

The study tools are as follows:

1. A questionnaire for the personal interviews with the concerned staff of the Arar Airport PHCC.
2. Statistics of patients, flights and the organizational structure.

4. Findings

4.1. First

After distributing the data of the interviews in the form of wrong or correct and coding them with (Yes/No), the study produced table 1 which showing the distribution of responses in the two interviews of the Director of the Arar Airport PHCC and the Airport's Director in the Northern border Region regarding the current status of the Arar PHCC. Responses were distributed as follows:

Question	The response of Airport's Director	The response of the Airport's PHCC Director
Is the current building of Airport PHCC adequate	Inadequate	Inadequate
Availability of Medical, nursing, and pharmaceutical staff	Unavailable	Unavailable
Availability of equipment and devices for critical and medium medical cases	Unavailable	Unavailable
Availability of treatment rooms (diagnosis clinic and testing clinic (admission)	Unavailable	Unavailable
Availability of a pharmacy, emergency room, delivery room, cardiac resuscitation room and burns treatment room	Unavailable	Unavailable
Clarity of legislation	Unclear	Unclear
Clarity of the organizational structure	Unclear	Unclear
Availability of a joint emergency management room for managing cases like adverse weather conditions	Unavailable	Unavailable
Availability of medical treatment and evacuation	Unavailable	Unavailable
Coordination between the airport and the PHCC regarding the needs of the center	Unavailable	Unavailable
Availability of a future improvement plan that takes into consideration the population growth and increased airport flights	Unavailable	Unavailable
A joint emergency training plan with the concerned authorities	Unavailable	Unavailable
Availability of medical supplies in inventory management	Unavailable	Unavailable
Availability of professional development programs for the existing staff	Unavailable	Available
Work hours at the center cover airport requirements	Doesn't cover	Doesn't cover
The system and the working environment of the center are motivating	Not motivating	Not motivating

Table 1. Interview answers of the directorate of airport and PHCC

The responses were coded within the logical relationship that assumes the existence of the category for each functional purpose while affirming that the absence of the category is an indication that it is unable to achieve the intended functional purpose. An example of this, the code (N) indicates (Unavailable) which means that there is a shortage, which requires the provision of the said item. On the other hand, the code (Y) indicates that the item is (Available) which indicate that item has achieved the intended functional objective. This is shown in the same table 2 as follows:

Question	Directorate of Airport	Airport PHCC
Is the current building of Airport PHCC adequate	N	N
Availability of Medical, nursing, and pharmaceutical staff	N	N
Availability of equipment and devices for critical and medium medical cases	N	N

Availability of treatment rooms (diagnosis clinic and testing clinic (admission)	N	N
Availability of a pharmacy, emergency room, delivery room, cardiac resuscitation room and burns treatment room	N	N
Clarity of legislation	N	N
Clarity of the organizational structure that takes into consideration the population growth and increased airport flights	N	N
Availability of a joint emergency management room for managing cases like adverse weather conditions	N	N
Availability of medical treatment and evacuation	N	N
Coordination between the airport and the PHCC regarding the needs of the center	N	N
Availability of a future improvement plan that takes into consideration the population growth and increased airport flights	N	N

A joint emergency training plan with the concerned authorities	N	N
Availability of medical supplies in inventory management	N	N
Availability of professional development programs for the existing staff	N	N
Work hours at the center cover airport requirements	N	N
The system and the working environment of the center are motivating	N	N

Table 2. Coding Interview answers of the directorate of airport and PHCC

The affirmative (Yes) response was replaced by (1) and the negative response was replaced by (0) which indicates the unavailability as shown in table 3 below:

Question	Directorate of Airport	Airport PHCC
Is the current building of Airport PHCC adequate?	0	0
Availability of Medical, nursing, and pharmaceutical staff	0	0
Availability of equipment and devices for critical and medium medical cases	0	0
Availability of treatment rooms (diagnosis clinic and testing clinic (admission))	0	0
Availability of a pharmacy, emergency room, delivery room, cardiac resuscitation room, and burns treatment room	0	0
Clarity of legislation	0	0
Clarity of the organizational structure	0	0
Availability of a joint emergency management room for managing cases like adverse weather conditions	0	0
Availability of medical treatment and evacuation	0	0
Coordination between the airport and the PHCC regarding the needs of the center	0	0
Availability of a future improvement plan that takes into consideration the population growth and increased airport flights	0	0
A joint emergency training plan with the concerned authorities	0	0
Availability of medical supplies in inventory management	0	0
Availability of professional development programs for the existing staff	0	0
Work hours at the center cover airport requirements	0	0
The system and the working environment of the center are motivating	0	0

Table 3. Binary Coding of Interview answers of the directorate of airport and PHCC

The same questionnaire was given to inquire about the new building of the Airport PHCC, which is expected to be commissioned in an unidentified date in the future. The responses were as follows in Table 4.

Question	Directorate of Airport	Airport PHCC
Is the current building of Airport PHCC adequate?	Adequate	Inadequate
Availability of Medical, nursing, and pharmaceutical staff	Available	Available
Availability of equipment and devices for critical and medium medical cases	Available	Available
Availability of treatment rooms (diagnosis clinic and testing clinic (admission))	Available	Available
Availability of a pharmacy, emergency room, delivery room, cardiac resuscitation room, and burns treatment room	Available	Unavailable

Clarity of legislation	Unclear	Unclear
Clarity of the organizational structure	Unclear	Unclear
Availability of a joint emergency management room for managing cases like adverse weather conditions	Unavailable	Unavailable
Availability of medical treatment and evacuation	Available	Available
Coordination between the airport and the PHCC regarding the needs of the center	Available	Available
Availability of a future improvement plan that takes into consideration the population growth and increased airport flights	Unavailable	Unavailable
A joint emergency training plan with the concerned authorities	Unavailable	Unavailable
Availability of medical supplies in inventory management	Available	Available
Availability of professional development programs for the existing staff	Available	Available
Work hours at the center cover airport requirements	Available	Available
The system and the working environment of the center are motivating	Available	Available

Table 4. Interview answers of the directorate of airport of Current PHCC

The responses were coded within the logical relationship that assumes the existence of the category for each functional purpose while affirming that the absence of the category is an indication that it is unable to achieve the intended functional purpose. An example of this, the code (N) indicates (Unavailable) which means that there is a shortage, which requires the provision of the said item. On the other hand, the code (Y) indicates that the item is (Available) which indicate that item has achieved the intended functional objective. See table 5.

Question	Directorate of Airport	Airport PHCC
Is the current building of Airport PHCC adequate?	Yes	No
Availability of Medical, nursing, and pharmaceutical staff	Yes	Yes
Availability of equipment and devices for critical and medium medical cases	Yes	Yes
Availability of treatment rooms (diagnosis clinic and testing clinic (admission))	Yes	Yes
Availability of a pharmacy, emergency room, delivery room, cardiac resuscitation room, and burns treatment room	Yes	No
Clarity of legislation	No	No
Clarity of the organizational structure	No	No
Availability of a joint emergency management room for managing cases like adverse weather conditions	No	No
Availability of medical treatment and evacuation	Yes	Yes
Coordination between the airport and the PHCC regarding the needs of the center	Yes	Yes
Availability of a future improvement plan that takes into consideration the population growth and increased airport flights	No	No
A joint emergency training plan with the concerned authorities	No	No
Availability of medical supplies in inventory management	Yes	Yes
Availability of professional development programs for the existing staff	Yes	Yes
Work hours at the center cover airport requirements	Yes	Yes
The system and the working environment of the center are motivating	Yes	Yes

Table 5. Coding Interview answers of the directorate of airport of Current PHCC

The affirmative (Yes) response was replaced by (1) and the negative response was replaced by (0) as shown in table 6.

Question	Directorate of Airport	Airport PHCC
Is the current building of Airport PHCC adequate?	1	0
Availability of Medical, nursing, and pharmaceutical staff	1	1
Availability of equipment and devices for critical and medium medical cases	1	1
Availability of treatment rooms (diagnosis clinic and testing clinic (admission))	1	1
Availability of a pharmacy, emergency room, delivery room, cardiac resuscitation room, and burns treatment room	1	0
Clarity of legislation	0	0
Clarity of the organizational structure	0	0
Availability of a joint emergency management room for managing cases like adverse weather conditions	0	0
Availability of medical treatment and evacuation	1	1
Coordination between the airport and the PHCC regarding the needs of the center	1	1
Availability of a future improvement plan that takes into consideration the population growth and increased airport flights	0	0
A joint emergency training plan with the concerned authorities	0	0
Availability of medical supplies in inventory management	1	1
Availability of professional development programs for the existing staff	1	1
Work hours at the center cover airport requirements	1	1
The system and the working environment of the center are motivating	1	1

Table 6. Binary Coding Interview answers of the directorate of airport of Current PHCC

When comparing the responses by applying the logical equation of the binary system as follows:

{R is True and only True If and Only If R= X1 AND X2: TRUE}

This means only if $X1 = 1$ and $X2 = 1$ Then the Formula $R = 1$ (True). Therefore, the responses of the study sample about the status of Airport PHCC indicate that the center is inadequate and unqualified to perform to carry out the tasks assigned to it according to the responses of the Airport's Director in the region and the Director Airport PHCC. Therefore, the outcome of the equation is: R is (0 = False). Upon comparing the responses in the second table of interviews with the study sample on the readiness of the new building of Airport PHCC, the study indicates that there are some items that have achieved the equation and are considered as available in the new building, while a number of items indicate the unavailability of the technical, theoretical, cognitive, physical and legislative dimensions of the center as shown in the following table 7.

Question	Response as per the Logical Matrix
Is the current building of Airport PHCC adequate?	0
Availability of medical, nursing, and pharmaceutical staff	1
Availability of equipment and devices for critical and medium medical cases	1
Availability of treatment rooms (diagnosis clinic and testing clinic (admission))	1
Availability of a pharmacy, emergency room, delivery room, cardiac resuscitation room, and burns treatment room	0

Clarity of legislation	0
Clarity of the organizational structure	0
Availability of a joint emergency management room for managing cases like adverse weather conditions	0
Availability of medical treatment and evacuation	1
Coordination between the airport and the PHCC regarding the needs of the center	1
Availability of a future improvement plan that takes into consideration the population growth and increased airport flights	0
A joint emergency training plan with the concerned authorities	0
Availability of medical supplies in inventory management	1
Availability of professional development programs for the existing staff	1
Work hours at the center cover airport requirements	1
The system and the working environment of the center are motivating	1

Table 7. Logical Matrix of interviews binary coding system of PHCC

Therefore, the items that are agreed upon by both the airport management and the health management are as shown in the following table 8.

Questions	Directorate of Airport	Airport PHCC
Is the current building of Airport PHCC adequate?	1	0
Availability of a pharmacy, emergency room, delivery room, cardiac resuscitation room, and burns treatment room	1	0

Table 8. Disagreement results between airport directorate and directorate of PHCC

This indicates that the response of Airport's Director is based on knowledge about the organizational structure of Airport in which airport managers spontaneously confirm that all their airport facilities are in full readiness. This response is contradictory to the Airport PHCC in which he stated that the center is not adequate based on his specialized experience in the work. In this context, specialty prevails over the general knowledge.

The inadequacy of items confirmed by both directors is as mentioned in interviews answerers. See table 9.

Question	Directorate of Airport	Airport PHCC
Clarity of legislation	0	0
Clarity of the organizational structure	0	0
Availability of a joint emergency management room for managing cases like adverse weather conditions	0	0

Table 9. Results between airport directorate and directorate of PHCC (Agreed about)

The correlation between the responses of both officials can be attributed to the legislation and organizational structure which is issued by the highest authorities and decision makers. This is an indication that both directors normally receive missions and tasks without reviewing or modifying the organizational structure and the action plan to be able to perform such mission and tasks. Moreover, there were no details in their responses that ensure the existence of an organizational structure. Both agreed on the following items that confirm the readiness of the center as in interviews results aforementioned early. See table 10.

This is something that you can easily answer in the affirmative. The new building of the primary health care center that is equipped with all international aviation service facilities is

Question	Directorate of Airport	Airport PHCC
Availability of medical, nursing, and pharmaceutical staff	1	1
Availability of equipment and devices for critical and medium medical cases	1	1
Availability of treatment rooms (diagnosis clinic and testing clinic (admission))	1	1
Availability of medical treatment and evacuation	1	1
Coordination between the airport and the PHCC regarding the needs of the center	1	1
Availability of medical supplies in inventory management	1	1
Availability of professional development programs for the existing staff	1	1
Work hours at the center cover airport requirements	1	1
The system and the working environment of the center are motivating	1	1

Table 10. Agreed results between airport directorate and directorate of PHCC

expected to have all medical, technical, laboratory and pharmaceutical and supervisory staff in addition to clinics, treatment rooms and the critical care testing devices and medical supplies and coordinated work hours within a motivating work environment. Therefore, their responses were not contradictory to each other. However, it is acceptable that the items rejected by both directors based on testing the Binary and Logical System can be considered as a clear shortage in the current health care center of Airport as well as many studies in this field according to Macinko et al. (2003), Patel (2017) .

4.2. Second

Flight statistics indicate that the available number of medical staff for serving flights passengers does not meet the actual requirement in which each flight needs the following requirements: The table shadows the required medical staff for Airport PHCC as per as the organizational structure of the Ministry of Health, see table 11.

Occupation	Number
Consultant	2
Specialist physician	1
Resident Physician	4
Technical nurse	7
Public Health Specialist	1
Epidemiology Specialist	1
Laboratory Technician	1
Medical Records Technician	1
Radiologist	1
Pharmacy technician	1
Driver	1
Total	21

Table 11. The required medical staff for Airport PHCC

The following table 12, shows the currently available staff.

Occupation	Number
Resident Physician	1
Technical Nurse	1
Public Health Specialist	1
Driver	1
Total	4

Table 12. Actual Number of staff at Airport PHCC

Therefore, the shortage in staffing the current center is as follows: in table 13.

Occupation	Number
Consultant	2
Resident Physician	3
Specialist physician	1
Technical nurse	6
Epidemiology specialist	1
Laboratory Technician	1
Medical Records Technician	1
Radiologist	1
Pharmacy	1
Total	17

Table 13. Shortage of staff at Airport PHCC

Based on the above, a simple calculation shows that only 4 out of 21 staff members are available at the health care center without verifying their healthcare specialties in general. This means that there is a shortage of 17 employees as per the calculation is done using the following equation:

{Medical staff= actually available ÷ the designated medical staff}

Therefore we found out that **Medical staff = 4 ÷ 17 = approximately (0.24%)**. This means that the center is understaffed by (76%). this indicates that requirement percentage must be divided by (0.24%) to get the shortage.

4.3. Third

Patient biostatistics as shown in table 14. It indicates more than a thousand medical cases annually:

Annual number of patients	1200
Monthly number of patients	100

Table 14. Number of medical cases Annual/monthly

Table 15 indicates that there is a variety of medical treatment, primary health care and health services provided to patients due to the variation in the medical cases as shown in the following:

Distribution of Medical Cases		Cases per month/12 correction for nearest 1 integer/month	Rounding up/down of percentage to one full number / monthly
Abortion	2	0.166667	0
Upper respiratory tract Infection	296	24.66667	25
Gastrointestinal inflammation	284	23.66667	25
Eye infection	73	6.083333	6
Joints and back pain	29	2.416667	2
Fatigue	37	3.083333	3
Dropped pressure	98	8.166667	8
Blood sugar disorder	254	21.16667	21
Sudden increase in temperature/infants	127	10.58333	11
Total cases after decimal rounding up/down		90 monthly cases	

Table 15. Medical cases per-monthly based on health case diagnosis

The medical cases that were confirmed by the medical records of the center were distributed into 12 months the percentages of medical cases were rounding up/down to get the number of medical cases treated in each month, which is 90 cases per month. This figure is close to the numbers reported by the records at a rate of 100 monthly cases. Which gives credibility to the figure received from the center. When comparing

Variable	Case Description Critical/ Medium/ Normal	Measuring the variable to provide the required medical procedure	Rate (100%)	Variation = need 100%
Medical service				
Medical service Abortion	Critical	Required	100	76
		Available	24	
Upper respiratory tract Infection	Critical	Required	100	76
		Available	24	
Gastrointestinal inflammation	Medium	Required	50	26
		Available	24	
Infection Eye	Medium	Required	50	26
		Available	24	
Joints and Back Pain	Normal	Required	25	1
		Available	24	
Fatigue	Medium	Required	50	26
		Available	24	
Drop pressure	Critical	Required	100	76
		Available	24	
Blood sugar disorder	Critical	Required	100	76
		Available	24	
Sudden increase in temperature /infants	Critical	Required	100	76
		Available	24	
Medical staff		Required	100	76
		Available	24	
Medical equipment and supplies		Required	100	100
		Available	0	0

Table 16. Breakdown of medical cases as per the medical classification and availability of staff and equipment

the number of patients with the number of treatment rooms and medical staff, we can infer that the relationship between these variables is as follows:

{Patient-> Required medical Service-> medical staff required-> devices and equipment}

The table 15 will be used to classify the normal relative distribution of the type of medical cases compared to the medical staff needed. The equation indicates that there is a difference as shown in table 16.

Results showed that in percent approximation:

Form1: Number of Patient > Than Required medical Service > than Medical staff required > than devices and equipment,

Then:

Form2: (100%patients > 100% Medical Services > 100% Staff > 100% Medical Devices >)

The health center has only insufficient treatment rooms and a medical staff of up to 4 employees including a resident physician, a technical nurse, and a public health management specialist as well as a driver. The team is in charge of managing all the functions of the center with an operation percentage of (0.24%) without designating the specialties of each. This percentage will be taken into consideration to determine the differences between the available and desired ratios where the researcher considered that the describing each case indicates each variable in which (100% means a critical case, 50% means medium, and 25% regular case). It is important to note that in this context that the state of the regular medical services can be provided by the current staff with a difference of only 1% while the medium cases need staffing by 26%. On the other hand, critical cases need staffing of 76%. The researcher assumed that the unavailability of equipment compared to the few available treatment rooms and supplying them with medical equipment indicate that the availability of equipment will be also (0%) because there is no space for such equipment and there is no medical staff to operate them as well as the additional roles played by the center in support of the heal care sector . based on the analysis there is a gap between the number of patients and the required medical staff which is associated with a severe shortage of medical devices and equipment.

4.4. Fourth

Table 17 show numbers of flights statistics:

Total number of passengers to Riyadh City during 2017	220527
Total number of passengers to Jeddah City during 2017	57137
Total number of passengers to Hael City during 2017	6333
Total number of passengers a week	52
Total number of passengers a month	208

Table 17. Flights Schedule

The monthly flight schedule shows that 90 cases per month arrive at PHCC. Therefore, the ratio of cases to the number of monthly flights is as follows:

Number of cases = the actual monthly number ÷ monthly number of flights

A number of cases = $90 \div 208 = 0.43\%$ which means that almost every two flights there is one of the medical cases shown in the above – mentioned table 16. By analyzing the number of weekly flights, there are approximately 52 flights, i.e. 7 flights per day. The ratio in every two flights will be $(7.4 \text{ trips} \div 2 \text{ cases per two flights}) = 3.71$ daily cases. This means that there are approximately 111 expected cases per month. When the ratio (approximately 100 cases per month as per the center's medical records) is compared to the analysis of the medical cases (90 cases per month) and the expected monthly cases in each monthly flights (111 cases per month), the difference between the actual monthly ratio and the expected monthly ratio (90 to 111) is close to a ratio of $= 90 \div 111 = (81\%)$. This is a high ratio that confirms the credibility of the figures again, indicating that there is a real need for a qualified medical staff to cover the medical cases from (90 to 110) monthly cases i.e. (1080-1332) per year.

Total number of passengers a week	6864
Total number of passengers a month	27456
Total number of passengers a year	329472

Table 18. Capacity Staff Assigned of Airport

The maximum capacity shows the validity of weekly flight records in which the number of passengers per week is (9894)

comparing to the number of flights (52) which means that there are 132 passengers on each flight with an average of 260 passengers on two flights. If we take out two passengers from each flight, the number of weekly medical cases ($52 \div 2$) will be (26) flights that have medical cases. In comparing the number of weekly flights to the patient's schedule, we will find that 26 flights mean we will have 26 patients per week in each flight, and in multiplying by (4 weeks) a month will statistically indicate that there are approximately 104 monthly medical cases i.e. approx-

ximately 100 cases per month. This correlates with the result of the relatively normal distribution of patients and flights (90-to-111) cases a month.

4.5. Fifth

The organizational structure that is expected to provide a qualified medical staff is virtual and is available at the Directorate of Health Affairs as shown in the following figure 1.

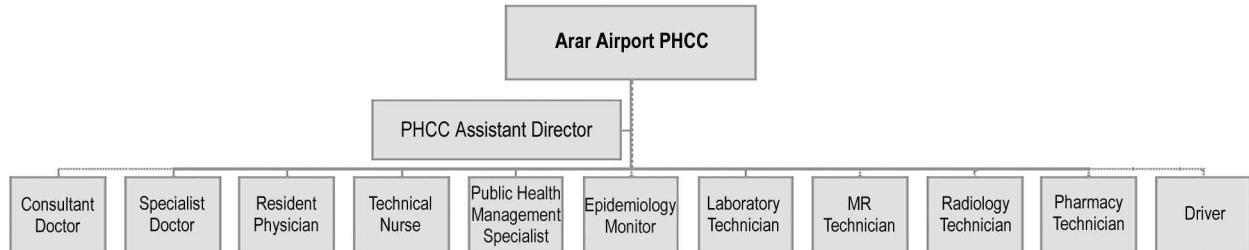


Figure 1. Organizational hierarchy staff of current PHCC at Arar airport based on Directorate of Health Affairs

The designated staff distribution allocated by the Ministry of Health has been aligned with the organizational structure to exclude the vacant non-operating units. The new organizational structure has become as shown in figure2.

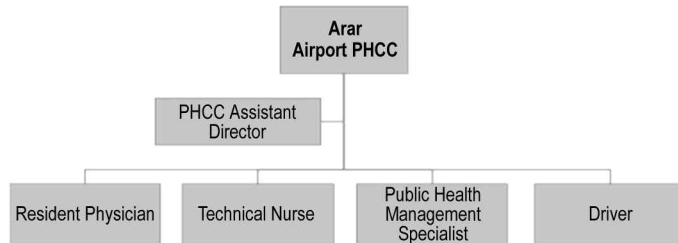


Figure 2. Actual structure based on current staff of PHCC at Arar airport based on Directorate of Health Affairs

5. Discussion

Based on the above – mentioned argument, it is clear that there is a multifaceted imbalance in the work of the Airport PHCC, which can be summarized according to the approved SWOT analysis. This supports an increase in the risk factor in the performance of the Airport PHCC and a real serious decline in the quality of the health services provided as well as a violation of the safety regulations of the air services. Sen et al. (2016), Voicilaş (2017) used to illustrate such risks and to develop suggestions and opportunities for improvement, the results have been analyzed following SWOT model based on the following table 19.

A (SWOT) model shown in the study includes the variables and the available and missing factors as in the figure 3.

Strengths	Weaknesses	Opportunity	Threats
The strengths depend on the availability of the following capabilities in Airport PHCC: • Availability of Medical, nursing, and pharmaceutical staff. • Availability of equipment and devices for critical and medium medical cases. • Availability of treatment rooms (diagnosis clinic and testing clinic (admission). • Availability of a pharmacy, emergency room, delivery room, cardiac resuscitation room, and burns treatment room. • Clarity of legislation. • Clarity of the organizational structure. • Availability of a joint emergency management room for managing cases like adverse weather conditions. • Availability of medical treatment and evacuation. • Coordination between the airport and the PHCC regarding the needs of the center. • Availability of a future improvement plan that takes into consideration the population growth and increased airport flights. • A joint emergency training plan with the concerned authorities. • Availability of medical supplies in inventory management. • Availability of professional development programs for the existing staff. • Work hours at the center cover airport requirements. • The system and the working environment of the center are motivating.	The weaknesses depend on the existence of the following issues in Airport PHCC: • Unclear legislation. • Unclear organizational structure. • Unavailability of a joint emergency management for emergency cases such as adverse weather conditions. • The new building of the Airport PHCC is inadequate. • Unavailability of a pharmacy, emergency room, delivery room, cardiac resuscitation room, burns room.	Opportunities for improvement and development are as follows: • Providing an interpretation guide for the bylaws and legislation enforce at Airport PHCC. • Clear presentation of the organizational structure for the staff. • The provision of supplies and needs of the Airport PHCC from the point of view of specialists such as a pharmacy, emergency room, delivery room, cardiac resuscitation room, and burns treatment room. • Coordinating with the Northern Border University Hospital being close to Airport and for being equipped with all specialized clinics, medical treatment, and latest medical equipment upon commissioning.	There are evident threats if Airport PHCC is left at it is for longer periods. These threats are as follows: • Arar Airport is close to the Haj routes and the Haj season of 1439 Hijri is just an example. This means that a number of passengers through Aljadeedah Checkpoint are willing to travel to Mecca from Airport after reaching the Northern Border Region by land. This requires experts in epidemiology, technical nurses, and specialist doctors. This could be a heavy burden on the capacity of the current center and could constitute a risk to the life of passengers and guests of the kingdom in the event that the appropriate health personnel, medical devices, and vehicles are not properly available. • The new center and its specifications could be to the contrary to expectations or below the required standards. This could confuse the operations of the airport in the event of an emergency. • During the summer season a number intestinal infections, sunstrokes, and allergies are prevalent which sometimes require rapid intervention and emergency staff are available to cover the actual requirement for such cases.

Table 19. SWOT results based on analysis

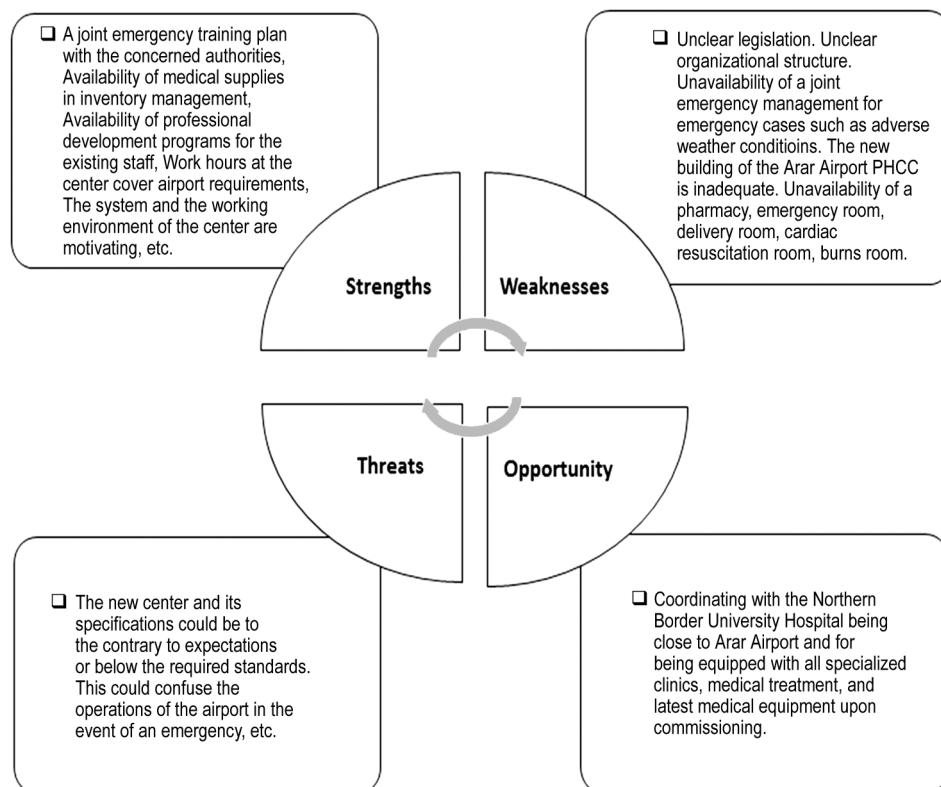


Figure 3. SWOT results based on analysis

6. Recommendations

The study recommends the following points:

1. Modifying and developing the proposed organizational structure and providing staff for the vacant positions.
2. Providing medical staff.
3. Providing the medical equipment and devices mentioned in this study.
4. Providing training and development of personnel and medical staff.
5. Providing an updated database on patients and medical statistical records.
6. Implementing technology in service delivery and patient records.
7. Coordinating with the relevant airport security authorities, the Red Crescent, and the civil defense to provide training on medical evacuation and treatment.

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