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Application of Six Sigma Methodology to Improve Customer Complaint Management

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Abstract: In today's competitive business environment, customer satisfaction is one of the most critical factors for sustaining a long-term success in an organization. Customers are mostly satisfied when the organizations meet all their needs and expectations. This means, organizations need to listen the voice of the customers and manage the customers' complaints in an appropriate way. In this paper, a case study about customer complaint management was carried out in a company from the plastics industry by applying six-sigma project management methodology. The aim of this project was to overcome the increase in the customer complaints by analyzing their root causes with six-sigma project management tools. The DMAIC methodology was used during the project which has been completed in nine months. In the end, customer complaints decreased %20 and the results show that six-sigma is a successful and encouraging tool for the improvement of customer complaint management process of any organization.

Keywords: Six-sigma, customer complaints, customer satisfaction

Introduction

Developing a customer centric business is one of the most important strategies for sustaining an organization. In order to do so, companies are trying to find the best methodologies to manage the customer relations. One of the best methodologies that companies are focusing on is six-sigma. According to Kansal and Singhal (2017), six-sigma offers an alternative problem-solving roadmap that can be implemented to any business function. Six-sigma is a disciplined approach, which is data driven and analytical.

Before six-sigma applications, quality management tools and techniques were more preferable especially for the production departments. El Haik and Roy (2005) explains that quality management system collects the business processes focused on achieving quality policy and aims to meet customers' needs. Different quality management techniques and tools like ISO 9001:2008; Total Quality Management (TQM), six-sigma and lean have been applied to improve internal and external customer satisfaction. Antony (2008) states that six-sigma is an important tool in order to identify the root causes of the problems and produce efficient solutions.

Since the early days of six-sigma applications, there has been a common perception that six-sigma is useful only for pure manufacturing processes and six-sigma does not very well adaptable to the other departments like sales and marketing. Although six-sigma has been very popular in production department for years, sales and marketing professionals have only recently started to use it (Pestorius, 2007). On the contrary, Desai and Shrivasta (2008) think that six-sigma is a tool that is used to do strategical planning and boost profit, increase market share and help to develop customer satisfaction by the help of statistical tools and also, service providers prefer to apply six-sigma in marketing, finance, information systems and human resources in order to improve the effectiveness and the efficiency of the system.

In this study, six-sigma management tools and techniques were applied to a company's customer complaint management system. In the company, there was a sharp increase in the customer complaints, product returns and

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some of the customers started to stop ordering and leave the company. This situation caused a stressful environment for all the employees and managers. Therefore; the top management focused on a new six-sigma project in order to find sustainable solutions to those problems. A project team was constituted, and project goals were defined.

The main goals of this research are to introduce a six-sigma case study applied to decrease the number of customer complaints, the total amount of product returns and the number of lost customers. Also, this study shows that six-sigma is a management tool that can be easily adapted to departments related to customer relations. Additionally, in this work, some recommendations for further studies are shared.

Literature Review

Six-sigma is a business management methodology that was first introduced by Motorola Inc. in the USA in 1987 (Nonthaleerak and Hendry, 2006). At that time, Motorola had an aggressive goal of 3.4 ppm defects and developed six-sigma in order to reach that aim (Barney, 2002b; Folaron, 2003). In 1994 Larry Bossidy, CEO of AlliedSignal, expressed six-sigma as a methodology that improves work processes, creates high-level results, develops employees' skills and effects the culture of the organization positively and worked on six-sigma (ASQ, 2002, p. 14). Afterwards, General Electric started to implement six-sigma to the processes of the company in 1995 (Slater, 1999).

Six-sigma has many definitions in literature in different perspectives. From the quality management points of view, six-sigma is a high-performance, data-oriented problem analyzing and solving approach that focuses on the root causes of business problems (Blakeslee, 1999, p. 78). Hahn et al. (2000) described six-sigma as an approach that improves product and process quality by the help of statistics discipline. Harry and Schroeder (2000), describes six-sigma as a "business process that allows companies to drastically improve their bottom line by designing and monitoring everyday business activities in ways that minimize waste and resources while increasing customer satisfaction. Additionally, Linderman et al. (2003) reiterated the need for a common definition of six-sigma and suggested: 'Six Sigma is an organized and systematic method for strategic process improvement and new product and service development that relies on statistical methods and the scientific method to make dramatic reductions in customer defined defect rates.'

Basically, six-sigma describes how a process is performing in a statistical way (Kansal and Singhal, 2017). The purpose of the six-sigma is to eliminate and to minimize the defects in any process. Mostly used six-sigma metrics are dpo (defects per opportunity), dpu (defects per unit), z-value or the sigma value, throughput yield, rolled throughput yield, etc. (Erturk et al., 2016). According to six-sigma level perspective, in a process, no more than 3.4 defects per million opportunities (DPMO) is acceptable (Linderman et al., 2003)

There are two main six-sigma methodologies: DFSS and DMAIC. These acronyms have special meanings. DFSS means Design for Six Sigma and that is used to design or develop;

a new product or service and/or
a new process for an existing product.

DMAIC emphasizes the parts of the implementation process: Define, Measure, Analyze, Improve and Control. DMAIC methodology is designed for the improvement of an ongoing process or existing product/service performance that is not satisfactory.

DMAIC and DFSS are based on statistical tools with an assumption of 1.5 sigma shift in the process mean when calculating the process capability of six-sigma (Nonthaleerak and Hendry, 2006). In this case study, DMAIC approach were used to conduct the six-sigma project. In each phase of the DMAIC, useful quality tools and techniques are applied (George, 2002; Pepper, 2010). Table 1 (Türkan, etc., 2009) shows the stages of Six Sigma (DMAIC) and some of the tools and techniques used in detail (Turkan, etc., 2009). These tools and techniques let the project team analyze the process performance and measure the system. The transition from one phase to another is completed if all the goals of the phase have been reached (Liebermann, 2011).

DMAIC methodology's success can be clarified by its structured logic that creates networks between phases, it is important to touch each step of the methodology otherwise, there might be risky situations for finding the best solutions for the problems. Some steps can be skipped only if the solution is clear and there is minimum risk. In order to have this decision, those questions should be answered;

What data exist to show that the proposed development is the best solution possible?
How can we make it sure that the solution will really solve the problem?
What are the disadvantages of the proposed development?

Table 1. Six sigma phases (DMAIC) and tools & techniques

Six-sigma phase	DMAIC phase steps	The tools and methods
Define	Ensuring that the problem and goal are defined in terms that truly relate to key customer requirements	Project Charter Process Flowchart SIPOC Diagram Stakeholder Analysis CTQ Definitions
Measure	Tested the output and input potential. Once it has determined the right measurement system for adequacy of available inputs and outputs.	Process Flowchart Data Collection Plan/Example Benchmarking Measurement's System Analysis/Gage R&R Process Sigma Calculations
Analyze	Define Performance Objectives Identify Value/Non-Value Added Process Steps Identify Sources of Variation Determine Root Cause(s) Determine Vital Few x's, Y=f(x) Relationship	Histogram Pareto Chart Regression Analysis Process Map Review and Analysis Statistical Analysis Hypothesis Testing Non-Normal Data Analysis
Improve	Perform Design of Experiments Develop Potential Solutions Define Operating Tolerances of Potential System Assess Failure Modes of Potential Solutions Validate Potential Improvement by Pilot Studies Correct/Re-Evaluate Potential Solution	Brainstorming Mistake Proofing Design of Experiments Pugh Matrix Failure Modes and Effects Analysis
Control	After optimized the output for the sake of continuity, and in selected cases of important input just to check if continued, will help to reduce the variability of the output.	Process Sigma Calculation Control Charts Cost savings Calculations Control Plan

If there is no data to answer these questions, although the solutions are obvious, it is necessary to follow a complete DMAIC project with all stages (George, 2005).

Six-sigma is generally related to recover of the defects and costs of in the industry, but it doesn't mean six-sigma is only related to manufacturing problems. Six-sigma is a methodology that is adaptable not only production but also services such as sales, marketing, supply chain, finance etc. After the implementation of six-sigma, costs might decrease, process performances might increase, customer satisfaction might increase, customer complaints might decrease (Antony, 2006; Kumar, etc., 2007; Noone, etc. 2010)

The Performance Management Group LLC (2006), reported that JP Morgan Chase (Global Investment Banking) applied six-sigma methodology and reduce failures in customer related processes. After the project customer satisfaction, process efficiency increased significantly. In addition to this, Celerant Consulting (2011), shared British Telecom Wholesale's case in their report. After six-sigma implementation, customer satisfaction and process effectiveness increased significantly. The company reached million $ 77 savings and 50% decrease in customer complaints thanks to six-sigma process improvement methodology. Additionally, Kansal and Singhal (2017), explained in their paper a six-sigma study that aimed to develop customer satisfaction in an ISO 9001:2008 certificated government R&D organization. The organization had problems about customer complaints. For these problems, six-sigma tools and techniques have been applied. After that, customer satisfaction increased to more than 85%.

Although there are some limitations, Reisenberger and Sousa (2010) explains that six-sigma applications in services affect the performances positively, especially low performance processes like customer complaint management, which will be explained in a case study in the following section, can benefit from six-sigma solutions.

Case Study

In this study, a company from plastics industry was chosen in order to see the effects of the implementation of six-sigma. The company produces three main plastics raw materials for the other companies in plastics industry. The customers of the company are mostly located in Europe and have a sensitive quality and service understanding. In this company, customer complaints between the years 2016-2018 were evaluated. After the six-sigma project use, the service quality and efficiency of the customer complaint management were improved. In this six-sigma project, DMAIC approach was applied that will be explained below.

Define

The company selected six-sigma project methodology in order to overcome customer complaints' increase. Before that the company had a Customer Complaint Management department, however in years, this department had cancelled, and technical team supported the management of customer complaints. Unfortunately, technical team was very busy with the production issues, they could not fully focus on the complaints and their solutions. This situation and change caused an increase in the number of customer complaints day by day. In today's competitive environment, this increase sounded very dangerous for the economy and prestige of the company from the top management's point of view. That's why, the top management planned to make started a new six-sigma project. Team consisted of 5 professionals from sales, production, logistics and marketing departments. Two of them have black belt six-sigma certification and minimum 2 years six-sigma project experience. Most of the members of the team attended the project implementation actively. Project team organized project status meetings regularly in every two weeks.

Customer complaints data between the years 2016 and 2018 had been used and analyzed as project data. Data of the customer complaints were taken from a special database of this company. This data included customer name, product group and name, date of the complaint and other details about complaint. There are three main product groups of the company. This project aimed to improve polymer products' customers' complaints; therefore, project scope was defined as it was in the Table 2, which explains the Project Charter that shows the details of the project in the beginning. Project lasted for 9 months and after this time interval project leader continued to control project indicators monthly in order prevent recurring increases of customer complaints.

Table 2. Project charter

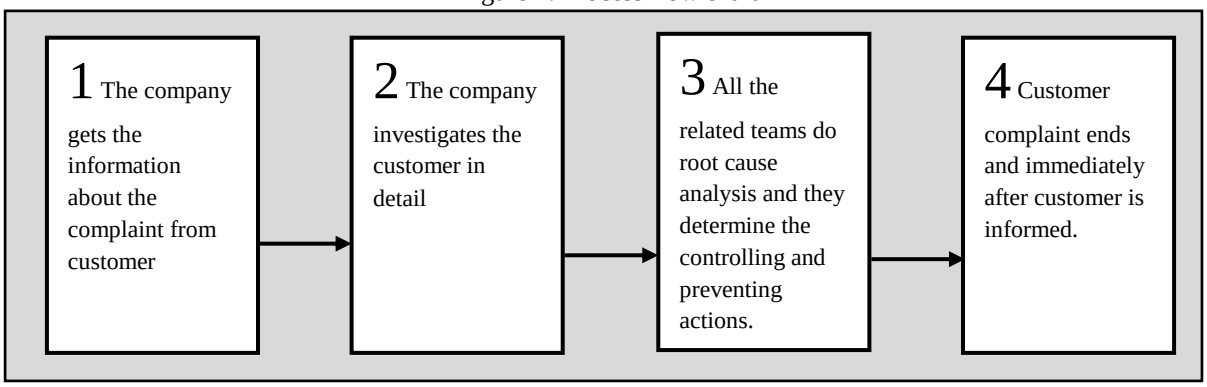
Six-sigma Customer Complaint Management Project		
Team Members		
Leader	: Gulsah Sisman	
Process Owner	: Member 1	
Members	: Member 2, Member 3, Member 4	
Problem Definition: Increase in the number of customer complaints between the years 2016 and 2018.		
Project Scope: The polymer products' customers' complaints		
Project Indicators	Unit	Goal
The Number of Complaints	Item/month	8
The Total Amount of Returns	Ton/month	0
The Number of Lost Customers	Item/month	0

In Table 2, the final goals of the project were stated as project indicators, also named as critical to quality (CTQ). There were three indicators of the project. The first one was the number of the complaints. For this indicator, the company aimed to have %20 decrease that means maximum 8 complaints monthly. Second one was the total amount of returns due to unsatisfactory products or services. The company aimed to have zero returns at the end of the project. Finally, the number of lost costumers was recorded monthly as another project indicator. For this indicator, the aim of the company was to keep all the customers at the end of the project.

In Figure 1, the process flow chart of the customer complaint management can be seen below. There are four main steps in this process. Firstly, the company has the information about the complaint coming from customer.

Then, customer complaint management team tried to understand the details about the complaint. After that, root cause analysis is conducted to specify and control complaints and prevent the system. Whenever the complaint comes to a conclusion, related customer is informed about it.

Figure 1. Process flow chart



Measure

In order to better understand the current state of the customer complaint management, two years data about the project indicators, which are customer complaints, product returns and lost customers were collected from the company's database. Minitab and Excel programs were used to measure and analyze the customer complaints between the years 2016 and 2018. In this section, each indicator was explained and compared through years.

The Number of Complaints

The first step of the project measurement was to see yearly customer complaints. From Figure 2, it is easily seen that the number of customer complaints increased in every year. In other words, the number of customer complaints was 98 in 2016, 114 in 2017, while it was 118 in 2018.

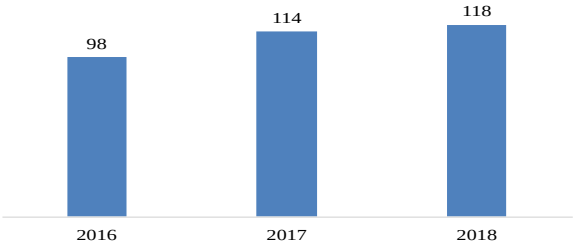


Figure 2. The number of complaints (ıtem/year)

Additionally, in Figure 3, monthly change in customer complaints between the years 2016-2018 can be seen in detail. From Figure 3, it is clear that there were some fluctuations in 2016 and 2017. In 2018, there was still some fluctuations, however it was in an increasing trend during the whole year.

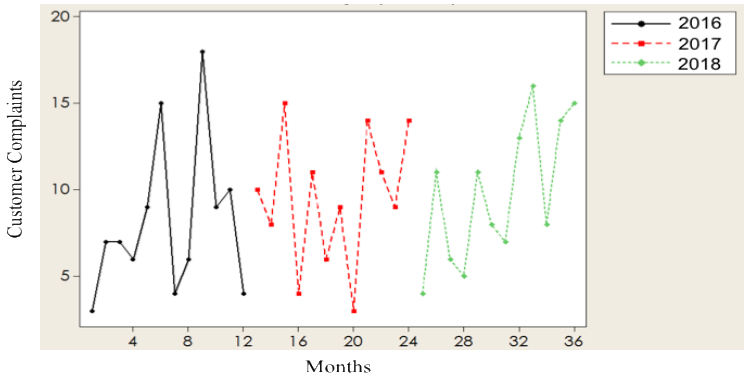


Figure 3. Time series plot of customer complaints

The Total Amount of Returns

Product returns were the most avoided procedure of the company's customer complaint management, since it was decreasing the profit of that sales badly. When a complaint happened and the customer insisted on sending back the product, the company had to face with additional costs such as logistics, stocking, controlling etc. Although the company tried to make the customer satisfied about the products or services, unfortunately, some of the customer complaints caused product returns. In Figure 4, yearly amount of product returns in tones can be seen in detail. In 2016, there were only 300 tones product returns however, in 2017 it increased dramatically to 890. This means in two years the amount of product returns had 296 % increase. Similarly, in 2018, the amount of returned product increased to 1123 tones very sharply.

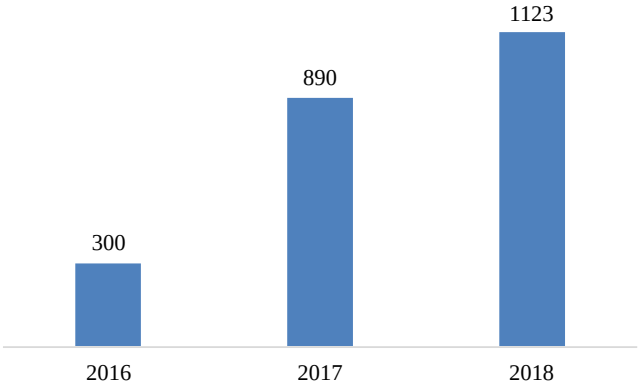


Figure 4. amount of returns (ton/year)

The Number of Lost Customers

In every customer complaint, unfortunately, did not end with a satisfactory solution. Some customers decided to end the customer-supplier relationship with the company due to the unsolvable problems. In other words, customer complaints might be a reason for the loss of customers. Figure 5 shows the yearly number of loss customers and while in 2016 it was just 2, in 2018 it increased to 5. This increase means more than a 100 % increase and affected the company's economy very negatively.

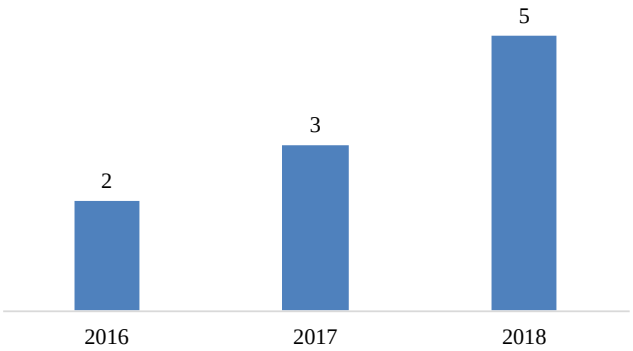


Figure 5. The number of lost customers (ıtem/year)

Analyze

In this part of the project, six-sigma project team tried to understand the root causes of the customer complaints. They came together and organized meetings with the related departments' managers to make everything crystal clear. If the main reasons of the complaints are clear, then it will be easier to manage all of them. Therefore, in this section, customer complaints' root causes were analyzed with some techniques such as fishbone diagram, process flow chart review and grouped according to their main categories. After the meetings, the team determined four main categories namely as quality, packaging, logistics and documentation for the customer complaints. When the previous years' complaints were analyzed in detail according to these categories, quality problems were the most encountered problems. About %65 of the customer complaints occurred owing to the quality problems such as melting point increase, different products' contamination, humidity, viscosity, color and shape. Afterwards, about 18% of the complaints happened because of the packaging issues. Wrong product deliveries, damaged products, or other products' contamination to the packages caused customers complain

about their unsatisfactory orders. In addition to this, some customers were not happy with the logistics process of the company. Logistics problems led to about 16% of the complaints of the company. Under this category, three subcategories, that were transport damage, delivery and loading, were decided by the project team. Transportation is a critical service for a company. Transportation needs to have a good plan and careful treatment from the first point until the last point. Sometimes, products might be damaged during transportation or might be loaded different from the customers' needs. These resulted in customer complaints for this company. Additionally, deliveries to the wrong time, place or people caused similar problems. The final category for the customer complaints was determined as documentation problems. Mostly the company's sharing the wrong documents, or some documents were being loss were the root causes of this type of complaints. Table 3 shows all the categories in detail.

Table 3. Categories of the Complaints Between 2016-2018

Main Category (%)	Subcategory
Quality (62)	Melting point
	Contamination
	Humidity
	Viscosity
	Color
	Shape
Packaging (18)	Wrong product
	Damaged product
	Product contamination
Logistics (16)	Transport damage
	Delivery
	Loading
Documentation (4)	Wrong documents
	Loss documents

Improve

After the define, measure and analyze steps of the six-sigma project, the project team organized a brainstorming session in order to designate a to-do list to improve the defects in the system. In the brainstorming meeting, potential solutions to the main problems were developed and the solutions were implemented accordingly. Established solutions were like in the following;

Assigning a customer complaints coordinator and department responsible in order to restructure the process.
Redrawing the process map.
Quality problems were analyzed in detail and special solutions were found to decrease the problems generating from the production processes.
Supply chain department organized weekly communication meetings with the customers and sales department in order not to miss any details about the shipments, packaging, required documents.
Packaging, documentation and logistics operations' process maps were restructured.
Company's customer complaints management database was reviewed, and special modules were added in order to respond the complaints quicker.

When there was a complaint, customer satisfaction-oriented solutions were applied. For the all the employees, customer satisfaction and communication trainings were arranged in order to raise awareness for this situation. Project improvement actions lasted for about 4 months. In this period, the project team managed each little step devotedly. Customer satisfaction awareness in the company increased very well with all the effort.

Control

The aim of this step was to see the effects of the improvements about customer complaint management in the company. In every month, three main project indicators were observed and reported to the top management. Additionally, some configurations about the procedures were planned and implemented when there was a need. In the following Table 4, indicators' monthly results were shared.

Table 4. Monthly project ındicators

Project Indicators	Unit	Goal	1	2	3	4	5	6
The Number of Complaints	Item/month	8	8	9	7	8	7	8
The Total Amount of Returns	Ton/ month	0	0	0	0	0	0	0
The Number of Lost Customers	Item/ month	0	0	0	0	0	0	0

As it can be seen in Table 4, in six months, all the complaints decreased about %20 when it is compared with 2018 average six-month results. In other words, there was a decrease from 59 to 47. For the second project indicator, there wasn't any product return during this control period. All the complaints could be resulted positively in a satisfactory way. Final project indicator was the number of lost customers. Luckily, there wasn't any customer leaving the company during the control period.

Conclusions

This case study describes the implementation of a six-sigma project for customer complaint management in a company from plastics industry. Six sigma methodology and DMAIC approach were used to improve the defects of the customer complaint management process. There are three goals of this project. The first one is to decrease the number of customer complaints. The second one is to decrease the amount of product return. The last one is to decrease the number of customer loss. Project has lasted for totally 9 months; about 5 months was spent for define, measure and analyze steps and about 4 months was spent for the improvements of the customer complaint management system. In this section, experiences and recommendations about managing a successful six-sigma project are explained together with the conclusions of this case study.

In the beginning, project started with generating a powerful and sophisticated team. Every team member had the responsibility and desire to carry out the project plan. In such a big project, team members' having the same energy and approach to the project is very important in order to finalize it successfully. Team leader should delegate the jobs to the right member who has enough knowledge, experience and capability to finish that job. Therefore, constituting efficient teams is crucial to have a successful six-sigma project in a company. Additionally, communication is one of the keys for the project success. In this case, team members met regularly in every two weeks in order to check the project status and have information about how the project was going on.

Also, in the six-sigma projects, top management's support changes the employees' approach to the project positively. If top management of the company has a special interest into the project, project team would be much more flexible and comfortable about the potential solutions and implementations. In this case study, the top management of the company was very enthusiastic about improving the customer complaint management process, therefore, the employees supported and accepted the change in the system faster.

This six-sigma project was different from the general six-sigma projects since originally six-sigma was developed for manufacturing processes. However, today's world, service organizations need to have different perspectives and management approaches in order to increase profits and performances. Service sectors are implementing six-sigma in marketing, finance, information systems and human resources with the aim of solving problems and find the best solutions. Therefore; six-sigma is a methodology that is used for to manage problems and increase customer satisfaction (Antony, 2008).

Project goals should be meaningful and reachable. In this case, project team focused on a decrease about 20% in the customer complaints. Additionally, project team wanted to have no other product return and customer loss since product return and customer loss are very painful experiences for the company. At the end of the six months, there were about 20% decrease in the customer complaints and there wasn't any product return or customer leave at that period of time.

According to the experiences from this case study, six-sigma is a useful methodology for customer complaint management improvements. In this case, it provided a collaborative and communicative environment in the company. After the project, production, marketing, sales, quality and supply chain departments were much more aware of each other's problems. The customer satisfaction awareness increased in the whole company.

As many of the case studies, there are some limitations in this work. Firstly, this project was implemented for just the plastics products' customers, other product groups' customers were kept out of the scope. Also, this project was conducted in a company from Turkey. If this kind of study would be repeated in another region, the cultural or corporate differences and effects should be kept in mind.

Recommendations

For the future works, in addition to customer complaint management system, customer satisfaction measurement system or customer communication system might be improved by the help of the six-sigma project management approach. Additionally, for a similar case, different six-sigma tools or techniques might be used for the measurement or analysis steps of the project.

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Model Design Supplier Relationship Performance Measurement

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Abstract: One way to maintain a position is how to meet customer satisfaction in a business-to-business context and build buyer-supplier relationships. There are many factors that influence customer satisfaction in the context of business to business and build buyer-supplier relationships. This paper aims to design a more comprehensive supplier relationship performance measurement (SRPM) model with the buyer's perspective and the supplier's perspective. The proposed SRPM model to make it easier for manufacturing companies to measure the performance of the established buyer-supplier relationship. The research method uses interviews and questionnaires to supply chain actors in manufacturing companies and validated by supply chain management experts. The resulting design model for measuring SRPM uses several factors including cost, quality, lead-time, flexibility, trust, power, transparency, communication, commitment, economic sustainable, social sustainable and environmentally sustainable. The proposed model is implemented directly into manufacturing companies using the Analitycal Hirarchy Process (AHP) method. The results obtained look at the total final value of the supplier-buyer relationship and do the mapping with the SRPM matrix model.

Keywords: Supplier, Supplier relationship performance measurement, SRPM, Supplier relationship management, AHP

Introduction

In today's competitive world, companies are constantly trying to make progress and maintain their current position (Beikkhakhian et al., 2015). One of the ways to maintain position is how to meet customer satisfaction in business to business and build supplier - supplier relationships. There are many factors that influence customer satisfaction in a business-to-business context and building supplier-supplier relationships (Rajagopall et al., 2009). According to Oghazi et al (2016) Supplier Relationship Management is a Supply Chain Management concept that can help achieve a competitive advantage.

Supplier Relationship Management is a way for buyers and suppliers to seek competitive advantages in the market, utilizing reciprocal resources as a result of supplier-buyer formation (Amoako-Gyampah et al., 2019). SRM is the management of directed relationships between buyers and suppliers in quality, quantity, and inventory on time. For this purpose, supplier relationship performance measurement (SRPM) is defined as one of the metrics used to measure SRM performance.

It is important to measure the performance of the supplier relationship for relationship development and increase trust. SRPM from a buyer-supplier perspective. Much of the literature on traditional models is based on a buyer perspective, such as evaluation. According to Damlin et al (2012) how to assess buyer-supplier performance by linking indicators and traditional relationships.

This paper aims to design a more comprehensive SRPM model developed by Damlin et al (2012). The SRPM model is based on the perspective of buyers and suppliers with traditional relationship indicators to see supplier relationship performance. In general, the relationship that the buyer-supplier wants to achieve is the closeness

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between the buyer-supplier in competitive global competition. This study produces a SRPM model and an increase in performance from the results of calculations using the AHP method. The results of this study serve as a basis for consideration of supplier companies to improve supplier relationship performance.

Method

This research consists of several stages. Stage 1, a literature review containing a literature review of the research by Damlin, 2012; Johnson, 2015 for the SRPM model. Phase 2, building a new model. This stage provides additional criteria and develops a model with two perspectives, namely a buyer perspective and a supplier perspective with the aim of building a more comprehensive model. Stage 3, Model Validation. This stage is carried out by testing and validating the new model that has been obtained by conducting interviews with several experts. This is done to verify the new model that has been formed. Stage 4. Case study. This stage is an implementation of an existing model to be applied directly in the field. Stage 5. Results and Conclusions. This stage describes the new model and implementation results in the company.

Results and Discussion

The framework used is the Damlin model linking traditional KPIs with KPI relationships to measure supplier-buyer relationships. The Damlin model has several factors that influence the supplier-buyer relationship, the factors in the supplier-buyer relationship can be seen in Figure 1.

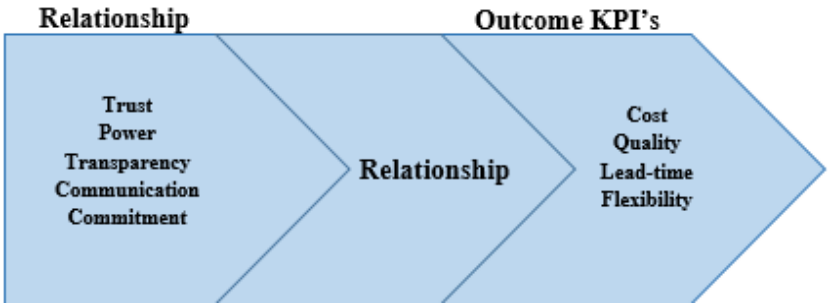

Figure 1. SRPM framework damlin (Damlin, 2012)

Damlin's model connects two categories of traditional KPIs and a relationship that uses only buyer perceptions. This study provides a more compensation model by linking traditional KPIs and relationships using a supplier-buyer approach. There are many criteria or factors that influence this relationship, the relationship criteria used in this SRPM model are criteria that broadly affect a relationship (Damlin, 2012). Supplier Relationship Performance Measurement is a performance measurement in supplier-buyer relationships with several activities including developing a relationship measurement model to identify actual and supplier-buyer perceptions, measure, and monitor and evaluate (Thanh Ha, 2015). The following is a proposed framework for Supplier Relationship Performance Measurement as shown in Figure 2.

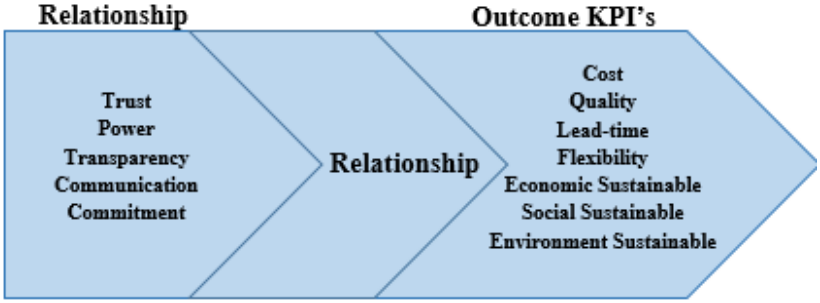

Figure 2. SRPM framework

The proposed SRPM framework is more comprehensive because it uses supplier-buyer perceptions and proposes sustainability criteria. The criteria for sustainability are proposed because the supplier-buyer company has adopted a sustainable management strategy. Sustainability proposed in the SRPM model integrates supplier-buyer sustainability strategy and evaluates sustainable performance to achieve supplier-buyer goals.

Table 1. Model supplier relationship peformance measurement buyer satisfaction

Category	Criteria	Indicator	Scale 1	Scale 2	Scale 3	Scale 4	Scale 5
Traditional (Damlin *et al*., 2012)	Cost (Taherdoost *et al.*, 2019., Cerna *et al*., 2016, Gangurde *et al*., 2015)	Product Price	20% >OE	10% >OE	OE	10% <OE	20% <OE
	Quality (Taherdoost *et al.*, 2019., Cerna *et al*., 2016., Gangurde *et al*., 2015)	Quality Product	30% defective goods	20% defective goods	10% defective goods	5% defective goods	0% defective goods
	Lead-time (Taherdoost *et al.*, 2019., Cerna *et al*., 2016)	Product Delivery	20%-50% late delivery during the contract period	20% late delivery during the contract period	10% late delivery during the contract period	Some items are on schedule, some items are late	As per the agreed schedule during the contract period
	Flexibility (Kurniawan *et al.*, 2017., Cerna *et al*., 2016)	Production Capacity	Not flexible only according to the available capacity	Flexible 10% of the available capacity	Flexible 20% of the available capacity	Flexible 20%-50% of the available capacity	Flexible >50% of the available capacity
Relationship (Damlin *et al*., 2012)	Trust (Graca *et al.*, 2015., Bandara *et al*., 2016., Yoon *et al*., 2019)	Solving Problem	Distrust in overcoming existing problems	Confidence in solving problems is limited to problems according to the interests of the supplier / buyer (calculative)	Confidence to solve the same problem, and nothing more than the existing problem (cognitive)	Trust in overcoming common problems in the form of general problems in the form of common views, expectations, and responsibilities that have been mutually agreed upon (normative)	Trust in overcoming all existing internal and external problems such as financial problems, supply chain problems of suppliers / buyers which are characterized by always keeping promises.

Category	Criteria	Indicator	Scale 1	Scale 2	Scale 3	Scale 4	Scale 5
	Power (Damlin *et al.*, 2012. Bandara *et al.*, 2016)	Reputation Branding	The power of suppliers in branding is that buyers depend on suppliers on standard goods.	The power of suppliers in branding is that buyers depend on suppliers on critical goods.	Balance of supplier-buyer brand reputation so that it is interdependent.	The dependence of suppliers in selling standard goods.	Strong buyer's brand reputation so that suppliers depend on buyers for critical goods.
	Transparancy (Gardner *et al*, 2019, Gyampah *et* al., 2019)	Information and Decisions	There is no transparency in sharing information or providing information to parties who need information	Limited transparency of supplier-buyer external needs (sales targets)	Transparency is limited to the needs of the supplier / buyer (nothing more) and is relevant to the supplier-buyer relationship.	Transparency of internal and external information is limited to buyer supplier relationships such as logistics, buying / selling, and production / operations schedules.	Full transparency in providing information without restrictions such as company objectives, customer information and marketing.
	Communication (Graca *et al.*, 2015., Vos *et al*., 2016., Maestrini *et al*., 2018)	Communication Quality	Cannot be reached except in person.	Difficult to contact, through many terrains and long waiting times.	Easy to contact, very long waiting time.	Contactable only by email, and on time.	Easy to contact by phone, cell phone, fax, email or website, good response, timely and considerate.
	Commitment (Graca *et al.*, 2015., Yoon *et al*., 2019., Bandara *et al.*, 2016)	Long term Relationship	Discommitted, irresponsible, and disloyal.	Make deals but don't commit.	Committed to agreed goals, irresponsible, disloyal.	Commit to agreed goals and be responsible.	Fully committed to realizing agreed goals, responsible and loyal.

Category	Criteria	Indicator	Scale 1	Scale 2	Scale 3	Scale 4	Scale 5
	Economic Sustainable (Giannakis *et al.*, 2020., Gardner *et al*., 2019., Jain *et al*., 2019)	Increased Sales	There is no increase in production from the start of the supplier-buyer relationship.	20% increased production from the start of establishing a supplier-buyer relationship.	30% increased production from the start of establishing a supplier-buyer relationship.	40% increased production from the start of establishing a supplier-buyer relationship.	50% increased production from the start of establishing a supplier-buyer relationship.
	Social Sustainable (Giannakis *et al.*, 2020., Gardner *et al*., 2019., Jain *et al*., 2019)	Increased social investment	There is no improvement from the beginning of the supplier-buyer relationship.	20% increased investment for environmental conservation, disaster management, social and community empowerment activities.	30% increased investment for environmental conservation, disaster management, social and community empowerment activities..	40% increased investment for environmental conservation, disaster management, social and community empowerment activities.	50% increased investment for environmental conservation, disaster management, social and community empowerment activities.
	Environment Sustainable (Giannakis *et al.*, 2020., Gardner *et al*., 2019., Jain *et al*., 2019)	Increased energy efficiency	There is no improvement from the beginning of the supplier-buyer relationship.	20% energy efficiency improvements from the start of the supplier-buyer relationship such as reduced use of electrical energy and use of energy efficient lighting.	30% energy efficiency improvements from the start of the supplier-buyer relationship such as reduced use of electrical energy and use of energy efficient lighting.	40% energy efficiency improvements from the start of the supplier-buyer relationship such as reduced use of electrical energy and use of energy efficient lighting.	50% energy efficiency improvements from the start of the supplier-buyer relationship such as reduced use of electrical energy and use of energy efficient lighting.

Table 2. Model supplier relationship peformance measurement supplier satisfaction

Category	Criteria	Indicator	Scale 1	Scale 2	Scale 3	Scale 4	Scale 5
Traditional (Damlin *et al*., 2012)	Cost (Asif *et al*., 2019., Cerna *et al*., 2016 Taherdoost *et al.*, 2019., Gangurde *et al*., 2015)	Product Price	20% > Own Estimate	10% > Own Estimate	Own Estimate	10% < Own Estimate	20% < Own Estimate
	Quality (Vos *et al.*, 2016., Cerna *et al*., 2016., Taherdoost *et al.*, 2019., Gangurde *et al*., 2015)	Purchasing Order	During the purchase contract period, there is always a change of > 50% from the initial purchase amount agreed upon from the beginning of the contract.	During the purchase contract period, there is always a change of 20% - 50% from the initial purchase amount agreed upon from the beginning of the contract..	During the purchase contract period, there is always a change of 20% from the initial purchase amount agreed upon from the beginning of the contract.	During the purchase contract period, there is always a change of 10% from the initial purchase amount agreed upon from the beginning of the contract.	Very good, as long as the purchase contract period is fixed / there is no change according to the number of purchases per month that has been agreed since the beginning of the contract.
	Lead-time (Taherdoost *et al.*, 2019., Cerna *et al*., 2016., Gangurde *et al*., 2015.)	Payment	>50% late payment during the contract period or more than 6 times late during the contract period.	20-50% late payment during the contract period or more than 2-6 times late during the contract period	20% late payment during the contract period or more than 2 times late during the contract period	10% late payment during the contract period or more than 1 times late during the contract period.	According to the agreed schedule every month during the contract period.
	Flexibility (Expert, 2019, Gyampah *et* al., 2019., Cerna *et al*., 2016)	Product Delivery	Not flexible in shipping products with varying quantities, must be according to the agreed schedule.	10% flexible delivery with varying quantities or 10% faster delivery of products according to the predetermined schedule for each shipment.	20% flexible delivery with varying quantities or 20% faster delivery of products according to the predetermined schedule for each shipment.	50% flexible delivery with varying quantities or 50% faster delivery of products according to the predetermined schedule for each shipment.	Flexible in delivery of various quantities during the contract period.

Category	Criteria	Indicator	Scale 1	Scale 2	Scale 3	Scale 4	Scale 5
Relationship (Damlin *et al.*, 2012)	Trust (Graca *et al.*, 2015., Bandara *et al.*, 2016., Yoon *et al.*, 2019)	Solving Problem	Distrust in overcoming existing problems	Confidence in solving problems is limited to problems according to the interests of the supplier / buyer (calculative)	Confidence to solve the same problem, and nothing more than the existing problem (cognitive)	Trust in overcoming common problems in the form of general problems in the form of common views, expectations, and responsibilities that have been mutually agreed upon (normative)	Trust in overcoming all existing internal and external problems such as financial problems, supply chain problems of suppliers / buyers which are characterized by always keeping promises.
	Power (Damlin *et al.*, 2012. Bandara *et al.*, 2016)	Reputation Branding	The power of buyers in branding is that suppliers depend on buyers on standard goods.	The power of buyers in branding is that suppliers depend on buyers on critical goods.	Balance of supplier-buyer brand reputation so that it is interdependent.	The dependence of buyers in selling standard goods.	Strong suppliers brand reputation so that buyers depend on suppliers for critical goods.
	Transparancy (Gardner *et al*, 2019, Gyampah *et* al., 2019)	Information and Decisions	There is no transparency in sharing information or providing information to parties who need information	Limited transparency of supplier-buyer external needs (sales targets)	Transparency is limited to the needs of the supplier / buyer (nothing more) and is relevant to the supplier-buyer relationship.	Transparency of internal and external information is limited to buyer supplier relationships such as logistics, buying / selling, and production / operations schedules.	Full transparency in providing information without restrictions such as company objectives, customer information and marketing.
	Communication (Graca *et al.*, 2015., Vos *et al*., 2016., Maestrini *et al*., 2018)	Communication Quality	Cannot be reached except in person.	Difficult to contact, through many terrains and long waiting times.	Easy to contact, very long waiting time.	Contactable only by email, and on time.	Easy to contact by phone, cell phone, fax, email or website, good response, timely and considerate.

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	Commitment (Graca *et al.*, 2015., Yoon *et al*., 2019., Bandara *et al.*, 2016)	Long term Relationship	Discommitted, irresponsible, and disloyal.	Make deals but don't commit.	Committed to agreed goals, irresponsible, disloyal.	Commit to agreed goals and be responsible.	Fully committed to realizing agreed goals, responsible and loyal.
	Economic Sustainable (Giannakis *et al.*, 2020., Gardner *et al*., 2019., Jain *et al*., 2019)	Increased Sales	There is no increase in production from the start of the supplier-buyer relationship.	20% increased production from the start of establishing a supplier-buyer relationship.	30% increased production from the start of establishing a supplier-buyer relationship.	40% increased production from the start of establishing a supplier-buyer relationship.	50% increased production from the start of establishing a supplier-buyer relationship.
	Social Sustainable (Giannakis *et al.*, 2020., Gardner *et al*., 2019., Jain *et al*., 2019)	Increased social investment	There is no improvement from the beginning of the supplier-buyer relationship.	20% increased investment for environmental conservation, disaster management, social and community empowerment activities.	30% increased investment for environmental conservation, disaster management, social and community empowerment activities..	40% increased investment for environmental conservation, disaster management, social and community empowerment activities.	50% increased investment for environmental conservation, disaster management, social and community empowerment activities.
	Environment Sustainable (Giannakis *et al.*, 2020., Gardner *et al*., 2019., Jain *et al*., 2019)	Increased energy efficiency	There is no improvement from the beginning of the supplier-buyer relationship.	20% energy efficiency improvements from the start of the supplier-buyer relationship such as reduced use of electrical energy and use of energy efficient lighting.	30% energy efficiency improvements from the start of the supplier-buyer relationship such as reduced use of electrical energy and use of energy efficient lighting.	40% energy efficiency improvements from the start of the supplier-buyer relationship such as reduced use of electrical energy and use of energy efficient lighting.	50% energy efficiency improvements from the start of the supplier-buyer relationship such as reduced use of electrical energy and use of energy efficient lighting.

After the proposed framework is made, expert validation is then carried out to obtain a framework that suits the needs in the field. The results of data collection of the proposed framework validation criteria are considered important by all experts so that the proposed framework can be accepted according to field needs. To determine the level of the supplier-buyer relationship, this study proposes the SRPM model. The basic concept in measuring the level of supplier-buyer relationship is the low / small gap between actual perceptions of supplier-buyer. The SRPM model for measuring supplier-buyer relationships uses a scale of 1-5. The SRPM model table is given in Tables 1 and 2.

Case Study

To implement the designed model, direct measurements were made at manufacturing companies, namely PT. X, P. Y and PT. Z. SRPM performance measurement in manufacturing companies is by distributing questionnaires and interviews to companies that are responsible and which deal directly with supplier buyers. There are 2 questionnaires used in this study, namely the SRPM measurement questionnaire and the pairwise comparison questionnaire in each company. The method used is the Analitycal Hirarchy Process (AHP). After distributing the questionnaires, the SRPM measurement results for each company were obtained which explained that the position of the relationship and the results of pairwise comparisons between the SRPM criteria aims to obtain the priority weight of each criterion. Furthermore, the measurement of the SRPM level score is carried out on each supplier-buyer relationship. The following is a summary of the results of the research conducted:

Table 3. Score supplier relationship peformance measurement PT. X and PT. Y

No	Criteria	PT. X to PT. Y			PT. X to PT. Y		
		Score	Criteria Weights	Final Score	Score	Criteria Weights	Final Score
1	Cost	4	0.161	0.644	5	0.131	0.655
2	Quality	4	0.142	0.568	5	0.144	0.720
3	Lead-time	5	0.125	0.625	4	0.131	0.524
4	Flexibility	5	0.12	0.600	5	0.119	0.595
5	Trust	4	0.053	0.212	4	0.052	0.208
6	Power	3	0.111	0.333	3	0.111	0.333
7	Transparancy	5	0.042	0.210	5	0.042	0.210
8	Communication	5	0.088	0.440	5	0.099	0.495
9	Commitment	5	0.081	0.405	5	0.09	0.450
10	Economic Sustainable	1	0.027	0.027	1	0.028	0.028
11	Social Sustainable	1	0.024	0.024	1	0.026	0.026
12	Environment Sustainable	1	0.027	0.027	1	0.028	0.028
	Total			4.115			4.272

Table 4. Score supplier relationship peformance measurement PT. X and PT. Z

No	Criteria	PT. X to PT. Z			PT. Z to PT. X		
		Score	Criteria Weights	Final Score	Score	Criteria Weights	Final Score
1	Cost	4	0.161	0.644	4	0.142	0.568
2	Quality	3	0.142	0.426	5	0.158	0.790
3	Lead-time	5	0.125	0.625	4	0.118	0.472
4	Flexibility	5	0.12	0.600	5	0.105	0.525
5	Trust	4	0.053	0.212	4	0.053	0.212
6	Power	3	0.111	0.333	3	0.11	0.330
7	Transparancy	5	0.042	0.210	5	0.042	0.210
8	Communication	5	0.088	0.440	5	0.098	0.490
9	Commitment	5	0.081	0.405	5	0.089	0.445
10	Economic Sustainable	1	0.027	0.027	1	0.029	0.029
11	Social Sustainable	1	0.024	0.024	1	0.027	0.027
12	Environment Sustainable	1	0.027	0.027	1	0.029	0.029
	Total			3.973			4.127

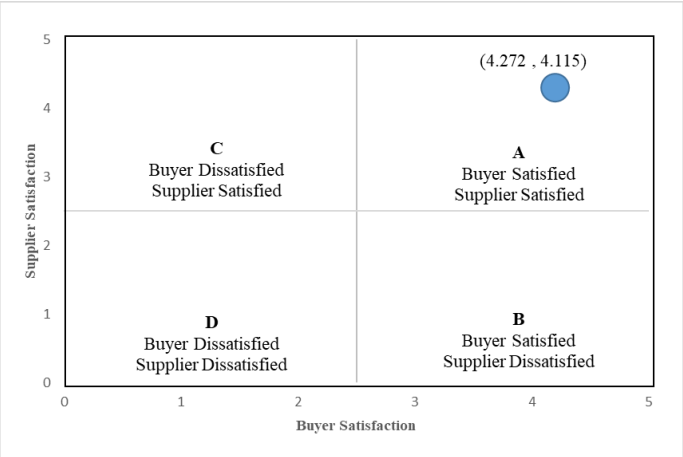

Figure 3. Matriks SRPM PT. X and PT. Y

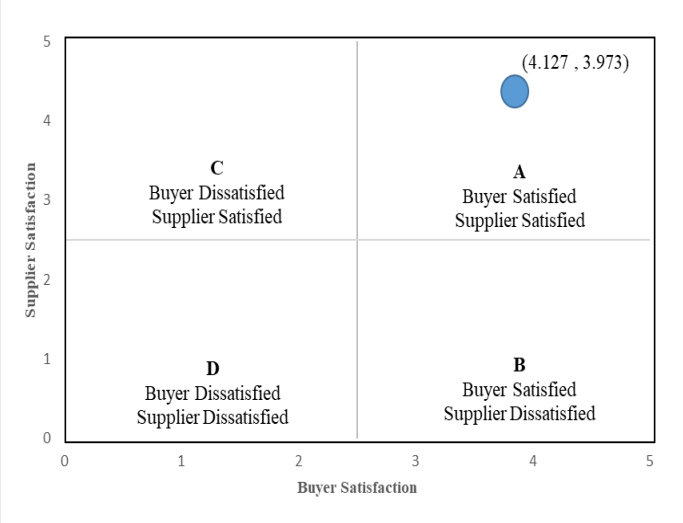

Figure 4. Matriks SRPM PT. X and PT. Z

Based on the research results above, the final value of PT. X and PT. Y with a score of 4,115 and 4,272, while PT. X and PT. Z has a score of 3,973 and 4,127. From the final value of the SRPM supplier-buyer matrix results can be seen in Figures 3 and 4 , where the supplier-buyer relationship is in quadrant A, which means that the supplier-buyer is equally satisfied. However, in this study, the researcher proposes to improve the performance of two supplier-buyer relationships in sustainable quality criteria so as to produce a more perfect SRPM score (5 and 5) as follows:

Standardizing quality by mutual agreement to overcome quality problems that often occur in recycled products and replacement products.

Integrate supply chain systems to produce better information, communication and transparency.
Build sustainable programs in living relationships to achieve mutual sustainability.

Conclusion

Based on the research that has been done, a comprehensive SRPM model was found to make it easier for companies to implement SRPM in the company. This model was built to determine the scale of measurement within the scope of SRPM. Companies are expected to have guidelines for assessing and planning for improvements in supplier-buyer relationships.

The proposal to improve the performance of SRPM in this study is to standardize quality by mutual agreement to solve quality problems that often occur in recycled and substituted products, integrate supply chain systems to produce better information, communication, and transparency, and build sustainable programs in relationship to achieve sustainability together.

Recommendations

In research there are weaknesses and strengths as well as research that has been done, this can be developed again in future research or research. The recommendation for further research is to validate the supplier relationship performance measurement model using SEM or other statistical methods.

Acknowledgements or Notes

Alhamdulillah, all praise and gratitude be to Allah SWT who never stops giving all pleasures and graces to all of His servants. Salawat and greetings to our prophet Prophet Muhammad and his successors who have brought Islam to all mankind. With the Grace and Hidayah of Allah SWT, the research entitled "Model Design Supplier Relationship Performance Measurement" can be completed properly. In completing his research, he received support, mentoring and guidance from various parties. For that, the authors would like to express their gratitude and highest appreciation for providing support directly or indirectly.

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Perceived Supervisor Support, Work Engagement and Career-Related Self-Efficacy: An Empirical Study

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Abstract: The purpose of this study is to examine the mediating effect of career-related self-efficacy in the relationship between the perceived supervisor support and work engagement. A cross-sectional research design was performed in the present study. Data were collected from a total of 184 participants employed full time in the manufacturing sector in Ankara. Structural equation modeling approach was used to estimate direct and indirect effects between variables. The results indicated that employees' perception of supervisor support is a positive predictor of their work engagement. Moreover, career-related self-efficacy was found to have a mediating role in the relationship between perception of supervisor support and work engagement. This study revealed that the perception of supervisor support is an important predictor in increasing employees' work engagement and the key importance of career-related self-efficacy in this relationship. In addition, the theoretical and practical contributions of this study, its limitations and implications for future research on the perception of supervisor support and work engagement were discussed.

Keywords: Perceived supervisor support, Work engagement, Career-related Self-efficacy

Introduction

Work engagement has drawn a lot of attention from scholars and practitioners becasue it is positively correlated with job performance (Yalabik et al., 2013), organizational citizenship behaviour (Runhaar et al., 2013; Babcock-Roberson and Strickland, 2010), job satisfaction (Lu et al., 2016), career satisfaction (Joo and Lee, 2017). Studies show an evidence that highly engaged employees are more positive about their jobs and organizations, treat their colleagues more respectfully, and continuously improve their job-related skills (Bakker and Demerouti, 2009). Considering these positive contributions of work engagement to the organization, organizations take action to support policies and practices that encourage employees's work engagement (Lu et al., 2016). Work engagement is defined as "a positive, fulfilling, work-related state of mind characterized by vigor (elevated levels of energy and resilience at work), dedication (deep involvement in one's work as well as a sense of significance and enthusiasm), and absorption (feeling of being completely concentrated and comfortably engrossed on one's work)" (Schaufeli et al., 2002, p. 74; Schaufeli et al., 2006).

Empirical studies indicated that perceived supervisor support was a significant predictor of work engagement (Ibrahim et al., 2019; Pattnaik and Panda, 2020; Swanberg et al., 2011). Perceived supervisor support is defined as employees' general views about the degree to which their supervisors value their contribution and care about their well-being (Eisenberger et al., 2002). Perceived supervisor support can be explained in the perspective of social exchange theory (Blau, 1964). In the line with the social exchange theory, employees who are treated well by their supervisors are able to respond with more positive attitudes towards their supervisors. As supervisors are agents of the organization, employees' perception of high levels of supervisor support will return to their organizations with positive attitude and behavior (Pattnaik and Panda, 2020). Emprical studies had an evidence that employees with a high perception of supervisor support are more motivated and engaged in their work (Swanberg et al., 2011; Suan and Nasurdin, 2016, Ibrahim et al., 2019).

The present study investigated work engagement by adopting a conceptual framework that focuses on the role of perceived supervisor support and the employees's career-related efficacy belief in work engagement. Career-related self-efficacy can be described as the personal belief that career aspirations can be effectively followed

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(Lent and Hackett, 1987). Previous studies paid little attention to the mediating role of career-related self-efficacy in the relationship between perceived supervisor support and work engagement . The underlying mechanisms that could explain the relationship between perceived supervisor support and work engagement. This study aimed to fill this gap by investigating the mediating role of career-related self-efficacy in the relationship between perceived supervisor support and work engagement.

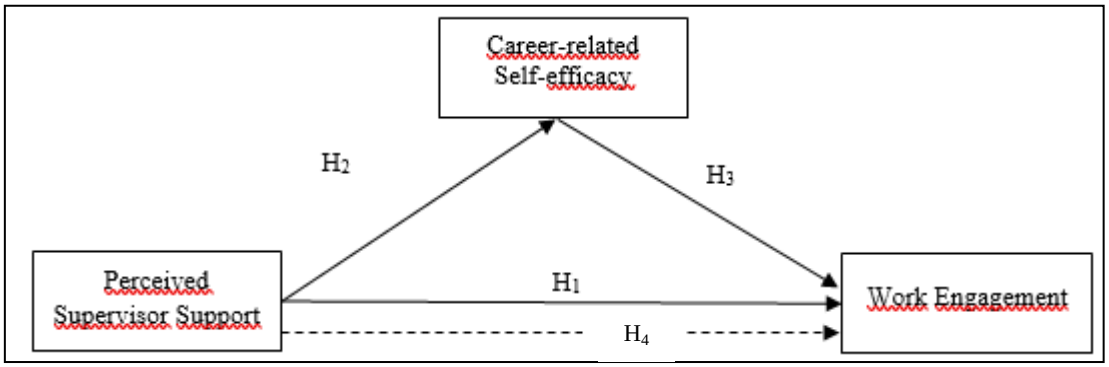


Figure 1. Research model

H_1=Perceived supervisor support relates significantly and positively to work engagement.
H_2=Perceived supervisor support relates significantly and positively to career-related self-efficacy.
H_3=Career-related self-efficacy relates significantly and positively to work engagement.
H_4=Career-related self-efficacy mediates the relationship between perceived supervisor support and work engagement.

Research Method

A cross-sectional research design was performed in the present study. This study was also carried out on employees in manufacturing enterprises between October 2019 and December 2019. A total of 250 questionnaires were submitted to the full-time employees working in ten different companies in manufacturing sector. The employees were invited to rate their level of agreement involving perceived supervisor support, work engagement, and career-related self-efficacy, and additionally provide their demographic information. The anonymity and privacy of the participants were stated to be ensured. Moreover, a paper-and-pencil survey was administered. Data collection was carried out with the aid of the human resources department of the manufacturing enterprises during daily operating hours. 198 questionnaires were returned. However, incomplete information led to the elimination of 14 questionnaires. Consequently, 184 usable questionnaires were obtained. First, descriptive statistics, validity and reliability analyzes were conducted in the study. Then, structural equation modeling approach was used to test the hypotheses in line with the research model.

To measure *perceived supervisor support*, an eight-item perceived organizational support scale developed by Eisenberger et al. (1986) was used. Perceived supervisor support scale was modified by replacing the word "organization" with "supervisor", as has been done in many other studies (Eisenberger et al., 2002; Maertz et al., 2007; DeConinck, 2010). The mediating variable "*career-related self-efficacy*" was assessed with the five-item scale developed by Higgins et al. (2008). The dependent variable "*work engagement*" was operationalized by the shortened version of the Utrecht Work Engagement Scale given by Schaufeli et al. (2006), consisting of nine items. Since this scale is a student version of work engagement scale, it was modified for organizational analysis. The scale for perceived supervisor support and career-related self-efficacy each had a range from 1 (strongly disagree) to 5 (strongly agree). However, work engagement scale was coded from 0 (never) to 6 (always). Table 1 below contains information about the scales used in the research.

Table 1. Scales used in the study

Scale	Researchers	Number of Items
Perceived Supervisor Support	Eisenberger et al. (1986)	8-item scale
Career-related Self-efficacy	Higgins et al. (2008)	5-item scale
Work Engagement	Schaufeli et al. (2006)	9-item scale

Research Findings

Frequency Analysis

As can be seen in Table 2 below, the sample for the study had 147 male (79.9%) respondents and 37 female (20.1%) respondents. Agewise, 64 (34.8%) were 23 to 27 years and 45 (24.4%) were in the age bracket of 18 to 22 years. In terms of education level, 135 have bachelor's degree (73.4%). Of the respondents, 78 had tenures between 6 and 10 years (42.4%).

Table 2. Frequency analysis

		n	Percentage (%)
Gender	Female	37	20.1
	Male	147	79.9
	18-22	45	24.4
Age	23-27	64	34.8
	28-33	38	20.7
	34-39	37	20.1
Education Level	High school degree	32	17.4
	Bachelor's degree	135	73.4
	Master's degree	17	9.2
Tenure	1-5 years	65	35.3
	6-10 years	78	42.4
	11-15 years	41	22.3
Total		184	100

Common Method Variance

Harman's single-factor test (Podsakoff and Organ, 1986) was utilized to control common method variance. In order for the common method variance to emerge, a single factor structure should emerge or the first factor obtained should constitute a significant part of the total variance (Podsakoff and Organ, 1986: 536; Podsakoff et al., 2003: 889). Unrotated exploratory factor analysis revealed that the first factor explained 39.3 percent of the total variance. The first factor explained less than 50 percent of the total variance. Accordingly, common method varience did not appear to pose a issue.

Measurement Model

To test the validity of all constructs, confirmatory factor analysis (CFA) was conducted. According to the results, it was determined that the measurement model has acceptable fit values and the standardized regression coefficients of each of the observed variables are greater than 0.50 (Bagozzi and Yi, 1988: 82). The fit indices that was used to demonstrate model adequacy were CMIN/df, comparative fit index (CFI), Incremental Fit Inde (IFI), root mean square error of approximation (RMSEA), Tucker–Lewis index (TLI), and standardized root mean square residual (SRMR).

Tablo 3. Measurement model- factor loadings

Variables	Range of Factor Loadings
Perceived Supervisor Support	0.60-0.88
Career-related Self-efficacy	0.70-0.89
Work Engagement	0.77-0.95
Note: *CMIN/df* = 488,219 / 199 = 2,453, p = 0,000, IFI=0,94; TLI=0,93; CFI=0,94; RMSEA = 0,08; SRMR=0,06	

In line with the data obtained as a result of the confirmatory factor analysis, there are composite reliability (CR), average variance extracted value (AVE) as seen in Table 4. Accordingly, both reliability and validity tests of the study were conducted. Cronbach alphas, means, standard deviations among all variables are also reported in Table 4. Moreover, as seen in Table 4, pearson correlation analysis was conducted to examine the relationship between research variables.

According to Hair et al. (2010), an acceptable fit should have CFI, IFI and TLI values >0.90, RMSEA <0.08 and SRMR <0.09. The three-factor model of measurement model of the study (perceived supervisor support, career-related self-efficacy, and work engagement) indicated a good fit with the data: CMIN/df = 488,219 /199 = 2.453, p <0.001, CFI=0.94, IFI=0.94, TLI=0.93, RMSEA=0.08 and SRMR=0.06. Factor loadings of the perceived supervisor support were between 0.60-0.88; The factor loadings of career-related self-efficacy were between 0.70-0.89; The factor loadings of the work engagement were values between 0.77-0.95. Moreover, t values were greater than 1.96 (p<0.001) (Schumacker and Lomax, 2004). Value ranges and goodness of fit indices of factor loadings are given in Table 3 below.

Table 4. Means, standard deviations, CR, AVE and correlations among study variables

Variables	M	SD.	Cronbach's α	CR	AVE	1	2	3
1. CSE	3.76	0.91	0.87	0.88	0.61	(0.78)		
2. PSS	2.71	0.80	0.88	0.89	0.52	0.30*	(0.72)	
3. WE	2.63	1.45	0.96	0.96	0.75	0.23*	0.34*	(0.87)

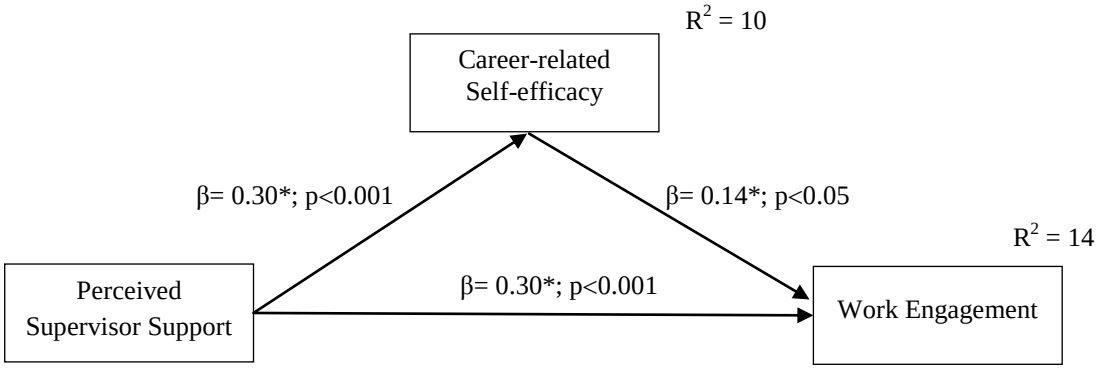
Note = n = 184, *p<0,01, CSE =Career-related Self-efficacy, PSS = Perceived Supervisor Support, WE = Work Engagement, M= Mean, SD. = Standard Deviations; CR= Composite Reliability AVE: Average Variance Extracted, values in parentheses on the diagonal are the square roots of the AVE of each scale.

Results reported in Table 4 indicated that work engagement was significantly and positively correlated with both career-related self-efficacy (r= 0.23, p 0.01), and perceived supervisor support (r= 0.34, p 0.01). Furthermore, it was found that perceived supervisor support was positively associated with career-related self-efficacy (r= 0.30, p 0.01). On the other hand, career-related self-efficacy has the highest mean (M = 3.76, SD. = 0.91), while the employees' work engagement is the least (M = 2.63, SD.=1.45).

The critical value for the composite reliability value is 0.70 and above (Hair et al., 2010). In this study, composite reliability values are between 0.88 and 0.96 and are greater than 0.70 critical value. For convergent validity, average variance value (AVE) should be greater than 0.5 and CR should be greater than AVE; For discriminant validity, the square root of the AVE value calculated for each structure should be greater than the correlation of each other variable (Hair et al., 2010). AVE values in the present study are between 0.52 - 0.75, and all values are higher than 0.50, and the square root of the AVE value of each structure is greater than its correlation with other structures. As stated in Table 4, correlations between latent variables are less than 0.85 (Kline, 2011). These results obtained as a result of the measurement model made show that this study is a reliable and valid study.

Hypotheses testing

Structural equation modeling was performed in order to examine the direct and indirect effects between variables. Accordingly, the mediating effect of career-related self-efficacy in the relationship between the perveived supervisor support and work engegament was examined. As seen in Figure 2, the research model showed acceptable fit indices (CMIN / df = 488.219 / 199 = 2.453, p = 0.000, IFI=0.94, TLI=0.93, CFI=0.94, RMSEA = 0.08, SRMR=0.06).



Note: n = 184, *Standardized Beta Coefficients, CMIN / df = 488.219 / 199 = 2.453, p = 0.000, IFI=0.94, TLI=0.93, CFI=0.94, RMSEA = 0.08, SRMR=0.06. Figure 2. Direct and indirect effects

According to the model, it was found that perceived supervisor support had a significant and positive effect on work engagement (standardized $\beta = 0.30$, $p<0.001$). Accordingly, the hypothesis (H_1) that "perceived supervisor support relates significantly and positively to work engegament" was accepted. Similarly, the model established showed that perceived supervisor support had a significant and positive effect on career-related self-efficacy (standardized $\beta = 0.30$, $p<0.001$). This result was evidence that the hypothesis (H_2) that "perceived supervisor support relates significantly and positively to career-related self-efficacy" was accepted. It was also found that career-related self-efficacy affects work engagement significantly and positively (standardized $\beta = 0.14$, $p<0.05$). According to this result, the hypothesis (H_3) that "Career-related self-efficacy relates significantly and positively to work engagement" was accepted.

Tablo 5. Direct, indirect and total effects

	Standardized Total Effects	Standardized Direct Effects	Standardized Indirect Effects
PSS→CSE	0,30**	0,30**	-
PSS→WE	0,34**	0,30**	0,04*
CSE→WE	0,14*	0,14*	-

Note = n = 184, **p<0,001, * p<0,05, PSS = Perceived Supervisor Support, CSE = Career-related Self-efficacy, WE =Work Engagement; In order to test the indirect effect of career-related self-efficacy in the relationship between perceived supervisor support and work engagement, (n=2000) bias-corrected bootsrapping - 95% confidence interval method was used (Preacher and Hayes, 2008; Mallinckrodt et al., 2006).

To examine the indirect effect of perceived supervisor support on work engagement through career-related self-efficacy, bias-corrected bootsrapping method was used. Accordingly, indirect effect values were calculated by resampling (n = 2000). The indirect effect of perceived supervisor support on work engagement through career-related self-efficacy at 95% confidence interval was found to be significant (standardized $\beta = 0.04$, $p<0.05$). Accordingly, the total effect of perceived supervisor support on work engagement was (0.30 + 0.04) 0.34. The results showed that the mediating role of career-related self-efficacy in the relationship between perceived supervisor support and work engagement. Accordingly, the hypothesis (H_4) that "career-related self-efficacy mediates the relationship between perceived supervisor support and work engagement" was accepted.

Results and Discussion

In this study, the mediating role of career-related self-efficacy in the relationship between perceived supervisor support and work engagement was investigated. The empirical data support the hypothesized relationships. This study is significant in the context of career research as it is based on the career-related self efficacy of employees. Because many studies on career have been carried out on university students.

Both perceived supervisor support and career-related self-efficacy increase work engagement of employees. Such adequate support from supervisors helps employees feel effective (Nisula, 2015). Accordingly, self-sufficient employees who receive adequate support from their supervisors exhibit high levels of work engagement.

In line with social exchange theory (Blau, 1964), when there is adequate supportive supervision, employees pay back to the organization via high work engagement. In addition to consistent with social exchange theory, the finding regarding the effect of perceived supervisor support on work engagement through the partial mediating role of career-related self-efficacy in this study also supports also Naeem et al. (2018)'s the empirical study. Moreover, it should be noted that the direct effect of perceived supervisor support (0.30) on work engagement was greater than that of career-related self-efficacy (0.14). Accordingly, employees' perception of supervisor support may have a stronger effect on work engagement than that of career-related self-efficacy.

According to the results obtained in this study, the perception of supervisor support enhances career-related self-efficacy of emloyees, which in turn increase their work engagement. In other words, employees's feelings of supported and appreciation to supervisors in their career aspirations are composing a high degree of career-related self-efficacy that increases work engagement. The partial mediation finding in the study also supports the previous empirical studies (Caesens and Stinglhamber, 2014). Self-efficacy enables a belief to employees to carry out on difficult tasks when faced with challenges (Ibrahim et al., 2019). Accordingly, an increase in individuals 'perception of career-related self-efficacy means an increase in individuals' personal beliefs about reaching their career goals. This can further motivate the employee and increase work engagement.

In the perspective of social exchange theory, career-related self-efficacy was included as a mediating variable in the relationship between perceived supervisor support and work engagement. Then, path analysis and bias-corrected bootsrapping was performed and the effect of the mediating variable between these two constructs was evaluated. As a result, it was confirmed that although career-related self efficacy is a partial mediating variable, it serves as a considerable variable in this relationship. In other words, as the employees' perception of supervisor support increases, the belief to accomplish career-related goals and tasks will be increase and the expectation and belief that they will achieve positive results related to their work engagement will be increase.

Work engagement is an important variable in terms of individual and organizational results. Work engagement aids in increasing performance (Kim et al., 2012), career satisfaction (Joo and Lee, 2017; Karatepe, 2012), innovative work behavior (De Spiegelaere et al., 2016), and in decreasing intention to quit (Yalabik et al., 2013). This study thus has a several of a practical implications. Organizations need to bring in motion the kind of organizational strategies that allow employees to maximize their work engagement (Naeem et al., 2018). Thus, organizations needs to coordinate on-going training activities to ensure that each supervisor is supportive and can serve as advisors throughout the operation (Ibrahim et al., 2019). For these purposes, organizations can facilitate for supervisors to support their employees, and as a result, employees can enhance their belief in their ability to fulfill their career goals and objectives, increasing their work engagement.

Limitations and future directions

The data were obtained from a single source and by the participants' self-reports. This may lead to a possible common method variance problem. Although Harman single factor test was performed in this study, it is not sufficient by itself (Podsakoff et al., 2003). A marker variable can be used in future studies (Simmering et al., 2015).

This research is also the first study conducted on employees in Ankara, Turkey. And a cross-sectional research design was established and carried out. Consequently, such a research design cannot determine causality. Longitudinal studies are needed to extend and validate the results of the study and for determining causality.

The study used only data from the manufacturing industry. Future researchers should replicate the results for other industries to boost generalizability. In this study, perceived supervisor support was only used to predict work engagement. Other dimensions of social support can also be assessed by scholars. This study used career-related self-efficacy as a mediator variable in the relationship between perceived career support and work engagement. In a way to support career studies, other variables that can be tested as mediators such as career optimism can be used.

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The Relationship between Governance and Economic Development: An Empirical Analysis from 1996 to 2019 for Albania

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Abstract: There is an on-going debate on the effect of governance on the economic development of a country. In an effort to shed some light on this matter, this article aims to identify the relationship between good governance and economic growth in Albania, considering that good governance might create the right habitat for economic growth.The values for the good governance index are calculated using the Principal Component Analysis and the values for the World Governance Indicators – WGI for Albania, taken from the World Bank database for 1996-2019 time periods. This period coincides with a series of important transformations undertaken by governments in Albania after the fall of the communist regime in 1990. The methods used are the regression analysis and the Granger Causality test. Main results: By analyzing the 1996-2019 time period data, we conclude that Good Governance is not a statistically significant factor for economic development in Albania and the Granger causality test indicates that neither of variables causes the other.

Keywords: Good Governance, economic growth, indicators, principal component analysis, Granger causality.

Introduction

Good governance is an important tool for stimulating sustainable development and is widely considered a significant instrument that should be included in development strategies. Good governance promotes transparency, accountability, efficiency and the rule of law at all levels and permits a fait and non-partisan management of natural, human, economic and financial resources by guaranteeing the participation of civil society in the decision – making processes. Sustainable development and good governance are two closely related concepts. Although good governance does not guarantee sustainable development, its absence considerably limits it. The definition of good governance and how to measure it has been the object of many institutions. In this paper we will refer mainly to the definition of good governance given by the World Bank, but not excluding other resources. In the 1992 report entitled "Governance and Development", the World Bank set out its definition of good governance. This term is defined as "the manner in which power is exercised in the management of a country's economic and social resources for development".

There is an ongoing debate on the effect of governance on the economic development of a country. Many scholars and policymakers argue that the good governance is a necessity for the economic development of a country but some others argue that the so-called good governance policies are relevant only if countries reach an adequate level of economic and social development that enable institutions of good governance to boost growth (Mira & Hammadache, 2017). But what happens in Albanian situation? Is the good governance a factor that explains the

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economic growth? This paper aims to respond this question using data for World Governance Indicators and economic growth taken from World Bank database, for 1996-2019 time period. Based on the Freedom House report 2020, entitled "Democracy under Lockdown", the democracy and human rights has worsened in 80 countries, including Albania. The president of Freedom House, Michael J.Abramwitz, said: "What started as a worldwide health crisis has become part of the global crisis for democracy. Governments around the world have abused their power in the name of public health, grabbing the opportunity to undermine democracy and human rights".

In the Freedom House report "Freedom in the World – Albania Country Report 2020", the score for Global Freedom in Albania is presented 67/100, so characterising Albania as partly free country. Corruption and organized crime remain serious problems despite recent government efforts to address them. Referring to the same report, there are problems with the implementation of the law on access to information, the underfunded courts are often subject to political pressure and influence, and public trust in judicial institutions is low. Also, in the Transparency International report for 2019, Albania ranked 106th out of 180 countries in total, ranking last in Europe and the Balkans. This result shows that Albania, with a CPI score of 35, is still far from the average score of 50, not to mention almost a third of the way to a corruption- free country with good governance. The economic effect is the most touchable effect of corruption, because it directly affects both the country's economy and life of the individual citizens. After the fall of the communist dictatorship, economic growth in Albania has had irregular patterns. There have been large fluctuations, reflecting the specifics of the Albanian transition. The country experienced a growth rate 5-6% in 1994-96, negative growth rate in 1997, almost 8% in 2008, plummeting to 1.3% in 2012 and 0.9% in 2013. The 2013-2018 period was characterized by a positive growth tendency, reaching 4.2% in 2018 (World Bank).

The economic growth in Albania has been based mostly on consumption, remittances and imports, but not on production, investments and exports. This growth rate has had more of a quantitative rather than a qualitative nature, coming from sectors and activities with high efficiency and modern technology and innovation. According to the Normative Act "On same changes in Law No.88/2019 "For the 2020 budget", it is projected that the real economic growth for 2020, previously forecasted at 4.1%, will drop to 2%. The earthquake of November 2019 and most importantly COVID-19 pandemic, severely impacted the Albanian economy. The most affected sectors have been tourism, the wholesale sector, and the manufacturing industry. The present-day situation raises the need to design wise policies that would foster job creation and resurrect the economy.This paper does not aim to draw universal conclusion on the relationship between good governance and economic growth, but only to illustrate the relationship between these variables on Albania during 1996-2019 period.This paper is organized as follows: Section 2 contains the literature review. Section 3 contains the data and graphic presentations about the six components of good governance for Albania. Section 4 contains the methodology and empirical analysis and in the section 5 are the conclusions.

Literature Review

There are many studies evaluating the relationship between economic growth and good governance. After all this historical point of view, there is a clear understanding that good governance is one of the main factors on the economic progress. From e general review on the literature, a positive trend has been obtained between these two variables on developed countries. According to neo-institutionalism economists, there are two main theories related to the relationship between these two concepts in developing countries:

> The first theory, defended by neo-institutionalism authors, considers the government as having an independent role and being a well-being government. The function of trade market is correlated with the function of state governance and all institutions derivate. Consequently, low economic growth performance and underdevelopment of countries could be explained by "state failure" due to the increase in corruption, instability of property rights, market distortions, and lack of democracy.
>
> The second theory, developed by Mushtaq Khan and Dany Rodrik, concerns the capability of the government to implement social changes and follow a controlled strategy of economic development: They need to establish efficient institutions in relation of sharing the political power in such countries to transit the developing countries towards a capitalist system similar to that of developed countries. Otherwise,

those countries would face state failure as a result of an inconsistency between institutions and an economic policy of development. (Mira. R, Hammadache. A, 2018)

Based on these approaches, the results of Hall and Jones (1998) have revealed that a country's long-run productivity, capital accumulation, and thereby productivity per worker are influenced the most by institutions and government policies. The main hypothesis of Hall and Jones describe that the major factor for a long-term economic growth is its social infrastructure (institutions and government policies). Alam, Kitenge and Bedane (2017), using a panel of 81 countries, found a significant positive effect of government effectiveness on economic growth.

AlBassam (2013) present that the global economic crisis has had an unnoticeable influence on the relationship between good governance and economic growth. However, this study found that different levels of development of nations affect the relationship between governance and growth in various ways during times of crisis. According to Aikins (2009), without appropriate economic strategy and regulatory structure, a nation's financial system becomes vulnerable to crisis and exposes the stability of the entire economy.

Usual, governments respond to crises with short-term remedial plans, potentially resulting in a harmful long-term economy recovery (Davidoff &Zaring, 2008; Reinhart &Rogoff, 2009). Davidoff and Zaring (2008) said that governments focus more on economic growth than on governance development during economic crises. Consequently, governments can be encouraged to adopt strategies that will improve governance quality and economic growth in the long term without sacrificing good governance practices in short term, if the influence of economic crises on the relationship between governance and growth is understood. So, studying economic growth and its relationship to the governing process will help explain the factors that influence it during times of crisis and the ways in which it might be improved.

Many authors describe the positive effect of the good governance on economic growth, but this correlation is not always positive in overall countries and in any conditions. Daniel Kaufmann and Aart Kraayĺ (2010) indicate that there is not a positive relationship between capital income and governance. The positive or negative causality depends on the implementation of a good strategy of governance that builds a set of efficient institutions and forward improvement the so-called good governance. His thesis involve that causality could not be automatically positive without considering the political will and the existence of feedback mechanisms between economic growth and good governance, to create a "virtuous circle" of good governance and national wealth. Kaufmann followed in a certain way the thesis developed by Mushtaq Khan (1995) on the role of the political factor in economic growth: in effect, the theory of Mushtaq Khan explain that good governance can only occur if one overcomes the symptoms of "state failure".

Hashem (2019), in his paper "The Impact of Governance on Economic Growth and Human Development During Crisis in Middle East and North Africa" concluded that there is no relationship between governance and economic growth in MENA countries and no impact of the global financial crisis in 2008 on the relationship between governance and economic growth. Pere (2015), using a panel data for western Balkan countries for the period (1996-2012), concludes that not all aspects of good governance have the same impact on economic growth and for some of them this impact is faster than others. The statistical analysis shows that political stability, absence of violence (stb) and the strengthening of law enforcement (law) affect the growth of the same period, but it is not evident for other indicators. The analysis by Pere (2015) concluded that the impact of good governance in economic development cannot be interpreted in short term, only 12 years study. Overcoming from this interpretation we have analyzed 23 years of data, period that coincides with a series of important transformations undertaken by governments in Albania after the fall of the communist regime in 1990.

Indicators of good governance according to the world bank and the values of these indicators for Albania

The Worldwide Governance Indicators (WGI) project reports aggregate and individual governance indicators for over 200 countries and territories over the period 1996–2019, for six dimensions of governance:

Voice and Accountability
Political Stability and Absence of Violence
Government Effectiveness

Regulatory Quality
Rule of Law
Control of Corruption

These indicators were developed by Kaufmann et al. (2011) and have been published since 1996 by the World Bank. They are based on several hundred variables obtained from 31 different data sources, capturing governance perceptions as reported by survey respondents, nongovernmental organizations, commercial business information providers, and public sector organizations worldwide (Kraay, Kaufmann & Mastruzzi, 2010). Each component takes values between -2.5 and +2.5 and the values near +2.5 are interpreted as a positive development in the related good governance component. The WGI tends to be the most widely-used indicators of good governance by policymakers and academics. The purpose of the construction of these indicators is to measure the evolution of good governance by country and implement a policy to improve these indices in order to ensure that improving good governance could reduce the failure of the state.

Table 1: The values for six indicators (or components) of good governance for Albania during 1996-2019 period

Year	Voice and Accountability	Political Stability/ No Violence	Government Effectiveness	Regulatory Quality	Rule of Law	Control of Corruption
1996	-0.648	-0.330	-0.689	-0.474	-0.684	-0.894
1997	-0.518	-0.436	-0.660	-0.324	-0.804	-0.964
1998	-0.387	-0.543	-0.631	-0.173	-0.924	-1.033
1999	-0.336	-0.540	-0.693	-0.214	-0.967	-0.945
2000	-0.285	-0.538	-0.755	-0.254	-1.009	-0.857
2001	-0.147	-0.416	-0.644	-0.240	-0.885	-0.863
2002	-0.008	-0.295	-0.533	-0.225	-0.762	-0.869
2003	0.070	-0.309	-0.538	-0.448	-0.723	-0.812
2004	0.007	-0.428	-0.416	-0.166	-0.688	-0.699
2005	0.004	-0.507	-0.659	-0.372	-0.736	-0.786
2006	0.076	-0.508	-0.524	-0.102	-0.685	-0.804
2007	0.113	-0.203	-0.407	0.061	-0.646	-0.688
2008	0.175	-0.031	-0.357	0.148	-0.589	-0.594
2009	0.141	-0.045	-0.258	0.238	-0.500	-0.538
2010	0.124	-0.191	-0.283	0.229	-0.407	-0.525
2011	0.062	-0.282	-0.208	0.233	-0.455	-0.683
2012	0.022	-0.144	-0.268	0.199	-0.520	-0.727
2013	0.049	0.092	-0.317	0.210	-0.518	-0.699
2014	0.144	0.486	-0.086	0.222	-0.338	-0.548
2015	0.157	0.346	0.010	0.187	-0.328	-0.479
2016	0.171	0.345	0.013	0.189	-0.329	-0.405
2017	0.203	0.378	0.084	0.223	-0.402	-0.418
2018	0.208	0.378	0.115	0.268	-0.392	-0.522
2019	0.152	0.119	-0.061	0.274	-0.411	-0.529

Below are the graphs of six components for Albania, during 1996-2019 period. A lack of stability is observed in the behavior of these indicators for the period analyzed and the values of all six indicators have deteriorated in 2019.

Voice and Accountability and Regulatory Quality Indicators have a positive trend and positive values after 2005.

Rule of Law and Control of Corruption indicators have only negative values. For more, the values in 2019 are lower than the values in 2018.

Political Stability and Absence of Violence indicators, although has a stability in period 2014-2018, while there is a decline in 2019.

Government Effectiveness indicator, has positive values only in period 2015-2018. In 2019, the value goes to negative again.

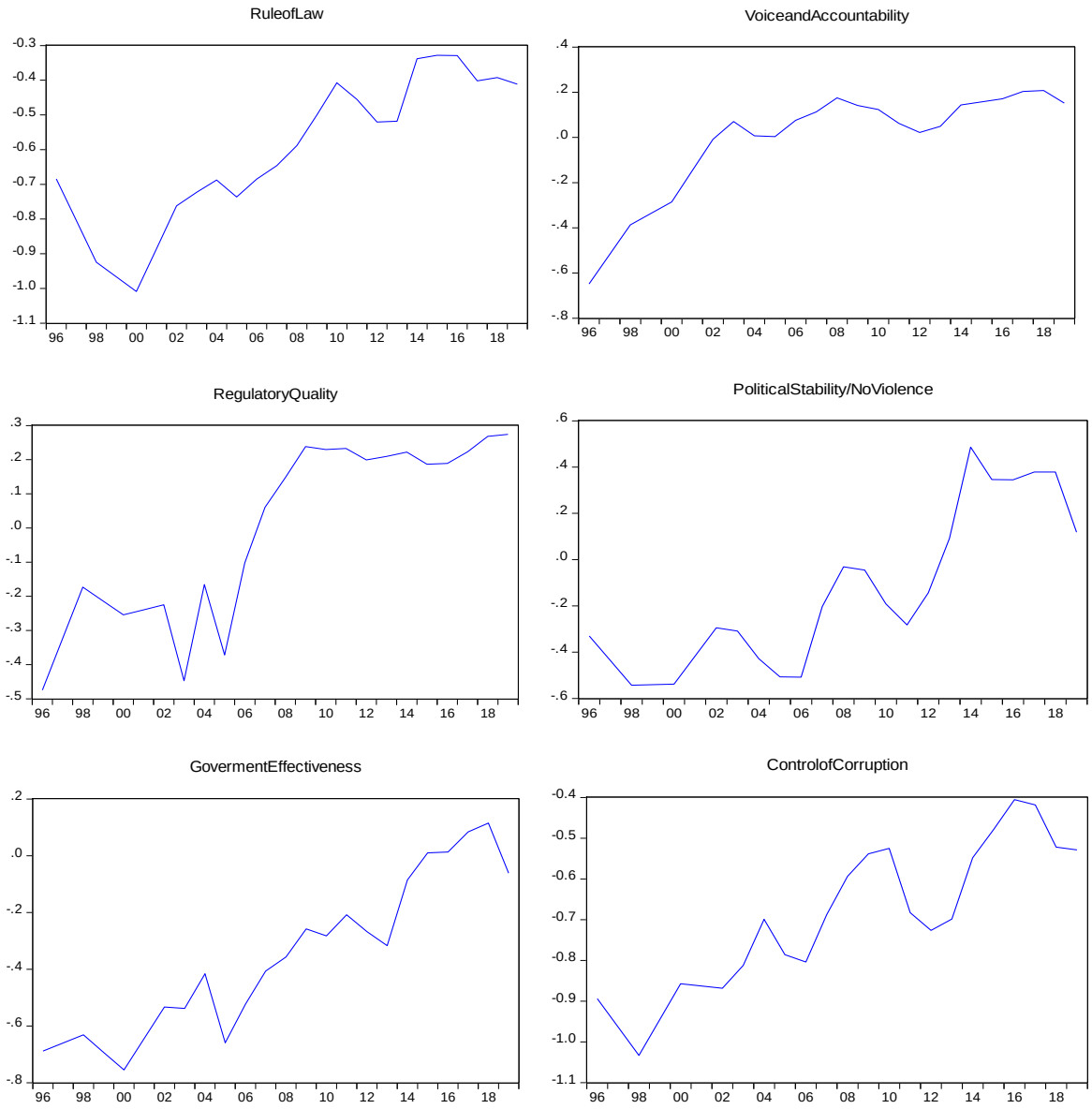

Figure 1: The graphs of six components for Albania, during 1996-2019 period

Methodology and Empirical Analysis

Methodology

In this study the relationship between good governance and economic development is tested using regression analysis. In order to define the good governance, is used the database of World Bank for six different World Governance Indicators (WGI), which are: government effectiveness, political stability, control of corruption and regulatory quality, voice and accountability, and rule of law.

In order to avoid the multicollinearity problem, caused by the correlation between the six components (see table 2), is calculated a unique composite index using principal component analysis, and this index was named the Good Governance Index (GGI). Firstly, since the values for the six components are missing for years 1997, 1999 and 2001, they are supplemented by the average of the neighboring values. For example, the missing value for Control

of Corruption for the year 1997 is calculated as the average of values for Control of Corruption for years 1996 and 1998.

After that, using Principal Component Analysis, is constructed the Good Governance Index (GGI), which will be used to perform regression analysis. The principal Component Analysis is a statistical technique which is used for to reduce the dimensionality of large data sets, by transforming the original set of correlated variables into e new smaller set of uncorrelated ones. The PCA is recommended in cases when the researcher is interested to determine the minimum number of factors that explain the maximum variance in original data. The first component founded by PCA, which is linear combination of original variables, is the one that explain the most variability in the original data, after the second and so on. After performing the PCA, is identified the unique component that explain about the 85% of variability in the original data. This component is called Good Governance Index and is taken into consideration to test for the relationship between Good Governance and economic growth.

Table 2: The correlation matrix for the 6 components values for Albania for 1996-2019 time period

Correlation Coefficient	Voiceand Accountability	Political Stability	Government Effectiveness	Regulatory Quality	Ruleof Law	Controlof Corruption
Voiceand Accountability	1	0.639	0.757	0.726	0.717	0.818
PoliticalStability	0.639	1	0.916	0.753	0.869	0.855
Government Effectiveness	0.757	0.916	1	0.865	0.925	0.912
RegulatoryQuality	0.726	0.753	0.865	1	0.812	0.814
RuleofLaw	0.717	0.869	0.925	0.812	1	0.903
ControlofCorruption	0.818	0.855	0.912	0.814	0.903	1

The values for economic growth were transform into logarithmic form to improve the distribution and avoid the effect of outliers. In order to avoid the spurious regression, before performing the regression analysis, the variables are tested for stationarity. The test used for stationarity is Augmented Dickey Fuller test (ADF). As the both series: Good Governance Index $(GGI)_t$ and economic growth $(\ln EG)_t$ result non stationary, they are differenced. After that, the new series $d(GGI)_t$ and $d(\ln EG)_t$, result stationary. On the other hand, the simple regression analysis is used to test for the effect of good governance to economic growth. The model of simple linear regression is:

$$d(\ln EG)_t = \gamma_0 + \gamma_1\, d(GGI)_t + \varepsilon_t, \text{ where } \varepsilon_t \text{ is the error term.} \qquad (1)$$

Finally, the Granger Causality Test was performed to test which kind of causality exists between two stationary variables $d(GGI)_t$ and $d(EG)_t$: Unidirectional causality, bilateral causality or the series are independent.

Data Analysis

In order to study the relationship between the two variables good governance and economic growth in the Albanian context, we have utilized data taken from the website of the World Bank, corresponding to the 1996-2019 time period. The data for economic growth are in (%) while the values for each of six different World Governance Indicators (WGI): government effectiveness, political stability, control of corruption and regulatory quality, voice and accountability, and rule of law are between -2.5 and +2.5. The Table 3 below presents the result from Kaiser – Meyer – Olkin measure of sampling Adequacy and Bartlett's Test of Sphericity.

Table 3: KMO and bartlett's test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.887
Bartlett's Test of Sphericity	Approx. Chi-Square	169.4
	df	15
	Sig.	0

As the value of KMO is greater than 0.8, this is an indication that principal Component Analysis is useful in our case.This result can be stressed by the result from Bartlett's test of Sphericity as the significance value is 0.000, smaller than α=0.05.This result demonstrate that there is a certain redundancy between the variables that can

summarize with a few number of components. Based on the findings of PCA, conducted on original data, only a single principal component was obtained, with an eigenvalue of 5.105.

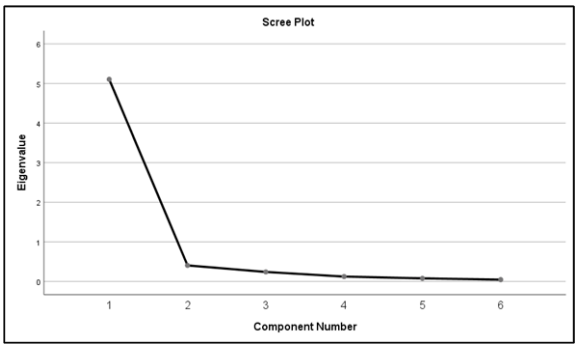

Figure 2: The scree plot identifies one component

From Table 4, can be seen that the principal component explains about 85.084% of variances from the original data set.

Table 4: The result from principal component analysis

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	5.105	85.084	85.084	5.105	85.084	85.084
2	0.406	6.76	91.844			
3	0.241	4.009	95.854			
4	0.124	2.063	97.917			
5	0.079	1.31	99.227			
6	0.046	0.773	100			

Extraction Method: Principal Component Analysis.

Also, the variables are loaded on the principal component with very high loading values ranging between 83.7% and 97.4%.

Table 5: The component matrix

	Component 1
VoiceandAccountability	0.837
PoliticalStability	0.913
GovermentEffectiveness	0.974
RegulatoryQuality	0.898
RuleofLaw	0.947
ControlofCorruption	0.959

Extraction Method: Principal Component Analysis.

a. 1 components extracted.

So, for further analysis, is taken into consideration the first component identified by principal component analysis and this component is called Good Governance Index. In order to avoid spurious regression, before performing the regression analysis, is necessary doing the stationary tests for both variables. The test used is the Augmented Dickey

– Fuller for unit roots.

The results for all three cases, for both series $(\mathrm{GGI})_t$ and $(\mathrm{lnEG})_t$ are shown below.

Table 6: ADF test results for unit roots for $(\mathrm{GGI})_t$ and for $(\mathrm{lnEG})_t$

Null Hypothesis: $(\mathrm{GGI})_t$ has a unit root			Null Hypothesis: $(\mathrm{lnEG})_t$ has a unit root		
Exogenous: None	Exogenous: Constant, Linear Trend	Exogenous: Constant	Exogenous: None	Exogenous: Constant, Linear Trend	Exogenous: Constant
p=0.2850	p=0.0517	p=0.7572	p=0.3354	p=0.5967	p=0.0521

As p-values are greater than α=0.05, we conclude that both series are not stationary. After that, the variables are tested in first difference for stationarity using again the ADF test and both variables became stationary at 5% level of significance.

Table 7: ADF test results for unit roots for $d(GGI)_t$ and for $d(lnEG)_t$

Null Hypothesis: $d(GGI)_t$ has a unit root			Null Hypothesis: $d(lnEG)_t$ has a unit root		
Exogenous: None	Exogenous: Constant, Linear Trend	Exogenous: Constant	Exogenous: None	Exogenous: Constant, Linear Trend	Exogenous: Constant
p=0.0014	p= 0.0350	p=0.0063	p=0.000	p=0.000	p=0.000

So, both series $d(GGI)_t$ and $d(lnEG)_t$ are stationary.

The table 8 presents the result from regression analysis, considering as dependent variable $d(lnEG)_t$ and as independent variable $d(GGI)_t$.

Table 8: The estimated equation of model (1)

Variable	Estimated coefficients	S.E	t-statistic	P-value
c	-0.022379	0.205078	-0.10912	0.9141
$d(GGI)_t$	0.050968	0.700725	0.072736	0.9427

So, the estimated equation is: $\hat{y}$ = - 0.022 + 0.051 x

The result from table 8 shows that although the sign before the independent variable $d(GGI)_t$ is positive, this variable is not statistically significant as the p-value is 0.9427. This result shows that the variable Good Governance Index is not statistically important to explain the variability of economic growth. Before testing for direction of causality between variables $d(lnEG)_t$ and $d(GGI)_t$ using Granger Causality test, it is necessary to select an appropriate lag order of the variables.

Table 9: Lag order selection criteria

VAR Lag Order Selection Criteria
Endogenous variables: GOODGOVERNANCEINDEX LNECONOMICGROWTH
Exogenous variables: C
Date: 10/14/20 Time: 00:37
Sample: 1996 2019
Included observations: 20

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-6.150517	NA	0.007746	0.815052	0.914625	0.834489
1	21.02558	46.19937*	0.000766*	-1.502558*	-1.203838*	-1.444245*
2	23.69811	4.008790	0.000890	-1.369811	-0.871945	-1.272622
3	24.40727	0.921904	0.001288	-1.040727	-0.343714	-0.904662
4	26.91496	2.758467	0.001615	-0.891496	0.004663	-0.716557

* indicates lag order selected by the criterion
LR: sequential modified LR test statistic (each test at 5% level)
FPE: Final prediction error
AIC: Akaike information criterion
SC: Schwarz information criterion
HQ: Hannan-Quinn information criterion

Table 9 presents the lag order of the variables selected by different tests. We have selected the lag 1, as it is suggested from all criterions: LR, FPE, AIC, SC and HQ.

The final step is identifying the direction of causality between variables $(GGI)_t$ and $(lnEG)_t$. To test for causality, we will use the Granger causality test. As for this test the variables are assumed to be stationary, it is necessary to operate with the variables $d(GGI)_t$ and $d(lnEG)_t$. Using the results of table 9, the lag order of variables is 1.
The Granger Causality test involves estimating the pair of regressions:

$$d(GGI)_t = c + \alpha_1\, d(lnEG)_{t-1} + \alpha_2 d(GGI)_{t-1} + u_{1t} \quad (2)$$
$$d(lnEG)_t = k + \beta_1 d(GGI)_{t-1} + \beta_2 d(lnEG)_{t-1} + u_{2t} \quad (3)$$

Where it is assumed that the disturbances u_{1t} and u_{2t} are uncorrelated. Equation (2) postulates that the current $(GGI)_t$ is related to past values of itself as well as that of $(lnEG)_t$ and equation (3) postulates a similar behavior of $(lnEG)_t$. The Table 10 shows the results of the Granger Causality test.

Table 10: Granger Causality test results

Granger Causality test results		
Lag 1	Null Hypothesis	Prob
	$d(GGI)_t$ does not Granger Cause $d(lnEG)_t$	0.5302
	$d(lnEG)_t$ does not Granger Cause $d(GGI)_t$	0.9324

From Table 10, as the p values are both greater than α=5%, the null hypothesis is not rejected. In other words, the $d(GGI)_t$ does not Granger Cause $d(lnEG)_t$ and vice versa. So, we conclude that the data-generating processes for the two series: $(GGI)_t$ and $(lnEG)_t$, are independent variables.

Conclusions

This study used Principal Component Analysis and the simple regression analysis to examine the relationship between Good Governance and Economic Development in Albania, using data from World Bank for 1996-2019 time period. Through Principal Component Analysis, using all the data for six indicators: government effectiveness, political stability, control of corruption and regulatory quality, voice and accountability, and rule of law, is identified the unique component that explain about the 85% of variability in the original data. This component is called Good Governance Index and is taken in consideration for regression analysis. The results indicate that Good Governance is not statistically important to explain economic growth in Albania. For more, using Granger Causality test results that neither of variables cause the other. This result can be explained with the current model of economic growth in Albania that is based mainly on remittances, public debt, donations, soft loans and foreign aid. It is time to implement wise and solid policies for economic growth to guarantee its long term sustainability.

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Comparison of Financial Performances of Banks by Multi Criteria Decision Making Methods: The Case of Turkey

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Abstract: The share of participation banking in the finance sector has been growing in recent years. This growth indicates that participation banking will be an important competitor for traditional banking in the banking system. In this context, the financial performances of traditional banking and participation banking are compared in this study. While measuring, primarily the data obtained from banks' financial statements were used. These data, consisting of 15 financial ratios in 5 different categories, have been obtained from banks' financial statements and income statements. In this study, the financial performance of 18 traditional banks and 3 participation banks operating in Turkey between 2010 and 2018 were analyzed with multivariate decision-making methods. The Technique for Order Preference by Similarity to Ideal Solution (TOPSIS) method was used to measure the financial performance. As a result of the analysis, it was determined which banks showed better financial performance and the results were commented.

Keywords: Financial Performance, Multi Criteria Decision Making, TOPSIS

Introduction

Banks are institutions that provide the funds they collect from people and institutions with excess funds as loans to people and institutions in need of funds in exchange for a certain interest. Besides intermediation activities between the real sector and the financial sector, banks are institutions that bring the idle funds in the economic life to the real economy (Bektaş, 2020: 794).

Banks have vital importance in delivering the funds required for individuals and institutions in the country's economy, and in this respect, they play an important role in the economic development and growth of countries. These features make them an indispensable element of economic life. Banks are also involved in other activities besides loan transactions such as investment consulting, mediation, guarantee and ownership, property assurance (Özkan and Deliktaş, 2020: 32) (Yetkin and Sandalcılar, 2017: 51).

There are serious groups of people in the world trying to stay away from the banks because of interest, especially in countries with a large Muslim population. Turkey is one of these countries. Although this system, which purposes risk sharing based on participation in profit and loss, is known as interest-free banking in the world, it is called participation banking in Turkey. Thanks to this system, which is an alternative to traditional banking, funds that are not directed to traditional banks because of the interest sensitivity of the savers are brought to the real economy (Parlakkaya and Çürük, 2011: 397). This alternative system, which has gained an increasingly important place in the financial system, has complemented traditional banks in recent years and adds depth and diversity to the financial sector (Özulucan and Deran, 2009: 86).

Since both traditional banking and participation banking are important actors of the financial sector, they significantly affect the national economies. For this reason, an accurate and reliable measurement of the financial performance of banks and realistic analysis of their financial structures are of vital importance for a sound banking system (Kaygusuz, Ersoy and Bozdoğan, 2020: 68). It is important to measure and evaluate their

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financial performance, as participation banks have increased their shares in the Turkish banking sector in recent years. Monitoring the financial performance of banks in a comparative, holistic, and practical way can be done with multi-criteria decision making (MCDM) techniques (Sarı and Kabakçı, 2019: 371).

In this study, the financial performances of 18 traditional banks and 3 participation banks operating in Turkey between 2010-2018 were compared. We divided the data used in the study into 5 different categories comprises 15 financial ratios. We got these financial ratios from the financial statements of the banks. In our study, TOPSIS method, which is one of the Multi-Criteria Decision Making (MCDM) techniques often used in financial performance comparisons, was used.

Literature

The table below summarizes some studies in this field.

Table 1. Summary of Literature

Research	Year	Method	Result
Yudistira (2004)	1998-1999	DEA	As a result of the research, it was concluded that inefficiency in Islamic banks was low and Islamic banks performed very well during the 1998-1999 global crisis.
Demireli (2010)	2001-2007	TOPSIS	As a result of the study, it was concluded that state-owned banks were affected by local and global financial crises.
Özgür (2008)	2001-2005	DEA	As a result of the analysis, it was concluded that total factor productivity is closely related to efficiency.
Dinçer and Görener (2011)		VIKOR and TOPSIS	As a result of the study, they found that foreign banks had a better performance than other banks.
Çetin and Bıtırak (2010)	2005- 2007	AHS	As a result of this study, Akbank ranked first among commercial banks during the research period.
Yayar and Baykara (2012)	2005–2011	TOPSIS	As a result of this study, AlbaraTurk ranked first among participation banks in the research period.
Onour and Abdalla (2011)	2007-2008	DEA	It has been demonstrated that bank size is an important factor for scale efficiency.
Sakarya and Kaya (2013)	2005-2012	Panel Data Methods	According to the results of the research, it has been concluded that while the participation banks have higher equity and focus on financial intermediation activities, they do not differ from other banks in terms of efficiency and profitability.
Doğan (2013)	2005-2011	t test	As a result of the analysis, it has been determined that traditional banks have higher liquidity, solvency and capital adequacy and lower risk than participation banks. However; There is no statistically significant difference between the profitability of participation banks and traditional banks.
Kandemir (2016)	2004-2014	TOPSIS-VIKOR	As a result of the research; Vakıfbank was the bank with the highest financial performance and Şekerbank was the bank with the lowest financial performance.
Esmer and Bağcı (2016)	2005-2014	TOPSIS	As a result, financial performance analysis can provide the investor with opportunities to invest by providing tips on predicting the future.

Financial Performance

Performance is a concept that determines the output quantitatively and qualitatively in line with the determined target (Vural, 2013: 45). We can define the efficient use of resources in an enterprise and the financial position of the enterprise as financial performance. In other words, financial performance is a measure of how effectively resources are used rather than total output (Karaoğlan and Şahin, 2018: 63).

Financial performance plays an important role in determining the financial structures of enterprises, investments, and the efficiency and risk level of these investments. Business managers also need financial performance measurements for the realistic evaluation of past term activities and for future investments and financing decisions (Uygurtürk and Korkmaz, 2012: 96). In business life, that there is intense competition, it is necessary for the banks to make the best decisions, to continue their activities effectively, and to maximize profits. The effective operation of the banking sector, which determines the resource distribution and acts as a financial intermediary, unlike other sectors in the economy, is of great importance for the economy. This situation has brought the banking sector to a central position in the economic development of the countries (Ertuğrul and Karakaşoğlu, 2009: 20). Especially with the global crisis in the 2000s, it is an undeniable reality that financial performance measures are now important in the banking sector.

Financial performance is the measure of the level of achievement of financial targets for banks. By measuring their financial performance, banks make more accurate evaluations in terms of how much they achieve their profitability and growth targets, customer satisfaction levels, service quality, employee performance, and accordingly regulating wages (Latifi, 2015: 30). Therefore, analyzing financial performance is a vital issue for all banks.

TOPSIS Method

The TOPSIS method is one of multi-criteria decision-making methods developed by Hwang and Yoon in 1981 to solve multi-criteria decision-making problems."The chosen alternative should have the shortest distance from the ideal solution and the farthest from the negative-ideal solution" (Yoon and Hwang, 1995: 75). With this method, it is possible to rank alternative options according to certain criteria and by analyzing their distance to the ideal solution between the maximum and minimum values that the criteria can take. Topsis method comprises the following steps and a series of mathematical calculations.

Step 1: Construct the decision matrix

The figure below shows the Decision matrix.

$$A_{ij} = \begin{bmatrix} a_{11} & a_{12} & \dots & a_{1n} \\ a_{21} & a_{22} & \dots & a_{2n} \\ . & & & . \\ . & & & . \\ . & & & . \\ a_{m1} & a_{m2} & \dots & a_{mn} \end{bmatrix}$$

In matrix A_{ij}, m shows the number of decision points and n shows the number of evaluation factors.

Step 2: Normalized Decision Matrix (R)
The Normalized matrix is calculated according to the following formula:

$$r_{ij} = \frac{a_{ij}}{\sqrt{\sum_{k=1}^{m} a_{kj}^2}}$$

$$R_{ij} = \begin{bmatrix} r_{11} & r_{12} & \cdots & r_{1n} \\ r_{21} & r_{22} & \cdots & r_{2n} \\ \cdot & & & \cdot \\ \cdot & & & \cdot \\ \cdot & & & \cdot \\ r_{m1} & r_{m2} & \cdots & r_{mn} \end{bmatrix}$$

i = 1, …,m j = 1,…,n

Step 3: Weighted Normalized Decision Matrix (V)

The weights are distributed so that the sum of the weight values is 1.

$$\sum_{i=1}^{n} w_i = 1$$

Then the elements in each column of the Matrix R are multiplied by W_i, creating The Matrix V.

$$\mathbf{V_{ij}} = \begin{bmatrix} \mathbf{w_1 n_{11}} & \mathbf{w_2 n_{12}} & \cdots & \mathbf{w_n n_{1p}} \\ \mathbf{w_1 n_{21}} & \mathbf{w_2 n_{22}} & \cdots & \mathbf{w_n n_{2p}} \\ \cdot & & & \cdot \\ \cdot & & & \cdot \\ \cdot & & & \cdot \\ \mathbf{w_1 n_{m1}} & \mathbf{w_2 n_{m2}} & \cdots & \mathbf{w_n n_{mp}} \end{bmatrix} \Rightarrow \mathbf{V_{ij}} = \begin{bmatrix} \mathbf{v_{11}} & \mathbf{v_{12}} & \cdots & \mathbf{v_{1p}} \\ \mathbf{v_{21}} & \mathbf{v_{22}} & \cdots & \mathbf{v_{2p}} \\ \cdot & & & \cdot \\ \cdot & & & \cdot \\ \cdot & & & \cdot \\ \mathbf{v_{m1}} & \mathbf{v_{m2}} & \cdots & \mathbf{v_{mp}} \end{bmatrix}$$

Step 4: Determination of Ideal (A^+) and Negative Ideal (A^-) Solution
At this stage, the maximum and minimum values in each column in the weighted decision matrix are determined.

$A^+ = \{v_1^+, v_2^+, \ldots, v_n^+\}$ (Max Values)

$A^- = \{v_1^-, v_2^-, \ldots, v_n^-\}$ (Min Values)

Step 5: Calculation Of Distance Measures Between Alternatives

In this step, the distance values to the maximum and minimum ideal points are calculated using the following formulas**.**

$$S_i^* = \sqrt{\sum_{j=1}^{n} (v_{ij} - v_j^*)^2}$$

$$S_i^- = \sqrt{\sum_{j=1}^{n} (v_{ij} - v_j^-)^2}$$

Step 6: Calculation of the relative closeness to the ideal solution

The relative closeness of each decision point to the ideal solution is calculated according to the formula below.

$$C_i^* = \frac{S_i^-}{S_i^- + S_i^*}$$

The value of C_i lies in the range 0 to 1. C_i=1 shows the ideal solution, Ci=0 shows the negative ideal solution (Ömürbek and Kınay, 2013:352-355).

Application

In this study, the financial performance of 18 traditional banks and 3 participation banks operating in Turkey between 2010 and 2018 was examined with multivariate decision-making methods. The figure1 below shows the financial ratios used in the study.

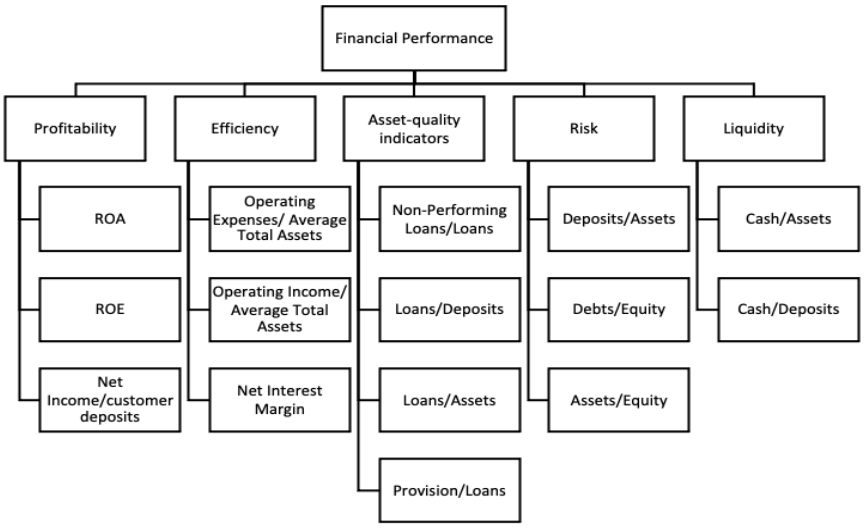

Figure1. Financial performance ratios

Banks whose financial performances were calculated in the study are shown in Appendix. There are two steps in the study. In the first step, we got an overall ranking of all banks. In the second step, banks were grouped as conventional public banks, conventional private banks and participation banks and then sorted. All stages of the TOPSIS method are shown in the Appendix. The last stage, the ranking table, is shown below. According to this table**;**

Table 2. TOPSIS Ranking Results

	Si*	Sİ-	Ci*	Rank
Akbank T.A.Ş.	0.022890514	0.053203738	0.699182091	1
Türkiye Garanti Bankası A.Ş.	0.024511167	0.053428983	0.685512962	2
Türkiye Cumhuriyeti Ziraat Bankası A.Ş.	0.025455672	0.053690506	0.678371432	3
Türkiye İş Bankası A.Ş.	0.027128045	0.050050708	0.648503713	4
Anadolubank A.Ş.	0.029776015	0.048547491	0.619832964	5
Türkiye Halk Bankası A.Ş.	0.033150335	0.048498452	0.59398864	6
KVYT	0.030428258	0.044491173	0.593853588	7
Yapı ve Kredi Bankası A.Ş.	0.0312249	0.045550475	0.593295372	8
Citibank A.Ş.	0.03660039	0.052784105	0.590528647	9
Denizbank A.Ş.	0.030809651	0.044121487	0.588827132	10
Türk Ekonomi Bankası A.Ş.	0.031376977	0.043001772	0.578145946	11
TF	0.032807265	0.041012664	0.555577127	12
ING Bank A.Ş.	0.034118523	0.040472286	0.54259079	13
Türkiye Vakıflar Bankası T.A.O.	0.035030401	0.04046617	0.536000103	14
ALB	0.036526271	0.039832633	0.521650145	15
Fibabanka A.Ş.	0.04034131	0.040989603	0.503985525	16
Turkish Bank A.Ş.	0.040256662	0.037165972	0.480040143	17
Alternatifbank A.Ş.	0.042226715	0.033033065	0.438920562	18
Şekerbank T.A.Ş.	0.041958285	0.032783199	0.438621193	19
HSBC Bank A.Ş.	0.046263847	0.025486478	0.355210624	20
Turkland Bank A.Ş.	0.055156928	0.027749041	0.334704985	21

Akbank is the most successful bank according to our calculations. It is followed by Garanti Bank and Ziraat Bank. According to the report published by Brand Finance, these three banks are in the list of the most powerful Turkish banks between 2014-2020. The last three banks are Şekerbank HSBC Bank and Turkland Bank.

As a second step, banks were grouped as conventional public, conventional private and participation, and ranked using the same methods. As seen in the table, the most successful bank group is state banks, secondly to participation banks and third to private banks.

Table 3. TOPSIS Ranking Results (Group)

	Si*	Sİ-	Ci*	Rank
Public Conventional	0.024296859	0.037735749	0.608321181	1
Private Participation	0.036537564	0.029478287	0.446533471	2
Private Conventional	0.039451644	0.028353273	0.418159541	3

Conclusion

In this study, we analyzed the financial performance of conventional banks and participation banks operating in Turkey using the TOPSIS method. According to the results of the first analysis, Akbank took first place. According to the results of the second analysis, public banks took first place. According to the results of the study, while the positive performances of public banks were similar to the studies of Demireli (2010) and Kandemir (2016), opposite results with the studies of Dinçer and Görener (2011). The result is not surprising. Because public banks can find deposits more easily and provide services to more customers compared to other banks. The reason private banks are in the last place is that banks such as Turkland Alternatifbank and Turkishbank and Fiba bank have tiny volumes and limited banking transactions. These banks lowered the average of the private bank's group.

In future studies, contributions to the literature can be made by adding new participation banks, removing small volume private banks, and using different financial ratios.

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Appendix

1) Normalized Decision Matrix

	ROA	ROE	Net Income/ Depo	Ope.exp/Asset	Ope. Inc/Asset	Net.In.M	Non-per lo/loans	Loan/Depo	Loan/Asset	Pro/Loan	Depo/Asset	Debt/Equity	Asset/Equity	Cash/Asset	Cash/Depo
Türkiye Cumhuriyeti Ziraat Bankası A.Ş.	0.291	0.331	0.273687681	0.188246527	0.208088905	0.205051769	0.104454778	0.181796978	0.190852635	0.108801026	0.229309847	0.226951883	0.226469395	0.230109907	0.210203851
Türkiye Halk Bankası A.Ş.	0.287	0.323	0.257053992	0.199659951	0.214817842	0.181751451	0.180945945	0.200080488	0.219995967	0.199995216	0.235276549	0.237026086	0.235521399	0.148708634	0.137115301
Türkiye Vakıflar Bankası T.A.O.	0.219	0.25	0.227601893	0.204854148	0.218399701	0.18345768	0.234167142	0.232741237	0.225331165	0.299808701	0.207075658	0.236247295	0.23482163	0.181174352	0.171510215
Akbank T.A.Ş.	0.296	0.256	0.323058622	0.177165166	0.205747078	0.18725826	0.114954935	0.211414379	0.195592289	0.155253075	0.196903378	0.172550285	0.177587762	0.250635171	0.241423117
Anadolubank A.Ş.	0.287	0.221	0.271128622	0.262423112	0.275099287	0.256679668	0.171695121	0.210921578	0.230275388	0.185597074	0.233513114	0.153300483	0.160291179	0.171596052	0.168966095
Fibabanka A.Ş.	0.099	0.146	0.102419267	0.240649008	0.219665976	0.188830618	0.106534104	0.240615729	0.260543172	0.062142025	0.232879239	0.277229697	0.271645672	0.153055884	0.14641666
Şekerbank T.A.Ş.	0.144	0.143	0.136224725	0.292651108	0.282214726	0.251324707	0.31316723	0.216142627	0.23005549	0.254520712	0.226868443	0.219383425	0.219668885	0.150936452	0.142474474
Turkish Bank A.Ş.	0.04	0.031	0.036321019	0.214328792	0.179612525	0.184618954	0.142378104	0.175053084	0.189971817	0.114634357	0.228714365	0.146769318	0.154422711	0.293862505	0.282478442
Türk Ekonomi Bankası A.Ş.	0.187	0.207	0.185418616	0.244968707	0.236507517	0.226629106	0.150998974	0.23334448	0.237879998	0.13981694	0.216939687	0.224146666	0.223948815	0.190888258	0.186650514
Türkiye İş Bankası A.Ş.	0.269	0.252	0.285479279	0.194067685	0.209066528	0.185897374	0.125279623	0.225014339	0.211232319	0.15261941	0.201052589	0.185635311	0.18934509	0.194918473	0.192571916
Yapı ve Kredi Bankası A.Ş.	0.256	0.249	0.274387511	0.190458942	0.209366795	0.182918461	0.219256057	0.235137372	0.220912469	0.222791094	0.199906018	0.200234827	0.202463237	0.169292791	0.175739276
Alternatifbank A.Ş.	0.105	0.152	0.12413991	0.230787837	0.227387828	0.193650004	0.265560031	0.269769472	0.232798951	0.2076432	0.184154364	0.305392382	0.296950773	0.155445045	0.149353274
Citibank A.Ş.	0.336	0.237	0.29247405	0.253024615	0.258399291	0.329097303	0.360989913	0.118465321	0.136057751	0.46103808	0.243203037	0.139051279	0.147487799	0.421930577	0.416550576
Denizbank A.Ş.	0.248	0.264	0.263600517	0.227338474	0.235757229	0.237937214	0.249293119	0.226070399	0.21573216	0.249161039	0.203254359	0.223955755	0.223777275	0.195834316	0.198375987
HSBC Bank A.Ş.	0.061	0.043	0.06077844	0.25324999	0.235220883	0.248471042	0.377550325	0.205912232	0.195992698	0.366678836	0.205488182	0.226378237	0.225953955	0.29409049	0.293657133
ING Bank A.Ş.	0.143	0.147	0.169009975	0.235855121	0.22984772	0.269028554	0.171601861	0.290453649	0.245373275	0.155899331	0.180101496	0.209303701	0.21061192	0.175360712	0.17092116
Turkland Bank A.Ş.	-0.08	-0.07	-0.059243932	0.311865592	0.265458294	0.194301377	0.284931325	0.185498097	0.217717007	0.168731474	0.250464575	0.162502836	0.168559797	0.219430552	0.20879675
Türkiye Garanti Bankası A.Ş.	0.305	0.273	0.338914621	0.189089022	0.218013906	0.210827329	0.140822214	0.22778851	0.206575045	0.161476983	0.193106122	0.176467527	0.181107533	0.211544123	0.208194075
ALB	0.17	0.224	0.144735116	0.104725163	0.109292472	0.183630128	0.201440649	0.199204815	0.233263958	0.179523517	0.24898243	0.28373079	0.277675787	0.183040361	0.200789195
KVYT	0.191	0.241	0.174900236	0.113159532	0.119522907	0.200598632	0.134587259	0.197371083	0.217085207	0.15287552	0.233956122	0.261148556	0.257316274	0.223543444	0.260327938
TF	0.189	0.197	0.187612011	0.116287779	0.12149034	0.212921616	0.218798632	0.241498956	0.238187595	0.197009295	0.211276121	0.218724635	0.219162375	0.173311226	0.225334467

2) Weighted Normalized Decision Matrix

	ROA	ROE	Net Income/ Depo	Ope.exp/Asset	Ope. Inc/Asset	Net.In.M	Non-per lo/loans	Loan/Depo	Loan/Asset	Pro/Loan	Depo/Asset	Debt/Equity	Asset/Equity	Cash/Asset	Cash/Depo
Türkiye Cumhuriyeti Ziraat B	0.019214898	0.021832706	0.018063387	0.012424271	0.013733868	0.013533417	0.006894015	0.011998601	0.012596274	0.007180868	0.01513445	0.014978824	0.01494698	0.015187254	0.013873454
Türkiye Halk Bankası A.Ş.	0.018921224	0.021344478	0.016965563	0.013177557	0.014177978	0.011995596	0.011942432	0.013205312	0.014519734	0.013199684	0.015528252	0.015643722	0.015544412	0.00981477	0.00904961
Türkiye Vakıflar Bankası T.A.(	0.014454619	0.016492517	0.015021725	0.013520374	0.01441438	0.012108207	0.015455031	0.015360922	0.014871857	0.019787374	0.013666993	0.015592321	0.015498228	0.011957507	0.011319674
Akbank T.A.Ş.	0.01954129	0.01687924	0.021321869	0.011692901	0.013579307	0.012359045	0.007587026	0.013953349	0.012909091	0.010246703	0.012995623	0.011388319	0.011720792	0.016541921	0.015933926
Anadolubank A.Ş.	0.01892113	0.014566078	0.017894489	0.017319925	0.018156553	0.016940858	0.011331878	0.013920824	0.015198176	0.012249407	0.015411866	0.010117832	0.010579218	0.011325339	0.011151762
Fibabanka A.Ş.	0.006544728	0.009609433	0.006759672	0.015882835	0.014497954	0.012462821	0.007031251	0.015880638	0.017195849	0.004101374	0.01537003	0.01829716	0.017928614	0.010101688	0.0096635
Şekerbank T.A.Ş.	0.009513601	0.009427064	0.008990832	0.019314973	0.018626172	0.016587431	0.020669037	0.014265413	0.015183662	0.016798367	0.014973317	0.014479306	0.014498146	0.009961806	0.009403315
Turkish Bank A.Ş.	0.002617215	0.002067289	0.002397187	0.0141457	0.011854427	0.012184851	0.009396955	0.011553504	0.01253814	0.007565868	0.015095148	0.009686775	0.010191899	0.019394925	0.018643577
Türk Ekonomi Bankası A.Ş.	0.012360373	0.013665026	0.012237629	0.016167935	0.015609496	0.014957521	0.009965932	0.015400736	0.01570008	0.009227918	0.014318019	0.01479368	0.014780622	0.012598625	0.012318934
Türkiye İş Bankası A.Ş.	0.017738727	0.016599394	0.018841632	0.012808467	0.013798391	0.012269227	0.008268455	0.014850946	0.013941333	0.010072881	0.013269471	0.012251931	0.012496776	0.012864619	0.012709746
Yapı ve Kredi Bankası A.Ş.	0.01690566	0.016465931	0.018109576	0.01257029	0.013818208	0.012072618	0.0144709	0.015519067	0.014580223	0.014704212	0.013193797	0.013215499	0.013362574	0.011173324	0.011598792
Alternatifbank A.Ş.	0.006951047	0.010057385	0.008193234	0.015231997	0.015007597	0.0127809	0.017526962	0.017804785	0.015364731	0.013704451	0.012154188	0.020155897	0.019598751	0.010259373	0.009857316
Citibank A.Ş.	0.022200037	0.015632976	0.019303287	0.016699625	0.017054353	0.021720422	0.023825334	0.007818711	0.008979812	0.030428513	0.0160514	0.009177384	0.009734195	0.027847418	0.027492338
Denizbank A.Ş.	0.01634335	0.017418531	0.017397634	0.015004339	0.015559977	0.015703856	0.016453346	0.014920646	0.014238323	0.016444629	0.013414788	0.01478108	0.0147693	0.012925065	0.013092815
HSBC Bank A.Ş.	0.004009384	0.002846768	0.004011377	0.016714499	0.015524578	0.016399089	0.024918321	0.013590207	0.012935518	0.024200803	0.01356222	0.014940964	0.014912961	0.019409972	0.019381371
ING Bank A.Ş.	0.009452448	0.009674302	0.011154658	0.015566438	0.01516995	0.017755885	0.011325723	0.019169941	0.016194636	0.010289356	0.011886699	0.013814044	0.013900387	0.011573807	0.011280797
Turkland Bank A.Ş.	-0.005186142	-0.004522056	-0.003910099	0.020583129	0.017520247	0.012823891	0.018805467	0.012242874	0.014369322	0.011136277	0.016530662	0.010725187	0.011124947	0.014482416	0.013780586
Türkiye Garanti Bankası A.Ş.	0.020144584	0.018027757	0.022368365	0.012479875	0.014388918	0.013914604	0.009294266	0.015034042	0.013633953	0.010657481	0.012745004	0.011646857	0.011953097	0.013961912	0.013740809
ALB	0.011241711	0.014772127	0.009552518	0.006911861	0.007213303	0.012119588	0.013295083	0.013147518	0.015395421	0.011848552	0.01643284	0.018726232	0.018326602	0.012080664	0.013252087
KVYT	0.012593925	0.015896609	0.011543416	0.007468529	0.007888512	0.01323951	0.008882759	0.013026491	0.014327624	0.010089784	0.015441104	0.017235805	0.016982874	0.014753867	0.017181644
TF	0.012456411	0.012991163	0.012382393	0.007674993	0.008018362	0.014052827	0.01444071	0.015938931	0.015720381	0.013002613	0.013944224	0.014435826	0.014464717	0.011438541	0.014872075

Ideal (A^+) and Negative Ideal (A^-) Solution

	ROA	ROE	Net Income/ Deposits	Ope.exp/ Asset	Ope. Inc/Asset	Net.In. M	Non-perlo/loans	Loan/ Depo	Loan/ Asset	Pro/Loan	Depo/ Asset	Debt/Equity	Asset/ Equity	Cash/ Asset	Cash/ Depo
S*	0.022200037	0.021832706	0.022368365	0.006911861	0.018626172	0.021720422	0.006894015	0.019169941	0.017195849	0.004101374	0.011886699	0.009177384	0.009734195	0.027847418	0.027492338
S-	-0.005186142	-0.004522056	-0.003910099	0.020583129	0.007213303	0.011995596	0.024918321	0.007818711	0.008979812	0.030428513	0.016530662	0.020155897	0.019598751	0.009801477	0.009004961

3) Distance Measures Between Alternatives

	Si*	Si-
Türkiye Cumhuriyeti Ziraat Bankası A.Ş.	0.025455672	0.053691
Türkiye Halk Bankası A.Ş.	0.033150335	0.048498
Türkiye Vakıflar Bankası T.A.O.	0.035030401	0.040466
Akbank T.A.Ş.	0.022890514	0.053204
Anadolubank A.Ş.	0.029776015	0.048547
Fibabanka A.Ş.	0.04034131	0.04099
Şekerbank T.A.Ş.	0.041958285	0.032783
Turkish Bank A.Ş.	0.040256662	0.037166
Türk Ekonomi Bankası A.Ş.	0.031376977	0.043002
Türkiye İş Bankası A.Ş.	0.027128045	0.050051
Yapı ve Kredi Bankası A.Ş.	0.0312249	0.04555
Alternatifbank A.Ş.	0.042226715	0.033033
Citibank A.Ş.	0.03660039	0.052784
Denizbank A.Ş.	0.030809651	0.044121
HSBC Bank A.Ş.	0.046263847	0.025486
ING Bank A.Ş.	0.034118523	0.040472
Turkland Bank A.Ş.	0.055156928	0.027749
Türkiye Garanti Bankası A.Ş.	0.024511167	0.053429
ALB	0.036526271	0.039833
KVYT	0.030428258	0.044491
TF	0.032807265	0.041013

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