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Research Articles

SUPPLY CHAIN MANAGEMENT PERFORMANCE EVALUATION: COMPREHENSIVE LITERATURE REVIEW

Emel YONTAR[1]

Süleyman ERSÖZ[2]

Abstract

Supply Chain Management Performance Evaluation (SCMPE) has become a necessity for businesses. In this study, the publications in the field of performance evaluation in supply chain management are analyzed. The distribution of the studies which deal with the issue of SCMPE is between 1991-2019 according to years. The literature review is made on the databases ScienceDirect, Scopus, Taylor&Francis Online and Emerald by using the keywords (Supply Chain Management, Performance Evaluation, Performance Assessment). For SCMPE, as a result of publications reviewed, it is seen that the most frequently used model encountered in literature researches is SCOR-based studies and Balanced Scored Card, model. However, recent research has drawn attention to those using different or integrated methods of performance evaluation in supply chain management. Performance evaluation criteria are determined as the most studied and least studied. For future studies, the scope of the study can be extended by adding more databases.

Keywords: Supply Chain Management, Performance Evaluation, Measurement Metrics

JEL Codes: M11, M19, L25

1. INTRODUCTION

With the world becoming a global market, Supply Chain Management (SCM) plays an important role in the efficient and efficient management of enterprises. Particularly, an evaluated supply chain management creates awareness in terms of deficiencies and errors in the enterprise. For this reason, performance measurement is included in the supply chain line and thus, it is provided to adapt to the developing market. There are quite common studies on the subject. In this study, it is aimed to draw attention to the publications performing performance evaluation in supply chain management and to guide the enterprises.

Supply Chain Management is a key strategic factor for increasing organizational effectiveness and for better realization of organizational goals such as enhanced competitiveness, better customer care and increased profitability (Gunasekaran et al., 2001).

A performance measurement system plays an important role in managing a business as it provides the information necessary for decision-making. According to Kaplan (1990), ‘‘No measures, no improvement,’’ it is essential to measure the right things at the right time in a supply chain and virtual enterprise environments so that timely action can be taken. Performance metrics are not measuring the performance. Good performance measures and metrics will facilitate more open and transparent communication between people leading to cooperative supported work and hence improved organizational performance (Gunesekaran and Kobu, 2007).

Performance measurement is an analysis of whether or not a business has reached its pre-determined goals. Given that the non-measurer cannot be managed, in order to gain access to the level of performance desired by the business, it is first necessary to have developments in the field of performance measurement.

The performance measures implemented in supply chain management provide the potential problems that may arise and occur at every stage of the chain and provide necessary pre-cautions to the enterprises.

Due to playing a critical role in the success of businesses, the evaluation of chain performance is an important analysis in order to develop an effective and effective supply chain. According to Parker (2000), it is important to measure supply chain management performance for the following reasons; (1) identify success; (2) identify whether they are meeting customer requirements; (3) help them understand

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their processes; (4) identify where problems bottlenecks, waste, etc., exist and where improvements are necessary; (5) ensure decisions are based on fact; (6) show if improvements planned, actually happened.

Performance measurement can be defined as the process of quantifying the efficiency and effectiveness of an action. A performance measure is a set of metrics used to quantify the efficiency and/or effectiveness of an action (Neely et al. 1995). A performance evaluation system should provide managers with sufficient information about innovation, internal processes, customer and finance, improvement (Kaplan and Norton 1997). Even many systems are used for this work, such as the Balanced Score Card (BSC) and the Supply Chain Operations Reference Model (SCOR) model. These methods have been popular in strategy formulation with clearly defined suitable performance metrics.

Chain performance has many elements in it and these elements are composed of many variables that can be measured by quantitative and qualitative methods. Maskell (1989) suggests seven principles of Performance Evaluation System: (1) nonfinancial measures should be adopted; (2) measures should change as circumstances do; (3) measures should stimulate continuous improvement (4) measures should vary between departments or companies; (5) measures should be simple and easy to use; (6) measures should provide fast feedback and (7) the performance measurement should be directly related to firm's strategy. There are several metrics in the literature and in this study, the issues of supply chain performance evaluation are analyzed, and the criteria used for evaluation, the methods that use these criteria in analysis, and the different study topics are addressed. Publications between 1991-2019 to perform supply chain management performance evaluation studies have been reviewed. Also, which methods have been used in the studies and which performance evaluation criteria are included in the evaluation are shown. In the literature, supply chain management is also understood in terms of the number of publications reviewed in which performance evaluation sub-jects are studied more.

The aim of this literature review firstly gives insight to the people who will perform supply chain performance evaluation studies. The other purposes are,

1. To understand the importance of performance evaluation in supply chain management.
2. To indicate the performance metrics with detailed studies.
3. To put the whole table in its general form without discriminating between different sectors.
4. To suggest some future research directions based on the gap.

This study attempts to provide an overview of performance evaluation studies in supply chain management systems. The publications on performance evaluation related to supply chain management between 1991-2019 are investigated. The results are tabulated for the performance measurement system. Performance evaluation criteria are determined as the most studied and least studied. The aim of this study is to reveal the performance evaluation criteria with a detailed analysis.

2. LITERATURE REVIEW

Based on the literature, we define supply chain performance as the ability of the supply chain to deliver the right product to the right place at the right time at the lowest logistics cost (Zhang and Okoroafo, 2015).

Supply chain performance evaluation problems range from assessing the performance of independent organizations to evaluating the performance of the all supply chain system and it is one of the most comprehensive strategic decision problems to consider. According to this, the performance evaluation of the supply chain means evaluating the performance of distribution, production, planning, purchasing, and marketing organizations independently (Xu et al., 2009).

In the literature, many different approaches are used in determining performance metrics. When the 79 publications between 1991 and 2019 are examined, the result in Figure 1 is revealed. In Figure 1, 69 of 79 publications are included to form this graph. Since 10 publications, which are not included in this graph, are related to examining the impact on performance evaluation, 69 publications are used. Accordingly, other approaches have the widest range (54%). 37 publications, 54% of which, are studied using different approaches (questionnaire, simulation, comparison, etc.). The relevant data is described

in Figure 2. 54% of the publications developed different approaches and contributed to the literature by developing new evaluation criteria or examining only performance evaluation criteria inspired by previous studies.

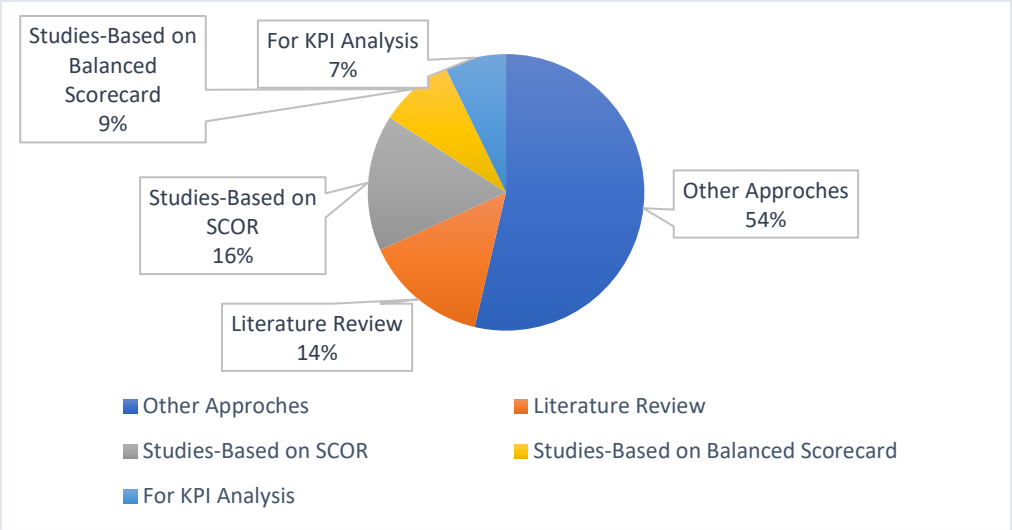

Figure 1: Approaches used in supply chain performance evaluation metrics

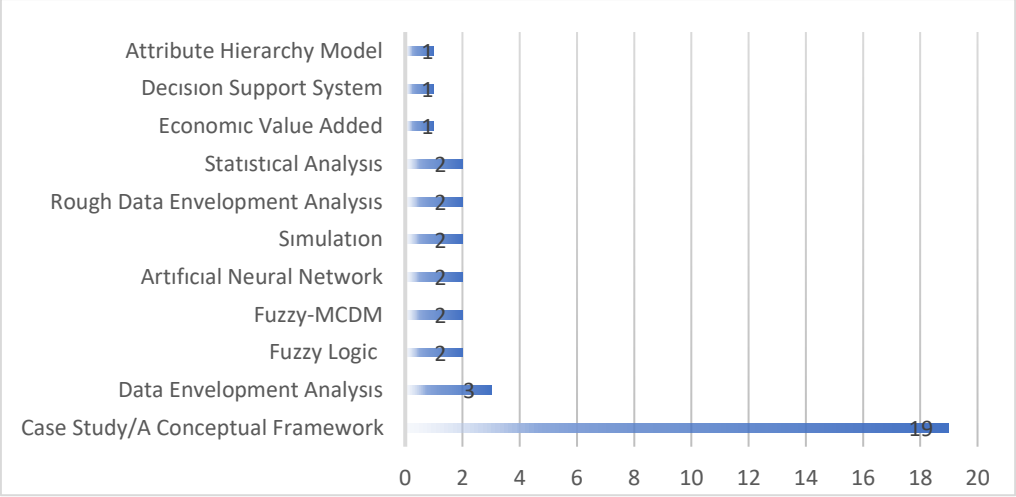

Figure 2: Distribution of methods used in other approaches

In Figure 1, for another important study, it is seen that the most frequently used model encountered in literature researches is Supply Chain Operations Reference-based (SCOR) studies (16%) as shown.

The SCOR model is a supply chain performance evaluation model. The SCOR model can help the supply chain participants to improve the efficiency of supply chain management by the reference model (Yeong-Dong et al., 2008). There are six levels within the SCOR model. Level 1 is top-level that deals with process types and defines the six key management processes (planning, making, enabling, sourcing, returning and delivering). Level 2 is the categorization of core processes. Level 3 contains process elements that provide an insight into the operation of a supply chain. Level 4 defines specific supply chain management practices. Level 5 involves the planning of activities within each task. Level 6 describes the rules for each activity (Yeong-Dong et al., 2008).

To give examples of users of SCOR models, Yeong-Dong et al. (2008) evaluated the supply chain performance according to the SCOR model. Ağar (2010) added sectoral innovation to the literature by using the SCOR model in the white goods sector. Alomar and Pasek (2014), who have presented a different model, proposed a new model that aligns supply chain strategies with the standard processes of the SCOR model in order to evaluate and improve the performance of small and medium-sized enterprises.

The Balanced Scorecard (BSC) model was used by the authors at a rate of 9% as shown in Figure 1. The BSC approach has been proposed by Kaplan and Norton (1992) as a tool to evaluate corporate performance from four different perspectives; financial, customer, learning and growth and internal business process. Özbakır (2010) conducted a supply chain performance evaluation study using the Balanced Scored Card method.

In Figure 1, 14% literature review studies are included in the studies discussed in this article (Neely et al. 1995; Shepherd and Günter, 2006; Gunasekaran and Kobu, 2007; Agami et al., 2012; Sillanpaa, 2012; Kazemkhanlou, 2014; Abou-Eleaz et al., 2015; Lima-Junior and Carpinetti, 2017; Maestrini et al., 2017). Another study group has been working on Key Performance Indicator (KPI) Analysis (7%) (Cai et al., 2009; Chae, 2009; Rodriguez-Rodriguez et al., 2010; Anand and Grover, 2015; Gamme and Johnson, 2015).

Figure 2 shows the distribution of the methods studied and used in the analyzes except for SCOR and Balanced Scorecard models. Also, it is a fact that the SCOR model alone is sufficient in the first place to evaluate supply chain performance, but in recent studies, it draws attention that uses different methods or integrated systems. In Figure 2, SCOR and Balanced Score Card models are separated and the distribution of the methods used in the analysis is given.

According to Figure 2, only 37 publications from 1991 to 2019 used different methods for performance evaluation. Nineteen publications from these studies have developed a different conceptual framework for performance evaluation by focusing on various subjects and various sectors, and in most of them, they have only been subject to supply chain performance evaluation criteria. In other studies, different methods have been examined on performance evaluation criteria. These different methods are Data Envelopment Analysis-3 times, Fuzzy Logic-2 times, Fuzzy-Multiple Criteria Decision Making (MCDM)-2 times, Artificial Neural Network-2 times, Simulation-2 times, Rough Data Envelopment Analysis-2 times, Statistical Analysis-2 times, Economic Value Added-1 times, Decision Support System-1 times, Attribute Hierarchy Model-1 times which are used in the process of solving them.

Only SCOR or BSC based studies are not included in Figure 2, integrated studies are emphasized. According to this, SCOR-MCDM (Kocaoğlu, 2009; Alomar and Pasek, 2014; Sellitto et al., 2015; Deva et al., 2019), SCOR-regression (Hwang et al., 2008), SCOR-Fuzzy Expert System (Ganga and Carpinetti, 2011), SCOR-Data Envelopment Analysis (Aydoğdu, 2011), SCOR-Fuzzy Logic (Ayçın and Özveri, 2015), BSC-Uncertain Clustering Algorithm (Shi and Gao, 2016), SCOR-SEM-MCDM (Dissanayake and Cross, 2018), SCOR-Artificial Neural Networks (Lima-Junior and Carpinetti, 2019) methods are used.

From these studies, Kocaoglu (2009) evaluated the strategic targets and operational targets by using the SCOR model and the Analytic Hierarchy Process (AHP) technique. The results from the AHP were taken as strategic weights and used with Technique for Order Preference by Similarity to Ideal Solution (TOPSIS). Strategic and operational targets were evaluated together with the developed model. Similarly, Aydogdu (2011) used the SCOR model and the Data Envelopment Analysis in their study to evaluate supply chain performance. Sellitto et al. (2015) developed a two-dimensional model with performance standards adapted from the SCOR model for performance evaluation in supply chains and have determined importance levels of performance criteria by using the AHP method. Ayçın and Özveri (2015), on the basis of the SCOR model, also created a supply chain performance model that was formed by integrating the fuzzy logic approach. Shi and Gao (2016) developed a performance evaluation index system based on the Balanced Scored Card model and then applied the Uncertain Clustering Algorithm. This study has become a new classification method that is worthy of practice.

As a result of extensive literature research, Shafiee and Shams-e-alam (2011) used the Rough Data Envelopment Analysis method to evaluate supply chain performance. Yavuz and Ersoy (2013) used the Artificial Neural Networks method to study the retail industry to measure supply chain performance in their studies. Zhu (2010) also developed a model with Artificial Neural Networks. Behind this study, Özalp (2016) studied the Economic Value Added (EVA) method which is a value-based measurement method in the measurement of supply chain performance.

In the literature, there are studies designed to reveal the elements, applications, and variables that affect supply chain performance as well as studies in supply chain performance evaluation. Lin and Lin (2002) investigated the impact of various levels of sharing of order, stock, and demand information on supply chain performance in electronic commerce. Ecevit Satı and Öçlü (2012), the effect on the performance of supply chain management logistics activities in the retail sector in Turkey evaluated through literature research and with this assessment of logistics management in the retail sector in Turkey have attempted to identify the detection of the effects on the SCM. Li et al. (2006), five dimensions (strategic supplier relationships, customer relations, level of information sharing, information sharing quality and postponement-delayed differentiation) related to supply chain management applications were established and these applications examined the relationship between competitive advantage and business performance. Rexhausen et al. (2012) noted the importance of demand management performance oversupply chain performance. Today, they emphasized that demand management needs to be studied more. In addition to this study; Bıçakçı and Üreten (2017), addressed demand management and supply base management issues, which play an important role in supply chain performance in their studies and they thought that it would be useful to evaluate these effects with an empirical study. As a result of analysis; both demand management, distribution management and supply based management practices have had positive effects on supply chain performance. Referring to a different topic, Macchion et al. (2017) used a simulation model to evaluate the performance of different supply chain configurations in personalized product production. Tarafdar and Qrunflen (2017) explained that applications and information systems, such as 1) strategic partnerships, 2) customer relationships and 3) postponement, act together to mediate a positive relationship between agile supply chain strategy and supply chain performance. Hull (2005) developed a model that defines the performance of supply chains based on supply and demand flexibilities. Unlike other studies in the literature, Chen et al. (2014), developed a model to study the effects of behavioral factors on supply chain performance. Again, in a different study, Kocaoglu (2013), hypothesized that the use of ERP II in internal and external integration areas in supply chain management examined the effects of the enterprises on supply chain management performance. The use of ERP II separately in external and internal supply chain integration has shown that the enterprise does not provide a complete improvement in supply chain performance.

According to this study; the distribution of the studies which deal with the issue of supply chain performance evaluation between 1991-2019 according to years is given in Figure 3. The first study was conducted in 1991 by Fitzgerald (1991). Supply chain performance evaluation studies have been increasing in recent years. Figure 3 is formed utilizing information from studies in Appendix 1 has been prepared.

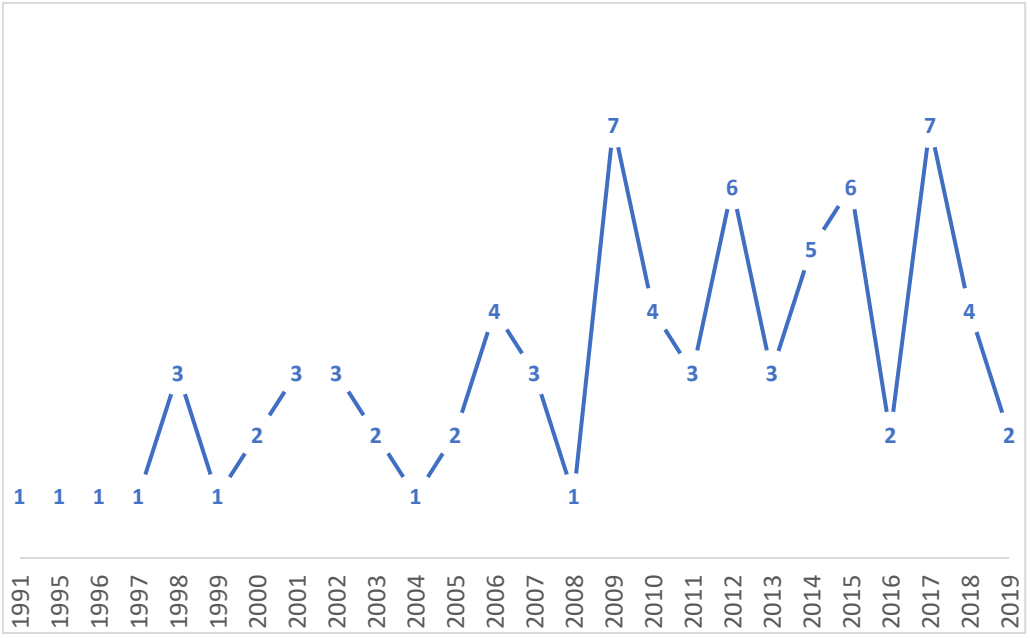

Figure 3: Number of papers by year of publications (publications are shown in Appendix 1)

This graph shows us that while studies on performance evaluation in supply chain management have been relatively low in the first years, it has increased in recent years. As of 2009, the number of studies has increased.

3. PERFORMANCE EVALUATION CRITERIA IN SUPPLY CHAIN MANAGEMENT

Developing a system to measure the performance of the supply chain requires the right selection of indicators first. Each author has gone to different distinctions on the topic and has given different criteria to the literature. In Appendix 1, the performance evaluation criteria are analyzed from 79 publications to 59 reviews. The performance evaluation criteria of the supply chain management and the evaluation criteria of the authors have been taken into consideration from Appendix 1 to Figure 4, it is mainly intended to show which criteria are being used for performance evaluation.

The criteria that the authors use in their studies are given as the main topics in Appendix 1, these main criteria are included in the studies by being reduced to independent sub-topics. In the supply chain, performance evaluation variables and applications used in the literature, firstly Neely et al. (1995) have drawn attention. Neely et al. (1995) considered supply chain performance measures as quality, time, cost and flexibility and formed sub-topics for each. In general, many studies describe supply chain performance measures as quality, time, flexibility and cost. Bagchi (1996) focused on time, quality, cost, and diagnostic measures. Fitzgerald et al. (1991) similarly determined the criteria as quality, flexibility, resource utilization, financial, competitiveness and innovation. Kaplan and Norton (1997) established a system of measurement of supply chain performance on financial, customer satisfaction, innovation, and internal processes.

Beamon (1998) investigated supply chain performance measures in two groups as qualitative (customer satisfaction, flexibility, knowledge and material flow, risk management, supplier performance) and quantitative (a measure of financial, resource utilization and customer responsiveness) and then he classified quantitative measures as both financial and non-financial measures. In Beamon (1999), he created a slightly different model than he did in 1998. In his study, the author evaluated supply chain performance measures in three parts: resource (collect the variables based on accounting and financial data such as total cost, distribution cost, production cost, stock, return on investment, etc. under a group.), output (sales, profit, occupancy rate, on-time delivery rate, order cycle, customer response time,

production preparation time, shipping errors, customer complaints), and flexibility (capacity flexibility, delivery flexibility, mixed flexibility, and new product flexibility).

Yavuz and Ersoy (2013), who developed this study by taking into account this study, also studied the main topics of resource, output, and flexibility in their study. Under the source criterion are production cost, distribution cost, stock cost, warehouse cost, production center profit; under the output criterion are sales, retailer profits, occupancy rate, on-time delivery rate, availability of stock, customer response time, product preparation time, customer complaints, stock turnover rate, economic order quantity, quality, accuracy; as a criterion of flexibility are capacity flexibility, product mix flexibility, new product flexibility, delivery flexibility.

Pires and Aravechia (2001), Angerhofer and Angelides (2006) used resource, output and flexibility criteria in evaluating supply chain performance in their article, inspired by the study of Beamon (1999). Chan et al. (2003) were inspired by the work of Beamon (1998) and tried to demonstrate supply chain performance on an example. Later, Chan (2003b) developed a model to evaluate supply chain performance using the AHP method in the electronics industry. In the model, supply chain performance was determined by quantitative and qualitative variables. So, quantitative variables were cost variables while qualitative variables were quality, flexibility, trust, visibility, and innovation.

For developing a model by separating the variables for supply chain performance into structural and operational levels, Li et al. (2007), in their studies used as a structural level, cost factors; as operational level, added value, customer satisfaction, and flexibility variables.

Gunasekaran et al. (2004) established a framework for measuring performance in the supply chain at strategic, tactical and operational levels, also they emphasized main performance measures related to suppliers, distribution and delivery performance, customer service, inventory and logistics costs.

Brewer and Speh (2000) studied supply chain performance in terms of customer benefit, innovation, internal process, and financial benefit and explained the subject by the Balanced Score Card approach. Tao (2009), in his work, used 16 variables in 4 basic categories: customer satisfaction, information sharing, logistics level, and financial situation.

In addition to the studies mentioned, Narasihman and Jayaram (1998) choose supply chain performance as customer responsiveness and make (manufacturing) performance. Persson and Olhager (2002) used variables such as cost, inventory, quality, lead time and lead time variability. Beierlein and Miller (2000) measured supply chain performance using customer satisfaction (quality), time, cost, assets variables. Fleisch and Tellkamp (2005) evaluated supply chain performance as dependent variables and independent variables. According to the study, dependent variables are cost excluding lost item value, cost including the lost item value, inventory inaccuracy, out-of-stock; independent variables are theft, unsaleable misplaced items and incorrect deliveries.

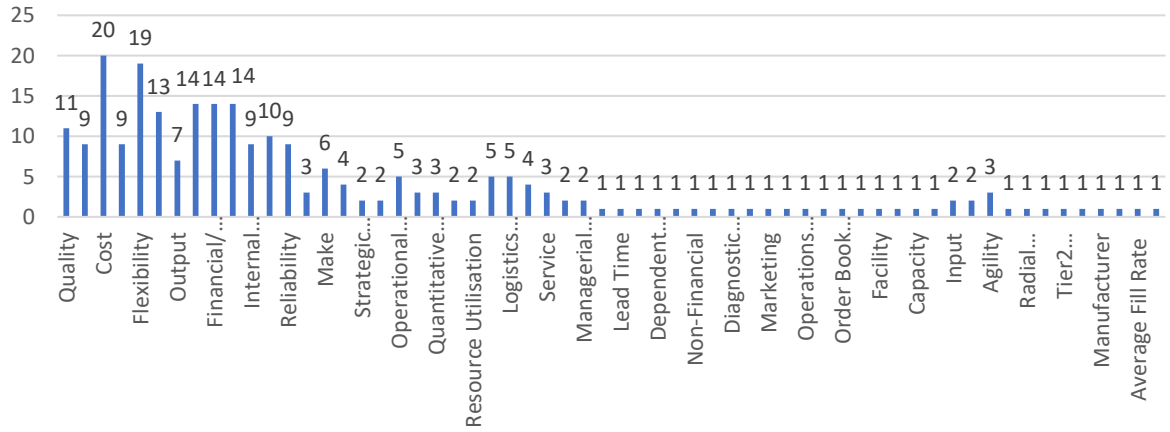

Figure 4: Supply chain performance evaluation metrics (criteria) according to usage quantities

In the result of these studies, it is desired to make a distribution among the criteria and in Figure 4, it is shown which criteria are less, which are more used, or which literatures are new titles and which authors study (Appendix 1). In studies where SCOR and BSC applications are predominantly used, the ratio of the main criteria has also increased due to these models. According to this, the performance evaluation criteria that are used in large numbers are as follows (Figure 5).

Figure 5: Frequently used metrics

Cost-20, Flexibility-19, Financial/Economic-14, Customer Satisfaction/Return-14, Innovation-14, Resource-13, Quality-11, Time-9, Internal Process-9, Responsiveness-10, Assets-9, Reliability-9 times are used the authors which shows at Appendix 1. These frequently used metrics can be preferred over and over again because their reliability is high compared to the new metric.

Other metrics used are Output, Plan, Make, Deliver, Strategic Measures, Tactical/Structural Measures, Operational Measures, Qualitative Measures, Quantitative Measures, Efficiency, Resource Utilization, Information/Information Sharing Degree/Information Technology, Logistics level/Transportation, Inventory Level, Service, Customer Services, Managerial Analysis/Corporate Management, Input, Intermediate Measure, Agility. These metrics are among the preferred metrics.

Except this, it is also observed that 28 criteria (Competitiveness, Lead Time, Lead-Time Variability, Dependent Variables, Independent Variables, Non-Financial, Society, Diagnostic Measures, Integration, Marketing, System Dynamics, Operations Research, Profitability, Order Book Analysis, Pricing, Facility, Human, Capacity, Including Trading Partners Measures, Sustainability, Radial Output, Non-radial Input, Tier2 Supplier, Main Supplier, Manufacturer, Average Inventory Time, Average Fill Rate, Average Cycle Time) are used in performance evaluation by participating in one time for study.

CONCLUSION

This paper presents a literature review of 79 studies that study supply chain performance evaluation. The distribution of the studies which deal with the issue of supply chain performance evaluation is between 1991-2019 according to years. For supply chain management performance evaluation, as a result of publications reviewed, it is seen that the most frequently used model encountered in literature researches is SCOR-based studies and behind, the Balanced Scored Card model is used. But in recent studies, it draws attention that uses different methods or integrated systems. The distribution of methods used 19 publications have developed a different conceptual framework for evaluating performance. Also, the other different methods are Fuzzy Logic, Fuzzy MCDM, Simulation, Rough Data Envelopment Analysis, Artificial Neural Network, Statistical Analysis, Economic Value Added, Decision Support System, Unascertained Clustering Algorithm, Data Envelopment Analysis.

The performance evaluation criteria are analyzed from 79 publications to 59 reviews. In studies where SCOR and BSC applications are predominantly used, the ratio of the main criteria has also increased due to these models (Cost-20, Flexibility-19, Financial/Economic-14, Customer Satisfaction/Return-14, Innovation-14, Resource-13, Quality-11, Time-9, Internal Process-9, Responsiveness-10, Assets-9,

Reliability-9). The other studies have been on the factors affecting performance evaluation in the supply chain management (10 publications) and on a literature review (10 publications).

It is also observed that 28 criteria (Competitiveness, Lead Time, Lead-Time Variability, De-pendent Variables, Independent Variables, Non-Financial, Society, Diagnostic Measures, Integration, Marketing, System Dynamics, Operations Research, Profitability, Order Book Analysis, Pricing, Facility, Human, Capacity, Including Trading Partners Measures, Sustainability, Radial Output, Non-radial Input, Tier2 Supplier, Main Supplier, Manufacturer, Average Inventory Time, Average Fill Rate, Average Cycle Time) were used in performance evaluation by participating in 1 times for study. Thus, these criteria are seen as recently used criteria in the literature. These less-used criteria will be among the criteria included in the subsequent studies of the authors, who have gained value if they give the correct results.

Finally, in this research, we introduce another review and summarize the reviewed researches in a table focusing on the area of application, framework dimensions and established indicators, applied approaches and methods. It is helpful for researchers to direct their future work and research questions to overcome any gab in the existing researches.

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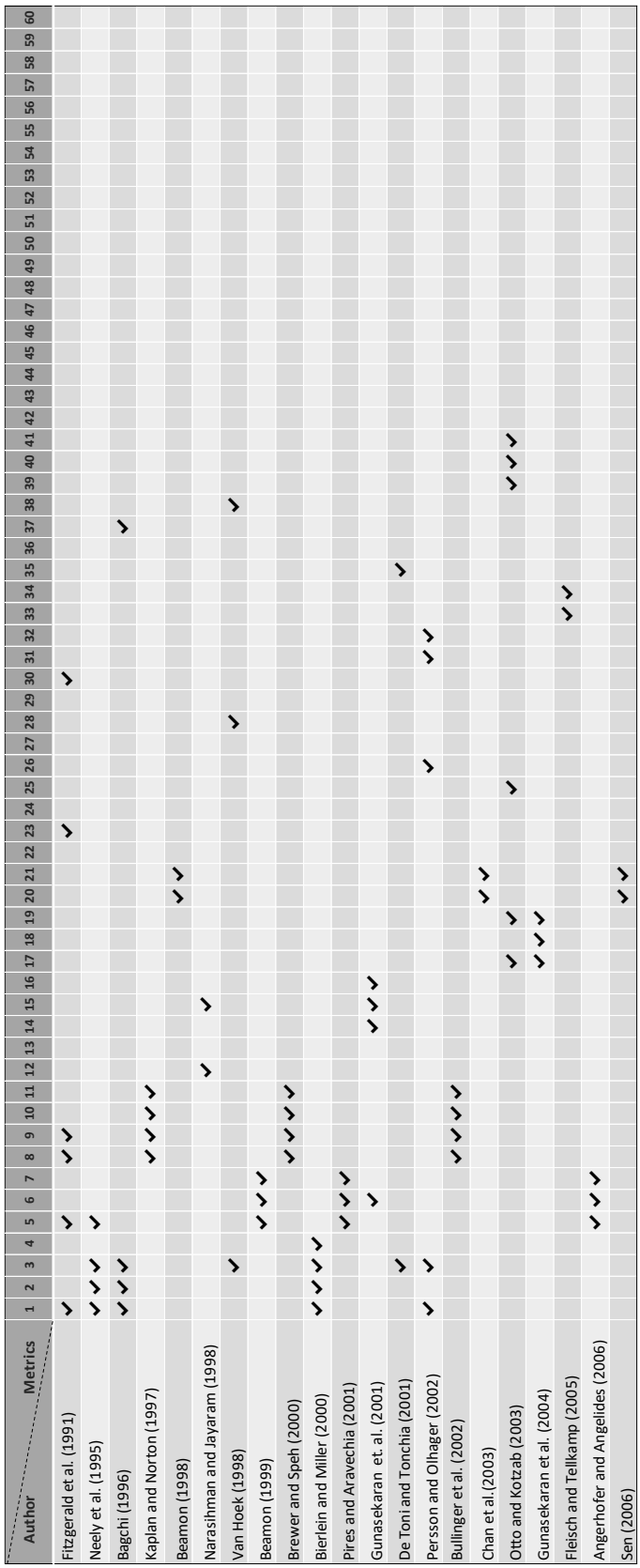
Appendix 1: Supply chain performance evaluation metrics according to the authors



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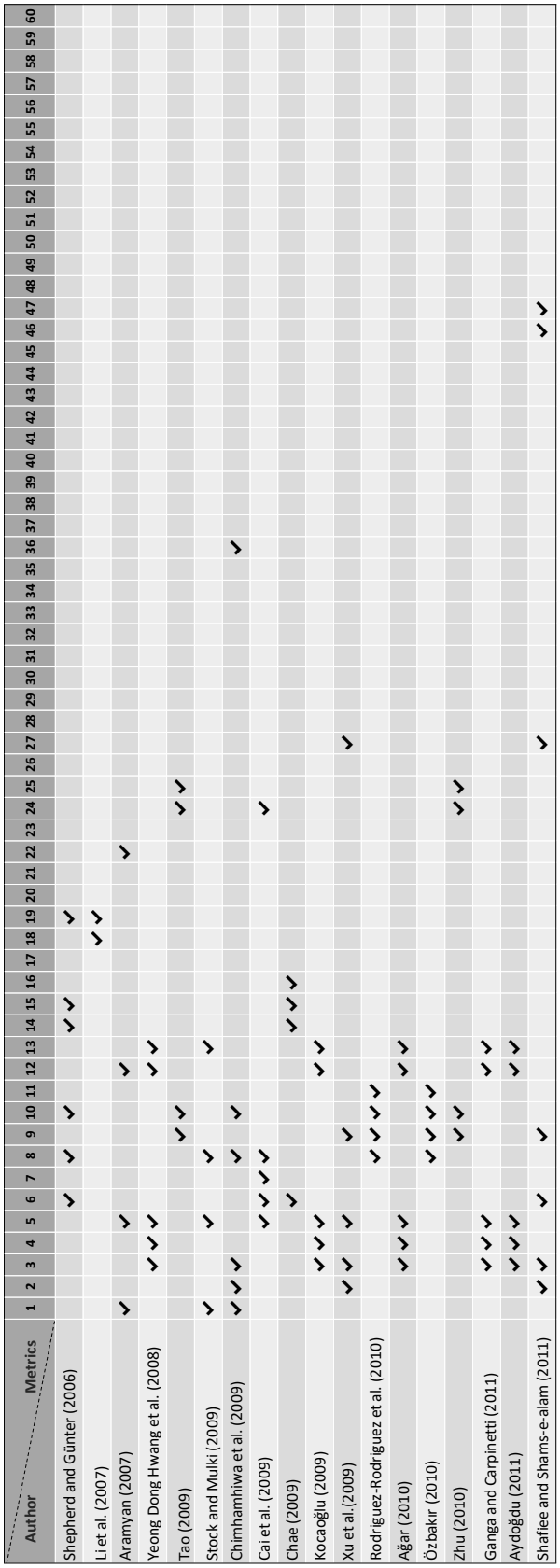

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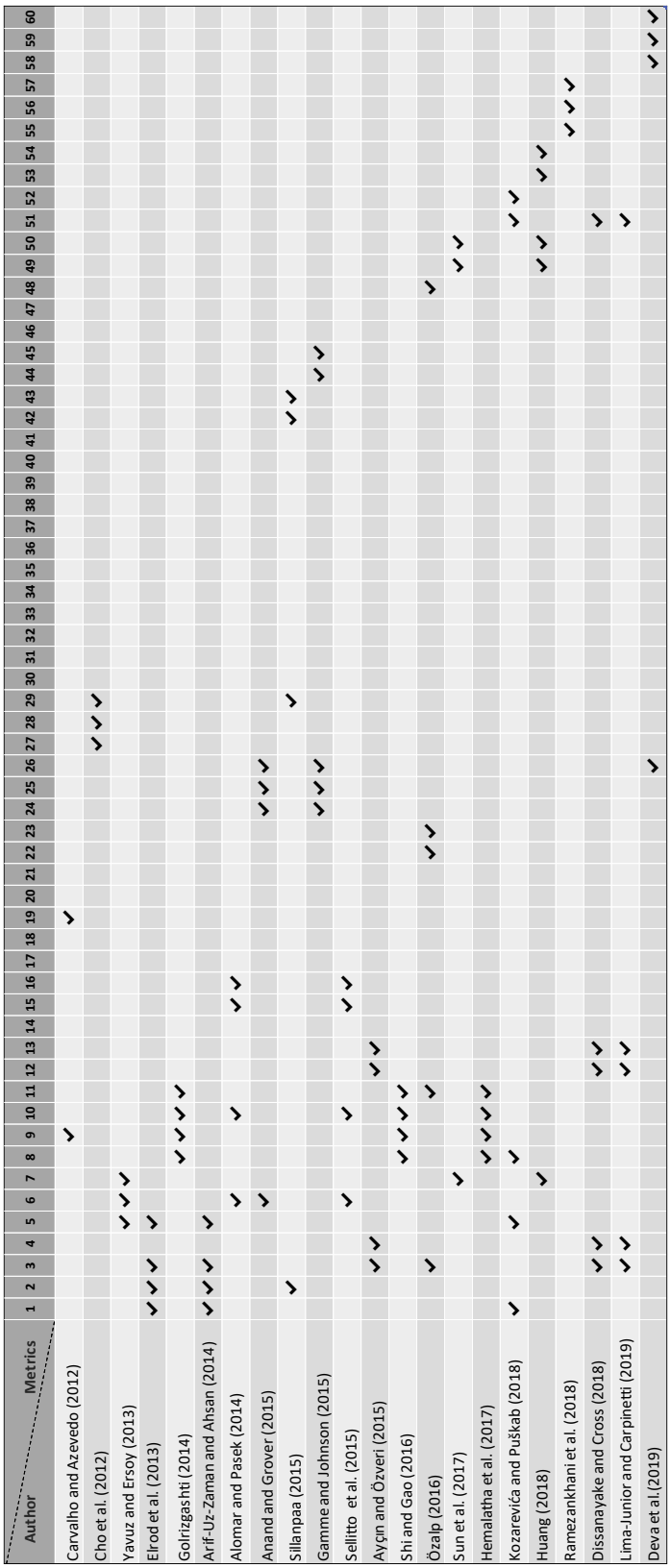

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INVESTOR PSYCHOLOGY ANALYSIS BY HERD CYCLE MOVEMENT APPROACH[1]

Şaban Onur VİGA[2]

Turgut ÖZKAN[3]

Abstract

In traditional finance theories, human beings are considered rational, while Modern Finance Theories are considered irrational. The "Behavioral Finance Theory" explains that the social environment and behavior affect investors ' making irrational decisions. In this study, the relationship between the "Herd Circle Movement Approach" presented to the literature for the first time and the behaviors affecting investors ' investment decisions from the perspective of the investors was examined. It is aimed to contribute to the development of behavioral finance. Data of the research as constituting the mass of financiers engaged in brokerage houses on the Istanbul Stock Exchange and the New York Stock Exchange reviewed the application. The survey responses as a result of "over-confidence" have been determined to be exhibiting the behavior of a mass. Among the findings of the study, it was determined that investors using the mental accounting power in their investments could be more dominant to them and that there was a positive interaction between the illusion of knowledge and illusion of control and investors who were aware of the herd movement did not show excessive optimism.

Keywords: Behavioral Finance, Investor Phycology, Stock Market

JEL Codes: G4, G40, G41

1. INTRODUCTION

When the development of economic history is examined from the past to the present, it is seen that two major factors have a lot of influence. The “Industrial Revolution” that began under Britain's leadership in the 1970s and another factor is considered to be the “Great World depression” that began at the end of the Second World War. While new economic systems were needed to be established, especially after the Great Depression, it was realized that human influence was at the center of the financial sector.

Kahneman and Tversky started by questioning the reasons for the different anomalies observed in the stock markets in the 1970s due to the unexpected movements in the stock market trends. Kahneman and Tversky laid the foundations of Behavioral Finance, one of the most prominent finance topics of our time, in their work "Prospect Theory: An Analysis of Decision under Risk - expectation theory: Decision Analysis at Risk" in 1979. The increase in popularity of this subject in the 2000s is a subject of interest for the sector as well as a popular subject for the academic community, this subject is tried to be told and taught with various perspectives. To contribute to the development of behavioral finance, it is aimed to explain the interaction between the investor's perspective and the behavioral characteristics that affect investment decisions through a visual form. This visualized behavioral interaction is presented in this research as the" herd Circle Movement approach".

2. BEHAVIORAL FINANCE AND DEVELOPMENT

It has emerged from the 1940s and accepted the man as a mechanism for acting rationally and has not accepted behavior that remains outside of theories (Shleifer, 2000: 6). In 1944, The Theory of expected utility began with the" Expected Utility Theory "and continued with the "Pricing Model OFf Capital Assets" introduced by Sharpe and Fama's "Efficient Markets Hypothesis" (Fama, 1998).

Traditional theories of Finance emphasize that the market has a movement in itself and that this movement occurs depending on production. In traditional finance theories, individuals are considered as rational as economic criteria. The notion that individuals act rationally is also indicative of a lack of focus on how investors should act according to market conditions (Willman, 2000: 73).

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[1] This article was produced from doctoral dissertation entitled “Investor Psychology Analysis by Herd Circle Movement Approach” written by Saban Onur Viga.

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Research Article

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Uncertainty is seen as the biggest obstacle facing investors in the decision-making process. Being able to make successful decisions and to make investment strategies in a mind free of uncertainty is a process that all investors desire. Especially in the decision-making process, the "benefit" factor comes to the fore in the decision-making process on financial markets, given that it is based on enjoying and entertaining ourselves. It is also difficult to measure the benefit in economic terms (Shleifer, 2000: 5).

2.1. Expected Utility Theory

"The Expected Utility Theory", first revealed by Daniel Bernoulli, was formulated by Jhon Von Neuman and Oscar Morgenstern in 1944. This model emphasizes that today's investors exhibit rational behavior and that investors aim to benefit under uncertain market conditions (Thaler R., 2005: 176). The Expected Utility Theory emphasizes that investors ' behavior will not change regardless of the market situation. It explains in three phases how investors keep their expectations at maximum level according to the expected utility theory; in the first phase, investors need to make calculations of the situations that may occur in the market and face the market conditions; in the second phase, increasing the probability and estimating how much the gain will be achieved in a short period of time; in the last phase, they aim to maximize the gain by investing at the highest rate and to minimize the losses (Yazdipour, 2011: 22).

According to Von Neuman and Morgenstren, people make investment decisions based on market uncertainties with a mathematical formula explained. With the claim that it is not very accurate to examine investors in terms of potential market conditions and possibilities, opposing the expected utility theory has arisen. In particular, Tversky and Kahneman have advocated a view opposite to the expected utility theory of the work they published in 1974 (Graham, Harvey, and Huang, 2009: 1094).

The basic assumptions of Expected Utility Theory are (Hens and Rieger, 2010: 22-26);

- In situations where there are uncertainties, investors conduct an objective case study with the Bayes theorem.
- When the options are undecided, whichever option is more beneficial is preferred.
- The investor invests in a way that maximizes his / her decision
- The theory of diminishing marginal is considered to be valid, and the benefit is gradually increasing less and less.

2.2. Capital Assets Pricing Model

Which were first discovered in 1964 By Sharpe Capital Asset Pricing Model (Capital Asset Pricing Method, CAPM) the expected rate of Return of the securities that are traded in the current market risk-free rate of return should be equal to the sum of risk and its market rate suggests. Shape "Beta" refers to the relationship between market return and the market return (Hens and Rieger, 2010: 107). The number of beta times represents the relationship between the return of the Securities and the market return. At its foundation is a model that briefly attempts to show the relationship between risk and return (Widger and Crosby, 2014: 86).

The content of the Capital Assets Pricing Model is as follows (Subash, 2011: 9);

- Investors make investments that they believe will benefit highly: investors prefer high-yield products so that they can keep their earnings at a maximum rate, and they make high-yield investments.
- They prefer the standard deviation (risk) to below: it is difficult to make high-benefit investments in situations of uncertainty. Therefore, low uncertainty (risk) is the preferred reason.
- There is a risk-free interest rate for borrowing/yield for investors and it is the same for all investors
- Investors ' portfolios have the same time horizon (cross-section). The rate of return and standard deviation (risk) are the same for all
- Factors such as transaction costs, taxes, inflation are not included: the adjusted price is more understandable for investors and contributes to lower error rates.

- The analysis of returns and standard deviation and the evaluation of these analyses are the same for each investor.

2.3. Efficient Market Hypothesis

The concept of "Effective Markets" first appeared in Louis Bachelier's concept in the 1900s. Bachelier's study investigated the frequency with which the breaking points of stock prices are realized in the context of stock market analysis. In 1905, Karl Pearson followed the" Random Walk, Random Walk/Drunkard Walk " model. In 1933, Cowles stated that as part of his research, intermediary companies, financial publishing organizations, insurance agents, and professional depositors all had no impact on the financial market (Widger & Crosby, 2014: 52). Random walking was first used by the British statistician Maurice Kendall in 1953 in the literature of Finance. Kendall suggested that the prices of stocks are not uniform order, that prices rise or fall purely by coincidence, that the prices of stocks have no relation to past price movements, and he first presented this content to the Royal Statistical Society (Pompian, 2006: 11).

The "Efficient Markets Hypothesis", first introduced there by Eugene Fama in 1970, was revealed as a result of studies on the activity levels of markets (Titan, 2015: 444). Effective markets are examined under three roofs. These are treated as activity, information and resource activity. Activity means that investors can achieve high earnings with minimum losses, resource activity means that resources are distributed optimally within the market, and in information activity, the current market prices contain all the information (Birau, 2012: 46).

Fama (1988) particularly focused on informational activity in his work. He claimed that all the information in the market was reflected in the price when the price of the shares was formed and that as a result of this information, no gain could be achieved above the market's return. It is a market hypothesis that stock pricing, which is free from external factors and is affected only by the sectors in which it is located, is not expected to gain in active markets (Baker & Nofsinger, 2010: 28).

When analyzing securities, it is stated that the information came in a coincidental manner and time and that the incoming information had a rapid effect on prices. In this case, the assumptions of the effective market hypothesis are as follows:

- There is no transaction cost in the purchase/sale of securities
- Investors can access all information in the market at no cost
- New information is announced to the market very quickly and information is quickly reflected in the prices of securities

Fama classified the active markets into 3 groups in its study. These are listed as (A) activity in weak form, (B) activity in semi-strong form, (C) activity in strong form.

2.3.1. Strong-Form Markets

In strong-form markets, prices reflect all information directly and all information presented to the public along with past prices and all specific information within the sector are included in the prices (Subash, 2011: 11). The speed of information flow in these markets is quite high and the interpretation part is easier in terms of technical analysis. However, markets that are active in the strong form are not affected by technical analysis speculation. It is easy to analyze whether possible speculation volatility is correct. At the same time, long-term indicators are often included in the technical analysis reports of effective markets in strong form to determine future targets for investors who want to make strategic investments. This offers investors an idea of future share pricing (Stracca, 2004: 378).

2.3.2. Semi-Strong Markets

Prices of stocks in semi-strong markets all the past prices, all the information in the market, all the data analysis, product ranges and quality management of the enterprises, announcements of stock increase, patents held by the enterprises, accounting records, such as all factors are reflected in the prices. This is

why technical analysis works in these markets. Stock market investors can gain more than they do in these markets. (Stracca, 2004: 378).

It is a form of activity usually seen in the financial markets of developing economies. Factors such as commitment to international funds, how much of a percentage share foreign investors from outside the country's stock market receive in the market, the political economy of the country in which they reside, and the financial sanctions imposed are also characteristics of markets in semi-strong form (Lumsdaine and Loon, 2017: 2).

2.3.3. Poor (Weak)-Form Markets

Forecasting prices in markets that are active in poor form is carried out by examining and analyzing past Price mobility. It means that in a weak form, there is no profit in markets above normal earnings and that current prices are a continuation of past prices. Therefore, price changes show a random walk (Jureviciene and Ivanova, 2013: 54). Analysts believe that technical analysis for a market in the poor form will not yield a profit and that an expert pricing analysis will not offer an idea of stock selection (Yazdipour, 2011: 23).

2.4. Behavioral Finance and History

Irrational behavior in markets it dates back to the century. In 1562, the tulip market was created with the “Tulip Onion”, which was given to the King of the Netherlands by Suleiman the Magnificent, and the introduction of the tulip flower by the Europeans, especially in the 1700s, when the Dutch middle section took great interest in tulips (Qoqiauri, 2016). While no one can believe what this formation was like at the beginning, it was observed that the most important factor in becoming a rapidly growing market was the behavioral effect of the middle section on Sunday and that tulip prices created their market. At that time, there was an increase in demand for tulips so that they could gain reputation and status with the difficulty of owning tulips and the desire of the middle section to the upper section, and it was first realized in this way how people's behavior affected a financial market. In 1841, Charles Mackay addressed” Tulip madness “in his book” Memoirs of Extraordinary Popular Delusions". Even though this “frenzy of tulip prices” does not seem to make much sense from today's perspective, it has become more apparent in current markets, especially in the last 20 years, that people's behavior affects the market (Shleifer, 2000: 30-33).

First uncovered by Adam Smith “The Theory of Moral Sentiments" in 1759) Smith; Economic people in their decision-making process can be affected by the social environment, reputation, pride, egoism and jealousy of human behaviors as irrational and people have explained it as such. In his work "the principle of usefulness" and "the principle of greatest happiness", Jeremy Bentham stated that in all of the actions that people take into account their happiness in the plans of their future decisions to be happy (Branch, 2014: 15-16). Bentham has said that happiness is calculated according to the greater part of the pleasure received or the pain of happiness that cannot be achieved (Hens and Rieger, 2010: 97). 18. At the end of the century, psychological research had lost its effect on the 19th century. The concept of "Economic Man - Homo Economicus" took place in the century. It was seen as a more rational mechanism for human beings during this period, keeping the benefit they wanted to achieve dependent on market conditions (Widger and Crosby, 2014: 50).

In the 1980s, the effective market hypothesis was itself calculated by adapting the available price, earnings, and dividend data to time series. The hypothesis of Effective Markets has been questioned because stocks show more volatility than expected and various anomalies in the formation of this volatility create mobility that does not fit the active market. The same anomalies at the beginning of the week and January showed that mobility was occurring, contrary to the efficient market hypothesis. Volatility occurring; economic morale or group psychology was linked to the fact that situations that explain the time-balancing of prices, such as price stickiness and exchange rate overshooting, cannot be explained (Shiller, 2003: 89).

It was first uncovered by Daniel Kahneman and Amos Tversky, who began in the 1980s, trying to explain market conditions and anomalies from a behavioral economic perspective (Illiashenko, 2017: 31). He says that with the birth of classical finance in the 1950s, rational consumer perception prevailed (Homo Economicus) and that in these processes' investors were involved in the economy as required by market conditions, where consumers followed a rational plane. Classic finance (anti psychologic) and psychological interactions (Behavioral Finance) for 30 years, created a paradox in itself, and with the work of Kahneman and Tversky, a new title in addition to winning that help to shed light on the current financial markets "behavioral finance theory" and are introduced to the literature (Ilyashenko, 2017, s. 32).

In 2002, he was awarded the Nobel Prize in economics for his work explaining the decision-making processes of investors under uncertainty by using the science of psychology and economics together. With this award, academic studies have accelerated and especially the work of world-renowned universities under the umbrella of "behavioral finance" has become a subject of interest and interest for the entire Finance Academy (Sairafi, Selleby, and Ståhl, 2008: 11). Besides the use of basic and technical analysis in the analysis of stock prices, behavioral finance techniques are now used today. The basic analysis includes the determination of the company's strengths and weaknesses, the analysis of competitors and the analysis of the market. In technical analysis, it is used as indicators to understand the price changes that the stock has been watching from the past to the present and how these changes will follow the trend in the future. It helps to understand the profiles of investors through the psychology that constitutes the content of behavioral finance. Behavioral finance has come to the fore in explaining the price balloons of stocks traded on the stock exchanges of Japan and America in particular (Nofsinger, 2005: 140).

3. HERD CYCLE MOVEMENT APPROACH AND BIASES AFFECTING INVESTOR BEHAVIOR

Daniel Kahneman and Amos Tversky's 1979 publication "Prospect Theory: An Analysis of Decision under Risk/expectation theory: analysis of investment decision at Risk" made the beginning of behavioral finance in the literature. In these studies, they explain that the expected utility theory has an effect on decision making in high-risk investment situations and that rational decision making is normatively accepted as economic behavior. However, they emphasize that the difficulties experienced in decision making are not explained by the expected utility theory and that the factors affecting investment decisions for these situations lead to irrational behavior. They examined investment decisions in two ways according to expectation theory (Kahneman and Tversky, 1979: 263). First, he stresses that the expectations of the return planned to be achieved must be regulated. Understanding the contents of the conditions that will enable the targeted return to be achieved in making investment decisions, classifying them in itself and making basic analysis makes it easier. Secondly, they express that organized expectation exhibits changes in itself and that these changes are perceived at the highest value in particular (Kahneman and Tversky, 1979: 274).

In the context of behavioral finance, it is observed that investors exhibit a lot of different behaviors and that these behaviors create different anomalies in market trends from the point of view of academic studies that they have either very detailed (within the framework of one or two behavioral characteristics) or very superficial points of view (Widger & Crosby, 2014). The perspective of "Herd Circle Movement Behavior" is explained in this research in order to represent the interactions of the affected characteristics when making investment decisions to bring innovation within the subject and to contribute to the main topic of "Behavioral Finance".

According to the science of psychology, human behavior has a beginning and an end. But behaviors tend to repeat themselves and follow each other. Therefore, the behavior of investors in a behavioral finance framework to be associated with each other, participants sorted from high to low, with the highest percentage rate of the behavior of behavioral traits and their relationship with each other suggests that have the lowest percentage (Zwiebel, 2002, s. 1218).

The content of the herd Circle Movement approach consists of psychological factors that form the outlines of expectation theory and these behavioral features have been used earlier in empirical applications in the literature, which constitute the content of the following 12 behavioral approaches. We can show the random symbolic ranking of 12 behavioral characteristics that constitute the content of behavioral finance as shown in Figure 1 below. This figure represents a visual expression of the attitudes and behaviors that investors exhibit in the process of making investment decisions (Shiller & Pound, 1986).

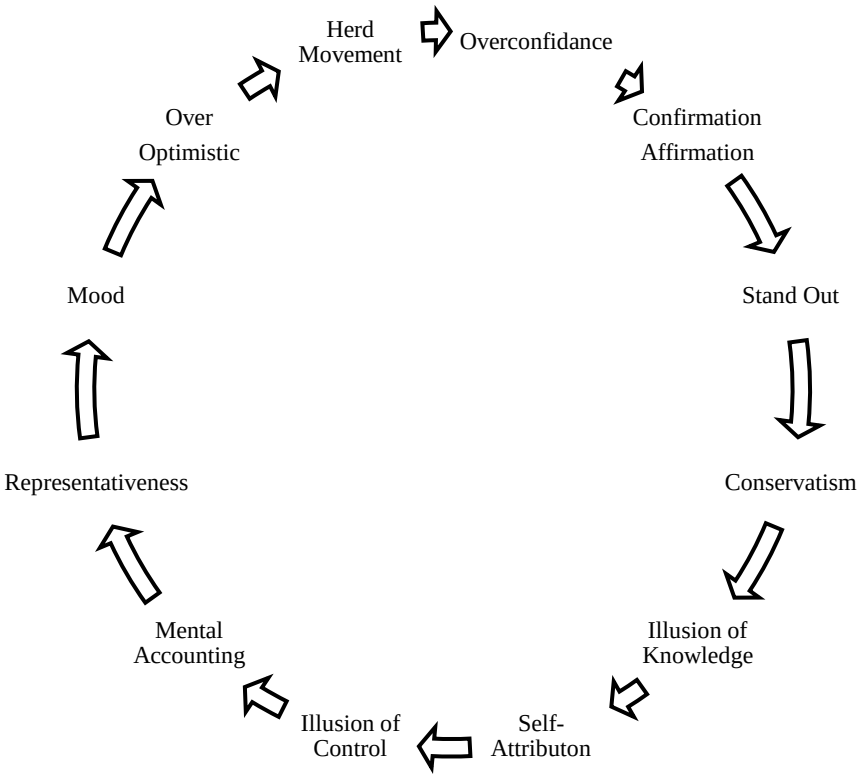

Figure 1. Herd Cycle Movement

The fact that these interactions, which affect each other as a result of the behavior, become active in succession is examined in Psychological Science under the title of behavioral interaction (Hirshleifer, 2008: 857). In this thesis, it is aimed to examine how these behavioral interactions interact with the investor.

3.1. Psychological Effects Affecting Investor Decisions

Behavioral finance shows that behavioral traits are the main factors influencing investors' investment decisions. It consists of reasons such as being influenced by past experiences in the decision-making process also the social environment creating pressure and their attitudes showing dominant characteristics in their decisions. The 12 psychological factors that make up the model of the research will be explained by behavioral characteristics that influence investors' decisions (Shiller, 2003).

3.1.1. Conservatism

It represents the difficulty in accepting a new opinion or idea in the first place. People who display a view of conservatism hold tight to their past thoughts and decisions, stay away from change, and perceive possible changes as a threat. The last group to contribute to the process that has become normalized by the acceptance of changing views by society is the conservative People (Ritter, 2003: 432). There are types of investors who exhibit conservative behavior in financial markets as well as individuals who exhibit conservative behavior in daily life. This group depends on the stocks they have long ago, and they stay away from newly launched companies. Even if there is a negative picture in the

market about those stocks, they hold the shares for a long time, and when they reach the bottom, they remove some of them, even if they are at a loss. It is very important for investors to be able to conduct market analysis objectively. However, the difficulty and complexity of market analysis are that high groups do not readily accept new ideas in market analysis and do not remain neutral when analyzing current information (Pompian, 2006: 122).

3.1.2. Confirmation/Affirmation

It involves the creation of an effort to get people out of negative situations or mistakes as soon as possible and the acquisition of information (people) that will confirm the decisions they make in this process. Psychologically, decision making is more secure, away from the harmful elements, and this decision is automatically followed by the instinct to make confirmation/confirmation. The most important thing to be done is not to be justified in their decision, but to be objective in the decision. Even if they receive confirmation of their own decisions, they need to be able to analyze the conditions of the market well and pay attention to the way the market is going, rather than the feeling of approval they will receive from external environmental factors (Branch, 2014).

3.1.3. Illusion of Knowledge

Informational infallibility is the illusion of knowledge, which tends to believe that the accuracy of people's predictions increases with more information. The high ratings of websites offering previous drawings of numerical Lotto and statistics of future predictions are the best examples of the illusion of control bias. People can increase their chances of finding future numbers by searching for some statistics about the predictions they make (Nofsinger, 2005: 148).

3.1.4. Illusion of Control

Control error represents a belief that people have a sense of control over themselves when they are not likely to be in their control, and that with this sense of control they think they can manage the system or the situation they are in. This behavior is more common in people who gamble (Nofsinger, 2005: 151). In a study conducted on this subject, a card game was asked to be played with a group. Half of the cards were shuffled to the players and the other half were dealt with by the computer. In the game, the player will determine the price given per the opening of each card. At the end of the game, it was noticed that players had placed a higher price on their cards and that they had placed a lower price on the cards that the computer had shuffled. This caused players to place higher bets on their own shuffled cards because they believed they were in control, and they experienced a control error within themselves (Pompian, 2006: 113).

3.1.5. Representativeness

It is an act that has been introduced to literature by Kahneman and Tversky. It can be explained as determining that the investor has experienced the same processes before in the market conditions or has achieved similar returns/earnings on the same trend basis when making decisions. It involves comparing the stocks to each other, classifying the elements such as previous price ranges and where the trends they follow have broken down. For example; It is as if the Dow Jones index's decline represents a result of declines in industrial businesses (Pompian, 2006).

3.1.6. Self-attribution

People don't know the full capacity of their abilities. Often, lessons are learned from past successes and failures that have been achieved above the expected level. Investors, however, tend to attribute success to their own ability but tend to blame external factors such as market conditions or bad luck for their failures. Therefore, the consequences of self-association with self-reliance, prejudice, or bias in order to be able to relate to self-more clearly cause people to question their confidence in themselves. Thus, with the help of this overconfidence, they will engage in the psychology of attributing directly to themselves in a negative situation that may occur during the decision-making process, as they will maintain the belief that they will not fail in the future (Ritter, 2003).

3.1.7. Over-optimism

Starting with optimism and continuing, investors start to show an overly optimistic attitude in their investments at any cost, resulting in a shift away from the objectivity of the market. Failure to realize the negative investments made, dreaming of earning above the market yield, is a behavior exhibited by investors who hope that the shares they buy from the low will eventually rise one day (Duxbury, 2015).

3.1.8. Mood

The choices of people under uncertainty can be influenced by their mood, especially for future prospects. People are optimistic if they are in a good (happy) mood and pessimistic if they are in a bad (sad) mood. The investor's investment activities are also affected by his mood. While it is quite difficult to determine which mood investors are in, there is some empirical evidence showing which moods influence investors ' decisions and how. There is a strong association between the degree of sunlight and one's mood (Baker and Nofsinger, 2010: 671).

3.1.9. Mental Accounting

When making economic decisions, the person's mind, to determine the value that will cause him to make that decision, to think about the rate of gain he will gain, to categorize the value of the asset himself covers all the operations (Thaler R. H., 1999: 184). Thaler made the most known work on this subject in 1999. A group was given $ 30 and then the bid was submitted, the offer will be put in a coin/flip as the content of the bid, with the win being +$9 in a coin toss and the loss being -$9. Within the group, 70% were involved in this proposal. The second group was offered as +$39 if they win, - $21 if they lose, and they were told that they could take $30 if they wanted to. In this group, the percentage of those who tried to win the toss was 34%. Although the offers presented to both groups of subjects were essentially the same, it was revealed that the accounts of the individuals in their own minds differed (Ritter, 2003: 431).

3.1.10. Herd Movement

Another important investor behavior in the herd movement approach involves decision-making behavior in line with the trend followed by the market, except for the investor's own ideas, experiences, knowledge level or analysis of the decisions made. In short, it can be explained as investor behavior that invests by following others (Widger and Crosby, 2014: 66). As can be understood from the name, it is a collective behavior that tends to follow the herd, moving in the direction the herd is going. The most important sign of displaying herd behavior is that when an investor has a decision to make himself/herself or an idea to buy, he/she ignores his/her own ideas and invests according to the course of the market by being influenced by herd movement (Javed, Zafar, and Hafeez, 2013: 20).

Herd movement is seen in two ways in itself. The first of these is rational herd behavior. In this behavior, the investor thinks that self-analysis is unnecessary and costly, and collectively believes that there is a rate of return on the trends that are progressing and is involved in the herd movement. The second form is irrational herd behavior. In this behavior, the investor's psychological state covers acting under the influence. They often follow the herd movement because of fears of being alone and losing (Kapusuzoglu, 2011: 1122).

3.1.11. Overconfidence

People tend to feel confident psychologically. The motivation behind overconfidence is that an individual's ability to control information and events increases confidence in themselves. Overly confident investors tend to trade more and trade costs can be covered by the expected gains, even if this behavior will continue, and this is wrong, as well as increased volatility and lower expected utility equities the investment options will cause you to low income. Overconfidence also affects investors ' perception of risk, forcing them to underestimate risk for two reasons. The first is that they tend to buy smaller and newer stocks with high risks, and the second is that they are holding unchanged or very little diversified portfolios. Investors who have overconfident themselves are looking for shares that have just been introduced to the market. They think the return on starting from scratch will be greater, and they

ignore the risks of these investments. With more small ventures, they are at a high earnings target and are at a high leverage ratio target (Qoqiauri, 2016: 12).

3.1.12. Stand Out

It means that investors who have overconfident themselves go further and attribute the success of every investment and gain they have made to their abilities in their personalities and their mental powers. Investors who exhibit this behavior want to be appreciated within the sector and express that they need to take their opinion, that they know the best about the market and that they are capable of technical analysis (Bhattacharya, 2005: 8).

4. BEHAVIORAL FINANCE ANALYSIS FOR BORSA ISTANBUL AND NYSE

The aim of the study was to determine which of the psychological factors that influence investors in the process of making investment decisions and to examine the relationship between these behaviors. The aim of this course is to examine the behavior of the participating masses in a dominant manner and the weight of the differences between the exchanges in terms of the same behavioral characteristics.

4.1. Purpose, Limits and Method of Research

Within the perspective of this study "herd circle movement approach", through which investor portfolio could be better analyzed, is first introduced to the literature. With complicated attitudes and market mobility increasing every day, understanding of investor (human) psychology becomes increasingly difficult. In particular, in order to avoid information confusion in the literature, investor behavior under the umbrella of behavioral finance will be examined under 12 behavioral characteristics. These behavioral characteristics have been used in practice since the selected characteristics were previously used in the behavioral finance literature and their scale was accepted. Professional stock market investors (brokers, dealers, in-house audit and registration) were identified as targets in the research. For the formation of the Investor portfolio and for the research to be in an international dimension, two groups were identified as BIST (Borsa Istanbul) investors and NYSE (New York Stock Exchange) investors. As the volume of the exchanges is very large, a cross-section is formed from the main mass; 157 investors from BIST and 184 investors from NYSE constitute the total mass of the analysis. The survey (assumption from multiple options) method used for the analysis of the research has been applied. 12 behavioral characteristics were selected from the current behavioral finance perspective and questions were determined to match the characteristics of these characteristics and a total of 30 behavioral characteristics questions and 8 demographic questions were asked to learn about the investors who participated in the survey. In the survey, the multi-option scale of 5 Likert was applied; never disagree, disagree, undecided, agree, completely agree. Content of the survey; (Shiller & Pound, 1986), (Hirshleifer, 2001), (Barberis et al, 1998), (Daniel et al, 1998), (Hong and Stain, 1999) scales have been used. The reliability test of the collected data, Cronbach's Alpha, found a value of 0.847 (84%). The fact that Cronbach's Alpha value is between 0.80 and 0.99 suggests that research is highly reliable (George & Mallery, 2016: 417).

4.1.1. Analyses of Demographic Questions

In Table 1, we can show the gender distinction, which is the first of the demographic characteristics of the mass of the survey, as follows;

Table 1: Gender Segregation on The Basis of Exchanges

Gender	NYSE	BIST
Man	137	129
Woman	47	28

As shown in Table 1, the majority of Stock Exchange Istanbul investors are men. Table 2. the total of male investors in both exchanges appears to be at a dominant high. As shown in Table 2, it can be said that male dominance is 78% higher on the basis of participants.

Table 2: Time for Investors to Follow the Market

Years	NYSE	BIST
1-3 Years Between	10	2
3-5 Years Between	63	24
5 Years and Over	111	131

It is observed that the majority of the investors who participated in the research have a period of 5 years and above following the current stock market in both stock markets. In this sense, investors ' market experiences and experiences are seen to be high.

4.1.2. Frequency Weights of Behavioral Traits

Within the scope of this study, 12 behavioral characteristics of psychological attitudes that constitute the content of behavioral finance were examined. These are conservatism, confirmation/affirmation, the illusion of knowledge, illusion of control, representativeness, self-attribution, over-optimism, mood, mental accounting, herd movement, over-confidence and stand out.

Table 3: Total Table of Frequency Percentages by Exchanges

BEHAVIORAL CHARACTERISTICS	QUESTIONS	NYSE						BIST					
		Frequency Percentages (%)						Frequency Percentages (%)					
		Mean	Never Agree	Disagree	Neither Agree Nor Disagree	Agree	Strongly Agree	Mean	Never Agree	Disagree	Neither Agree Nor Disagree	Agree	Strongly Agree
Conservatism	**Q.6**	3,76	1,6	20,1	5,4	46,7	26,1	3,97		5,1	22,3	43,3	29,3
	Q.7	4,20		3,3	7,6	54,9	34,2	3,19	3,2	35,7	10,8	39,5	10,8
	Q.22	3,48	3,3	22,3	10,9	50,0	13,6	3,40	,6	23,6	15,9	54,8	5,1
	Q.23	3,59	1,1	21,7	6,5	58,7	12,0	3,56	4,5	20,4	10,8	43,3	21,0
Confirmation	**Q.4**	3,89	2,7	13,6	6,0	47,3	30,4	3,59	3,2	20,4	8,9	49,7	17,8
	Q.29	3,79		13,6	3,3	73,4	9,8	3,71	1,9	19,1	5,7	52,9	20,4
Illusion of Knowledge	**Q.8**	3,22	3,8	28,8	18,5	38,1	9,8	3,19	8,3	26,8	15,3	36,9	12,7
	Q.25	4,32			1,6	64,7	33,7	3,79	1,3	12,7	12,1	53,5	20,4
Illusion of Control	**Q.5**	4,11		3,8	6,5	64,1	25,5	3,59		18,5	18,5	48,4	14,6
	Q.19	4,03	,5	2,2	11,4	65,2	20,7	3,66	1,3	19,1	6,4	59,2	14,0
	Q.20	3,15	1,1	39,7	4,9	51,6	2,7	2,50	10,2	52,2	17,8	16,6	3,2
Representativeness	**Q.2**	3,51	20,7	40,2	10,3	27,2	1,6	3,99	29,3	50,3	10,8	9,6	
	Q.18	3,01	2,2	42,9	10,3	40,8	3,8	3,57	3,2	19,7	7,6	56,1	13,4
Self-Attribution	**Q.12**	2,89	7,6	38,6	15,8	33,2	4,9	3,07	5,7	35,7	12,1	38,9	7,6
	Q.14	4,30			8,7	52,7	38,6	3,84	1,9	7,6	15,9	53,5	21,0
Over-Optimism	**Q.10**	3,26	3,8	32,6	10,9	39,7	13,0	3,49	2,5	21,0	15,9	45,9	14,6
	Q.24	2,41		19,6	16,3	49,5	14,7	2,96	7,6	34,4	12,1	38,2	7,6
Mood	**Q.27**	3,01	1,1	47,8	2,2	46,7	2,2	2,31	9,6	61,1	18,5	10,8	
	Q.30	3,53	1,1	23,9	4,9	60,9	9,2	3,43		26,8	12,7	51,6	8,9
Mental Accounting	**Q.11**	2,98	7,1	38,0	13,6	32,1	9,2	2,95	8,3	38,9	7,0	41,4	4,5
	Q.13	3,60	1,1	22,8	8,7	50,0	17,4	3,71	1,9	19,7	9,6	43,3	25,5
	Q.15	2,60	12,0	50,0	8,2	26,1	3,8	3,29	4,5	26,1	15,3	44,6	9,6
	Q.26	4,25	1,6		7,1	54,3	37,0	4,13		1,9	3,2	74,5	20,4
	Q.28	3,46	,5	29,3	2,7	58,7	8,7	3,82		13,4	7,0	64,3	15,3
Herd Movement	**Q.9**	2,99	10,9	32,6	13,6	32,6	10,3	3,24	5,7	25,5	14,6	47,8	6,4
	Q.21	2,29	17,4	58,2	2,2	22,3		3,22	2,5	32,5	10,8	48,4	5,7
Over-Confidence	**Q.1**	3,34	5,4	25,0	14,1	41,3	14,1	4,11		8,9	15,9	29,9	45,2
	SQ17	4,30	,5	3,8		60,3	35,3	3,62	,6	16,6	17,2	51,6	14,0
Stand Out	**Q.3**	3,74	1,6	14,7	13,6	47,8	22,3	4,18		8,3	6,4	44,6	40,8
	Q.16	3,67	21,7	3,8		59,8	14,7	3,10	8,3	29,3	17,8	33,1	11,5

When the conservative behavior of the investors is examined, it is seen that the New York Stock Exchange participants have more and more agree on answers than the stock exchange Istanbul. In this sense, NYSE investors exhibit more conservatism behavior.

In terms of confirmation/affirmation, which is another behavioral trait, BIST investors are less likely than NYSE investors to question decisions made without the approval of third parties. In this case, NYSE investors are more likely to be influenced by the opinions of people who have knowledge of the market or by the intense crisis rhetoric that occurs in the market.

BIST investors are less likely to distribute their investments on different instruments than New York investors. More NYSE investors are shying away from the trend of the illusion of knowledge by understanding that the market is on an upward trend and believe that this trend will continue. The BIST investor appears to be slightly more open to the illusion of knowledge.

In other words, NYSE investors are far more likely to gain as far as they can direct their investments; in terms of their level of control over the risk of losing their investments, NYSE investors are far more likely to gain. BIST investors dispose of their shares directly instead of selling their stock profits, which is one of the issues in the content of the illusion of control. The NYSE investor is understood to have spent the dividend income earned if necessary, not selling the shares. In this sense, these investors are more connected to stocks and are thought to develop investment strategies that are longer in duration.

It is seen that BIST evaluates companies according to the market on the basis of their representativeness and decides whether the company is good or not in this sense. In terms of long-term investments, NYSE shares are more lucrative than bonds, while BIST is more representational in the view that bonds will yield more gains for long-term investments.

NYSE investors exhibited more self-attribution behavior (3.59% of NYSE) in their investments than BIST investors. In this sense, Stock Market Istanbul investors are costing themselves less on their investment strategies (gains/losses).

Investors who showed over-optimism were particularly BIST Investors (3.22%), and NYSE investors did not seem to be overly optimistic about the market.

NYSE investors (3.27) are more likely to direct their investments according to their mood, while those who invest in BIST (2.87) are less likely to be affected by mood changes.

It has been argued that most of the investors directing their investments by doing mental accounting are BIST investors (3.58). NYSE investors (3.27) were slightly lower in their mental accounting behavior, as the New York Stock Exchange would be easier to implement a day-to-day investment strategy based on retrospective technical analysis as a result of being an older stock market.

The majority of investors who are influenced by herd movement and believe in the accuracy of herd movement is BIST investors (3.86). NYSE investors (2.64) may be said to be tracking herd movement to a lesser extent.

Over-Confidence behavior, another factor affecting investor psychology, was found to be high and close together in both groups of participants (BIST: 3.86-NYSE: 3.82).

Finally, there is little difference between the investors who tend to come forward, and they are overconfident and have a high tendency to come forward. BIST investors were at 3.64 percent, while the NYSE was at 3.70 percent with aspirations to stand out.

4.1.3. Hypotheses and analyses

Regression testing was applied in the analysis of hypotheses created within the framework of the nature of the research, and it was aimed to find the relationship between dependent and independent variables of the behavior properties that are contained within each hypothesis.

Hypothesis 1

H0: *Investors with High Mental Accounting Power Cannot Control Themselves.*

H1: *Investors with High Mental Accounting Power Can Control Themselves*.

Regression Testing		
	P-Value	
β:0,29	,001	H1 Accepted
R^2: 0,29	F: 0,391	t: 6,451

The H0 hypothesis is rejected because the findings obtained are positive and meaningful (β: 0.29 and p < 0.01). the H1 hypothesis is considered that investors with high mental accounting power can dominate themselves. H1: it has been recognized that investors with high mental accounting power can dominate themselves. Investors can be said to have an impulsive attitude in their decision-making process by dominating them in the short-term when they make their return/loss calculations from an intellectual point of view. 29% of the R Square value indicates the accuracy of the research model and the F value indicates the significance of the whole model.

Hypothesis 2

H0*: Investors Who Take a Herd Movement Approach Are Not Overly Optimistic*.

H1: *Investors Who Take a Herd Movement Approach Are Overly Optimistic.*

Regression Testing		
	P-Value	
β: 0,19	,000	H1 Accepted
R^2: 0,224	F: 0,367	t: 3,462

The model of the hypothesis is significant and (p=0.000) investors who exhibit a herd movement approach can be said to be overly optimistic, and a positive relationship between herd movement behavior and excessive optimism has been found (β:0,19). H1: investors who take a herd movement approach are not overly optimistic, not being overly optimistic causes them to open positions late in their decision-making process and are pessimistic for investors. It is normal for them to follow the herd movement as a way out of this waste of time and distrust of decision-making. At the point where they cannot decide, they continue their investments by adapting to the trading trend of the market. It is observed that 36% of the established model has significance and 22% of the independent variable has an effect on the dependent variable.

Hypothesis 3

H0: *Investors with High Mental Accounting Power Are No More Self-Attributing Behavior*.

H1: *Investors with High Mental Accounting Power Have More Self-Attribution Behavior.*

Regression Testing		
	P-Value	
β: 0,40	,000	H1 Accepted
R^2: 0,462	F: 0,563	t: 2,621

The H1 hypothesis was accepted (β: 0,40), and it was observed that there was a very high and positive relationship between those who exhibited high mental accounting and those who showed self-attribution behavior. H1: Investors With High Mental Accounting Power Have More Self-Attribution Behavior. Investors who make their investments by estimating their small account movements correctly will begin to attribute to them the increase in their earnings that their denominator is high in their achievements after a while. Therefore, investors who invest in using their mental accounting ability attribute their earnings more to themselves. 56% of the model's significance value of the whole has been determined, which shows us that the interaction of the established model is high.

Hypothesis 4

H0: *Investors with High Representability Are Making Informational Mistakes.*

H1: *Investors with High Representability Do Not Make Informational Mistakes.*

Regression Testing		
	P-Value	
β: 0,27	,000	H1 Accepted
R^2: 0,421	F: 0,340	t: 1,942

It has been determined that there is a positive relationship between representability and informational error, and investors with high representability can be said to exhibit no illusions. H1: Investors with High Representability Do Not Make Informational Mistakes. The ability to stabilize earnings income integrates the formation of portfolios of investors who can adopt their own strategies over time and apply them in different markets with representational behavior. It is normal for the investor who continues by not removing it even in the fall of the previously owned stock by showing a representation characteristic, to not make any illusions. Because representational behavior also contains past knowledge and experiences, it avoids the mistakes of instant informational error.

Hypothesis 5

H0: *Conservative Investors Don't Exhibit Herd Movement Behavior*

H1: *Conservative Investors Exhibit Herd Movement Behavior*

Regression Testing		
	P-Value	
β: 0,20	,000	H1 Accepted
R^2: 0,285	F: 0,443	t: 2,341

The H1 hypothesis is accepted when showing us that the Beta value of 0.20 is a positive interaction between conservatism and herd movement. H1: Conservative Investors Exhibit Herd Movement Behavior. Conservatism, which is seen as the most behavior of conservative and non-changeable investors, is more likely to follow fixed ideas and lead to investments that are free of risk. It is possible for investors who exhibit conservatism to follow the herd movement, moving in a more secure and market-attuned direction.

Hypothesis 6

H0: *Investors Who Invest According to Their Spiritual State Do Not Need Confirmation/Confirmation*

H1*: Investors Who Invest According to Their Spiritual State Need Confirmation/Confirmation*

Regression Testing		
	P-Value	
β: 0,29	,000	H1 Accepted
R^2: 0,394	F: 0,513	t: 3,108

In this model, because there is a positive and meaningful relationship between the spiritual state and the confirmation/affirmation, the H1 hypothesis is accepted that "investors who invest according to their spiritual state need confirmation/affirmation". H1: Investors Who Invest According to Their Spiritual State Need Confirmation. Investors who invest according to their emotions will experience ambivalence because they exhibit behaviors of getting approval from their environment, being confirmed and asking for approval for their decisions. In this respect, investors who invest according to their spiritual state need confirmation.

Hypothesis 7

H0: *Being in The Psychology of Herd Movement Does Not Provide Overconfidence*

H1: *Being in The Psychology of Herd Movement Provides Overconfidence*

Regression Testing		
	P-Value	
β: 0,22	,001	H1 Accepted
R^2: 0,322	F: 0,373	t: 3,159

The explanatory significance of the established model was 37%, indicating a positive relationship between herd movement behavior and overconfidence behavior. There is a positive relationship between herd movement and overconfidence, and the H1 hypothesis has been accepted. H1: Being in The Psychology of Herd Movement Provides Overconfidence. Psychologically, belonging to a crowded group is a very reassuring behavior. For investors, too, following the herd movement and investing according to the trend of the market provides excessive confidence. Because in the opposite situation, the person does not give himself too much margin for error, but he can still feel consolation because there will be no loss of his own.

Hypothesis 8

H0: *Overly Optimistic Investors Don't Exhibit Conservatism Behavior.*

H1: *Overly Optimistic Investors Exhibit Conservatism Behavior.*

Regression Testing		
	P-Value	
β: 0,28	,000	H1 Accepted
R^2: 0,395	F: 0,573	t: 1,906

The significance of the established model is 57% and it has a high significance. Over-optimistic investors ' display of conservatism was found at a positive rate of 28%, and the H1 hypothesis was accepted.

CONCLUSION

As a conclusion; NYSE investors are more likely to be influenced by the opinions of people who have knowledge of the market or by the intense crisis rhetoric that occurs in the market, BIST investor appears to be slightly more open to illusion of knowledge, NYSE investor is understood to have spent the dividend income earned if necessary, not selling the shares. In this sense, these investors are more connected to stocks and are thought to develop investment strategies that are longer in duration, it is seen that BIST evaluates companies according to the market on the basis of their representativeness and decides whether the company is good or not in this sense. In terms of long-term investments, NYSE shares are more lucrative than bonds, while BIST is more representational in the view that bonds will yield more gains for long-term investments. Those who perform mental accounting in their investments are abler to control themselves, the market outlook of investors who tend to herd movement behavior is not overly optimistic, Conservative investments were found to have an overly optimistic attitude, determining that there is a positive interaction between informational error and control error and that it affects control errors in the continuation of sectoral information deficiencies.

In this study, a symbolic expression was used to understand the behavior of investors. The analogy of the "Herd Circle Movement" has been made because the interaction of investor behavior with each other continues to be chained and this movement repeats. as a result of the data obtained in the study, the behavior of investors was explained as a result of the hypotheses which were prepared on the basis of the data obtained from frequency-based sequences and the behavioral similarities. In recent years, the increasing popularity of behavioral finance, human behavior attempts to explain and, especially in terms

of stock markets, the classical theories of Finance express the contrary, explains the popularity of behavioral finance.

As a continuation of this topic and as a suggestion, the attitudes of investors can be examined in a more specific behavioral table under the heading of behavioral finance. In this thesis, the behavioral features included in the herd circle movement approach can be improved by adding more behavioral features and then applying this approach to different markets (such as Future, WOB, Forex) can be presented and the behavioral attitudes of different securities investors can be compared.

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APPENDEX 1. SURVEY

Sex:	Male ( ) Female ( )
Age:	( )18-29 ( )30-39 ( )40-49 ( )50-59 ( )60 And Over
Education:	( ) High school ( ) Under graduation ( ) Graduation
How Long You Have Been Following Up With Stock?	( ) Less Than a Year ( ) Between 1-3 Years ( ) Between 3-5 Years ( )5 Years and More
How Long Approximately Do You Hold Stock?	( ) Less Than 6 Months ( ) Between 6-12 Mon. ( ) Between 1-3 Years ( ) Between 3-5 Years ( ) 5 Years and More
How Many Company Stocks Do You Have Approximately In Your Portfolio?	( ) 1-3 Company ( ) 3-5 Co. ( ) 5-9 Co. ( ) 9 Co. and More
What Are The Features That You Pay Attention When Buying A Stock Investment Decision?	( ) Interest Rates ( ) Basic Analysis ( )Technical Analysis ( ) Exchange Parities ( )Politic Economy
How Is Your Level Of Information About The Stock Exchange?	( ) Less ( ) Normal ( )More

QUESTIONS	**STRONGLY DISAGREE**	**DISAGREE**	**NEITHER AGREE NOR DISAGREE**	**AGREE**	**STRONGLY AGREE**
1. I Find Winning Stocks Even When The Stock Markets Decline					
2. A Good Company's Stock Is A Good Stock.					
3. Expert Opinions In Written and Visual Media Should Be Taken Into Consideration When Investing					
4. I Realize That I Am On The Right Track To Invest If The Investments Of The People Whose Opinions I Value Are Similar To Mine					
5. As Long As I Manage My Investment Myself, My Likelihood Of Winning In The Stock Market Increases					

6. If I Believe In My Investment Strategy, I Do Not Give Much Credit To The Confusing New Information					
7. In Any Condition, I Am Able To Acquire All Information That I Need When Making Investment Decisions.					
8. Once the Stock Market Indices Start To Rising, I Think They Will Continue To Increase In The Future As Well					
9. Those Who Follow Institutional Investors At Stock Market Win					
10. Because It Is Hard To Foresee The Timing Of The Crisis, Unsuccessful Trading Activities In Crisis Times Do Not Imply The Investor's Incompetency.					
11. If The Actual Price Of The Stock Decreases To Below Its Purchasing Price, It Should Be Held Until It Breaks Even					
12. The Increase In The Value Of My Stocks May Be Due To Luck Rather Than My Own Ability.					
13. The Sadness Resulting From Losses In Investments Have Relatively Greater Impact On The People Than The Joy Resulting From Gains					
14. My Ability To Pick The Stock Is Above That Of The Average Investor.					
15. A Company's Stock About Which The Media Often Make News Should Be Preferred When Investing.					
16. The Rumors Of Crisis In Written And Visual Media Affect And Push Me To The Tendency Of Selling All My Investments.					
17. The Past Return Performance Of Stock Provides Information About Its Future Performance.					
18. In The Long Run, Bonds and Bills Earn More Than The Average Stock					
19. I Easily Foresee That The Stock Market Is About To Decline and Sell My Stocks.					
20. When I Am In Need Of Money, I Spend The Incoming Dividends Instead Of Selling My Stocks Instead Of Selling My Stocks					
21. The Most Successful Investment Tactic Is To Copy The Successful Investment Tactics Of The Successful Traders.					
22. We Should Not Panic and Should Stick To The Original Strategy Even If A Specific Stock, Which We Strongly					

Believe, Will Increase Starts To Decline.					
23. The More Information About A Specific Stock I Have, The Better It Is					
24. The Losses In Bonds and Bills Create Sadness To People More Than The Same Amount Of Losses In Stock Because Bonds and Bills Are Less Risky.					
25. We Have To Diversify Our Investments By Distributing Them Equally Among The Instruments, Which Are Being Considered.					
26. The Positive News In The Written And Visual Media About A Specific Stock That I Plan To Buy Reinforces My Tendency To Buy					
27. The Increase In The Value Of My Stocks May Be Due To Luck Rather Than My Own Ability.					
28. It Was Clear That The Foreign Investors Will Sell Their Portfolio Investments And Leave The Country.					
29. The Rumors Of Crisis In Written And Visual Media Affect And Push Me To The Tendency Of Selling All My Investments.					
30. The Investor Is More Optimistically/ Pessimistic Inclined To Buy The Stocks Of His/her favorite Corporation When They Win, and More Pessimistic When They Lose.					

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