

## Balanced scorecard-based performance assessment of Turkish banking sector with the Analytic Network Process (ANP)

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### ABSTRACT

In the last decade, Performance assessment of banking sectors in advanced economies became a prominent issue investment decision. This paper aims to evaluate the balanced-scorecard-based performance of the Turkish banking sector using the Analytic Network Process Approach. Within this scope, all 33 deposit banks were intended to analyze out of 34 banks. Within this scope, we made an analysis in order to determine which perspectives of the balanced scorecard approach are appropriate for each type of bank (state banks, private banks, foreign banks). In this study, we used Analytic Network Process (ANP) approaches so as to achieve this objective. With a balanced-scorecard performance assessment of the banking sector using the ANP approach, all the factor priorities have been extracted and normalized to one for each cluster and final priorities have been obtained. The final priorities and rankings of each perspective of the balanced scorecard and the type of bank ownership have been assessed in the model. According to the results of the analysis, Findings demonstrate that (i) financial factor of balanced scorecard approach has the first rank with 65.7 percent; (ii) Customer perceptible is in the second rank with 22.1 percent. (iii) Third and fourth ranks have close results, (iv) learning and growth stay in the third rank with 6.3 percent (v) internal factor has the weakest importance with 5.9%, (vi) state banks into bank ownership have the highest rank with 53.9 percent, (vii) Private owned banks are the second in the relative performance of the bank groups with 36.1%, (viii) Balanced scorecard based performance of foreign banks are replaced in the last order with approximately 10%.

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## Introduction

Banks play a critical role in financial sectors all around the world. Most of the companies increase their investments with the loans taken from the banks. In addition to this situation, because a lot of investors trust the banks, they put their money to deposit accounts of the banks. Therefore, it can be said that any problems related to banks affect many parties negatively. Due to this situation, the performance of the banks should be audited and controlled regularly.

With respect to the evaluation of the banks' performance, generally some financial ratios are taken into the consideration. One of the most popular ratios is return on assets (ROA) that shows the net profit amount per total asset. Similar to this ratio, return on equity (ROE), net interest margin (NIM), return on investments (ROI) are also other significant ratios used in evaluation of the performance of the banks. Moreover, non-performing loans (NPL) ratio is also important determinant of banks' performance. This ratio demonstrates the success of the banks regarding giving loans to the customers. In addition to them, change in total assets, deposits and expenses gives information about the performance of the banks. By controlling the variations in these ratios regularly, it can be possible to have information related to the performance changes. Furthermore, according to some performance measurement approach, sub titles of these main figures are also considered as informative factors for the performance. To sum up briefly, most of

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the approaches related to performance measurement are considered different financial ratios. On the other hand, balanced scorecard approach became popular for performance evaluation in recent years. The main difference of this approach from others is that it considers non-financial ratios in addition to financial ratios. Because of this situation, it is accepted that balanced scorecard approach provides more realistic results in comparison with other techniques. Another advantage of this approach is that it increases communication between employees in different departments.

Owing to the situations emphasized above, the main purpose of this study is to evaluate the performance of Turkish banking sector. In order to achieve more accurate results, balanced scorecard approach is used in this study. After the introduction, second section of this paper gives information about balanced scorecard approach and its role in banking sector. The third section explains Analytic Network Process (ANP) approach. The fourth section reviews empirical results of our study. After that, conclusion part is stated at the final section.

## **Literature Review**

### **Theoretical and Empirical Review**

Balanced scorecard is a performance measurement tool which evaluates the company by using various performance indicators. It was firstly emphasized in an article published by Robert Kaplan and David Norton in 1992. Because these authors think that considering only financial indicators are inadequate, balanced scorecard also focuses on non-financial indicators while measuring performance of the company. With respect to the process of developing balanced scorecard, first of all, top management should define the strategies by considering the purposes of the company. After that, the aims of all department regarding these strategies are defines. These aims include both financial and nonfinancial issues. Furthermore, strategies of all departments can also be identified while taking into the consideration of the strategies defined before. Owing to these issues, the performance of all departments is stimulated to increase. In addition to this situation, measuring the performance of this company becomes easier with the help of balanced scorecard (Kaplan and Norton, 1996).

Balanced scorecard has many advantageous by comparing with other techniques. The main difference of balanced scorecard from other performance measurement methods is that balanced everybody in a company benefits from the results of the balanced scorecard whereas other techniques provide information for only management level personnel (Kaplan and Norton, 1996). In other words, scorecard aims all personnel to become aware of the purposes and strategies of the company. Therefore, it can be said that balanced scorecard increases communication between personnel and the departments. Moreover, increasing motivation of the personnel is another advantage of balanced scorecard. During the process of the generating balance scorecard, all employees become informed of the purposes and strategies of the company. Because they have knowledge about the company, they feel themselves a part of the company and the sense of belonging to the company goes up. Due to this situation, they become more motivated (Senge, 2014). There are four perspectives of balanced scorecard which are; financial, customer, internal processes and learning and growth (Kaplan and Norton, 1996). With respect to financial perspective, financial ratios of the company are used in order to measure the performance. The main financial purpose of the companies is to increase revenue and decrease the costs. Therefore, financial ratios such as, return on asset, total revenue/total costs help to understand the financial performance of these companies (Dincer et al., 2017). In addition to the profit, risk dimension should also be considered in financial perspective. Regarding customer perspective, some criteria related to customers should be considered. Customer satisfaction is an important indicator for this perspective because it shows how effective these customers are served. Moreover, customer loyalty is also another indicator that helps to understand how long the customers prefer to work with our company. Furthermore, market share ratio is also helpful to see the performance of the company in comparison with the customers. When taking into the consideration all of these aspects, identification of market and the customers, providing efficient products to the customers and the quality of the services are very important so as to increase the performance for this perspective (Kaygusuz, 2005). As for internal processes perspective, the processes of the company should be focused in order to measure the performance. Companies evaluate and improve their internal processes to satisfy the need of the customers. This improvement can be renewing the process or making some changes in this process. For example, having an efficient production process is related to this perspective. Because of this situation, production on time or the quality of the products may be the measurement criteria for this example. As a result, the main purpose is to increase efficiency by improving the operational processes (Kaplan and Norton, 1992). Last but not least, learning and growth is essential perspective for a company to increase its performance. The main reason behind this situation is that a company can increase its performance with the help of qualified and motivated employees. For instance, the responsibilities of the employees may be changed in order to increase their motivation. In this perspective, both the skills of the customers and work environment are aimed to be improved. Owing to this situation, employee turnover rate, the results of employee satisfaction survey can be used as measurement criteria for learning and growth perspective (Kaplan and Norton, 1996).

Balanced scorecard is used in many different sectors to assess the performance of the companies. It is also a useful approach to measure the performance of the banks. Especially after banking crises occurred in last decades, the popularity of performance management increased very much. Because balanced scorecard has many advantages by comparison with other performance measurement techniques, it was started to prefer by most of the banks (Zhang and Li, 2009). In the field, there is an extent literature on balanced scorecard technique which is used in performance measurement. Some of these studies were depicted on the following table.

**Table 1:** Studies Related to Balanced Scorecard

Research Interest	Authors	Key Factors	Method	Results
Evaluating the performance of strategic business units of a steel company	Noori (2015)	Sales, Cost Reduction, ROI, Profit, Market Share, Satisfaction Levels of the Customers, R&D Expenses, Productivity, Number of new products, Degree of Involvement, Training Expenses, Number of Employees	Fuzzy Analytic Hierarchy Process (FAHP)	The best SBU of the steel company was selected.
Analyzing the performance of the branches of Bank Sepah	Alidade and Ghasemi (2015)	The number of open account, The number of people receiving wages, The number of credit files of the branch, Education of the Staff, Profit, E-services, Bills of exchange, Trust fund, The number of the recommendations presented from the branches, The views of the regions management, Other deposits	Fuzzy Analytic Hierarchy Process (FAHP)	In conclusion the performance of all branches was analyzed.
Evaluation of bank performance	Panicker and Seshadri (2013)	Liquidity Ratio, ROE, Net Profit, Leverage Ratio, ROI, Business Per Employee Growth, Growth of Banking Services, Credit Growth, Numbers of suppliers, Customer Complaints Redressed, Growth in Customer Saving Accounts, Growth in Term Deposit, Growth in Demand Deposit, Consumer Banking Net Promoter Score, Number of Employees, Profit Per Employees, Percentage of Employees receiving Training, Employee Engagement	Descriptive Statistics	There was a decline in the performance of SCB in the last two years.
The importance of approach in evaluation of bank performance	Eskandari, et. al. (2013)	Revenue, Debt Ratio, ROA, Earnings per share, Profit Margin, ROI, Customer Satisfaction, Profit per Customer, Market Share, Customer Retention Rate, Customer Increasing Rate, Profit per Customer, Number of New Service Items, Transaction Efficiency, Customer Complaint, Sales Performance, Management Performance, Responses of Customer Service, Professional Training, Employee Stability, Employee Satisfaction	Fuzzy DEMATEL	It was defined that Fuzzy DEMATEL method is very helpful to show the importance of performance evaluation criteria.
Evaluating the performance of Indian banks	Dave and Dave (2012)	Cash Deposit Ratio, Credit Deposit Ratio, Interest Income/Total Assets, NIM, ROE, Capital Adequacy Ratio, ROA, Net Profit, Growth Rate of Total Credits, Ratio of Term Loans to Total Advances, Growth in Total Deposits, Ratio of Term Deposit to Total Deposits, Ratio of Deposits to Total Liabilities, Marketing Expenses, Business per Employee, Profit per Employee, Training Expenditure, Number of Skilled Employees, Number of ATMs, Number of Debit Cards, Number of Credit Cards	Descriptive Statistics	It was concluded that using non-financial criteria is very important to measure the performance of the banks.
Performance evaluation and relationship model for hot spring hotels	Chen, et. al. (2011)	ROA, Revenue Growth Rate, Net Profit Ratio, Customer Satisfaction, Service Quality, Hotel Image, Customer Loyalty, Ability to keep existing customers, Hotel management efficiency enhancement, Customer background information compilation, Effective problem-solving percentage, Employee education, Employee professional ability, Employee productivity, Employee ability to manage emergencies	DEMATEL and ANP	A model was developed for performance evaluation for hot spring hotels.
Evaluating the performance of Iranian banks	Shaverdi, et. al. (2011)	Sales, Debt Ratio, ROA, Earnings per share, ROI, Net Profit Margin, Customer Satisfaction, Profit per Customer, Market Share, Customer Retention Rate, Customer Acquisition Rate, Number of new service items, Sales Performance, Customer Complaints, Transaction Efficiency, Professional Training, Employee Stability, Employee Satisfaction, Organizational Competence	TOPSIS, VIKOR, and ELECTRE	It was concluded that customer is the most significant perspective of BSC.
Evaluation of bank performance	Wu et al. (2009)	Sales, ROA, Debt Ratio, Earnings per Share, ROI, Net Profit Margin, Customer Satisfaction, Market Share, Profit per Customer, Customer Retention Rate, Number of New Service Items, Customer Complaints, Responses of Customer Service, Professional Training, Employee Stability, Employee satisfaction	Fuzzy Analytic Hierarchy Process (FAHP)	The FAHP model of banking performance using the BSC framework can be a useful and effective assessment tool.
Evaluating the performance of banks in Ghana	Yahaya (2009)	Market Share, ROA, ROE, Customer Satisfaction Index, Customer Retention, SLA for Account Opening, SLA for cash withdrawal, SLA for Loan Disbursement, Employee Satisfaction Index, Employee Innovativeness, Employee Stability Index	Descriptive Statistics	Non-financial factors play an important role in the performance of the banks in Ghana.
Evaluating the performance of Large Local Bank (LLB) in Iraq	Najjar and Kalaf (2012)	Liquidity Ratio, ROI, ROE, Profit Margin, Leverage Ratio, Productivity Growth, Growth of Banking Service, Credit Growth, Growth in Software Applications, Customer Satisfaction, Customer Growth, Growth of Accounts, Employee Productivity, Employee Turnover, Growth in Branches,	Descriptive Statistics	The performance result of LLB increased between 2006 and 2009.

<b>Table Cont'd</b>				
Defining Balanced Scorecard Aspects in Banking Industry	Rostami, et. al (2015)	Outstanding Loan Balances, Deposit Balances, Number of Products per Customer, Number of New Customers, Non-Interest Income, New Loans Created, New Accounts, New Products Introduced, Employee Training Hours, Customer Satisfaction, Customer Retention, Employee Satisfaction, Sales Calls to Potential Customers, Thank-You Calls, Employee Turnover	Fuzzy Analytic Hierarchy Process (FAHP)	It was concluded that customer perspective of BSC is the most important aspect for the banks.
Evaluating the performance of banks in Ethiopia	Abay (2010)	Net profit growth, ROE, ROA, Customer Satisfaction, Customer Retention, Customer Intention, Transaction Speed, Responsiveness, Service Quality, Payment, Social Relationship, Working Condition, Participation	Regression Analysis	It was identified that there was a strong relationship between financial and non-financial performance of the commercial banks of Ethiopia.
The effects of e-supply chain system	Karaca and Demirtas (2010)	Efficiency, Profit, Stock Level, Payment and Collection, Direct Sales, Elasticity in Price, Returning Customer Requests on time, Numbers of the Customer, 7/24 Access, Operational Time, Numbers of Online Orders, Number of Customer Complaints	Descriptive Statistics	There was a performance increase in the company after the usage of e-supply chain system.
The performance in logistic sector	Ozyoriük, et. al (2014)	Changes in Revenue, Profitability, Cost per Employee, Average Sales per Customer, Customer Complaints, Change in Customer Numbers, Error Rate, Delivery on Time, Customer Satisfaction, Turnover Rate, Number of Suggestions, Training per Customers	Analytical Hierarchical Process	They defined the logistic firm that has the best performance.
The effects of balanced scorecard for Turkish companies	Bekmezci (2013)	Turnover, Net Profit before Tax, Total Assets, Capital	Descriptive Statistics	Using balanced scorecard increased the performance of the companies.
The evaluation of the performance of a company by using balanced scorecard	Uygun (2009)	Change in Sales, COGS/Total Sales, Change in Price, Marketing Cost/Total Sales, Asset Turnover, Market Share, Number of the Customers, The Ratio of Fulfilling Customer Orders, Return Ratio, The Ratio of Damaged Product, Training Expenditure per Employee, Results of the Employee Survey	Descriptive Statistics	Using balanced scorecard increased the performance of the companies.

**Source:** Authors

Noori made a study so as to determine the performance of strategic business units of a steel company. Within this scope, he used balanced scorecard approach and Fuzzy Analytic Hierarchy Process (FAHP) in this study. According to the results of the analysis, the strategic business unit that has the best performance was defined (Noori, 2015). Alidade and Ghasemi tried to analyze the performance of the branches of Bank Sepah which is one of the biggest banks in Iran. They used balanced scorecard approach in order to achieve this objective. In addition to this situation, they benefited from Fuzzy Analytic Hierarchy Process in this study. As a result, all branches of Bank Sepah were analyzed according to their performance results (Alidade and Ghasemi, 2015). Panicker and Seshadri made a study about how to use balanced scorecard in order to measure the performance of the banks. Within this scope, the performance of Standard Chartered Bank in India was evaluated by using this approach. Moreover, the data for the period between 2009 and 2012 was used in this study. As a result, it was determined that the performance of SCB increased in first two years. However, there was a decline in the performance of this bank in the last two years (Panicker and Seshadri, 2013). Eskandari, Roudabr and Kamfiroozi made a study about banks' performance evaluation. Within this scope, balanced scorecard approach was used in this study. In addition to this situation, The Fuzzy Decision Making Trail and Evaluation Laboratory (FDEMATEL) method was also used in order to see the importance of performance measuring criteria. As a result, it was defined that Fuzzy DEMATEL method is very helpful to show which performance evaluation criteria are more significant (Eskandari, et. al., 2013).

Dave and Dave tried to evaluate the performance of Indian Banks by using balanced scorecard approach. Within this scope, the performance of State Bank of India was analyzed. Furthermore, 29 performance indicators for his bank were evaluated for the years between 1997 and 2008. As a result, it was determined that using non-financial criteria is very important to measure the performance of the banks (Dave and Dave, 2012). Chen and others made a study about performance evaluation for hot spring hotels. In this study, balanced scorecard approach was used in order to achieve this purpose. Because the process was thought very complex, they decided to use ANP approach as well. At the end of the analysis, a performance evaluation model was developed for hot spring hotels (Chen, et. al., 2011). Shaverdi, Akbari and Tafti made a study in order to evaluate the performance of the banks in Iran. Within this scope, the performance of three non-governmental banks of Iran was analyzed in this study. 21 different criteria for balanced scorecard were defined for these banks. Moreover, fuzzy analytic hierarchy process (FAHP) calculated the relative weights of each chosen criteria. As a result, it was concluded that customer is the most important perspective of balanced scorecard approach (Shaverdi, et. al., 2011). Wu and others tried to define criteria in order to evaluate bank performance. Within this scope, they used balanced scorecard perspectives and determined 21 performance indicators related to them. Moreover, the relative weights of the chosen evaluation ratios

were calculated by Fuzzy Analytic Hierarchy Process (FAHP). In conclusion, it was identified that as for measuring the performance of the banks, balanced scorecard approach is very useful (Wu, et. al., 2009). Yahaya made a study in order to evaluate the performance of the commercial banks in Ghana. In this study, balanced scorecard technique was used so as to achieve this purpose. Moreover, 3 biggest banks of Ghana were included in this study. According to the results of the analysis, it was defined that non-financial factors play an important role in the performance of these banks (Yahaya, 2009). Najjar and Kalaf tried to analyze the performance of Large Local Bank (LLB) in Iraq. They used balanced scorecard approach in this study. In addition to this situation, the data for the period between 2006 and 2009 was used in order to achieve this objective. As a result, it was determined that the performance of LLB increased during this period (Najjar and Kalaf, 2012). Rostami and others made a study so as to identify the balanced scorecard aspects in banking sector. In this study, ranking 4 perspectives of BSC with respect to their importance was also aimed. Due to this situation, Fuzzy Analytical Hierarchy Process approach was also used. It was concluded that customer perspective of BSC is the most important aspect for the banks (Rostami, et. al., 2015).

Abay evaluated the performance of Ethiopian commercial banks by using balanced scorecard approach. Moreover, 4 biggest banks of Ethiopia were included in the scope of this study. In this study, regression analysis was also made to the data of these banks. In conclusion, it was identified that there was a strong relationship between financial and non-financial performance of the commercial banks of Ethiopia (Abay, 2010). Karaca and Demirtas tried to analyze the effects of e-supply chain system to the performance of the companies. In this study, balanced scorecard technique was used in order to measure the performance. In conclusion, it was determined that there was a performance increase in the company after the usage of e-supply chain system (Karaca and Demirtas, 2010). Ozyorük and others made a study about performance assessment in logistic sector. They compared the performance of three different logistic companies by using balanced scorecard. In addition to this situation, they also benefited from analytical hierarchical process in order to benchmark these companies. As a result, they defined the firm that has the best performance (Ozyorük, et. al., 2014). Bekmezci made a study about the success of balanced scorecard in Turkey. Within this scope, enterprises among the first 500 companies in Turkey that use balanced scorecard as a performance measurement technique, were analyzed. In addition to that, financial data for the period between 2006 and 2011 was used in this study. As a result, it was defined that these enterprises were in a better financial situation (Bekmezci, 2013). Uygur analyzed the performance of a Turkish company by using balanced scorecard approach. Firstly, he determined the criteria for performance measurement. In conclusion, it was defined that this company is successful with respect to each perspective of the balanced scorecard (Uygur, 2009).

As it can be seen from the studies emphasized below, balanced scorecard approach is very popular in order to evaluate the performance of the banks. The most commonly used determinants of banks' performance were also explained on the following table.

**Table 2: Most Commonly Used Determinants of BSC**

Main Items of BSC	Key Factors	Supported Literature
<b>Financial</b>	Net Profit Growth	(Abay, 2010), (Dave and Dave, 2012), (Eskandari, et. al., 2013), (Karaca and Demirtas, 2010), (Noori, 2015), (Ozyorük, et. al., 2014), (Panicker and Seshadri, 2013), (Rostami, et. al., 2015), (Shaverdi, et. al., 2011), (Chen, et. al., 2011)
	ROE	(Abay, 2010), (Dave and Dave, 2012), (Eskandari, et. al., 2013), (Najjar and Kalaf, 2012), (Panicker and Seshadri, 2013), (Rostami, et. al., 2015), (Shaverdi, et. al., 2011), (Yahaya, 2009)
	ROA	(Abay, 2010), (Bekmezci, 2013), (Dave and Dave, 2012), (Eskandari, et. al., 2013), (Ozyorük, et. al., 2014), (Shaverdi, et. al., 2011), (Wu, et. al., 2009), (Yahaya, 2009), (Chen, et. al., 2011)
	Capital Adequacy Ratio	(Dave and Dave, 2012)
	Net Interest Margin	(Dave and Dave, 2012), (Eskandari, et. al., 2013), (Najjar and Kalaf, 2012), (Shaverdi, et. al., 2011)
	NPL	(Rostami, et. al., 2015)
	<b>Customer</b>	Number of Customers
Deposit Growth		(Alidade and Ghasemi, 2015), (Dave and Dave, 2012), (Najjar and Kalaf, 2012), (Panicker and Seshadri, 2013), (Rostami, et. al., 2015)
Deposits/Total Liabilities		(Dave and Dave, 2012), (Rostami, et. al., 2015)
Market Share		(Eskandari, et. al., 2013), (Noori, 2015), (Panicker and Seshadri, 2013), (Rostami, et. al., 2015), (Uygur, 2009)
Profit per Customer		(Eskandari, et. al., 2013), (Shaverdi, et. al., 2011)
<b>Internal</b>	Profit per Employee	(Dave and Dave, 2012), (Panicker and Seshadri, 2013), (Wu, et. al., 2009)
	Customer Complaint	(Eskandari, et. al., 2013), (Noori, 2015), (Ozyorük, et. al., 2014), (Panicker and Seshadri, 2013), (Rostami, et. al., 2015), (Shaverdi, et. al., 2011), (Yahaya, 2009)
	Total Loans Growth	(Dave and Dave, 2012), (Panicker and Seshadri, 2013), (Rostami, et. al., 2015), (Shaverdi, et. al., 2011)

**Table Cont'd**

<b>Learning and Growth</b>	Training Expenses	(Dave and Dave, 2012), (Eskandari, et. al., 2013), (Noori, 2015), (Ozyorük, et. al., 2014), (Panicker and Seshadri, 2013), (Rostami, et. al., 2015), (Shaverdi, et. al., 2011), (Uygur, 2009), (Chen, et. al., 2011)
	Employee Turnover Rate	(Dave and Dave, 2012), (Eskandari, et. al., 2013), (Najjar and Kalaf, 2012), (Noori, 2015), (Ozyorük, et. al., 2014), (Panicker and Seshadri, 2013), (Rostami, et. al., 2015), (Shaverdi, et. al., 2011), (Uygur, 2009)
	Number of Debit Cards	(Dave and Dave, 2012), (Najjar and Kalaf, 2012)
	Number of Credit Cards	(Dave and Dave, 2012), (Najjar and Kalaf, 2012)
	Number of Branches	(Dave and Dave, 2012)
	Number of ATMs	(Dave and Dave, 2012)

**Source:** Authors

Net profit growth is one of the most important criteria with respect to the financial perspective of balanced scorecard. The main reason behind this situation is that this ratio gives information about the financial success of the banks. Similar to this ratio, return on equity (ROE) and return on assets (ROA) are other important ratios that show the performance of the banks. ROE shows the ratio of total profit to total equity. This ratio also demonstrates how the resources of the banks are used efficiently. In addition to the ratios emphasized above, capital adequacy ratio means the minimum amount of capital that banks have to hold. There are different opinions related to the relationship between capital adequacy ratio and the performance of the banks in the literature. Some of the researchers think that having high amount of capital decreases the performance of the banks because this amount cannot be used as a loan. However, others claim that there is a positive relationship between these two variables. The main reason behind this issue is that this amount is a guarantee in case of any crisis occurred. Net interest margin is also another important ratio of financial perspective of balanced scorecard. This ratio shows the difference between interest income and interest expenses. Therefore, it gives information about the efficiency of the banks. In other words, if the banks have high amount of net interest margin, this means that these banks also have high profitability. Additionally, non-performing loans ratio is also used in financial perspective of balanced scorecard. This ratio demonstrates the success of the banks, so there is a negative relationship between NPL ratios and the performance of the banks.

Regarding customer perspective of balanced scorecard, the change in the number of the customers is an essential ratio that shows the performance of the banks. It is accepted that there is a positive relationship between these two variables. Parallel to this ratio, increase in profit per customer also demonstrates better performance for the banks. In addition to them, if the bank has a greater market share, it is thought to have a better performance.

Furthermore, ratios related to the deposits are significant as for customer perspective of the balanced scorecard. One of these ratios is the deposit growth rate that has a direct relationship with banks' performance. Additionally, the ratio of total deposits to total liabilities is another significant ratio of customer perspective. There is a positive relationship with this ratio and the performance of the bank because increase in this ratio means that more customers started to work with the bank.

Determining the ratios about the internal perspective of balanced scorecard is quite difficult for banking industry. Regarding internal perspective, profit per employee is one of the most significant ratios. This ratio demonstrates the efficiency of the company. Moreover, the number of customer complaint is also another important variable for this situation. It is accepted that there is a negative relationship between this ratio and the performance of the banks. Furthermore, the growth in total loans is also accepted as a determinant of banks' performance.

With respect to the learning and growth perspective of balanced scorecard, the most popular ratio is the amount of training expenses. This ratio shows how much banks give importance to the training of the employees. In addition to this ratio, employee turnover rate is also another significant variable. If this ratio is high, this means that employees are not satisfied with the condition of the banks. Moreover, the change in the numbers of debit cards, credit cards, branches and ATMs are another important ratios related to this issue. These ratios show the growth situation of the banks.

## **Research and Methodology**

### **Analytical Hierarchy Process (AHP)**

Determining the accurate relationship between the variables is not an easy process. The main reason is that decision making process should involve many different factors to reach the correct result. However, available approaches for decision making process were criticized by many people due to not defining correct relationship. Because of this situation, researchers needed some new approaches to solve this problem.

Some techniques were created in order to help decision makers in this process. These techniques contain complex situations so as to make decisions more correctly. Analytical Hierarchy Process (AHP) was the first example regarding making process by using multi

criteria (Dincer & Hacıoglu, 2013; Dincer & Hacıoglu, 2015; Dincer et al., 2017). This approach was created by Saaty in 1980. This approach is used in order to make decisions in very complex situations. Therefore, it is a very useful approach for decision makers (Saaty, 1990).

AHP is mainly used when there is a hierarchical structure. With respect to the implementation of this approach, first of all, a purpose is defined and it is stated at the top of this hierarchy. In addition to them, criteria are stated below this purpose. Moreover, there are alternatives for the selection at the bottom of this hierarchical structure (Saaty, 1990).

### Analytic Network Process (ANP)

Analytic Network Process (ANP) is also another technique that is used to make decision for complex situation. This model was also introduced by Saaty similar to AHP. Interaction, dependence and feedback between elements of the clusters are considered in ANP. Therefore, it can be said that ANP has a network structure instead of hierarchical structure. Owing to this situation, it is believed that ANP provides more effective results comparing by other methods (Dargi, et. al, 2014). Although there are many similarities between AHP and ANP, there are also some differences. The first difference is that ANP considers complex relationship between the elements in decision making process. However, AHP approach contains one way relationship. That is to say, ANP uses interactive relationship despite the fact this relationship is hierarchical in AHP. Another difference between these two approaches is related to the calculation of supermatrix. Because of these differences, it can be said that ANP is more effective and realistic approach in comparison with AHP (Chang, et. al., 2015).

In order to implement Analytic Network Process, first of all, sub problems are created from our original problem. After that, qualitative scale, which was created by Saaty, is filled. The importance of the variables is compared in this scale. There are 9 different values in this scale which are explained below (Yazgan, et. al, 2009).

- 1=Equal importance
- 2=Weak
- 3=Moderately Important
- 4=Reasonably plus
- 5=Strong weight
- 6=Strong plus
- 7= Very well-built confirmed important
- 8=Very, very strong
- 9=Excessive importance

While using these values, a quantitative scale is created from this qualitative scale. During this process, a matrix is created from this pairwise comparison. This matrix is obtained as follows (Saaty, 1990).

$$A = [a_{ij}]_{n \times n} \quad i = 1, \dots, n \quad j = 1, \dots, n$$

After this comparison, the consistency of the matrix is measured.

$$A_w = \lambda_{\max} W$$

In this equation, w represents eigenvector (priority vector) and  $\lambda_{\max}$  is the major eigenvalue of the matrix. The consistency index (CI) provides the consistency of the pairwise matrix. The equation of consistency matrix is shown below (Nazir, et. al., 2014).

$$C_i = \frac{\lambda_{\max} - n}{n-1}$$

In addition to this situation, consistency ratio (CR) is explained below.

$$CR = \frac{CI}{RI}$$

In this equation, RI represents random consistency. The value of RI was defined by Saaty. It was expected that the value of CR should be less than 0.1 in order to accept consistency (Saaty, 1990). After this process, a supermatrix is formed. The sum of the column of the supermatrix is very significant. If this value is less than "1", the matrix should be normalized until the value becomes less than or equal to "1". After that, limit supermatrix is formed. It shows the effects of the variables in the long run. The final step of ANP is to choose the best alternative (Nazir, et. al., 2014). There are a lot of studies in the literature related to ANP technique. Yazgan and other made a study about enterprise resource planning (ERP) software selection. Analytic network process (ANP) method was used in order to make decision in this study (Yazgan, et. al, 2009). Meade and Presley also made an analysis related to the project selection about research and development. In this study, they used analytic network process (ANP) technique in order to reach this objective. They created a model for project selection and concluded that ANP is an effective and efficient decision-making tool (Meade and Presley, 2002). Similar to this study, Mohanty and others also tried to determine the best research and development project by using this approach (Mohanty, et. al, 2005). Gencer and Gürpınar tried to create a model for supplier selection process. With the scope of this study, analytic network process (ANP) technique was used while making model (Gencer and Gürpınar, 2006). In addition to this study, Dargi and others also made a study related to supplier selection. In this study, they used fuzzy-ANP approach in order to

achieve this objective (Dargi, et. al, 2014). Furthermore, Sadeghi and others also made an analysis about supplier selection by using ANP technique (Sadeghi, et. al., 2012). Jharkharia and Shankar made a study about the selection of a logistic service provider. Because they thought this situation as a complex problem, they decided to use ANP approach in decision making process. In conclusion, it was defined that compatibility is the most important determinant between the user and the provider companies. Another conclusion of this study is that ANP approach provides decision makers to reach the correct solution (Jharkharia and Shankar, 2005). Yüksel and Dagdeviren tried to make a quantitative Strengths, Weaknesses, Opportunities and Threats (SWOT) analysis. In this study, they used ANP approach because they aimed to include relationship between the variables stated in each component of SWOT analysis (Yüksel and Dagdeviren, 2007). Similarly, Sevkli and others (2012) used ANP approach for SWOT analysis of airline industry in Turkey. In addition to this study, Gorener also compared AHP and ANP approaches in order to provide a SWOT analysis for a manufacturing company (Gorener, 2012). Another study which compared these two approaches was made by Büyükyazıcı and Sucu (2002) and Shahabi and others (2014) also compared these two approaches in their studies.

Wu and Lee made a study about selecting knowledge management strategies. Because this process is thought as a complex process, ANP approach was decided to use in this study. In conclusion, it was defined that ANP help companies to select knowledge management strategies (Wu and Lee, 2007). Bayazit made a study to evaluate supplier selection alternatives by using ANP approach. It was concluded that ANP is an appropriate approach to solve this kind of problem (Bayazit, 2006). Similar to this study, Kaur and Mahanti also tried to select the best ERP vendor by using fuzzy ANP approach in their studies (Kaur and Mahanti, 2008). Chen and Yang analyzed agricultural drought risk in a region. They made this analysis by using fuzzy ANP method in this study (Chen and Yang, 2011). In addition to this study, Wolfslehner, Vacik and Lexer also used ANP approach in the analysis of sustainable forest management (Wolfslehner, et. al., 2005). Moreover, Güneri, Cengiz and Seker made a study related to shipyard location selection by using fuzzy ANP approach (Güneri, et. al., 2009). In a similiary study, Gorener and his colleagues employed hybrid decision making tools to determine bank branch location (Gorener, 2013).

Cheng and Lee made a study about contractor selection. Because they thought this problem as a complicated process, they decided to use ANP approach (Chang and Lee, 2004). Gorener made a study about Enterprise Resource Planning (ERP) software selection. In this study, four alternative ERP software solutions were evaluated by using combined ANP- VIKOR methodology and the best alternative was selected (Gorener, 2011). Similar to this study, Nazir and others (2014) and Kılıç and others (2015) also used ANP approach for ERP software selection.

Lam analyzed to design supply chain by using ANP approach in order to guide shipping companies (Lam, 2015). Sakthivel, Ilankumaran and Gaikwad also made a study to select the best biodiesel blend by using ANP approach (Sakthivel, et. al., 2014). Chemweno developed a risk assessment technique with the help of ANP method (Chemweno, et. al., 2015). Boj and others tried to identify the relationship between intangible assets and organizational performance. ANP approach was used as a methodology in this study (Boj, et. al., 2014). Moreover, Xu and others investigated a way to improve efficiency with respect to energy consuming. In order to achieve better results, they decided to use ANP approach (Xu, et. al., 2014). Beltran made a study about the selection of solar-thermal power plant investment projects with the help of AHP and ANP approaches (Beltran, et. al., 2014). Similar to this study, Atmaca and Basar evaluated power plants in Turkey by using ANP approach (Atmaca and Basar, 2012). Dincer and his colleagues employed hybrid models including AHP, FTOPSIS and VIKOR methods to measure the efficiency of deposit banks (Dincer et al., 2019; Yüksel, 2015).

Yeh and Huang made a study to evaluate key factors in order to determine where wind farms will locate. In this study, they used ANP method so as to achieve this objective (Yeh and Huang, 2013). Similarly, Lam and Lai tried to develop a decision-support model for shipping companies with the help of ANP method (Lam and Lai, 2014). Horenbeek and Pintelon tried to develop a performance measurement framework for manufacturing companies by using ANP approach (Horenbeek and Pintelon, 2013).

## **Application on Turkish Banking Sector**

### **Information about Turkish Banking Sector**

Banking sector is the most important sector in the financial market of Turkey (Dincer & Hacıoglu, 2018; Dincer et al., 2016). The percentage of the sectors in financial market of Turkey was depicted on the following table. As it can be seen from the table above, banks play the most important role in financial Turkish financial markets. The assets of the banks comprise 85.55% of all financial market. Portfolio management companies have 3.51% of the financial sector whereas insurance companies form 3.39%. The following table gives general information about the banking sector of Turkey as of 31.12.2014.

As of 31.12.2014, there are 51 banks in Turkish banking sector. 34 of these banks are deposit banks whereas 13 of them are development and investment banks. In addition to them, there are 4 different categories regarding deposit banks. 3 of them are state banks, 11 of them are private banks and 19 of them are foreign banks. Additionally, 4 participating banks operate in Turkey. Furthermore, there is also 1 bank which is under the control of Saving Deposit Insurance Fund. Moreover, there are also 12,209 branches in Turkey. In addition to this situation, following figure gives information about the number of personnel working in banks. As it can be seen from the figure, there is a significant increase in the number of personnel in the banks.



**Table 3:** The Size of Assets in Financial Markets of Turkey (million TL)

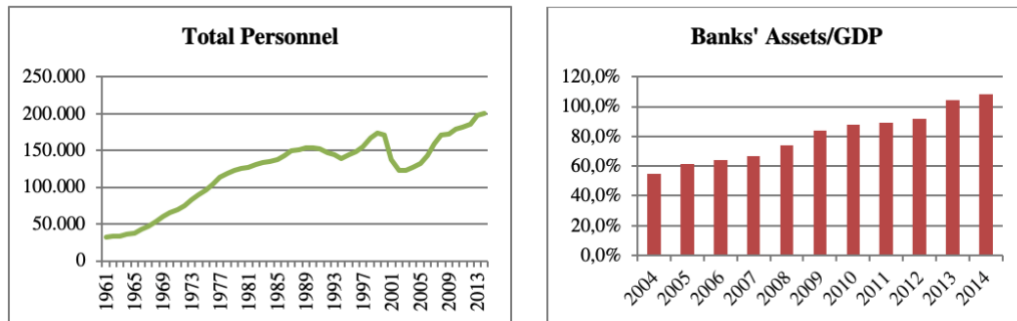
Sector	Total Assets	Percentage (%)
Banks	1,994,159	85.55
Portfolio Management Firms	81,867	3.51
Insurance Companies	79,028	3.39
Real Estate Investment Company	41,400	1.78
Private Pension Funds	37,771	1.62
Leasing Companies	32,563	1.40
Factoring Companies	26,512	1.14
Financing Companies	20,284	0.87
Intermediary Institutions	14,116	0.61
Reassurance Companies	2,004	0.09
Venture Fund	769	0.03
Investment Trust	449	0.02
<b>Total</b>	<b>2,330,922</b>	<b>100.00</b>

Source: Turkish Banking Association

**Table 4:** Banks in Turkey

Type of Banks	Total Banks	Total Branches
Deposit Banks	<b>34</b>	<b>11,182</b>
• State Banks	3	3,500
• Private Banks	11	5,455
• Banks in Saving Deposit Insurance Fund	1	1
• Foreign Banks	19	2,226
Development and Investment Banks	<b>13</b>	<b>41</b>
Participation Banks	<b>4</b>	<b>986</b>
<b>Total</b>	<b>51</b>	<b>12,209</b>

Source: Turkish Banking Association



**Figure 1:** Total Personnel in Banks and the Size of Banking Sector in Turkey; Source: TBA

**Table 5:** Percentage of Bank Groups in the Sector

Type of Banks	Total Assets	Total Loans	Total Deposits
Deposit Banks	<b>91</b>	<b>91</b>	<b>94</b>
• State Banks	28	27	30
• Private Banks	48	49	48
• Banks in Saving Deposit Insurance Fund	-	-	-
• Foreign Banks	15	15	16
Development and Investment Banks	<b>4</b>	<b>4</b>	-
Participation Banks	<b>5</b>	<b>5</b>	<b>6</b>
<b>Total</b>	<b>100</b>	<b>100</b>	<b>100</b>

Source: Turkish Banking Association

Moreover, Figure 1 demonstrates the size of the banking sector of Turkey over the years. Figure 1 also explains that the size of the banking sector in Turkey increases dramatically. Although the ratio of banks' total assets to GDP was less than 60% in 2014, it exceeded 100% in 2014. When taking into the consideration of the factors emphasized above, the importance of the banking sector in Turkey increased over the years. Besides this situation, it will be better to analyze the importance of the type of the banks in this

sector. As it can be understood from the table above, deposit banks play the most significant role in Turkish banking sector. 91% of total assets and total loans belong to deposit banks. Moreover, these banks have 94% of total deposits in the sector. Because of this situation, it was decided to analyze the performance of deposit banks in Turkey. Furthermore, in deposit banks, domestic private banks have the highest ratio. They have almost the half of total assets, total loans and total deposits in the sector. After private banks, state banks have the second highest rates. Although there are only 3 states banks in Turkey, they have 25% of total assets, 27% of total loans and 30% of total deposits. Moreover, foreign banks are other important performers in the sector. They have 15% of total assets and total loans and 16% of total deposits.

**The Scope and Constraints of the Study**

The main purpose of this study is to evaluate the performance of Turkish deposit banks. Within this scope, all 33 deposit banks were intended to analyze out of 34 banks. The main reason is that the bank which is under the control of Saving Deposit Insurance Fund was eliminated from this study. The list of the banks was shown in the following table.

**Table 6:** List of Banks Analyzed in this Study

Bank Name	Asset Size (% of deposit banks) in 2014	Asset Size (% of deposit banks) in 2014	Asset Size (% of total banks) in 2014	
<b>State Banks</b>	Türkiye Cumhuriyeti Ziraat Bankası	13.7	13.1	
	Türkiye Halk Bankası	8.6	8.2	
	Türkiye Vakıflar Bankası	8.8	8.4	
<b>Private Banks</b>	Adabank	0.0	0.0	
	Akbank	11.4	10.9	
	Anadolubank	0.52	0.5	
	Fibabanka	0.42	0.40	
	Sekerbank	1.15	1.1	
	Tekstil Bankası	0.21	0.2	
	Turkish Bank A.S.	0.1	0.07	
	Türk Ekonomi Bankası	3.5	3.3	
	Türkiye Garanti Bankası	12.1	11.6	
	Türkiye İş Bankası	13.1	12.6	
	Yapı ve Kredi Bankası	10.1	9.6	
	<b>Foreign Banks</b>	Alternatifbank	0.63	0.6
		Arap Türk Bankası	0.21	0.2
Bank Mellat		0.02	0.01	
Bank of Tokyo Mitsubishi		0.2	0.17	
Burgan Bank		0.52	0.5	
Citibank A.S.		0.38	0.37	
Denizbank		3.8	3.7	
Deutsche Bank		0.21	0.2	
Finans Bank		4.2	4.0	
Habib Bank		0.0	0.0	
HSBC Bank		1.9	1.8	
ING Bank		2.1	2.0	
Intesa Sanpaolo		0.08	0.08	
JP Morgan		0.02	0.02	
Odea Bank	1.42	1.36		
Rabobank	0.04	0.04		
Royal Bank of Scotland	0.15	0.14		
Societe Generale	0.04	0.04		
Turkland Bank	0.31	0.3		

Source: Turkish Banking Association

**Model of the Study**

The study has been designed considering the main determinants of the balanced scorecard approach for the criteria and the type of bank ownership for the alternatives. Expert choices have been debated to evaluate the relative importance of each determinant using the scale of weightage implies values intensity between 1 and 9. In this context, pairwise comparison matrices of the banks with respect to each determinant and the determinants with respect to each alternative have been constructed to weight the criteria. Weighted supermatrix has been computed through the eigenvectors determine the priorities of the determinants in Table 7. The entries of the weighted supermatrix itself give the direct influence of any factor on any other. Limit matrix examines the stable weights of all factors that are priorities imply the weights of the factors and alternatives present the types of the bank ownership in Table 8. All the factor priorities have been extracted and normalized to one for each cluster and final priorities have been obtained. The final priorities and rankings of each perspective of balanced score card and the type of bank ownership have been given in Table 9.

**Table 7:** Weighted Supermatrix

	Financial	Customer	Internal	Learning & Growth	State Banks	Private Banks	Foreign Banks
Financial	0.0000	0.0000	0.0000	0.0000	0.6714	0.6341	0.6603
Customer	0.0000	0.0000	0.0000	0.0000	0.2189	0.2298	0.1997
Internal	0.0000	0.0000	0.0000	0.0000	0.0540	0.0649	0.0665
Learning and Growth	0.0000	0.0000	0.0000	0.0000	0.0557	0.0712	0.0734
State Banks	0.5695	0.4054	0.5876	0.6442	0.0000	0.0000	0.0000
Private Banks	0.3331	0.4806	0.3234	0.2706	0.0000	0.0000	0.0000
Foreign Banks	0.0974	0.1140	0.0890	0.0852	0.0000	0.0000	0.0000

**Table 8:** Limit Matrix

	Financial	Customer	Internal	Learning and Growth	State Banks	Private Banks	Foreign Banks
Financial	0.3284	0.3284	0.3284	0.3284	0.3284	0.3284	0.3284
Customer	0.1105	0.1105	0.1105	0.1105	0.1105	0.1105	0.1105
Internal	0.0296	0.0296	0.0296	0.0296	0.0296	0.0296	0.0296
Learning and Growth	0.0315	0.0315	0.0315	0.0315	0.0315	0.0315	0.0315
State Banks	0.2695	0.2695	0.2695	0.2695	0.2695	0.2695	0.2695
Private Banks	0.1806	0.1806	0.1806	0.1806	0.1806	0.1806	0.1806
Foreign Banks	0.0499	0.0499	0.0499	0.0499	0.0499	0.0499	0.0499

**Table 9:** The final priorities of the criteria and the alternatives

Clusters	Factors	Priorities from limiting matrix	Priorities normalized by cluster	Ranking of normalized values in cluster
<b>Criteria</b>	Financial	0.3284	0.6568	1
	Customer	0.1105	0.2209	2
	Internal	0.0296	0.0592	4
	Learning and Growth	0.0315	0.0631	3
<b>Alternatives</b>	State Banks	0.2695	0.5391	1
	Private Banks	0.1806	0.3612	2
	Foreign Banks	0.0499	0.0998	3

The first value column of table 9 states the global priorities with respect to entire model that the sum of the values is equal to one. The second value column exhibits the priorities normalized by cluster that the sum equals one. The third value column demonstrates the final rankings of each cluster. The results show that financial factor of balanced score card approach has the first rank with 65.7 percent. Customer perceptive is in the second rank with 22.1 percent. Third and fourth ranks have close results. So, Learning and growth stays in the third rank with 6.3 percent and internal factor has the weakest importance with 5.9%. In addition to this, state banks into bank ownership have the highest rank with 53.9 percent. Private owned banks are the second in the relative performance of the bank groups with 36.1%. Balanced scorecard based performance of foreign banks are replaced in the last order with approximately 10%.

## Conclusion

We tried to evaluate the performance of Turkish banking sectors in this study. Within this context, we analyzed which perspectives of balanced scorecard are more significant with respect to the state banks, private banks and foreign banks. Moreover, because the performance measurement aspect is very complex for the banks, we decided to use analytical network process (ANP) approach so as to achieve better results.

In Turkey, major financial institutions with asset size are banks. Banks play the most important role in financial market of Turkey. The assets of the banks comprise 85.55% of all financial market. In the last several years, there is a significant increase in the number of personnel in banking sector while assets of banks are growing. Nevertheless, the size of the banking sector in Turkey increases dramatically, the ratio of banks' total assets to GDP was less than 60% in 2014, which exceeded 100% in 2014. Deposit banks play the most significant role in Turkish banking sector. 91% of total assets and total loans belong to deposit banks. Moreover, these banks have 94% of total deposits in the sector. Based on the latest advances in banking operations, it is possible to spotlight the importance

of the banking sector for Turkish economy also, which increases over the last years. Besides this situation, it will be better to analyze the performance banks based on their ownership structure. Based on performance analysis with financial ratios, domestic private banks have the highest ratio scores. They have almost the half of total assets, total loans and total deposits in the sector. Following private banks, the state banks have the second highest rate scores. Although there are only 3 states banks in Turkey, they have 25% of total assets, 27% of total loans and 30% of total deposits. Moreover, foreign banks are the other important performers in its sector. They have 15% of total assets and total loans and 16% of total deposits. With balanced-scorecard performance assessment of banking sector using ANP approach, all the factor priorities have been extracted and normalized to one for each cluster and final priorities have been obtained. The final priorities and rankings of the each perspective of balanced score card and the type of bank ownership have been assessed in the model.

Findings demonstrate that (i) financial factor of balanced score card approach has the first rank with 65.7 percent, (ii) Customer perceptive is in the second rank with 22.1 percent. (iii) Third and fourth ranks have close results, (iv) learning and growth stays in the third rank with 6.3 percent (v) internal factor has the weakest importance with 5.9%, (vi) state banks into bank ownership have the highest rank with 53.9 percent, (vii) Private owned banks are the second in the relative performance of the bank groups with 36.1%, (viii) Balanced scorecard-based performance of foreign banks are replaced in the last order with approximately 10%.

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