

# Investigation of Relationship between Balanced Scorecard Prospects Using Accounting Numbers in the Manufacturing Companies Listed on the Stock Exchange

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**Abstract** Separation of ownership and management caused performance evaluation to become an important issue in the field of accounting and finance. In this regard, various financial measures are introduced and used, but all of them are criticized due to the fact that they consider only one prospect of the organization (financial prospect). In order to overcome the shortcomings of financial measures, balanced scorecard was introduced as one of the best strategic performance measurement systems. In this system, the performance of organization is evaluated in four prospects: financial, internal process, customer, learning and development. This study examined the relationship between prospects of the balanced scorecard in companies listed on the Stock Exchange. Ex post facto and correlational research methods by nature of the study were used. Data collection source of the study was financial statements and explanatory notes accompanying the sample companies from 2007 to 2012. Statistical sample consisted 66 companies accepted in the Stock Exchange obtained by systematic elimination method. After collecting the data and calculating the main variables, canonical correlation method was used to test research hypotheses. Results of the study showed that there is a significant relationship between the balanced scorecard prospects while growth and learning prospect were of great importance among the 4 available prospects.

**Key words** Balanced scorecard, financial prospect, internal process prospect, customer prospect, growth and learning prospect

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## 1. Introduction

Each organization is in dire need of the evaluation system in order to understand the degree of acceptance and the quality of their activities, especially in complex and dynamic environments. On the other hand, the lack of evaluation and control in the system is considered as lack of communication with organization's internal and external environment which leads to aging and eventually death. Investigation of the performance results is considered as one of the main and strategic processes. Quality and effectiveness of the management and performance are determining factors crucial for the realization of the programs. The emergence of large corporations in the 18th century and the separation of ownership from management led to evaluated designs. Today, different methods are used to evaluate performance of the company. Moreover, the significant role of performance evaluation for orientation of accurate and timely information for decision making by users has been proven. The method used to evaluate the performance should provide accurate and comprehensive information to managers, shareholders and investors for different decisions. Criticism leveled on traditional performance measures led to the development of a new operation system called strategic performance measurement system (SPMS). These criticisms were due to fulfilling legal requirements and accounting reports as well as measuring the past activity rather than future

activity, a short-term prospect rather than long-term prospect and the ability of manipulation by managers. Among main features of this system was considering financial and non-financial measures (Jusoh & *et al*, 2008).

One of the best strategic performance measurement systems is the balanced scorecard introduced by Kaplan and Norton in 1992. They introduced balanced scorecard as performance measurement system with an integrated view of the business performance of a company with a set of measures (including financial and non-financial measures) (Lee *et al*, 2008). Each performance criterion in the balanced scorecard introduces one prospect of corporate strategy because there should be a link between strategy and performance measures (Jusoh *et al*, 2008). The strategy of an organization is the way an organization tries to maximize the value of resources under the control of the organization. Therefore, company's strategy is related to the method of allocation of resources (Lee & *et al*). Balanced scorecard measures are formed by four aspects with a causal relationship. These aspects include: financial, customer, internal process and growth and learning aspects (Braam & *et al*). Kaplan and Norton in 2006 suggested that the training program will improve staff skills (growth and training aspect) and leads to improvements in customer service (internal process aspect) and customer satisfaction (client aspect) and ultimately increases revenue and profit (financial aspects) (Kong, 2010).

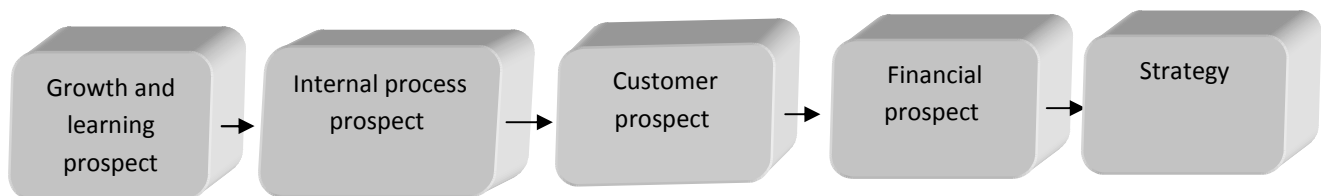


Figure 1. The relationship between various aspects of balanced scorecard (Kong, 2010)

In fact, studies show how non-financial measures can be integrated to with financial measures to obtain the best measure of performance in a competitive environment (Jusoh *et al*, 2008). Balanced scorecard reveals the importance of non-financial measures in the organization. Existence of non-financial measures such as customer retention, labor turnover, number of new products in assessment of balanced assessment model is the results obtained by the activities of the organization which lead to implementation and strategy. Therefore, these measures are considered as predictors of the future financial performance of the organization (Kaplan and Norton, 1996). With the increasing use of the balanced scorecard, managers pay the same amount of attention to financial and nonfinancial variables. In addition, the use of the balanced scorecard encourages managers to pay more attention to the relationship between financial and nonfinancial variables. Frig investigations (1999) showed that between 40 to 60 percent of the firms changed considerably their evaluation method during 19995 – 2000. According to what mentioned before and the increasing importance of performance evaluation of the companies as well as the necessity to apply the new measures to evaluate performance in terms of scientific research, the present study aimed at answering the main question related to relationship between financial and non-financial measures in the companies?

## 2. Theoretical principles and research background

### 2.1. Balanced scorecard method

Traditional methods of performance evaluation, which are mainly based on financial measures, not only are not suffice for full reflection of the success or failure of firms and organizations, but also do not show a logical casual relationship between the driving factors of success and obtained achievements. Therefore, these methods are not capable of supporting management plans particularly strategic plans of the organization. Nowadays, organizations are required to be both strategically and operationally at appropriate levels in order to survive and left behind the future challenges.

One of the methods that help organizations to balance the activities and strategies is Balanced Measurement. Balanced Scorecard was introduced in the early 1990s by Kaplan and Norton in a paper called "Balanced Measurement, measures that would lead performance ". Balanced scorecard includes four

categories of measures which form its four aspects. These four aspects are: learning and growth, internal process, customer, and financial aspects. The word "balanced" in the phrase "Balanced Scorecard" means as follows (Lee et al, 2008):

- Balance between long-term and short-term goals
- Balance between internal and external stakeholders
- Balance between financial and non-financial measures
- Balance between prospective and retrospective indicators

In 1993, Kaplan and Norton in an article titled "performance of scorecards measurement" developed a model representing the casual relationship of the model to enforce management of policies. Inventors of this model in their second article developed the balanced scorecard not only as a measure but as also as a system of management and emphasized its organizational strategy and mission prospect. 4 years after the publication of the first paper, many organizations and companies used Kaplan and Norton advisory approach to measure performance and they also used it as a tool to control and perform their strategy. In 1996, they summarized their obtained experiences in a advisory book entitled "balanced scorecard". They suggested that traditional management systems are not able to make a relationship between long-term strategies and short-term actions of the company. But managers who are using BSC system should not rely on short-term financial measures as the sole criterion for company's performance. Scorecard allows them to launch four new management processes which help them to make a relationship between long-term strategic objectives and short-term activities separately or in combination with each other.

In each of the four balanced scorecard prospect s, initially objectives will be determined. Then some measures will be selected to investigate the success of these goals at any point. Quantitative objectives of each of these measures will be determined for the course of the evaluation. In the next step, performance activities and initiatives to achieve this goal will be planned and implemented. Meanwhile, there is a causal relationship in determination og objectives and measures of the four aspects which makes them related to each other. Next part briefly describes each of the aspects of the balanced scorecard.

#### ***Financial prospect***

This prospect is focused on the company long-term goals. An ultimate goal is considered for other aspects (Creamer and Freund, 2010). In this prospect of assessing performance, financial indicators are not removed, but they will be examined as an important part of the evaluation measures in the context of the organization's strategy. On the other hand, the role of these factors in determining the strategy of the organization is undeniable. Among important indicators in this area we can refer to rate of return on assets, return on equity, economic value added, etc.

#### ***Customer prospect***

This prospect is related to product lifetime and providing high quality services and products for satisfaction of customer (Creamer and Freund, 2010). Customer satisfaction as one of the most important issues plays a role in today's business world and many areas of business management science. Most indicators such as product quality, price, waiting time, after sales services, etc. are related to this aspect.

#### ***Internal process prospect***

Focus of this prospect is on customers' information to sell products and services based on their needs (Creamer and Freund, 2010). What makes a good product or appropriate service is to design and implement effective processes in an organization. In this regard, balanced scorecard emphasizes the evaluation of processes which have significant impact on improving the relationship with customers and meeting financial goals. Among the most important indicators of this prospect we can refer to return on sales, circulation period of asset, price-to-earnings ratio, etc.

#### ***Growth and learning prospect***

This prospect makes the foundation of BSC. This prospect focuses on prospect on motivation, training, and capacity to innovate that employees need in order to implement new strategies (Creamer and Freund, 2010). Staff in an organization is the main human sources and they are considered as the most important beneficiaries of an organization. According to this prospect, survival of many big scientific institutions in the world is dependent on attention of staff and their continuous improvement. Accordingly,

the balanced scorecard considers employee satisfaction and their appropriate and continuous training among the main indicators. Objectives of this prospect include determination of jobs (human capital), systems (investors information), a kind of organizational climate (organizational capital) required to support internal processes (Cohen *et al.* 2008).

## **2.2. Review of literature**

Ling Sim and Chye Koh (2001) study examined the relationship between the prospects and inter-group communications (goals and measures) in the electric companies of United States of America. The results suggest the importance of learning the growth prospect and represent direct relationship of this prospect with customer performance, reduced production costs, increased sales, increased market share and reduced product development time.

Isabel & Elena (2006) study investigated the financial and non-financial performance of Spanish companies. Results of the study suggested that there was a direct relationship between the ability of training and non-financial performance measures as well as financial and non-financial performance. Jusoh & *et al* (2008) study investigated the results of the use of multiple measures for evaluating the performance of manufacturing corporations in Malaysia. Results analysis shows that the sample companies pay more attention to financial measures than non-financial measures to evaluate the performance. However, the use of non-financial measures especially the customer prospect is increasing. Findings indicate that companies may use quadruple measures to measure their performance compared with those companies that pay more attention to a particular measure to have a better performance.

Cohen *et al* (2008) study investigated the relationship between non-financial prospects in the balanced scorecard structure and their impact on the financial prospects of a productive- service company in Greece. Analysis of the results indicates that BSC measures are interrelated but the relationship between them is not homogeneous. Relationship between indicators of customer prospect and internal process is much stronger than the relationship between indicators of learning and growth or internal process prospect s. Moreover, there is no significant relationship between the indicators of growth and learning and customer prospect. Results of this study suggest that improvements in each non-financial measure have positive impact on improvements in the organization. Specifically, those companies with increased ROA and ROE compared with companies with decreased ROA and ROE, have invested in new technology, innovation, cooperation of domestic companies and information exchange (growth and learning prospect).

Rosemary & William (2009) study investigated the impact of using non-financial measures on the relationship between lean production and financial performance (profitability of companies). Results of this study in 121 manufacturing companies in the United States of America show the non-financial measures will balance the relationship between lean production and financial measures. Kamhawi (2010) study was aimed at investigating the impact of information technology and non-informational factors on accepting the balanced scorecard. The results show that information technology and non-informational factors are equally important in the BSC acceptance. Among factors related to non-information technology, management factors (strategic management and senior management commitment) and implementation parameters (projects implementation, appropriate training and guidance) are at first and foremost degree of importance. Among factors related to information technology, features of the software interface (User Interface and easy to use application) and data quality (standard data format and accurate data) are at first degree of importance.

Maditinos *et al* (2011) study titled "The Impact of intellectual capital on firm market value and financial performance" examined the relationship between intellectual capital and market value to book value and financial performance. In this study, a sample of 96 companies from 4 different industries in Greece was selected. The regression model was used to test the hypotheses. Results of the study show that among three components of intellectual capital (human capital, structural capital, customer capital), the human capital has a significant relationship with market value to book value while among three measures of financial performance (ROE, ROA, Growth of sales), ROE has a significant relationship with human capital. Consequently, it appears that human capital is an important factor in the success of the country economy.

### 3. Methodology of research

The present study is an applied study of *ex post facto* approach (through past data), which can be performed using canonical correlation. Canonical correlation analysis is the most common general linear mode that examines the relationship between the two sets of multiple variables using multivariate statistical technique (Thompson, 1984).

In Canonical correlation analysis, independent statistical relationship between two sets of variables will be examined by simultaneous analysis of collections, identification of the elements of a complex set of variables with the most correlation with other variables. This statistical technique can simultaneously consider two sets of variables or it can consider a set of variables as predictor (independent or explorative criteria) and all other collections as a set of criteria (criterion-related). Also in the multivariate regression analysis, F is calculated in cases where there is only one dependent variable while canonical correlation analysis uses multiple dependent variables and goes one step beyond regression analysis. Canonical correlation starts with two sets of data including vectors of observations on all variables. The purpose of canonical correlation, with insertion of X, as m-dimensional vector of predictive variables and Y as p-dimensional vector of criterion variables, is to obtain a linear combination of prediction variables which has the highest correlation with a linear combination of criterion variables. Canonical correlation analysis determines the size of relationship between the two sets of variables with redundancy coefficients. Degree of redundancy coefficients shows the overlap between the two sets of variables.

In this study, data collection was based on financial statements and explanatory notes in the sample companies from 2007 to 2012. All collected data was entered in the Excel software. For data analysis, the collected data was transferred to SPSS software based on the definitions of the variables and calculation formula. The following tables summarize the variables used in the study.

Table 1. Financial prospect variables and their calculation method

Financial prospect		
Criterion	Calculation method	Symbol
Performance ratio	Operating expenses divided by sales	Efficiency
Return on assets	Earnings before deduction of interest and taxes divided by average total assets	ROA
Return on equity	Net income divided by average capital	ROE
Earnings per share	Net income divided by the number of ordinary shares	EPS
Cash flow per share	Operating cash flow divided by the number of ordinary shares	CPS

Table 2. Variables of internal processes prospect and their calculation method

Internal process prospect		
Criterion	Calculation method	Symbol
Circulation period of assets	Sales divided by average fixed assets	FAT
Cost price to income ratio	Cost price of sold goods divided by sales	CR
Circulation period of inventories	365 divided by frequency of inventory circulation	IT
Salary costs to net sales ratio	Salary costs divided by net sales	LCS
Operating expenses to operating profit ratio	Operating expenses divided by operating profit	EP
Cost of sales to salary cost ratio	Sales divided by salary cost	SLC

Table 3. Variables of customer prospect and their calculation method

Customer prospect		
Criterion	Calculation method	Symbol
Market share	Sales of company divided by industry sales	Market share
Sales volume	Amount of the sales of products	Sales volume
Selling costs and distribution costs to sales ratio	The cost of distribution and sales divided by sales	MCS
Than the cost of distribution and Total cost of sales	The cost of distribution and sales divided by the total cost	MCTC

Table 4. Variables of growth and learning prospect and their calculation method

Growth and learning prospect		
Criterion	Calculation method	Symbol
Personnel expenses to operating income ratio	Salary costs divided by the operating income	SER
Employee performance	(Operating income divided by number of staff) LN	EP
Employee profitability	Net income divided by the number of staff	IE
Employee profitability	Operating profit divided by number of staff	EI

The statistical population of this study includes all manufacturing firms listed on the stock exchange composed of 407 companies from 20 industries from 2007 to 2012. Statistical sample consists of 66 companies selected using the systematic elimination method. Each of the companies that lack the following features is excluded.

1. Companies that have reported selling and distribution expenses in their financial statement.
2. Companies with continuous activity during 6 years of study and companies that have complete available information.

In order to achieve the main objectives of the study, the following hypotheses were proposed and tested:

1. There is a significant relationship between the four components of comprehensive measure for evaluation of performance.
  - 1-1. There is a relationship between components of financial prospect and internal process prospect.
  - 1-2. There is a relationship between components of financial prospect and customer prospect.
  - 1-3. There is a relationship between components of financial prospect and growth and learning prospect.
  - 1-4. There is a relationship between components of internal process prospect and learning and growth prospect.
  - 1-5. There is a relationship between components of the internal process prospect and learning and growth prospect.
  - 1-6. There is a relationship between components of customer prospect and growth and learning prospect.

#### 4. Findings

##### First sub-hypothesis

Statistical results of the first hypothesis and the standardized coefficients for linear combination with highest correlation are shown in Table 5. According to linear combinations of the canonical correlation coefficient as 0.94 and according to the F statistics, Wilks test and p-value lower than 0.05, it will be indicated that there is a significant canonical correlation between two sets of variables. Therefore, canonical correlation between the two variables is confirmed at 95% confidence level.

Table 5. Standardized coefficients and statistical results for the first sub-hypothesis

Standardized canonical coefficients	Components of financial prospect	Standardized canonical coefficients	Component of internal process prospect		
0.9074	Performance ratio	- 0.0318	Circulation period of assets		
- 0.1142	Return on assets	0.9997	Cost price to income ratio		
- 0.0476	Return on equity	0.03298	Circulation period of inventories		
0.0245	Earnings per share	0.0 047	Operating expenses to operating profit ratio		
		0.0922	Cost of sales to salary cost ratio		
		- 0.0028	Sales to salary cost ratio		
Canonical correlational coefficients	Wilks	F	Df1	Df2	p-Value
0.94	0.88796	45.15930	30	1542	0.000

### Second sub-hypothesis

Standardized coefficients for linear combination representing the highest correlation with the second sub-hypothesis along with statistical results are given in Table below.

Table 6. Standardized coefficients and statistical results for the second sub-hypothesis

Standardized canonical coefficients	Components of financial prospect	Standardized canonical coefficients	Components of customer prospect		
1.00669-	Performance ratio	04 924.	Market share		
11 813. -	Return on assets	43 262.	Sales volume		
08 466.	Return on equity	3.18735-	Selling and distribution costs to sales ratio		
11 626.	Earnings per share	3.13514	Selling and distribution cost to total cost ratio		
07 198.	Cash flow per share				
Canonical correlation coefficient	Wilks	F	Df1	Df2	p-value
76 584.	38 267.	21.57460	0	1284.48	000.

According to obtained linear combinations of the canonical correlation coefficient equal to 0.77 and according to the F statistics, Wilks test and the p-value lower than 0.05, it will be indicated that there is a significant canonical correlation between two sets of variables. Therefore, canonical correlation between the two variables is confirmed at 95% confidence level.

### Third sub-hypothesis

Statistical results of the third hypothesis and standardized coefficients for linear combination representing the highest correlation are given in Table 7.

Table 7. Statistical results and standardized coefficients for third sub-hypothesis

Standardized canonical coefficients	Components of financial prospect	Standardized canonical coefficients	Components of growth and learning prospect		
40 796.	Performance ratio	41 773.	Personnel costs		
56 373. -	Return on Assets	77 858. -	Employee performance		
02 610.	Return on equity	04 061.	Net income to number of employees ratio		
20 433. -	Earnings per share	42 146. -	Operating profit to total number of employees ratio		
05 854.	Cash flow per share				
Canonical correlation coefficient	Wilks	F	Df1	Df2	p-Value
79 179.	33 924.	24.55635	20	1274.53	000.

According to obtained linear combinations of the canonical correlation coefficient equal to 0.79 and according to the F statistics, Wilks test and the p-value lower than 0.05, it will be indicated that there is a significant canonical correlation between two sets of variables. Therefore, canonical correlation between the two variables is confirmed at 95% confidence level.

### Fourth sub-hypothesis

Standardized coefficients for linear combination representing the highest correlation with the fourth sub-hypothesis statistical results are given in Table below.

Table 8. Standardized coefficients and statistical results for the fourth sub-hypothesis

Standardized canonical coefficients	Components of customer prospect	Standardized canonical coefficients	Component of internal process prospect		
04 227. -	Market share	09 237. -	Circulation period of assets		
48 343. -	Sales volume	98 148.	Cost price to income ratio		
2.92239	Selling and distribution costs to sales ratio	05 397.	Circulation period of inventories		
3.11160-	Selling and distribution cost to total cost ratio	05 565.	Operating expenses to operating profit ratio		
		0.0922	16 402.		
		- 0.0028	01 464.		
Canonical correlation coefficient	Wilks	F	Df1	Df2	p-Value
73 574.	39 666.	17.04426	24	1347.80	000.

According to obtained linear combinations of the canonical correlation coefficient equal to 0.74 and according to the F statistics , Wilks test and the p-value lower than 0.05 , it will be indicated that there is a significant canonical correlation between two sets of variables. Therefore, canonical correlation between the two variables is confirmed at 95% confidence level.

#### **Fifth sub-hypothesis**

Statistical results of the fifth hypothesis and standardized coefficients for linear combination representing the highest correlation are given in Table 9.

Table 9. Statistical results and standardized coefficients for the fifth sub-hypothesis

Standardized canonical coefficients	Components of learning and growth prospects	Standardized canonical coefficients	Component of internal process prospect		
80 672. -	Personnel costs	04 299. -	Circulation period of assets		
23 073. -	Employee performance	00 378. -	Cost price to income ratio		
05 354.	Net income to number of employees ratio	00 590. -	Circulation period of inventories		
26 373.	Operating profit to total employees ratio	92 770. -	Operating expenses to operating profit ratio		
		0.0922	14 636. -		
		- 0.0028	32 943.		
Canonical correlation coefficient	Wilks	F	Df1	Df2	p-Value
84 893.	09 747.	52.88597	24	1337.34	000.

According to obtained linear combinations of the canonical correlation coefficient equal to 0.85 and according to the F statistics , Wilks test and the p-value lower than 0.05 , it will be indicated that there is a significant canonical correlation between two sets of variables. Therefore, canonical correlation between the two variables is confirmed at 95% confidence level.

#### **Sixth sub-hypothesis**

Standardized coefficients for linear combination representing the highest correlation along with statistical results of the sixth sub-hypothesis are given in the following table.



Table 10. Statistical results and standardized coefficients for the sixth sub-hypothesis

Standardized canonical coefficients	Components of customer prospect	Standardized canonical coefficients	Components of growth and learning prospect		
59 985.	Market share	05 216. -	Personnel costs		
58 537.	Sales volume	09 253. -	Employee performance		
1.98670-	Selling and distribution costs to sales ratio	11 699.	Net income to total employees ratio		
2.02247	Selling and distribution cost to total cost ratio	84041 ..	Operating profit to total employees ratio		
Canonical correlation coefficient	Wilks	F	Df1	Df2	p-Value
67 908.	47 646.	20.20123	16	1176.83	000.

According to obtained linear combinations of the canonical correlation coefficient equal to 0.68 and according to the F statistics , Wilks test and the p-value lower than 0.05 , it will be indicated that there is a significant canonical correlation between two sets of variables. Therefore, canonical correlation between the two variables is confirmed at 95% confidence level.

## 5. Conclusions and recommendations

The present study was designed and implemented to investigate the relationship and interaction between four prospects of Balanced Scorecard. Obtained results indicate that Balanced Scorecard measures are interrelated but the relationship between them is not homogeneous. Relationship between indicators of customer prospect and internal process is much stronger than the relationship between other indicators. Therefore, in accordance with the existing theoretical concepts, it can be acknowledged that growth and learning prospect has a significant impact on improving internal processes followed by improvements in the performance of economic unit (financial prospect). Results of the study are consistent with findings of Cohen *et al* (2008) and Jusoh *et al* (2008). These results again remind us that merely addressing the financial prospects and neglecting other prospects can lead to superficiality in the organization and lack of attention to its strategies. Therefore, it is necessary to consider all four prospects in a balanced form for organization excellence.

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