



# Factors Affecting the Use of Balanced Scorecards at Mechanical Enterprises in Hanoi

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## ABSTRACT

In the current period, mechanical enterprises face many difficulties and have to find ways to survive and develop. Besides organizing the apparatus, investing in production lines, designing and building brands, and setting up management tools to achieve strategy and goals are top priorities. Therefore, the application of the Balanced Scorecard (BSC) to evaluate the performance of an enterprise contributes to helping businesses improve operational efficiency and increase competitiveness in the market. The article aims to evaluate the influence of factors on the application of BSC in mechanical enterprises in Hanoi. The study shows that factors: enterprise culture, enterprise size, the usefulness of BSC, and ease of use of BSC are factors affecting the application of BSC at mechanical enterprises in Hanoi. Based on the research results, the authors give some recommendations and solutions to enhance the application of the balanced scorecard in mechanical enterprises in Hanoi.

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**KEYWORDS:** Balanced scorecard, Influential factors, Mechanical enterprise.

## 1. INTRODUCTION

Since 1992, when BSC was introduced by Kaplan & Norton, it has been widely used in the US to evaluate the performance of business units. In the survey by Silk (1998), up to 60% of companies in the US have applied BSC and consider it an effective management tool. It can be seen that BSC is a management tool that helps businesses set, implement, monitor, and achieve their strategies and goals through the interpretation and development of strategic goals into specific goals and action plans based on four aspects: financial, customer, internal processes, training, and development. Implementing a successful BSC system will be influenced by many factors inside and outside the enterprise; these factors can increase the effectiveness of the application of BSC in the enterprise and vice versa.

According to the Hanoi Department of Industry and Trade, there are more than 14,600 enterprises and mechanical production facilities in the area with about 254,000 employees. The mechanical engineering industry was once considered the key to domestic industrial production, a spearhead industry that played a leading role, but in the current period, the mechanical industry is having to find a way to survive and develop. In the coming years, the mechanical industry still has the prospect of increasing revenue, but its competitive position will be threatened by foreign companies. Therefore, an effective response is to

have an overall strategy that includes the organization of the apparatus, investment in the production line, design, branding, and choosing the right business solution to develop the business. In addition, managers of mechanical enterprises in Hanoi need to set up management tools to achieve the goals and strategies of their enterprises.

Resulting from the outstanding advantages of BSC and the fact that applying BSC in different businesses will be different due to the influence of many factors, as well as no research on the impact of these factors on the application of BSC at mechanical enterprises in Hanoi. Therefore, this study aims to understand the factors affecting the application of BSC at mechanical enterprises in Hanoi.

## 2. LITERATURE REVIEW

Kevin Hendric et al. (2004) conducted a survey of 579 companies in Canada. The results showed that business strategy, firm size, and environmental uncertainty have an influence on the acceptance of BSC. Specifically: the application of BSC is significantly related to business strategy, organizations with business strategies are more likely to apply BSC than other organizations; firm size has a positive impact on the trend towards BSC adoption because as organizations grow, problems in communication and control increase, so organizations are more likely to adopt a management system such as BSC; Environmental

uncertainty: research indicates that environmental uncertainty has a positive influence on the propensity to adopt BSC.

Braam and Nijssen (2008) surveyed 40 companies in the Netherlands, with the subjects being accountants, financial directors, and managers. The study includes seven factors: the level of involvement of managers; the degree of centralization; the power of the finance department; standardization, internal communication; and product and market dynamics. The research results show that the level of management involvement and the power of the finance department play an important role in the acceptance of the BSC; the degree of centralization, internal communication have a positive effect on the acceptance of the BSC; standardization has a negative impact and the other two factors are a product and market dynamics that do not affect the acceptance of the BSC.

Tanyi (2011) examines factors affecting managers' use of BSC to explain why some companies use BSC successfully while others do not, even though they all use BSC to interpret strategy, plan, control, obtain feedback, and monitor implementation. Group of factors studied: The control system managers are using; Ability to receive new knowledge from managers; The way to evaluate subordinates of managers and two new factors introduced from the application of the TAM model: Perceiving the usefulness of BSC by managers; Perceived ease of use of BSC by management.

Shutibhinyo (2014) suggested that the successful implementation of the BSC requires a positive attitude towards the BSC. Information collected from 73 survey questionnaires has shown that the support of top management and training have an impact on the use of BSC through the factors of perceived ease of use and perceived usefulness.

In Vietnam, refer to the research of author Bui Thi Hai Van (2009) on small and medium enterprises in Vietnam. The model proposes four influencing factors: the usefulness of the individual; the usefulness on the part of the company; feeling easy to use; and general attitude. Research results show that there are three out of four factors that affect the intention to use BSC in small and medium-sized enterprises in Vietnam: usefulness on the part of the company; feeling easy to use; and general attitude.

Assoc. Prof. Dr. Vo Van Nhi and Dr. Pham Ngoc Toan (2016) conducted research on listed companies in Ho Chi Minh City. The group of factors studied includes firm size, managers' perception of BSC, business strategy, company culture, BSC organizational costs, and qualifications of accounting staff.

In summary, in the world and in Vietnam, there have been many studies on the factors affecting the implementation of BSC. The studies are based on different theories and different research contexts, leading to different research results. Factors include as follows: size, type of capital ownership, standardization, degree of centralization,

business strategy, internal communication, power of the financial department, corporate culture, level of management employees, qualifications of managers, ways of evaluating subordinates of managers, etc.

### 3. RESEARCH METHOD

#### Implementation process

Step 1: We build a questionnaire on Google Forms, send it to accountants and business managers via email using a convenient sampling method, and send it to friends, relatives, and partners. ...

Step 2: The number of survey questionnaires distributed was 150, sent to 150 enterprises, and the number of votes collected was 125 from 125 enterprises, reaching 83.3%. All receipts met the required information requirements.

Step 3: We analyzed the data on SPSS 22 software with the following tools: checking the reliability of the scale using Cronbach's alpha; EFA exploratory factor analysis; correlation analysis; and regression analysis.

#### Research scale

Inheriting from previous theoretical studies, the proposed hypotheses:

*Hypothesis 1: A strong corporate culture has a positive influence on the ability to apply BSC.*

In enterprises, there are different forms of control, including formal control and informal control. These are the rules and procedures that enterprises put in place to control the activities of employees (Tanyi, 2011). It is reflected in the customs, habits, rituals, etc. of the business. Thanks to the corporate culture, employees will achieve their goals, thereby realizing the common goals of the enterprise, and employees and departments always help and support each other.

*Hypothesis 2: The larger the enterprise, the greater the positive influence on the ability to apply BSC.*

Enterprise size is expressed through the following indicators: revenue, assets, and number of employees (Hoque & James, 2000). Large-scale enterprises are enterprises with a large turnover, a large asset value, and a large number of employees. Enterprise size greatly affects the design and use of management and control systems in enterprises.

*Hypothesis 3: Managers' ability to access new knowledge positively affects their ability to apply BSC.*

Different managers will have different personalities and characteristics. There are managers who are open to accessing information, but there are also managers who are conservative about accessing information. Open, creative managers are those who are willing to use information from modern management accounting systems such as the BSC method.

*Hypothesis 4: Managers realize that the usefulness of BSC positively affects its use.*

To determine the factors affecting the application of BSC, Tanyi (2011), Hongfei and Rui (2016) used the TAM model as a theoretical basis for research, and the results

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showed perceived usefulness and perceived ease of use have a positive and significant impact on managers regarding the use of BSC. This result is also similar to the research result of Davis (1996), who thinks that this factor has a decisive influence on the acceptance of new technology.

*Hypothesis 5: Managers believe that the ease of use of BSC has a positive influence on its use.*

The TAM model is a popular tool for assessing user acceptance and use of technology. Realizing how easy it is to use BSC, most people want to use it more, especially senior managers with very little time to learn how to use it. This hypothesis is also inherited from the work of Tanyi (2011), Hongfei and Rui (2016).

The scales of this study are inherited from Davis (1989), Wiersman (2009), Hoque & James (2000), Tanyi (2011), and Hongfe & Rui (2016). The details of the scale are shown in Table 1.

Corporate culture includes management's support for employees, mutual support between employees and departments, and consensus on common goals in the enterprise.

Enterprise size includes large revenue increases using BSC, large assets increasing the use of BSC, and a large number of employees increasing the use of BSC.

Managers' ability to access new knowledge includes managers' willingness to receive knowledge from the new management system, and the BSC is more suitable for assessment than traditional metrics.

The perceived usefulness of the BSC system by the manager includes the usefulness of the BSC implementation; the BSC information is clear and easy to understand; and the BSC is flexible to use.

The perceived ease of use of BSC by managers includes ease of learning how to use the BSC system; easy to use BSC proficiently; BSC is easy to use; and the BSC system makes the job easy.

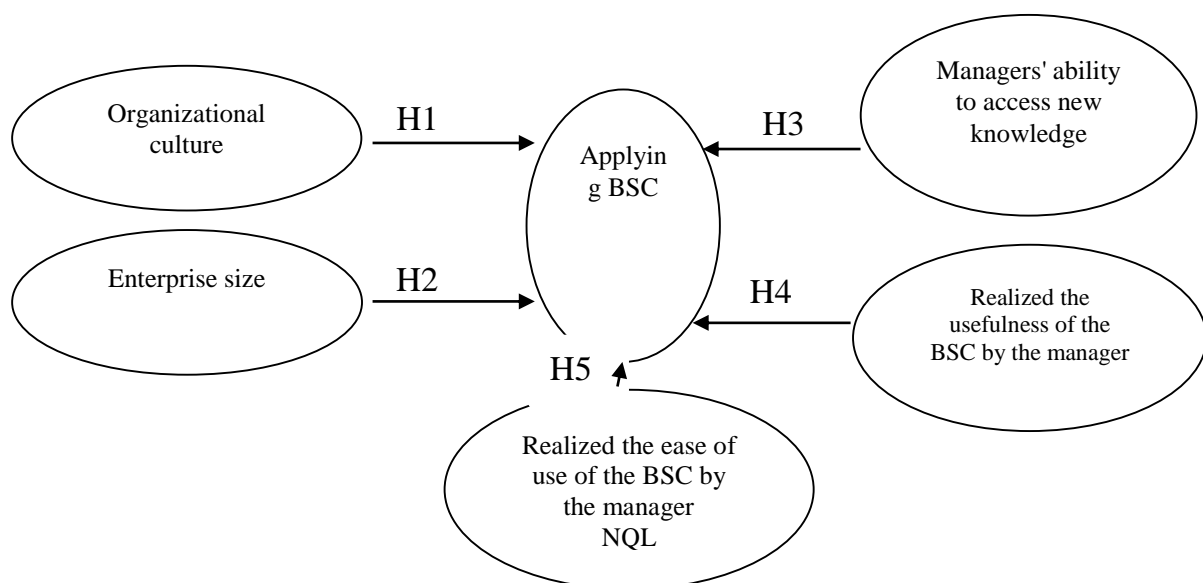
Applying BSC includes BSC to effectively support enterprises in assessing financial performance; BSC to effectively support businesses in terms of customers; BSC to improve internal processes; and BSC to improve staff skills through learning and training aspects.

Apply the 5-point Likert scale: 1- Strongly disagree; 2 - Disagree, 3 - Normal, 4 - Agree, 5- Strongly Agree.

**Table 1.** Scale description table

No	Factor	Code	No. Variables
1	Organizational culture	VH	3
2	Enterprise size	QM	3
3	Managers' ability to access new knowledge	KT	2
4	Realized the usefulness of the BSC by the manager	HU	3
5	Realized the ease of use of the BSC by the manager	SD	4
6	Applying BSC	VD	4

From the above theoretical analysis, the proposed research model evaluates the factors affecting the application of the balanced scorecard in mechanical enterprises in Hanoi:



**Figure 1.** The proposed research model

## 4. RESULTS

### 4.1. Evaluate the reliability of the scale

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Evaluate the reliability of the scales using Cronbach's Alpha reliability coefficient to reflect the close correlation between the observed variables in the same factor.

All factors ensure Cronbach's Alpha reliability of 0.6 or more (Hair et al., 2010), therefore, the observations in each scale are suitable to perform exploratory factor analysis.

**Table 2.** Reliability Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Cronbach's Alpha = .842				
VH1	6.72	.703	.805	.680
VH2	6.78	.816	.661	.823
VH3	6.75	.801	.661	.824
Cronbach's Alpha =.846				
QM1	7.18	.920	.582	.907
QM2	7.13	.774	.810	.691
QM3	7.07	.793	.762	.739
Cronbach's Alpha =.742				
KT1	3.45	.249	.590	.
KT2	3.51	.252	.590	.
Cronbach's Alpha =.809				
HU1	6.99	.798	.657	.737
HU2	6.96	.813	.632	.763
HU3	6.96	.781	.681	.712
Cronbach's Alpha =.784				
SD1	11.84	2.539	.604	.725
SD2	11.80	2.565	.497	.780
SD3	11.79	2.408	.633	.709
SD4	11.73	2.393	.636	.708
Cronbach's Alpha =.797				
VD1	10.95	1.433	.509	.796
VD2	10.85	1.291	.760	.675
VD3	11.02	1.371	.551	.777
VD4	10.91	1.339	.636	.733

### 4.2. Exploratory factor analysis

#### *EFA analysis for the independent variable*

The first test results for 15 observed variables with KMO coefficient = 0.748 satisfy the condition ( $0.5 < 0.748 < 1$ ), Sig. = 0.000 < 0.05, so EFA analysis is consistent with the collected data. The results of the first EFA analysis show that: variables SD1 and SD3 uploaded in both factors are Component 1 and Component 4 with download coefficients of 0.440 and 0.535; 0.592 and 0.526, the load factor difference is less than 0.2. Therefore, the results of the EFA analysis with bad variables SD1 and SD3 need to be removed.

From the 15 observed variables in the first EFA analysis, SD1 and SD3 were removed, and the remaining 13

observed variables were included in the second EFA analysis. The second test results for 13 observed variables have KMO coefficient = 0.695, Sig.= 0.000 < 0.05, so the EFA analysis is consistent with the collected data, the variables are correlated with each other and are eligible for EFA analysis. Results of the second EFA analysis with standard Eigenvalues > 1, 5 factors were extracted with a total variance of 78.88%. All factor loading factors are > 0.5. The variables all satisfy the convergent and discriminant values, so the scales have high values to evaluate the corresponding variables.

**Table 3.** Rotated Component Matrix<sup>a</sup>

	Component
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	1	2	3	4	5
QM2	.909				
QM3	.888				
QM1	.758				
VH1		.906			
VH3		.853			
VH2		.813			
HU1			.844		
HU3			.834		
HU2			.737		
KT2				.904	
KT1				.780	
SD2					.894
SD4					.753

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization. a. Rotation converged in 6 iterations.

**EFA analysis for the dependent variable**

The test results have KMO coefficient = 0.736, Sig.= 0.000 < 0.05. Therefore, factor analysis is suitable for collected data, variables are correlated with each other and are eligible for EFA analysis. The results of factor analysis

with standard Eigenvalues > 1 have 1 factor extracted with a total variance of 63.09 % (> 50%). The factor loading coefficient of all factors is greater than 0.5, and all variables satisfy convergent and discriminant values.

**Table 4.** Component Matrix<sup>a</sup>

	Component
	1
VD2	.893
VD4	.821
VD3	.745
VD1	.703

Extraction Method: Principal Component Analysis.  
a. 1 components extracted.

**4.3. Multivariate regression analysis**

**Correlation analysis**

The results of the Pearson correlation matrix between the four independent variables SD, HU, QM, and VH with the dependent variable are all less than 0.05. Thus, there is a linear relationship between these independent variables and the dependent variable VD. Particularly, the variable KT has a Pearson correlation matrix sig of 0.589, so there is no linear relationship with the dependent variable.

**Table 5.** Correlations

		VD	SD	HU	QM	VH	KT
VD	Pearson Correlation	1	.372**	.277**	.475**	.269**	-.049
	Sig. (2-tailed)		.000	.002	.000	.002	.589
	N	125	125	125	125	125	125
SD	Pearson Correlation	.372**	1	.180*	.387**	-.053	-.097
	Sig. (2-tailed)	.000		.045	.000	.560	.281
	N	125	125	125	125	125	125
HU	Pearson Correlation	.277**	.180*	1	.204*	.202*	.419**
	Sig. (2-tailed)	.002	.045		.022	.024	.000
	N	125	125	125	125	125	125
QM	Pearson Correlation	.475**	.387**	.204*	1	.065	-.074

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	Sig. (2-tailed)	.000	.000	.022		.469	.411
	N	125	125	125	125	125	125
VH	Pearson Correlation	.269**	-.053	.202*	.065	1	.296**
	Sig. (2-tailed)	.002	.560	.024	.469		.001
	N	125	125	125	125	125	125
KT	Pearson Correlation	-.049	-.097	.419**	-.074	.296**	1
	Sig. (2-tailed)	.589	.281	.000	.411	.001	
	N	125	125	125	125	125	125

\*\* . Correlation is significant at the 0.01 level (2-tailed).

\* . Correlation is significant at the 0.05 level (2-tailed).

**Multivariate regression analysis**

The results of the regression analysis are shown in Table 6. The KT variable has a value of 0.059 > 0.05, so this variable is not significant in the regression model, in other words, this variable has no impact dependent variable VD. Four variables: SD, HU, QH, and VH have sig values < 0.05,

so the regression model with these 4 variables is suitable. The coefficients table shows that the VIF coefficient is < 2, so there is no multicollinearity.

The linear regression model reflects the impact of the following factors:

$$VD = 0.211*SD + 0.186* HU + 0.325*QM + 0.270*VH$$

**Table 6.** Regression analysis

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF
(Constant)	1.193	.383		3.112	.002		
SD	.137	.052	.211	2.616	.010	.818	1.222
HU	.164	.075	.186	2.199	.030	.744	1.344
QM	.282	.070	.325	4.014	.000	.812	1.231
VH	.239	.069	.270	3.491	.001	.895	1.118
KT	-.136	.072	-.162	-1.906	.059	.739	1.352

a. Dependent Variable: VD

**5. DISCUSSION AND CONCLUSION**

The results of the Pearson correlation test and computational regression analysis accepted 4 hypotheses and rejected one.

Firm size positively affects BSC application: The results of regression analysis show that company size effects BSC application. This result is similar to previous studies, such as the results of Hoque & James (2000) and Quesado et al. (2006).

Organizational culture has a positive influence on BSC application: The analysis results show a positive relationship between organizational culture and BSC application. This result is consistent with the study of Tran Ngoc Hung (2016), Nguyen Thi Hong Hanh (2013), and Vo Van Nhi (2016), when businesses have support from managers, colleagues, or agreeing on a common goal, it is easier to use the BSC.

The ability of managers to receive new knowledge does not affect the application of BSC: This result is contrary to the research results of Hongfei and Rui (2016), Tanyi (2011). For mechanical enterprises in Hanoi city, the

application of BSC is not affected by managers' ability to receive new knowledge or not.

The perceived usefulness of BSC by management has a positive effect on BSC application: Perceived usefulness refers to the extent to which a person believes that using a particular system will improve work performance their. This result supports the view those managers of mechanical enterprises in Hanoi are willing to use BSC when they perceive it as a useful tool. This is also found in previous studies, such as that of Tanyi (2011).

The manager's perception of ease of use of the BSC has a positive influence on the application of the BSC: Finally, the perception of ease of use of the BSC by the manager when using the BSC. This result once again confirms the technology acceptance model (Davis, 1986) and Tanyi's study (2011). The large workload and fierce competitive environment make the managers of mechanical enterprises in Hanoi city interested in the ease of use of BSC because they do not have much time to study and learn and are asked to use the new performance appraisal method.

With the above research results, mechanical enterprises in Hanoi city need to have changes in perception

of usefulness, ease of use, and creating a cultural environment to improve the efficiency of using BSC in enterprises. Enterprises can hire consulting companies on BSC to organize seminars, etc., to help business managers better understand the usefulness of BSC as well as the process of implementing BSC and help in the implementation of BSC. The acceptance and application of the BSC are important, but only the first step. The problem is how to be able to apply it successfully, really bring about the original desired effect, which is more important. In fact, today's businesses spend too little on resources and intelligence to build a clear strategy for their business. Without a clear and reasonable strategy, BSC certainly cannot achieve success.

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