



The effect of Non-financial Performance Measurement System on Firm Performance

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ABSTRACT

Non-financial performance measurement systems have emerged as a results of the growing use of modern manufacturing practices where it is able to improve crucial activities for performance improvement. This research examines the effect of the non-financial performance measurement systems (NFPMSs) on firm performance within Malaysian manufacturing firms using a survey questionnaire. Based on 118 useable questionnaires, the results demonstrate that there are high extent of use of NFPMSs related to internal efficiency, product development and growth and corporate social responsibility. Furthermore the data provide support as to the effect of NFPMSs on firm performance within a manufacturing environment. Therefore the finding ascertains that NFPMSs play significant roles in the production and operations environment especially for increasing the performance of the firm.

Keywords: Non-financial Performance Measurement, Manufacturing Firms, Performance

JEL Classification: M1, M11

1. INTRODUCTION

Performance measurement systems (PMSs) is a set of measures that help organisations to run business operations effectively and efficiently in accomplishing goals. Generally, PMSs can be divided into financial and non-financial components. The non-financial PMSs (NFPMSs) is developed as a consequence of the shortages in financial-based performance measures (Drury et al., 1993; Gomes et al., 2004; Preda and Watts, 2004). Gomes et al. (2004) argued that traditional approach fails to cater the current need in today's rapidly changing environment that may lead to short-term thinking. NFPMSs take an explicit strategic focus and provide more appropriate internal information within a proper time period and is able to respond to various information needed for decision making. This system is also capable to provide signals for improving crucial activities in organisations (Hoque and Adams, 2011); become better indicators of future financial performance, and is valuable for motivation (Banker et al., 2000). Additionally, Van der Stede et al. (2006) contended that organisations that included objective and subjective non-financial measures, have better overall performance. Given the advantages of NFPMSs, it is

crucial for today's organisations to adopt this system for improving the level of competitiveness and the overall firm performance. The use of NFPMSs in today's organisation is mostly utilised in manufacturing environment (Ahmad and Mohamed Zabri, 2016). This is due to the nature of the daily routine for controlling manufacturing and distribution operations is best handled through the adoption of non-financial measures (Abdel-Maksoud et al., 2005). Previous literature indicated that NFPMSs were moderately used by small manufacturing firms (Ahmad, 2014). Despite the consistent argument regarding the importance of NFPMSs the empirical evidences on the application of NFPMSs and their effect on performance are still lacking. Previous researches on the relationship between NFPMSs and performance have been conducted by a few researchers. For example the link between balanced score card (BSC) and performance have been examined by Hoque and James (2000); Maiga and Jacobs (2003); Davis and Albright (2004) and Maiga and Jacob (2006). Meanwhile Anderson et al. (1994); Abernethy and Lilis (1995); Ittner and Larcker (1998); Banker et al. (2000); Said et al. (2003); Bryant et al. (2004); and Van der Stede et al. (2006) focused on the selected NFPMSs and performance criteria. Another studies attempted to

test the mediating effects of the third variable on the relationship between NFPMSs and performance (see Fullerton and Wempe, 2009 and Lau, 2015).

Given the paucity of comprehensive studies relating to the NFPMSs and performance, this research adds new empirical evidence in this area by exploring the overall use of NFPMSs and their effect on performance. The remainder of this paper is set out as follows; the next section demonstrates the literature review followed by methodology. Results and discussions as well as conclusion are presented in the final part of this article.

2. HYPOTHESIS DEVELOPMENT ON THE EFFECT OF NFPMS ON PERFORMANCE

The effectiveness of PMS in assisting firms achieving their goal has become important research topic. There are substantive efforts have been done in measuring the effects of NFPMSs and performance. The implementation of BSC and its positive impact on performance were revealed by Hoque and James (2000); Maiga and Jacobs (2003) and Davis and Albright (2004). Hoque and James (2000) reveal that there is a significant and positive relationship between the use of BSC measures and superior performance among Australian manufacturing firms. Similarly Maiga and Jacobs (2003) tested for complimentary effects between BSC and activity based costing (ABC) found that ABC, when combined with BSC, has a significant positive impact on organisational performance. A study by Davis and Albright (2004) provide evidence of superior financial performance for bank branches adopting the BSC when compared to non-BSC branches.

More studies reporting a positive association between non-financial performance measure and its performance include Anderson et al. (1994); Abernethy and Lilis (1995); Ittner and Larcker (1998); Banker et al. (2000); Said et al. (2003); Bryant et al. (2004); Maiga and Jacob (2006) assessed and Van der Stede et al. (2006). Anderson et al. (1994) revealed that one of the non-financial performance indicator; customer satisfaction was positively associated with contemporaneous accounting return on investment. Similarly, Ittner and Larcker (1998) demonstrated that customer satisfaction measures are leading indicators of non-financial performance and accounting. This is supported by a finding by Banker et al. (2000) who revealed a positive relationship between customer satisfaction measures and future accounting performance. With a wider range of non-financial measures, Said et al. (2003) examined the current and future performance consequences of incorporating non-financial measures in a set of performance metrics among U.S companies. Based on performance measured as accounting-based measures return on assets and market-based measures (RET), they reported that using non-financial measures in evaluating performance had positively affected market performance. In a later study Bryant et al. (2004) suggested that when firms implement a PMS that contains both financial and non-financial measures will benefit more than the firms that rely solely on financial measures. In particular, the study found that there is a positive relation between financial outcomes and both customer satisfaction and new product introductions which holds only for firms that use both financial and non-financial

measures in their performance. Later, Van der Stede et al. (2006) demonstrated that non-financial performance measures are better than financial measures in helping organisations implement and manage new initiatives. Maiga and Jacob (2006) indicated that there is a strong positive relationship between benchmarking antecedents and quality improvement and the significant impact of quality improvement on relative costs improvement, which in turn is significantly associated with profitability. Meanwhile studies on the mediating effects of another factor on the relationship between NFPMSs and performance was conducted by Fullerton and Wempe (2009) who examined the impact of NFPMSs on the relationship between lean manufacturing and financial performance. The results indicate there is substantial evidence that NFPMSs mediates the relationship between lean manufacturing and financial performance. A recent study by Lau (2015) who conducted a survey questionnaire on 103 large UK manufacturing organisations concluded that role clarity significantly mediates the relationship between non-financial measures and managerial performance. The literature review provides some evidences on the direct and indirect positive effects of specific indicators of NFPMS and performance. This leads to the development of the following research hypothesis:

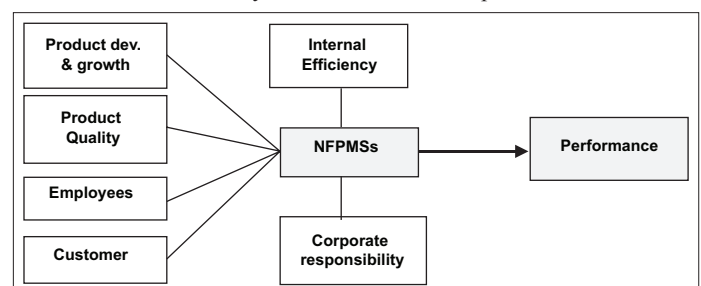
H₁: NFPMSs usage have significant effects on firm performance.

This study divides NFPMSs into six components; product quality, employees, customer, internal efficiency, product development and growth and corporate social responsibilities. These components are developed based on the findings by Gomes et al. (2004) and Abdel-Maksoud et al. (2005). Figure 1 shows a different dimensions of NFPMSs and performance.

3. RESEARCH METHODOLOGY

The data was collected through the distribution of questionnaires to the financial executives of 800 manufacturing firms that were randomly selected from the Federation of Malaysian Manufacturers. At the end of the survey, 118 completed questionnaires were received. NFPMS was measured using 29 indicators (based on scale 1 = rarely used to 7 = Very frequently used) which cover various type on non-financial measures under product quality; internal efficiency; customer; employees; product development and growth, and corporate social responsibilities. Meanwhile the performance is measured using selected financial and non-financial elements which are return on investment, margin on sales, capacity utilization, customer satisfaction, and product quality. This is based on the instruments used by Hoque and James

Figure 1: A conceptual model on non-financial performance measurement systems dimensions and performance



(2000). A reliability test for 29 NFPMSs items indicates that the measurement used are good and reliable where the Cronbach's alpha values is 0.914. The following section discusses the findings of this study.

4. RESULTS AND DISCUSSION

4.1. Descriptive Statistics

Table 1 shows profile information relating to the respondents was collected to gain an overall overview of respondents. The results indicate that almost half of the responding firms have average number of employees between 6 and 75 employees which indicates firms from the small-sized enterprises. The concentration in small firms is also consistent with the information gathered on the annual sales turnover of the respondents where more than half of the responding firms reported annual sales from this category. Meanwhile respondents from medium-sized firms are around 20% of total respondents (see annual sales turnover RM15 million to RM50 million).

Table 2 shows the results of a mean score of all contextual variables of NFPMSs and performance. The results suggest that there are high extent of use of NFPMSs based on efficiency, product development and business growth and corporate social responsibility with average mean score more than 4.50. Meanwhile product quality, customer and employees based measures were moderately adopted by the responding firms. The overall average score for performance appears to be highly perceived by the respondents.

Next, Table 3 shows Pearson correlation analysis results for each main variables used in this study. The variables of NFPMSs were coded as follows: Product quality (QU); internal efficiency (EF); CUSTOMER (CS); employees (EM); product development and business growth (PR); corporate social responsibilities (RS); and firm performance (PF). The results indicate that all NFPMSs components have positive and significant relationships with performance except product quality. Efficiency, product development and business growth and corporate social responsibilities appear to have strong relationships with the average performance.

The next section provides results on multiple regression on NFPMSs and performance.

4.2. The effect of NFPMSs on Performance

The multiple regression analysis was performed to analyse the effect of different dimensions of NFPMSs on performance. The following regression model was developed to test the effect of independent variables on the dependent variable.

$$Y = \alpha_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + e$$

Where Y = Average performance; X₁ = Product quality (QU); X₂ = Efficiency (EF); X₃ = Customer (CS); X₄ = Employee (EM); X₅ = Product development and business growth (PR), and X₆ = Corporate social responsibility (RS) and e = error term. Table 4 shows the results of the multiple regression analysis. The overall

Table 1: Demographic of respondents (n=118)

Company profiles	%
Business duration	
<5 years	11.0
5-10 years	22.9
11-20 years	41.5
More than 20 years	24.6
Total	100.0
Number of employees	
1-5	8.5
6-75	42.4
76-200	18.6
201-500	23.7
More than 500	6.8
Total	100.0
Annual sales turnover	
0- RM300,000	7.6
RM300,000-RM15,000,000	49.2
RM15,000,001-RM50,000,000	20.3
RM50,000,001-RM100,000,000	16.1
More than RM100,000,000	6.8
Total	100.0

Table 2: Descriptive statistics on NFPMSs and performance (n=118)

Items	Minimum	Maximum	Mean±SD
Product quality	1	7	3.75±1.53
Internal efficiency	1	7	5.13±1.25
Customer	1	7	4.46±1.05
Employees	1	7	3.78±1.17
Product and growth	1	7	4.57±0.99
Responsibility	1	7	4.50±1.02
Performance	1	7	5.26±1.20

Table 3: Correlation matrix (Pearson coefficients)

Items	QU	EF	CS	EM	PR	RS	PF
QU	1	0.196*	0.804**	0.602**	0.477**	0.256**	0.125
EF		1	0.421**	0.485**	0.685**	0.438**	0.630**
CS			1	0.701**	0.598**	0.419**	0.310**
EM				1	0.469**	0.329**	0.337**
PR					1	0.636**	0.678**
RS						1	0.665**
PF							1

regression model explains 61.4% (adjusted R²) of the variance in the dependent variable (F = 32.01, P = 0.000) and the standardized beta coefficients for efficiency, product development and business growth, and corporate social responsibility have significant effects on the average performance. Therefore the results provide support for the proposed hypothesis that NFPMSs have significant effects on firm performance.

5. SUMMARY AND CONCLUSION

This study investigates the effect of the use of NFPMSs on firm performance. A quantitative data on 118 firms from manufacturing

Table 4: Regression results

Model summary ^b	R	R ²	Adjusted R ²	Standard error of the estimate	Durbin-Watson
Model 1	0.796 ^a	0.634	0.614	0.747	1.914
ANOVA ^a	Sum of squares	df	Mean square	F	Significant
Regression	107.138	6	17.856	32.011	0.000 ^b
Residual	61.918	111	0.558		
Total	169.056	117			
Coefficients ^a	Unstandardized coefficients		Standard coefficient	t	Significant
	B	Standard error	Beta		
Constant	0.661	0.388		1.705	0.091
QU	-0.138	0.084	-0.175	-1.651	0.102
EF	0.232	0.086	0.241	2.700	0.008
CS	-0.111	0.135	-0.096	-0.819	0.415
EM	0.098	0.089	0.096	1.103	0.272
PR	0.445	0.126	0.368	3.521	0.001
RS	0.446	0.089	0.380	5.002	0.000

^aPredictors: (Constant), responsibility, quality, efficiency, employees, product growth, customer, ^bDependent variable: Mean performance

industries were used to facilitate the analysis. The descriptive results indicate that NFPMSs related to customer, efficiency, product development and business growth and corporate social responsibilities, are highly used by the responding firms. Furthermore, results regarding the associations of the NFPMSs and performance suggest that all NFPMSs components except quality appear to have positive and significant associations with firm performance with the strength of correlation ranges from medium to high. A further analysis on the effect of NFPMSs on performance using multiple regression analysis supports the proposed hypothesis that NFPMSs have significant effects on firm performance. This research has highlighted the importance of NFPMSs in today's organisations as well as the effect of their use to firm performance. Therefore the adoption of a broader measures of NFPMSs should be emphasised by today's firm for improving organisation's decision making which consequently will increase the level of competitiveness and performance. This statistical evidence confirms previous findings with respect to the relationship between NFPMSs usage and performance (Banker et al. (2000); Said et al. (2003); Bryant et al. (2004) and Van der Stede et al. (2006).

The results provide no support for the significant effects of quality, customer and employees based measures on performance. Possibly there are indirect effects of these measures on performance that need a further testing to gauge more significant results. Overall this study presents a new empirical evidence on the effect between NFPMSs and performance. The results of this study is viewed as a distinctive element of the Malaysian context from a manufacturing sector. A further study can be carried out in finding a mediating or moderating effects of potential variable on the relationship between NFPMSs and performance. Furthermore a comparison study should be conducted in other sectors for more understanding on the NFPMSs application and development in modern organisation.

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