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COMPETITION, NON-FINANCIAL MEASURES AND THE EFFECTIVENESS OF MANAGEMENT CONTROL SYSTEMS

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ABSTRACT

This paper reports the results of an empirical study examining the relationship between the emphasis on non-financial measures and two other variables; the intensity of competition and the effectiveness of a management control system, in a manufacturing company. Two important issues focused in the study are: does competition compel managers to utilize more non-financial measures in decision making and is the emphasis given to non-financial measures worthwhile? Data from 105 manufacturing companies throughout Malaysia were analyzed using correlation and regression analysis. The results of both analyses indicate that the emphasis given to non-financial measures in decision making has a positive correlation with the effectiveness of a management control system and secondly, the intensity of competition faced by an organization is positively correlated with the emphasis on non-financial indicators. Descriptive analysis was also performed to evaluate the distribution of emphasis on non-financial measures by the age, location, ownership, size of an organization and its industry.

ABSTRAK

Kertas ini melaporkan hasil kajian empirik yang menguji hubungan-hubungan antara penekanan ke atas ukuran bukan kewangan dengan dua pembolehubah yang lain; kesengitan persaingan dan keberkesanan sistem kawalan pengurusan, dalam syarikat perkilangan. Dua isu penting yang difokuskan dalam kajian ini adalah: adakah persaingan memaksa pengurus-pengurus mengguna lebih banyak ukuran bukan kewangan dalam pembuatan keputusan dan adakah penekanan yang diberi terhadap ukuran bukan kewangan berbaloi? Data daripada 105 buah syarikat perkilangan dari seluruh Malaysia telah dianalisa menggunakan analisis korelasi dan regresi. Hasil kedua-dua analisis tersebut menunjukkan bahawa penekanan yang diberikan terhadap ukuran-ukuran bukan kewangan dalam pembuatan keputusan mempunyai hubung kait yang positif dengan keberkesanan sistem kawalan pengurusan dan kedua, kesengitan persaingan yang dihadapi oleh organisasi adalah berhubung kait secara positif dengan penekanan yang diberikan terhadap ukuran-ukuran bukan kewangan. Analisis deskriptif juga telah dilakukan untuk menilai taburan penekanan ke atas ukuran-ukuran bukan kewangan mengikut umur, lokasi, pemilikan, saiz organisasi dan industrinya.

INTRODUCTION

Financial performance measures have for a long time been used in understanding the health of business organizations. Although this tradition continues to be practiced, there has been in recent years a growing realization among both academics and practitioners that non-financial measures of performance (NFI) are equally important. A commonly cited reason for the growing emphasis on the importance of NFI is the changing nature and intensity of competition. As a result, the actions taken by firms to enhance or maintain their competitiveness have rendered the routine financial data relatively less useful in comparison with NFI. It is no wonder therefore that the last two decades have seen a dramatic increase in research into the importance of non-financial measures on the effectiveness of a management control system.

As the use of NFI is relatively new in comparison with the financial indicators (FI), there is the tendency for firms to differ a lot in the emphasis they give to the use of NFI. This leads to the question: Does the degree of emphasis given by firms to NFI affect the effectiveness of their

management control system? This is the crux of the matter being investigated in this paper. The rest of this paper is divided into four parts. Section two reviews existing literature, section three details the methodology. In section four, the results are reported while section five summarizes the findings and highlights the possible areas for further research.

LITERATURE

The field of management accounting received a boost recently through researches investigating the relationship between business situation and the design of accounting information system, AIS. Despite the amount of effort expended in this area, opinion remains divided especially concerning the importance of certain accounting information to the effectiveness of decisions taken by management based upon such information. For example, Johnson and Kaplan (1987) noted that a lot of the information prepared by management accountants for managers is irrelevant. At the same time, there are studies emphasizing the need for both accounting and non-accounting information. For example, studies by Hopwood (1972), Otley (1978) and Hirst (1983) show that information whether accounting or non-accounting, has a tremendous impact on the behavior and performance of management. While these studies acknowledge the importance of both accounting and non-accounting information, they do not explain the influence that competition has on the emphasis given by organization to non-accounting information. This gap appears to be filled by a study carried out by CIMA (UK).

CIMA (1993) conducted an exploratory study on the performance measures used by various interest groups in manufacturing companies facing strong competition in the UK. Using questionnaire as well as case-study approaches, CIMA reports some significant findings. First, it finds that most companies have a tendency to base their decisions primarily on financial measures of performance. Second, its study reveals that although most managers and executives support the internal use of non-financial performance information, most companies tend to adopt appropriate performance measures only as they grow in size. Finally, CIMA cautions the need for each company to have a balanced approach by having a basket of measures containing an appropriate mix of both financial and non-financial performance measures.

Echoing the findings of CIMA is a study by Abernethy and Lillis (1995) who conducted a study on manufacturing firms in Melbourne, Australia. They found that the use of accounting performance measures appear to decline amongst firms with a commitment to manufacturing flexibility. A recent study in Malaysia reveals results that are in tandem with those of Abernethy and Lillis (1995). Yau *et al.* (1999) examined the influence of competition on the use of performance measures. They find no evidence to show that financial measures are more important than the non-financial measures amongst the manufacturing firms of Malaysia. In addition, the authors find significant relationship between the level and intensity of competition on the one hand, and the emphasis placed on non-financial performance measures on the other.

HYPOTHESES DEVELOPMENT

This study in keeping with tradition falls back on earlier research for guidance on the development of hypotheses. An important clue to the nature of the relationship between Intensity of Competition (DECOM), Emphasis on NFI (ENFI) and Effectiveness of Management Control System (EMCS) may be found from earlier studies such as those of Emmanuel *et al.* (1990). Emmanuel *et al.* (1990) found that financial indicators alone are incomplete and need to be complemented by NFI. They give several reasons for the inadequacy of financial indicators. First, they argue that financial indicators come in a great variety of measures (price, cost, revenue, expense, profit, etc), making it difficult for employees to focus on any one or few of such measures. Second, they stress that financial measures are biased towards results, and penalize effort that does not yield results. Under this kind of situation, they call for the adoption of NFI as a complement to, not a substitute for, financial measures.

Based upon the argument by Emmanuel *et al.*(1990), the first hypothesis of this research is:

> *The higher (lower) the emphasis given by managers to NFI compared to FI, the higher the effectiveness of MCS.*

Unlike the arguments put forth by Emmanuel *et al.* (1990), other studies emphasize the importance of the level and intensity of competition. An

early study stressing the importance of competition was conducted by Khandwalla (1972) which showed that competition affects the methods adopted by management in their control function. Khandwalla's assertions were vindicated in later studies by Hayes (1977), Gordon and Narayanan (1984), and Chenhall and Morris (1986). These studies report that the intensity of competition has resulted in a reduction in the use of FI and a greater use of NFI. Vollmann (1990) goes further to suggest that another reason for the declining importance of FI is that they are too aggregative and give pictures of the past, with little or no regard to the present. Perhaps it is in view of such glaring deficiencies of the FI that Kaplan and Norton (1995) suggest a balanced approach towards the use of information for management decision. The balanced approach involves an appropriate mix of both FI and NFI so that the deficiencies of the former can be overcome by advantages of the latter. In view of the foregoing review, the second hypothesis of this paper is:

> *The higher (lower) the level of intensity of competition faced by the organization, the higher (lower) is the level of emphasis given to NFI.*

METHODOLOGY

This section on methodology is divided into two parts. The first considers the subjects of the study while the second is on measurement.

Subjects of the Study

The subjects chosen for this study are large manufacturing companies operating in Malaysia. In this study, the number of employees is used to determine the size of the companies. Companies with employees of 200 or more are defined as large, and by virtue of their size are expected to have more formal management control systems, and more formal internal reporting systems. Employees in a formal environment are expected to be better able to fill in forms such as questionnaires and to provide the objective information being sought in this study. The sample was drawn with the aid of the 1996 issue of FMM directory. From the directory, it was found that 629 companies satisfied the 200 employee-benchmark for size. Twenty-five companies were selected at random using a table of random numbers for the pilot study. The results of the pilot study are not reported because they were meant to ascertain the reliability of the

items of the questionnaire. Suffice to say that the pilot study enabled the researchers to improve the questionnaire, which was then sent out to the 604 companies not covered by the reliability analysis. Of the 604 questionnaires sent, 105 of them were returned in a usable form, giving a response rate of 17.24 per cent.

Measurement

Three variables were measured: effectiveness of management control systems (EMCS), emphasis on non-financial indicators (ENFI) and intensity of competition (DECOM).

Effectiveness of Management Control Systems (EMCS)

The EMCS was measured by comparing the actual performance of a department and a priori expectation. Govindarajan and Gupta (1985) emphasize that this method has an edge over the use of absolute performance figures.

Twelve dimensions were used to measure performance. The overall measure of performance was obtained by taking a weighted-average of the twelve dimensions, with weights determined by the relative importance attached to each dimension. To obtain information about performance and the weight attached to each dimension, the production or manufacturing managers were asked to indicate the extent to which he/she has accomplished his/her superior's expectations for each of the dimensions. They were also asked to state the importance of each dimension to the success of their department.

Emphasis on Non-financial Indicators (ENFI)

The ENFI was measured using perceptions of managers towards the importance of NFI as a performance measure in different contexts of decision-making and the frequency of each decision being made. Eleven decision-making contexts were listed in the questionnaire, with both frequency and importance of each decision-making context measured on a 5-point Likert scale. The reliability test for the importance of NFI in the eleven decision-making contexts gave a Cronbach's Alpha of 0.8311, well above the minimum benchmark of 0.7. The corresponding figure for the frequency of NFI was 0.8645, also above the threshold of 0.7.

The geometric average for the two dimensions was calculated to derive a measure for emphasis on NFI. Factor analysis was done on the measure of ENFI and based on that analysis, three of the eleven decision contexts were dropped.

Intensity of Competition (DECOM)

The final measure employed in this study is the degree of intensity of competition. The intensity of competition faced by a firm was measured based on the perception of the managers. The motivation for the use of perception, rather than the actual level of competition, arises from the argument by Lawrence and Lorsch (1967) that it is the perception of competition, rather than its actual level that influences the decision that managers make in response to organization's operating environment. Several items in the questionnaire were used to measure the extent of competition. The overall measure of intensity of competition was then obtained using a weighted average of the items, with weights determined by the perceived importance attached by the managers to each item.

Other Methodological Issues

Two other aspects of methodology need to be stressed here: the treatment of missing items, and that of non-response bias. An examination of the data reveals that more than 80% of the respondents have answered at least 97 items out of the total of 98. Following the suggestion offered by Madow (1983, p. 58), this study replaced the missing values by the mean response for those items. Madow (1983) shows that this technique has the advantage of being objective, without introducing any measurement bias.

The second aspect of the methodology that needs be stressed is the non-response bias. The response rate for this study has been shown to be 17.24 per cent. Thus, there is the fear that the sample may have been plagued by the problem of non-response bias. Oppenhiem (1966) has suggested a technique for gauging the presence and severity of this bias. Following Oppenhiem's suggestion, this study compared the responses of the first ten respondents to those of the last ten. Using a t-test to compare the two groups, this study found that only in 7 out of the 98 items were significant differences found. Thus, it would be safe to conclude that the sample, though accounting for only 17.2 per cent of the target population, does not suffer from any perceptible level of non-response bias.

RESULTS

This section presents the results obtained from this study. The section is divided into two. In the first section, descriptive statistics are given in order to obtain some basic information concerning the nature of the data. In the second section, results are given concerning the hypothesis-testing procedure.

Descriptive Statistics

This section attempts to obtain some idea concerning the emphasis given to NFI. A number of variables are used to obtain a basic idea concerning their relationship to emphasis on NFI: age, type of industry, location, ownership, and size.

Age and NFI

Firms were classified into four age categories: less than or equal to 5 years; between 6 to 10, 11 to 20, and more than 20. For each of the four age categories, the mean NFI is computed and reported in Table 1.

Table 1
Classification of NFI by Age of Firm

Age (Years)	Mean score	Number of companies
Less than 5	3.6073	10
Between 6 to 10	3.6223	30
Between 11 to 20	3.6686	20
More than 20	3.4037	45
Total		105

From Table 1 above, it is ascertained that despite the variation in age, the mean score for each age category of firms does not show any wide variation. The highest mean of 3.67 was observed for firms between 11 to 20 years of age; while the lowest mean ENFI of 3.40 was obtained for firms with more than twenty years of age. Thus, it can be concluded that age of firm is probably not a significant factor affecting EFNI. This is a tentative conclusion, as it involves no statistical evidence.

EFNI and Type of Industry

Another aspect of the descriptive statistics involves computing the mean EFNI based on type of industry. Table 2 shows the mean ENFI by type of industry. From the table, it is clear that there are seventeen industry types, with the electrical and electronic industry accounting for 28 out of the 105 firms in the sample. This is followed by paper and paper product industry, which accounts for 10 of the firms in the sample. The mean EFNI appears to vary considerably from one industry to another. For example, while the wood and wood product industry reported a mean EFNI of 3.85, the corresponding figure is 2.99 for the food industry, 2.83 for the beverage industry, and 2.97 for the non-metallic mineral industry. It should be stressed however that although wide variations in mean ENFI are observed across industry types, no definite conclusion can be made concerning the effect of industry type on emphasis on non-financial indicators.

Classification of EFNI by Location

The third aspect of the descriptive statistics concerns the classification of EFNI by location. Table 3 shows the distribution of mean EFNI by location of firms. The results in Table 3 also show that with the exception of East Malaysia, ENFI does not seem to vary considerably from one location to another. For example, Eastern Peninsular reported a mean of 3.58, Southern and Central Peninsular 3.55 each, and Northern Peninsular 3.48. The mean ENFI for East Malaysia is 4.19, which is well above the mean for the other locations. This should not be construed to mean that East Malaysia places more emphasis on NFI than does West Malaysia. The rather high mean from East Malaysia is probably due to the small sample from that region. One would expect the mean from East Malaysia to fall into line with that of the west if the sample was larger.

Classification of ENFI by Country of Ownership

Another aspect of the descriptive results concerns the effect of ownership on ENFI. Table 4 shows the distribution of mean ENFI across firms of different ownership.

Table 2
Classification of ENFI by Type of Industry

Industry	Mean score	Number of companies
Food	2.99	8
Beverage	2.83	1
Textile, wearing apparel and leather industry	3.80	5
Wood and wood product	3.85	5
Paper and paper product, printing and publication Publishing	3.57	10
Chemicals	3.64	3
Petroleum and coal	3.33	3
Rubber product	3.56	4
Plastic product	3.62	7
Non-metallic mineral product	2.97	4
Basic metal industry	3.72	4
Fabricated metal product	3.47	6
Machinery and equipment	3.85	2
Transport equipment, professional, scientific measuring and controlling equipment	3.41	6
Electrical and electrical product	3.67	28
Other manufacturing industries	3.53	9
Average/Total	3.54	105

Table 3
Classification of ENFI by Location of Firm

Company's Location	Mean score	Number of companies
Northern peninsular	3.48	41
Central peninsular	3.55	42
Southern peninsular	3.55	14
Eastern peninsular	3.58	6
East Malaysia	4.19	2
Average/total	3.54	105

Table 4
Emphasis on NFI by Country of Ownership

Owner's Country of Origin	Mean score	Number of companies
Malaysia	3.56	63
Other Asian countries	3.56	18
Europe	3.15	5
America	3.48	15
Other country	3.68	4
Average/Total	3.54	105

The mean emphasis on NFI appears to vary ranging from 3.56 for Malaysian owned firms, to 3.15 for European firms. This might suggest that emphasis on NFI tends to vary with ownership. This conclusion is tentative due to lack of statistical evidence.

Classification of ENFI by Size

The classification of the mean emphasis on NFI, is also performed according to size of the firm. The results are reported in Table 5. From the table, it is evident that firms with between 201 to 500 employees is the largest group, accounting for 38 of the 105 firms in the sample. This is followed by the two next largest size categories of firms, which account for 31 each. The table also shows that the mean emphasis on NFI appears not to vary considerably. Firms with more than 1000 employees report a mean emphasis on NFI of 3.62, while firms with 200 employees report a mean NFI of 3.35. Thus, the variation in mean is not wide enough to warrant a conclusion for a significant difference.

Hypothesis-testing

The hypothesis-testing is divided into two sections. The first section deals with the correlation test while the second with regression.

Correlation Test

A correlation test was performed to test the two hypotheses of this study. The results obtained from the correlation tests are given in Table 6.

Table 5
Classification of Mean NFI by Size

Number of Employees	Mean score	Number of Firms
Exactly equals 200	3.35	5
Between 201 – 500	3.51	38
Between 501 - 1000	3.51	31
More than 1000	3.62	31
Average/Total	3.54	105

Table 6
Pearson Correlation Coefficient

Variables	Emphasis on NFI	Effectiveness of MCS
Emphasis on NFI		
Effectiveness of MCS	0.532**	
Degree of Competition	0.332**	0.238*

* Significant level 0.05 ** Significant level 0.01

A number of observations could be made regarding the results shown in Table 6. First, the correlation between emphasis on NFI and effectiveness of MCS is significant at the one per cent level. This means that the higher (lower) the emphasis given to NFI, the higher the effectiveness of management control systems. This suggests that the first hypothesis of this study, which predicts that "The higher (lower) the emphasis given by managers to NFI compared to FI, the higher the effectiveness of MCS" is not rejected.

The second aspect of the results in Table 6 is that a significantly positive correlation is found between intensity of competition and emphasis on non-financial indicators and is significant at the one per cent level. Thus, we do not reject the second hypothesis of this study, which predicts that "the higher (lower) the level of intensity of competition faced by the organization, the higher (lower) is the level of emphasis given to NFI".

The conclusions emerging from the correlation tests are tentative because of a number of underlying weaknesses of the correlation. An important weakness of correlation is that it is only a measure of association, not of causality. Second, and perhaps more important, is that correlation could be spurious. Spurious correlation arises when two variables are significantly correlated not because of any underlying relationship between the two, but because they both are affected by one or more other variables. The common relationship the two variables share with other variables makes the two appear to be significantly correlated. To support the result obtain from correlation analysis, a regression technique is employed.

Regression Analysis

The two hypotheses of this study were tested using regression analysis. The results obtained from the test of the first hypothesis pulled out from the regression output are given in Table 7.

Table 7
The Relation between Emphasis on NFI and Effectiveness of MCS

Variable	Coefficient	't' value	Significant t
Constant	2.221	9.578	0.000
Emphasis on NFI	0.413	6.373	0.000

The regression results in Table 7 indicate that the coefficient estimate for emphasis on NFI is positive and significant as predicted. This is a confirmation of the results in the correlation section, which finds a significant positive association between emphasis on NFI and effectiveness of management control system.

The second hypothesis was also tested using the regression analysis. The partial results as taken from the regression output are given in Table 8.

From the results in Table 8, it is evident that a positive relationship is found between intensity of competition and the emphasis given on NFI. The results also are in agreement with those obtained under the correlation analysis, which indicate a significant positive relationship between intensity of competition and emphasis given to non-financial indicators. Thus, the second hypothesis of this study, which predicts that "the higher (lower) the level of intensity of competition faced by the organization, the higher (lower) is the level of emphasis given to NFI" is not rejected.

Table 8
The Relation between Emphasis on NFI
and Intensity of Competition

Variable	Coefficient	't' value	Significant t
Constant	2.470	8.144	0.000
Degree of Competition	0.282	3.569	0.001

CONCLUSION

This study examined the relationship between emphasis on NFI on the one hand and intensity of competition and effectiveness of management control systems on the other. Both the correlation and regression analysis suggest that emphasis on NFI is positively related to intensity of competition and management control system respectively. How do these findings compare with those of earlier studies? The findings appear to be in conformity with those of Hopwood (1972), Otley (1978) and Hirst (1983) who stressed the importance of accounting as well as non-accounting information in management control systems. The findings also echo those of Emmanuel *et al.* (1990) who found a significant relationship between emphasis on NFI and effectiveness of management control systems. The findings of this study are also in agreement with those of Khandwalla (1972), Hayes (1977), Gordon and Narayanan (1984) and Chenhall and Morris (1986) who reported the tendency on the use of non-accounting data in situations of intense competition.

The findings have implications for both academics and practitioners. In order for management to enhance the effectiveness of their control systems, there is a need for them to pay closer attention to both financial and non-financial indicators. Relegating the latter in favor of the former could spell havoc especially in an environment of intense competition. The findings of this study have stopped short of explaining the joint effect of emphasis on NFI and intensity of competition on the effectiveness of management control systems. The implication for the academics is that there is a need for further research to try to unravel not only the individual effects of competition and ENFI on effectiveness of management control systems (as provided here) but also on their joint effect. Research in this

direction could go a long way towards expanding the frontiers of knowledge concerning the determinants of the effectiveness of management control systems.

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