

OVERVIEW ON MANUFACTURING PRACTICES AND MANUFACTURING CAPABILITIES: A PERSPECTIVE FROM LOCAL MANUFACTURERS IN NORTHERN REGION OF MALAYSIA

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ABSTRACT

Generally, manufacturing capability is the important factor in running and developing business. Hence, this research is aimed to identifying the relationships of critical factors and ensure the companies can survive in the northern region of Malaysia. Those identified factors are manufacturing practices and manufacturing capabilities. Through the email survey, a total of 89 companies representing various industries had responded. The hypotheses involved were tested using correlation and regression techniques. The results of the study support all the hypotheses. The multiple regression analysis indicates that there are significant relationships among the factors on each criterion to manufacturing capabilities. While hierarchical multiple regression analysis was carried out to test the role of moderating in the relationship between independent variables with dependent variables. The results of the hierarchical multiple regressions indicate that training moderated the relationship between manufacturing practices, knowledge sharing to manufacturing capabilities. It is believed that results of this study will be beneficial for shareholders and directors of companies to apply these manufacturing capabilities.

Keywords: *Manufacturing practices, manufacturing capabilities, local manufacturers, Northern region of Malaysia.*

INTRODUCTION

Malaysia had becomes the transit and destination for foreign companies and multinational manufacturing companies to invest and develop their business. With this environment, Malaysia needs to be competitive in order to be a good player in manufacturing sector. The major step towards globalization was set by all our Prime Minister in the nation's vision 2020, the achievement of this vision is contingent upon how capable to use and manage our manufacturing practices, apply our knowledge and learning and training to perform in our areas. As Zeleny (1986) explained, we must not lack the ideas, which will enable us to perform certain tasks effectively and efficiently. Malaysian economy has sustained an enviable growth of an average of 8% in its Gross Domestic Products (GDP) over the last ten years, with highest number recorded in 1995 which is 9.4%. In 1996, the GDP was estimated at US\$96.6 billion, which reflected a significant growth of 8.9% (SIRIM QAS Directory, 2005)

Manufacturing Capabilities

The concept of strategic capabilities that determine a manufacturing's contribution to the success of a firm is closely related to the notions of strategic resources, competences and priorities. In contrast to capabilities, resources are something a firm possesses or has access to, not what a firm is able to do. Resources can be tangible, e.g. specialized production systems, and intangible, e.g. level of training of workers (Hall, 1992; Hall, 1991). Based on such resources, capabilities are developed. For instance, flexible production systems in combination with highly skilled workers or resources, allow to produce in a flexible way, capability. Capabilities allow an enterprise to develop and to exploit resources in order to generate profit through its products and services (Amit & Schoemaker, 1993). In this research, the researcher focus more on the "improvement" factors in Manufacturing Capabilities which had been identified as the important factors in increasing the performance of manufacturing companies.

Improvement

Improvement is the process of a thing moving from one state to a state considered to be better, usually through some action intended to bring about that better state. The concept of improvement is important to governments and businesses, as well as to individuals. In the 20th century, the concept of improvement expanded even further. Businesses developed philosophies of having a continual improvement process, wherein all activities of the business are constantly examined to weed out inefficiencies and better ways of carrying out tasks. At the same time, the concept of individual self-improvement blossomed, leading to "tremendous growth in self-help publishing and self-improvement culture", wherein people assessed their lives in much the same way. Home improvement, the process or result of improving the efficiency, livability, or market value of a personal dwelling, has also become a substantial industry. Many theories and practices exist with respect to improvement in business. For example, business process improvement is a systematic approach to help an organization optimize its underlying processes to achieve more efficient results. One such approach is focused improvement, the ensemble of activities aimed at elevating the performance of any system, especially a business system, by working on eliminating its constraints one by one while *not* working on non-constraints. Performance improvement focuses on measuring the output of a particular business process or procedure, then modifying the process or procedure to increase the output, increase efficiency, or increase the effectiveness of the process or procedure. Quality improvement is one of the four aspects of the concept of quality management. According to Swink & Hegarty (1998), the manufacturing companies should focus more on removing the non-value adding process.

Manufacturing Practices

In order to enhance and utilize these capabilities, manufacturing strategies need to be developed. The nature, content and scope of these strategies and their link to agility and mass customisation are obviously unclear (Papke Shields & Malhotra, 2001; Bozarth & McDermott, 1998). One consequence of the changing nature of manufacturing industry has been a difficulty for practitioners and academics to understand and evaluate findings relating to a particular practice before having to

move on and examine new ones. Bolden, (1997), clustered the identify practices in terms of ‘strategic emphasis’ (i.e. why the practice is used) and the ‘domain of application’ (i.e. the part of the manufacturing process primarily involve). Within ‘strategic emphasis’, two types of primary emphases were identified: business focused and organization focused. While business focused strategic emphases draw primarily on operation management theory, organization-focused strategies represent the core subject areas of engineering and organizational psychology & organizational behaviour.

Quality Management

The quality of a product is measured of its relative ‘usefulness’ to the customer. It includes product features, which might differentiate it from competitive products (New 1992). Two of the mentioned measures are consistent quality and high performance products (Roth & Miller 1990). Essential decisions need to be made in terms of cost/quality, product technology and process technology (Hill 1983). Measures for product and process quality can include, for example: i) Manufacturing conformance, product quality and reliability, customer service and support, delivery reliability, environmental performance (Laugen et. al. 2005), ii) Return rate, defective rate (Ward et al. 1995), iii) Vendor quality (Ward et al. 1995), iv) Quality control circles (Ward et al. 1995), v) ISO 9000 certification (Ward et al. 1995), vi) Field failure under warranty (Neely et al. 1994), vii) In process quality (Neely et al. 1994), viii) Incoming parts quality (Neely et al. 1994) and vix) Consistent quality with low defects (Meyer & Pycke 1996)

Based on the discussion it can be concluded that manufacturing practices play an important role in determining manufacturing capabilities. Therefore, it is essential to consider these factors in studying manufacturing capabilities. This study focuses on manufacturing practices namely *quality management*. The investigation on the effects of manufacturing practices on the manufacturing capabilities addressed by the following hypotheses;

H_1 Quality Management has positive significant influence on Improvement.

METHODOLOGY

The Sample and Data

A survey was conducted to collect through a cross sectional data in Northern Region of Malaysia which is one of the state introduce as the Silicon Valley of Malaysia. The population of this study involved the Top Management and Managers . These grades consist of management and professional employees which identified a group with high potential to engage manufacturing capabilities. The selection of the survey location and the sample was due to the Federation of Manufacturers of Malaysia (FMM). A set of questionnaire was formulated and designed based on the previous literature in the subject area. The questionnaires were emailed to 160 respondents. 119 sets questionnaires received within two weeks giving the response rate of 74.4%. The sample profile of the survey is shown in Table 1

Table 1
Sample profile of the respondent

Variables	Item	Frequency	Percentage (%)
Companies's Type	Malaysian owned	75	63.0
	Foreign owned	28	23.5
	Joint Venture	16	13.5
Size of Company(Full Time Employees	Less than 5	-	-
	5 to 50	-	-
	51 to 150	36	30.0
	More than 150	83	69.7
Respondents' Job Designation	General Manager	3	2.5
	Manager	89	74.8
	Executive	27	22.7
Year of designation	Less than 1 years	8	6.7
	1-5 years	31	26.1
	6-10 years	17	14.3
	More than 10 years	63	52.9
Education level	Degree	98	82.3
	Master Degree	20	16.8
	PhD	1	0.9

From Table 1 it is found that more than 75% respondents are Malaysian owned companies and 83 companies had more than 150 workers in their operation. The respondents are 3 General manager, 89 Managers and 27 Executives and 63 from the respondents work more than 10 years. 98 from this respondents are from Degree level.

Reliability Analysis

An internal consistency analysis was performed separately for the items of each personality traits and cyberloafing behaviour by using the SPSS version 20, reliability procedure. Hair, Money and Samuel (2007) suggested an acceptable alpha value is greater than 0.6. As show in Table 2, the alpha values of reliability analysis for this study ranges from 0.82 to 0.92. From the results obtained, all the alpha values are greater than 0.7. Thus it can be concluded that this instrument has good internal consistency and is therefore reliable.

Table 2
Reliability analysis result

Variables	Number of items	Alpha
Quality Management	4	0.914
Improvement	4	0.823

Descriptive analyses for the manufacturing practices and manufacturing capabilities are shown in Table 4 and Table 5. The levels of manufacturing practices and manufacturing capabilities are based on the levels of mean score range provided in Table 3 which adopted from Kosnin and Lee (2008).

Table 3
Level of Mean Score Range

Range of mean score	Level
1.00 – 2.33	Low
2.34 – 3.67	Medium
3.68 – 5.00	High

FINDINGS

The Level of Manufacturing Capabilities

Manufacturing capabilities among the manufacturing companies are measured based on the values of means and standard deviations. Table 4 shows the ranking of Improvement and the value of mean and standard deviation for each activity.

Table 4: Mean Values of Manufacturing Capabilities

Activities	Mean	Standard Deviation
Able to improve human resource to higher levels	3.45	0.692
Able to increase the process understanding	3.23	0.647
Able to identify and remove the non-added value activities	3.17	0.664
Manufacturing Capabilities	3.28	0.667

Mean values explained the tendency of the respondents to involve in the manufacturing capabilities (Li, 2000). According to Kosnin and Lee (2008) the mean values in range of 2.34 to 3.67 is categorized as a medium stage. The mean score for the overall manufacturing capabilities is 3.28. This indicated that the level of manufacturing capabilities among manufacturing companies is at the medium stage.

The Level of Manufacturing Practices

Table 5 gives the mean values for the eight Manufacturing Practices. It is shown that one of the manufacturing practices has more than 3.67 mean values which is 3.92. Base on Table 3, the levels of these manufacturing practices are considered as medium stage among the manufacturing companies.

Table 5
Mean Values of Manufacturing practices

Personality Traits	Mean	Standard deviation
Had supplier certification programs	3.94	0.89
Statistical Process control	4.04	0.87
Real time quality information	4.01	0.92
Had quality improvement teams	3.96	0.94
Quality Award guidelines	3.92	0.86
Had plant quantity certification	3.98	0.87
Continuous improvement	3.99	0.93
Acceptance sampling	4.01	0.91
Manufacturing Practices	3.98	0.89

The lowest mean of manufacturing practices is quality award guidelines and the average mean value of manufacturing practices is at high levels.

Correlation Analysis

From the results of correlation analysis it is found that manufacturing practices is significantly correlated to manufacturing capabilities. As shown in Table 6, the correlation coefficients are found to be positive and statistically significant at 0.01 level ($p < 0.01$).

Table 6
Pearson Correlation Coefficients between manufacturing practices and Manufacturing Capabilities

Variable	F1	Manufacturing Capabilities	Correlations
F1	1.00		
Manufacturing Capabilities	0.947**	1.00	

** Correlation is significant at the 0.01 level (1-Tailed)

* Correlation is significant at the 0.05 level (1-Tailed)

Therefore, Hypothesis 1 is supported. There is a significant relationship between quality management with the other variables that is improvement (manufacturing capabilities). Hence, Hypothesis 1 is supported.

DISCUSSION

This study is to empirically identify the core manufacturing capabilities in manufacturing companies, across industry in the northern region of Malaysia. The rationale of the study stems from the major consideration, that is, the emerging concern of shareholders of the manufacturing companies and the directors of the companies in this industry in particular to develop core manufacturing capabilities. The analysis based on the respondents' perception of core manufacturing capabilities in manufacturing companies showed that manufacturers took a lot of effort in manufacturing practices in achieved high degree of core manufacturing capabilities. The findings show the manufacturing practices is the important variables that must be consider by the manufacturers in their operation. These findings are supported by previous researchers who have studied in developing manufacturing capabilities (Swink & Hegarty, 1998; Haifeng, 2006; Li, 2000). The correlation analysis show that manufacturing practices is the priority variables that must be highlight which show the correlations coefficients 0.947 at the 0.01 level (1-Tailed).

Limitation of study

This survey has been conducted with the manufacturers in Northern Region of Malaysia. Nevertheless, the result may not be able to generalize the influence of manufacturing capabilities on manufacturing capabilities for the whole country as there are different focus on their operation. This study focuses solely on the manufacturing practices in term of quality management. Future research should consider the other factors that influence the manufacturing capabilities such as flexibility and team works.

CONCLUSION

This paper has applied empirical analysis on the influence of manufacturing practices on manufacturing capabilities of local manufacturers.. Survey on manufacturing capabilities on the local manufacturers reveals that the level of manufacturing capabilities is high level. The results show that the manufacturing practices contributes to the manufacturing capabilities. The results suggest that, all manufacturers must consider quality management (Manufacturing practices) as their focusing aspect to survive in the business. Companies or manufacturers must increase their manufacturing practices in term of quality management to gain significantly in the core manufacturing capabilities. The manufacturing practices absolutely is very important in develops manufacturing capabilities.

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