

## **CHAPTER SIX**

### **SUMMARY AND CONCLUSION**

#### **6.0 Introduction**

This chapter consists of four sections. Section 6.1 summarises the findings of the current study. Then, the implications of the study both for theory and practice are discussed in Section 6.2. Finally, Section 6.3 highlights the limitations of the study as well as providing suggestions for future research.

#### **6.1 Summary of Research Findings**

As mentioned in Chapter 1, this study attempts to answer six research questions:

1. Is there any relationship between intensity of market competition and the use of IMP?
2. Is there any relationship between strategy and the use of IMP?
3. Is there any relationship between IMP and business unit performance?
4. Is there any relationship between IMP and MAS?
5. Is there any relationship between MAS and business unit performance?
6. Does MAS mediate the relationship between IMP and business unit performance?

In doing so, this study employed both a questionnaire survey and interviews as data collection methods to managers of manufacturing firms in Malaysia. The following are the summary of the findings obtained from both the survey and interviews, which are subdivided into four sections:

### **6.1.1 Market Competition and Integrated Manufacturing Practices**

The first objective of this study is to examine the relationship between intensity of market competition and the use of IMP. It was hypothesised that increase in market competition influences firms to adopt IMP. The results from the questionnaire survey show that market competition has a positive and significant relationship with IMP. Further analysis on the impact of market competition on each dimension of IMP also produces similar findings. These findings suggest that the intensity of market competition influences manufacturing firms in Malaysia to adopt JIT, TQM and AMT.

The responses received from the semi-structured interviews also confirmed the findings obtained from the survey. The interviewees opined that controlling and maintaining quality is the most important aspect to survive the competition. The loyalty of customers depends on the quality of the products and services. In order to obtain certain quality standards, manufacturing firms have to improve their technology. Implementing modern and advanced technology such as AMT could help them to minimise defects and wastage, thus, enhancing quality. Furthermore, the ability of these technologies and machines to produce large quantities of products in a shorter time frame helps firms to fulfil customers' demands in a timely manner. This is critical for them to compete successfully with other competitors and gain a competitive advantage. Similar to TQM,

the respondents also stressed that JIT is a “must have” practice in every manufacturing firm. For decades, JIT has been recognised as a method to eliminate non-value added activities in every stage of production process. The reduction in storage, wastage and lead-time has resulted in the reduction in costs. Manufacturing firms that utilise JIT in their production processes have experienced a significant decrease in their operating costs. As a result, their product costs are also decreased and, therefore, they could market their products at a relatively lower price compared to their competitors. Thus, JIT helps firms to sustain their market position.

### **6.1.2 Strategy and Integrated Manufacturing Practices**

The second objective of this study is to examine the relationship between strategy and the use of IMP. In this study, strategy is defined as business strategy and utilised Miles and Snow’s (1978) typology of strategy. The results from the questionnaire survey suggest that the business strategy adopted by manufacturing firms in Malaysia does influence the use of IMP. Further analysis on the impact of individual strategy on the use of IMP shows that among the five archetypes of strategy, only prospector strategy is significant and positively related with the use of IMP. This result is further supported by the opinions obtained from interviews. The majority of the respondents indicated that their firms adopted the strategy that focuses on innovation and technology, market opportunities and new products introduction (prospector) due to the characteristic of the strategy that could assist firms to survive in a competitive environment. This strategy is also suitable for fast moving products. Most of them also agreed that business strategy influences the use of IMP. Firms adopt a certain strategy to satisfy customers and gain competitive advantage. In doing so, manufacturing firms require the use of IMP because

of its flexibility and quality, especially in terms of product specifications such as packaging and size. The respondents also indicated that strategies that focus on innovation, quality and change product line frequently (prospector) are more suitable for the use of IMP because this strategy requires flexibility, a fast response, and a stable and reliable system, while, at the same time, maintaining and controlling quality.

### **6.1.3 Integrated Manufacturing Practices and Performance**

The third objective of the study is to examine the relationship between IMP and performance. The results of the PLS analysis of the survey data show that the relationship between overall IMP and performance is positive but not significant ( $p > 0.05$ ). Even though this result shows that overall IMP is not significantly related to performance, the relationship is positive, which is in the expected direction. Further analysis of individual IMP dimensions indicates that JIT and TQM have a significant positive relationship with performance, whereas AMT has no significant relationship with performance. These results are further supported by the opinions gathered through the semi-structured interviews. Almost all respondents agreed that IMP, especially JIT and TQM implementation, result in many directly observable benefits to their organisations. Among the benefits that have been highlighted are the reductions in cost and wastage, effective use of raw materials, on-time delivery, sustainability of supply in the market, and continuous improvement of quality, which in turn could lead to improved performance of the adopter firms. However, it was also suggested that the implementation of IMP would not be effective and result in improved performance if it is not implemented in the whole organisation. Therefore, the insignificant path between IMP and performance obtained from the survey findings could be due to the

implementation of IMP in some organisations being departmentalised (on a piecemeal basis) and not for the whole organisation. Furthermore, the insignificant relationship between AMT and performance could also influence the relationship between IMP and performance.

Concerning the relationship between AMT and performance, the respondents felt that the negative impact of AMT on financial performance is not surprising. They gave various factors that could contribute to this situation. The increase in the cost of machinery and equipment, spare parts, maintenance, and manpower, as well as inaccurate product mix, lack of feasibility study, and time factor are among the contributing factors mentioned by the interviewees that could adversely affect the financial performance of AMT firms.

#### **6.1.4 The Role of MAS Information**

The fourth to sixth objectives of the study are concerned with the mediating effects of MAS information in the relationship between IMP and performance. In the current study, it was expected that the relationship between IMP and MAS information would be positive. This expectation was confirmed by the results obtained from the questionnaire survey. Further analysis on each dimension of MAS also demonstrated that IMP has a positive impact on scope, timeliness, integration and aggregation. Consequently, the relationship between MAS information and performance was examined. In the overall model, support was found for the positive relationship between MAS information and performance. However, the examination of individual dimension of MAS shows that only integration has an insignificant positive relationship with

performance. Even though it was in the expected direction, it was not statistically significant ( $p > 0.05$ ).

Since this study found no support for the significant positive relationship between IMP and performance, but instead, found support for the significant positive relationship between IMP and MAS information, as well as between MAS information and performance, it can be concluded that MAS information mediates the relationship between IMP and performance. The results of the study suggest that the role of MAS information in enhancing performance is crucial in an advanced manufacturing environment. Manufacturing firms that use IMP would demand a greater amount of MAS information. They used all four types of information to assist them in their daily operations as well as in making decisions for the benefit of their organisations. More importantly, the results show that the use of MAS information by managers could help firms to achieve the ultimate outcome of every organisation, i.e., improved performance. This is consistent with the contingency theory, which states that the nature of control systems such as MAS is contingent upon the context in which the organisation operates. In this study, it is found that IMP firms need to use MAS information in order to improve performance. In other words, the performance of IMP firms is contingent upon the use of MAS information by managers.

The importance of MAS information is further confirmed by the information supplemented during the interview sessions. All participants agreed that they used such information in managing their operations such as to monitor sales, collection, and inventory status in order to achieve their targeted performance. Inconsistent with the survey findings, they believe that integration of information is critical for improved performance. According to them, integration is very important to ensure the smooth

flow of operation. The integration of information helps firms to detect any problems quickly and, as such, fast action could be taken to rectify them. For example, the number of defective products, rework costs and wastage could be reduced if the production department received the information about low quality materials from the purchasing department. Therefore, integrated information assists firms in improving their performance. In addition, the interview participants also stressed that integration helps them to gain a competitive advantage and improve organisational culture.

The results of both the interviews and the survey suggest that the integration of information is important in helping firms to improve performance. Even though the survey results show that the relationship between integration and performance is not significant ( $p > 0.05$ ), the relationship is positive. Thus, it can be argued that integration does have a positive impact on performance, but the strength of the relationship is not so strong. The information gathered from the interviews suggests that the managers believe that integration is the backbone of every organisation.

Overall, this study also shows that the use of MAS information is still relevant in managing firms in the current economic situation. The information provided by MAS has been changed to cope with the changes in the environment. In adjusting to the increasing competition and advanced technological environment, manufacturing firms in Malaysia use broader scope information that focuses more on external, non-financial and future oriented information; emphasis on timely reporting; and concern with integrated and aggregated information in making managerial decisions. The review of recent literature on MAS shows that the research on the role of MAS remains significant and continues to attract scholars attention (e.g.: Ahrens and Chapman, 2007; Fay, Malmi and Brown, 2008; Mia and Winata, 2008; Patiar and Mia, 2008; Introna and

Puyou, 2010; Williams and Seaman, 2010; Weißenberger and Angelkort, 2011; Hoque, 2011) in various ways.

## **6.2 Implications of the Study**

In this section, implications of the current study to both theory and practice are discussed.

### **6.2.1 Theoretical Implications**

The current study has several theoretical implications. First, the significant relationships between market competition and IMP found in this study indicate the importance of market competition as a contingent variable. Thus far, research on market competition is still scarce compared to other environmental contingent variables such as PEU. As such, this study could contribute to the literature on market competition.

Similarly, numerous studies (e.g.: Jaikumar, 1986; Swamidass and Newell, 1987; and Parthasarthy and Sethi, 1992) examined the link between manufacturing strategy and practices. However, with the exception of Dansky and Brannon (1996), Kotha and Swamidass (2000), and Prajogo and Sohal (2006), studies examining the link between the business strategy and manufacturing practices are very limited. Therefore, the findings from this study could provide some insights into the relationship between the business strategy and manufacturing practices.



Second, studies that examine three manufacturing practices simultaneously or IMP are very limited. Thus far, only Dean and Snell (1991, 1996), and Snell and Dean (1992, 1994) who examined JIT, TQM and AMT simultaneously, whereas Flynn et al. (1995), Sriparavastu and Gupta (1997), and Sim and Killough (1998) examined the joint relationship between TQM practices and JIT practices. Furthermore, none of these studies examined the relationship between IMP and MAS. Hence, this study contributes significantly to the literature on the relationship between these three practices and MAS, especially in the Malaysian manufacturing environment.

Third, this study provides evidence of the importance of MAS information for the managers. The results from this study suggest that the relationship between the types of manufacturing practices adopted by the firms and performance could be improved through the use of MAS information. The results provide empirical evidence that support the contingency theory, which suggests that MAS are adopted in order to assist managers to achieve some desired company outcomes or goals. This also might explain why previous studies (e.g.: Balakrishnan et al., 1996; Dean and Snell, 1996; and Fullerton et al., 2003) failed to find a significant positive relationship between manufacturing practices and performance.

Finally, this study also provides theoretical implications since it combines various disciplines. For example, IMP falls into production and operational management, whereas MAS represents the accounting discipline. In addition, the business strategy could also be classified under the strategic management discipline. By combining several disciplines into a theoretical model, it would contribute significantly to the literature. As asserted by Sousa and Voss (2008, p. 698), many operational management problems have a cross-disciplinary nature. Thus, by conducting interdisciplinary

research, operational management problems could be viewed from another angle and might provide a solution to some of them.

### **6.2.2 Practical Implications**

This study could contribute to the practice in a number of ways. First, the results of the study show that in a competitive market environment, manufacturing firms adopt IMP as a strategy to gain competitive advantage. Therefore, it will provide an indication of the type of manufacturing practices that are more suitable under this environment. Similarly, the business strategy adopted by firms could also influence the use of certain manufacturing practices. In this study, it shows that the prospector strategy, which focuses on innovation and flexibility, is more related to the use of IMP. Thus, it could provide an insight into the type of strategy that is more suitable for the use of IMP.

Second, this study portrays the relationship between IMP and performance. It suggests that JIT and TQM are positively related to performance while the relationship between AMT and performance is insignificant. Therefore, due to the capabilities of JIT and TQM, manufacturing firms could consider implementing these two practices since they could effectively enhance organisational performance. In addition, the results of the study also highlight several important aspects that should be considered before implementing AMT. A proper feasibility study and thorough financial planning including potential accounting treatment should be conducted prior to AMT implementation to overcome or minimise the negative impact of AMT implementation on financial performance.

Finally, manufacturing firms that adopt IMP could use information provided by MAS as suggested in the current study since it will lead to an improvement in performance, both financial and non-financial. MAS information might be available in every organisation but if it is not used it would not have any impact on the organisation. Managers might not be aware of the impact of this information in improving firm performance. Therefore, this study could shed valuable insights into the role of MAS information in enhancing firm performance.

### **6.3 Limitations of the Study and Suggestions for Future Research**

This study has several limitations that should be noted, and suggestions for future research that could be conducted by other researchers are presented. First, the sample was only drawn from manufacturing firms operating in Malaysia. The nature of competition, the strategy adopted, the implementation of JIT and TQM, and the use of MAS information may be different in other industries such as service industries or public sector organisations. Therefore, the findings from this study cannot be generalised to other industries. Future studies could extend this research for other industries and countries.

Second, since this study used the business unit as the unit of analysis, only one respondent was selected from each firm. The responses given by him/her might be biased and not represent the actual scenario. Furthermore, the respondents hold different positions such as Production Manager, Accountant, Financial Controller, Engineers and other managers. Therefore, their nature of work and responsibilities were different.

Consequently, their perceptions of market competition, strategy, IMP, MAS and performance might also be different.

Third, the small sample size and low response rate of 11% received in the survey might affect the results of the study. The findings might be different if a larger sample was obtained. Even though it is common for surveys to have a low response rate, future studies should try to obtain a higher response rate for more meaningful results.

Fourth, this study only examined the impact of two contextual factors on IMP implementation. Future research may examine other potential factors that may influence IMP implementation, for example, culture and size.

Fifth, IMP might be defined differently. In this study, IMP is defined as including three practices: JIT, TQM and AMT, which is similar to the study of Snell and Dean (1992). Future research may use different types of practice as IMP. Moreover, there are also other measures for JIT, TQM and AMT that were not used in the current study. For example, *kaizen* and *kanban* systems could be included as measures for JIT. Similarly, other factors may affect market competition and performance. For example, factors such as customer demand and preferences may affect market competition and balanced scorecard measures could be used as performance indicators.

Sixth, the insignificant and negative relationships between AMT and performance could be due to timing effect of AMT implementation. Future research should consider the timing effect of AMT implementation to examine its relationship with firm performance. In this regard, a longitudinal study would be needed to overcome this limitation and could produce interesting findings.

Seventh, the scales employed in this study were based on individuals' perceptions. Therefore, they may not reflect objective reality. Future studies could replicate the current study by utilising different methodologies such as case studies. In addition, the use of cross sectional data in the current study might be biased and not represent the actual situations. Thus, adopting a longitudinal approach might produce more meaningful results.