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RELATIONSHIPS AMONG ADVANCED MANUFACTURING TECHNOLOGY, MANAGEMENT ACCOUNTING SYSTEMS AND PERFORMANCE

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ABSTRACT

In this globalisation era, the business environment has changed tremendously. The complexity and competitiveness in the market place require appropriate business strategy and modifications in the way an organisation operates. In manufacturing environment, adopting more advance manufacturing techniques probably could help firms to remain competitive and achieve the desired outcome. It is also argued that traditional management accounting practices are no longer relevant to the new business environment. The information provided by the management accounting systems (MAS) is also claimed to be obsolete and unable to help firms to compete in the condition of intense competition. Thus, should be modified to suit the changing information needs of managers in advanced manufacturing environment.

This study examines the role of MAS information in the relationship between Advanced Manufacturing Technology (AMT) and performance. Data were gathered from questionnaire survey on manufacturing firms listed in the Federation of Malaysian Manufacturers (FMM) Directory 2009. The results of the study reveal that the relationship between AMT and performance is indirect through MAS. This provides evidence that the use of MAS information in advanced manufacturing environment facilitates firms in improving organisational performance.

Keywords:
Advanced manufacturing technology, management accounting systems, performance
1.0 Introduction

Johnson and Kaplan (1987) argued that management accounting system (MAS) practices are no longer relevant in the new business environment. The business environment is now becoming more complex and competitive due to rapidly changing technologies and increasing number of rivals striving to achieve competitive advantage. Therefore, to remain competitive, the management accounting system practices by organisation should be changed in line with the changes in the environments in which the organisation operates.

The obsolescence and ineffectiveness of the conventional management accounting in advanced manufacturing environments have also attracted many academia attentions (i.e.: Johnson and Kaplan, 1987; Hiromoto, 1991; Sillince and Sykes, 1995; Davila and Wouters, 2007). But yet, research on the use of MAS with advanced technology is rather scarce. Therefore, there is a need to examine the use of MAS information in advanced manufacturing technology implementation. Furthermore, the review of literature indicates that there has been no published research examining the use of MAS information in Advanced Manufacturing Technology (AMT) environment.

AMT is one of the integrated manufacturing practices adopted by firms to reduce costs, improve quality, and faster manufacturing processes, in order to ensure continuous improvements. Firms adopt AMT as one of the strategies to remain competitive. However, the ability of this technique in helping firms to improve performance is not conclusive. As such, further investigation on the ability of AMT to improve performance is warranted.
Furthermore, due to recent economic crisis affecting businesses worldwide, firms are experiencing a decline in organisational performance. Various measures are being used by firms to alleviate their performance, including continually improve production process, but many still find difficulties to sustain their market positions. In advanced manufacturing environment, scholars have argued that the use of relevant MAS information may help the organisations to achieve their performance target, which subsequently will improve the organisation’s performance as a whole. For example, Mia and Clarke (1999) showed that the use of MAS information in the condition of intensified market competition has led to improvement in both financial and non-financial performance. Mia (2000) also found that MAS information links to higher financial performance in JIT firms. It is thus, necessary to extend these research by examining the use of MAS in improving organisational performance in different setting. The results of this study will assist us in determining whether AMT is useful to improve performance, with the use of MAS information as a mediating variable. The review of literature reveals that there has been no published study examining these relationships whether in Malaysia or other countries.

Based on the above discussion, the objectives of this study are:

.1 To examine the relationship between AMT and business unit performance.
.2 To examine the relationship between AMT and MAS.
.3 To examine the relationship between MAS and business unit performance.
.4 To examine whether MAS mediate the relationship between AMT and business unit performance.
The remainder of this paper is organised in the following manner. Section 2 provides the development of the theoretical framework and presents the research hypotheses. Section 3 discusses on the methodology used in the study. Section 4 provides a discussion on the results of the data analysis. Finally, discussion, limitations and conclusions are presented in Section 5.

2.0 Theoretical Framework and Hypotheses Development

According to Otley (1980), the contingency approach to management accounting is based on the premise that there is no universally appropriate accounting system that applies equally to all organisations in all circumstances. It is therefore suggested that particular features of an appropriate accounting system will depend upon the specific circumstances of an organisation. A contingency theory must identify specific aspects of an accounting system with certain defined circumstances and demonstrate an appropriate matching. The effectiveness of the design of an accounting system depends on its ability to adapt to changes in external circumstances and internal factors.

The review of the literature on contingency theory shows that this theory originated from theorists such as Burns and Stalker (1961), Thompson (1967), Lawrence and Lorch (1967), Perrow (1970), and Gobraith (1973). The early works on this theory examined the impact of environment and technology on organisational structure. Since then, the contingency theory has been applied and widely used in management and accounting research. More recently, the impact of new contextual factors such as contemporary technology and strategy are examined. Chenhall (2003) provided a comprehensive review of the
Contingency theory states that efficient organisation structures vary with organisational contextual factors such as technology and environment. It is further implied that the efficacy of certain managerial techniques is contingent on the organisation’s context and structure (Waterhouse and Tiessen, 1978; 1983). In today’s competitive environment, the manufacturing processes become more complex which require more sophisticated and advanced technologies. Contemporary technologies such as JIT, TQM, and flexible manufacturing (FM) become the new contextual factors of technology (Chenhall, 2003). In this study, it is expected that the implementation of AMT would change the way managers use of MAS information. They would require the information which is more broadly-based in order to suit into the new advanced manufacturing environment. The contingency-based approach assumes that MAS are adopted in order to assist managers in achieving some desired company outcomes or goals. The ultimate outcome of all organisations is to achieve the highest performance level as possible. To materialise this, each organisation would set its own performance target based on the resources available and its capabilities. As such, the contingency theory is relevant in discussing the relationships among AMT implementation, broad scope MAS and performance. Thus, this study’s research framework is developed based on the contingency theory framework.

Figure 1 shows the research framework of this study. It is proposed that the implementation of AMT influences managers’ use of broad scope MAS information to improve performance. As asserted by Haldma and Laats (2002), contingency-based research
postulates the existing link between context, the use of the MAS and consequently improved performance.

2.1 Advanced Manufacturing Technology and Performance

The forces of globalisation and the advancement in technologies have transformed businesses into a rapidly changing and dynamic business environment. As for manufacturing firms, the rapid technological change gives major impact on their cost structures, processes and controls. Manufacturing firms need to revise their techniques to be able to compete with their rivals. One of such techniques is the adoption of advanced manufacturing practices. Firms adopt advanced manufacturing practices such as AMT as part of the strategies to improve performance. AMT is a modern manufacturing technique encompassing the use of computer to integrate manufacturing processes. AMT may improve performance due to its ability to produce products in large quantity with speedier manufacturing processes. However, past studies examining the relationship between AMT and performance showed mixed results. For example, Jaikumar (1986) and Kotha and Swamidass (2000) showed that AMT is related to performance, but Dean and Snell (1996)
found otherwise. In view of the mixed findings, there is a need to examine the relationship between AMT and performance. It is expected that AMT has a positive impact on performance. The following hypothesis ensues:

\[ H1: \text{There is a positive relationship between AMT implementation and performance.} \]

2.2 Advanced Manufacturing Technology and MAS Information

The inconclusive results for the direct relationship between AMT and performance could be due to several reasons. One of the possible explanations is managers’ use of information provided by MAS may mediate this relationship. MAS information refers to the information provided by management accounting system in an organisation (Chenhall and Morris, 1986). For the past few decades, the use of MAS in an organisation is very limited. The MAS has been traditionally viewed as having a narrow scope because it is expected to provide information only on financial, historical and internal information (Chenhall and Morris, 1986; Mia, 1993). However, the MAS has been changing to adapt to the new environment which is more competitive.

The work of Chenhall and Morris (1986) can be considered as the most prominent study in this area. While a traditional MAS focuses on internal information within the organisation, financial information and information that is based on historical data, the new MAS provides a broader scope concentrating on external, non-financial and future-oriented information. This transformation is necessary to overcome the claims made by Johnson and Kaplan (1987), among others, that MAS information is obsolete and should be changed in
order to adapt to a new business environment. The adoption of advanced manufacturing practices such as AMT would require the use of MAS information that could facilitate their implementation.

Mia and Clarke (1999) addressed the gap that managerial use of MAS should be examined in other circumstances including the application and evaluation of new manufacturing technology such as CAD/CAM and JIT manufacturing systems. The use of the information provided by the MAS may assist managers to adopt and implement manufacturing practices more efficient and effectively. Application of new manufacturing technology is expected to change the way managers use MAS. The findings of Isa and Foong (2005) imply that AMT adoption requires changes in the operations of the organisations in terms of cost structures and information needs of managers. They found that firms with high level of AMT adoption have extensively used the new costing method such as Activity Based Costing (ABC), with a mixture of the traditional costing systems, such as standard and process costing systems. AMT firms were also found to put greater emphasis on non-financial measures of performance and innovative management reports such as suppliers’ performance report and benchmarking report. Similarly, broad scope MAS is expected to be useful to managers in advanced manufacturing environments. Recently, Mia and Winata (2008) found that JIT is positively associated with the use of broad scope information. However, to date, no published study has investigated use of MAS in AMT environment. Hence, the current study attempts to fill the gap by testing the following hypothesis:
H2: There is a positive relationship between AMT implementation and managers’ use of broad scope MAS information.

2.3 MAS Information and Performance

MAS information is expected to help organisations to survive in competitive environment by providing useful information for planning, controlling, monitoring and making decision. These information will then be used to improve organisational performance. As asserted by Mia (1993), the use of MAS information by managers can assist them in making more accurate decision, which will lead to improvement in performance. Sim and Killough (1998) suggest that the performance of firms adopting JIT or TQM is higher if they use information provided by MAS. Mia (2000) also found that higher performance is achieved by JIT firms that have greater MAS information compared to non-JIT firms. Realising the usefulness of MAS information, the current study also postulates the positive relationship between managerial use of MAS and performance. Hence, the following hypothesis follows:

H3: There is a positive relationship between broad scope MAS and performance.

2.4 Advanced Manufacturing Technology, MAS Information and Performance

Hypotheses two and three postulate that managerial use of broad scope MAS information plays a mediating role in the relationship between the AMT and performance. A mediating or an intervening relationship exists when the relationship between independent and dependent variables exists at least partly through a third variable. In that case, the third
variable plays the mediating role in the relationship between the other two variables (Mia, 1993; Mia and Clarke, 1999). Therefore, if hypotheses two and three are supported, then, managerial use of broad scope MAS information plays a mediating role in the relationship between AMT and performance (see Figure 1).

3.0  Research Method

3.1  Data Collection

The population of interest is all manufacturing firms operating in Malaysia. The manufacturing sector was chosen because AMT is mainly applicable for manufacturing firms. The sample of firms was selected from manufacturing firms listed in the Federation of Malaysian Manufacturers (FMM) Directory year 2009. There are over 2000 firms registered as a member of FMM which come from various sectors and located all over Malaysia. The sample consisted of 1000 manufacturing firms randomly selected from the FMM Directory.

Questionnaire survey technique was used as data collection method for this study. Questionnaires were either distributed through email or postal mail to respondents. The questionnaires were sent either to General Manager, Financial Controller, Production Manager, Factory Manager, Operation Manager or other top managers. They were chosen due to their experience in AMT implementation, their use of MAS as well as responsibility for the company performance. After omitting unusable responses, a final sample consisted of 110 responses or 11% of the total sample.
3.2 The Measures

3.2.1 Advanced Manufacturing Technology

AMT comprised a 23-item scale measuring the extent to which an organisation implements and integrates computer technologies in its manufacturing processes. Out of 23 items, 18 items were adopted from Snell and Dean (1992) and the remaining 5 items were adopted from Koc and Bozdag (2009). The items that were adopted from Dean and Snell (1991) were: manufacturing resource planning (MRPII), computer-aided design (CAD), numerical control (NC), computer numerical control (CNC), direct numerical control (DNC), flexible manufacturing systems (FMS), robotics, automated materials handling, computer-aided test and inspection, computer-aided process planning, product design-product planning, product planning-component manufacturing, component manufacturing-assembly, assembly-production scheduling, production scheduling-maintenance, maintenance-materials handling, materials handling-quality control, and quality control-materials management. The items that were adopted from Koc and Bozdag (2009) were: computer-aided manufacturing (CAM), automated packaging, automated storage, local area network (LAN), and wide area network (WAN).

The AMT implementation consisted of two parts: the implementation of AMT technologies and the integration of computer technologies. The level of implementation of AMT technologies was measured on a scale of N/A (If the technology is not applicable for your operation), 1 (Not used at all) to 5 (Extensively used) and the level of integration of computer technologies was measured on a scale of N/A (Not applicable), 1 (Not computer integrated at all) to 5 (Completely computed integrated).
3.2.2 Broad Scope MAS Information

This study utilised one of the four perceived usefulness of MAS information introduced by Chenhall and Morris (1986), i.e.: broad scope, in measuring the extent of MAS information is being used by manufacturing firms in Malaysia. There were five questions that were related to the characteristic of broad scope MAS information: external information, non-economic information, future oriented, non-financial information for production and market, and probabilistic. This type of information ranged from narrow scope at one end to broad scope at the other. Narrow scope information is normally associated with financial, historical and internal information. Traditional MAS is viewed to have narrow scope information characteristics. In contrast, broad scope information focuses on non-financial, future oriented and external information. The scope of MAS information was measured on a five-point likert scale, ranged from “not used at all” to “extensively used”.

3.2.3 Business Unit Performance

This study used business unit performance similar to Mia and Clarke’s (1999) study. The business unit performance measures the extent to which the unit is successful in achieving its planned targets. This is done by comparing previous years’ actual performance with target performance. There were nine dimensions of performance: productivity, costs, quality, delivery, service, sales volume, market share, profitability and overall performance. The dimensions comprise of both financial and non-financial measures of performance. The managers were required to indicate their perceived business unit
performance on a five-point likert scale where 1 represents “poor performance” and 5 represents “excellent performance”.

3.4 Data Analysis Technique

The data were analysed using Partial Least Square (PLS), which is a type of Structural Equation Modelling (SEM). One of the advantages of SEM is that it can examine multiple relationships simultaneously in one model at the same time (Hair et al., 1998). This study used SmartPLS software as a method for data analysis.

4.0 The Results

4.1 Validity and Reliability

Prior to testing the hypotheses, the adequacy of measurement model is assessed by examining convergent validity, discriminant validity and reliability. Convergent validity assesses the degree to which two measures of the similar concept are correlated, whereas discriminant validity refers to the degree to which two conceptually similar concepts are distinct (Hair et al., 1998). There are two ways to assess convergent validity in PLS: (1) factor loading for each indicator should exceed 0.50; and (2) the value of average variance extracted (AVE) for each construct should be at least 0.50 (Fornell and Larcker, 1981).

Discriminant validity can also be assessed using two ways: (1) cross-loadings, where the loading for each indicator should be higher than all of its cross-loadings; and (2) The Fornell – Larcker criterion (Fornell and Larcker, 1981), where the value of AVE for each construct should be higher than its highest squared correlation with any other construct.
Table 1 shows the loadings and cross loadings for all indicators. The shaded area consists of loadings for all indicators in each construct. Two items that were deleted from AMT constructs due to low loadings were AMT2 (computer aided design/CAD) and AMT14 (local area network/LAN). No item was deleted from scope and performance constructs since the loadings were higher than 0.50. All items were found to load higher on their own block (construct) than on other blocks (constructs). This implies that the construct component score predicts each indicator in its block better than indicators in other blocks, thus, fulfills the first criteria of discriminant validity.
Table 1: Loadings and Cross Loadings

<table>
<thead>
<tr>
<th>Items</th>
<th>AMT</th>
<th>Financial Performance</th>
<th>Non financial Performance</th>
<th>Scope</th>
</tr>
</thead>
<tbody>
<tr>
<td>AMT1</td>
<td>0.589910</td>
<td>0.256736</td>
<td>0.286149</td>
<td>0.338458</td>
</tr>
<tr>
<td>AMT2</td>
<td>0.444922</td>
<td>-0.03995</td>
<td>0.110668</td>
<td>0.053654</td>
</tr>
<tr>
<td>AMT3</td>
<td>0.563910</td>
<td>0.200670</td>
<td>0.245027</td>
<td>0.371787</td>
</tr>
<tr>
<td>AMT4</td>
<td>0.551146</td>
<td>-0.01090</td>
<td>0.074763</td>
<td>0.101488</td>
</tr>
<tr>
<td>AMT5</td>
<td>0.578940</td>
<td>0.035078</td>
<td>0.016013</td>
<td>0.095834</td>
</tr>
<tr>
<td>AMT6</td>
<td>0.500159</td>
<td>0.0113299</td>
<td>0.012195</td>
<td>0.025947</td>
</tr>
<tr>
<td>AMT7</td>
<td>0.527909</td>
<td>0.120504</td>
<td>0.185747</td>
<td>0.148926</td>
</tr>
<tr>
<td>AMT8</td>
<td>0.549535</td>
<td>0.165508</td>
<td>0.103777</td>
<td>0.187357</td>
</tr>
<tr>
<td>AMT9</td>
<td>0.608762</td>
<td>0.231201</td>
<td>0.165469</td>
<td>0.293318</td>
</tr>
<tr>
<td>AMT10</td>
<td>0.611350</td>
<td>0.172511</td>
<td>0.129046</td>
<td>0.249316</td>
</tr>
<tr>
<td>AMT11</td>
<td>0.565189</td>
<td>0.152848</td>
<td>0.135507</td>
<td>0.149167</td>
</tr>
<tr>
<td>AMT12</td>
<td>0.662136</td>
<td>0.223791</td>
<td>0.207441</td>
<td>0.344097</td>
</tr>
<tr>
<td>AMT13</td>
<td>0.766032</td>
<td>0.306894</td>
<td>0.229885</td>
<td>0.356838</td>
</tr>
<tr>
<td>AMT14</td>
<td>0.338766</td>
<td>0.235960</td>
<td>0.179702</td>
<td>0.175251</td>
</tr>
<tr>
<td>AMT15</td>
<td>0.580703</td>
<td>0.341446</td>
<td>0.230411</td>
<td>0.273467</td>
</tr>
<tr>
<td>AMT16</td>
<td>0.621791</td>
<td>0.211000</td>
<td>0.269778</td>
<td>0.175545</td>
</tr>
<tr>
<td>AMT17</td>
<td>0.774106</td>
<td>0.167283</td>
<td>0.281764</td>
<td>0.244727</td>
</tr>
<tr>
<td>AMT18</td>
<td>0.765534</td>
<td>0.094813</td>
<td>0.220314</td>
<td>0.269736</td>
</tr>
<tr>
<td>AMT19</td>
<td>0.783523</td>
<td>0.141692</td>
<td>0.318609</td>
<td>0.300475</td>
</tr>
<tr>
<td>AMT20</td>
<td>0.782418</td>
<td>0.132401</td>
<td>0.262291</td>
<td>0.274809</td>
</tr>
<tr>
<td>AMT21</td>
<td>0.810532</td>
<td>0.292702</td>
<td>0.291646</td>
<td>0.433788</td>
</tr>
<tr>
<td>AMT22</td>
<td>0.791010</td>
<td>0.313566</td>
<td>0.338383</td>
<td>0.375018</td>
</tr>
<tr>
<td>AMT23</td>
<td>0.787720</td>
<td>0.220707</td>
<td>0.290681</td>
<td>0.297517</td>
</tr>
<tr>
<td>P2</td>
<td>0.310541</td>
<td>0.737264</td>
<td>0.558205</td>
<td>0.362811</td>
</tr>
<tr>
<td>P6</td>
<td>0.227867</td>
<td>0.873727</td>
<td>0.601147</td>
<td>0.414588</td>
</tr>
<tr>
<td>P7</td>
<td>0.126445</td>
<td>0.835471</td>
<td>0.411819</td>
<td>0.381630</td>
</tr>
<tr>
<td>P8</td>
<td>0.239467</td>
<td>0.829909</td>
<td>0.511968</td>
<td>0.423061</td>
</tr>
<tr>
<td>P1</td>
<td>0.281898</td>
<td>0.633935</td>
<td>0.847009</td>
<td>0.344078</td>
</tr>
<tr>
<td>P3</td>
<td>0.285528</td>
<td>0.543470</td>
<td>0.863589</td>
<td>0.337507</td>
</tr>
<tr>
<td>P4</td>
<td>0.269570</td>
<td>0.536291</td>
<td>0.870003</td>
<td>0.318825</td>
</tr>
<tr>
<td>P5</td>
<td>0.257116</td>
<td>0.434698</td>
<td>0.804180</td>
<td>0.299635</td>
</tr>
<tr>
<td>S1</td>
<td>0.331246</td>
<td>0.304904</td>
<td>0.199225</td>
<td>0.732139</td>
</tr>
<tr>
<td>S2</td>
<td>0.238860</td>
<td>0.356296</td>
<td>0.318009</td>
<td>0.647531</td>
</tr>
<tr>
<td>S3</td>
<td>0.359987</td>
<td>0.367253</td>
<td>0.305546</td>
<td>0.810811</td>
</tr>
<tr>
<td>S4</td>
<td>0.220007</td>
<td>0.449284</td>
<td>0.343840</td>
<td>0.855810</td>
</tr>
<tr>
<td>S5</td>
<td>0.351614</td>
<td>0.391612</td>
<td>0.323800</td>
<td>0.828229</td>
</tr>
</tbody>
</table>
Table 2 tabulates the results for composite reliability ($\rho_c$), AVEs and latent variable correlations. All shaded numbers on the leading diagonals in Table 2 are the AVEs while the off-diagonal elements are the latent variable correlations. The AVE value above 0.50 for all constructs satisfied the second test of convergent validity. To fulfil the second test of discriminant validity, the value of AVE for each construct should be higher than its highest squared correlation with any other construct. Since value of AVE for every construct was already higher than its correlations, therefore, discriminant validity is achieved.

Table 2: Composite Reliability, AVEs and Correlations

<table>
<thead>
<tr>
<th>Items</th>
<th>Composite Reliability</th>
<th>AMT</th>
<th>Performance</th>
<th>Scope</th>
</tr>
</thead>
<tbody>
<tr>
<td>AMT</td>
<td>0.900050</td>
<td>0.818269</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Performance</td>
<td>0.896337</td>
<td>0.319349</td>
<td>0.812187</td>
<td></td>
</tr>
<tr>
<td>Scope</td>
<td>0.881740</td>
<td>0.382928</td>
<td>0.485352</td>
<td>0.599930</td>
</tr>
</tbody>
</table>

Reliability assesses the degree of consistency of various measures. In PLS, this is done by using composite reliability, $\rho_c$ developed by Werts, Linn and Jöreskog (1974). The threshold for reliability is 0.70, where the value above 0.70 indicates high reliability and the value below 0.70 implies lack of reliability (Hair et al., 1998). As depicted in Table 2, the composite reliability for all constructs exceeded the threshold of 0.70. Therefore, all constructs were found to be reliable and valid.

4.2 Hypotheses Testing

The hypotheses developed in the study are then tested by examining path coefficients ($\beta$ estimates), path significances (p-values), and variance explained ($R^2$) for dependent variables. Figure 2 summarises the results of the PLS analysis, including the path
coefficients ($\beta$ estimates), path significances (p-values), and variance explained ($R^2$ values) for dependent variables.

Figure 2 shows that the relationship between AMT and performance (Perf) was positive but not significant ($\beta = 0.156$, $p > 0.05$). As such, hypothesis 1 is not supported. Both hypothesised paths from AMT to scope as well as from scope to performance were positive and significant at 1% significance level with $\beta$ equal to 0.383 and 0.425, respectively. Thus, hypothesis 2 and 3 are supported. AMT explained 14.7 percent of the variance in scope, whereas about 25 percent of the variance in performance was explained by AMT and scope.

To test the mediating effects of scope in the relationship between AMT and performance, similar procedures recommended by Baron and Kenney (1986) was used. Evidence for full mediation is present when the following conditions are met: A path from the independent

** Significant at p<0.01
variable (i.e., AMT) to the dependent variable (i.e., performance) is not significant but paths from the independent variable to the mediator (i.e., scope) and from the mediator to the dependent variable are significant (Wold, 1985). Partial mediation is present when all paths are significant. In this study, the results indicated that scope fully mediated the relationship of AMT with performance.

5.0 Discussion, Limitations and Conclusions

The advancement in technologies has forced manufacturing firms to adopt advanced manufacturing techniques to gain competitive advantages. The adoption of these techniques would affect the information needs of managers. Review of literature suggests that the information needs of managers in advanced manufacturing environment would be different. In this study, it is found that the use of advanced manufacturing technology would affect the use of information by managers, which will subsequently affect organisational performance. In other words, the implementation of AMT demands greater use of MAS information. This finding is similar to Mia and Winata (2008), in which they found that JIT application used broad scope MAS information. Isa and Foong (2005) also demonstrated that the adoption of AMT requires changes in cost structures and information needs of managers.

In this study, the scope of information, which is provided by management accounting systems, plays an important role in improving organisational performance in AMT environments. The broader the scope of MAS information, the better the organisation could achieve its performance targets. It means that if managers use more non-financial, external
and future oriented information that are provided by MAS, the higher the chances of meeting their performance targets. For example, external information on economic conditions and possibility of certain event occurs could help managers to find ways to achieve the desire performance targets.

Overall, the results suggest that the relationship between AMT and performance is indirect, via management accounting systems, rather than direct. Possible explanation could be the high investment costs incurred to implement AMT outweigh the benefits of its implementation. This finding is similar to Dean and Snell’s (1996) study that AMT did not have significant relationship with performance.

There are several limitations to the study that need to be highlighted. First, the sample was drawn only from manufacturing firms operating in Malaysia. The implementation of AMT and the use of MAS information may be different in other countries. Therefore, the findings from this study cannot be generalised to other countries. Future studies could extend this research for other countries.

Second, 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 larger sample is obtained. Even though it is common for the survey to get low response rate, future study should try to obtain higher response rate for more meaningful results.

Third, 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 bias and not represent the actual situations. Thus, adopting a longitudinal approach might produce more meaningful results.

Apart from these limitations, this study provides evidence for the relevancy of the management accounting systems in advanced manufacturing environment. Consequently, the claims made by previous researchers (Johnson and Kaplan, 1987; Hiromoto, 1991; Silence and Sykes, 1995; among others) that MAS were obsolete and ineffective are not true in Malaysian manufacturing firms. MAS are still relevant since its usage can help the firms to achieve their performance targets.
Bibliography


