The Effect of Activity-Based Costing on Firms Performance, A Study Among Chinese Manufacturing Firms

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Abstract: Problem statement: Assessing the effect of ABC success implementation on the firms’ performance is considered as an important research topic. Previous empirical studies provide the evidence that the implementation of ABC could improve firms both financial performance and non-financial performance. However, the researches on the relationship between ABC implementation and firms’ performance are relatively few, especially in Chinese context. Due to the limitation of financial performance, this study investigates the role of Activity-Based Costing (ABC) in predicting the improvements in firms’ performance, namely, manufacturing performance and business performance among manufacturing firms in China. Approach: Survey questionnaire was delivered to Chief Financial Officers (CFO), Financial Control of 1000 manufacturing firms listed on Chinese Chamber of Commerce and Industry 2008 directory. There were 106 usable responses representing 10.6% of response rate. This study hypothesized that ABC success implementation could result in firms manufacturing performance, as well as business performance. Factor analysis was applied to reduce data, and regression was used to test research hypothesis. Results: The findings of this research showed that respondents generally achieved a moderate level of success of ABC implementation. The success of ABC implementation leads to the decrease in manufacturing cycle time. In addition, ABC success implementation was found to be impact the attainment of target to costs, productivity, quality, profit, sales, as well as service. However, this research failed to find a significant association between ABC success implementation and attainment of target to market share. ABC success implementation could results in the improvement in manufacturing performance and business performance.

Key words: Activity-Based Costing (ABC), Manufacturing performance, Business performance

INTRODUCTION

Nowadays, competition is a key factor for any firms to survive in this competitive environment. However, a number of firms lost their competitive advantages due to poor service, low quality or high costs (Carolfi, 1996). Activity-Based Costing (ABC) was introduced by Cooper and Kaplan (1988) as the alternative method for traditional volume based costing system. Previous studies reported that ABC implementation could provide both strategic and operational benefits to ABC adopters (Shields, 1995; Kennedy & Affleck-Graves, 2001; Ittner et al., 2002; Narayanan & Sarkar, 2002; Majid et al., 2008).

Researchers also believe that ABC implementation could improve the firms’ performance. Previous, studies were conducted to investigate the association between ABC and the firms’ financial performance. Kennedy and Affleck-Graves (2001) conducted a survey by mail to examine the relationship between ABC adoption and firms’ financial performance in terms of firms’ value and stock price. In their study, they randomly selected firms listed on the London Stock Exchange (LSE) and separated the respondents into ABC adopters and non-adopters. The findings showed that ABC produces a significant impact on the shareholders’ value. However, they also concluded after further analysis that ABC impacts firms’ value indirectly, and ABC could only increase firms’ value by better cost control, asset utilization, as well as greater application of financial leverage. They also concluded that there is no causal association between ABC adoption and shareholders’ value. Another study by Cagwin (2002) examined the association between ABC adoption and the firms’ financial performance. In Cagwin’s (2002) research, the measure for financial performance was Return on Investment (ROI). The result also showed an indirect rather than direct relationship between ABC success and ROI, and ROI could be improved by linking ABC to other initiatives, such as Just in time (JIT) and Total quality control.
(TQC). Using financial measures, such as ROI or firms’ value to examine the association between ABC success and the firms’ performance has limitations as ROI or firms’ value is affected by a number of factors, such as information technology sophistication, importance of cost, complexity, level of intra-company transactions, unused capacity and competition (Gagwin, 2002). Thus, it is extremely hard to confirm how much of the improvement in firms’ performance are contributed by the ABC success. Kennedy and Affleck-Graves (2001) highlighted that many factors that may drive the firms’ performance in terms of stock price performance and shareholder value. Thus, improvements in firms performance maybe attributed by other variables rather than ABC only. Shields (2000) also expressed the same view that the effect of ABC system on the firms’ performance maybe indirect and mediated by other variables.

In view of the limitations of financial performance measures, this study examines the effect of ABC success implementation on perceived performance, such as manufacturing and business performance. In this research, the manufacturing performance was made up of a reduction in manufacturing cost, a decrease in manufacturing cycle time and customer lead time, as well as on improvement in quality, especially the first yield pass quality. Banker et al. (2008) stated that however, few studies have been done on the effect of ABC implementation on the firms’ performance. Up to date, only two studies by Ittner et al. (2002) and Banker et al. (2008) examined the association between ABC implementation and manufacturing performance. Thus, more studies should be done to investigate on the association between ABC success implementation on the firm’s manufacturing performance.

However, in addition to manufacturing performance, Mia and Clarke (1999) argued business performance should also be taken into consideration in assessing firm performance. Mia and Clarke (1999) highlighted that the measure for performance includes both the quantitative and the qualitative perspectives, and also both financially and non-financially. Moreover, Mia and Clarke (1999) found a significant relationship between usefulness of management accounting and control system (MACS) and business performance among Australian business units. They also concluded that the use of MACS information could result in the improvement in business performance. ABC is considered as the one of the most important management accounting innovations, and the application of ABC could provide managers with more accurate costing information, which could assist managers in identifying non-value added activities and improving the quality of products. It is believed that success of ABC implementation could eventually result in the enhancement in business performance. In addition, no prior empirical studies have investigated the relationship between the ABC success implementation and the firm’s performance from both manufacturing and business performance perspectives. Therefore, the objectives of this paper are to examine the relationship between ABC success implementation and 1) the firms’ manufacturing performance, and also 2) the business performance.

The remainder of this paper is organized as follows: In the section 2, the development of theoretical framework which describes the relationship under examination is presented. The descriptions of research sample and measures for the main research variables are provided in section 3. Section 4 shows the descriptive statistics and results of the data analysis. Finally, conclusions and discussions are highlighted in section 5.

Research Framework and Hypothesis Development:

2.1 Research Framework:

Based on the discussions in previous section about the relationship between ABC success implementation, manufacturing performance, and business performance, this research extends the study by Ittner et al. (2002) by examining the relationship between ABC success and both performance measures, the manufacturing as well as the business performance. Two research frameworks for this study are proposed. One is related to the relationship between ABC success implementation and manufacturing performance. The dependent variable (DV) is the firms’ manufacturing performance, and the independent variable (IDV) is ABC success implementation. The following is the regression equation related to the above model.

\[ Y_1 = b_0 + b_1X + e \]

Where \( Y_1 \) = manufacturing performance; \( X \) = ABC success implementation

The second framework aims to examine the relationship between ABC success implementation and business performance. For this framework, the dependent variable (DV) was business performance, while, the independent variable (IDV) was ABC success implementation. The regression equation is proposed as follows:

\[ Y_2 = b_0 + b_1X + e \]

Where \( Y_2 \) = business performance; \( X \) = ABC success implementation
2.2 Underlying Theory and Hypothesis Development:

The framework for this research is developed based on the contingency theory which asserts that the firms’ performance could be enhanced if the management control system is well designed (Anderson & Lanen, 1999). It has been argued that the appropriate control systems for a firm are contingent upon the contextual environment within which the firm exists which in turn will influence the performance of the firm (Mia and Clarke, 1999). Thus, factors such as competition, culture, technological advancement and uncertainty will influence the types of control systems appropriate for firms.

So far, the empirical studies on ABC are mostly done in the western context and the findings of these studies provide limited evidence on the relationship between ABC implementation and performance. Since China represents an Asian culture which is distinctly different from the western culture (Hofstede, 1984), it may be possible that the level of ABC success and its relationship with performance among the Chinese firms might be different from those of the western firms. This study attempts to investigate the impact of ABC success on the firms’ performance, namely, manufacturing performance and business performance among manufacturing firms in China.

In this study, the measure used for manufacturing performance were a reduction in manufacturing cost, improvements in quality, especially first pass quality yield, as well as decreases in customer leading time and waiting time. On the other hand, the attainment of targets related to productivity, costs, quality, delivery, service, sales volume, market share, and profit were the components for business performance. The following hypotheses are as follows:

2.1.2 ABC Success and Manufacturing Performance:

Some manufacturing firms may lose its competitive advantage due to high quality costs, lower product quality, and long customer leading time, as well as manufacturing cycle time. ABC can be an effective tool to solve this problem and develop core competencies.

According to Carolfi (1996), through the application of ABC, activities that produce poor quality can be analyzed. Poor quality indicates that the costs of some aspects of processes should be reduced, and by using ABC, processes can be evaluated. Opportunities with greatest potential for improving quality, reducing cost and also efficiency and effectiveness of major activities or process, which could be used as the standard for continuous improvement, could also be identified. And Carolfi (1996) also stressed that information supplied by ABC could assist companies to adapt to the constantly changing business environment and build up competitive advantages.

Anderson and Young (1999) conducted a field research on two automobile manufacturing firms. Both firms were at the mature stage of ABC implementation and many branches adopting ABC. They found that the branches, which perceive ABC is successful, argued that the cost in plants can be assessed accurately, and ABC’s information impacts on plant performance significantly, in terms of reduction in manufacturing cycle time, customer leading time, and quality improvement.

Ittner et al. (2002) carried out a study to examine the connection between ABC implementation and manufacturing performance. They adopted cost, quality and time as the indicators for manufacturing performance. The results showed that ABC implementation led to higher quality and a reduction in manufacturing cycle time and lead time. Even though the results did not present a significant relationship between cost reduction and ABC implementation, but they also propose that cost reduction can be attained through the improvements in cycle time and quality.

The latest research on the relationship between ABC implementation and manufacturing performance was done by Banker et al. (2008). Their study aimed to investigate the effect of ABC on the use of world-class manufacturing (WCM) practices and manufacturing performance. In their research model, ABC adoption is the independent variable, WCM is the mediator, and plant performance is the dependent variable. They found that the firms, which adopted ABC system, are more likely to apply world-class manufacturing practices, and the firms, which adopt world-class manufacturing practices, have a higher level of product quality, shorter manufacturing cycle time and customer lead time, and lower manufacturing cost, exclude purchasing cost. Even though they did not find a direct relationship between ABC and manufacturing performance, they still found that the impact of ABC on manufacturing performance can be mediated by the application of world-class manufacturing practices.

Based on the discussions of prior research, this research attempts to examine the following hypothesis:

H1: There is a positive relationship between ABC success and manufacturing performance among Chinese manufacturing performance.
2.1.3 ABC Success and Business Performance:

Business performance in this study adopts Mia and Clarke’s (1999) definition, who viewed operational performance as the extent to which the organization has been successful in attaining its planned target or targets. Examples of performance criteria are: attainment of targets related to productivity, costs, quality, delivery, service, sales volume, market share, and profit.

Isa (2004) conducted a research among manufacturing firms in a Malaysian context to examine the relationship between MACS changes and business performance, and the measure for business unit performance were drawn from Mia and Clarke’s (1999) instrument. The findings indicate that there is a moderate positive relationship between the perceived business unit performance and MACS changes. It also concluded that management accounting and control system should be constantly updated to suit the dynamic business environment, and if MACS is out of date, it could not supply accurate feedback information to managers to make strategic decision, and the business unit performance would also be harmed, due to untimely and irrelevant feedback information.

However, until now, there is still a lack of literature about the relationship between ABC success and business performance, and ABC is considered as the new management accounting practice, and quality of relevant information needed by managers could be enhanced through ABC implementation. The implementation of ABC is believed to lead to an improvement in business performance. Thus, the hypothesis below formally represents the above discussion:

H2: There is positive relationship between ABC success and business performance among Chinese business performance.

Method:

3.1 Sample:

Survey questionnaires were used to collect data. This study required respondents to have a clear understanding of firms’ management accounting system. The Chief Financial Officers (CFO) and Financial Controllers were chosen as the respondents for this study as they are considered to have the relevant knowledge about ABC. However, some organizations do not have the positions of CFO or financial controllers, therefore, finance managers are responsible for designing the management accounting system of their firms. Hence, under these circumstances, the finance managers were also suitable for this study.

Samples were selected from the firms listed on Chinese Chamber of Commerce and Industry 2008 Directory. Previous studies concluded that the more products a firm manufactures, the more likely the firm may adopt ABC system (Bjornenak, 1997; Khalid, 2005). Hence, in this research, only firms that manufacture more than three products were chosen.

A total of 1000 questionnaires were mailed to the selected firms. Finally, 123 completed questionnaires were returned. However, 13 respondents stated that they neither adopt ABC nor implement any aspects of ABC. Therefore, they were excluded from the analysis. Furthermore, 4 questionnaires were incomplete, and were excluded from the data analysis. Finally a total of 106 completed questionnaires were used for data analysis which represents a usable response rate of 10.6%.

Chief financial officers accounted for the largest number of respondents, or 33% (35) of total respondents, followed by finance managers (27.4%), and financial controllers (25.5%). Only 15 (14.2%) of respondents chose others, which may include accounting supervisors, business analysts.

This paper adopted Williams and Seaman’s (2001) approach to check for response bias. Respondents were divided into two groups, namely early and late reply. The results of Independent Sample T-Test show no significant difference between the two groups. Thus, response bias did not emerge to be problematic.

3.2 Measure:

3.2.1 ABC Success:

This study adopts McGowan’s (1998) measure for ABC success. In McGowan’s (1998) research, he divided ABC success down into four perspectives, namely users’ attitude, technical characteristics rating, perceived usefulness in improving user job performance and impact on organizational process. Respondents were asked to state their overall attitude towards the four perspectives of ABC implementation on a five-point likert scale ranging from “1=strongly unfavorable” to 5= “strongly favorable”. McGowan’s instrument to measure ABC success was also adopted by the latest research that conducted by Byrne et al. (2009) to examine the degree of ABC success implementation among Australian business units. In the research, they adopted McGowan’s (1998) instruments to measure ABC success among Australian business units. Therefore, this study also employs McGowan’s (1998) instrument to measure the extent of ABC success among Chinese firms.
In this study, the technical characteristics are composed of five aspects: accuracy, accessibility timeliness, reliability and understandability. The respondents were asked to make a comparison between ABC information and the information produced by the previous traditional accounting systems on all these five technical characteristics using a scale of “1=strongly disagree” to 5=“strongly agree”.

Six statements were used in this study to measure the respondents’ perception about usefulness in improving job performance. These statements include various measures for the improvement in job performance, such as quality of job, effectiveness of job, and overall job performance. Respondents needed to rate their view on the improvement in their job performances by the application of ABC information by using a five-point likert scale anchored 1=“strongly disagree to 5=“strongly agree”.

Quality decisions, efficiency, waste reduction, innovation, relationships across functions, communications across functions, and the overall focus on the goal of the entity were employed to measure the impact on process. Respondents were required to rate their perception about the impact that ABC implementation has had on the five dimension of organizational process by choosing a survey item ranging from 1=“strongly disagree” to 5=“strongly agree”.

3.2.2 Manufacturing Performance:

Quality, time and cost were used to measure the enhancements in manufacturing performance. These measures were derived from Ittner et al. (2002), who used all these measures to examine the association between Activity-Based Costing and manufacturing performance among US manufacturing plants. These instruments and measures were subsequently used by Banker et al. (2008) to examine the effect of ABC on manufacturing performance. This study also adopted Quality, time and cost to examine the association between ABC success and manufacturing performance among Chinese manufacturing firms.

The measures used for manufacturing performance are made up of four statements. They are related to improvement in finished product first pass quality, decrease in manufacturing cycle time and customer lead time, as well as reduction in manufacturing cost. Respondents were requested to indicate their perceptions on the statements using a scale “1=strongly disagree” to “5=strongly agree”.

3.2.3 Business Performance:

In the current research, the measures for business performance also adapted from Mia and Clark’s (1999) work with the purpose of testing whether ABC success implementation could lead to the improvement in business performance. Respondents were requested to rate their perceived performance of their own firms on a five-point Likert scale of 1 (very poor performance) to 5 (very excellent performance) after ABC application. High (low) score means high (low) level of attainment against the planned performance. It is believed that the measure for business unit performance comprise all aspects of performance, both quantitative and qualitative, both financial and non-financial (Mia & Clarke, 1999).

Mia and Clark’s instrument was employed by Isa (2004) to examine the effect the management accounting system changes on business performance among Malaysian manufacturing firms.

RESULTS AND DISCUSSION

4.1 Factor Analysis:

The primary objective of factor analysis is to reduce research data and recap essential information included in the variables (Hair et al., 2006). Factor analysis is commonly employed by researchers as an exploratory approach to extract the structure of a set of research variable (Coakes & Steed, 2003). This research applied principle components analysis (PCA) to conduct factor analysis. PCA is recommended by a number of researchers as the most appropriate approach to conduct factor analysis as the most suitable method used for the summarising of a large number of data (Coakes and Steed, 2003). Malhotra (2006, p. 564) argued that “principal components analysis is recommended when the primary concern is to determine the minimum number of factors that will account for maximum variance in the data for use in subsequent multivariate analysis”. Hair et al. (2006) stated that if a factor loading greater than 0.30 is considered to meet the minimum level, loading of 0.4 is considered more important, and if the loading is 0.5 or greater, it is considered as practically significant. Hair et al. (2006) further argued that the larger the size of the factor loading, the more important the loading in explaining the factor matrix. Therefore, in this study, the items with a factor loading of less than 0.5 were removed.

This research conducted factor analysis for the firms’ performance. However, factor analysis was not conducted for ABC success implementation as this study focuses on the overall ABC success, which is
represented by the overall average of the measure, instead of the individual dimensions of ABC success. Table 1 summarized the results of factor analysis for performance. The results imply that Bartlett’s test of Sphericity is significant and KMO measure is adequate. Therefore the appropriateness of factor analysis could be confirmed.

The two components together could explain 60.72% of total variance. Component 1 contains items for manufacturing performance, and component 2 represents business performance. The retained items were used for succeeding multivariate data analysis.

Table 1: Factor Analysis for Performance

<table>
<thead>
<tr>
<th>Components</th>
<th>1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quality</td>
<td>.901</td>
<td></td>
</tr>
<tr>
<td>Cycle time</td>
<td>.862</td>
<td></td>
</tr>
<tr>
<td>Lead time</td>
<td>.857</td>
<td></td>
</tr>
<tr>
<td>Attainment of target related to productivity</td>
<td></td>
<td>.554</td>
</tr>
<tr>
<td>Attainment of target related to costs</td>
<td>.745</td>
<td></td>
</tr>
<tr>
<td>Attainment of target related to quality</td>
<td>.839</td>
<td></td>
</tr>
<tr>
<td>Attainment of target related to service</td>
<td>.603</td>
<td></td>
</tr>
<tr>
<td>Attainment of target related to profit</td>
<td>.822</td>
<td></td>
</tr>
<tr>
<td>Attainment of target related to sales volume</td>
<td>.509</td>
<td></td>
</tr>
<tr>
<td>KMO = 0.779; Bartlett’s Test of Sphericity sig = 0.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total variance explained = 60.72%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

4.2 Descriptive Statistics:

The descriptive statistics for the dependent and independent variables are summarized in Table 2. Table 3 shows the correlations of these variables.

Table 2: Descriptive Statistics of Variables (n=106)

<table>
<thead>
<tr>
<th>Variables</th>
<th>Mean</th>
<th>S.D</th>
<th>Actual Range</th>
<th>Theoretical Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABC success</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. User Attitude</td>
<td>3.6</td>
<td>0.87</td>
<td>1-5</td>
<td>1-5</td>
</tr>
<tr>
<td>2. Technical Characteristics</td>
<td>3.66</td>
<td>0.9</td>
<td>1.25-5</td>
<td>1-5</td>
</tr>
<tr>
<td>3. Perceived usefulness in improving user job performance</td>
<td>3.44</td>
<td>0.86</td>
<td>1-5</td>
<td>1-5</td>
</tr>
<tr>
<td>4. Impact on Organizational Process</td>
<td>3.62</td>
<td>0.89</td>
<td>1.67-5</td>
<td>1-5</td>
</tr>
<tr>
<td>Overall ABC success</td>
<td>3.58</td>
<td>0.73</td>
<td>1.25-5</td>
<td>1-5</td>
</tr>
<tr>
<td>Manufacturing Performance:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Quality</td>
<td>3.03</td>
<td>1.02</td>
<td>1-5</td>
<td>1-5</td>
</tr>
<tr>
<td>2. Cycle Time</td>
<td>3.07</td>
<td>1.01</td>
<td>1-5</td>
<td>1-5</td>
</tr>
<tr>
<td>3. Lead Time</td>
<td>3.02</td>
<td>1.09</td>
<td>1-5</td>
<td>1-5</td>
</tr>
<tr>
<td>MPERFORMANCE (OVERALL)</td>
<td>3.04</td>
<td>0.94</td>
<td>1-5</td>
<td>1-5</td>
</tr>
<tr>
<td>Business Performance</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Productivity</td>
<td>3.11</td>
<td>0.81</td>
<td>1-5</td>
<td>1-5</td>
</tr>
<tr>
<td>2. Costs</td>
<td>3.32</td>
<td>0.91</td>
<td>1-5</td>
<td>1-5</td>
</tr>
<tr>
<td>3. Quality</td>
<td>3.19</td>
<td>0.91</td>
<td>1-5</td>
<td>1-5</td>
</tr>
<tr>
<td>4. Service</td>
<td>3.16</td>
<td>0.94</td>
<td>1-5</td>
<td>1-5</td>
</tr>
<tr>
<td>5. Profit</td>
<td>3.25</td>
<td>0.87</td>
<td>1-5</td>
<td>1-5</td>
</tr>
<tr>
<td>6. Sales Volume</td>
<td>2.95</td>
<td>0.95</td>
<td>1-5</td>
<td>1-5</td>
</tr>
<tr>
<td>7. Market Share</td>
<td>2.43</td>
<td>0.99</td>
<td>1-5</td>
<td>1-5</td>
</tr>
<tr>
<td>BUSINESS PERFORMANCE (OVERALL)</td>
<td>3.06</td>
<td>0.63</td>
<td>1.29-5</td>
<td>1-5</td>
</tr>
</tbody>
</table>

Table 3 presents the overall mean score for the perceived overall ABC success and its four dimensions, namely, user attitude, technical characteristics, perceived usefulness in improving user job performance and impact on organizational process. The overall mean score for ABC success 3.58 suggesting that the level of ABC success implementation was above average level. Technical characteristics were ranked as the highest in terms of mean value (3.66) suggesting that respondents perceived that information supplied by ABC were more accurate, more accessible, more reliable, more timely, and more understandable than the their previous costing system.

The mean score for manufacturing performance was 3.04. It suggests that respondents agreed that their performance after ABC implementation were marginally improved. Among the three perspectives of
manufacturing performance, the highest mean value was rated for reduction in cycle time (mean=3.07), followed by quality (mean=3.03), while the lowest mean score was for the lead time (mean=3.02). It indicates that respondents perceived that ABC success implementation leads to marginally reduction in manufacturing lead time, customers waiting time and also improvement in quality. As for the business performance perspective, performance based on cost was rated the highest (mean score 3.32), while a low mean score was given to the sales volume (mean score=2.95) and market share (mean score=2.43). This indicates that respondents perceived that their firms were most satisfied with their firms’ ability to meet the targets related to costs after ABC success, but were dissatisfied with their firms’ ability to meet the targets on sales volume and market share by ABC success implementation.

Correlation and Reliability Results for Research Variables:

Table 3: Correlation Results for Research Variables (N=106)

<table>
<thead>
<tr>
<th>ABC Success</th>
<th>Cronbach Alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td>Improvement in quality</td>
<td>r=0.137; p=0.160</td>
</tr>
<tr>
<td>Decrease in manufacturing cycle time</td>
<td>r=0.249; p=0.010</td>
</tr>
<tr>
<td>Decrease in customer lead time</td>
<td>r=0.138; p=0.159</td>
</tr>
<tr>
<td>Overall Manufacturing Performance</td>
<td>r=0.192; p=0.049</td>
</tr>
<tr>
<td>Attainment of target related to productivity</td>
<td>r=0.230; p=0.018</td>
</tr>
<tr>
<td>Attainment of target related to costs</td>
<td>r=0.395; p=0.000</td>
</tr>
<tr>
<td>Attainment of target related to quality</td>
<td>r=0.439; p=0.000</td>
</tr>
<tr>
<td>Attainment of target related to service</td>
<td>r=0.316; p=0.001</td>
</tr>
<tr>
<td>Attainment of target related to profit</td>
<td>r=0.331; p=0.001</td>
</tr>
<tr>
<td>Attainment of target related to sales volume</td>
<td>r=0.362; p=0.000</td>
</tr>
<tr>
<td>Attainment of target related to market share</td>
<td>r=0.103; p=0.292</td>
</tr>
<tr>
<td>Overall Business Performance</td>
<td>r=0.446; p=0.000</td>
</tr>
</tbody>
</table>

Table 3 shows that the Cronbach alpha coefficients for manufacturing performance and business performance were 0.889 and 0.802 respectively. This indicates that the levels of scale reliability for the research variable are acceptable.

The correlation results are presented in Table 3. The Pearson correlation tests were carried out to examine the correlation between the success of ABC implementation and the dimensions manufacturing and business performance, respectively. Among the dimensions of manufacturing performance, positive and significant correlations were found between manufacturing performance and ABC success implementation (r=0.192; p=0.049), and between business performance and ABC success implementation (r=0.446; p=0.000). This indicates that higher level of ABC success correlated with higher levels of manufacturing performance and business performance. Thus, preliminary support for hypothesis 1 and hypothesis 2 are provided.

Among the dimensions of manufacturing performance, positive and significant correlations were found between ABC success and decrease in manufacturing cycle time (r=0.249; p=0.010). However, the correlation between ABC success and improvements in quality (r=0.137; p=0.160), and decrease in customer lead time (r=0.138; p=0.159) were positive but insignificant. Furthermore, among the dimensions of business performance, attainment of target related to productivity (r=0.230; p=0.018), costs (r=0.395; p=0.000), quality (r=0.439; p=0.000), service (r=0.316; p=0.001), profit (r=0.331; p=0.001), service (r=0.316; p=0.001), and sales volume (r=0.362; p=0.000) were significantly correlated with ABC success. While, only positive but not significant correlation was found between ABC success implementation and attainment of target related to market share (r=0.103; p=0.292).

Regression Results:

In this section, the dependent variable, manufacturing performance and business performance were regressed against the independent variable, ABC success implementation, the regression results are summarized in Table 4. Furthermore, separate regressions were carried out for the dimensions of manufacturing performance and business performance against ABC success implementation. The regression result is shown in the Table 4.

Table 4 shows the regression results for the relationship between ABC success implementation and the dimensions of manufacturing performance and business performance. Among dimensions of manufacturing performance, a significant and positive (beta=0.062; p=0.010) relationship was found between ABC success implementation and the decrease in manufacturing cycle time indicating that the higher level of ABC success implementation leads to shorter manufacturing cycle time. Therefore, Hypothesis 1 that states a significant and
positive relationship between ABC success implementation and manufacturing performance only could be marginally supported.

Table 4: Regression Results for the Relationship between ABC Success Implementation and Performance

<table>
<thead>
<tr>
<th>Dependent Variables</th>
<th>IDV_{ij}</th>
<th>ABC Success</th>
</tr>
</thead>
<tbody>
<tr>
<td>Improvement in quality</td>
<td>0.137</td>
<td>0.160</td>
</tr>
<tr>
<td>Decrease in manufacturing cycle time</td>
<td>0.062</td>
<td>0.010</td>
</tr>
<tr>
<td>Decrease in customer lead time</td>
<td>0.138</td>
<td>0.159</td>
</tr>
<tr>
<td>Attainment of target related to productivity</td>
<td>0.230</td>
<td>0.018</td>
</tr>
<tr>
<td>Attainment of target related to costs</td>
<td>0.395</td>
<td>0.000</td>
</tr>
<tr>
<td>Attainment of target related to quality</td>
<td>0.439</td>
<td>0.000</td>
</tr>
<tr>
<td>Attainment of target related to service</td>
<td>0.316</td>
<td>0.001</td>
</tr>
<tr>
<td>Attainment of target related to profit</td>
<td>0.331</td>
<td>0.001</td>
</tr>
<tr>
<td>Attainment of target related to sales volume</td>
<td>0.362</td>
<td>0.000</td>
</tr>
<tr>
<td>Attainment of target related to market share</td>
<td>0.103</td>
<td>0.292</td>
</tr>
</tbody>
</table>

Furthermore, among the dimensions of business performance, significant and positive relationships were found between ABC success implementation and attainment of target related to productivity (beta=0.230; p=0.018), costs (beta=0.393; p=0.000), quality (beta=0.439; p=0.000), service (beta=0.316; p=0.001), profit (beta=0.331; p=0.001); as well as sales volume (beta=0.362; p=0.000) suggesting that the higher level of ABC success implementation results in higher attainment of target related to productivity, costs, quality, service, profit, as well as sales volume.

However, improvements in quality (beta=0.137; p=0.160), decrease in customer lead time (beta=0.138; p=0.159), as well as attainment of target related to market share (beta=0.103; p=0.292) were found to be associated with ABC success implementation positively but insignificantly. This indicates that respondents perceived that ABC success implementation contributes insignificantly to the decrease in customer lead time, improvements in quality, as well as attainment of target related to market share. Thus, Hypothesis 2 which states that a significant and positive relationship could be partially confirmed.

**Conclusion and Discussion:**

The main objectives of this research are to investigate the effect of ABC success implementation on firms’ performance, namely manufacturing performance and business performance.

The research findings show that ABC success implementation marginally influences the manufacturing performance. The finding is marginally consistent with Ittner et al.’s (2002) finding, which found the implementation of ABC could impact manufacturing performance significantly. Among subcomponents of manufacturing performance, decrease in manufacturing cycle time was associated with ABC success implementation positively and significantly. The results confirm the finding of Ittner et al.’s (2002) research, which found ABC implementation leads to the decrease in customer cycle time. However, positive but insignificant relationship was found between the improvements in quality, decrease in customer lead time and ABC success implementation. This results are consistent with Banker et al.’s (2008) finding, who also found an insignificant relationship between quality, time and ABC success implementation. Banker et al. (2008) concluded that ABC implementation results in the adoption of world class manufacturing practices (WCM), such as JIT. WCM could be able to realize the improvements in manufacturing performance, such as time, quality and time, and the association between ABC implementation and manufacturing performance is mediated by WCM.

Up to date, no empirical research has been carried out to investigate the effect of ABC success implementation on business performance. Only, studies by Isa (2004) and Williams and Seaman (2002) tested the association between MACS and business performance. Isa (2004) found MACS associated with business performance moderately among Malaysian manufacturing firms. Williams and Seaman (2002) found a significant relationship between MACS and performance in Singaporean context. Therefore, the finding of this study is still consistent with the findings of Isa (2004) and Williams and Seaman (2002). Furthermore, research results also show that attainment of productivity, quality and profit related to ABC success implementation positively and significantly. This finding is consistent with Carolfi’s (1996) arguments, which claimed that information supplied by ABC could assist managers in defining poor-quality problem and non-value added activities including rework, the elimination of the non-valued activities, such as rework and quality problem could lead to the enhancements in quality of products. The finding also confirms Carolfi’s (1996) view that
the cost of production also could also be reduced by eliminating non-value added activities, such as rework and quality problem, and once cost is reduced, profit could be increased. Moreover, a positive and significant association between ABC success and attainment of target related to service and sales volume. The reason might be the improvements in product quality would increase the service and degree of customer satisfaction, and if customers are satisfied with the quality and service, the sales volume could be eventually increased. However, this study presents a positive but insignificant association between ABC success implementation and market share. The reason might be that market share is determined by numerous factors, such as marketing strategy and so on. Therefore, it is difficult to specify how much of increase in market share is contributed by ABC success implementation.

This study is still subjected to a number of limitations. Firstly, the usable response rate is only 10.6%, the finding of research would be more meaningful if a larger size of sample could be obtained. Secondly, 14.2% (15) questionnaires were completed by accounting supervisors and business analysts. Their understanding of management accounting system including ABC could be different from that of CFO or financial controllers, hence, the accuracy of their responses may be affected. Thirdly, this research covers only manufacturing firms, thus; the findings of this research could not be generalized to other sectors, such as service industry.. Fourthly, among subcomponents of manufacturing performance, the finding shows a insignificant relationship between ABC success implementation and improvements in quality. However, among indicators of business performance, attainment of target related to quality was associated with ABC success significantly. Therefore, it is difficult to determine the relationship between ABC success and quality. Fifthly, due to the low response rate, this study did not separate the stages of ABC implementation. The mature stage of ABC implementation might produce more significant impact on the firms’ performance compared to the early stage of ABC implementation. Finally, this study did not group the respondents according to the years of implementing ABC. The relationship between ABC implementation and the firms’ performance might be influenced by the period of implementation, the longer the firms implement ABC system, the higher level of performance they might achieve.

Suggestions for Future Research:

Based on the discussion in the previous section, suggestions for future research are as follows: First, future research could increase response rate by including other industry, and future research may also consider alternative method to collect data, such as case study or field study, which could provide a more comprehensive and in-depth understanding the relationship between ABC implementation and performance. Secondly, future research should ensure the questionnaire be answered by CFOs or financial controllers, interview may be more suitable than survey. Thirdly, future research should separate the respondents according to the years of the implementation of ABC system, as well as the stages of ABC implementation. Then, the accuracy of the association between ABC success implementation and firms’ performance could be improved. Finally, future research should adopt new measurement to measure firms’ performance and ABC success implementation, therefore, the accuracies of the measurement for performance and ABC success implementation could be enhanced.

Appendix:

ABC Success Implementation (McGowan, 1998; Byrne et al., 2009)

The listed questions related to the level of ABC success implementation in your firms. Please select the item which can best describe your perception about ABC implementation.

User attitude:

Please indicate your overall attitude toward the implementation of ABC ranging from “1=strongly unfavorable” to “5=strongly favorable”.

Technical Characteristics:

Please indicate your opinions of the information provided by ABC for each of the following characteristics of information ranging from “1=strongly disagree” to “5=strongly agree”: accuracy, accessibility, reliability, timeliness and understandability.

Perceive usefulness of ABC:

Please indicate your views of the usefulness of the information provided by ABC in improving job performance (ranging from “1=strongly disagree” to “5=strongly agree”).
ABC leads to improvements in the quality of my job
ABC leads to great control over my job
ABC enables to accomplish tasks more quickly
ABC enhances the effectiveness on the job
ABC makes it easier to do job
ABC is useful in job

**Impact on Organizational Process:**
Please rate the perceived the impact that ABC implementation has had on ranging from “1=strongly disagree” to “5=strongly agree”.
- Quality of decision
- Efficiency and waste reduction
- Innovation
- Relationships across functions
- Communication across functions
- Overall focus on the goal of entity

Manufacturing Performance (Ittner et al., 2002; Banker et al., 2008)
Please select the item which best describe the performance from ABC implementation from “1=strongly disagree” to “5=strongly agree”
- First pass quality yield has improved
- Manufacturing cycle time decreased
- Customer lead time decreased
- Manufacturing costs, excluding purchased materials reduced

Business Performance (Mia & Clark, 1999)
Please rate the performance of your organization after ABC implementation on a scale of 1 (very poor performance) to 5 (very excellent performance)
- Attainment of target related to productivity
- Attainment of target related to costs
- Attainment of target related to quality
- Attainment of target related to service
- Attainment of target related to profit
- Attainment of target related to sales volume
- Attainment of target related to market volume

**REFERENCE**