

*Full Length Research Paper*

# **Behavioral and organizational variables affecting the success of ABC success in China**

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**In today's advanced manufacturing environment increases the need for more accurate costing information. However, traditional volume-based costing system leads to cost information distortion. Activity-Based Costing (ABC) was introduced to address the shortcomings of traditional volume-based costing system. Due to its abilities to provide more accurate costing information for strategic decision, ABC has attracted the attention of both practitioners and researchers. Prior research findings indicated that in western countries, the main factors influencing the success of ABC were organizational factors, such as top management support, adequate resources, training and so on. Chinese firms are also motivated by current competitive environment to adopt ABC system to trace overhead cost. However, little research has been done in Chinese context and it is necessary to examine whether ABC could be implemented successfully in China. This paper replicates Shields's (1995) framework to examine the effect of behavioral and organizational variables on the ABC success implementation by using a sample of 106 Chinese manufacturing firms. The result shows that top management support significantly influences the ABC success implementation. The findings of this study also provide implication for the implementation of ABC for Chinese manufacturing firms.**

**Key words:** Activity-based costing (ABC), behavioral variables, organizational variables.

## **INTRODUCTION**

Nowadays accurate costing information is crucial for businesses to maintain a competitive advantage over its competitors. However, traditional volume-based costing system is subject to many criticisms due to fail to provide timely, reliable and accurate costing information for managers to make strategic decisions (Gunasekaran 1998; Ruhanita et al., 2006). Activity-Based Costing (ABC) was introduced by Cooper and Kaplan (1988) to address the shortcomings of traditional costing system.

Number of previous researches reported the benefits of ABC. For example, Ittner et al. (2002) found that ABC is significantly associated with higher product quality, decrease in cycle time and noticeable increase in the first pass quality. Majid and Sulaiman (2008) found that ABC implementation contributes significantly to companies' manufacturing process and enables firms to differentiate the value added and non-value added activities.

The benefits of ABC have motivated numerous studies. Such as Innes and Mitchell (1995, 2000), Kahild (2005) and Yanren et al. (2008) researched on factors affecting ABC adoption; Shields (1995), Shields and McGowan (1996), Baird et al. (2004) and (2007) conducted research on factors influencing ABC success, especially at implementation stage.

However, majority of empirical research has been carried out in Western countries, little researches were conducted in developing countries (Zhang and Isa, 2009). Thus, it is necessary to examine whether ABC could be successfully implemented and factors influencing ABC success in Asian context, especially, in China (Lana & Fei, 2009). Shields (1995) concluded that ABC success is determined by behavioral and organizational factors in Western countries. One accounting technique can be successfully adopted in one country does not mean it also can be success in another country (Supitcha, 2001). Thus, it is necessary to examine whether ABC could be successfully implemented and factors influencing ABC success in Asian context, especially, in China (Lana and

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Fei, 2007). The objective of this study is to examine factors influencing ABC success by using behavioral and organizational factors in Chinese context.

## MODEL DEVELOPMENT, THEORY AND HYPOTHESES

### Developing the theoretical framework

The framework of this study is based on organizational theory, which claims that organizational factors summarized by Shields (1995) play a key role in success of a management accounting and control system (Krumwiede, 1998; Ruhanita et al., 2006). Shields (1995) concluded that to implement ABC successfully in the organization, firms should deal with behavioral and organizational variables, Shields and McEwen (1996) found that overlook the importance of behavioral and organizational results in the failure in ABC implementation. Norris (1997) also argued that behavioral and organizational factors influence ABC success. Shields's (1995) measure was still employed by Mohammed (2007) to examine the effect of behavioral and organizational variables on ABC success in the U.K context, and Shields's work was also applied by this study.

Using a sample of manufacturing firms in China, this study aimed to provide further insights to effect of behavioral and organizational variable, namely top management support, resources, non-accounting ownership, training, link ABC to performance measure and evaluation, link ABC to competitive strategies, as well as clarity of ABC objectives on ABC success. This study examines this relationship relative to the following hypothesis:

#### *Top management support*

The literature on innovation suggests that leadership is the critical factors for the success of an innovation (Walton and Susman, 1987; Hoffman and Hegarty, 1999; Scott and Bruce, 1994), especially for accounting innovation (Campi, 1992). ABC is considered as an administrative innovation, top management support or leadership is expected to be a critical factor for its success.

Top management is considered as the most crucial factor in influencing the success of ABC according to numerous studies (Chongruksut, 2002; Krumwiede, 1998a; Lana and Fei, 2007; McGowan and Klammer, 1997; Shields, 1995; Shields and McEwen, 1996; Taba, 2005). According to Shields and McEwen (1996), the organization's goal, competitive strategies, as well as resources (capital, time and competence) can be influenced by top management support. Thus, top management support is a vital factor to affect ABC implementation. Top management support also has a key

role in using ABC information to communicate with non-accounting staffs so that they could be encouraged to make use of ABC information (Shields, 1995).

Similarly, Foster and Swenson (1997) concluded from a survey of 166 ABC users, that the success of ABC needs cross-functional support, as well as top managements' commitment.

The ABC system should possess the necessary resources, such as man-hours, capital and operational employees' participation. Therefore, top management should invest considerable financial resources to purchase ABC software and hardware, provide training for employees at adoption and implementation stage of ABC, as well as in the collection of detailed data (Gunasekaran et al., 1999). Top management support could eventually eliminate the employees' resistance towards the implementation of ABC (Agryris and Kaplan, 1994). This study examines this relationship relative to the following hypothesis:

H<sub>1</sub>: There is a positive relationship between top management support and ABC success implementation in manufacturing firms in China.

#### *Non-accounting ownership*

Cooper et al. (1992) surveyed eight companies to investigate the reason why companies had trouble and delay in using ABC for decision making even though they are applying a high technical method in the design stage. They found that in most of these firms, only the accounting staffs retain the ABC ownership. They suggested that if non accounting employees could take part in the early stage of ABC implementation, ABC can be implemented more effectively (Ruhanita et al. 2006). Ruhanita et al. (2006, p. 83) stated that "Since ABC can provide important economic information about all parts of a company; broad ownership increases the chances that non-accountants will support and promote ABC and be committed to its use and success. When ABC is owned by accountants, there is danger that it might be used only to satisfy their needs, which often related to status within the accounting profession and external reporting. The consequence can be a cycle of ABC designs without corresponding management action". The following hypothesis is presented as below:

H<sub>2</sub>: There is a positive relationship between non-accounting ownership and ABC success implementation in manufacturing firms in China.

#### *Training*

According to Tait and Vessey (1998) and Ruhanita et al. (2006), the accessibility of well trained manpower could influence the success of any projects. They found that in

order to enhance the usefulness of information provided by a system, training is a very important component that could equip employees with knowledge of the system. They suggested that to prevent their employees from feeling stressed during the process of change, an organization should provide adequate training resources.

Training refers to the level of training put into the design, implementation, and the application of ABC. Krumweide (1998a) found out that a high association exists between ABC success implementation and training program, and Krumweide (1998a) also stressed that training could make ABC implementation to reach the highest level of success. Similar views are presented by Shields (1995) and McGowan and Klammer (1997) that sufficient training programs and resources can affect the level of satisfaction of ABC implementation among users.

The aims of ABC training are not only to educate employees on the benefits and objectives of ABC, but also to remove the resistance to ABC and the feeling of being threatened (Argyris and Kaplan, 1994; Shields, 1995). Finally, training can assist in establishing confidence in ABC and building non-accounting ownership, which facilitates the employees' continuous improvement (Chongruksut, 2002), and training could help to correlate corporate strategy, performance evaluation and compensation system and the objective of ABC (Shields, 1995). The present study examines the relationship relative to the following hypothesis:

H3: There is a positive relationship between training and ABC success implementation among manufacturing firms in China.

### ***Internal resources***

Chongruksut (2002) argued that sufficient resources, particularly internal resources are needed at the designing and implementation stage of ABC. Internal resources normally refer to sufficient fund and time, as well as employees' knowledge and understanding on how to implement ABC effectively (Clarke and Mullins, 2001; Mehmet and Douglas, 2001). Sufficient resources have been claimed as the critical factors for successful implementation and adoption of ABC (Innes, Mitchell and Sinclair, 2000; Clarke and Mullins, 2001; Mehmet and Douglas, 2001). Seaman and Shields (2001) argued that the cost of implementing ABC is very expensive, as the cost incurred during the ABC adoption stage, and further upholding cost during implementation stage may lead to the cost of operating ABC to exceed the benefits of ABC. This may lead to the resistance to adopt and to implement ABC. Similarly, Krumwiede (1998a) stated that the implementation of ABC is a time consuming process, and it takes more time than expected, which may also lead to the resistance of implementation. However, the employees' resistance to ABC can be eliminated by

providing adequate resources during its implementation (Shields, 1995). Based on the above discussion, the following hypothesis tested in this study is:

H4: There is a positive relationship between internal resources and ABC success implementation among manufacturing firms in China.

### ***Linkage of cost management system to performance and evaluation***

Krumwiede and Roth (1997) regarded tracing overhead cost as an administrative function, rather than technical function. Therefore, any changes in the cost allocation method that influence the employees' performance evaluation may result in resistance. Normally, employees are interested in what determines their wellbeing. Thus, employees could be motivated and stimulated to implement ABC when there are links between the ABC system and performance assessment and compensation especially, employees feel that ABC system could demonstrate their performance fairly (Shields and McEwen, 1996).

Moreover, for employees, who link the ABC system to performance and evaluation would create awareness of the rewards determined by their behavioral pattern and the resulting system shows their performance and reflects their compensation (Shields and McEwen, 1996). Thus, the hypothesis to be tested is:

H5: There is a positive relationship between linkage to performance compensation and evaluation and ABC success implementation among manufacturing firms in China.

### ***Linkage of the cost management to competitive strategies, particular with quality initiatives***

Shields (1995) concluded that ABC success is still influenced by the degree to which ABC is linked to competitive strategy. If a company could integrate ABC and the competitive strategy closer, it is more likely to implement ABC successfully. Shields (1995) also concluded that it is also necessary to combine ABC system with quality initiative, such as Just-in time and other speed initiative. Shields and McEwen (1996) presented a similar view that the higher the degree of linkage between ABC and competitive strategies, particularly with quality initiative, the higher level of ABC success would be.

H6: There is a positive relationship between linkage to competitive strategies and ABC success implementation in Chinese manufacturing firms.

### **Consensus about and clarity of the objectives of the cost management system**

Shields (1995) argues that consensus on the clarity of the objectives of the ABC system is necessary for ABC designers and users to ensure the effectiveness of ABC information and efficiency of ABC implementation process.

McGowan and Klammer (1997) states that during the ABC implementation process. If the objectives and benefits of ABC are understood by designers and users clearly, the ABC implementation would produce a higher level of success. So the proposed hypothesis is as follows:

H<sub>7</sub>: A positive relationship exists between consensus on the clarity of the objectives of the ABC success implementation in Chinese manufacturing firms.

### **RESEARCH FRAMEWORK**

Based on prior discussions in this paper on the relationship between ABC success between various behavioral and organizational variables, the following research framework is proposed.

In this study, the dependent variable (DV) is ABC success; the independent variable (IDV) are top management support, adequate resources, training, non-accounting ownership, link ABC to performance measure and evaluation, link ABC to competitive strategies, clarity of ABC objectives.

The following is the regression equation related to the above model:

$$Y = b_0 + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + b_7X_7 + e$$

Where Y = ABC success; X<sub>1</sub> = top management support; X<sub>2</sub> = adequate resources; X<sub>3</sub> = training; X<sub>4</sub> = non-accounting ownership; X<sub>5</sub> = link ABC to performance measure and evaluation; X<sub>6</sub> = link ABC to competitive strategies; X<sub>7</sub> = clarity of ABC objectives.

### **METHODS**

#### **Sample**

In this research, large sized manufacturing firms were chosen for research. Prior studies showed that larger sized firms are more likely to employ ABC system to allocate overhead cost (Bjornenak, 1997; Khalid; 2005).

Chief Financial Officers (CFO) or Financial Controllers are consider as suitable respondents for this research due to they are familiar with management accounting system and responsible for designing the management accounting system.

A total of 1000 questionnaires were mailed to the Chief financial officers, financial controllers of manufacturing firms listed on Chinese Chamber of Commerce and Industry 2008 directory. Finally, 123 questionnaires were returned and it stands for the response rate of 12.3%. However, 13 questionnaires were stated that they neither do not adopt ABC nor implement any aspects of ABC were excluded from the analysis. Furthermore, 4 questionnaires were incomplete and also abandoned before the data analysis started. Finally a total of 106 completed questionnaires were used for data analysis.

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%). While, only 15 (14.2%) of respondents chose others, which may include accounting supervisors, business analysts.

### **Measure**

#### **ABC success**

This study adopts McGowan (1998)'s measure for the success of ABC. In McGowan's (1998) research, he divided the success of ABC 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 toward the four perspectives of ABC implementation on a five-point likert scale ranging from "1=strongly unfavorable" to 5= "strongly favorable". Even though McGowan used this instrument to measure ABC success in the year of 1998, but it was still adopted by the latest research that conducted by Byrne et al. (2009). In their research, they adopted McGowan's (1998) instruments to measure ABC success among Australian business units. Therefore, this study also employs McGowan (1998)'s instrument to measure the extent of ABC success among Chinese firms.

In this study, technical characteristics were composed of five aspects: accuracy, accessibility timeliness, reliability and understandability. Respondents needed to make a comparison between ABC information and 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 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, 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-Likert scale anchored 1="strongly disagree to 5="strongly agree".

Quality decisions, efficiency and waste reduction, innovation, relationships across functions, communications across functions, and the overall focus on the goal of the entity were employed to measure 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".

#### **Behavioral and organizational variable**

The measure for behavioral and organizational variable was adopted from Shields's (1995). Shields's (1995) instrument was employed by numerous researches, such as Shieldss and McEwen (1996) and Mohammed (2007). This study also applied Shields's (1995) instrument to measure behavioral and organizational variable.

### **RESULTS**

#### **Descriptive statistics**

The descriptive statistics for the dependent variables and independent variables are summarized in Table 1. Table 2 shows the correlations between ABC success

**Table 1.** Descriptive statistics of variables (N=106).

Variable	Mean	SD	Min.	Max.
<b>Behavioral and organizational factors</b>				
Top management support	3.56	1.09	1.00	5.00
Performance measurement	3.37	3.37	1.00	5.00
Non accounting ownership	3.33	1.00	1.00	5.00
Training	3.28	1.01	1.00	5.00
Link ABC to competitive strategy	3.27	1.00	1.00	5.00
Resources	3.48	1.03	1.00	5.00
Clarity of ABC objectives	3.27	1.00	1.00	5.00
<b>ABC success</b>				
User attitude	3.60	0.87	1.00	5.00
Technical characteristics	3.66	0.90	1.25	5.00
Perceived usefulness in improving user job performance	3.44	0.86	1.00	5.00
Impact on organizational process	3.62	0.89	1.00	5.00
<b>Overall ABC success</b>	<b>3.58</b>	<b>0.73</b>	<b>1.53</b>	<b>5.00</b>

implementation and independent variables.

The mean value for overall ABC success was moderate, with a mean score of 3.58. It indicates that Chinese manufacturing firms generally implement ABC successfully. Among the sub components of ABC success the highest mean score was ranked for technical characteristics (3.66). This represents that respondents perceived that information that supplied by ABC are generally more accurate, more accessible, more reliable, more timely, and more understandable than their previous costing system.

Mean values for behavioral and organizational variables were shown in Table 1. The highest mean value was top management support (mean value = 3.56). It suggests that respondents perceive that top provide relatively high level of support to ABC. The lowest value were 3.27 for linking ABC system to competitive strategy and clarity of the objective of the ABC (mean value = 3.27). This indicates that respondents perceived that when ABC project begins, the overall objectives and its benefits were understood moderately by designers and users, and ABC system was moderately associated with the competitive strategy of their firms and quality imitative.

### Correlation and reliability

The Cronbach alpha coefficients ranged from 0.75 to 0.90 indicates that an acceptable levels of scale reliability for the concerned variables. Table 2 shows that Pearson correlation between ABC success and top management support ( $r = 0.653$ ,  $p = 0.000$ ), resources ( $r = 0.476$ ,  $p = 0.000$ ), training ( $r = 0.508$ ,  $p = 0.000$ ), link to performance measure and evaluation ( $r = 0.484$ ,  $p = 0.000$ ), non-

accounting ownership ( $r = 0.356$ ,  $p = 0.000$ ), link to competitive strategies ( $r = 0.553$ ,  $p = 0.000$ ) and clarity of the ABC objective ( $r = 0.394$ ,  $p = 0.000$ ) are all significantly and positively. Thus, it provides the preliminary support to research hypothesis 1 to hypothesis 7.

### Regression results

Multiple regression technique was also applied to examine the association between behavioral and organizational variables and ABC success implementation. The results are presented in the Table 3. From Table 3, a significant relationship can be found between ABC success and top management support ( $\beta = 0.435$ ,  $p = 0.000$ ), therefore, H1 can be supported. While, adequate resources ( $\beta = 0.142$ ,  $p = 0.101$ ), link ABC to competitive strategy ( $\beta = 0.185$ ,  $p = 0.101$ ), training ( $\beta = 0.072$ ,  $p = 0.551$ ), link ABC to performance compensation and evaluation ( $\beta = 0.139$ ,  $p = 0.140$ ), non-accounting ownership ( $\beta = 0.086$ ,  $p = 0.328$ ), as well as clarity of ABC objectives ( $\beta = 0.058$ ,  $p = 0.567$ ) were found not significantly associated with ABC success. Thus, the hypotheses; H<sub>2</sub>, H<sub>3</sub>, H<sub>4</sub>, H<sub>5</sub>, H<sub>6</sub>, as well as H<sub>7</sub> cannot be supported.

### DISCUSSION AND CONCLUSIONS

In this study, only top management support was found to be associated with ABC success positively and significantly. This indicates that the top management support can produce a positive impact on the ABC success in Chinese manufacturing firms. It suggests that the stronger the top management support the ABC implementation, the

**Table 2.** Correlation (p value) and reliability measures for variables (N=106).

Variables	ABC success*	Cronbach alpha
Top management support	0.653	0.905
Resources	0.476	0.756
Training	0.508	0.906
Link to performance measure and evaluation	0.484	0.773
Non –accounting ownership	0.356	0.763
Link to competitive strategy	0.553	0.886
Clarity of the objective of ABC	0.394	N/A

\*P=0.000

**Table 3.** Summary of regression (N=106).

Variables	Standardized Beta	Sig.
Top management support	0.435	0.000
Adequate resources	0.142	0.140
Training	0.072	0.551
Link ABC to performance measurement and compensation	0.139	0.140
Non-accounting ownership	0.086	0.328
Link ABC to competitive strategy	0.185	0.101
Clarity of ABC objectives	0.058	0.567
R squared = 0.702, F=13.604, Sig = 0.000		

implementation, the higher level of ABC success could be achieved. Firms also stated that in their firm's top management provide visible support to ABC implementation and have a clear commitment to apply information supplied by ABC as the basis for decision making. Therefore, the finding of this research support the previous work of Shields (1995), Shields and McEwen (1996), Innes and Mitchell (2000), Krumwiede (1998a, 1998b), Ruhanita et al. (2006) Baird et al. (2007), all those researches all concluded that top management support is the most curial factor in the success of ABC implementation. The finding is also consistent with leadership theory, which claims that the effectiveness of leadership produce significant impact on any innovation.

However, resources, link ABC to competitive strategies, training, linkage to performance evaluation and compensation, non-accounting ownership, clarity of ABC objectives were not found significantly related to ABC success. The results are still consistent with some previous researches, such as Shields and McEwen (1996) and Innes and Mitchell (2000) did not find a significant association between non-accounting ownership and ABC success among largest firms in the U.K. Ruhanita et al. (2006) did not found significant association between ABC success and non-accounting ownership, resources among Malaysian manufacturing firms. Baird et al. (2007) found insignificant relationship between link ABC to performance evaluation, training, as well as linkage to performance evaluation and compensation and ABC success among Australian

business units. Furthermore, Mohammed (2007) also failed to found significant relationship between internal resources and ABC success among manufacturing firms in the UK. Therefore, findings of this study are still considered as reasonable. Furthermore, Ruhanita et al. (2006) also failed to find any significant association between training and ABC success among Malaysian manufacturing businesses. Ruhanita et al. (2006) stated that training is not an important factor in determining ABC success at the initial stage of ABC implementation. In this study, most of the firms are at an initial stage of ABC implementation. Therefore, failure to find a significant relationship between training and ABC success implementation is reasonable.

This study found an insignificant relationship between ABC success and link ABC to performance measurement and evaluation might be due to the Chinese national culture. China is categorized by Hofstede (1983) as a high uncertainty avoidance culture. Under this high uncertainty avoidance culture, employees would resist the implementation of ABC if they feel the information supplied by the ABC is used for performance measurement and may affect their status (Brewer, 1998; Supitcha et al., 2001).

In additional, an insignificant relationship was found between non-accounting ownership, link ABC to competitive strategy, as well as clarity of ABC objectives and ABC success might be possible that most of firms in this study are at an early stage of ABC implementation. Thus, top management lack knowledge about the critical

factors in determining ABC success.

This research is still subject to some limitations. Firstly, this research achieved a response rate of 10.6%. Efforts could be made to increase the response rates, and alternative methods, such as interview, case study could be adopted. Secondly, this study only covers manufacturing sector. Therefore, the findings of this research cannot be generated to other industries, such as merchandizing industry. In addition, the targeted respondents of this study were Chief Financial Officers (CFO) or Financial Controllers. However, some survey questionnaires were answered by finance managers, accounting supervisors or business analysts, their views on ABC success and its predictors maybe different from those of CFO or Financial Controllers. Therefore, these questionnaires may not fairly reflect standpoint of ABC success and its critical success factors. Also the knowledge of management accounting or management control system of finance managers, accounting supervisors or business analysts maybe limited. Thus, future research should make efforts to ensure that responses are obtained from targeted respondents, interview survey maybe considered as an alternative survey method.

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