

Research note

# The implementation of Activity-Based Costing in China: An innovation action research approach

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## Abstract

Research on Activity-Based Costing and its applications has mainly been focused on organisations in developed countries. Little has been learnt as to whether ABC techniques can be implemented successfully in organisations in developing countries. With the adoption of an innovation action research approach, we have successfully developed an ABC system jointly with a large Chinese manufacturing company, Xu Ji Electric Co. Ltd. (Xu Ji), for the period 2001–2005. The research provides a unique opportunity to examine some key success factors pertinent to ABC implementation within a Chinese organisational and cultural setting. The findings indicate that top management support, which has been identified as an important success factor in ABC literature, is evidently the predominant success factor in this organisation. In addition, Xu Ji's corporate culture of “top-down” instigation of the adoption of a series of management innovations (e.g., Economic-Value Added<sup>®</sup>, Balanced Scorecards and Six Sigma) and its hierarchical command and communication structure, coupled with active involvement of a high proportion of dedicated professionals, can be seen as another success factor in achieving a relatively high level of diffusion of this accounting concept within the organisation. This study also reveals a different insight of internal resistance to change, which is contrary to the evidence presented in the existing ABC literature.

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## 1. Introduction

Over the last two decades, the Chinese economy, with growing global competition as a catalyst, has gone through a gradual transformation from a “planned” to a “socialist market” economic system. With the foreign investment injections and technology transfers, business organisations in China have the opportunity to rapidly improve their manufacturing technology and information systems. Availability of abundant labour force at competitive prices has also gained Chinese businesses some leeway in global competition within the manufacturing sector. However, despite the rapid rate of technological progress, a relatively slow pace of advancement in management accounting practices has been observed (Sulaiman et al., 2004). This lag in

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development may have become an impediment for many indigenous Chinese organisations in improving performance and competing in both domestic and global markets (Liu and Zhang, 1996; Li, 1997; Lee, 2001; O'Connor et al., 2004; Tsui et al., 2006). An urgent search for innovative management and advanced accounting techniques has thus begun in China (Lin and Yu, 2002; O'Connor et al., 2004).

The popularity of Activity-Based Costing (ABC) in the West and its widespread coverage in the Chinese management accounting textbooks have made ABC an attractive costing method for academics and practitioners in China. Since the understanding of success and/or failure of ABC implementation has primarily been generated through empirical research in developed countries (e.g., Anderson, 1995; Innes and Mitchell, 1995; Swenson, 1995; Gosselin, 1997; Krumwiede, 1998; Friedman and Lyne, 1999; Innes et al., 2000), one cannot state with certainty that ABC can be implemented successfully in developing countries such as China (Scapens and Meng, 1993; Hopper et al., 2003; Islam and Kantor, 2005). It is fair to state that the contribution of this popular costing method in Chinese practice is at best at a theoretical level (Wang et al., 1999; Li, 2000; Hu, 2001; Lin and Yu, 2002; Pan et al., 2004).

This study aims to contribute to the quest for the success factors of ABC implementation in China in two complementary ways. First, with the adoption of an innovation action research approach (Kaplan, 1998), we examine an ABC implementation process which took place in a large Chinese manufacturing company, Xu Ji Electric Co. Ltd. (Xu Ji), from 2001 to 2005. Second, synthesising the issues reported in the existing ABC literature with the actual implementation experience from this study, we reveal the key success factors that are pertinent to an ABC implementation in the context of a large Chinese manufacturing company.

The rest of this paper is organised as follows: Section 2 reviews the existing ABC implementation literature. Section 3 discusses the research rationale for using innovation action research as the research methodology and data collection. Section 4 briefly describes the implementation experience. Section 5 analyses the results of the study. Conclusions are then drawn in Section 6.

## 2. Literature review

Studies of ABC implementation had been undertaken by academics and management consultants since the early 1990s. Focuses of some of the earlier studies were primarily on the technical aspects of ABC, such as selection of activities, cost drivers and process design (e.g., Cooper, 1990; Cokins et al., 1993; Morrow and Connelly, 1994). With the realisation of the association of ABC in a social setting, case studies adopting a social science stance have been carried out in an attempt to gain a better understanding of ABC implementation from a wider perspective (Innes and Mitchell, 1998). From a longitudinal study of an organisation's initiation and implementation of ABC concepts, Innes and Mitchell (1991) reported some success factors of an ABC implementation. These factors included the establishment of clear and achievable objectives for an ABC implementation to match the underlying strategic policies and goals of an organisation, steadfast support from top management, provision of adequate resources in a timely manner, involvement and consultation of staff, and adoption of a participative approach in data gathering. They also revealed some difficulties encountered. For example, it was a common situation that managers were too enthusiastic about ABC initially to be fully aware of its disadvantages or prepared for the necessary effort required. Also, the process activity information revealed by ABC may be incongruent with functional structure of an organisation and, thus, may cause some potential conflicts during an ABC implementation process.

Innes and Mitchell's earlier attempt to identify the success factors related to an ABC implementation was echoed by some 'factors studies'<sup>1</sup> in ABC literature (e.g., Cobb et al., 1992; Shields, 1995; Anderson, 1995; Malmi, 1997; Friedman and Lyne, 1999). For example, in a longitudinal investigation of ABC implementation process in General Motors (GM) between 1986 and 1993, Anderson (1995) adopted Cooper and Zmud's (1990) 'Factor-Stage' model to segment GM's ABC implementation into four stages, i.e., initiation, adoption, adaptation and acceptance, and found evidence to associate specific factors with various implementation stages. Organisational factors, such as support of top management and investment in training, were found to

<sup>1</sup>The term 'factors study' was, according to Malmi (1997, p. 460), borrowed from IT implementation literature. It refers to a research approach whereby influential issues are synthesised and correlated into various stages of an IT implementation project (Kwon and Zmud, 1987; Cooper and Zmud, 1990).

Table 1  
Prior studies in ABC implementation

Author	Research method	Source	Implementation stages	Measurement of 'Success'	Main factors influencing 'Success'
Innes and Mitchell (1991)	Case study of one UK-based manufacturing organisation	CIMA, London "Activity based cost management: a case study of development and implementation"	<ul style="list-style-type: none"> <li>● Initiation</li> <li>● Implementation</li> </ul>	Perception by information producers (accountants), users (managers) as well as cost saving	External consultation, top management support, resource adequacy, participative manner in data gathering
Bhimani and Pigott (1993)	Case study of one British pharmaceuticals company	MAR <sup>a</sup> , Vol. 3, pp. 119–132 "Implementing ABC: a case study of organizational and behavioural consequences"	Not segmented	Perception by factory managers and Head Office managers	External consultation, involvement of selected managers from factory and Head Office, heavy reliance on input from factory managers' knowledge of operational details, information available for both managers at factory and Head Office
Anderson (1995)	Case study of one American organisation	JMAR <sup>a</sup> , Vol. 7, pp. 1–51. "A framework of assessing cost management system changes: the case of activity-based costing implementation at General Motors, 1986–1993"	<ul style="list-style-type: none"> <li>● Initiation</li> <li>● Adoption</li> <li>● Adaptation</li> <li>● Acceptance</li> </ul>	Successful attainment of stage	Individual, technological, organisational, task and external environmental factors, including compatibility with existing systems, relevance to manager's decisions, and competition
Shields (1995)	Survey of 143 organisations that had implemented ABC	JMAR <sup>a</sup> , Vol. 7, pp. 148–166. "an empirical analysis of firms' implementation experiences with activity-based costing"	Not segmented	Management evaluation and dollar improvement	Top management support, linkage to quality initiatives and to personal performance measures (pay/appraisal), implementation training and resource adequacy. Technical characteristics of the system are not associated with success
Innes and Mitchell (1995)	Survey of UK's largest organisations	MAR <sup>a</sup> , Vol. 6, pp. 137–153. "A survey of activity-based costing in the UK's largest companies"	<ul style="list-style-type: none"> <li>● Adoption</li> </ul>	Attainment of stage	Sale revenue, top management support, continuous improvement
Gosselin (1997)	Survey of 161 Canadian manufacturing SBUs	AOS <sup>b</sup> , Vol. 22, No. 2, pp. 105–122 "The effect of strategy and organizational structure on the adoption and implementation of activity-based costing"	<ul style="list-style-type: none"> <li>● Adoption</li> <li>● Implementation</li> </ul>	Attainment of stage	Adoption: prospector strategy Implementation: hierarchy organisational structure, centralised decision-making, and formalised job procedures
Foster and Swenson (1997)	Survey of 166 ABC users at 132 organisations Field visits to 15 sites	JMAR <sup>a</sup> , Vol. 9, pp. 109–142. "Measuring the success of activity-based cost management and its determinants"	Not segmented	Usage, decision actions, dollar improvements and management evaluations	Supplementary to Shield (1995)'s factors with years of usage, number of primary applications, link to compensation, champion, cross-functional support and commitment and culture Supplementary to Shield (1995)'s factors with clarity of objectives, quality of ABCM information, preparers over users, implementation involvement
McGowan and Klammer (1997)	Survey of 53 employees from 4 targeted sites	JMAR <sup>a</sup> , Vol. 9, pp. 217–237 "Satisfaction with activity-based costing management implementation"	Not segmented	Employee satisfaction with ABC	Supplementary to Shield (1995)'s factors with clarity of objectives, quality of ABCM information, preparers over users, implementation involvement

Table 1 (continued)

Author	Research method	Source	Implementation stages	Measurement of 'Success'	Main factors influencing 'Success'
Anderson and Young (1997)	Surveys and embedded multiple case study of 21 ABC projects in 2 US auto/manufacturers	Working Paper, University of Michigan "Evaluation of activity-based costing systems: the impact of contextual and procedural factors"	Not segmented	Management evaluation, perceived accuracy and use	Quality of information system, reward structure, union support, resource adequacy, need for change, individual commitment
Malmi (1997)	Case study in a Finish Company	MAR <sup>z</sup> Vol. 8, pp. 459–480. Towards explaining activity-based costing failure: accounting and control in a decentralised organisation	Not segmented	n.a.	In the context of strategic decision-making the success of ABC cannot depend on whether its results require any actions or decisions to be taken, but on its ability to make a correct diagnosis of the situation
Krumwiede (1998)	Survey of 225 members of the Cost Management Group at US manufacturing organisations	JMAR <sup>*</sup> , Vol. 10, pp. 239–277. "The implementation stages of activity-based costing and the impact of contextual and organisational factors"	Attainment of stage	Stage of ABC implementation	Organisational factors (top management support, non-accounting ownership and implementation training) Usefulness of cost information, IT existence, less task uncertainty and larger organisations are more likely to adopt ABC
Friedman and Lyne (1999)	A longitudinal case study of six companies which have implemented ABC techniques for at least an 8-year period	CIMA monograph "Success and failure of activity-based techniques: a long-term perspective"	Not segmented	'Clear success of an activity-based technique occurs when a substantial proportion of the initial objectives have been met, or where significant benefits from the use of the technique have been organised' (p. 15)	A compelling business need, not just activity-based techniques but also broad-based support within an organisation; support from both senior management; embedded in the organisational structure, procedures or practice; adequate resource; careful management. ABC techniques can be successful implemented by small and inexpensive project team
Innes et al. (2000)	Survey of UK's largest companies	MAR <sup>z</sup> Vol. 11, pp. 349–362. "Activity-based costing in the UK's largest companies: a comparison of 1994 and 1999 survey results"	● Adoption	Success of specific applications (e.g. performance evaluation and improvement) and size (i.e. larger companies are more likely to adopt).	Both 1994 and 1999s survey results show top management support as a strong impact to success. Involvement of accountants does not have a beneficial effect

Note: JMAR<sup>\*</sup>: Journal of Management Accounting Research; MAR<sup>z</sup>: Management Accounting Research; AOS<sup>β</sup>: Accounting, Organizations and Society.

affect the various stages significantly in different ways. Other contextual factors, such as competition, relevance to managers' decisions and compatibility with existing systems had varying degrees of impacts among the various stages studied. Gosselin (1997) divided the implementation of ABC into two stages: adoption and implementation. He found that ABC adoption was associated with a 'prospector' strategy and with vertical differentiation, whereas ABC implementation was associated with centralised decision-making and formalised job procedures, but not with the strategy of vertical differentiation. Krumwiede (1998) studied the influences of organisational and contextual factors via a 10-stage ABC implementation process. He confirmed earlier findings that organisational factors (i.e., top management support, non-accounting ownership and implementation training) were strongly linked to the likelihood of reaching the highest stage of

an ABC implementation. Contextual factors, on the other hand, which had the potential of distorting costs, appeared to be an important motivator in both the adoption and routinisation stages of an ABC implementation.

Friedman and Lyne (1999, p. 15) asserted from their longitudinal studies of ABC implementation in six organisations that “clear success of an activity-based technique occurs when a substantial proportion of the initial objectives have been met, or where significant benefits from the use of the technique have been organised.”

A summary of prior empirical studies, which have been undertaken in developed countries, focusing on factors affecting ABC success and/or failure is listed in Table 1. The success factors of an ABC implementation as reported in the literature can be summarised as follows:

- *Technical factors*: practical knowledge of applying the conceptual design of an ABC system within an organisational context, which mainly includes the identification of a suitable number of cost drivers and activities, selection of activities that relates to products, linkage between ABC and organisational strategic objectives, and an understanding of the capability of existing computer systems to support ABC systems.
- *Organisational factors*: top management support, adequacy of resource, implementation training, and structure of organisation and culture.
- *Behavioural factors*: participative manner in the process of development and implementation of ABC systems and awareness of individual users’ behaviour.
- *Other contextual factors*: competition, task, quality and relevance of cost information to managerial decisions, size of organisation, compensation and reward, general need for change, and culture.

### 3. Research methodology—innovation action research

#### 3.1. Rationale

This study employs an innovation action research<sup>2</sup> approach as purported by Kaplan (1998, p. 90) ‘... in innovation action research, scholars work with client organizations to enhance and test an emerging theory that has been proposed to improve organizational performance...’<sup>3</sup>

The circumstance that led to this research was very similar to that being described by Kaplan (ibid). In its search for a better costing method, Xu Ji sought advice from the co-author, who is a leading academic<sup>4</sup> in Chinese management accounting research at Shanghai University of Finance and Economics (SUFU). After a series of discussions, the co-author was appointed as a consultant to assist Xu Ji to develop and implement an ABC system since 2001, when ABC was still regarded as a relatively new paradigm in China. Thus, for both the co-author and Xu Ji, this ABC implementation represented an important pioneering experiment.

#### 3.2. Data collection and analysis

The innovation action research was carried out during the implementation period (2001–2003) with following-up research visits leading to December 2005. Data collection methods comprised interviews, observation and documentation at various implementation stages, and participation of management meetings, examination of organisational documents and archives, and scrutiny of external information (e.g., newspaper reports and websites). The use of this range of sources permits extensive triangulation in data analysis. In addition, two group-feedback sessions were held in August 2003 and November 2005, respectively, in an

<sup>2</sup>The distinction between action research and other types of qualitative research approaches (e.g., field studies, case studies and ethnologies) is often unclear. Meanings of action research can also vary depending on one’s interpretations and disciplines. We do not directly consider a clarification of these research approaches here. Some scholarly discussions about qualitative research methods can be found in the feature articles of *Journal of Management Accounting Research* (1998) and *Accounting Forum* (2000).

<sup>3</sup>Some resemble this type of action research with consultation processes (Baker, 2000; McSweeney, 2000).

<sup>4</sup>In China academia (instead of management consultants) is often highly regarded as a reliable new knowledge base and often the advocates of Western management accounting techniques.

Table 2  
Profile of the interviewees at Xu Ji

Interviewee	Position	Location	Involvement with ABC	Education background
A	Finance Director	Headquarter, Xu Ji plc	Leader of the entire ABC implementation project and user of ABC information	BA (Eco.), CPA and Principal accountant
B	Head of finance department	Finance	ABC team member	BA in Accounting, Senior accountant
C	Cost manager	Finance	Leader of ABC implementation team.	Accountant
D	Group cost accountant	Finance	Preparer of ABC reports; ABC team member	Diploma in Accounting
E	Manager	Logistic and warehouse of FPD	User of ABC information	B.Eng. (Hon) Engineering
F	Assistant manager	Logistic and warehouse of FPD	User and Preparer of ABC data	Diploma in Engineering
G	Product line manager	First Production Department	User of ABC information	B.Eng. (Hon) Senior engineer
H	General manager	First Production Department	User of ABC information	B. Eng. (Hon). Principal engineer
I	Accountant	First Production Department	User of ABC information	Accountant

attempt to elicit some qualitative feedback from production line managers and other members of staff involved in the ABC process (see Section 4.2.2).

A profile of interviewees, who were implementers and users and were interviewed on a one-to-one basis, is listed in Table 2.

#### 4. Xu Ji Electric Co. Ltd.

##### 4.1. Company background

Xu Ji was publicly listed in 1997 on Shen Zhen Stock Exchange in China. The company manufactures a wide range of relay electrical products, including electronic telecommunication systems, transformers and automation systems for railway and power stations. In the financial year of 2002, the company's annual sales revenue was RMB1288 million (£92 million<sup>5</sup>) with a net profit of RMB151 million (£11 million). Its holding company, Xu Ji Group Ltd. (the Group), was re-formed in 1993 from a State-Owned Enterprise (SOE) called Xu Chang Relay Plant. Like all SOEs in China prior to 1977, the plant's production and sales quotas were imposed by the central government under the 'central planning' system. With the move towards a 'socialist-market' economic system, the central government no longer imposed those quotas. The plant subsequently gained its autonomy status and was reformed to become the Group. In an attempt to obtain capital for technological development and expansion, the Group floated the relay electrical equipment manufacturing business—Xu Ji.

Top management in Xu Ji has always been keen to adopt innovative management ideas, particularly those that are successfully adopted by the established and matured economies in the West. For example, Key Performance Indicators (KPIs) and Economic Value Added (EVA<sup>®</sup>) have been introduced to measure and monitor managerial performance of the middle line management. This form of assessment tends to go beyond merely assessing the departmental outputs but also helps to judge comprehensive managerial skills. Such a rigorous review process has had some profound impacts on middle-line managers' attitudes towards accepting new ideas. Whether willingly or otherwise, a proactive attitude towards learning and acquiring knowledge has been cultivated and ingrained into the corporate culture.

<sup>5</sup>Exchange rate is based on £1 = RMB14.

## 4.2. ABC implementation at Xu Ji's first production department

### 4.2.1. ABC implementation process

The ABC project was initiated in 2001 due to growing internal pressure and intensified market competition. The internal pressure came with the introduction of EVA and KPIs in evaluating departmental profitability performance, which exposed the fundamental incompatibility of its traditional costing system. Apparently, this system,<sup>6</sup> which was based on direct labour-hour absorption rate to allocate direct labour costs and overhead across production lines, produced inaccurate product costing and divisional profitability information. For a company that has been driven by technology, the costing system was rather inadequate and untrustworthy. The middle line managers grew increasingly frustrated with the erroneous costing information upon which their performances were judged and thus demanded for a better costing system.

The inaccuracy of the traditional costing information also directly impeded Xu Ji's ability to compete on pricing. Given that the market competition was dominated by demand for cheaper products, the company faced enormously imminent pressure. The finance director of Xu Ji gave an example.

[Finance Director]... our traditional costing system indicates that one of our products cost RMB800 per unit to produce. But one of our main competitors only priced their product with the same specification at a mere RMB500. Our sales people did not feel confident enough (about our product costing information) to drop our bidding price. So we had suffered some losses...

The push and pull factors of growing internal pressure and intensified market competition had prompted the top management to seek for a better costing method. A feasibility study, which was conducted in 2001, revealed that ABC could potentially meet Xu Ji's needs. The ABC project officially commenced in January 2002 with a pilot project in the First Product Department (FPD) (see Fig. 1), with the formation of a steering committee, which set the strategic objectives for the ABC implementation and monitored the progress and achievements of the project. At this stage, the main objective of the ABC project was to establish accurate product costing information for the cost control purposes.

The execution of the project was undertaken by an ABC implementation team, which comprised all cost accountants at the finance department and a consulting team of the co-author and four research assistants from SUFE. The roles of the consulting team were to build an ABC conceptual model and to train those cost accountants and staff members at FPD. The team first built an ABC conceptual model based on identified manufacturing processes, activities and cost drivers. At this stage, most of the cost drivers for the defined activity cost centres were identified, except for the general administrative and finance expenses which amounted to RMB209 million or 77% of total expenditure. Being constrained by its organisational arrangements (see later discussions in Sections 5.3.2 and 5.4.3), the team and steering committee eventually decided to apportion these costs on the basis of the number of employees in each product lines as a temporary measure.<sup>7</sup>

The next stage was to develop the ABC conceptual model into a computerised system. A well established Chinese software company was chosen to produce a customised version of the ABC software. The no prior experience in ABC concepts or software development of the software company resulted in substantial conceptual errors in the initial version of ABC software delivered in late 2002, and the software problems had nearly halted the project.

Xu Ji's top management decided to send the ABC team leader (interviewee C) to the software company to liaise directly with the programmers to put right the various software errors. The move was indeed a turning

<sup>6</sup>Xu Ji's traditional costing system was an accounting system, which was designed to suit external financial reporting purposes and could only produce highly aggregated costing information. Thus, its direct labour-cost, instead of being charged directly to products, was allocated first to production departments, then to finished products. This practice was common in some Chinese manufacturing companies as it was relatively difficult to track direct labour to individual products without using sophisticated tools such as Manufacturing Resource Planning (MRP) system or some elaborate recording mechanism within a mass production environment.

<sup>7</sup>The root cause of those general administrative and finance costs is not only generated by its organisational arrangement and social responsibility agenda, but also associated with an inflationary 'liquidity tango' between the SOEs and the state-owned banks and provincial economical and political considerations (e.g., Liu and Woo, 1994; Chen, 1996; Woo, 2006). We do not directly consider the clarification of these issues here.

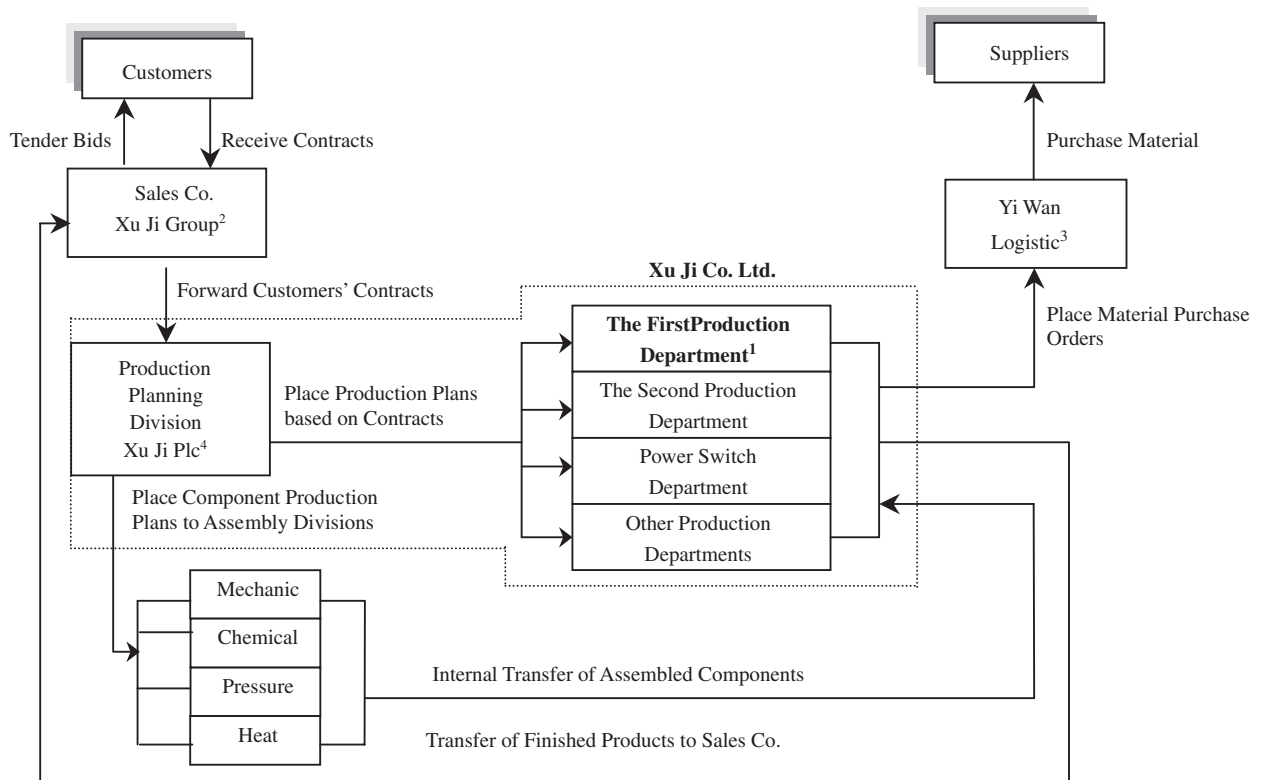


Fig. 1. A schematic diagram of Xu Ji's data flow process. *Notes:* (1) The main production departments include the First and Second Production Department. FPD manufactures Xu Ji's high yield products—high-voltage electric equipment. SPD manufactures relatively low yield products—safety and automation systems. (2) The Sales Co. of Xu Ji Group is an independent business unit, which deals with all sales orders for the group. The Sales Co. charges Xu Ji for relevant expenses except the salary costs of its sales staff. (3) Yi Wan Logistic is one of the subsidiaries of the Group and the sole authorised purchasing company for the Group. The company purchases all raw materials and components which are not manufactured internally. Yi Wan Logistics charges a commission of 0.1% for all purchases. (4) The main functions of the Production Planning Division are to set production plans based on customers' specifications and place production orders to both production departments and component assembly divisions.

point, and once the programmers understood Xu Ji's ABC rationales, the technical issues of the ABC software were then dealt with rather effectively. The ABC system was eventually able to produce monthly ABC product reports since June 2003. One issue, which was unresolved at this stage, was the labourious manual data entry task due to the incompatibility between the ABC system and other existing computer software systems.

#### 4.2.2. Users' acceptances of the developed ABC system

The level of users' perceptions and acceptances was sought through two formal feedback sessions, held in August 2003 and November 2005, respectively. Both sessions involved the same group of staff, including line managers and accountants. The second session revealed a gradual improvement of understanding in ABC, in particular amongst accountants, who began to recognise the potential benefits of the ABC information.

[group cost accountant in 2003] ... the way that we used to cost our product contracts was a kind of guess work. We knew our product costs were not accurate. Since we started this (ABC) project, it was the first time that I began to understand what was going on in our production processes, not just cost codes...

[group cost accountant in 2005] ... now we sorted our ABC software problems, ... I can also trace where the costs occur (*activity centres*) and compare cost drivers between contracts ....

[accountant 1 in 2003] ... I learnt ABC during my degree study. It is great to be involved in the real implementation.... At the moment we are still sorting out some glitch problems in producing ABC reports. But I can see ABC will be useful when it comes to managers' negotiate their internal transfer prices. ...

[accountant 1 in 2005] ... I provide ABC information as a basis of negotiation for managers to decide on their transfer prices... Now they do not question much about the accuracy of costing information. They complain about something else, for example, the unfairness of production quota....

Resentments expressed by the front-line managers during the first feedback session were understandably related to the labourious manual data inputting tasks.

[assistant manager of Logistic and Warehouse Department in 2003] ... it (*ABC data input*) was very tedious as we had to key-in all those details which were not required before and make sure they are correct.... I was at the (*ABC*) presentation and was told about all these benefits, frankly what I can see now is the amount of extra work...

[manager of Logistic and Warehouse Department in 2003] ... ABC information cannot influence the way I manage my department. The amount of work we put in is to support others. ... at the moment I am not sure how that extra work will affect my EVA, which is the most important part of my performance appraisal...

Some issues raised during the second feedback session in 2005 demonstrated a growing level of understanding of ABC amongst managers.

[ABC team leader/cost manager] ... at the moment we use ABC information as a standard basis for budgeting purposes. We have seen some obvious benefits in the manufacturing department. In the past we did not have basic information for cost control, now we can achieve better controls over both volume and costs in production, material storing and handling processes. However we also begin to see some problems. For example, because our ABC system is not integrated with the procurement system (*which belongs to Yi Wan, a different subsidiary, see Fig. 1*), we have to spend quite a lot of time on converting data between the two systems...

[production line manager of FPD] ... For the cost of each product lines, we currently use two costing methods—ABC and traditional. This parallel use naturally makes people turn to the traditional costing information inevitably. ABC does provide some efficiency and productivity information. However our performance appraisal system is still based on traditional financial accounting information. This has made us focus more on traditional financial reports. ...

[finance director] ... After solving ABC software problems, we now face another set of problems—ABCM. At the moment, two accounting systems, ABC and traditional, are still in use in parallel because our accountants are not very confident in providing full costing and performance reports using ABC information alone. Therefore we still use traditional information for performance evaluation. ... We may also face some obstacles in applying ABCM, for example, links between advertising expenses and products were not properly established and these expense are not effectively managed (*as advertising expenses occurred elsewhere in the Group*)...

[general manager of FPD] ... At the moment no one is judged by controlling costs effectively. Despite the fact that ABC provides better costing information than the traditional one, we are judged by KPIs, which are not linked to ABC...

The second discussion in 2005 elicited some interesting issues, one of which was related to a lack of links between ABC information and performance measures (including EVA and KPIs), and the other the traditional arrangement of the Group. Answers to these questions are still being sought at the time of writing.

#### 4.2.3. Summary of ABC implementation at FPD

On the whole, it was clear that the initial objective of the ABC project, which was “to establish accurate product costing information for cost control purposes”, has been achieved. In particular, the ABC system has established a clear understanding of “shop-floor” activities in FPD by tracing activity costs to products (including the direct traceability of direct labour costs, which were allocated to product costs under its traditional costing system). Hence, relatively effective cost controls have been established in FPD’s main functional divisions, i.e., manufacturing and logistic and warehouse.

## 5. Analysis of Xu Ji's ABC implementation experience

With reference to the success factors outlined in existing ABC literature, the various issues pertinent to Xu Ji's ABC implementation process are analysed on the basis of four perspectives: technical, behavioural, organisational and contextual.

### 5.1. Technical perspective

Technical factors, such as identification of cost drivers and compatibility of the new system with existing accounting information systems, are critical during the system design stage (e.g., Cooper, 1990; Morrow and Connelly, 1994). Xu Ji experienced similar technical issues which were well documented. The novice nature of this ABC implementation for all three parties (namely Xu Ji ABC team, SUFE consultants and the software company) and the constant changes in Xu Ji's production processes have made the following two issues most prevalent:

- (i) obsolete activity cost drivers and accuracy of ABC information and
- (ii) functionality and compatibility issues.

#### 5.1.1. Obsolete activity cost drivers and accuracy of ABC information

Xu Ji operates in a fast growing economy heavily influenced by markets and customers' demands. Xu Ji often needs to change its product design specifications and processes to suit customers' needs. This constant change, although a common phenomenon in today's global markets, creates a real difficulty for the ABC team to keep the ABC model up-to-date. There were instances in which activities and cost drivers identified in the system design stage became obsolete during the system implementation stage. This situation was also experienced by some Western companies operating in volatile and diverse business markets, which had to abandon their ABC attempts (e.g., Friedman and Lyne, 1999; Liu et al., 2003). Being aware of the potential detrimental impact of obsolete activities on the accuracy and credibility of ABC information, the ABC team took a proactive approach by working with the production planning division to standardise some of its processes and activities at the product design phase to ensure obsolete drivers are kept to a minimum.

#### 5.1.2. Functionality and compatibility issues

Xu Ji has installed advanced computerised systems to automate, control and monitor the manufacturing processes including the use of Manufacturing Resource Planning System II (MRPII). However, the current version of the ABC system was unable to either integrate or interact with these information systems. Hence, staff at product lines, logistic and warehouse divisions and finance department found their workload doubled or even tripled, as accountants had to double-check input data which were handled manually by front-line staff. Concerns about inevitable human errors could lead to doubts about the accuracy of the ABC information.

### 5.2. Behavioural perspective

Some important behavioural factors affecting the success of an ABC implementation include the presence and involvement of accountants, participative approach in data collection, resistance to change and ownership issues (e.g., Anderson, 1995; Innes and Mitchell, 1995; Malmi, 1997). The manifestation of the effects of some of these factors, to varying degrees, is evident in Xu Ji's ABC implementation process.

#### 5.2.1. Positive influence from the participative approach to implementation

The participative approach to implementation has led to a general sense of satisfaction from both accountants (see comments in Section 4.2.2) and the general manager of FPD.

[general manager of FPD] ... throughout this implementation, we have had quite a few briefings and my line managers and staff have also been consulted during the model design and data gathering stages.... We

have for the first time had some good ideas about our costs, so our discussions on internal transfer prices (*between departments*) have had some logical negotiation bases. What we had before was purely ‘human relationships (*guan xi*)’ but nothing else.

The involvement of non-accounting staff members during gathering ABC data allowed effective diffusion of some fundamental issues (e.g., non-value added activities and efficient business processes). One example was the identification of some non-value added processes by one of the product line supervisors.

[one supervisor of a product line] ... we never questioned that the old lay-out of our panel assembling line was in anyway wrong. However when the ABC team presented us with the time and cost wasting on the activity of moving panel, we were frankly shocked. We have since taken their advice and changed the lay-out in line with the logical operating process. We are not sure the exact savings we achieved, but things definitely are running noticeably smoother than before...

### 5.2.2. *Mixed influence of accountants’ presence and accounting ownership at different stages*

It is notable that some behavioural factors, such as the accounting ownership and the presence and involvement of accountants, did not seem to cause any noticeable resistance at the earlier stages of ABC implementation in Xu Ji. This observation is in contrary to some of the findings in ABC literature (e.g., Malmi, 1997). The positive behavioural phenomena observed in Xu Ji may be partly attributed to the initial enthusiasm and expectations of the potential benefits of the ABC system without being fully aware of the required efforts, a situation observed at the introduction of ABC in the UK (Innes and Mitchell, 1991).

Xu Ji also revealed a different aspect of ownership contentions at different stages of implementation. The initial enthusiasm about the prospect of ABC system had initially masked the detrimental impacts of accounting ownership as revealed in ABC literature (e.g., Innes and Mitchell, 1995; Malmi, 1997; Krumwiede, 1998; Friedman and Lyne, 1999; Innes et al., 2000).

The initial ownership contentions were mainly between the external SUFE consultants and staff from Xu Ji. Xu Ji’s ABC team who were unfamiliar with ABC concepts was over-reliant on the SUFE consultants to steer the implementation at the start of the project. As a result, some confusion existed amongst Xu Ji staff, as some even thought “it was SUFE’s research project”. Such confusion was cleared after the Xu Ji team successfully resolved the software issues.

A more complicated ownership issue (which is yet to be resolved) emerged at the later stages—the ultimate ownership contention between the ABC team which comprised mainly cost accountants and FPD managers. The accountants’ dedications to the ABC project have resulted in a certain degree of emotional attachment towards the system. And naturally this has led the accountants to regard themselves as the owner of the system.

The accountants’ zealous involvement, which did not cause any negative impacts at the earlier stages (see Section 5.2.1), produced some unexpected side effects at the later stages. The perceived accounting ownership of the ABC system has made the FPD managers feel rather exposed and vulnerable, in particular when the project progressed from the ABC to ABCM/ABB phase.

[general manager of FPD] ... ABC should link to the whole business process. At the moment only my department has applied the ABC thus is exposed (*to the top management*) in some respects... .

The shared feeling of vulnerability amongst FPD managers might somewhat discourage them from supporting the system. Some resistances were evident.

[cost accountant] ... top (*managers*) have to put some pressure on them (*production line managers*) to supply ABC raw data. ...

[assistant manager of logistic and warehouse department] ... With the manual data-inputs, some of our front-line workers had more work (*demanding by accountants*) but no rewards... At the moment traditional data still dominates everyone’s behaviour.

With the wearing-out of the initial enthusiasm and the growing understanding of the potential use of ABC in decision making and budgeting, the vulnerability perceived by middle-line managers could fuse into a growing resentment on accounting ownership and eventually on supporting the ABC system. The observed

resistance to accounting ownership, compounded with the issues in the organisational structure (see Section 5.3.2) and contextual factors (see Section 5.4), may have some serious impacts on the long-term success of Xu Ji's ABC system implementation.

### 5.3. Organisational perspective

#### 5.3.1. Positive influence—sustained top management support and top-down instigation of learning and training

Support from the top management, which is one of the important success factors according to findings in ABC literature (see Table 1), was paramount to the success and continuation of Xu Ji's ABC implementation. In particular the finance director's steadfast support played a crucial role in securing full co-operation from the line managers and adequate resources for the entire duration of the project. The top management's keenness to innovative ideas was an apparent phenomenon in Chinese SOEs as they, transitioned from planned bureaucracy to self-managing shareholding company, felt the urge to be more forward looking than before in order to compete in the market economy (Xin et al., 2002).

In addition, Chinese organisations (especially the former SOEs) in the industrialised northern China are generally compliant to the direct influence from the hierarchical chain of command initiated from the central authority (Schlevogt, 2002). Hence the "top-down" instigation of ABC implementation has worked quite well in Xu Ji, which is in direct contrast to a lack of success from such an approach in some Western experience (Brewer, 1998). In fact this "top-down" approach, in conjunction with conscious enforcement through the managerial review process, has also induced a proactive towards acquiring new knowledge and innovative ideas across the organisation.

#### 5.3.2. Potential hurdle—organisational structural arrangement

Xu Ji's organisational structure was designed to meet the criteria of public listing in 1997. However, its operational structure has largely remained unchanged. Xu Ji is the production arm of the Group, which in fact controls Xu Ji's operations and makes strategic decisions. One of such decisions is to let Xu Ji's sales and purchasing matters be handled by two independent subsidiaries, the Sales Co. and Yi Wan Logistic, respectively (see Fig. 1). Xu Ji pays selling and purchasing expenses to these two companies. This arrangement has had long-standing concerns amongst Xu Ji managers as these "uncontrollable" expenses<sup>8</sup> have serious adverse impacts on their divisional financial performance and EVA figures.

[general manager of FPD] ... ABC ought to trace costs through the whole value chain, from purchasing material, through production, then to sales. At the moment, we only apply ABC in production, which is the FPD, not in material purchasing or in sales. This ABC exercise in fact only maps 14% of the total costs. A large bulk of the costs, including purchasing and selling expenses, incurs elsewhere and is not based on ABC. ...Worse still, these expenses are charged back to the FPD. It inevitably affects our financial performance and EVA measures...

It is evident from the above comment that the ABC information has helped to expose the hindrance of this organisational structural arrangement, which may suit the Group's broader objectives such as social responsibility (see later discussion in Section 5.4.2). However, this arrangement has impeded the visibility and autonomous control of costs in Xu Ji. The growing understanding of ABC has allowed the managers to have more objective assessment to the detrimental impacts of this organisational arrangement.

#### 5.3.3. Mixed influence of training

Being fully aware of the importance of training, Xu Ji's top management was relatively generous with training. For this ABC project, presentations, briefing and debriefing sessions were held at the various stages of the ABC model development. It was also the top management's deliberate attempt to use these training sessions to disseminate ABC knowledge across the organisation. The trainings have indeed provided the line

<sup>8</sup>These expenses form part of general service and financial expenses, i.e., 77% of total expenditure in 2002 income statement (see earlier discussion in Sections 4.2.2 and 5.1.1).

managers of FPD and accountants with reasonably good grasps of the ABC concepts (see the feedback from FPD managers at the second feedback session in Section 4.2.2).

However excessive training sessions could also produce some side effects. In particular, staff members had various training sessions of a few initiatives concurrently with the ABC project. Observations indicated that some staff members felt too inundated with various training sessions to understand ABC fully.

#### 5.4. *Other contextual factors*

##### 5.4.1. *Challenges posed by market competition*

To win businesses in a highly competitive market, Xu Ji naturally focuses more on setting competitive prices and satisfying customers' requirements. Its customer orientation has manifested in frequent modifications to production process to meet customers' specifications, which inevitably would produce cascading changes in activities and cost drivers in the ABC model (see earlier discussion in Section 5.1.1). Ironically, the nature of free market and competition, with its effects in frequent and constant changes, implies that in the long term, keeping the ABC system up-to-date definitely requires zealous commitments and investments, should Xu Ji decides to continue with the ABC system.

##### 5.4.2. *Orientation of financial performance*

Managers have the propensity to use tools which present them with reasonable answers to financial performance or residual income maximisation (Anctil et al., 1998; Gurd et al., 2002). This propensity is clearly evident in Xu Ji, whereby the middle line managers are very much attuned to the attainment of divisional financial performance targets, in particular EVA and the bottom-line net profits. Since these targets are still generated from the financial accounting system, there is a natural tendency for the managers to channel their learning efforts on understanding financial reports, rather than controlling costs. The allocation of the 77% general and finance expenses in the ABC system, which has yet to be resolved due to organisational arrangements (see Section 5.3.2), has given the managers legitimate excuses for contributing less efforts in ABC related endeavours.

##### 5.4.3. *Goal incongruence between Xu Ji and the group*

The concerns over the restrictions and limitations posed by the current organisational structure, as discussed in Section 5.3.2, provide a glimpse of the underlying goal incongruence between Xu Ji and the Group. The latter, still an SOE, is expected to fulfil certain aspects of social responsibilities through the provision of employment and job security to people in the region and significant contributions to the local economy (in terms of tax and support of auxiliary industry). The Group has always given social agenda the highest priority because the key to success for companies in northern China is to secure local governmental support (Schlevogt, 2002, p. 243). Understandably, as Xu Ji's dominant state shareholder, the Group needs to ensure that Xu Ji contributes towards its fulfilment of the social responsibilities besides the financial returns.

As a public listed company, one of Xu Ji's corporate objectives is to deliver respectable profit returns to its shareholders. The prime aim of the ABC implementation is to fulfil this objective by improving cost controls. The prospect of controlling (and possible eliminating) non-value added activities, which is one of the key aspects of ABC analysis and would be beneficial from Xu Ji's perspective, may be incommensurate to or even in conflict with the Group's social agenda. This incongruence of organisational objectives between Xu Ji and the Group may hinder the future success of the ABC implementation.

## 6. **Concluding remarks**

This study has examined an ABC implementation in a large Chinese manufacturing company over a 5-year period from 2001 to 2005. The findings categorised under the technical, behavioural and organisational perspectives revealed that the company generally faces the same uphill struggle as experienced by Western organisations (e.g., Bhimani and Pigott, 1993; Anderson, 1995; Krumwiede, 1998; Friedman and Lyne, 1999; Innes et al., 2000). The outcome of the ABC project can be regarded as a relatively successful one as it has achieved its initial objective, "to establish accurate product costing information for cost control purposes".

The company has replaced its untrustworthy traditional costing system with an ABC system, which provides a clearer understanding of front-line activities and processes for the FPD. The success factors pertinent to Xu Ji's experience can be briefly summarised as follows:

- (1) The most important success factor in the Western ABC experience—sustained top management support—is evidently the paramount contributing factor to the success of Xu Ji's ABC implementation. In particular, it was the top management support that kept the project going during the most critical period when the ABC software was plagued with problems and uncertainty.
- (2) The involvement of external consultation by the SUFE team during the early stages of the ABC project was perceived as necessary and useful because of the novice state of ABC application in China (Kaplan, 1998).
- (3) The “top-down” instigation of the adoption of a series of innovative management ideas, hierarchical command and communication structure, the participative manner adopted by the ABC team in data gathering and active involvement of a high proportion of dedicated professionals have helped to diffuse the ABC concepts effectively across the organisation.

As Xu Ji progresses, its ABC implementation to advanced phases—ABCM and ABB, some issues may affect the future success. For example, the significant costs associated with constantly updating rapidly changing cost drivers may outweigh the benefits provided by the ABC information. Resistance to change, which was not prevalent at the earlier stages of ABC implementation, has gradually transpired amongst FPD managers at this advanced phase. This phenomenon is contrary to what has been observed at the earlier stages of ABC implementation in some Western experience (Malmi, 1997), though perhaps not unusual at the introduction of ABC concepts in a country (Innes and Mitchell, 1991).

Notwithstanding the eagerness for acquiring innovative ideas being fully ingrained in Xu Ji's corporate culture, the zealotness of the management in adopting new and advanced techniques had resulted in some unfavourable manifestations. For example, the simultaneous adoption of several advanced techniques (e.g., from ABC to ABCM and ABB) within a relatively short span of time resulted in its line managers being inundated with new knowledge. As a result, the organisation may run a risk of being unable to proficiently apply the knowledge in practical circumstances. The following contextual factors may add to the concerns over the future of the ABC system, including the following:

- (1) the goal incongruence due to its organisational structure and arrangements which segregates business functions (i.e., sales, purchase and production) into separate independent companies,
- (2) the continuous use of traditional financial accounting information in measuring financial performance, and
- (3) the dominance of market prices and customer demands.

These contextual factors, if unresolved appropriately, might lead to a situation described by Jones and Dugdale (2002, p. 159), “ABC became an untrustworthy system that failed to comprehend the nature of managerial work and is thus an unreliable technology for achieving long-term philosophy.”

The major limitation of this innovative action research was the inevitable use of a single company. Although most findings from this empirical study tended to be generic, one has to be cautious in generalising the results beyond its current context. It must be viewed in the particular context which involved a largely Chinese manufacturing company with certain exposure to Western management techniques and a corporate culture of top-down instigation of learning innovative ideas. Given the relatively short-term ABC experience at this stage, the research was unable to evaluate the effectiveness of ABC on the improvement in financial and manufacturing performance. Thus, further studies could be undertaken in the following areas:

- the applications of ABCM and associated influential factors, and
- the integration of ABC with EVA (and/or KPIs) in evaluating divisional performances and promoting goal congruence.

Despite these limitations, this study represents pioneering work in documenting the first step taken by a Chinese manufacturing company's adaptation of ABC in response to challenges posed by today's competitive

global business environment. The uniqueness of Chinese revolutionary cultural background and evolutionary economic development beg one to ask the question, “how would the adoption of Western innovative ideas, such as ABC and ABM, affect the Chinese business management that inherently places significant emphasis on traditional Chinese values and management techniques?” The authors’ view is that this question could only be answered with further innovation action researches.

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