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## Research note

## Activity-based costing user satisfaction and type of system: A research note

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## ABSTRACT

This paper examines user perceptions of Activity-based costing (ABC) performance for three different types of system in a major information and communication provider in South East Asia. Few prior ABC studies have considered the effect of system type on ABC performance. The study draws on a survey of 54 developers and 181 users of 16 different ABC systems within the organisation to produce five performance constructs (cost accuracy, cost-benefit trade-off, ABC impact, information use, and decision action). The results show that both the development inputs and user performance perceptions varied with the type of system (embedded, stand-alone, ad-hoc). While embedded systems enjoyed far stronger inputs (e.g. top management support, rewards and recognition, task significance) and greater development team cohesion than stand-alone systems, they were perceived by users to perform significantly less well. These findings suggest that system type is an important factor in assessing ABC performance.

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## 1. Introduction

Understanding the factors that contribute to the success of management accounting systems innovations is a central concern in the field of accounting. As one management accounting innovation, Activity-based costing (ABC) and its derivatives have enjoyed a high profile for more than two decades. ABC has been applied in a wide variety of commercial manufacturing businesses, public utilities, wholesale and retail organisations and a range of service firms. Activity-based techniques (ABTs) have been adopted for product costing, customer profitability analysis and various cost management purposes (Drury & Tayles, 2000; Innes & Mitchell, 1995).<sup>1</sup> While much of this research has been conducted in the US and UK, studies have been conducted in other countries, for example, India (Joshi, 1998), Malaysia (Brewer, 1998) and China (Liu & Pan, 2007).

Cooper, Kaplan, Maisel, Morrissey, and Oehm (1992) observed that a key ABC implementation problem relates to the tendency to focus only on the technical issues involved. They suggest that implementation of ABC will be more effective when ABC advocates begin to focus more on non-technical issues. This includes the early involvement of non-accountants who will be the primary users of ABC information, ensuring that the sponsor is a member of top management and introducing a training programme emphasising the logic, design, implementation and use of ABC. While individual studies by Anderson, Hesford, and Young (2002), Anderson and Young (1999), Bhimani (2003), Shields (1995), Shields and Young (1989) have identified a number of organisational variables associated with ABC implementation success; there is no generally accepted

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E-mail address: [m.e.tayles@hull.ac.uk](mailto:m.e.tayles@hull.ac.uk) (M.E. Tayles).<sup>1</sup> Drury and Tayles (2000) report adoption rates in the West of ABC and derivatives at approximately 20 per cent in large companies.

agreement on the determinants of successful development and implementation. This research note aims to explore the effectiveness of ABC systems using perceptions of both developers and users. It specifically examines whether the type of system employed influences the perceived effectiveness of such systems.

Following this introduction the next section summarises the relevant literature on ABC implementation and success. This is followed by a section which deals with the research site and research approach, which examines the extent to which embedded ABC systems in the organisation include these implementation and success factors, using comments from interviews with accountants and other managers involved in their development. The next section presents results where user perceptions of effectiveness for embedded ABC systems, based on survey data, are then compared with those of stand-alone and ad-hoc systems. Finally, the paper discusses the findings, addresses the implications of the study and concludes with the potential for future research.

## 2. Activity-based costing and system success

Several studies have been undertaken relating to the success of ABC amongst adopting firms. In the UK, [Friedman and Lyne \(1999\)](#) used longitudinal case studies to explore factors influencing ABC success. They found that success was associated with a clearly recognised need for ABC at the outset, broad-based support for it beyond the accounting function, and adequate resourcing of the implementation. A survey by [Innes, Mitchell, and Sinclair \(2000\)](#) investigated the association between ABC success and top management support, the involvement of consultants and user involvement in the implementation. Only top management support had a significant impact in explaining ABC success. [Innes and Norris \(1997\)](#), dealing with six detailed case studies of both manufacturing and service businesses, focused on the use of activity-based information (ABI) from a managerial perspective. They pointed to the importance of training in the use of ABI and observed that there was very little post-implementation audit of such systems. In research that contrasts the use of ABI in two banks, an industry sector showing increasing ABC uptake, [Norris \(2002: 248\)](#) observes more generally that 'little is known about the success of these applications or of what manageable factors influence the use of those ABTs and the ABI they generate'. This paper seeks to add to our empirical evidence on the post-implementation effectiveness of ABC systems as identified by the foregoing studies.

Based on work in the USA, [Shields \(1995\)](#) acknowledges the difficulty in defining ABC success, pointing to vagueness in the literature and a failure to achieve consensus about a definition, even after consulting ABC experts. He found that respondents' perception of success was linked to six behavioural and organisational variables: top management support; integration with competitive strategies; performance evaluation and compensation; non-accounting ownership of the ABC project; training provided for designing, implementing and using ABC; and the provision of adequate resources. He found no correlation in his empirical work between perceived ABC success and technical variables such as software used, stand-alone system used or external consultant employed. He also highlighted the importance of training in designing, implementing and using ABC. This was, first an important way to integrate ABC into the company and second to provide an opportunity to achieve non-accounting ownership.

In a detailed UK case study using grounded theory, [Norris and Innes \(2002\)](#) investigated user satisfaction with ABC techniques, the influences upon their views and the effect these views have on the organisational outcomes of adopting ABC techniques. Issues emerging included the perceived relevance of ABC to managers, increased costs awareness coupled with a tension related to dealing with qualitative factors and the profile or status of accountants. On a more technical level, in earlier research, [Cobb, Innes, and Mitchell \(1992\)](#) pointed out that the evaluation of ABC techniques is not always trouble-free, for example, they found problems in early ABC development involving data collection on cost drivers, cross departmental responsibility and demands on employees' time.

[Swenson \(1995\)](#) surveyed 50 financial and operating managers at 25 firms on their satisfaction with ABC and use of ABC information to support decisions. The results indicated that participants viewed ABC as an improvement over their old system. Those participants who were more satisfied with their ABC systems were more likely to make greater use of the ABC information. [McGowan and Klammer \(1997\)](#) examined the users' perceptions of ABC systems covering four research sites. Their findings supported three of the factors identified by [Shields \(1995\)](#) as significantly associated with ABC success (top management support, performance evaluation links and adequacy of training and training resources). In addition, user involvement in implementation and their perception of the quality of the information produced was positively associated with ABC success.

[Foster and Swenson \(1997\)](#) examined the effect of using alternative success measures. They concluded that the highest explanatory power was found from broad-based ABC success measures and identified potential success measures that have been used in part to guide this study: the perceived cost accuracy, the use of ABC information in decision-making and the decision actions taken with ABC information. Many of the variables used also resonate with the themes observed in the grounded theory research into manager's views of ABC by [Norris \(1997\)](#).

In a survey of 225 USA firms [Krumwiede \(1998\)](#) found that different contextual and organisational factors were associated with ABC success. He divided the firms that implemented ABC into those where ABC was mainly used within the accounting department (non-routine), for example, where data was used to inform a particular problem; and those where ABC information was extensively used throughout the organisation (routine) by both accounting personnel and non-accountants. [Krumwiede](#) found that for all 'integrated systems', where ABC is integrated with the primary financial system of the company, respondents perceived clear benefits whereas for routine systems, the level of satisfaction was lower.

In a vein similar to that above, Kaplan and Cooper (1998) refer to different stages of the design and evolution of cost systems, particularly, Stage II systems with separate financial reporting; Stage III, customised, managerially-relevant and stand alone, and Stage IV, containing systems employing integrated cost management and financial reporting. They contend that these different systems may exist within different organisational units, but also that as systems are improved companies will 'migrate' from Stage II, through Stage III to Stage IV. An interesting and largely unexplored research question flowing from the above is whether the different types of systems or stages in ABC development have an impact on ABC success, that is, the performance of the systems as perceived by users. This link between the types of system and performance is an issue that has been generally neglected in the literature and we believe it requires further consideration. Drawing on the above, in the next section we identify and define three types of ABC systems employed in the company studied, namely embedded, stand-alone and ad-hoc systems.

### 3. Research site and research approach

The organisation chosen for this study is a large provider of information and communication products and services in South East Asia. The company provides telecommunications products and 'solutions' to consumers and general telecommunications infrastructure for the sector. This is from within three major Business Units (Fixed Telephony, Cellular Services and Support Services). The ABC development was undertaken to support management within this structure in the process of costing, decision-making and control. The Strategic Cost Management Group (SCMG) in the company was involved in all aspects of ABC implementation. Various cross-functional teams were engaged in the development of the ABC systems, each team included accounting specialists, those familiar with the company's systems and procedures and direct users. Development teams were able to get advice and assistance from the SCMG to ensure the systems developed met agreed aims.

Preliminary interviews took place between representatives of the company management and the researchers in both the UK and Malaysia to explore the potential of this work and to scope the project. The information collected to achieve the aims of the investigation was derived from various sources including two separate questionnaires, one to preparers of the ABC systems and one to users of the systems. With the support of the management questionnaires were distributed and then returned to the researchers anonymously. This whole process of interaction with the company lasted more than one year.

Two separate questionnaires were employed. The first was administered to 72 managers and accountants involved in developing each of the 16 ABC systems in use within the organisation. It sought to investigate how team inputs varied according to system type. A total of 54 responses were received (75% response rate). The main questionnaire was administered to ABC system users and sought to identify the effectiveness of each ABC system used within the organisation. This questionnaire posed questions about their perception of the ABC systems and their satisfaction with them; for example, perceived cost accuracy and use in decisions. This questionnaire was distributed to 243 users of ABC systems across the 16 divisions in which the systems were employed. 181 usable responses were obtained, a highly satisfactory response rate of 74%. Responses to questionnaire items were scored on a five-point scale where 1 indicates 'very unimportant' and 5 'very important'. Responses for both surveys were tested for non-response bias. An investigation of early and late responses, showed no problem. Data gathered were then coded into SPSS and used for statistical analysis to explore and test possible relationships in the research.

In addition to the survey, interviews were carried out with the General Manager of the SCMG, with the project champions, ABC project team members and system users to help in understanding the ABC systems developed within the organisation. The semi-structured interviews enabled us to investigate and confirm a number of team-related and user-related factors in ABC implementation for two embedded systems, thus strengthening the research with triangulation. The research involved method triangulation, that is, interview and survey research within the case company. It also benefited from triangulation between elements of this research and the work of other authors and this can also strengthen the research message.<sup>2</sup> For example, some of the findings in this research resonate with the case research of Norris and Innes (2002) regarding manager's prior knowledge and education concerning ABC and increased costs awareness.

The declared primary objective of the development of the ABC systems in the company was to improve the quality of cost information provided, often starting from quite a low competence base. The systems used throughout the organisation prior to the development of ABC were quite basic and orientated round the requirements of financial reporting. Influential drivers of this innovation were the perceived need to satisfy the Industry Regulator for this sector and to cope with the increasing inter-sector competition. ABC systems were developed in various functional areas, such as operations and marketing. The declared objective in the former was 'improving operational effectiveness', whilst in the latter it took the form of 'improved retail accounting and profitability analysis'. In terms of model complexity, the respondents pointed out that they were used to dealing with up to 20 different cost drivers, which has been shown to be in line with typical ABC cost systems (Drury & Tayles, 2005).

At an early stage in the discussion with the company management it was apparent that some systems displayed characteristics different from others. These were recognised throughout the research and its interpretation. We offer below a brief description of the types of systems encountered in the company and will return to these later in the paper.

*Embedded Systems* (EMs) are generic ABC systems designed within a particular division with the intention of being applicable for a wide range of purposes (e.g. targeting operational excellence, improving business operations, transfer pricing

<sup>2</sup> We are grateful to an anonymous reviewer for drawing our attention to this point.

**Table 1**

Team members perceptions of the important characteristics in developing the ABC systems ( $n = 54$ ) (Scale: 1 = very unimportant, 5 = very important).

|                                | Type of ABC systems       |                         |                              |
|--------------------------------|---------------------------|-------------------------|------------------------------|
|                                | Embedded (EM) (2 systems) | Ad-Hoc (AH) (7 systems) | Stand-Alone (SA) (7 systems) |
| Top management support         | 3.70                      | 3.54                    | 3.25                         |
| Team rewards and recognition   | 2.56                      | 2.53                    | 2.38                         |
| Existing cost system knowledge | 3.13                      | 2.98                    | 2.87                         |
| Task significance              | 3.65                      | 3.74                    | 3.29                         |
| Team cohesion                  | 4.20                      | 4.30                    | 3.61                         |

and budgeting). These systems are updated frequently and integrated into the company's financial information system. EMs are typically larger than the other systems, involving considerable investment in terms of time and money. These resonate with *Krumwiede's (1998) 'integrated systems'* and *Kaplan and Cooper's (1998) Stage IV systems*.

*Ad-Hoc Systems (AHs)* are one-off ABC applications developed to meet a particular purpose or problem; they are not therefore embedded into the information system. Typically, these take less time to develop, and are not subject to regular updating or review once the problem or issue at hand has been addressed. The decision to develop these systems frequently arose from a managerial problem or conflict requiring better costing information; for example, two divisions may disagree about the appropriate transfer price and ABC information is required to throw light on the costs involved. These may be aligned with the non-routine type mentioned by *Krumwiede (1998)*.

*Stand-Alone Systems (SAs)* are reasonably comprehensive systems, designed to meet various information requirements (like EMs), including transfer pricing and improving operations. However, they are not fully integrated into the company's financial information system. A key distinction between EMs and SAs was the extent of formal integration into the information system of the company hence these are similar to Stage III systems (*Kaplan & Cooper, 1998*) and similar to routine systems (*Krumwiede, 1998*).

Both EMs and SAs were interrogated for multiple purposes, whereas AHs were perceived to have a more specific purpose. The characteristics and the categories of the systems were confirmed with management both as the research progressed and at its conclusion when some of the findings were discussed and validated.

To contribute to the reliability of the data the questionnaires were grounded in the questions used by other researchers, particular use being made of prior instruments by *Anderson and Young (1999)* and *Anderson et al. (2002)* and by *Foster and Swenson (1997)* though these were adapted to suit the circumstances of the company concerned. There were responses to more than forty questions about the ABC system and these were subject to factor analysis in order to detect the underlying performance constructs and reduce the data to a more manageable and parsimonious set. Factor analysis reduced the questions relating to ABC performance to derive four performance constructs (each with acceptable Cronbach alphas).<sup>3</sup> These factors we label: Cost Accuracy, ABC Impact, ABC Information Use and Decision Actions Taken. The results of these analyses are presented in *Appendix A*. To these, one further single question was added – Cost/Benefit which asked whether the system costs were exceeded by any perceived benefit obtained.

#### 4. Analysis of results

*Table 1* summarises the descriptive statistics for the team inputs of the 16 ABC systems employed within the organisation based on the 54 team member responses. Looking at the three generic forms of ABC system it is clear that EMs have the highest means for top management support, rewards and recognition and knowledge of existing cost system. EMs are the second highest for task significance and team cohesion. In other words, the EMs possess many of the characteristics suggested by the literature for ABC success.

Feedback from interviews with team members involved in developing EMs support this view. For example, regarding the level of top management support:

"From the very start, top management gave full support for the project. It was considered the first ABC in the company... and something that we could look forward to. The company invested so much in the innovation. They would certainly want to see results. Support came from top management in all aspects. There was the CEO coming to brief and congratulate us on becoming the team members... sometimes we had e-mails that top management sent to ensure that we were comfortable with ABC."

The reward and recognition associated with the system development was given less emphasis:

"Only the two accountants (in the team) were acknowledged for their efforts. Perhaps if rewards were given to those team members that worked hard, we could have made the project better."

<sup>3</sup> All factors had eigenvalues greater than one explaining over 70% of the total variance. All Cronbach alphas were 0.80 or above indicating internal consistency of the items within each factor. 2.

Training of team members was seen to be appropriate:

“I feel I received enough information about the ABC tool and concepts. There was no need for further training except if there were changes in software applications...This led me to give my best effort to team members.”

Team heterogeneity has also been identified as a requirement for successful ABC development:

“Being diverse enabled us in understanding and accepting each other’s differences.”

Of the behavioural variables cited as relevant to successful development, team cohesion is a key determinant (Anderson et al., 2002):

“I feel we had a good working team that was able to work to meet desired targets...We worked together well in building the systems... I feel by our working well and having a feeling of friendship and cohesion, we see an increase in better situations of ABC for changing our decision actions.”

“Sometimes we do not agree with one another. I myself sometimes feel a bit uncomfortable... However we pull though and managed to work it out.”

The survey responses and respondent comments suggest that many of the requirements for successful development and implementation were being observed, and it is therefore not unreasonable to assume that EMs would be the most effective of the three forms of system.

Table 2 shows that with regard to system performance, the 181 users who responded generally gave mean ratings in excess of 3 for all performance variables. This suggests that most users perceived that their particular ABC system offered benefits beyond the fairly basic previous cost system - in terms of greater cost accuracy, information use and other benefits. The lowest scores recorded were attributable to decision actions taken. This implies that they were reluctant to unequivocally attribute ‘decision actions’ to the ABC information, though they were supportive of it in other respects. It is observed that the SAs are those with which the users are most satisfied, that is, offering greatest ABC performance.

We next consider the main differences between the types of systems. Table 2 shows that four of the five ABC performance constructs are statistically different according to type of system. In contrast to expectations stated earlier, based on the survey and interviews with team members, the user survey finds that EMs have the *lowest* mean for most of the performance constructs.

As suggested above, ad-hoc systems (AHs) are characterised by a strong incentive towards resolution of a particular management problem - top management demanding ‘solutions’ in rapid time. Hence the scores for team inputs (Table 1) were relatively high. AHs are formed at relatively short notice for a particular highly visible task. Typical examples, found in the case company, related to on the one hand, an outsourcing decision or on the other, the need to reduce significantly the levels of overtime in one facility. In a meeting to discuss the findings an accounting manager observed:

“Compared to EMs, AHs were simple systems and clearly users could see the relevance and implications of their message. This was not so with EMs where, with hindsight, we perhaps tried to be too sophisticated. I guess many users were not able to see the potential of EMs in the way we envisaged. That is a learning point for us.”

While AHs are typically better perceived by users than EMs, Table 2 shows that for stand-alone systems (SAs) the five perceived benefits are consistently higher than for other types, all but one variable being significantly better ( $p < 0.01$ ).

Partial correlations (not shown) were computed between input variables (top management support, team size, training and team heterogeneity) and the five ABC performance constructs, controlling for type of system. Only two significant associations were found: perceived benefits in decision actions were associated with smaller team size and greater team heterogeneity. Contrary to prior empirical findings, top management support is strongly negatively associated with ABC performance based on simple correlations. However further analysis found no association obtains when controlled for system type. This implies that the significant management incentive towards system development, particularly for embedded systems, was not delivering in terms of perceived performance and is further discussed below. In other words, for the organisation investigated, the most significant factor in determining ABC performance/success was type of system. While embedded systems were less successful in terms of the five ABC performance constructs used within this organisation, we would not wish to infer that this can be extended more widely. Our point is that type of system is an important variable which few prior studies have included in their research design and this was revealed as particularly relevant to this organisation at this stage of its development.

**Table 2**

User perceptions of the important performance variables for the ABC Systems ( $n = 181$ ) (Scale: 1 = very unimportant, 5 = very important).

|                               | Type of ABC System        |                         |                              |
|-------------------------------|---------------------------|-------------------------|------------------------------|
|                               | Embedded (EM) (2 systems) | Ad-Hoc (AH) (7 systems) | Stand-Alone (SA) (7 systems) |
| Cost accuracy <sup>a</sup>    | 3.23                      | 3.63                    | 3.96                         |
| ABC impact <sup>a</sup>       | 3.53                      | 3.46                    | 3.87                         |
| Cost/Benefit <sup>a</sup>     | 3.40                      | 3.86                    | 4.07                         |
| Information Use               | 3.63                      | 3.63                    | 3.69                         |
| Decision actions <sup>a</sup> | 2.61                      | 2.91                    | 3.46                         |

<sup>a</sup> = difference between means for system type at 1% level of significance.

## 5. Summary and discussion

We observe that the type of ABC system (embedded, ad-hoc or stand-alone) can have a significant impact on user satisfaction and perceived ABC performance in this company. Higher performance was found where the system developed was stand-alone, rather than embedded, despite the greater inputs invested in developing the latter.

While ad-hoc Systems are smaller, less complex ABC systems, they too, like EMs, are subject to considerable political pressure, typically being expected to offer rapid and acceptable 'solutions' to political/economic issues, such as disagreements over outsourcing or attempts at overtime reduction. Strong team dynamics are essential to achieve rapid response, but the time pressure can result in less than satisfactory outcomes, including only partial consideration of options and user needs, and inadequate testing of the system. Our study suggests that ABC effectiveness, as perceived by users, in this case, is not simply a matter of getting support of top management, appropriate rewards/recognition and strong team dynamics; it must address the needs of users – such as ease of use, level of required training and awareness of the potential of ABC.

Users view stand-alone systems as the most successful but they have the lowest development scores for team inputs (top management support, rewards and recognition, prior cost system knowledge and task significance) and team dynamics (team cohesion). Such work forms part of the ongoing service provided by the accounting function to improve cost information. It brings together users, accountants and other specialists to explore how ABC can aid managers in their tasks. Whether consciously or unconsciously this encouraged the interaction between developers and users and resulted in a more satisfactory system.

In discussion during the research, and in validating the results, staff pointed out that they saw this as a period of development and evolution of ABC (from ABC to Activity-based Management and Activity-based Budgeting) with an overall focus on the 'efficient use of resources', an aspect which previously had received limited attention. It was also pointed out that cost consciousness was not 'second nature' in this environment, and that they did not start from a position of strength in educating managers in cost management. Many managers still identified with their previous environment, where a near monopoly existed. They were now faced with increasing competition and pressure from the regulator, a situation in which they were significantly less comfortable, thus, cost containment was now more important.

This raises a second possible explanation; that the management were seeking to migrate in one step from a relatively low cost management competence level with separate financial reporting (Stage II) to integrated cost management and financial reporting (Stage IV) (Kaplan & Cooper, 1998). They were possibly seduced to do so by the installation of sophisticated ERP systems. Kaplan and Cooper counsel against such a course of action, they point out that 'companies need the experimentation and learning that occurs with Stage III systems... for their managerial purposes... for their learning and improvement activities...' '...rushing prematurely into a Stage IV system may compromise the managerial relevance and usefulness of the system' (Kaplan & Cooper, 1998: 26, 27). This case generates empirical support for this assertion.

Our research finds that, for all three types of system, users perceive improved performance and ABC benefits exceeding costs, with stand-alone systems clearly the highest. However, this study has revealed a clear distinction between the types of systems. Each have their strengths, but it seems that users in this company have a preference for using ABC where the benefits are more easily identifiable and the initial investment, in terms of development time and training, are reduced. Based on subsequent discussion within the organisation, it seems that senior managers within the organisation have recently recognised this distinction. The company had intended to develop further EMs through undertaking more development work on SAs. Some work on this had already progressed, but managers are currently reassessing the position.

## 6. Conclusion

The paper has examined the implementation of and user satisfaction with various ABC systems in independent divisions of a large company. Measures of development team inputs and system performance (satisfaction with the application) were obtained using a questionnaire to both developers and users of the systems.

It is shown through interviews and the questionnaire responses that while the embedded systems (EMs) have the characteristics of successful systems according to prior literature, they were not well received by users who prefer stand-alone systems (SAs). A number of possible reasons were offered for this of which the most important is the speed with which the company sought to migrate from a situation of limited management information in their traditional system to the relative sophistication of an embedded ABC system. This could be related to the level of cost system awareness and education surrounding the use of the systems, which was alluded to earlier, but which we do not address here in any detail. It is also noted that ad-hoc systems are perceived to offer better performance than embedded systems, it may be that users are more able to focus on the specific problem being addressed with these and thus see more clearly how they are an aid to their resolution. The embedded systems being at the present time too complex for their purposes and as a result they have less confidence in them. Future research may revisit this situation when greater experience has been acquired which may record a different outcome or case studies of greater depth may probe the reasons for the satisfaction levels recorded.

A limitation of this work is that this survey represents the views of only those persons in the company and therefore cannot be extended more widely, but the ideas have universal application. The responses record the perceptions of the individuals at a certain point in time and in relation to the operation of the ABC systems within their experience. The work was undertaken in Malaysia and hence in any international interpretation, cultural differences should be acknowledged,

though the ABC systems were being compared within the same environment. See also the work of Brewer (1998) who applied individualist/collectivist and power-distance perspectives to implementation of ABC in Malaysia. The ABC systems are being evaluated partly in relation to the systems previously employed in their environment, which were inevitably somewhat varied, although previous provision was generally 'limited'. Nevertheless the large number of responses representing the collective views of the organisational participants about the systems operating in one major company is a useful empirical contribution to the literature and 'represents a form of post-implementation audit' (Innes & Norris, 1997: 52). We suggest that future research on ABC performance should include system type as an important variable.

## Acknowledgements

We are grateful for the constructive comments of two anonymous referees and the journal's editor Mike Jones.

## Appendix A The results of the factor analysis applied to user responses about ABC system performance ( $n = 181$ ).

|   | Item<br>N | Item<br>Mean | S.D  | Cronbach<br>Alpha |
|---|-----------|--------------|------|-------------------|
| <i>Cost Accuracy</i>  |           |              |      | 0.89              |
| Data from the ABC model provide an accurate assessment of costs in this division.   | 181       | 3.53         | 1.01 |                   |
| Data from the ABC model are used only for special cost studies.   | 172       | 2.71         | 0.91 |                   |
| The ABC costs do not seem reasonable to me based on what I know about this division.  | 181       | 2.87         | 0.97 |                   |
| Despite the implementation challenges, I am convinced that ABC is the right tool for helping us manage costs in this company. | 181       | 3.81         | 0.88 |                   |
| The managers of this division are eager to get ABC data.  | 180       | 3.58         | 0.96 |                   |
| Cost information from the ABC model is more accurate than produced by the traditional cost system.                            | 179       | 3.50         | 1.00 |                   |
| Results from the model matched my intuition about cost of operations and services.  | 170       | 3.44         | 0.98 |                   |
| Generally, managers prefer to use data from the traditional cost system rather than the ABC cost system.                      | 180       | 2.74         | 1.08 |                   |
| ABC data didn't tell me anything that I didn't already know about the division's costs  | 179       | 3.06         | 0.96 |                   |
| <i>ABC Impact</i>   |           |              |      | 0.80              |
| Managers would like the ABC model to be updated more frequently.  | 178       | 3.93         | 0.85 |                   |
| Information from the ABC model has had a noticeable positive impact on this division.   | 177       | 3.60         | 0.83 |                   |
| The managers of this division understand the importance of ABC.   | 174       | 3.60         | 0.82 |                   |
| Overall, ABC implementation has been a worthwhile experience for this division.   | 180       | 3.66         | 0.86 |                   |
| The managers of this division are knowledgeable about the theory of ABC.  | 175       | 3.42         | 0.92 |                   |
| Supporting ABC is the right thing to do for this company.   | 180       | 3.82         | 0.76 |                   |
| In general, ABC is a good thing for this company.   | 179       | 3.95         | 0.97 |                   |
| I would vote to continue implementing ABC   | 180       | 3.82         | 0.97 |                   |
| I am reluctant to use ABC data in place of costs from traditional costs system.   | 178       | 2.93         | 0.93 |                   |
| Corporate ABC group are the only ones who care about the divisions' ABC model.  | 170       | 2.59         | 1.03 |                   |
| <i>ABC Information Use</i>  |           |              |      | 0.95              |
| ABC identifies opportunities for improvements.  | 174       | 3.77         | 0.81 |                   |
| Use in product management decisions.  | 155       | 3.73         | 0.89 |                   |
| Driving process improvement decisions.  | 172       | 3.68         | 0.86 |                   |
| Outsourcing decisions.  | 161       | 3.59         | 0.81 |                   |
| Process/operating management  | 168       | 3.74         | 0.85 |                   |
| Product development strategies and decisions.   | 154       | 3.66         | 0.87 |                   |
| Budget and planning.  | 180       | 3.97         | 0.77 |                   |
| Restructuring or reorganisation decision.   | 167       | 3.57         | 0.87 |                   |
| Forecasting.  | 174       | 3.69         | 0.87 |                   |
| Capital investment  | 155       | 3.57         | 0.82 |                   |
| Performance Measures  | 177       | 3.60         | 1.06 |                   |
| Value-based management tools  | 155       | 3.65         | 0.81 |                   |
| Manage working capital  | 157       | 3.67         | 0.87 |                   |
| Rewards and recognition   | 163       | 3.32         | 1.11 |                   |
| <i>Decision Actions Taken</i>   |           |              |      | 0.98              |
| ABC changed process   | 154       | 2.68         | 1.02 |                   |
| ABC changed pricing strategy  | 150       | 2.84         | 1.20 |                   |
| ABC change process steps  | 149       | 2.64         | 0.99 |                   |
| ABC changed strategic focus   | 150       | 2.83         | 1.05 |                   |
| ABC changed operations  | 153       | 2.79         | 1.08 |                   |
| ABC changed customer support/services   | 151       | 2.69         | 1.06 |                   |
| ABC changed activities/processes  | 152       | 2.74         | 1.10 |                   |
| ABC changed customer segments.  | 151       | 2.61         | 0.97 |                   |
| ABC changed distribution channels.  | 144       | 2.60         | 0.94 |                   |
| ABC changed incentive compensation.   | 144       | 2.44         | 0.93 |                   |

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