# PERCEPTION OF ACTIVITY BASED COSTING IN AUSTRALIAN UNIVERSITIES

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**Abstract**

The study examines the perception of activity based costing (ABC) in Australian universities. Using a questionnaire survey, data was collected from twenty-six finance directors and/or chief financial officers in Australian universities. The perception of ABC implementation in Australian universities depends on many variables including the understanding of ABC, consideration of ABC as a strategic cost management system, the role of ABC in reduction of expenses, consideration of ABC as a valuable tool to enhance overhead cost allocation, and consideration of ABC as an effective strategic cost management system designed to incorporate the university's critical input, output, and process variables resulting in value creation. The result of regression analysis provides significant and positive association between the decision to implement ABC in Australian universities and both the treatment of ABC as a strategic cost management system and the degree of both senior management and internal champion support. The findings indicate substantial differences in the allocation of the overhead costs between ABC and traditional costing systems. The result also reveals that many Australian universities using the ABC method receive benefits in improving cost reduction and better resource allocation with revenue surplus. Furthermore, the study develops a generic model of cost pools and drivers of ABC implementation in Australian universities.

**Keywords:** ABC Implementation, Australian Universities, Equivalent Full- Time Student Unit, Cost Drivers, and Cost Pools

**JEL Classification:** G29; G30; M14

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## 1. Introduction

Since the 1980s, activity-based costing (ABC) has emerged as an important tool in business (Kaplan, and Bruns, 1987; Langfield-Smith et al., 2009). Gradually, ABC has penetrated into non-profit organizations including institutions of higher education (for example, see Cook, 2003; Cropper and Cook, 2000; Deacon and Huntington, 1987; Novak et al., 2011). According to Kaplan and Anderson (2007), ABC has corrected serious deficiencies in traditional standard-cost systems. The rationale for using ABC is to allocate indirect costs to products and services based on the factors that most influence them (Ellis-Newman, 2003; O'Connor and Cheung, 2007). By emphasizing the question of why an organization spends money in the first place, the ABC system has challenged traditional allocation of costs (Kaplan and Cooper, 2006; Wang et al., 2005). Moreover, the ABC approach involves an in-depth analysis of an organization in order to make an accurate determination of what is 'driving' cost (Davila, 2000; Simmons et al., 2006).

Most of the Australian universities are publicly funded by the Department of Education, Employment, and Training (DEET) on behalf of the Federal government and the Ministry of Education of the individual state governments. The per equivalent full-time student unit (EFTSU) has been declined and the government advised the universities to generate their own funds by increasing students' fees and reducing operating costs. Therefore, the planned dollars per EFTSU are declining and the Australian universities are expected to become more efficient with improved resource allocation and utilisation resulting in overall budget surplus (Sharman, 1989). In addition, all the Australian universities are facing quality audits and institutional accountability for their costs and efficient performance in quality teaching and research, so many universities are attempting organisational structural changes to achieve strategic objectives by merging different faculties, schools, divisions and departments (Langfield-Smith et al., 2009).

One of the problems faced by the Australian higher education sector is the use of traditional costing and financial accounting systems to meet the requirements for external reporting and audit (Sharma, 1995; Sharma and Ratnatunga, 1997). According to Ernst and Young (2000), these tools may be important and essential but they failed to provide minimal internal flexibility and information beyond being an extension of the institution's general ledger.

The results of the Ernst and Young (1998a and 1998b) surveys revealed that 42 per cent of staff considered that ABC would not be accepted within the university, while 29 per cent believed that it would be accepted and the rest (29 per cent) remained undecided. The DEYTA was interested and stressed priority in looking at costing data related to courses, units of study, student types and research grants (Ernst and Young, 2000). The ABC study provides an opportunity with better information on the costs of individual activities and may contribute to continuous improvement through benchmarking with other Australian universities (Skilbeck and Connell, 2001). A few Australian universities have initiated ABC implementation such as Monash, Wollongong, Western Australia; however, there is a great deal of opposition from the other universities (Gerdsen, 2001). Doyle (1994) cautioned about difficulties in comparing different costs within different divisions of the same university and among similar activities carried out by different universities. According to Ernst and Young (2000), cultural resistance is the main challenge of implementing the new ABC costing methodology into Australian universities.

The current study aims to (1) identify the number of Australian universities that are using ABC; (2) find out the number of universities that are planning to implement ABC in the future; (3) identify impediments in implementing ABC into Australian universities; (4) test a set of independent strategic variables that may motivate top and middle management and other employees to implement ABC; and (5) develop a generic model of viable cost drivers and cost pools that may be used by the universities in Australia in order to implement ABC.

The remainder of the study is structured as follows. Section 2 reviews prior research. Section 3 develops the research hypotheses and the model of the study. Section 4 discusses the research methodology. Section 5 presents the empirical findings of the study. Finally, conclusion and suggestions for further research are discussed in Section 6.

## 2. Literature review

Deacon and Huntington (1987) reported increasing demand of Australian universities for institutional accountability and being encouraged to rethink their organisational structure and methods of decision making. DEET (1991) developed a policy to use a funding model related directly to current patterns of institutional expenditure rather than costs based on ideal inputs. Cooper and Cook (2000) noted ABC as the alternative economic modelling approach with modern concepts of costing. Sharma (1995) developed a model for calculating program and graduate unit costs applied to an institution which produced results within five percent of the expectation. Kober et al. (1996) surveyed the application of ABC to human resource management in Western Australian universities and reported increasing demand of institutional accountability in terms of university costs and performance. Goddard and Ooi (1998) assessed the role of ABC to solve problems associated with central overhead cost allocation to library services at the University of Southampton and propositions showed substantial differences in allocation of the costs through ABC implementation compared to an existing system. Alejandro (2000) developed an ABC model in the higher education institutions to measure the costs of academic programs. Although the

process of implementation was complex, Alejandro's model was utilised successfully in the academic environment.

During the first half of 2000, the Information and Education Services Division of the University of Newcastle undertook an ABC study into its library and information technology (IT) services (Skilbeck and Connell, 2001). The study followed the methodology and objectives of the DETYA-sponsored study to develop a costing methodology for the Australian Higher Education Sector and the final report which was released in May 2000, was concurrent with the completion of this study (Skilbeck and Connell, 2001). The study was not undertaken by the division as an accounting process but rather as a strategic exercise that can provide information and feedback on activities to inform decision making and planning. The division saw its potential as a cost management strategy to assist in the setting of goals and tracking progress towards their attainment in an environment of intensifying competition and resource constraints, both internally and externally.

According to Skilbeck and Connell's (2001) report, the framework and systems for studying costs through such methodologies as ABC should continuously be challenged to ensure relevance in the data and activities and that the overall focus is informed as strategies change to meet competitive pressures and opportunities. The study also offered the opportunity for managers to approach cost management and budgeting from an alternative strategy to that which normally prevails within universities, generally involving financial performance measurement by comparing actual and budgeted results.

Heskin and Sharma (2001) undertook an ABC study of the discipline of social and behavioural science in Australian universities and proposed methodology which would lead to future implications in the pilot study. Gerdsen (2001) developed a model that has sector wide applicability requiring minimal future development or adaptation at the university level with a view to refinement as a standard tool for benchmarking and costing for support services in Australian universities. Cook (2003) developed a model for the Washington State University to gain information about the costing of different distance education courses and he found very positive results that are critical to strategic planning and for adapting new technological developments. Heaney (2004) discussed the ABC model of Oxford University Library services and expected to enhance operational efficiency of 30 federated library services at Oxford University. Novak et al. (2011) describe how a medium-sized university library implemented ABC and other broad-based decision-making strategies to make the necessary budgetary cuts and refocus library services accordingly. Their study uses ABC to quantify the cost-drive of services in the library. Given the current budgetary cuts that academic libraries are facing, a rational, data-driven ABC approach can lead to constructive organizational decision making and outcomes. The study by Novak et al. (2011) also demonstrates the value of ABC in assessing services and addressing issues on how libraries can do more with less.

The studies into Australian universities include Rumble (1989) at Deakin University, Doyle (1994) at University of Technology in Sydney, Izan et al. (1995) at University of Western Australia, Ellis-Newman et al. (1996) at Edith Crown University, Ellis-Newman and Robinson (1998) at University of Western Australia, and Gerdsen (2001) and Skilbeck and Connell (2001) at University of Newcastle. Most of these studies focused on the identification of administrative cost, support cost as well as total cost (i.e. cost drivers and pools) with performance measurement and improvement. Although, Kober et al. (1996) reported on a special study by the Australian Vice Chancellor Committee, which indicates the pressing need for universities to reform their administrative operations and to develop streamlined and integrated systems.

Most of previous literature suggests that there is a good opportunity to explore the governing fact of the ABC within the whole university costing system and the application of ABC technique to educational institutions. Also ABC can assist managers and staff to better understand their actions and decisions by focusing attention on those activities that help them achieve their goals through a structured and methodical process (Johnson and Kaplan, 1987; Kaplan and Norton, 1992; Skilbeck and Connell, 200; Pernot et al., 2007).

According to Kaplan and Bruns (1987), Sapp et al. (1990), and Skilbeck and Connell (2001), there are common threads of ABC implementation. These threads include: (a) capture the attention of top management, (b) don't shoot the customer, (c) decide the form ABC will take, (d) supplement the ABC measure creatively where appropriate, (e) supplement ABC techniques, which strengthens the tool

without damaging propensity for action, (f) challenge managers, who believe their costs are fixed, (g) calculate costs top-down and bottom-up, (h) account for cost of capital, and (i) use multi-functional teams in business, which means that people with different perspectives, including managers from different functions**,** who must be compelled to deal with the problems that are critical for the business as a whole (Kaplan and Bruns, 1987).

## 3. Development of study hypotheses and model

There are many studies that have been undertaken for the implementation of ABC in manufacturing, financial and service organizations[12]. On the other hand, not much research has occurred within the Australian university system (Ernst & Young, 2000; Gordon and Charles, 1997; Linke, 1991; Zaman, 2007). Most of the ABC research at Australian universities has been conducted on library, information technology services, and human resource division areas (Cropper and Cook, 2000; Gerdsen, 2001; Ellis-Newman et al., 1996; Ellis-Newman and Robinson, 1998; Peebles and Antolovic, 1999).

### *3.1.Implementation decision of ABC and its treatment as a strategic cost management system*

The importance of ABC implementation in Australian universities and higher educational institutions has been felt by the Federal Government, State Governments, Ernst and Young consulting CPA firm and some universities, which have already implemented and benefited (Ellis-Newman et al., 1996; Ellis-Newman and Robinson, 1998; Gerdsen, 2001). On the other hand, many universities and higher learning institutions have not taken the initiative to implement ABC (Kober et al., 1996; Rumble, 1989). Due to these circumstances, an investigation is undertaken to discover the problems of ABC implementation in Australian universities in the light of the significant changes that have occurred. ABC management is now increasingly seen as a strategic tool to achieve organisational objectives under the new competitive environment of the higher education sector (Gerdsen, 2001). If ABC is implemented into Australian universities, it will reduce the costs and improve the resource allocations and may result in improve resource allocations consistent with strategic objectives and budget surpluses of these universities. It will also enable university students and the community to determine true cost and profitability of the individual courses and feasibility of university degrees with a cost benefit analysis (Gerdsen, 2001; Kober et al., 1996). Since ABC is a strategic cost management technique, its use will help the particular university to compete with other competitors nationally and globally. ABC will also help in its benchmarking (Langfield-Smith et al., 2009; Sharman, 1989; Sharma and Ratnatunga, 1997). Moreover, ABC offered an approach that could inform management of the actual costs of the services they provide; how these costs might vary with changes in demand from client groups; the cost of different student types enrolled; or the unit cost of providing particular services in comparison to other universities or providers (Skilbeck and Connell, 2001).

Based on the above discussion, the first hypothesis is proposed as follows.

**H1:** The implementation of ABC in Australian universities is positively associated with the treatment of ABC as a strategic cost management system.

### *3.2 Implementation of ABC and top management and internal champion support.*

According to Ernst and Young (2000), the use of traditional costing and financial accounting systems to meet the requirements for external reporting and audit (Sharman, 1989; Sharma and Ratnatunga, 1997) may be important and essential; however, they failed to provide minimal internal flexibility and information beyond being extensions of the institution's general ledger. Therefore, Ernst and Young (2000) proposed an activity based costing and management methodology that was trialled into the four universities of Charles Stewart University, Murdoch University, University of Western Australia (UWA), and the Royal Melbourne Institute of Technology (RMIT University). The University of Newcastle used ABC as a tool for better linking the Division's plans with budgets and improving decision making

[12] For studies undertaken for the implementation of ABC in manufacturing organizations, see Abernethy and Brownell, 1997, 1999; Booth and Giacobbe, 1997; Chenhall, 2005; Davila, 2000; Zaman, 1997. In financial and service organizations, see Brown et al., 2004; Coit and Karr, 1997; Cobb et al., 1995; Innes and Mitchell, 1997; Isik and Hassan, 2002; Pi and Timme, 1993; Pollitt, 1986.

processes within the Division. It was expected that other Australian universities would adopt the ABC system as the study was viewed as a determination of accurate estimation of funding level required by particular divisions, faculty and schools for tracking their true costs of activities (Gerdsen, 2001; Skilbeck and Connell, 2001).

A few Australian universities have initiated ABC implementation such as Monash, Wollongong, Western Australia; however, there is a great deal of opposition from the other universities (Gerdsen 2001). Therefore, the top management and internal champion support of ABC by the chief financial officers with the support of chief executive officers (Vice Chancellor) may result in ABC implementation into Australian universities (Booth and Giacobbe, 1997; Brown, et al., 2004). Internal champion support is a kind of support of a person within the university/organisation, who promotes the cause of innovation and acts as the role of a champion to educate senior managers and users about a new system like the ABC project and its need for implementation (Flower and Yahanpath, 2000; Premkumar and Potter, 1995).

Based on the above discussion, the second hypothesis is developed as follows.

**H2:** The implementation of ABC in Australian universities is positively associated with the top management and internal champion support.

### *3.3. Study model*

To test the above hypotheses we used the following model:

$$ABCIMPL_i = \beta_0 + \beta_1 REDEXP + \beta_2 OHCALL + \beta_3 STCMS + \beta_4 UNDRST + \beta_5 VALCRE + e_i$$

Where:

| | | |
|---|---|---|
| $ABCIMPL_i$ | ABC implementation for participant ¡th | |
| $\beta_0$ | Constant (Intercept) | |
| REDEXP | Reduction of expenses | (H1) |
| OHCALL | Enhanced overhead cost allocation | (H1) |
| STCMS | Strategic cost management | (H1) |
| UNDRST | The understanding of ABC | (H2) |
| VALCRE | Value creation | (H2) |
| $e_i$ | The difference between the predicted and observed values of the ABCIMPL for participant ¡th (the error term). | |

The expected signs of the coefficients are $\beta_1 > 0$, $\beta_2 > 0$, $\beta_3 > 0$, $\beta_4 > 0$, $\beta_5 > 0$ respectively.

As discussed above, our dependent variable, implementation of ABC, has taken the value of "1" if the university has implemented ABC or has a plan to implement ABC in the future and the value of "0" if otherwise. We used a single-item instrument for each of the independent variables, namely consideration of ABC as a strategic cost management system, the role of ABC in reduction of expenses, consideration of ABC as a valuable tool to enhance overhead cost allocation, and consideration of ABC as an effective strategic cost management system designed to incorporate the university's critical input, output, and process variables resulting in value creation. Therefore, we asked the participants in the study to indicate, on a Seven-point Likert-type scale ranging from 1 = 'To a strongly disagree' to 7 = 'To a strongly agree', their perceptions of the extent to which each of the independent variables contributes in implementing ABC in their university. For the last independent variable of the understanding of ABC, we used a Five-point Likert-type scale ranging from 1 = 'To no understanding of ABC to 5 = 'To a very high understanding'.

## 4. Research methodology

The sample comprises all 38 universities in Australia. The participants are the finance directors, chief financial officers, cost and management accountants, and other senior executives related to finance, budget and costing in these universities. Each participant was contacted by phone/email to obtain his/her consent to participate in the study before sending the survey questionnaire. Data was collected by

sending the survey questionnaire to selected participants using email/mail with paid self addressed envelopes to increase the response rate. A preliminary study was conducted in the universities about who were already using activity based costing (ABC). Also, data was collected using the case study research method through direct interviews.

In order to preserve the rights and safety of the participants, the rules of ethics and confidentiality in collecting data are followed. In addition, details of variables and the questionnaire design to test research questions in the survey questionnaire have been outlined. A questionnaire[13] was developed as the survey instrument incorporating university profiles followed by questions specific to the use of ABC implementation. A number of measures were taken to enhance the response rate using the reply paid envelopes, assuring participants that their responses will be treated as confidential and aggregate responses would be reported to them after the data analysis is completed. Telephone interviews were also conducted.

The survey instrument was tested through a mail out to 25 per cent of the universities as a random sample leaving 75 per cent for the final mail out. In the pilot study involving 25 per cent of the universities, 15 per cent were returned within three weeks and the response received was per expectation. The remaining 75 per cent were sent to the respondents after contacting them by phone/email. Twenty-six (26) completed questionnaires were received from 26 universities. The questionnaire response rate was 68 per cent. Table 1 presents the participating universities. Collected data was analysed by content analysis for qualitative data and by the SPSS program for quantitative data.

## 5. Research findings

The finance directors, chief financial officers, and cost and management accountants of the 26 responding universities displayed a wide range of variability on the characteristics surveyed. Most of them were experienced accountants and aged between the ranges of 25 years to 59 years. Most of them had graduated with a master's degree in accounting and are members of either Certified Practising Accountants (CPA) or the Institute of Chartered Accountants (CA). As part of the project plan, only 8 agreed participants from different universities who are chief financial officers and/ or finance directors have been interviewed over the phone.

The spokesperson from Murdoch University stated at this moment that they have started to develop a unit costing model and capturing some elements of costs in relation to units but it would be verified. They initially started to track academic time and maybe some administrative time within the divisions had been captured as well. Also they are planning a strategic plan and looking at what and how to deliver. He concluded that:

> 'The performance of the school should be by simply looking at high-level financial information. Then identification of the opportunity within the school to reduce its cost is necessary, looking at the activity and the costs being allocated, where they are spending plenty of times. The decision should be based on ABC depending on drivers and a strategic reason'.

The spokesperson from University of Newcastle said:

> 'The results that they are receiving are qualitative in nature and give understanding on the financial impact on various courses and programs. It is interesting to identify some board rules of thumb and get some indication, which course and program that are not financially viable or sustainable. The finance division received appreciation at both the levels of Head and Dean of school and as they are being able to manage their financial situation. So the university give them a budget for the year and it is ultimately within their control to ensure that they are not operating under financial stress and know essential economy of skeleton in term of student load per subject. The budget model is really annual process system and ABC allows University of Newcastle budget planner to get better understand which area is under financial stress and/or has got excess capacity and pay budget accordingly which helps to be more strategic in the budget process'.

[13] A copy of the survey questionnaire can be provided if it is requested.

The spokesperson from Monash University stated that they have implemented activity based costing for more than five years and identified the biggest problem from the implementation point of view to be changing the working environment and management. His final comment is that:

> 'For non-profit organization like university, the management structures are based on teaching and research, research outcome, the quality of research and teaching and are not for making profit. In that case they are evaluating the performance, which is very difficult. For costing process, they have incentives to be able to manage cost better and want the way how the finance is actually managed'.

The spokesperson from the University of South Australia believed that they are in the stage of developing a cost model that can inform on university overheads which is in almost half of the organisation, all the central administration and infrastructure. They are using the costing result that has set the levy rates. So in that way the amount of overhead that has been identified which was more appropriate than before and the better costing will necessarily reduce cost. His concluding comment is that:

> 'Universities those implemented ABC feel more confident on their results and more enthusiastic. Now they started to use the results in a particular way rather than very directly'.

The spokesperson from the Finance division of the Central Queensland University believed that ABC is a valuable overhead cost allocation system in the manufacturing environment and slightly agreed about its use in an academic environment. When the interviewer informed about the benefits received by implemented universities, like Monash, Newcastle, and James Cook University, and asked why it is not implementable at the Central Queensland University? He replied that:

> 'ABC implementation is not cost effective. He also mentioned the problem of finding real cost drivers of teaching activities of the present courses'.

He also mentioned the fundamental problem of cost drivers of the various courses and reported some of the underlining facts such that:

> 'We are teaching 193 courses where 50 per cent of our student load is, and we deliver 1,200 courses, where the other 50 per cent student load is and the fundamental problem is in that equation'.

Table 1 provides that 13 universities (50 per cent) have implemented ABC, while 11 universities (42 per cent) planned to implement ABC in the near future and 2 universities (8 per cent) did not have plans to implement ABC yet.

The descriptive statistics (skewness and kurtosis) for the dependent and explanatory variables presented in Table 2 indicate that the implementation of ABC and all independent variables are normally distributed (both skewness and kurtosis coefficients are not significantly different from zero at the 0.05 level of significance)[14]. Five independent variables of activity based costing implementation, namely reduction of expenses, enhanced overhead cost allocation, strategic cost management, the understanding of ABC, and value creation are ranked based on the mean score of responses to an item. The highest mean score was given the highest rank (enhanced overhead cost allocation, the understanding of ABC, strategic cost management, reduction of expenses, and value creation respectively).

[14] A rule of thumb for the normal distribution of the data based on the statistic value (z) for the skewness and kurtosis is that a calculated statistic value should not exceed the critical z value ± 2.58 at the .01 probability level and ± 1.96 at the .05 probability level (Groebner et al., 2005; Hair et al., 1998, pp. 70-73) .

**Table 1.** ABC implementation in Australian universities

| ABC Implemented | | Plans to implement ABC | | No plan |
|---|---|---|---|---|
| Uni. no. | years of implementation | Uni. no. | Years to implement ABC | No ABC plan |
| 2 | ≤ 1 year | 1 | less than 5 to ≥ 4 years | |
| 3 | more than 1 to ≤ 2 years | 1 | less than 4 to ≥ 3 years | |
| 3 | more than 2 to ≤ 3 years | 2 | less than 3 ≥ 2years | |
| 2 | more than 3 to ≤ 5 years | 4 | less than 2 ≥ 1 year | |
| 3 | more than 5 years | 3 | less than 1 year | |
| **13** | | **11** | | **2** |

**Table 2.** Descriptive statistics for all variables

| Variables[1] | Rank[2] | Mean | Median | Std. D | Theoretical range | Actual range | Skewness | Kurtosis | N |
|---|---|---|---|---|---|---|---|---|---|
| **ABCIMPL** | | 0.5000 | 0.5000 | 0.50990 | 0 -1 | 0 - 1 | 0.000 | -2.174 | 26 |
| **REDEXP** | 4 | 4.3077 | 4.5000 | 2.31118 | 1 - 7 | 2 - 7 | 0.056 | -2.041 | 26 |
| **UNDRST** | 2 | 3.2692 | 4.0000 | 1.31325 | 1 - 5 | 1 - 5 | -0.198 | -1.323 | 26 |
| **OHCALL** | 1 | 4.6923 | 4.5000 | 2.01533 | 1 - 7 | 2 - 7 | 0.013 | -1.913 | 26 |
| **STCMS** | 3 | 4.3462 | 4.5000 | 2.20803 | 1 - 7 | 2 - 7 | 0.030 | -1.978 | 26 |
| **VALCRE** | 5 | 4.2692 | 4.0000 | 2.06993 | 1 - 7 | 2 - 7 | 0.049 | -1.891 | 26 |
| **Valid N** | | | | | | | | | **26** |

[1]Definition of variables: ABCIMPL: ABC implementation, REDEXP: reduction of expenses, UNDRST: the understanding of ABC, OHCALL: enhanced overhead cost allocation, STCMS: strategic cost management, VALCRE: value creation.
[2]Ranking was made based on the mean score of responses to an item. The highest mean score was given the highest rank.

**Table 3.** Results of regression analysis

$$ABCIMPL_i = \beta_0 + \beta_1 \text{REDEXP} + \beta_2 \text{UNDRST} + \beta_3 \text{OHCALL} + \beta_4 \text{STCMS} + \beta_5 \text{VALCRE} + e_i$$

| **Predictor*** (Expected Sign)** | **Coefficient** | **Std. Error** | **T- Value** | **P- Value** |
|---|---|---|---|---|
| REDEXP (+) | 0.476 | 0.031 | 3.360 | 0.003** |
| OHCALL (+) | 0.262 | 0.033 | 2.023 | 0.050* |
| STCMS (-) | -0.041 | 0.043 | -0.218 | 0.830 |
| UNDRST (+) | 0.066 | 0.024 | 1.078 | 0.294 |
| VALCRE (+) | 0.251 | 0.029 | 2.139 | 0.045* |
| Constant | -0.570 | 0.054 | -10.650 | 0.000 |

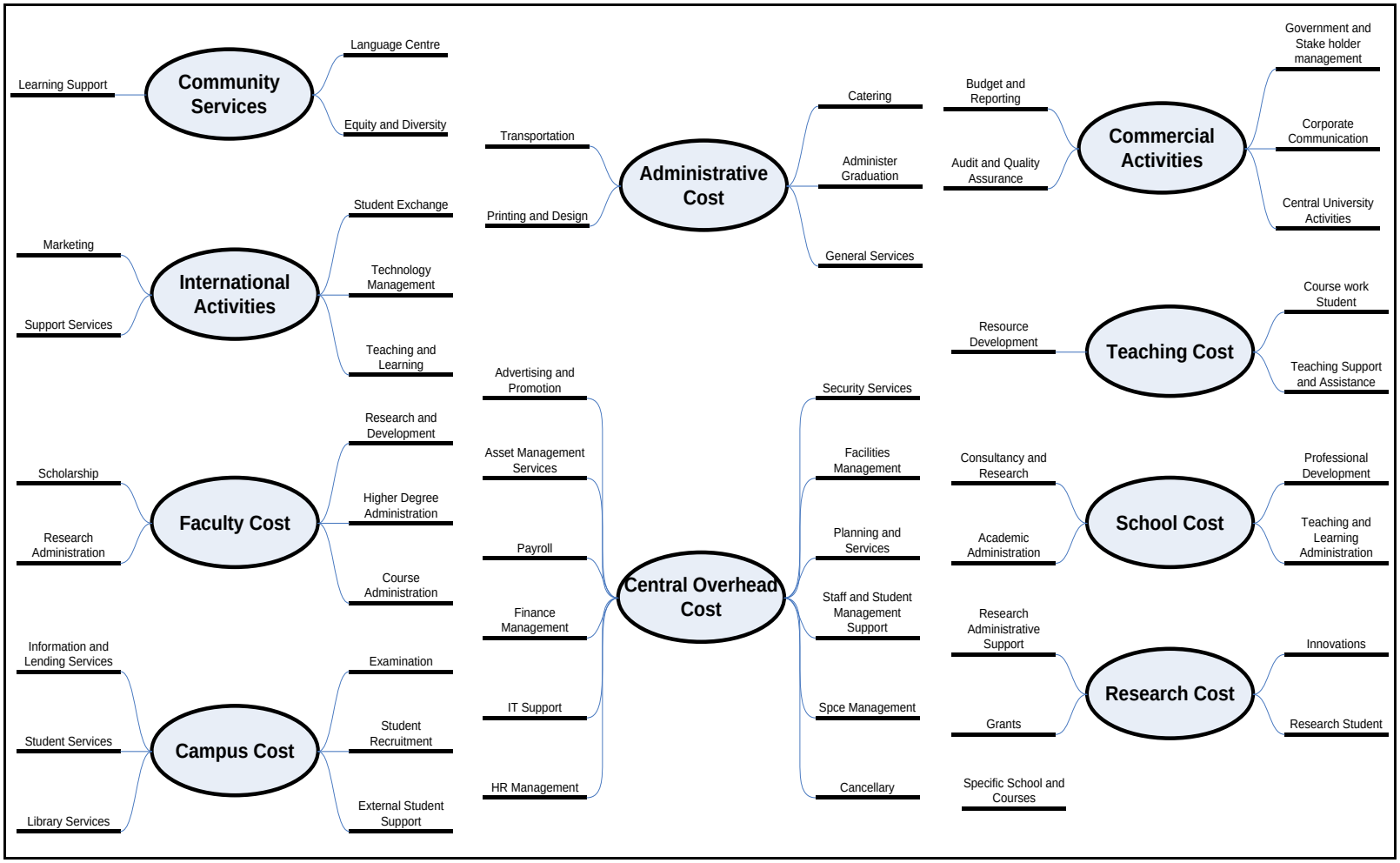
| | |
|---|---|
| S.E of regression | 0.074 |
| $R^2$ | 0.983 |
| Adjusted $R^2$ | 0.979 |
| F – Value | 232.187; P = 0.000 |
| DF - Model | 5 |
| DF - Error | 20 |

** $p < 0.01$ (two tailed test). * $p < 0.05$ (two tailed test). Note: Variables are described in Table 2.

**Table 4.** ABC implementation problems and benefits

| ABC implementation problems | ABC implementation benefits |
|---|---|
| ▪ Gaining full understanding of ABC concept by the stakeholders.<br>▪ Strong cultural and philosophical traditions within university sector.<br>▪ Liability of finance department to communicate real benefits of ABC (potential qualitative as well as financial benefits).<br>▪ Complexity in data collection.<br>▪ Administratively very burdensome in an academic environment where no time sheet is maintained.<br>▪ Lack of detailed costing process and better understanding of cost drivers and cost pools and its linkage between revenue and expenditure.<br>▪ Encouraging staff to participate in the process.<br>▪ Staff resistance to measuring outputs.<br>▪ Cost of implementation and lack of cooperation of the staff.<br>▪ Reliable information as to the basis for allocation of direct and overhead costs.<br>▪ Data collection if not often user friendly.<br>▪ Information often kept at school level on spreadsheets are not openly submitted or sometimes submitted incompletely.<br>▪ Education across the university and ownership by the university wide.<br>▪ Suspicion among the academic staff on the motives of introducing ABC.<br>▪ Internal Political influences.<br>▪ Confidence within the university.<br>▪ Student information system is not able to produce the required level of detail.<br>▪ Time consuming and tend to use proxy drivers.<br>▪ Lack of gaining acceptance of costing academic activities, to determine profitability from the academic activities and the assignment of academic staff report.<br>▪ Construction of the finance system and the ability to extract accurate cost pools for ABC allocation. | ▪ Effectively allocate resources for the generation of the certain outcomes and objectives.<br>▪ Outputs can be used to develop models for the assessment of the new proposals.<br>▪ Benchmarking to drive out further efficiency.<br>▪ Strategic resulting in different outcomes that is more robust decision rather than decision based on personal bias and preferences.<br>▪ Improves costing information leading to improved strategic management decisions<br>▪ Greater understanding of cost drivers.<br>▪ Management can be better guided as to efficient and profitable areas.<br>▪ Management can be identified the cost drivers that effect profitability.<br>▪ May lead to reduction in unprofitable courses by identifying cost of each course.<br>▪ Powerful management tool for rationalisation of courses offering and more effective use of funds.<br>▪ Would provide additional data for the consideration of the budget process.<br>▪ Provide useful data for the analysis of the course or unit contributions.<br>▪ More effective and efficient methodology for overhead allocation and for reduced budgeting process.<br>▪ Improve core system to be able to deliver appropriate information for informed decision making.<br>▪ Increasing initial data capture and more detail planning.<br>▪ Able to approach funding bodies for more funding with solid data.<br>▪ Provide transparency and fact based decision.<br>▪ Great tool for financial viability of problems.<br>▪ Understanding true cost of activities of administration and cost of research.<br>▪ Able to assess the viability of the faculties, schools and new program. |

**Figure 1.** ABC cost drivers and pools



All the variables were correlated[15]. The correlation reflects the joint contribution of all five independent variables predicted by ABC as a strategic cost management system for strategic planning and decision making of the universities. The five independent variables of activity based costing implementation, namely reduction of expenses, enhanced overhead cost allocation, strategic cost management, the understanding of ABC, and value creation, are highly and significantly correlated with the implementation of ABC in Australian universities (i.e., 0.984, 0.973, 0.977, 0.866, 0.966 respectively) at the 0.01 level (2 - tailed).
We tested our hypotheses by regressing the implementation of ABC against the proposed independent variables using the following multiple regression model:

$$ABCIMPL_i = \beta_0 + \beta_1 REDEXP + \beta_3 OHCALL + \beta_4 STCMS + \beta_2 UNDRST + \beta_5 VALCRE + e_i$$

Table 3 presents the results of the multiple regression analysis.

The independent variables, namely reduction of expenses (Coefficient = 0.476, p = 0.003) and enhanced overhead cost allocation (Coefficient = 0.262, p = 0.050) are highly and significantly associated with the implementation of ABC in Australian universities. This provides strong support of the first hypothesis (H1).The significant correlation coefficient (F = 232.187, p = 0.000) shows that Australian universities are likely to implement ABC by meeting corporate strategic planning objectives. On the other hand, there is no significant association between implementation of ABC in Australian universities and consideration of ABC as a strategic cost management system (Coefficient = -0.041, p = 0.830).

There is also statistical support to the second hypothesis (H2) as implementation of ABC in Australian universities is positively and significantly associated with the consideration of ABC as an effective strategic cost management system designed to incorporate the university's critical input, output, and process variables resulting in value creation (Coefficient = 0.251, p = 0.045); however, there is no significant association between ABC implementation decision and the understanding of ABC in Australian universities (Coefficient = 0.066, p = 0.294).

Table 3 shows that the overall regression model is significant at a $p < 0.01$ level (F = 232.187). The adjusted $R^2$ reveals that 97.7 per cent of the dependent variable (*ABCIMPL*) is explained by the explanatory variables.

In the open ended questionnaire and in telephone interviews, most of the respondents viewed that internal champion support (i.e., chief executive officer like Vice-Chancellor and chief financial officer's support) and promotion about an innovation like ABC are essential in implementation of ABC into Australian universities. This provides strong support for the second hypothesis (H2). Although the ABC approach may overcome some of the problems of overhead allocation and improve the economic efficiency of organizations, there are significant problems with its practical application and data collection reliability (Jarrar et al., 2007; Valderrama and Sanchez, 2006). Therefore, respondents were also asked a series of open ended questions to write their opinions of the problems and benefits of ABC implementation at the university level. Table 4 summarises the problems and benefits of ABC implementation in Australian universities from the respondents' perspectives.

Development of a generic model for cost drivers and cost pools for ABC implementation in Australian universities is an important contribution to the literature by the current study. Data collected from ABC implemented universities have been used to develop a generic model for cost pools and cost drivers of ABC. The model consists of 10 cost pools and 53 cost drivers. The major university costing activities have been listed although more detailed cost drivers may be required in the practical applications. We believe that the developed model may initially be tested in implementing ABC by each individual university in Australia in order to prepare its own model that suits the particular needs of an individual university.

[15] For reasons of space, only summary results of correlation are presented here; however, the detailed results are available from the first author on request.

## 6. Conclusion and suggestions for further research

The results indicate that Australian universities appeared to have adopted a strategic environmental posture to implement ABC as 13 out of 26 participating universities (50 per cent) have already implemented ABC and 11 (42 per cent) are planning to implement in the near future. Two universities (8 per cent), although not implementing ABC, have intentions to implement if funds are available from the government and other sources. The statistical results show that chief financial accounts officers and other management accountants believe that ABC is a strategic cost management system and if it is used in strategic planning by the individual university then ABC is likely to be implemented.

Moreover, the respondents' replies revealed that organisational factors like top management support, internal champion support and other staff support are very important for ABC implementation (Premkumar and Porter, 1995). ABC is a bigger project so a champion is needed to drive the project and to facilitate communication within a university (Abernethy and Brownell, 1997; Foster and Swenson, 1997; Partridge and Perren, 1998). This issue had been explored concerning information system implementation (Prescott and Conger, 1995; Wang et al., 2005). Those findings of champion support will be positively associated with the implementation of ABC.

The findings related to ABC implementation have implications for the top managements, practitioners, academics and scholars of the universities in Australia. The findings about ABC as a strategic cost management system will help the universities in Australia in their strategic planning and decision making in the growing competition of the higher education sector in Australia. If ABC is adopted then it will improve resource allocation, reduce expenses and improve budget surpluses. It is recommended that the management of individual universities may adopt our developed generic model of cost drivers and cost pools (see Figure 1) for implementation of ABC and the university management can prepare tailor made model to suit the individual need of the university**.**

## References


1. Abernethy, M. and Brownell, P. (1997), 'Management control systems in research and development organizations: the role of accounting, behavior and personnel controls', *Accounting, Organizations and Society*, 22, 233-248.
2. Abernethy, M. and Brownell, P. (1999), 'The role of budgets in organizations facing strategic change: an exploratory study', *Accounting, Organizations and Society*, 24, 189-204.
3. Alejandro, J. N. (2000), Utilising an activity based approach for estimating the costs of college and university academic program, *PhD Thesis*, Baylor University, USA.
4. Booth, P. and Giacobbe, F. (1997), *Activity-based costing in Australia manufacturing firms: key survey findings*, Management Accounting Issue Report Number 5, Management Accounting Centre of Excellence, CPA Australia, Melbourne.
5. Brown, D., Booth, P. and Giacobbe, F. (2004), 'Technological and organisational influences on the adoption of activity-based costing in Australia', *Accounting and Finance*, 44, 329-356.
6. Chenhall, R. H. (2005), 'Integrative strategic performance measurement systems, strategic alignment of manufacturing, learning and strategic outcomes: an exploratory study', *Accounting, Organizations and Society*, 30, 395-422.
7. Cobb, I., Helliar, C. and Innes, J. (1995), 'Management accounting change in a bank', *Management Accounting Research*, 6(2), 155-176.
8. Coit, C.I. and Karr, J. (1997), 'Performance measurement in the banking industry: results of a BAI survey', *Bank Accounting & Finance*, 10(3), 23-30.
9. Cook, C.L. (2003), Activity based costing at Washington State University: A comparative cost study of three distance education delivery modes, *PhD Thesis*, College of Education, Washington State University.
10. Cropper, P. and Cook, R. (2000), 'Activity-based costing in universities - five years on', *Public Money &Management*, 20(2), 61-68.
11. Davila, T. (2000), 'An empirical study on the drivers of management control systems' design in new product development', *Accounting, Organization and Society*, 25, 283-410.
12. Deacon, G and Huntington, R. (1987), 'Organisational change at the University of Melbourne - eighteen months on'. *Journal of Tertiary Education Administration*, October, 173-190.
13. Department of Employment, Education and Training. (1991), *Accounting in Higher Education: report of the review of the accounting discipline in higher education*, AGPS, Canberra.

14. Department of Employment, Education and Training. (1993), *National report on Australia's Higher Education Sector*, AGPS, Canberra.
15. Doyle, K. (1994), 'Some Pioneering Studies of Student Costs Using the New Activity Based Costing Methodology', *Journal of Institutional Research in Australia,* 3(2), 40-54.
16. Ellis-Newman, J. (2003), 'Activity-based costing in user services of an academic library', *Library Trends*, 51(3), 333-348.
17. Ellis-Newman, J., Izan, H. and Robinson, P. (1996), 'Costing support services in universities: An Applicationof Activity-Based Costing, *Journal of Institutional Research in Australia,* 5(1), 75-86.
18. Ellis-Newman, J. and Robinson, P. (1998), 'The cost of library services: Activity-based costing in an Australian academic library', *The Journal of Academic Librarianship,* September, 373-379.
19. Ernst &Young. (1998a), *Costing methodology: for use within Australian higher education institutions,* September, DETYA, Canberra.
20. Ernst & Young. (1998b), *Issues Report: On costing within Australian higher education institutions,* September, DETYA, Canberra.
21. Ernst & Young. (2000), *A Study to develop a costing methodology for the Australian Higher Education Sector: final report,* May, DETYA, Canberra.
22. Fowler, M. and Yahanpath, N. (2000), 'Implementing activity based costing in tertiary institutions, *Chartered Accountants Journal of New Zealand,* 79 (11), 28-31.
23. Foster, G. and Swenson, D. (1997), 'Measuring the success of activity-based cost management and its determinants', *Journal of Management Accounting Research*, 9, 109-141.
24. Gerdsen, T. (2001), *Activity Based Costing as a performance tool for library and information technology services*, Forth Northumbria, Information and Education Services Division, The University of Newcastle, Australia [Accessed online 5th Sep. 2011].
25. Goddard, A. and Ooi, K. (1998), 'Activity based costing and central overhead cost Allocation in universities: A case study', *Public Money & Management*, 18(3), 31-49.
26. Gordon, G. and Charles, M. (1997), 'Unravelling Higher Education's Costs', *Planning for Higher Education,* 26 (Winter), 24-26.
27. Groebner, D. F., Shannon, P. W., Fry, P. C., and Smith, K. D. (2005), *Business Statistics- A Decision- making Approach*. Pearson, Prentice Hall, New Jersey.
28. Hair, Jr. J. F., Anderson, R. E., Tatham, R. L. and Black, W. C. (1998), *Multivariate Data Analysis*, Prentice-Hall, New Jersey.
29. Heaney, M. (2004), 'Easy as ABC? Activity-based costing in Oxford University Library Services", *The Bottom Line: Managing Library Finances*, 17(3), 93-107.
30. Heskin, K. and Sharma, R. (2001), 'Activity based costing in an Australian university: A pilot of social and behavioural sciences', *Journal of Institutional Research*, 10(1), 56-62.
31. Innes, J. and Mitchell, F. (1997), 'The application of activity-based costing in the United Kingdom's largest financial institutions', *The Service Industries Journal*, 17(1), 190-203.
32. Isik, I. and Hassan, M.K. (2002), 'Technical, scale and allocative efficiencies of Turkish banking industry', *Journal of Banking and Finance*, 26, 719-66.
33. Jarrar, N. S., Smith, M. and Colin, D. (2007), 'Perceptions of preparers and users to accounting change; a case study in an Australian university', *Managerial Auditing Journal*, 22(1), 80-92.
34. Johnson, H. T. and Kaplan, R. S. (1987), *Relevance lost: The rise and fall of management accounting*, Havard University Press. Boston.
35. Kaplan, R. S. and Anderson, S. R. (2007), *Time-driven activity-based costing*, Harvard Havard University Press. Boston.
36. Kaplan, R. S. and Bruns, W. (1987), *Accounting and Management: A field study perspective*, Havard University Press. Boston.
37. Kaplan, R. S. and Cooper, R. (2006), *Activity-based Costing: Introduction*, Havard University Press. Boston.
38. Kaplan, R. S. and Norton, D. P. (1992), 'The Balanced Scorecard- Measures that drive Performance', *Harvard Business Review*, 70(1), 71-79.
39. Kober, R., Brown, P., Izan, H. and Robinson, P. (1996), Costing human resource services in an Australian university: An application of activity based costing, Working Paper, 97-172, Department of Accounting, University of Western Australia. Online at URL: http://www.af.ecel.uwa. WorkingPapers//abstracts/97-72.htm [accessed June 9 2011].
40. Langfield-Smith, K., Thorne, H. and Hilton R. W. (2009), *Management accounting: information for managing and creating value*, 4th Edition, McGraw-Hill, NSW.
41. Linke, R.D. (1991), *Performance indicators in higher education*, Volume 1, Report and Recommendations, AGPS, Canberra.

42. Matthews, J. (2007), *'The evaluation and measurement of library services'*, Libraries Unlimited, Westport.
43. Novak, D., Paulos, A. and Clair, G. St. (2011), 'Data-driven budget reductions: A case study', *The Bottom Line: Managing Library Finances*, 24(1), 24-34.
44. O'Connor, N. G. and C. L.K. Cheung, C. L.K. (2007), 'Product/service adoption strategies and bank customer accounting in Hong Kong', *Pacific Accounting Review, 19(1), 31-46.*
45. Partridge, M. and Perren, L. (1998), 'An integrated framework for activity-based decision making management decision', 36 (9/10), 580-588.
46. Peebles, C. S. and Antolovic, L. G. (1999), 'Cost and quality and value of information technology support in large research universities', *Educom Review*, 34(5), 20-49.
47. Pernot, E., Roodhooft, F. and Van den Abbeele, A. (2007), 'Time-driven activity-based costing for inter-library services: a case study in a university', *The Journal of Academic Librarianship*, 33(5), 551-60.
48. Pi, L. and Timme, S. G. (1993), 'Corporate control and bank efficiency', *Journal of Banking and Finance*, 17, 515-530.
49. Pollitt, C. (1986), 'Beyond the managerial model: the case for broadening performance assessment in government and the public services', *Financial Accountability & Management*, Autumn, 155-170.
50. Premkumar, G. and Potter, M. (1995), Adoption of computer aided software engineering (CASE) technology: an innovation adoption perspective, *DATA BASE Advances*, 26, 105-124.
51. Rumble, G. (1989), *Activity costing in mixed mode institutions: A report based on Deakin University*, Deakin University.
52. Sapp, R., Crawford, D. and Rebishcke, S. (1990), 'Article title?', *Journal of Bank Cost and Management Accounting*, 3(2), 221-237.
53. Sharma, R., Ratnatunga, J. (1997), 'Traditional and activity based costing systems', *Accounting Education*, 6 (4), 337-345.
54. Sharma, R. (1995), 'Program and graduate cost model: an Australian case study, *Australasian Association for Institutional Research*, 4(1), 84-88.
55. Sharman, R. (1989), 'Resource planning of non-academic units within higher education institutions', *Journal of Tertiary Education Administration*, May, 19-36.
56. Simmons, C., Wright, M. and Jones, V. (2006), 'Full costing of business programs: benefits caveats', *International Journal of Education Management*, 20(1), 29-42.
57. Skilbeck, M. and Connell, H. (2001), *A study to develop a costing methodology for library and information technology activities for the Australian higher education sector*, Report for Information and Education Service Division, The University of Newcastle. Accessed online on 5th September 2011.
58. (http://www.dest.gov.au/sectors/higher_education/publications_resources/summaries_brochures/activity_based_costing.htm).
59. Valderrama, T. G. and Sanchez, R. D. (2006), 'Development and implementation of a university costing model', *Public Money and Management*, 26(4), 251-255.
60. Wang, P., Qinglu, J. and Thomas, W. (2005), 'How an ABC study helped a China state-owned company stay competitive', *Cost Management*, 19(6), 39-47.
61. Zaman, M. (1997), 'Implementation of ABC in some Australian manufacturing', *CIMA in Focus*, August/September, 6-8.
62. Zaman, M. (2007), 'A case study of the three Australian universities', *North South Business Review*, 2(1), 30-41.