

Implementation of Activity Based Costing (ABC) in Some Australian Manufacturing Companies

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(Received 1-9-1415 A.H.; accepted for publication 10-7-1416 A.H.)

Abstract. Implementing Activity Based Costing (ABC) in some Australian manufacturing companies results in physical psychological and environmental changes in the firm's work environment. Changes to ABC from the traditional costing system may require substantial changes in the firm's overhead allocation and application procedure, inventory control procedures and treatment of direct labor, and involves additional capital costs as a result of automation. As a result, both top and middle managers may be reluctant to actively support the implementation of ABC. It is proposed that the expectancy theory will provide the appropriate conceptual model for understanding this issue. A sample of 100 out of the top 300 Australian manufacturing companies was selected for the study. Three proposals were examined. The results suggest that the Chief Executive Officers (CEO's) have only moderate support for the implementation of ABC. Two further proposals were also examined using expectancy theory. First, it was proposed that the valence model would predict the valence of implementing ABC to middle and frontline managers, and secondly it was proposed that the force model would predict the motivation of the middle and frontline managers to implement the use of ABC. The result of the high adjusted R^2 values provide strong empirical support for the explanatory ability of the valence and the force models of expectancy theory. The results help to conclude that although middle managers and frontline supervisors have strong support for the implementation of ABC, but about forty per cent of the CEO's do not support the implementation of ABC. The findings also suggest guidance for accountants, accounting educators and researchers along with recommendations for future research.

Introduction

ABC helps companies to measure performance from both a financial and an operating standpoint, it determines true costs and profitability of products and services and identifies and then controls factors that drive costs.

The objectives of the implementation of activity based costing system are to:

- produce meaningful product costs for pricing decisions;
- understand profitability by product group, customer and market segment;
- provide a basis for some aspects of performance measurement;

provide more awareness among managers and staff of the non-value added concept [1].

ABC's approach is to identify a series of cost drivers; that is, events or factors which cause overhead costs to occur and then attribute the cost to a product or profitability analysis. Thus an appropriate cost pool is created of costs relevant to each driver. On the basis of the production and sales function of an identical manufacturing firm, the following cost drivers may be identified:

1. Total operating minutes
2. Set up minutes
3. Number of batches
4. Percentage material value
5. Special product inspection time
6. Direct costs
7. Number of variable sales order lines
8. Weight of bearings
9. Number of fixed order lines
10. Delivery band
11. Number of customers
12. Market support and product support.

A more general and accurate characterization is to conceptualize a range of cost allocation systems differing in their cost groupings (cost pools) and/or cost allocation bases (cost drivers).

Often the literature on ABC characterizes traditional or non-ABC costing system as utilising a single cost pool.

Importance of ABC Implementation in Australia

In Australia, as in the rest of the world, both manufacturing and service companies are experiencing fundamental changes in the way they operate as follows:

- * Globalization of markets, products and services
- * Greater price sensitivity
- * Deregulation
- * The technological explosion.

With the changing environment Australian companies today have many questions to

which they need answers to, but the present traditional costing systems fail to answer those questions, including the following [1]:

- * How do the Australian companies' profit and loss structures measure up to our competition?
- * Are the Australian companies correctly located to source their labor and materials, and serve their customers at minimum cost?
- * What impact will changes have in those companies' manufacturing and service processes?
- * How can those companies reduce ever-increasing overhead costs to compete globally?
- * How can companies eliminate waste?

A Brief Literature Review on ABC

Activity Based Costing (ABC) is a method of analyzing business operations that lead to cost identification (trace direct vs. indirect) and cost classification based on activities. In simple language, activity based costing is a costing method that assigns costs first to activities, then to products based on each product's use of activities. According to Maher, *et al.* [2] activity based costing is based on the premise, "Products consume activities; activities consume resources."

Macintosh [3] observed that the Relevance Lost Proponents (Johnson & Kaplan 1987) argue that most of today's cost accounting systems produce highly misleading cost information and advocate the development of new methods of indirect costs to products. The new methods are regarded as ABC. The proponents maintain that accounts allocate indirect costs (overhead) mainly using formulae based on direct labor or machine utilization. The result is inaccurate and arbitrary cost information which, if relied on by managers, leads to poor decisions for vital matters like product policies and capital investment. This information also misguides management on financial performance evaluation and assessment systems. The ultimate consequence, according to the relevance lost camp, is a decline in profitability and a deterioration of competitiveness.

So, the remedy offered is activity based costing (ABC). ABC involves identifying those activities which exist to support and make possible the production and delivery of products. These activities are assigned on cost pools and subsequently allocated to products on the basis of identified cost drivers. (For example, for the activity "purchasing materials", the cost driver could be "number of orders"). Mevellec [4] observed that ABC originated in the US — most likely it will be followed by Functional Cost Analysis — a Japanese concept. He concluded that in the search for a more relevant cost analysis system, costs could not be controlled as costs under traditional volume based costing systems. Structure, performance and business processes, and primary causes of resource consumption are the only elements that can be directly managed so as to control costs.

Activity based costing requires accountants to follow four steps:

1. Identify the activities that consume resources, and assign cost to these activities. For example, purchasing materials is an activity.
2. Identify a cost driver which causes cost. For example, in purchasing materials cost drivers could be "number of orders."
3. Compute a cost per cost driver unit. For example, the cost driver rate could be the cost per purchase order.
4. Assign cost to products by multiplying the cost driver rate times the volume of cost drivers consumed by the product. For example, the cost per purchase order times the number of orders required for product A for the month of July would measure the cost of purchasing activity for product A for July.

Activity based costing eliminates non-value added costs without reducing product quality, performance or value. For example, storing bicycle frames until needed for production does not add to the finished bicycle's value. By using the Just-in-Time (JIT) purchasing policy, management can eliminate non-value added costs, i.e. storage costs, moving time cost, inspection cost, cue time cost. Only production process time adds value, all other activities add costs but no value to the product and are deemed as non-value added processes within the JIT concept. ABC using the JIT philosophy reduces total cost of purchase by reducing lead time.

In sum, ABC provides more detailed measures of costs, accurate cost information for pricing decision and cost decisions for management, but it requires more record keeping and installing ABC requires teamwork between accounting, production, marketing, management and other non-accounting people. One of the problems encountered when implementing ABC is the failure to get influential people in the organization to buy into the process. The costing systems like ABC are like rules in sports and people accustomed to a traditional system are resistant to change of something unknown.

ABC practicing countries are USA, UK and Australia. Many companies in the USA like Hewlett-Packard, Procter and Gamble, Boeing, Caterpillar and IBM have recently implemented ABC and have revealed new information about product costs. For example, Business Week [5, pp. 128-141] reported Tetronix, Inc., found that one of its products, a printed-circuit board, was generating negative margins of 46 per cent.

Lamond [1] found that Australian companies — Parke Davis, ICI Film products and Comaleo rolled products by adopting ABC have been able to determine "true" costs and profitability of their products and services and ABC has helped them to identify and then control the factors that drive costs.

However, the relevance lost critique argues that today's cost and management accounting systems cannot cope with the new manufacturing environment of robotized,

automatic "factory-of-the-future." Current systems emphasize short-run efficiencies and cost reduction at the expense of long-run considerations such as quality, morale, innovation and effectiveness, and simple mention of ABC is one of the important steps to meeting the challenge for future environments.

Problem Statement

ABC implementation is a sort of strategic cost management decision. According to Snead [6] and Turner [7] a continuing gap exists between the capabilities provided by the new cost management system and the extent to which this system is accepted and used by individuals. Davis and Alson [8] found that the use of a new system is voluntary, individuals not accepting the system may resist it. When the system is mandatory, a lack of user acceptance can lead to high error rates, deliberate sabotage and increased personnel turnover.

Burke and Huff [9] observed that a lack of user acceptance may negate the potential benefits of a new system like ABC resulting in less than effective use of organizational resources. As a result, many practitioners and academicians consider user acceptance to be a primary indicant of successful implementation.

Unfortunately, many Australian companies still do not realize the importance of ABC as a strategic philosophy. Many Western companies had already shown considerable interest in the implementation of ABC. ABC implementation needs a change in the attitudes of both top and middle managers, and staff with a clear understanding of the move to an ABC approach.

Lamond [1] also stated that the result of ABC implementation in a few Australian companies, such as Park Davis, ICI Film Products and Comalco, have shown better investment decision-making and better resource utilization has been achieved as a result of more accurate product costs and more awareness among the managers and staff of the non-value added concept. Lamond [1] also claims that activity based management (ABM) was a major force in management in Australia — even though most companies have not yet realized all the benefits that ABM can bring. Under the circumstances this is an attempt on the issue of ABC implementation to Australian manufacturing companies using the Expectancy Theory. The empirical findings may contribute to the unexplored knowledge about whether ABC is acceptable to top and middle managers and frontline supervisors in Australian companies.

Expectancy Theory (Research Framework)

Arnold [10] Stahl and Harrell [11] Butler and Womer [12] and Murray and Fraziers [13] found that the expectancy theory refers to set decision theories of work motivation and continues to be one of the most popular theories of work motivation and performance. Formulation of expectancy theory involves two models, the valence model and the force model.

The valence model

The valence model, which predicts the attractiveness of a first level outcome, is a monotonically increasing function of the sum of the products of the valences of associated second level outcomes and the strength of the perceived relationship between the first level outcome and the associated second level outcomes. The valence model therefore predicts the valence of particular acts of behavior, as follows:

The valence model posits that the valence or attractiveness of a first level outcome for an individual (V_j) is represented by the summation of the product of all corresponding second level outcome valence (V_k) with their respective instrumentalities (I_{jk}), as follows:

$$V_j = \sum_{k=1}^n (V_k I_{jk}) \quad (1)$$

where: V_j = the valence of outcome j (first level outcome)

V_k = the valence of outcome k (second level outcome)

I_{jk} = the perceived instrumentality or belief that outcome j will lead to outcome k

n = the number of potential second level outcomes

Relatively little research has focused upon the valence model. Stahl and Harrell [11] present results which support the model's expectancy ability and demonstrate how judgement modelling can be used to measure the valences associated with second-level outcome, V_k in equation (1). Arnold [10] presents evidence which implies individuals do employ the multiplicative information processing procedures implied by equation (1).

The force model

In the force model, Vroom [14] predicts the level of motivational force acting on a person to exert effort to perform an act is a monotonously increasing function of the sum of the product of valences of first level outcomes and the expectancies that the act will be followed by attainment of these outcomes. The original model as proposed by Vroom [14] implies the use of multiplicative information processing procedures, as follows:

$$F_i = (V_i E_{ij}) \quad (2a)$$

Stahl and Harrell [11], Rynes and Lawler [15] and Butler and Warner [12] observe that the findings of recent expectancy theory studies imply that many individuals employ additive information processing implied by equation 2a. Accordingly, Stahl and Harrell [11] propose that the force model should be modified to reflect these findings as follows:

$$F_i = (V_j + E_{ij}) \quad (2b)$$

Such a modification would allow the use of either multiplicative functional form shown in equation 2a or the additive form shown in equation 2b.

In the equation 2 (both 2a and 2b), F_i is the motivational force acting upon an individual to perform act I. E^{ij} is the expectancy likelihood that act I will be followed by outcome j, and V_j is the valence of outcome j. In the context of the study, the force model implies the motivation of a middle manager and a frontline supervisor to implement ABC philosophies is explained by the valence of implementing ABC philosophies and the expectancy (probability) that some particular level of effort will result in implementation.

Given the description of the support of the Chief Executive Officer (CEO), and of the components of expectancy theory, the following three research hypotheses were examined.

- H1 : It is proposed that the Chief Executive Officers (CEO) of Australian manufacturing firms have got strong support to implement Activity Based Costing (ABC).
- H2 : It is proposed that the valence model will predict the valence (attractiveness) of implementing ABC philosophies to middle managers and frontline supervisors.
- H3 : It is proposed that the force model will predict the motivation of middle managers and frontline supervisors to implement ABC philosophies in Australian manufacturing firms.

Methodology

The judgment analysis approach for expectancy theory research developed by Stahl and Harrell [11] was used to examine whether the valence and force models can predict the motivation of middle managers and union leaders to implement the new ABC manufacturing techniques. This method was also used by Griffin and Harrell [16], and Snead [6]. The approach uses individuals' decisions as operational measures of valence and motivation. The use of decisions made by individuals in completing hypothetical cases as operational measures of valence and motivation was first proposed independently by Mitchel and Beach [17] and Zedeck [18], based on Vroom's [14] suggestions about how expectancy theory can appropriately be tested.

Judgment modeling

Judgment modeling involves providing an individual with a set of variables or cues which the individual must use in arriving at a particular judgment or decision. The goal of this procedure is to assess the relative importance of cue usage in the judgment process of individuals, Snead [6]. A separate judgment is required from the individual for each combination of strengths.

Support for the external validity of the judgment analysis approach is provided by

Brown [19], whose findings indicate the decisions individuals reach in completing hypothetical cases corresponding closely with the decisions they will reach in similar real-world settings.

The decision making exercise

A judgment modelling-based decision making exercise was developed for the ABC implementation context of this study. The exercise instructions provided to the participants are shown in Exhibit 1. Several terms used in the exercise were defined within the context of ABC. For example, "Implementation" was described in terms of the operational success of the ABC concept, i.e. a lack of operational success would indicate that implementation of the ABC philosophies had not occurred.

Exhibit 1. Sample case from the decision exercise identifying corresponding elements of the valence model and the force model

	Case # If Activity Based Costing (ABC) is implemented in your plant, the likelihood that	
Second-level outcomes	- you will be required to exert a greater effort to coordinate your department's activities with the activities of other department is	HIGH (90%)
	- your employment security will increase	LOW (10%)
	- your department will experience more challenging production standards and output goals is	HIGH (90%)
	- your superiors will recognise and reward your productivity in the new work environment is	LOW (10%)
Valence (V_i) of first-level outcome	- DECISION A. With the factors and associated likelihood levels shown above in mind, indicate the attractiveness to your effort implementing ABC in your plant. -5 -4 -3 -2 -1 0 1 2 3 4 5	
	Very attractive	
Expectancy (E_i)	FURTHER INFORMATION. If you exert an average level of effort to implement ABC, the likelihood that ABC will be implemented in your plant is HIGH (90%)	
Motivational force (F_i)	DECISION B. With all of the above information in mind, indicate the level of effort you would exert to implement ABC. 1 2 3 4 5 6 7 8 9 10 zero average great effort effort effort	

An example case from the decision making exercise used to collect the data for this study is presented in Exhibit 1, and a factorial design is incorporated into the exercise. The four second-level outcomes were presented at two levels of instrumentality (10 per cent and 90 per cent) and two levels of expectancy (10 per cent and 90 per cent), resulting in 32 cases ($2 \times 2 \times 2 \times 2 = 32$). Each case describes a unique hypothetical ABC implementation situation. The exercise is modelled after similar exercises used in prior studies (e.g. Rynes and Lawler [15], Butler and Womer [12], Harrell, *et al.*, [20] and Griffin and Harrell [16]).

The exercise was designed to incorporate each of the essential elements of the valence and force models as specified in equations (1) and (2). The probabilities associated with each of these second-level outcomes correspond to the I_{jk} values in the valence model. Decision A, which corresponds to V_j in both the valence and force models provides an operational measure of V_j the valence of implementing ABC philosophies. The likelihood of information presented in the "Further Informaion" section of Exhibit 1 corresponds to E_{ij} in the force model. Decision B, which corresponds to F_i , in the force model, provides an operational measure of F_i the participants motivation to implement the ABC philosophies.

Four second-level outcomes (greater co-ordination of departmental activities, employment security, more challenging standards and output goals and rewards for productivity) are associated with ABC implementation in the exercise.

Sample selection and data collection

The present study is limited to a sample of 100 top manufacturing companies out of the top 300 hundred manufacturing companies operating in Australia selected on a random basis from the Riddle Information Services Pty Ltd [21]. The selected companies are mainly subsidiaries of foreign owned multinationals and are engaged in the manufacture and sale of motor vehicles, electronics, engineering, chemicals and computer technology. The home countries of those multinational subsidiaries are UK, USA, Japan, France, Germany, Holland, South Korea, Taiwan and Singapore. It is very difficult to select groups of manufacturing industries among so many, and this may limit the scope of the study. But the selected group are the dominating multinationals in Australia and these companies were chosen due to greater amount of relevance of implementing ABC to them than to others.

Questionnaire and measurement issues

The primary data was collected through a survey questionnaire. The questionnaire was sent by mail to three groups of participants, namely Chief Executive Officers (CEO's), Middle Managers (Cost Accountants), and frontline supervisors. The data collection instrument was pre-tested on a sample of 20 firms before the general mailing and the response rate was 40% from the respondents within two weeks and the replies received as predicted. The valid response rates were 41%, 44% and 45%, from CEO's, Middle Managers and Frontline Supervisors respectively. Although the response rate is

not too high, this is a satisfactory response and prior studies have also reported response rates below 25%. For example, Imoff [22] had a response rate of 9.4% and Eichenseher and Shidds [8] reported a response rate of 24%. A five point scale was used by the CEO's of reporting firms as follows: extremely strong support (4), strong support (3), moderate support (2), low support (1) and no support (0).

Data from middle managers and frontline supervisors were collected by using decision making exercise instructions as shown in Exhibit 1.

Exhibit 2. Means, medians, standard deviations and S.E. means for the question of strong support by the CEO to implement ABC

	N = 41				
	Mean	Median	True mean	SD	SE
1. Support ABC (0-4 scale)	2.951	3.000	3.000	0.947	0.148
2. Significance of ABC	2.220	3.000	2.243	1.129	0.176
3. Value placed on the company's viability by CEOs to implement ABC	2.122	2.000	2.135	1.249	0.195
4. ABC implementation	YES 60%	NO 40%			

Limitations and strengths of the study

1. The replies from the respondents were collected through survey questionnaire by the mail system. So, there are limitations in the understanding of the questionnaire by the respondents and the reply may not be free from personal biases. Face to face interviews could overcome these limitations, but due to limitations of time and cost, personal interviews to such a diverse group of respondents spread all over Australia were not possible. However, such limitations were minimized by sending a sample questionnaire to the respondents. Initially 20% of the population were sent questionnaires and 40% of them responded within two weeks and replies were received as predicted.
2. A strength of the study is the use of a within-persons methodology appropriate for research which employs expectancy theory. In addition, the use of diverse groups of participants adds to the potential generalization of the results.
3. Moreover, the high adjusted R^2 values reported (Exhibit 3) provide evidence that experimentation within the context of the decision making exercise was probably obtained.

Exhibit 3. Adjusted R² values for cost accountants and frontline supervisors for valence model and force model

	Cost accountants	Frontline supervisors
Valence model	0.95	0.96
Force model	0.98	0.95

Analysis and Results

A within person methodology approach was used to examine the data. The same approach was used by Griffin and Harrell (1991) and Snead (1991). The valid responses were 41% 44% and 45% from Chief Executive Officers, Middle Managers and Frontline Supervisors respectively.

The average mean (2.95) and median values (3.00) predict the moderate support of the CEOs to implement ABC in the selected Australian manufacturing firms, so the result supports the first hypothesis, that the CEOs support the implementation of ABC in Australian manufacturing firms, but not as strongly. They also believe that ABC implementation needs active support by middle managers and staff. Accordingly, these results are considered to support H1, although about 40% of CEOs surveyed did not support ABC. The result indicates that the importance of ABC has not been realized by a sizeable number of CEOs in Australian manufacturing firms. These findings support the views expressed by Lamond, that most Australian companies have not yet realized all the benefits that ABM can bring.

The second proposal was that the valence model would predict the valence (attractiveness) of implementing ABC systems to Cost Accountants. Accordingly, the first step in the analysis involved regressing each participant's valence decisions (Decision A in Exhibit 1) on the instrumentalities associated with the four second-level outcomes. The explanatory power of the valence model (H2) was examined using multiple regression analysis, requiring estimation of a multiple regression valence model for each participant; the individual is the appropriate unit of analysis, given the within-person nature of the expectancy theory. The adjusted R² values obtained from the person-by-person regression analysis (Exhibit 3) provides an indication of the ability of the valence model to explain variations in the participants' valence decisions. The typical individual in each of the two groups had adjusted R² values of 0.95 for Cost Accountants and 0.96 for Frontline Supervisors. The high adjusted R² values provide evidence for the explanatory power of Vroom's valence model in this ABC implementation context. Accordingly, the results are considered to support H2.

The explanatory ability of the force model in an ABC implementation context (H3) was also examined using the multiple regression model estimation on a subject-by-subject basis. The model's dependent measure was the individuals effort level to implement captured by decision B of the exercise, representing the F_i term in equation 2. Two independent variables were used as specified by equation 2: the expectancy information (E_{ij} , represented by the "Further information" in Exhibit 2 and each individual's first level outcome valence (V_j , represented by each individual's decision A in Exhibit 1).

Hierarchical regression analysis was performed on a person-by-person basis to examine this issue concurrently with the evaluation of the force models ability to explain variations in the participants motivation (effort level). It involves two steps. First, regression analysis is performed with only the additive main effect terms as independent variables in the regression model. That is, the individual's effort level decisions (Decision B in Exhibit 1) are regressed on the expectancy E_{ij} . Values (10 per cent or 90 per cent) and the valence (V_j) values (Decision A in Exhibit 1) to obtain an initial R^2 value. Next, the multiplicative interaction term ($E_{ij}V_j$) is forced into the model and regression analysis is again performed to obtain a second R^2 value. If the model's explanatory ability (as indicated by the adjusted R^2 value) is significantly improved (F test $p < 0.05$) by including the multiplicative interaction, the individual employed multiplicative information processing implied by equation 2a. Otherwise, the individual is presumed to have employed the additive information processing implied by equation 2b. In addition, the high adjusted R^2 values of the force model (Exhibit 3), of 0.98 and 0.95 obtained from this procedure provides an indication of the ability of the force model to explain variations in an individual's effort-level decisions. Accordingly, the results are considered to support the H3.

The valence measure of twenty task outcomes are presented in Exhibit 4.

Valence

Valence measures for twenty task outcomes were also obtained using the Lawler-Suttle instrument. The instrument was also used by Ferris [23]. Respondents were asked to rate on a five point scale, ranging from extremely desirable (4) to extremely undesirable (0). The twenty outcomes included both intrinsic and extrinsic rewards; intrinsic rewards refer to those outcomes (psychological motivation) which are rewarding to the individual in and of themselves, and extrinsic rewards refer to those rewards which are generally utilised by the organisation to influence the performance of the individual. Means and standard deviations of the Valence measure suggests that the most desirable task outcomes to the middle manager group were high productivity, good job performance, high pay, special awards or recognition, greater chances for independent thought and action and receiving more compliments on ABC implementation. The most desirable task outcome to frontline supervisors were high productivity, good job performance, high pay, respect from other employees, promotion, special awards or recognition, acting to high standard for yourself, passing too fast, and

Exhibit 4. Means and standard deviations median & SE mean of the valences of the twenty task outcomes

Job facets	Middle managers		Frontline supervisors	
	Mean	SD	Mean	SD
1. High productivity (task goal)	3.80	0.55	2.94	0.42
2. Good job performance	3.56	0.66	3.11	0.58
3. High pay	2.77	0.80	3.61	0.60
4. Respect from other employees	3.31	0.77	2.88	0.67
5. Respect from your boss	3.00	0.52	1.77	1.06
6. Promotion	2.77	0.83	3.11	0.47
7. Being tired from hard work	1.02	1.06	3.11	0.67
8. Special awards or recognition	3.22	1.05	2.94	1.16
9. Feelings of security	3.06	0.73	1.50	0.98
10. Feelings of accomplishments	3.50	0.82	1.38	0.77
11. Fewer chances to make friends	1.04	1.03	1.27	1.07
12. Setting too high standards for others	0.81	1.01	3.16	0.78
13. Setting too high standards for yourself	1.09	1.23	3.61	0.50
14. Personal growth and development	3.38	1.03	2.94	0.41
15. Greater chances for independent thought and action	3.59	0.75	3.16	0.51
16. Pay rise	2.79	0.76	3.11	0.67
17. Giving help to others	3.36	0.65	2.05	0.87
18. Receiving more compliments	3.34	1.03	3.61	0.50
19. Time at work passing fast	1.61	1.01	3.72	0.57
20. Offering good service	3.68	0.63	1.83	0.38

greater chances for independent thought and action on ABC, receiving more compliments and time at work passing too fast on ABC implementation.

Summary and Conclusions

The paper first examined the support of the Chief Executive Officers (CEOs) to implement ABC in their organizations and the value placed on them on the motivation of middle managers and frontline supervisors to achieve the desired objectives. The empirical findings revealed that 40% of the CEOs did not support the implementation of ABC. The average mean was 2.95 and standard deviation was 0.95. CEOs have moderate support for the implementation of ABC in Australian manufacturing firms but not so strongly.

As there is no strong support by the CEOs to implement ABC, although 60% support strongly, the strong support hypothesis is neither accepted nor rejected. Analysis indicates that the ABC concept is still not fully accepted among CEOs of Australian firms.

Two more proposals were also examined. First, it was proposed that the valence model would predict the valence (attractiveness) of implementing ABC philosophies to middle managers and frontline supervisors. Second, it was proposed that the force model of the expectancy theory would predict the motivation of middle managers and frontline supervisors to implement the use of ABC systems. The high adjusted R^2 values presented in Exhibit 3 indicate the strong ability of the valence model and the force model to explain variations in individual motivation levels. The results are therefore considered to support the hypothesis H3.

Valence measures for twenty task outcomes were also examined in the study, which included both extrinsic and intrinsic rewards. The relatively high average mean values presented in Exhibit 4 indicate that the most desirable task outcomes to middle managers and frontline supervisors were high productivity, good job performance, greater chances for independent thought and special awards or recognition, feelings of accomplishment, helping others, receiving more compliments and offering good services on ABC implementation.

Policy Implications

1. The results of the study provide both theoretical and practical implications. Theoretically, the results suggest that, as proposed by Harrel and Stahl [10], the additive version of the force model will provide adequate predications of individual behavior in most situations. Also, the wide range of values for different individual participants presented in Exhibits 2, 3 and 4 indicate that a within-persons methodology should be used when theoretical expectancy issues are examined.
2. In a practical sense, the results provide some knowledge of the valences individuals place on second-level outcomes which are associated with the implementation of ABC. This suggests that management accountants can suggest to CEOs about design appropriate incentives for motivating employees of new systems implementation.
3. These findings provide guidance for accounting researchers who may wish to employ the expectancy theory to examine the motivational aspects of implementing new procedures and systems in organisations, such as target costing and decision support system, Just-in-Time and Total Quality management (TQM), etc.

Direction for Future Research

1. Expectancy theory might be used to study the motivation of a firm's cost accountants to implement new costing accounting systems, such as Activity Based Costing, Target Costing in response to the implementation of new manufacturing procedures, such as flexible manufacturing systems.

2. Another study on Decision Support Systems (DSS) and Management Information Systems (MIS) can be made on both Australian manufacturing and service companies using the Valence and Force models.
3. Another study can be undertaken by accounting researchers, who might examine whether differences in individuals' intrinsic needs influence the valences they associate with various outcomes within the context of the expectancy theory (a partial study has been done in this study, see Exhibit 4, and analysis underneath).

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تطبيق نظام تحديد التكاليف على أساس النشاط في بعض الشركات الصناعية الاسترالية

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(قدم للنشر في ١٤١٥/٩/١هـ، وقبل للنشر في ١٤١٦/٧/١٠هـ)

ملخص البحث. إن تطبيق نظام تحديد التكاليف على أساس النشاط في بعض الشركات الصناعية الاسترالية ينتج عنه تغييرات مادية ونفسية وبيئية في البيئة التي تعمل بها المنشأة. كما أن التحول من النظام التقليدي لتحميل التكاليف إلى نظام تحديد التكاليف على أساس النشاط قد يتطلب تغييرات ملموسة في نظام تحميل التكاليف الصناعية غير المباشرة وإجراءات الرقابة على المخزون ومعالجة العمل المباشر، كما يتضمن تكاليف رأسمالية إضافية نتيجة للمكثنة.

وعليه فإن الإدارة العليا والوسطى في المنشأة ربما تعارض تطبيق نظام تحديد التكاليف على أساس النشاط. وفي هذا الصدد نقترح بأن نظرية التوقع ستوفر النموذج المناسب لاستيعاب هذه الظاهرة. وللحصول على البيانات اللازمة تم اختيار عينة من ١٠٠ شركة من أكبر ٣٠٠ شركة صناعية في استراليا. وقد تم اختبار ثلاث فرضيات. وبينت النتائج بأن المديرين التنفيذيين في المنشأة يدعمون تطبيق نظام تحديد التكاليف على أساس النشاط بشكل متوسط. كما تبين أن القيمة العالية لـ R^2 توفر دعماً قوياً للقدرة التنبؤية لكل من عاملي الدافع والجهد المبذول في نظرية التوقع.

كما بينت النتائج أنه بالرغم من أن الإدارة الوسطى والدنيا تدعم بشكل قوي تطبيق نظام تحديد التكاليف على أساس النشاط، إلا أن حوالي ٤٠٪ من المديرين التنفيذيين لا يدعمون تطبيق هذا النظام. وقد انتهت الدراسة ببعض التوصيات للمحاسبين والمهتمين بتعليم المحاسبة والباحثين.