

## Factors influencing adoption of activity-based costing in developing country

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### CHRONICLE

#### Article history:

Received: April 29, 2020

Received in revised format:

April 30 2020

Accepted: May 30, 2020

Available online:

June 2, 2020

#### Keywords:

Activity-based costing (ABC)

Potential adoption

Organizational factor

Cultural factor

### ABSTRACT

This paper focuses on the potential adoption of activity-based costing (ABC) in businesses in a developing economy. Through factor analysis, this research identifies the impacts of organizational and cultural factors on ABC adoption. The study employs survey methodology to collect primary data on factors that expect to have impacts on the adoption of ABC. The logistic regression was used to analyze the relationship between these factors and the adoption of ABC. The result indicates that most factors do not cause significant influences on the potential adoption of ABC in the targeted economy, except for the size of company. This indicates that larger companies are more interested in ABC adoption than smaller ones. This result also gives some explanation of the research results.

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## 1. Introduction

In the today economy, companies are facing fierce competition that required them to change and to adapt with the business environment. Changing or innovating the management practice plays a key role to maintain company's competitiveness in the market, therefore the implementation of modern management tools are crucial for firms. Among management tools, the costing tool is very important since this tool can help to manage firms more efficiently. In the 1980s, the limitation of traditional costing systems was shown. These systems were applied for a long time for companies with a narrow range of products. According to this costing tool, direct labor hours, production units, material purchases, and machine hours were used to allocate proportion to overhead costs (Cooper & Kaplan, 1992; Sánchez et al., 2020). The allocation seems relevant to a few types of products or services. Practically, the allocation which is based on some assumptions like direct labor hours has been identified as inefficient. Therefore, Activity-Based Costing (ABC) costing tool has been applied in practice to overcome these problems. ABC was an innovative method to enhance the accuracy in cost allocation (Maiga & Jacobs, 2003). ABC is a strategic management tool, which leads to appropriate decisions for management. The objectives of ABC system are to allocate costs, to monitor activities, and to recognize the right activity costing to drive outputs (CIMA, 2008). ABC allocates overhead cost according to the resources which are used for corresponding activities and this is an important foundation to make the right management decisions. Therefore, ABC implementation is important to increase profit of companies (Cooper & Kaplan, 1992). ABC has a role in measuring the cost of resources used in a period, so it shapes the full cost for outputs. ABC assigns company's resources through activities to products and services supplied to its customers. In general, ABC is used as a management tool to measure cost and profit associated with product and service that is based on relevant activities. Hence, ABC supports companies to make strategic decisions in pricing, outsourcing, identification, and measurement of activities. In spite of researchers' believes in the effectiveness of the ABC costing tool, Gosselin (1997) showed that the implementation of ABC costing caused the problem of bureaucracies. Other researchers identified factors influenced ABC adoption and implementation (Binaebi, 2013; Charaf & Bescos, 2013; Gosselin, 1997; Ruhanita Maelah, 2007; Ahmadzadeh et al., 2011; Nair & Tan, 2018). Binaebi (2013) reconfirmed the usefulness of adoption ABC through an implementation of activity management in hospitality industry. They attested several factors that affected the adoption of

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ABC. These factors can be individuals or groups. Reviewing 27 prominent papers in total 2,770 articles related to ABC adoption, Lueg and Storgaard (2017) demonstrated several factors which played the key roles influencing the adoption and implementation of ABC. These factors included technical, behavioral, organizational and other contextual factors. These factors can also be classified as top management support, implementation of training, non-accounting ownership and business size, which were associated with a successful process of implementation and adoption ABC costing. Among these factors, cultural and organizational factors showed positive relationships with ABC adoption consistently, particularly in manufacturing environments (Maelah et al., 2007; Lueg & Storgaard, 2017). Studies on the development of ABC has been emerged from 1988. All of them mentioned benefits, communication, diffusion, adoption and implementation of ABC methodology and academics played an important role in this development. Moreover, most of the relevant studies had been carried out in developed economies, and only a few of them studied the ABC adoption in developing economies (Bjørnenak & Mitchell, (2002). Vietnam is an emerging economy (OECD, 2019), in which firms normally utilized traditional management methodologies. The fast changing of the business environment caused pressure for firms to adopt new and innovated management practices including the ABC tool for their business. However, firms are still uncertain about implementation of the ABC tool. Some Vietnamese academics have studied ABC costing system that applied in Vietnam, particularly in manufacturing area (Huynh et al., 2014, Soa, 2017, Tran & Thao, 2020). They indicated that the application ABC in Vietnam is still limited and should be studied further. Therefore, this research aims to assess the factors that influence the adoption of ABC costing tool in Vietnam and to identify the potential success of ABC implementation in the Vietnam business environment.

The paper is organized as follows. Section 2 reviews literature on the factors affected to adoption of ABC. Section 3 presents the research model and methodology. Section 4 analyses and discusses the empirical findings and the last section concludes the study.

## 2. Literature review

### 2.1. Activity based costing

ABC costing is considered as a modern cost allocation system for products and services in firms. ABC provides an efficient tool for monitoring costs and activities related to resources (Cooper & Kaplan, 1992). ABC added value to firms that adopted ABC costing after few years (three-year study period) (Kennedy & Affleck-Graves, 2001). ABC supported to re-structure the management system to help cutting-off and controlling costs. ABC helps to identify clearly activities and resources that contribute to the product and service costs and let managers choose the right management actions. ABC management system also provides firms with the precise cost information; hence firms know which product/ service should be dropped off and which should be focused on. ABC can be considered as a strategic management tool that increases companies' competitive advantages and contribute values for customers and shareholders (Kennedy & Affleck-Graves, 2001). ABC is a cost management tool that allows an organization to determine the actual cost related to product and service produced. It provides a more accurate method of allocating indirect costs and supporting resources to activities and business processes. ABC points out the corresponding underlying resources and driven activities that enable products and services to be produced. The objectives of ABC are to measure and then to allocate costs of all resources which are used for activities that support the production and delivery of products and services to customers (Srividhya, 2015). ABC has received great attention from scholars and practitioners and it plays a role of a cost management innovation. Tracing overhead costs related to cost objects and supporting cost-effective production are required in competitive environment. These differences are significant for companies with a large amount of overheads, multiple products and high product diversity. ABC is also defined as a system that allows organizations to track the cost related to activities that contribute to products and services (James, 2013).

Accounting information plays a key role on cost allocation and therefore has an important role in adoption of ABC. Binaebi (2013) and Ruhanita Maelah (2007) attested the relationship between accounting information and ABC adoption. Baird (2007) indicated the relevant of ABC costing in business and public sectors, and Bjørnenak and Mitchell (1997) showed that ABC adoption effectiveness is not affected by the size of the organization. In practice, CIMA identifies activity-based management as the principle of ABC. ABC has been applied for all business sectors (as service companies, government agencies, manufacturing industries) and provides special and flexible reports for management. ABC is an approach for cost allocation through cost drivers and activities (CIMA, 2008). In day-to-day operations, managers use management information system which integrates costing tool to govern to operations of firms. And ABC is an important costing tool to provide cost information of the products and services. The cost information is crucial integrated part of management information system to help managers make the relevant management decision of the firms. Using ABC, organizations gain a deeper understanding of their business processes and cost behaviors. Management applies this insight to improve decision making at operational and strategic levels (CIMA, 2008). Two surveys on ABC adoption of the UK's largest companies during 1994 and 1999 showed that some companies adopted ABC and others were not. These studies indicated some implications of ABC adoption, perceptions of ABC method, and the relation with performance evaluation. Top management support is indispensable for the success ABC implementation (Innes et al., 2000).

## 2.2. Factors affect adoption of activity-based costing

ABC has been considering as useful management tool for companies. ABC provides a solution to the problem of lack of relevance in the costing system (Charaf & Bescos, 2013). Shields (1995) assessed the successful implementation ABC in 143 enterprises in the US and found the important roles of behavioral, organizational and technical factors. The experiences of ABC implementation in these firms confirmed importance of cost information to support managerial decisions. Many academics concerned about methods to adopt ABC in industrial firms in order to innovate the cost management practice. They studied and found several factors that were related to ABC adoption and implementation. According to Lueg and Storgaard (2017), factors affecting the adoption ABC included technical, behavioral, organizational and other contextual factors. Factors affecting ABC adoption had been studied by many scholars (Gosselin 1997; Binaebi, 2013; Charaf & Bescos, 2013); Ahmadzadeh et al., 2011). Baird (2007) attested the relationship between organizational, cultural factors and the adoption of activity management in public sectors. This relationship was stronger than the corresponding one in private sectors. By survey method, cultural factors (included innovation, outcome orientation and tight versus loose control) were examined. The results confirmed that cultural factors significantly affected ABC adoption and activity management practices in the Australian business context (Baird, 2004). In Norway, Gosselin (1997) studied factors such as cost structure, competition, existing costing system, product diversity and size of company that were related to ABC adoption. This research indicated that only cost structure affected significantly the adoption of ABC. In another research, Charaf and Bescos (2013) identified three variables in an organization that affect the adoption ABC. These are the importance of costs for decision – making, the complexity of business unit and the proportion of indirect costs. This research confirmed the positive hypothesis of the importance of costs for decision and adoption ABC. The results of this research were limited because of small samples. Other scholars concerned stages of adoption and implementation ABC with organizational and contextual factors (Krumwiede, 1998; Nassar et al., 2011). Factors that affected stages of ABC adoption and implementation were different. In general, organizational factors proved the important role in adoption of ABC in enterprises.

Charaf and Bescos (2013) identified parameters in cultural variables that affected ABC adoption. These were outcome orientation, innovation, team orientation and attention to detail. In this study, outcome orientation and innovation showed a positive relationship. Outcome orientation or performance confirmed the positive relationship many cases (Binaebi, 2013; Ruhaniha Maelah, 2007). Gosselin (1997) attested the significant role of innovation. Otherwise, the impact of team orientation was not confirmed in a case study in US and Malaysia plants (Brewer, 1998). Although, many prior researches had proved ABC's effectiveness but only few companies adopted it. By doing a cross-sectional survey of Australian enterprises, seven technical and organizational factors affecting ABC adoption was identified. Among them, three of organizational factors showed significant impacts on ABC adoption. These were top management support, internal champion support and organizational size. All technical factors had negative impacts, they are level of overhead, product complexity and diversity and relative advantage. Some factors were similar to factors in previous researches but were named differently (Brown et al., 2004).

A case study research on the Chinese largest corporation indicated that technical, behavioral and organizational factors affected ABC adoption and implementation in Western enterprises (Liu & Pan, 2007). This study confirmed the success of ABC implementation and indicated that the top management support is the most important factor of ABC implementation. The cultural difference between Western and Asian companies were concerned in ABC adoption and implementation (Morakul & Wu, 2001; Liu & Pan, 2007; Chongruksut & Brooks, 2005). Hence, cultural factors should be re-examining while assessing potential ABC adoption in companies located different countries.

As a result, the factors affected adoption of ABC in the literature can be summarized as follows:

- (i) Organizational factors include top management support, business size or complexity of business unit, the importance of costs for decision making or importance of cost information and the proportion of indirect costs or cost structure, adequacy of resource and structure of organization and culture.
- (ii) Cultural factors include outcome orientation, innovation, team orientation and attention to detail.
- (iii) Contextual factors: the size of organization.

Besides, some factors affect implementation ABC in practice, that include technical factors (designing ABC system, identification cost drivers.), behavioral factors (and awareness of individual users' behavior) and other contextual factors (compensation and reward, competition...).

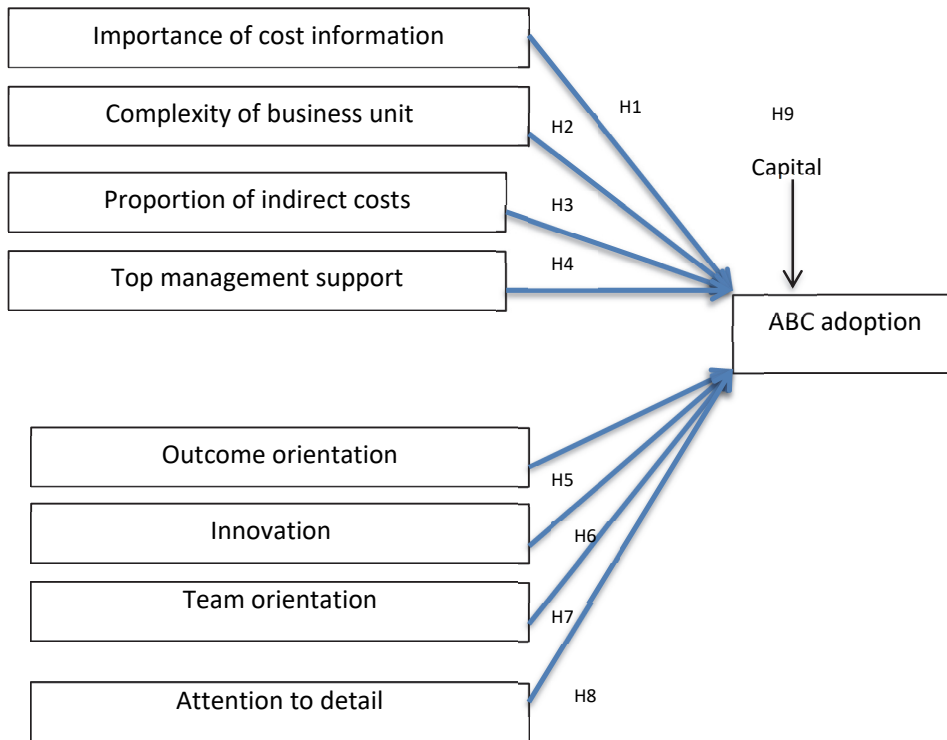
This research focuses on the ABC adoption method of Vietnamese companies and the way their management supports application of the new method for more accurate cost allocation. At the first stage of ABC diffusion, organizational and cultural factors are studied carefully. The adoption stage in S-shape of the ABC diffusion is very important to decide ABC success later (Nassar et al., 2011).

## 3. Methodology

### 3.1. Hypotheses and research model

In the literature, several scholars who studied factors affecting ABC adoption used logistic regression for surveying data (Lueg & Storgaard, 2017; Baird et al., 2004, Brown et al., 2004). Other studies combined the case study and regression methodology

(Liu & Pan, 2007; Brewer, 1998). In our study, logistic regression approach is used to study factors affecting ABC adoption. Learning from previous analysis, the research model is proposed in Fig. 1. The conceptual framework has been adopted from contingency theory in management accounting (Otley, 1980), technology acceptance model (TAM) (Davis, 1989), and previous researches of management accounting. The contingency theory supports identifying contingent factors affecting ABC method. TAM explains the importance of the external factors as culture affected to ABC adoption. Besides, TAM indicates roles of information systems and enhances innovation methods with ABC.



**Fig. 1.** Research Model

In our research, factors affecting ABC adoption are inherited from the previous studies and adjusted for Vietnamese context. We have eight factors in two groups (organizational and cultural factors). From literature of ABC adoption, these factors have proved significant in the first stage of ABC diffusion (Nassar et al., 2011). In a developing country, they are meant to assess relevance in adoption. Besides dependent and independent variables, the control (contextual) variable is used for additional analysis. Organizational factors include top management support, complexity of business unit, importance of costs for decision – making or importance of cost information and the proportion of indirect costs or cost structure in our study. Top management support has identified as a dominant factor in organizational factor category and has positive impact on adoption and implementation of ABC (Liu & Pan, 2007; Brown et al., 2004; Innes et al., 2000). The importance of cost information has been confirmed and it is considered a decisive factor in any company (Charaf & Bescos, 2013; Krumwiede, 1998). The complexity of the business unit is a motivating factor in the organization (Gosselin, 1997; Charaf & Bescos, 2013; Brown et al., 2004). Proportion of indirect costs is a technical factor in ABC adoption and implementation (Baird, 2004; Brown et al., 2004). Cultural factors from literature included outcome orientation, innovation, team orientation and attention to detail. Outcome orientation is a popular measure of all companies adopting ABC (or any management method) in order to gain higher performance (Baird, 2004). Innovation is a specific characteristic of the current business model and helps organization to face changes. ABC can be seen as a management innovation method (Baird, 2004; Gosselin, 1997). Team orientation is required for success in conducting management tools. In previous research, these indicated a negative impact and we re-examine these hypotheses (Charaf & Bescos, 2013; Brewer, 1998). Attention to detail is a characteristic in team to implement ABC (Charaf & Bescos, 2013).

On the basis of the theoretical framework that has been stated previously, the research hypothesis are formulated as follows:

- H1. Importance of cost information positively affects ABC adoption;
- H2. Complexity of business unit positively affects ABC adoption;
- H3. The proportion of indirect costs positively affects ABC adoption;
- H4. Top management support positively affects ABC adoption;

- H5. Outcome orientation positively affects ABC adoption;
- H6. Innovation positively affects ABC adoption;
- H7. Team orientation positively affects ABC adoption;
- H8. Attention to detail of costs positively affects ABC adoption.
- H9. Capital positively affects ABC adoption.

In our research model, independent variables are measured using Likert Scale from 1 to 5. ABC adoption is a binary (0 or 1) dependent variable. Legal capital is a control (contextual) variable and is converted from the original scale to nominal scales (from 1 to 5).

### 3.2. Sample size

Hair Jr (2014) recommended a sample size of at least five observations per estimated parameter. In our study, samples size is required at least 80 respondents. In fact, we sent questionnaires through Google form, and got 52 respondents. We got other 20 respondents from tax officials and 24 respondents from Hanoi planning and investment Department. We cleaned data and got 90 qualified respondent data which can be used for analysis using SPSS software.

## 4. Results

### 4.1. Descriptive statistic

In this survey, respondents' characteristics are shown in Table 1.

**Table 1**  
Respondents characteristics

Business sector	N	%
Industrial manufacturing	15	17%
Agricultural manufacturing	6	7%
Forestry manufacturing	3	3%
Services business	28	31%
Commercial business	38	42%
<b>Total</b>	<b>90</b>	<b>100%</b>

More than 60% of respondents registered capital that is smaller than 20 billion Vietnam Dong, approximately 1 million USD. In which, more than 50% companies are below 10 years of operation. Table 2 indicates descriptive statistics of parameters of organizational and cultural factors.

**Table 2**  
Descriptive statistics of parameters of organizational and cultural factors.

Parameter	Mean	Max	Min
Importance of costs information – O1	3.8	5	1
Complexity of business unit – O2	3.6	5	1
Proportion of indirect costs – O3	3.14	5	1
Top management support – O4	3.62	5	1
Outcome orientation – C1	3.79	5	1
Innovation in business – C2	3.76	5	1
Team orientation – C3	3.77	5	1
Attention to detail of costs – C4	3.83	5	1
Legal capital – Cap	2.04	5	1

### 4.2. ABC adoption

ABC adoption is questioned in two parameters. One status confirms adoption or non-adoption ABC in business and other considers knowledge about ABC.

**Table 3**  
ABC adoption status in Vietnam

ABC adoption	N	%
Adoption ABC in business	19	21.1%
Non-adoption ABC in business	71	78.9%
Knowledge about ABC in business	61	67.8%
No consideration of ABC in business	29	32.2%
<b>Total</b>	<b>90</b>	<b>100%</b>

Comparison with the result of Charaf and Bescos (2013), the rate adoption of ABC in Vietnam (21.1% of the respondents) is lower than the rate of 22.6% in Morocco, 33.3% in France and 23.75% in Tunisia. Depending on the survey data, business in industry, services in Vietnam have trend toward using ABC more than commerce, forestry or agriculture areas.

#### 4.3. Organisational and cultural factors

After testing reliability of questionnaires and ensuring the reasonable threshold, we applied binary logistic regression for surveyed data. The analysis complies with the guidelines in (Hair Jr et al., 2014).

##### Model estimation fit

Logistic regression model, some indicators resulted as follows. The indicator of -2 Log likelihood is a basic measure model estimation fits, similar to the sums of squares values used in multiple regression. Logistic regression measure is referred to -2LL or -2 log likelihood. If we indicate the lower in the -2LL value, the better the fit of the model showed. In this study, it is higher (88.728). The Cox and Snell R<sup>2</sup> measure with higher values indicates a greater model fit (the range of 0 to 1). In our study, indicators of Cox & Snell R Square is 0.275 and Nagelkerke R Square is 0.376 are low.

##### Interpreting the logistic coefficients

###### Direction of relationship

To assess the direction of the relationship of each variable, we examine either the original logistic coefficients or the exponential coefficients. In the case both variables have positive signs, indicating a positive relationship between both independent variables and predicted probability. With the following result (Table 4), coefficients of almost parameters are negative and their exponential coefficients are reasonable. When they are above 1,0 reflect a positive relationship and less than 1,0 representing negative relationships but in this case the results indicate non-significant. This statistic tests the nine hypotheses that the observed data are significantly different from the predicted values.

**Table 4**

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1a	O1	-0.546	0.452	1.457	1	0.227	0.579
	O2	-0.162	0.341	0.226	1	0.634	0.850
	O3	0.009	0.353	0.001	1	0.980	1.009
	O4	-0.468	0.446	1.101	1	0.294	.626
	C1	0.517	0.444	1.355	1	0.244	1.677
	C2	-0.223	0.439	0.257	1	0.612	0.800
	C3	0.171	0.446	0.147	1	0.701	1.186
	C4	0.056	0.386	0.021	1	0.884	1.058
	Cap	0.904	0.235	140.845	1	0.000	2.470
	Constant	-0.100	1.521	0.004	1	0.948	0.905

a. Variable(s) entered on step 1: O1, O2, O3, O4, C1, C2, C3, C4, Cap.

##### Magnitude of the Relationships

The most direct method of assessing the magnitude of the change in probability due to each independent variable is to examine the exponentiated coefficients. In the result, all significance of variables are higher than 0.05, so they are not meaningful in statistic. It implies all hypotheses indicated previously that is not proved. The result does not re-confirm the relationship of factors to adoption ABC like Gosselin (1997) and Ruhanita Maelah (2007) but shows a negative relationship as Ahmadzadeh et al., (2011). It proves larger companies interested in adoption ABC.

#### 4.4. Other results

To analyze other aspects in application a indicator for allocation overhead costs in companies, 70% companies have used revenue based method (63/90 respondents) in which almost focused commercial and services sector (see Table 5). Enterprises in agricultural manufacturing have been interest revenue based method for all six representatives. The companies prefer using revenue based method than another. Although, there are 67.8% of companies that have knowledge of ABC method.

**Table 5**

Allocation method for business sectors

Business sector	Number	Activity based	Revenue based	Non applicable
Industrial manufacturing	15	7	7	1
Agricultural manufacturing	6	0	6	0
Forestry manufacturing	3	1	2	0
Services business	28	7	18	3
Commercial business	38	4	30	4
Total	90	19	63	8

In the survey, we find out 73.3% respondents (66 of 90 companies) that identified cost centers and cost drivers. Based the survey data, 86.7% (78 companies) have used a list of detail costs to recognize costs in their accounting system.

The larger and long time companies in the survey that have salient characteristics of ABC adoption. But the number of companies like that are small in the survey.

## 5. Conclusions and recommendations

This study has examined some critical factors affecting the adoption ABC based the logistic regression of data from 90 companies in Hanoi, Vietnam. Parameters of organizational factors and cultural factors were examined in the possibility of adoption ABC. The study has indicated capital that represented the control variable impacted to adoption ABC in business sectors, this finding conforms with the previous research (Brown et al., 2004). In general, larger companies have a salient features that are relevant in adopting ABC. Many companies have knowledge of ABC method and they indicated cost centers and cost drivers for their cost management. It is proved that chances of ABC adoption and implementation in these companies would be recognized. Nevertheless, this paper indicates an insignificant relationship between organizational and cultural factors and the adoption ABC. Some parameters have negative coefficients and significance over 0.5. It implies if we increase sample size, positive relationship may be raised. It is hoped that this paper will motivate researchers to undertake further research in the future. Besides attempting to improve the methods of measurement the variables, future research should consider incorporating other important variables that have been omitted from this study which are likely to influence the adoption ABC. The most notable omitted independent variables are organizational variables such as resistance to change by providers and lack of relevant employees' skills, training, environmental factors and information technology level.

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