



(RESEARCH ARTICLE)



## Model of factors affecting to cost-volume-profit analysis application: Research on the Unified Theory of Acceptance and use of Technology

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### Abstract

The primary objective of this article is to introduce new model The Unified Theory of Acceptance and Using of Technology (UTAUT). The article shows which factors have the impact on the cost – volume – profit analysis (CVP) applying. CVP is a tool to help manager to make optimal business decision (Fong-Ching Yuan, 2009), in order to achieve the highest aim in finance operation that is business value maximization. Through studying and mastering the CVP relationship, managers can maximize the potential capabilities of the enterprise, use and promote effectively all resources in the enterprise to perform well manufacturing business. However, CVP analysis adaptation in making business decisions in each manufacturing enterprise is different because of many factors. This article mentions the factors based on UTAUT including: perceived usefulness, perceived ease of use, social influence, facilitating conditions.

**Keywords:** Cost-volume-profit analysis; Applying; Factors; UTAUT

### 1. Introduction

In recent years, the managerial research has used different models to find the variables that help managers to make decision as to whether to apply a new analysis technology or not. Some of the more popular models used for this purpose are: Technology Acceptance Model (TAM), Theory of Reasoned Action (TRA), among others. Recently, Venkatesh, et al., (2003) tried to unify the different constructs of all these models in one unique model, and with this in mind developed the Unified Theory of Acceptance and Use of Technology (UTAUT). It is the objective of this article to test the usefulness of this model in cost – volume – profit analysis.

Cost-volume-profit (CVP) analysis has been studied form may different perspective through may periods of its development, with changes in variable cost, fixed cost and selling price affecting profit. The research by Ismail & Louderback (1979) shew the development of a stochastic, simulation and probabilistic CVP analysis model. According to research of James A. Yunker and Penelope J. Yunker (1982), CVP analysis was considered as a tool to provide financial information for business decision making with a focus on the future. Profit is affected by 5 factors: selling price, output, input, variable cost per unit and fixed cost, so the future value of profit is determined by the value future of these 5 factors. In the thesis of Anniliina (2018) of researching CVP analysis in manufacturing company, the author shows that there were 5 main indicators making the change of profitability of a company, including selling price, overall sale, volume, variable cost and fixed cost. The author research the CVP analysis in manufacturing enterprises by finding out the break-even point and evaluating the magnitude of business leverage. The research by Hilliard and Leitch (1975); Jaedicke and Robichek (1964) was improved by using different variables such as: sale volumen, selling prices and costs as random variables. Around the world, the researchs focus on the criteria or content of CVP analysis in businesses, or research the costs, prices and profits separately. In this article, the author build the model of factors affecting the application of CVP analysis, including: perceived usefulness, perceived ease of use, social influence, facilitating condition, intention to apply CVP analysis, based on the Unified Theory of Acceptance and Use of Technology (UTAUT)

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## **2. Model of affecting factors review**

### **2.1. The Theory of Reasoned Action (TRA)**

The Theory of Reasoned Action (TRA), developed by Ajzen & Fishbein (1975), is one of the most influential theories in applying behavior and it has received considerable attention in applying behavior area.

TRA has had significant impact in the field of marketing and is the key theory for identifying consumer behavioral changes. According to Ajzen and Fishbein, the TRA theory is based on an assumption that people, within their context, are characteristically rational and make logical use of information at the disposal. TRA assumes there are two independent variables related to the intention to perform: attitude toward the behavior and subjective norm. The attitude toward the behavior refers to the degree to which a person has a favorable or unfavorable evaluation of the behavior in question. The other variable, subjective norm is a social factor that refers to the perceived social pressure to perform the behavior question. This pressure is provided by the people who are important to the person (relatives, friends, coworkers, etc.) and it is a perception that the person has about these people, not necessarily the actual opinion of those persons. The antecedents of attitudes toward the behavior are belief about consequences of developing a subjective norms are normative beliefs, such as the individual's perception about expectations of specific individuals, and his or her motivation to comply with these expectations (Davis et al., 1989)

Over the year, many studies have attempted to address TRA limitations. Sheppard et al. (1988) conducted meta-analyses research to address the then limitations. TRA is a key determinant of a person's attitude and intention toward using a technology.

### **2.2. The Technology Acceptance Model (TAM)**

The Technology Acceptance Model (TAM) which predicted the acceptance of IT systems, services and technology, was introduced by Davis in 1986, adapted from TRA by Davis in 1989 and supplemented twice in 1989 and 1993. These adjustments gave a birth to a new TAM model. According to Davis (1989), the main goal of TAM is to focus on clarifying them important factors affecting users' acceptance of new technology, created a useful model to explain technology applying behavior. The TAM model describes the cause and effect relationship between "perceived usefulness" and "perceived ease of use" of technology, techniques and the attitude of applicants. The TAM model is widely used to evaluate applicant' acceptance and to explain their behavior by assessing the impact of information on applicants in terms of trust, attitude and intention. Attitudes towards applying can be positive or negative to the informaion. Differing from the TRA model (Ajzen & Fishblein, 1975), this theory emphasizes the self-determination role of human in the applying process. The TAM model is applied more widely than the TRA model because it explained succesfully that someone dislike applying but still use information cause of perceived usefulness (bring better results).

For CVP analysis, the perceived usefulness of this technique demonstrates the managers' belief that the information provided by CVP analysis will improve their operating results. Perceived ease of use shows that managers can grasp management accounting information without their effort or understanding, bringing efficiency in their work from using the TAM model (Figure 1). Evaluating usefulness and ease of use is very suitable for managers' application of CVP analysis in making business decisions, such as using break-even information to determine the necessary output for goals achievement, evaluating contributions margin to find the optimal solution.

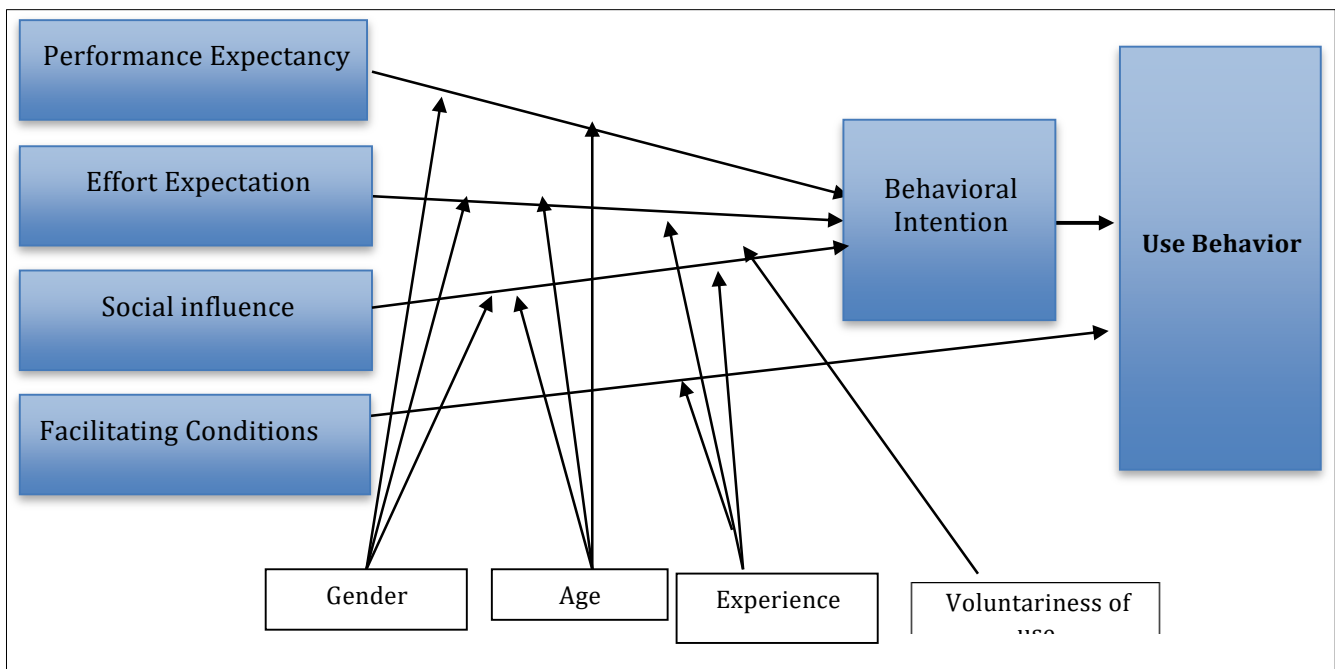
According to this model, perceived ease of use is the perception of accountants and managers that CVP analysis adaptation does not require much effort, and perceived usefulness of CVP analysis is the level of trust of accountants and managers will help improve their job performance (Davis, 1989). Operational perspective is defined as positive or negative feelings about performing a target behavior (Ajzen and Fishbein, 1975). Behavioral intention is awareness of trends or ability to decide to apply CVP analysis. Application behavior is the level of satisfaction, voluntariness of use, or the level and frequency of applying CVP analysis.

Today, TAM model is considered one of the most popular models to evaluate acceptability not only for services or technology techniques in the field of information technology (Kuo & Yen, 2009; Shroff et al., 2011; Melas et al., 2011) but also for techniques and methods in management accounting (Pindaro, 2007; Oanh Thi Tu Le & Quynh Mai Cao, 2020).

### 2.3. The Unified Theory of Acceptance and Use of Technology (UTAUT)

UTAUT is one of the most impressive information using studies conducted by Venkatesh, Morris, Davis, and Davis (2003). Taking a theoretical perspective, UTAUT provides an assessment of how variables related to intention and behavior change over time.

The UTAUT model is built on the argument that there are many similar underlying theoretical ideas, so it makes sense to organize and synthesize them to create a unified theoretical foundation. (Venkatesh, 2003). With that idea, UTAUT built with the hope that future research will not need to research, collect and synthesize ideas from a large number of different models, but instead, just need the unique application of UTAUT to solve many problems related to the acceptance and diffusion of certain technologies or techniques both in the fields of information, social psychology and economics. This model provides a foundation for future research in many fields such as information technology, economic management, corporate governance, etc. The UTAUT model is shown in Figure 1 as follow:



**Figure 1** The Unified Theory of Acceptance and Use of Technology (UTAUT)

Source: Venkatesh et al., 2003

The UTAUT posits four direct determinants of behavioral intention and user behavior: performance expectancy (perceived usefulness), effort expectancy (perceived ease of use), social influence, and facilitating conditions. Moderating influences are experience, voluntariness, gender, and age (Venkatesh et al., 2003).

Performance expectancy is defined as the degree to which an individual believes that using a particular service or technology will help them achieve benefits in job performance (Venkatesh et al., 2003). This variable is synthesized from the aspects of perceived usefulness (in the TAM model), relative advantage (in the IDT theory), and outcome expectations (in the SCT theory). Performance expectancy is the strongest predictor of intentions and is defined as the extent to which an individual believes that using the system will help them achieve their job performance. This factor is moderated by gender and age and is more pronounced for men and for younger workers (Venkatesh, 2000).

Effort expectancy is defined as the ease associated with using an information system (Venkatesh et al., 2003). Effort expectancy was integrated by the authors from three similar factors in other models: perceived ease of use (TAM model) or ease of use (IDT theory). This factor is moderated by gender, age and experience, and is more prominent in the early stages of use, becoming insignificant with prolonged use (Venkatesh et al., 2003).

Social influence is considered the degree to which an individual perceives how important the people around them are to whether they should use a new system (Venkatesh et al., 2003). Social influence is a factor integrated from subjective standards (TRA/TPB model), social factors. This factor is moderated by gender, age, experience and willingness to use.

Social influence is important in voluntary contexts at the early stages of personal experience with technology. The effect of social influence becomes evident for women when forming intentions to use new technology as well as for older workers (Venkatesh et al., 2003).

Facilitating conditions are defined as the degree to which an individual believes that the organizational and technical infrastructure exists to support system use (Venkatesh, 2003), which has a significant influence on operational behavior. This concept is established on the basis of integrating the concepts of perceived behavioral control (TPB model) and compatibility (in IDT theory). Facilitating conditions is a construct that relates to intention and use behavior, especially when effort expectancy is not present. Research shows that variables related to the support infrastructure are included in effort expectancy constructs. Normally, this construct captures the idea of the ease in which some technology can be used (Venkatesh, 2000). For that reason, even though this construct can be significant in some of the previous studied models, it is expected that in UTAUT model, when effort expectancy is included, it will be non-significant in predicting intention. Facilitating conditions is moderated by age and experience (Morris & Venkatesh, 2000; Venkatesh et al., 2003).

Behavioral Intention is attitude toward using the technology. Attitude toward usage of technology is defined as an individual's overall affective reaction to using a technology. Attitude towards usage of technology is drawn from attitude towards behavior construct found in the theory of reasoned action, affected toward usage from the model of personal computer utilization, and affect from the social cognitive theory, and intrinsic motivation from the motivational theory. Attitude toward behavior refers to an individual's feelings about performing a target behavior (Fishbein & Ajzen, 1975). Intrinsic motivation refers to one's perception of anticipation to perform an activity for no reason other than the desire to perform the activity (Davis et al., 1993). Affect refers to the resulting feeling of an individual who likes a behavior being performed (Venkatesh et al., 2003).

UTAUT is used as a foundation theory for many studies. There have been many studies expanding or integrating UTAUT. Three types of extension or integrative studies have been performed. Some studies apply the original UTAUT model in new contexts such as collaborative technology, management information systems (Chang et al., 2008), health care (Yi et al., 2016). The second type of research is UTAUT expanded by adding new variables to the model and removing moderating variables such as cost awareness and risk awareness (Yu, 2012). However, different studies show that the contribution to understanding UTAUT in different contexts is different. In addition to the factors that Venkatesh et al studied in 2003, other studies have tested the influence of other factors. In 2012, Venkatesh et al conducted a study to expand UTAUT to make it more suitable for users, in which the author removed the regulation of the voluntariness of use variable and added the link between Facilitating conditions and behavioral intention.

In general, the UTAUT model is integrated from many different behavioral prediction models, especially technology and engineering acceptance behavior prediction models. The first trend is that UTAUT was commonly used to measure the acceptance of new technology in the fields related to information technology, social psychology. Next trend is that UTAUT was used to evaluate technology acceptance in the field of management and economics. Researching factors affecting the behavior of applying CVP analysis to business decision making using the UTAUT model is consistent with this second trends.

#### **2.4. UTAUT and CVP analysis application**

From the perspective of evaluating the influence of factors on the application of CVP analysis in making business decisions, the factors in the UTAUT model can be expressed as follows:

**Performance expectancy:** inheriting the factor "Perceived usefulness" in TAM theory. Perceived usefulness is defined as the degree to which accountants and managers believe that applying CVP analysis will make their work more effective. Perceived usefulness describes the extent to which individuals believe that the CVP analysis is relevant to their job requirements. Perceived usefulness has a positive influence on the intention to use and the views of accountants and managers about CVP analysis (Davis, 1993; Yu et al., 2012).

**Effort expectancy:** Evaluate the ease of use of the administrator's application of CVP analysis in making business decisions, inheriting the factor "Perceived ease of use" in TAM theory. Perceived ease of use is the degree to which a person believes that using a technology or technique will not be difficult. Perceived ease of use is a construct associated with an individual's assessment of the effort involved in using the system. Although a potential user may believe that a technology will be useful, the user may believe that the technology will be too difficult to use. Davis (1989) suggests that perceived use may be superior to ease of use. According to Venkatesh et al. (2003), perceived ease of use originates from perceived ease of use proposed in the TAM technology acceptance model. Davis (1989) points out that an

application is perceived by individuals who can easily use them to be likely to adopt them. Perceived ease of use is determined by the ease of interacting with the system.

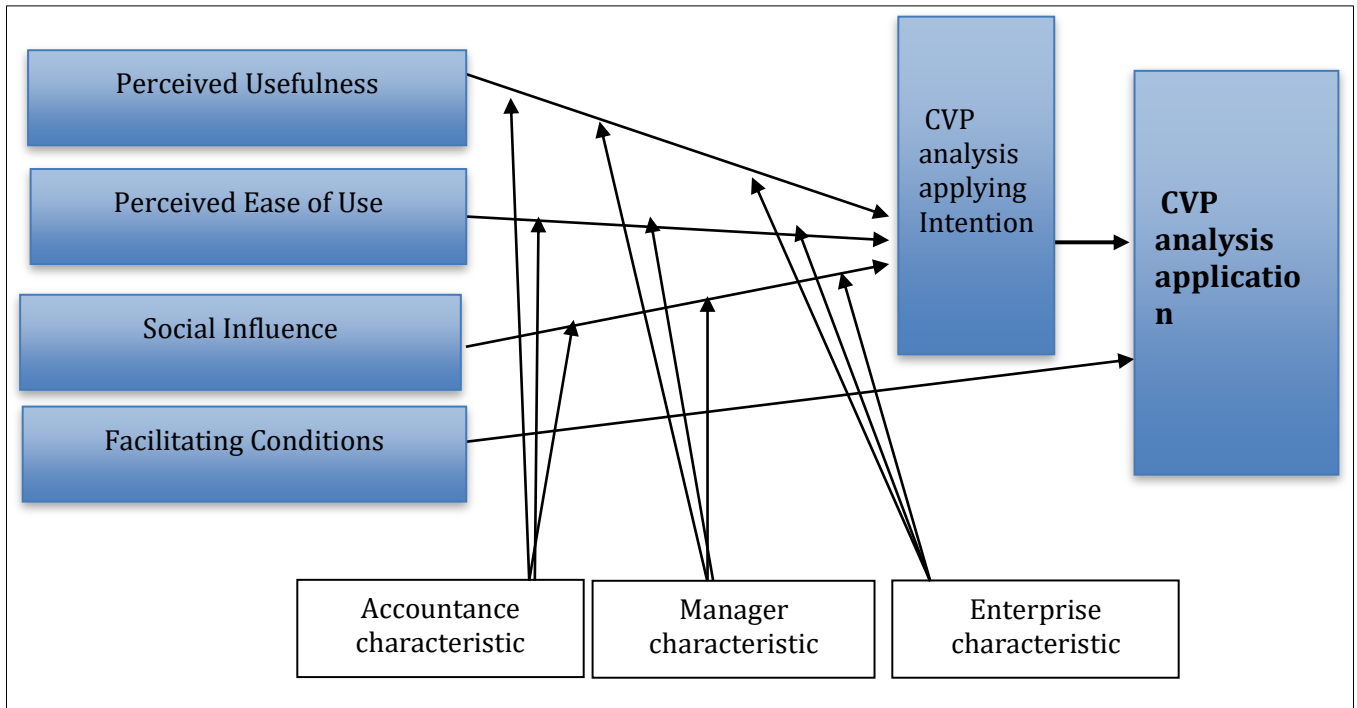
**Social influence:** Social influence is defined as the degree to which an individual perceives that people important to them believe that they should adopt a new technology or technique (Venkatesh et al., 2003). Social influence describes how individuals perceive that people important to them will support the adoption of technology. Taylor (2004) argues that when users actually use a new system, their expectations will come from their direct experience and are less influenced by others. The intention to apply CVP analysis is influenced by close friends, people who influence the user's work or accounting experts, and by managers in the business. Administrators are the ones who directly use information from CVP analysis to make decisions, so the administrator's need to use information has an important influence on the application of management accounting, whose foundation is CVP analysis. Research results of Abdel-Kader and Luther (2008) show that the attention of managers has a significant influence on the application of management accounting in enterprises.

**Facilitating conditions:** Demonstrates the current level of infrastructure and technology to support the application of CVP analysis by administrators, taken from "Perceived behavioral control" (TPB/C-TAM-TPB). Facilitating conditions are defined as the degree to which an individual believes that the organizational and technical infrastructure exists to support the use of the system (Venkatesh et al., 2003). The basic structure of operating conditions includes aspects of the environment, facilities, and organizational structure, which facilitate easy implementation (Thompson et al., 1991). Taylor (2004) attributes user facilitation to individual beliefs about the technical infrastructure that supports system use. Providing clear communication about different types of support will increase user confidence, assisting them in adopting new technology. Although Venkatesh et al (2012) showed that facilitating conditions have positive influence on behavioral intention, most studies show that facilitating conditions do not have affecting on intention to use but have an directly influence on behavioral intention.

**Behavioral Intention:** is an individual's willingness to accept the application of technology (Davis et al., 1989). Venkatesh et al (2003) have demonstrated that behavioral intention has a significant influence on adoption. In this study, the intention to apply CVP analysis is the intention of accountants and managers.

## **2.5. The model of factors affecting to CVP analysis application**

With the purpose of evaluating factors affecting the application of CVP analysis in making business decisions at enterprises, thereby proposing solutions to improve the application of CVP analysis in decision making. doing business in these enterprises, the author has proposed a model to research factors affecting the application of CVP analysis in making business decisions on the basis of inheriting factors in the TAM and UTAUT models after the variable "voluntariness of use" has been removed. This is a typical model for evaluating individuals' use of information in many fields and can be applied to research in the application of CVP analysis by managers. This combination is relatively complete, inherited and perfect for researching factors affecting the behavior of applying CVP analysis in making business decisions. The variables "age", "gender", "experience" are considered for two subjects: Accountants and Manager", so the author proposes the variables "accountant characteristics" and "manager characteristics" in addition to the variable "enterprise characteristics" including size, number of years of establishment, and form of ownership. Therefore, the author proposes a research model on factors affecting the application of CVP analysis according to Figure 2 as follows:



**Figure 2** Proposed research model

Source: Proposed by author

## 2.6. Identify variables in the research model

### 2.6.1. Independent variables

- factors that influence to CVP analysis applying intention, thereby affecting the action of applying CVP analysis in making business decisions.
- Perceived usefulness (Davis, 1989; Venkatesh, 2000, 2003): defined as the degree to which accountants and managers believe that applying CVP analysis will make their work more effective , they find CVP analysis useful for business management.
- Perceived ease of use (Davis, 1989; Venkatesh, 2000, 2003): is the degree to which accountants and managers find it difficult or easy to apply CVP analysis in making business decisions.
- Social influence (Venkatesh, 2000, 2003): CVP analysis applying intention is influenced: by close friends, by people who influence the user's work or by accounting professionals.
- Facilitating conditions (Venkatesh, 2000, 2003): are conditions where the organizational and technical infrastructure exists to support the application of CVP analysis.
- CVP analysis applying Intention (Davis, 1989; Venkatesh, 2000): For accountants, intention to apply CVP analysis is the accountant's intention to analyze accounting information according to the contents of CVP analysis, then, they get information about revenue, output costs, profits and provide to managers to make business decision. For managers, the intention of CVP analysis is that they use information provided by accountant for the application of CVP analysis, applying it to specific business situations, especially making effective business decisions.
- CVP analysis application: Adoption behavior is the act of actually using a technology or technique and the cognitive commitment to maintain this applying. Application adoption behavior depends on internal urges and external influences on that application. Studies show that adoption behavior is strongly influenced by intention to use (Davis, 1993; Venkatesh & Davis, 2000). In this study, CVP analysis application is the implementation of CVP analysis intention of accountants and managers, is the accepting of CVP analysis application and committing to maintain the

application with the desiration of high effectiveness achieving. Work efficiency in this study is efficiency in providing information to accountants and efficiency in making business decisions of managers.

## 2.7. Moderating variables

Moderating variables is the influence of independent variables on dependent variables. Moderating variables related to accountants and managers include: age, gender, experience, education level and training major. Variables related to enterprise include: size, ownership form.

Age has been mentioned as related to the TPB model. Morris and Venkatesh (2003) research found that attitudes toward behavior is higher in younger employees and perceived behavioral control was more important for older ones. On the other hand, older women show more influence from subjective norm.

Gender is mentioned as an important moderator in findings related to TAM and TPB models. Venkatesh et al. (2000) reported difference in gender results. When they evaluated attitudes toward behavior, men were more salient than women but subjective norm and perceived behavioral control were more salient in women. In TAM model, Venkatesh and Morris (2000) showed report stronger results in men when measure perceived usefulness and in women when measure ease of use. In both studies, when they measured subjective norm, they found stronger relationship related to women in early stages of experience.

Experience, as the rest of variables, was not explicitly included in original models. But late findings relate this variable in almost all the models with significant differences according to the level of experience of respondents. The results were similar in the Theory of Planned Behavior (Morris and Venkatesh, 2000). Using the technology acceptance model, some studies (Davis et al., 1989) suggest that ease of use does not change significantly as experience levels increases. Taylor and Todd (1995) used experience in a combined TAM-TPB model and found that perceived usefulness, attitudes toward behavior, and perceived behavioral control were more important with more experience. On the other hand, subjective norms are less important as experience increases.

In this study, the author further studies the variables Education Level and Training Major. The author analyzes how the influence of education level and training major on the relationship between perceived usefulness, perceived ease of use and social influence with the intention to apply CVP analysis is.

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## 3. Conclusion

Based on theoretical research of the model of influencing factors, including the TRA model, TAM model and UTAUT model, the article has built a model of factors affecting the application of cost-volume-profit analysis. Influencing factors include: Perceived usefulness; Perceived ease of use; Facilitating condition; Social influence. In addition, the model also studies the influence of moderating variables including: enterprise characteristics; Managers characteristics; Accounting Characteristics. Moderating variables related to accountants and managers includes: Age, gender, experience, education level, training major; related to the enterprise includes: scale and ownership form.

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