



The acceptance and use of customer relationship management (CRM) systems: An empirical study of distribution service industry in Taiwan

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ABSTRACT

With the rapid change of business competitive environment, enterprise resource integration and innovative issues of business operation have gradually become the most important issues for businesses. Furthermore, many enterprises have implemented novel information technology and developing the innovative e-business applications systems such as enterprise resource planning (ERP), customer relationship management (CRM), knowledge management (KM) and supply chain management (SCM) to enhance their competitive advantages. CRM systems can help organizations to gain the potential new customers, promote the existing customers' purchase, maintain good relationship with customers as well as to enhance the customer value, thus can improve the enterprise images. Moreover, the development and applications of CRM systems have also been considered as important issues for researchers and practitioners in recent years. For Taiwan's industry, it has been gradually transferred from manufacturing-oriented to a service-oriented. Thus, the service industry has higher percentage in the GDP and in which the distribution service industry is the biggest one and be a core industry in the whole of service industry. The main purpose of this study is to explore the factors affecting the acceptance and use of CRM systems. Furthermore, the proposed research model was built on the basis of unified theory of acceptance and use of technology (UTAUT) and task-technology fit (TTF) framework as well as technological and managerial theories. The implications of findings for practice will be discussed.

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1. Introduction

E-business has become a global trend and there are a variety of studies exploring the issue; especially, the research on how to implement technology acceptance model into customer behavior pattern, is very much respected by general enterprises. According to the report proposed by Market Intelligence and Consulting Institute (MIC) in 2006, it pointed out that "electronic sophistication of Taiwan's large-scale enterprises has been increasing: Manufacturing sector is currently at 55%, and the remaining (including service-oriented sector) is currently at 45%". The same report also pointed out that enterprise resource planning (ERP) and customer relationship management (CRM) systems are commonly implemented in businesses, also, BI system is gradually becoming more and more popular. In addition, the Small and Medium Enterprise Administration, Ministry of Economic Affairs began issuing the "Industry-specific e-Commerce Promotion Program" since 2002; up to now, there are over 4000 enterprises which have employed e-business

programs, representing popularity and proven performance of the various programs. Such is the iron-clad proof of how important e-business is today.

According to statistics issued by Directorate-General of Budget, Accounting and Statistics of Executive Yuan (2007) in Taiwan, pointing out that "the proportion of service product value to GDP is up to 72.91%, with a working population standing at 5.91 million persons; especially, for the production value of distribution service industry (which includes wholesale, retailing, catering and logistic) has shown significant performance and that proportion is up to 26.7%, with a working population standing at 2.91 million persons". Thus, it can be seen that the distribution service industry has become a mainstream player in service-oriented development in Taiwan. However, in the related literatures of CRM, very few studies have been conducted on discussion of distribution service industry. For this reason, the main purpose of this study hopes to explore exactly how distribution service industry utilizes the CRM system, and try to execute analysis regarding the appropriateness of the application of unified theory of acceptance and use of technology (UTAUT); finally, to provide reference data for industries which still have not yet applied any e-business programs.

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As mentioned above, this study uses the theory of UTAUT and TTF to explore the acceptance and use of CRM system in distribution industry. The aim of this paper is therefore twofold:

- (1) Analyzing the variable in the theory of UTAUT and TTF theory, and reorganizing key factors affecting user acceptance of newest information technology, for realizing the user's behavioral intention of employing the CRM system.
- (2) Providing valuable reference for businesses which intend on implementing or upgrading e-business systems in the future.

2. Literature review

2.1. Customer relationship management (CRM)

Customer relationship management (CRM), a derivative of the earlier American term of “contact management” (during the 1980s). From the report of Spengler (1999), one can find out that extended functions of “Contact Management” are: Customer data collection, as well as gathering and application of useful information. It further developed to be the call center, representing the unit or research tool to analyze customer data. To understand CRM system from the aspect of marketing, its ultimate target also involves of how to fit the customer's requirement; with quest to achieving the objective of establishing the “Relationship Marketing”, in other words, a long-term customer relationship. The only differentiation is in the application of information technology enhancing its effectiveness (Ryals & Payne, 2001).

Kalakota and Robinson (1999) considered that customer relationship management (CRM) can be seen as the consistent organizational activity under usage of integrated selling, marketing and service strategy. That is, trying to define the real need of the customer, by the enterprise integrating various process and technology, in asking internal product and service improvement, in order to dawn effort of enhancing customer satisfaction and loyalty. In 2001, they also offered the concept of CRM system to synthesize with functions of sales, customer service, and marketing activity, all based on customer orientation. The same idea also served as the developmental foundation of CRM system upgrades in the present (Kalakota & Robinson, 2001).

The benefits of CRM implementation not only can assist the enterprise to locate the profitable market (or business opportunity), but it also improves the competitive advantage, through lowering cost and gaining higher customer value, in comparison with the competition. However, a real successful CRM should integrate information technology (such as basic installation, applicable system, etc.), information resource (such as customer data base, interview record of salesman, well interaction with customer, and so on), as well as organizational resource (for example, customer-oriented business culture, etc.); all these can actually exert the best effectiveness (Pushkala, Michael Wittmann, & Rauseo, 2006).

2.2. Unified theory of acceptance and use of technology (UTAUT)

For past studies, technology acceptance model (TAM) (Davis, 1986) was used to analyze a variety of acceptance behavior of information technology. Due to its high level of reliability, various empirical studies had been greatly improved. In 2000, Venkatesh and Davis proposed the newest theory of TAM: The TAM 2 research scheme. In 2003, Venkatesh, Morris and other scholars offered the UTAUT, linking up theory of rational action (TRA), technology acceptance model (TAM), motivational model, theory of planned behavior (TPB), theory combined with TPB and TAM, model of PC utilization, innovation diffusion theory and social cognitive theory. Within the UTAUT, there are four major dimensions, such as

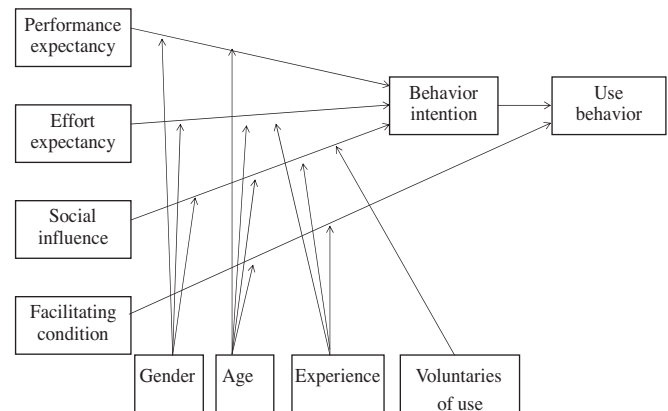


Fig. 1. Unified theory of acceptance and use of technology (source: Venkatesh et al., 2003).

performance expectancy, effort expectancy, social expectancy and facilitating expectancy. The structure of UTAUT theory is shown in Fig. 1.

Researchers of information technology have, thus far, developed many sophisticated theoretic frameworks on how and why people are willing to adapt to the latest information technology. Relevant research can be classified into two categories: Exploration of acceptance degree when the individual is facing the latest technology, also, their users' behavioral intention and actual users' behavior. For example, the report of Lin and Anol (2008), which discussed internet content, has found that internet information technology, social expectancy and other enabling factors will significantly influence user's social behavior on internet websites. Furthermore, the focusing of successful adoption of organizational culture dimension, such as offered by the research of information technology adoption of Arabic culture proposed by Al-Gahtani, Hubona, and Wang (2007); that research found out performance expectancy and social expectancy, both positively affecting adoption behavior of using information technology. In addition, the more abundant experience of computer usage will bring about higher acceptance to information technology.

2.3. Task-technology fit (TTF) model

Task-technology fit (TTF) was offered by Goodhue and Thompson in 1995. Main purpose was to evaluate successful matching between task and information technology. Goodhue and Thompson proposed the idea that information technology should provide assistance to job performance, also, that technology has to be accepted and willing to be used by people on job-sites. Hence, the technology, the task and the individual all will affect final job performance, as well as user's self-persuasion. In a relevant research conducted on trust funds, Gebauer and Shaw (2004) analyzed the relationship between task and technology, from the angles of behavior and organizational effect. They pointed out that a powerful information technology was of essential importance. The Model of TTF theory can be seen as per Fig. 2.

3. Research models and hypotheses

This research employed the UTAUT theory, as proposed by Venkatesh, Morris, Davis, and Davis (2003), and the TTF theory, as offered by Goodhue and Thompson (1995); those served as main basis of the study. We aim to explore and make the empirical study on cause-and-effect relationship for: Performance expectancy, effort expectancy, social expectancy, enabling factor, task character,



Fig. 2. Task-technology fit (source: Goodhue and Thompson, 1995).

technology character, task-technology fit, in relations to distribution service behavior with intention of using the CRM system. The research model can be given in Fig. 3.

According to pre-set research purpose and the relationship of each dimension in the research model, the authors intend to propose following hypotheses in order to conduct the empirical study. The authors use the UTAUT to explore how the “Behavioral Intention” of CRM system will be affected by three dimensions of “Performance Expectancy”, “Effort Expectancy” and “Social Expectancy”; as well as the influence for “Task Character” and “Technology Character” of TTF to “Task-Technology fit” and indirect affect to “Behavioral Intention”. Finally, the determination of whether “User Behavior” will be influenced by “Behavioral Intention” and “Enabling Factor”.

In general, when enterprises consider whether or not their company must invest in the newest technology, installations, or implementing the system, the main consideration is whether the technology or system can enhance the overall performance, or can effectively achieve pre-set task. The researches of Venkatesh et al. (2003), Neufeld, Dong, and Higgins (2007), Al-Gahtani et al. (2007) and Chiu and Wang (2008) found that information technology seizes positive acceptance, if using it to enhance overall performance for on-site job behavior. Therefore, under the premises that CRM system can benefit job performance and will improve system usage behavior, the authors offered their first hypothesis:

H1: Performance expectancy significantly and positively affects behavioral intention.

When enterprises decide on whether or not to adopt the CRM system, they usually compare it with existing usage system or current business operations. If they feel the CRM system is easily apprehended and used, then their willingness to adopt will be enhanced. From the research of Venkatesh et al. (2003), Park, Yang, and Lehto (2007) and Chiu and Wang (2008) one can observe that individuals will demonstrate positive acceptance for information technology, if it is not too time or energy consuming to learn. Thus,

the authors state that there will be higher user's behavioral intention, if and when the CRM users expect that they need not spent too much time or attention in learning the system. Hence, the authors propose their second hypothesis:

H2: Effort expectancy significantly and positively affects behavioral intention.

Although e-business in Taiwan is currently considered normality, there is still necessity to examine industry trends, real needs of enterprises, and the cost factor, when businesses build and implement new information technology. By consequence, when enterprises decide on whether or not their company will adopt the CRM system, their decisions might be affected by certain social factors, such as: Benchmarking enterprises, internal supervisors, colleagues, as well as if the comprehensive organizational policy and budget can gather internal support. Thus, the authors took into consideration that user's behavioral intention will be enhanced, if and when the enterprise have cognition that adopting CRM system will create higher social impact. Agarwal and Prasad (1997), Venkatesh et al. (2003), Park et al. (2007) and Chiu and Wang (2008) have found that when the user senses the new system is easily learned and operated, they will show more positive attitude of acceptance. Thus, the following hypothesis is proposed:

H3: Social influence significantly and positively affects behavioral intention.

Besides user intention, the user also needs to possess relevant knowledge of CRM system. For non-professionals or new users, they definitely need professional assistance and guidance, or relative training course, when they do not know how to operate it. If there were such benefiting resource and environment available, their user intention will be enhanced. The study of Venkatesh et al. (2003) and Chiu and Wang (2008) found that when the users consider they have enough usage capacity and assistance resource, they will show more positive acceptance of information technology. Hence, the authors believe that user intention and cognition of advantageous environment will influence CRM system being actually used in the work place. Therefore, the following hypothesis is proposed:

H4: Facilitating condition significantly and positively affects user behavior.

Generally speaking, higher user intention represents higher usage frequency rate. Relative result from past research shows that user shows more willingness to employ the new system, when they sense it can be supported by technological or organizational structure (Chiu & Wang, 2008; Venkatesh & Davis, 2000; Venkatesh et al., 2003). Thus, the following hypothesis is proposed:

H5: Behavioral intention significantly and positively affects user behavior.

The research of Goodhue and Thompson (1995) defined the mission as “the final result from input to output, derived from the individual's use of information technology”. Task character means to explore whether the influence of using technology included characters of non-routine and dependency. For CRM system, different manufacturers develop dissimilar systems under different purposes; some even belong to the ERP system category. But in fact, the main purpose is to handle cross-data integration and explore most effective information to benefit the entire operation. From the research proposed by Goodhue and Thompson (1995), it can be stated that task character will directly or

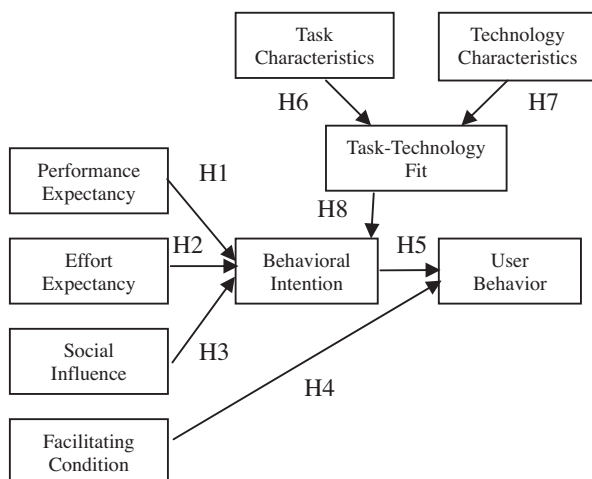


Fig. 3. Research model.

indirectly affect the character of specific system, or the effectiveness of using information technology. The study of Dishaw and Strong (1999) also reinstated that task and technology character will directly influence task-technology fit. Therefore, the following hypothesis is proposed

H6: Task characteristic significantly and positively affects task-technology fit.

In Goodhue and Thompson's research (1995), information technology comprises of various systems, such as: Information system mechanism, computer department service, etc. For CRM system, main characteristics of its software are stability, easy usage and integration. Thus, if system software does not function well or advantageously, such will decrease behavioral intention of using the CRM system. In addition, the same research also found that technology character will directly or indirectly affect the character of specific system, or the effectiveness of information technology. In the research of synthesizing TTF and TAM models, as proposed by Dishaw and Strong (1999), study result showed that task and technology characters dawn direct influence on task-technology fit. In addition, the research also states that task-technology fit will be enhanced, whilst technology character is increased. Therefore, the following hypothesis is proposed:

H7: Technology characteristic significantly and positively affects task-technology fit.

Task-technology fit, as per Goodhue and Thompson's research (1995), proposes main theoretic character of offering the variant of "task-technology fit". The model presumes that the variances of "task characteristics", "technology characteristics", and the user, directly or indirectly influence "utilization" and "performance impacts". In addition, the research also found that user's own cognition and belief will determine the strength of behavioral intention, thereafter affecting final performance of the actual behavior. Hence, the following hypothesis is proposed:

H8: Task-technology fit significantly and positively affects behavioral intention.

4. Research methodology

4.1. Samples and data collection

Concerning enterprises using CRM, questionnaires were issued to all related staff members. Main sample basis for the final questionnaire involved four distribution service companies in Taiwan; there were a total of 350 questionnaires delivered and received 210 useful responses, an effective response rate of around 60%. All sample subjects were confirmed as possessing actual usage experience regarding CRM system.

4.2. Measurement development

The authors used original theoretic questions of UTAUT as basic foundation; also, they referred to the character of CRM system. In addition, they took into consideration ideas proposed by relevant school professors, who are accredited with information management background, as well as the opinion of industrial operators, in order to develop the final questionnaire. Questions regarding TTF were very basic theoretic ones; nevertheless, minor modifications were carried out, thereafter ideas and references being offered by industrial operators. Measurement items were each based on a 5-point Likert scale, from strongly disagree (=1) to strongly agree (=5).

4.3. Pre-testing

When the initial script was designed, the authors conducted pre-testing, in order to avoid any vagueness or fuzziness therein the questionnaire design, which could ultimately affect both reliability and validity of the entire research. Pre-testing subjects included: Five professors possessing background of information management, three industrial supervisors who have used CRM system, and four post-graduate researchers (Master's degree). After modifying unclear and grey areas therein the questionnaire, the formal survey was conducted.

4.4. Method of data analysis

In order to present an easily understood sample structure, the authors firstly employed frequency analysis representing actual distribution spreading of the samples, coupled with the characteristics of demographic statistical variance. Thereon, they calculated the mean value, standard of error, percentage of research variance, etc., offering an understanding of the initial situation and a general description concerning research sample basis.

Structural equation modeling (SEM), a type of statistic method, is normally used to examine the accuracy of constructive relationship, explore relationship between the observable variance and potential variance, as well as defining the interactive relationship between each other. Due to general theoretic of social science and behavioral science, which are usually constructed by some unobservable or unmeasured variance, therefore, this research adopted the SEM, in order to analyze the relationship of each potential variance, and to examine research assumptions.

5. Results

5.1. Sample characteristics

Of the 430 questionnaires distributed, 271 were returned; an effective response rate of 63%. Regarding gender, male samples were the majority of total samples; the percentage of males was around 60%. For age distribution: 75% under 40 years old. Concerning education level, 63.4% was above university degree. From the vocational angle, 50.3% qualified with a one-to-five year working experience. Concerning computer usage experience, those who have accumulated more than eight years, occupied the most, at about 43.5%. Nearly half of the samples used CRM system occasionally; amongst whom, those using no more than 5 h/week, the percentage was 37.3%. Having the habit of using CRM system, within the past three years, showed up at 38.7%. In addition, questionnaire responses also revealed usage situation of other e-business systems; it was confirmed that a majority of most enterprises surveyed, had used other e-business systems in the past (71.7%); amongst whom, those having used ERP system came in as the majority, at 73.4%.

5.2. The measurement model

Prior to conducting path analysis for overall research model, it is important to determine how to evaluate potential variance, due to the fact that only potential variance can be effectively evaluated. Statistics can precisely predict path coefficient in the evaluation model.

The confirmatory analysis is the examining action in evaluating the numbers. In this research, both UTAUT and TTF theories had been used in conducting confirmatory factor analysis (CFA). This is to examine and test whether accuracy and fitness evaluation of the variance gets firm support from the theoretic. CFA involves

Table 1
Results of measurement model CFA.

Variable	Estimate	t-Value	R ²	Composite reliability	AVE
PE1	0.75	–	0.57	0.6003	0.4325
PE2	0.55	3.17***	0.30	–	–
EE2	0.61	–	0.38	0.5561	0.2974
EE3	0.51	3.45***	0.26	–	–
EE4	0.50	3.52***	0.25	–	–
SI1	0.71	–	0.51	0.6975	0.3701
SI2	0.69	9.16***	0.47	–	–
SI3	0.50	5.93***	0.25	–	–
SI4	0.50	5.29***	0.25	–	–
FC1	0.57	5.92***	0.39	0.7031	0.3733
FC2	0.52	6.33***	0.27	–	–
FC4	0.67	–	0.45	–	–
FC5	0.67	7.97***	0.45	–	–
BI1	0.72	–	0.60	0.7836	0.5234
BI2	0.71	9.91***	0.51	–	–
BI3	0.74	10.33***	0.54	–	–
TA1	0.85	–	0.72	0.6651	0.5071
TA2	0.54	3.46**	0.30	–	–
TE1	0.75	–	0.56	0.705	0.4499
TE2	0.68	8.98***	0.46	–	–
TE3	0.57	7.23***	0.32	–	–
FT1	0.64	–	0.41	0.6982	0.3159
FT2	0.55	7.03***	0.31	–	–
FT3	0.58	6.60***	0.34	–	–
FT4	0.53	5.13***	0.28	–	–
FT5	0.50	5.92***	0.25	–	–

GFI = 0.95, AGFI = 0.92, NFI = 0.82, CFI = 0.95, RMR = 0.021, RMSEA = 0.057, $\chi^2/df = 1.74$.

** $p < 0.05$.

*** $p < 0.001$.

specification and estimation of one or more hypothesized factor structure(s), each of which proposes a set of latent variables to account for covariance among a set of observed variables.

If CFA does not get appropriate fitness, then by deleting inappropriate questions or by amending the modification indices (M.I.), one can enhance the fitness level. Within the CFA analysis, some questions of UTAUT and TTF theory were dismissed since its loading (λ) is less than 0.5; thereafter, CFA analysis was re-conducted. Table 1 represents entire range of indexes achieving the suggestion value which Bagozzi and Yi (1988) proposed. The GFI, AGFI, NFI and CFI all shown above 0.9; RMR is less than 0.05, RMSEA is less than 0.08, χ^2/df is smaller than 3, as well as the negative p value. Those results meant the structural equation model constructed in this research indeed achieved the ideal level. Internal quality analysis (as shown per Table 1) had indicated that the estimate of each question landed between 0.504 and 0.801 and t -value achieved positive level of 0.001.

In addition, according to the research of Joreskog (1993), excepting for the dimension of effort expectancy which fell below 0.6, all other dimensions showed more than 0.6. Overall, the internal quality of evaluation model was achieved the acceptance level.

Reliability results are also given in Table 1. The data indicates that the measures, in terms of their internal composite reliability as indexed by the composite reliability, ranged from 0.5561 to 0.7836, exceeding the recommended threshold value (0.50). In addition, the average variance extracted (AVE) for each measure ranged from 0.2974 to 0.5234. Consequently, validity was not firmly and completely supported by our scales.

5.3. The structural model

The authors adopted AMOS software to process path analysis. In which, seven (out of eight) hypotheses were supported. The path coefficient result can be seen as per Fig. 4:

As predicted by H1, performance expectancy is non-significant and not positively affecting behavioral intention ($\beta = -0.12$, thus,

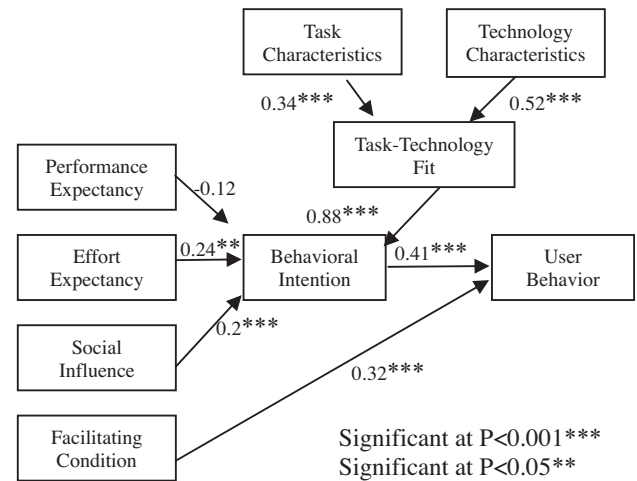


Fig. 4. Results of structural model.

no influence on intention). As predicted by H2, effort expectancy shows a significant and positively affect on behavioral intention ($\beta = 0.24$, $p < 0.001$); consequently, H2 is supported. H3 is also supported since Social Influence shown a significant positive affect on behavioral intention ($\beta = 0.2$, $p < 0.001$). As predicted H4, facilitating condition significantly and positively affect user behavior ($\beta = 0.32$, $p < 0.001$). Moreover, H5 behavioral intention significantly and positively affect user behavior ($\beta = 0.41$, $p < 0.001$).

Finally, task characteristics as mentioned in H6, significantly and positively affect task-technology fit ($\beta = 0.34$, $p < 0.001$). Technology characteristics as described per H7, significantly and positively affect task-technology fit too ($\beta = 0.52$, $p < 0.001$). Last, H8 ($\beta = 0.88$, $p < 0.001$) demonstrate that task-technology fit significantly and positively affect behavioral intention is also supported.

6. Conclusions and recommendations

6.1. Research findings

- (1) The influence of performance expectancy on behavioral intention.

In past researches, performance expectancy has shown positive influence on user's behavioral intention. However, the distribute service industry does not concur with any positive effects of using the CRM system. The reason could be, that by using the CRM, one can only handle issues concerning sales and operations, nevertheless, the same system dawns no apparent effect regarding performance merit bonus or promotion matters. Hence, it has no influence on performance expectancy.

- (2) The influence of effort expectancy on behavioral intention.

In the CRM system, effort expectancy has shown positive effect on user behavior. If staff members feel that the CRM is easily learned and operated, their willingness to employ it will be enhanced. From the empirical study, it was also found that staff members, when feeling the CRM system is easily learned and operated, will also sense the system being able to assist them regarding better job performances.

- (3) The influence of social expectancy on behavioral intention.

In the CRM system, social expectancy shown positively effects on user behavior. From the empirical study, it can be found that

the CRM system will be easily accepted by enterprises when someone with power and authority from within the company, strongly advocate to conduct use of the CRM system.

(4) The influence of enabling factor on actual use.

From the result shown in the empirical study, the enabling factor has positive influence on actual usage. If staff were well trained and educated whilst the enterprise is implementing the CRM system, it will product positive effect of CRM use. For other enterprises who had developed their own CRM systems, behavioral intention thereof has obviously been enhanced, since there were internal system engineers and educators, who could have quickly handled any technological problems.

(5) The influence of task-technology fit on behavioral intention.

From the empirical study, task-technology fit positively affects behavioral intention. It can be seen that the CRM system can handle business issues for user; thus, the user is more willing to use it. This presumption fits the idea of Goodhue and Thompson (1995), also the two factors have demonstrated significant positive correlation.

This study was set out to explore the factors affecting behavioral intention of using CRM systems, based on the theory of UTAUT and TTF. For final results, the following factors were detected: Whether or not the user feels the CRM system is helpful or not in doing the job; whether or not the system is easy to use, what exactly will be profitable conditions in the environment; whether or not each task can benefit each other, etc. Such were all key factors to influence user's acceptance. In other words, when the distribution service implements the CRM system which fit its industrial character, then proper job-site education and training will be necessary. When the staff feels the system is easy to use and can effectively handle relevant business issues, the job performance can be naturally enhanced; one thus can achieve the pre-set purpose of the enterprise's decision to use the CRM system.

6.2. Research limitations

Followings are descriptions of the limitations encountered for this research:

- (1) Overall representation and stability may not be sufficient, since the authors acquired CRM user data from only two distribution service companies.
- (2) Although the authors conducted the empirical study by using the UTAUT theory, the original variance in the theory was not explored in this research; thus, it might have influenced final effects.

6.3. Suggestions for future study

This research model is synthesizing two theories of UTAUT and TTF. Therefore, except for CRM, this model may be employed for other relative researches, in order to observe differentiations between acceptance and behavioral intention in relevance of using various information systems. For future researches, the authors could also combine with other theory, or expand research scope, in order to experience with broader references and directions. This research is using the distribution service as the subject; for future researches, the authors can use another industry, which can be explored and compared, in order to determine whether differentiations exist between technology acceptance and behavioral intention.

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