Modified of UTAUT Theory in Adoption of Technology for Malaysia Small Medium Enterprises (SMEs) in Food Industry

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A R T I C L E   I N F O

A B S T R A C T

A small and medium enterprise is a backbone of local and world economy including Malaysia as developing country. It is estimated that over 90 percent of all enterprises are SMEs and the contribution from SMEs is more than 70 percent of goods and services sold worldwide. Food industry is mainly dominated by SMEs, even though SMEs of food industry is huge contribution towards economies. Moreover, Malaysian SMEs are still rely on imported food and use of technology adoption has been spike issues among SMEs as they require a big outlay which lacking resources to SMEs. However, SMEs of food industry in Malaysia could be improve their competitive advantage through the increasing level of use technology and provide training to enhance more skills of employees. Moreover, the introducing of Unified theory of acceptance and use of technology (UTAUT) is one option for SMEs to increase quality of products and simultaneously enhance the contribution of good domestic product and export activity. This study will attempt to analyze the acceptance and use of technology in SMEs of food industry in order to understand the SMEs behavior towards acceptance and use of higher level of technology. A model developed and empirically tested through survey data obtained from 135 organizations. This model was analyzed using SPSS and test exploratory factor analysis. The result indicates effort expectancy has been removing and this study decides to replace this construct resistance to use. Thus, this study contributes to existing literature by incorporating resistance of use of new construct UTAUT theory as a proposed model.

INTRODUCTION

During the last few decades' theory of adoption becomes widely attraction among the researcher in information communication field and others types of technology. There are a few theories that examine the behavior of individual adoption of technology that focus on people's intention to appoint in a certain behavior such as theory of reasoned action (TRA), theory acceptance model (TAM), Theory of planned behavior (TPB) and Innovation of Diffusion. Although several theories have been offered to determine the adoption of innovation, the UTAUT theory explained about 70 percent of the variance in behavioral intention to use a technology and about 50 percent of the variance in technology use (Viswanath, James and Xin, 2012). UTAUT model is useful for analyzing issues involved in the identification of skills, competencies, and specific training to achieve an understanding of predictors of actual usage of technology (Sarah and Haddow, 2011). However in Malaysia, previous researchers interested to test this model in Information Communication Technology (ICT), internet banking and education field. Hence, little has done so far regarding adoption technology in SMEs especially in food industry (Zanariah *et al*, 2012). The adoption of technology among SMEs is considered as not enough where the study (Hazana, Alina, Eta and Norhadilah, 2012) designates that SMEs in Malaysia make practice of very limited range of technologies and also not able to define their real technological needs. Even though, this problem has been covered with the effort from government in term of financial or training but a few studies on other type of technology adoption show the low level of adoption among the SMEs. Thus, this study examines to develop a new model of UTAUT for SMEs of food industry in order to enhance more competitiveness in productivity and industry as well.

The remainder of this paper begins with conducting review of SMEs adoption and UTAUT theory. Its follows with presenting the empirical study which describing methodological consideration and procedure of

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data collection in this study. Afterward, this study will describe analyses and findings. Finally, a proposed a new model has been created based on exploratory factor analysis results.

Literature review:
*Adoption Technology:*
      Technologies that facilitate collaboration via electronic have become an important component of day to day life. Several studies have examined the adoption of collaboration technologies such as voice mail, email group support system, services and so on. Particularly collaboration technologies are not progressing as fast or as broadly as expected, it seems a different approach needed. New system or new technologies acceptances require input for both the managerial or organizational level and individual level. It is important for firms to understand not only the end user beliefs, attitudes and intentions of technologies, but the management strategies, policies and actions which have significant effect on the successful acceptance of a technology (Bhattacherjee, 1998). Furthermore, for driver of an innovation or technology supplier, the acceptance of technology is only successful when both the individuals and organizations accept the innovation and targeted adopters also shows the commitment by continuing to use the technology over times (Bhattaherjee 1998 and Rogers 2003). According to Renaud and Van Biljon (2008) user become aware about technology and has intention to use the technology when technology acceptance process has begun and technology adoption stems from acceptance and result in the actual use of the technology (Premkumar and Bhattacherjee, 2008).The user's intention to use the technology may change and will be affecting both for adoption and acceptance through the process of adoption. Thus, technology acceptance and technology adoption are closely related and are often considered as the same concept.

Unified Theory of Acceptance and Use of Technology (UTAUT):
      In a further effort to improve the models of technology acceptance, Vankatesh, Davis and Morris have proposed UTAUT (Vankatesh *et al*., 2003). UTAUT has four key constructs which are present as performance expectancy, effort expectancy, social influence and facilitating conditions. UTAUT model is useful for analyzing issues involved in the identification of skills and competencies, and specific training to achieve an understanding of predictors of actual usage of technology. (Sarah and Haddow, 2011).
      UTAUT theories not only have four main key construct but also there are three additional constructs which are anxiety, perceived credibility and attitude toward using. This construct are theorized not to be direct determinants of intention. (Vankatesh, Morris,Davis, 2003). The UTAUT construct was develop from 8 models which are Theory of Reasoned Action (TRA), Technology Acceptance Model (TAM), Motivational Model (MM), Theory of Planned Behavior (TPB), Model of PC Utilization (MPCU) and Innovation Diffusion Theory (IDT). There are three broad type of extension/ integration to examined UTAUT in new contexts, such as new technologies (e.g, collaborative technology, health information systems, Chang *et al*. 2007), new user populations (e.g, healthcare professional, consumers, Yi *et al* 2008) and new cultural settings (e.g, China, India, Gupta *et al*. 2008).
      Fig. 1 shows the proposed model for this study and the four constructs of UTAUT suggest act as the determinants of usage behavior. Performance expectancy is defined as individual believe that use the technology will enhance their job performance, effort expectancy bring meaning individual believe that use the technology is easy for them whereas social influence is defined as use the technology influence by others and the last construct which is facilitating condition defined as individual believe that an organizational and technical infrastructure exits to support the use of a technology. (Vankatesh, 2003). Many of studies, while examining influence possible factors that may influence acceptance where different study different factor that influencing user on accepting the technology. For examples study on smartcard application (Loo, Paul and Chong, 2009) was stated that the reason they use this application because of cultural characteristic and their intention to use is moderate because they do not understand the benefits which represent by performance expectancy and also lack of facilitating condition to use the application. Furthermore, the adoption of information communication technology (ICT) services in libraries (Patrick, Ikoja and Wokadala, 2010) show that the user are using this services because of social influence factors whereas performance expectancy do not have effect on behavioral intention to accept and use the electronic library services. The adoption of technology continue with adoption of electronic dinar payment (Nazri, Elsadig and Hishamuddin, 2011) where this study show that performance and effort expectancy give affected to the intention to use this technology and also show that this technology is easy to use, learn and interact. Most of studies, consistent with the original statement of the authors UTAUT Vankatesh *et al* (2003) where the effect of Performance Expectancy, Effort Expectancy and Social Influence on behavioral Intention are consistent even though the results come from different field of study.
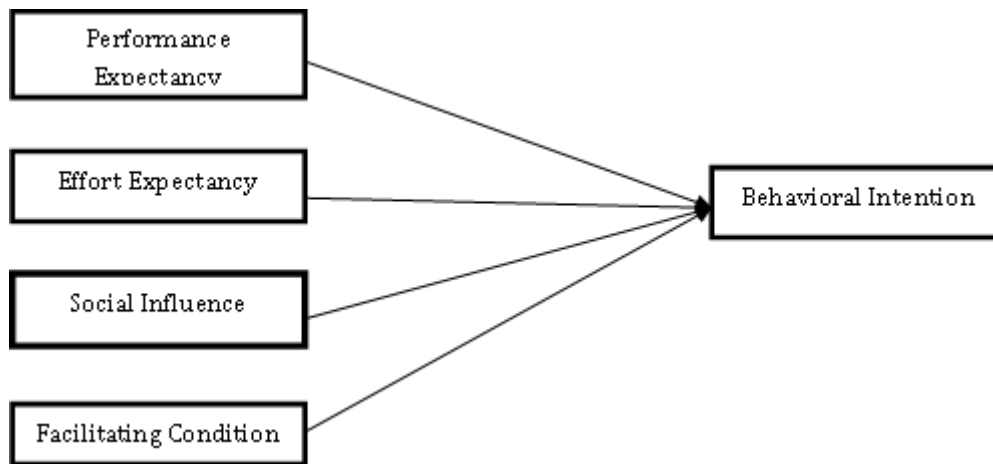
Fig. 1: Model of UTAUT Theory.

Research methodology:

The process of data collection was commenced after getting approval of questionnaire. The questionnaire was developed three sections. Section A elaborate about background of organizational while section B consists of technology adoption question and Section C include questions about performance of organization. The main focus data collection in of this study is SME food industry in area Selangor, Johor and Melaka with total of population identified as 1,255 organizations. The data gathered from Federation of Malaysian Manufactures directory, SME info website and Melaka Halal Hub. The reason of this selection according to Malaysia SME Census 2011, in area of Selangor, Johor and Melaka which is indicate a larger contribution on establishment of SME of food industry Malaysia. The process of data collection commences from April 2014 and there was involve in two stages of procedure. The two stages of procedure are pilot study and large scale survey distribution as discussed below.

Pilot study:

The purpose of pilot study is to implementing for checking the feasibility and determines reliability of measurement and to calculate how big the final samples needs to be. The data collected process for pilot study began on 26 February 2014. In the pilot study, 10 respondents consist of academic experts in adoption technology field and middle to senior business executives in SMEs were chosen and took part in a face to face interview to comment on the questionnaire constructed. Moreover a response rate for this pilot study is good and the correction will be made if necessary. Data collected from this pilot study was test by using SPPS version 21.0 to measure the internal consistency of reliability for this instrument. As a result, this study was conducting the analysis of reliability for each variable by using the Cronbach's Alpha. All the variable has meet 0.70 and above value as suggested by Nunally (1978) and it typically consider acceptable for the purpose of organizational research. Each participant was asked to indicate the items with respect to the technology adoption engaged by his/her affiliated organizations. After necessary revisions were made based on the feedbacks received, the final questionnaire was distributed in the large scale survey.

Large Scale Survey:

The questionnaires were distributed to 400 selected SMEs of food companies in Selangor, Negeri Sembilan and Malacca. The survey was collected through email, postal and by hand. Most of the survey collections are from event that SMEs involved send directly to SMEs organization which is face to face and get their feedback instantly. The period data collection process was complete within 4 month with returned samples of 135 respondents. From 135 respondents, only 134 valid responses were usable with a response rate of 99.26 percent. Table 1 indicates the result of descriptive analysis for respondent's background of the organization. The main respondent of this study were, top management, senior management, middle management and lower management.

Table 1: Descriptive analysis for respondent's background of the organization.

Characteristic	Category	Frequency	Percent
Position in Organization	Top Management	62	45.0
	Senior Management	31	23.0
	Middle Management	27	20.0
	Lower Management	15	11.1
Type of food industry	Bakery	30	22.2
	Frozen food	27	20.0

	Canned/Preserved Food	4	3.0
	Traditional Food	15	11.1
	Beverage	20	14.8
	Snack Food	11	8.1
	Sweet and Svoury Food	1	0.7
	Health food	7	5.2
	Cereals/Flour Products	8	5.9
	Others	12	8.9
Approximate market share in food industry	0%-10%	95	70.4
	11%-20%	24	17.8
	21%-30%	6	4.4
	31%-40%	6	4.4
	Others	4	3.0
Technology utilize in SMEs company	Food Processing Machine	67	49.6
	Packaging Machine	29	21.5
	Cooker	33	24.4
	Vacuum Packaging Technology	5	3.7
	Others	1	0.7

Results and findings:
Reliability Analysis:

The purpose of reliability analysis is to measure the extent of measurement without bias and ensures the consistency of the items in the instrument .Table 2 indicates the Cronbach's alpha are above 0.7 for all constructs. It is demonstrates that the survey is acceptable and it was has been understand by respondents and reliable for organization measurement.

**Table 2:** Reliability Analysis Result.

Constructs	Cronbach's Alpha
Performance expectancy	0.91
Social influence	0.92
Resistance to use	0.70
Facilitating condition	0.92
Behavioral intention	0.78

Table 3: Exploratory Factor Analysis of Unified theory of acceptance and Use of Technology.

Items Measurement	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
SI 3 Top Management view this technology as useful for the company	0.94				
	0.91				
SI 4 In General, the organization has supported the use of this technology	0.85				
SI 2Top manager is very supportive of the use of this technology					
FC3 Our employees have resources necessary to use the technology		0.93			
FC2 Our employees have received sufficient information regarding this technology		0.90			
FC4 Our employees have the knowledge necessary to use this technology		0.89			
		0.79			
FC5 Our employees can get help from others when they have difficulties using this technology		0.79			
FC6 Using this technology fits into our employees' working style		0.72			
FC1 Our employees have received necessary training to use this technology					
EE7 Our employees' found that working with this technology is so complicated and difficult to understand			0.92		
EE6 Using this technology takes too much time from our employees normal duties			0.64		
			0.50		
PE5 Using this technology will decrease our company's performance.					
PE3 Using this technology will increase our company's productivity				0.93	
PE4 Using this technology will enhance our company's efficiency				0.91	
PE2 Using this technology helps our employees accomplish things more quickly				0.69	
BI3 The employees feel that working with this technology is a good idea					0.88
BI1 The employees feel glad to learn new technology					0.70
BI2 Our employees will use the technology rather than manual methods to complete the job					0.69
BI5 The employees feel that using this technology would be pleasant					0.69
BI4 This technology would be one of our employees' favorite technologies for their work					0.45

Exploratory Factor Analysis:

Based on table 3 above, this study were analyzed the data by using exploratory factor analysis (EFA). Principal axis factoring as the extraction method and direct oblimin rotation were used to assess the technique used to explore the underlying factor structure of the instrument. EFA was conducted with 135 samples. This processed was performed to examine whether the items for construct share a single underlying factor and it is uni-dimensional. The Kaiser-Meyer-Olkin (KMO) and Bartlett's test value of 0.82 and sphericity of χ^2 ($df =$ 190, $n = 135$) = 1923.99, $p < .000$. Principal axis factoring identified the presence of two factors with eigenvalue above 1. Eigenvalues for the first factor 35.84 percent, second factor indicates 15.85 percent; the third factor 9.72 percent, the fourth factor indicates 7.4 percent and the last factor show 5.5 percent. Based on the EFA procedure, seven items of PE1, SI1, EE1, EE2, EE3, EE 4, and EE5 consist of cross loading between factors and low factor loading. All cross loading was removed completely in this study. The EE constructs also need to remove since this construct feed the same problem. Hence, the items of effort expectancy were representing a new construct in this study since it was stand with one generic factor. The new construct was rename as resistance to use. Fig 2, present a new model of UTAUT theory in the field of food industry in Malaysia SMEs.

Modified theoretical framework:
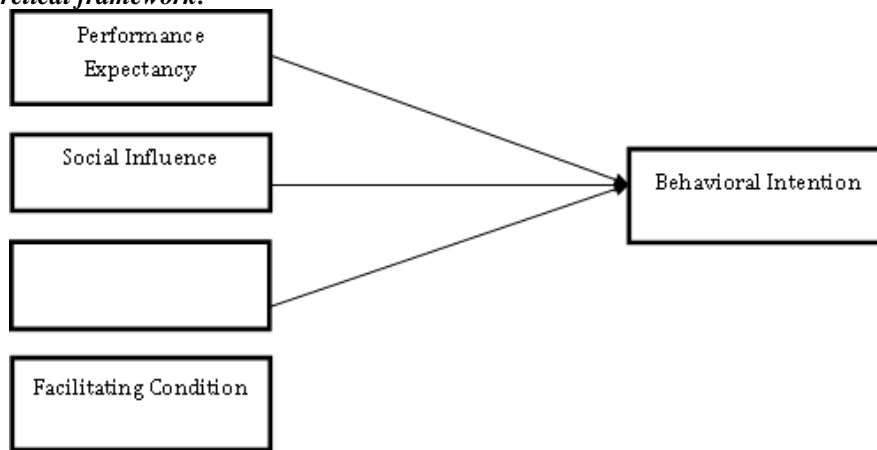
Fig. 2: Modified of UTAUT theory for SMEs Organizations.

DISCUSSION AND CONCLUSIONS

The main contribution of this study is the proposed model to represent the factors in adoption technology in SMEs organization. From the result above, the items of effort expectancy could not survive at their own group factor and researcher decides to remove the construct effort expectancy. Effort expectancy bring meaning 'an individual believe that using this system is easy to use' and SME itself reluctant to improve their productivity and employees skill. The culture in Malaysian SMEs some of them less adaptable to the globalization pressure, unlikely to survive in the present situation without making fast move to improve productivity to conform the international standards, train and employ skill management and professional staff to compete (Samad, 2007). Thus, it is not impossible why SME did not show their effort toward use and acceptance of technology in their organization. Based on finding, a modified model with extension of the new construct of resistance to use (RTU) was introduced the negative factor that significantly explains the negative user acceptance. Therefore, the original of UTAUT model has been proposed new UTAUT model that this study offers valuable understandings in acceptance of technology for SMEs in Malaysia especially in food industry which will combine both positive and negative constructs that may influence the behavioral intention of the users.

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