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Determining ICT Use Level from Use Pattern: ICT Use Level of Malaysian Agribusinesses

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Abstract
There has been a continuous commitment of policymakers in Malaysia to support information and communication technology (ICT) adoption in small and medium-scale enterprises (SMEs). For these novel and innovative policy initiatives to be successful, an understanding of the SMEs' ICT use pattern and use behaviour is required. In this study, the focus is upon the pattern of the use of ICT in agribusiness enterprises and the use level, which could explain the role that ICTs play in the performance (processing and production) of agro-based products by Malaysian agro-SMEs and give insight into the factors that influence their ICT use. The study adopted the Unified Theory of Acceptance and Use of Technology (UTAUT) and focused on model's independent variable, i.e., ICT use. Using data obtained from randomly sampled 400 workers (both managers and employees) of 43 agribusiness enterprises that were also randomly selected, the study ran factor and descriptive analyses to determine the most important items in the questionnaire that determine the ICT use level in the scale. The findings have shown that the prevalent patterns of ICT use among the agro-SMEs are in entrepreneurial (organisational) business communication and product processing and production line, though the use of ICT in the latter purview was rather still low. Some recommendations for policy-makers and a suggestion for future research were provided.
Keywords: Agribusiness Enterprises, ICT use behaviour, ICT use level, ICT use pattern, SMEs

1. Introduction

Information and communication technology (ICT) has gained increased attention in scholarly discourse in research as a means to boost business in a manner that is time-and-place-blind (Jones, Simmons, Pakham, Beynon-Davies & Pickemell 2014). ICTs have served as a tool that helps spur the socio-economic development of nations (Abd Rahman, Kamarulzaman, Nitty Hirawaty & Sambasivan 2013).

Past studies suggest that ICT use in business, especially in developing societies favours mobile phone and Internet more than other ICTs (Adamkolo & Adamu 2016). A pattern is defined as the consistent and recurring characteristic or trait that helps in the identification of a phenomenon or problem, and serves as an indicator or model for predicting its future behaviour (Business Directory 2016). Hence, ICT use pattern is defined as the typical manner in which workers use ICT in terms of type of ICTs and purpose of use. In other words, it refers to the context in which ICT is predominantly applied to enhance performance and improve productivity (Adamkolo & Adamu 2016). Applying ICT to socio-economic development (such as that of small and medium-scale enterprises) is an opportunity that has been held with high regard by the international development community (World Economic Forum [WEF] 2010).

ICT adoption has been progressively becoming an interesting field of research. ICT includes a wide range of technological applications, which include telecommunications, digital broadcast and electronic information facilities. ICT, therefore, encompasses an array of technologies, information and resources. However, the adoption and use of ICT for entrepreneurial purposes will mainly depend on whether SME managers and employees believe that using ICT in business meets their particular entrepreneurial needs (Hoque, Saif, Albar & Bao 2015; Redoli, Mompo, Garcia-Diez & Lopez-Coronado 2008; Taylor 2015). Many influencing factors are involved in the ICT adoption processes (Venkatesh, Morris, Davis & Davis 2013). Similarly, adopting a particular technology is a very complex phenomenon the understanding of which requires holistic, empirical investigation (Abu Bakar, Abdul Razak & Abdullah 2013). Hence, this study was prompted by the urge to investigate and determine the ICT use level of Malaysian agro-SMEs.

Eentrepreneurship is seen as the practice of starting new business organisations in response to perceived opportunities (Sonawane 2014). In addition, the literature has documented that ICTs have the potential to boost small and medium-scale enterprises (SMEs) (Ismail, Jeffery & Van Belle 2011). Equally, the literature outlines

that SMEs are often not willing to relinquish the traditional approaches and means of conducting business and firm operation and embrace innovative technological change. For firms to be able to compete favourably in the modern market that adopts technological innovations, the numerous benefits of ICT should be taken into consideration (Chitura, Mupemhi, Dube & Bolongkikit 2008).

Small and medium-scale enterprises have been identified as a major business sector across the world, covering a wide range of industries, such as agribusiness or farm-based, metal-based, cosmetic-based and even garment-based. Often in most countries, the number of SMEs exceeds the number of large firms and companies. One of the advantages of SMEs that the literature highlights is that they contribute strongly to the gross domestic products (GDP) of nations and provide ample employment opportunities (Malhan 2015; Do, Mazzarol, Volery, Geoff & Reboud 2015). The literature has outlined numerous instances where ICT contribute to economic development of nations in couple of ways as underscored by (Sonawane 2014).

1. as an important channel to convert innovative ideas into economic opportunities;
2. as the basis for competitiveness through the revitalisation of social and productive networks as a source of new employment; and
3. as a way to increase productivity

This study was performed with a single objective, to determine the level of ICT use among Malaysian agribusiness enterprises. After the introductory part, this paper was structured into three main segments, namely literature review, methodology, results and discussion and conclusion, recommendation and suggestion. In the literature review section, relevant literature that critically discussed the concept was reviewed; in the methodology section, the research design, the conceptual framework and the factor analysis were discussed; while in the results and discussion the findings of the study were presented and discussed simultaneously. The paper ended with a conclusion. At the end of the conclusion, some policy recommendations and a suggestion for future research were included.

2. Literature Review

2.1. The UTAUT Model

Understanding employee acceptance and use of ICT has become an advanced field of research (Benbasat & Barki 2007; Venkatesh, Davis & Morris 2007; Venkatesh, Morris, Davis & Davis 2003). Researchers have developed many theoretical models from theories in psychology and sociology to explain technology acceptance and use by employees (Venkatesh *et al*. 2003). The Unified Theory of Acceptance and Use of Technology (UTAUT) was developed based on a comprehensive review and synthesis of eight theories/models of technology use (Venkatesh *et al*. 2003). The UTAUT model is so comprehensive that it has determined the critical factors and contingencies that are related to the prediction of behavioural intention to use ICT and actual ICT use, mainly in organisational contexts (Venkatesh *et al*. 2003).

The formulation of the UTAUT model followed three longitudinal field studies of ICT adoption by employees; the model predicted 70% of the variance in behavioural intention to use ICT and 50% of the variance in actual ICT use (Venkatesh *et al*. 2003). The model is reputed to have been one of the most adopted technology adoption models, and it serves as a baseline model that has been applied to the research of a variety of ICTs in both organisational and non-organisational contexts (Brown & Venkatesh 2005).

Venkatesh *et al*. (2003) developed the UTAUT model following a review of the extant literature as a comprehensive synthesis of previous technology adoption research. The model has five key determinants of ICT adoption, namely performance expectancy, effort expectancy, social influence, facilitating conditions and behavioural intention to use/actual use alongside four moderators namely, gender, age, experience and voluntariness of use (Taiwo & Downe 2013).

Findings from a cross-cultural study of ICT adoption performed by Oshlyansky, Cairns and Thimbleby (2007) reveal that performance expectancy, effort expectancy and social influence predict use intention. Šumak, Polančič and Heričko (2010) found social influence has a significant impact on students' behavioural intention to use moodle; and, behavioural intention is a powerful predictor of the use of ICT (Al-Qeisi, Dennis, Hegazy & Abbad 2015; Baptista & Oliveira 2015). In a research conducted by Cheng, Liu, Song and Qian (2008), the validity of the UTAUT model was investigated using 313 intended users of Internet banking in China. The result identified performance expectancy and social influence as strong predictors of behavioural intention (Taiwo & Downe 2013).

In spite of the wide support accorded the UTAUT model by many studies, many other studies criticise results from the four predictive factors of UTAUT. For example, Li and Kishore (2006) studied the use of online community weblog systems and discovered that scales for the four constructs in the UTAUT model, including performance expectancy, effort expectancy, social influence and facilitating conditions have invariant true scores across most but not all subgroups (AlAwadhi & Morris 2008; Taiwo & Downe 2013; Taiwo, Downe & Mahmood 2012). Therefore, there is need for researchers using the UTAUT model to be cautious when interpreting it.

2.2. Effect of Pattern and Level of ICT Use on SMEs' Performance

Prior research suggests that rather than ICT investment, employees and managers' ICT use level, use skills and abilities of human capital strengthen the ICT effect. In essence, this implies that the greater the use of these technologies among employees, the higher the impact on labour productivity (Bayo-Moriones, Billo'n & Lera-Lo'pez 2013). In addition, apart from ICT-friendly policy, improvement of management commitment, customers' focus, employees' involvement, training and education, as well as reward and recognition to the workers are some of the factors that positively influence enterprises' innovative technology use behaviour and pattern (Bayo-Moriones & Lera-Lopez 2007). Higon (2011) suggests that SME-friendly ICT policy and firm size also affect SMEs' pattern and behaviour of technology adoption. Bernaert, Poels, Snoeck and De Barker (2014) suggest firms' ability to survive and compete in the market as another critical factor, while Murthy and Mani (2013) emphasised that skills and creativity are some of the factors that influence SMEs' ICT use pattern and behaviour.

A previous study found that the ICT use level of agribusiness SMEs in Selangor was low (Nawi & Luen 2014). The study indicates that less than half of the SMEs that participated used as an information-sharing tool across several departments within the organisation. The study concludes that the main factors that affect ICT use in agro-SMEs in Selangor are system support and system readiness and perceived benefits. The low level of ICT use is attributable to the constraints of ICT use faced by most SMEs. These constraints include lack of required skills and knowledge to make ICT adoption a success, reluctance to adopt advanced ICT due to employee's limited ICT knowledge and skills, lack of skilled labour to enable the SMEs to further adopt advanced ICT (Ramli, Abu Samah, Hassan, Omar, Bolong & Shaffri 2015; Nawi & Luen 2014).

SMEs' ICT use behaviour and pattern could be determined using a framework called 'adoption ladder' designed by Martin and Matlay (2001). The framework views ICT use pattern from two dimensions namely, entrepreneurial business benefits and extent of organisational change and sophistication. The ladder starts at the basic use pattern (level), which is ***e***-mail then proceeds to website, ***e***-commerce, ***e***-business and finally to transformed organisation (Dutta & Evrard 1999; Martin & Matlay 2001). Martin and Matlay (2001) defined the ICT use parameters on the use ladder as follows:

1. Website – Enterprises use it for marketing purposes and for suppliers to search for information.
2. E-commerce – Customers use this application to order for commodities and pay online at all times of the day, higher-level of accessibility.
3. E-business – This application incorporates a higher level of integration with the organisations' functions together with ***e***-commerce, which involves technical support and other services.
4. Transformed organisations – This is the highest level of ICT sophistication. It concerns integration with the firms' business model and often applies to firms using Internet as a platform for their daily business activities.

Concisely explaining the ICT use ladder, Martin and Matlay (2001) state that, "the process views firms as starting with the simple use of ***e***-mail for the purpose of text messaging and communication. Further developmental stages build up, step by step, through to the final goal of integrating most if not all internal processes of business through the use of ICT" (p. 400).

Internet use is one of the most popular patterns of ICT use (Ramayah, Ling, Taghizadeh & Rahman 2016). Internet use is divided into two main categories namely, Internet tools used and applications used on the Internet (Palmer, 2000). Level of Internet use is often determined based on percentage of use, which is measured based on ***e***-mail use, searching for company websites and randomly looking for information (browsing), receiving orders from customers (***e***-shopping), voice/video conferencing and placing job vacancies (Walczuch, Braven & Lundgren 2000).

2.3. ICT Use Behaviour among SMEs

The literature stipulates that ICT adoption is based three stages of cognitive, affective and behaviour. At the cognitive stage, SMEs become aware of ICT and through analysis of the benefits and feasibility of its use, they develop feelings towards it. If the feeling is favourable (positive), the SME will move to behavioural stage in terms of actual use of ICT, which eventually translates into organisational willingness (Bayo-Moriones, Billo´n & Lera-Lopez 2013; Higon 2011; Petroni & Rizzi 2001; Rogers 2003). Hence, it is presumed that the success of any ICT adoption will depend on various factors such as ICT characteristics, external characteristics and organisational characteristics (Abdullah, Shamsuddin, Wahab & Abdul Hamid 2012).

Effective ICT use behaviour by SMEs is guided by certain preconditions, namely it must fit within existing production and use infrastructures, meet perceived needs of the SMEs and be literally affordable (Croissant 2008). According to Moore (1991), most SMEs do not want to participate in ICT use since they regard it as an expensive, long-term and risky venture that may not produce the desired results even after a substantial investment. Five categories of participants in the ICT use process have been identified (Abd Rahman *et al*. 2013; Moore 1991):

1. Innovators – those who tend to be experimentalists and interested in ICT itself

2. Early adopters – those who may be technically sophisticated and interested in ICT for solving professional and academic problems
3. The early majority – those who are pragmatists and constitute the first half of the mainstream users
4. The late majority – those who are less comfortable with ICT and constitute the sceptical second half of the mainstream users
5. The laggards – those who may never use ICT and may be antagonistic and critical of its use by others

Furthermore, a number of factors are found to influence ICT use behaviour of SMEs. Runevad and Olofsson (2014), and Touray, Salminen and Mursu (2013) identified some use challenges in ICT literature concerning developing countries and divided them into eight categories. These are then referred to as critical ICT adoption success factors. The challenges, according to the scholars (*ibid*) include economic, socio-cultural, infrastructural, political and leadership, legal and regulatory, educational and skills, technical, security and safety.

Runevad and Olofsson (2014), and Mpofu, Milne and Watkins-Mathys (2013) found that lack of time and financial constraints are the two major challenges of ICT adoption that affect use behaviour among SMEs. The perceived benefits of ICT use, which include business efficiency, competitiveness, planning, management, communication, ***e***-mailing, security, cash handling and billing purposes as well as online advertising and market sourcing (Mpofu, et al, 2013) could not be fully utilised due to these barriers (Runevad & Olofsson 2014).

2.4. Malaysian Agribusiness SMEs

Agribusiness enterprises or agro-based SMEs is a term that is often used to refer to an aggregate view of agriculture and similar business-related activities that cover the myriad of functions and processes that are involved in modern food production and distribution (Food and Agricultural Organisation [FAO] 2013). Agribusiness SMEs have been defined from various perspectives. Cited in FAO (2013), the United States Agency for International Development (USAID) (2008) defined agro-based SMEs as any business related to agriculture, including farming, processing, exporting, input suppliers, trading and retailing. Broadly defined, agribusiness SMEs are agriculture operated by business; specifically, a part of a modern economy devoted to the production, processing and distribution of food, fibre products and by-products including the financial institutions that fund these activities (Encyclopaedia Britannica 2011, cited in *ibid*). In this broad definition, even the financial institutions that fund agribusiness firms are included in the folds of agribusiness enterprises. That therefore, means that even the Malaysian SME Bank that provided finances to the country's SMEs in also an agro-based firm. Similarly, Sharma (2013) saw agribusiness SMEs as those entrepreneurial firms that are engaged in the sourcing, production, processing (manufacturing) and distribution (marketing) of farm produces.

Agribusiness SMEs are also defined from a size perspective, i.e., capital-base (annual turnover) and number of employees (Bernaert, Poels, Snoeck & De Barker 2013; SMECORP 2014). Agribusiness SMEs in Malaysia are grouped under manufacturing industry. The Small and Medium Enterprises Corporation (SMECORP) of the country has provided a working definition for SMEs based on their size and capital base. Small enterprises are business firms with an annual turnover ranging from RM340,000 to RM17 million, or comprising of between 5 and 75 employees, or both. Medium enterprises are business firms with an annual turnover ranging from RM17 million to RM56 million or comprising between 75 and 200 employees, or both (SMECORP 2015).

Statistics indicate that SMEs account for 99.2% of total (645,136) business organisations in Malaysia and employs over 4,854,142 labour, which is 56.4% of total (8,460,971) SMEs employment figure in 2012 and contributes 31% to the country's GDP. Agricultural sector with 34,188 SMEs (6.2%) contributes 6.6% to the country's GDP and grows at 3.3% rate per annum (DOSM 2014a, b; SMECORP 2014). These statistics are low compared to those from the services and manufacturing sectors, which showed that the sector recorded 7.2% and 5.7% annual growth rates respectively. However, only 27.0% of the 645,136 SMEs in Malaysia use high-tech ICT even though most (67.0%) of them use the Internet (MCMC 2014). The relatively low annual growth rate and low contribution to GDP attributed to the agro-SMEs in the country may have some link with some of the factors that the literature identified as instrumental to the below-expectation performance by SMEs, especially with regard to technology adoption and use.

3. Methodology

3.1. Study Population, Sampling and Study Location

This study was performed using a research design that was laid out in order to test the theoretical model based (conceptual framework). The current study adopted quantitative (survey) approach. Factor analysis was performed to determine the salient items in the scale while descriptive analysis was run to determine the ICT use level. One of the main advantages of quantitative research method is that it provides room for the researcher to use small groups of people to signify larger groups (Creswell 2013; Neuman, 2007). The population of this study comprised workers (both employees and managers/owners) of agro-based SMEs that use ICTs in their businesses in Selangor. Selangor was selected because the state has the highest concentration of SMEs in the country (Saleh & Burgess 2009; SMECORP 2014).

The primary criterion for any individual to be selected to participate in this study was that he or she must have been using ICTs in his or her entrepreneurial business activities. This category of employees was selected because an SME's managerial personnel constitute the real entrepreneurs and administrators while the non-managerial employees can constitute the actual ICT-user employees, whose jobs are crucial and can serve as an auxiliary 'management' function in terms of running the SME from production perspective (Gallego, Gutierrez & Lee 2015). Furthermore, this population of SME workers oversees the entire ICT-related operations in their business organisations and is therefore, in a better position to understand the ICT usage patterns, level and trends of the enterprises (Zulkifli, Ahmad, Fuzi & Hashim 2013).

Approximately, the population of agribusiness SMEs's employees in Selangor was 15,362 while that of agro-SMEs (SMECORP, 2014). The sampling frame of the agro-SMEs was obtained online from Malaysian Small and Medium Enterprises Corporation (SMECORP) and from the country's SME Bank. To determine the sample size, the sample technique suggested by Cochran (1977) was adopted. The technique indicated a sample size of 384 agro-SMEs' workers, and the researcher rounded the figure up to 400. Therefore, the survey form was administered to the 400 personnel from 43 agro-SMEs. Because majority of the selected firms did not have many permanent employees that use ICT in their entrepreneurial tasks, simple random sampling technique was adopted (see Babbie 2010).

Using online sampling software (Randomizer), the list of identified workers from each of the 43 organisations was keyed into the software and only the individuals selected by the software participated in the survey. However, only data of 382 cases were analysed. That was short by eight cases, which were lost during data cleansing as well as the researcher's inability to retrieve a few survey forms from the respondents. Moreover, Ismail, et al. (2014) and SMECORP (2014) classified agribusiness SMEs into crop-based, fish-based, agro-chemical-based, livestock-based and forest-produce-based categories.

Driving from the literature (see Zaridis & Mousiolis 2014), the researcher had proposed to survey 10 workers, consisting of five managerial and five operational staff per organisation. However, that turned out to be impossible because some of the SMEs that were sampled had less than 10 permanent workers. In addition, some personnel of a selected firm that had more than 10 permanent employees that had been sampled for the participation in the survey did not turn up. Hence, the researcher was compelled to sample 50 SMEs, that is, to compensate for unforeseen lacunae (shortfalls). In addition, the justification for selecting five workers per SME from among operational staff was obtained from the SMECORP (2014) definition of SMEs where a small enterprise is defined as a business firm that has five to 17 permanent employees. That is to say, the minimum number of workers of a small enterprise is five. Therefore, it was theorised that 10 workers would be surveyed per SME thus:

5 management staff + five operational staff = 10 SME personnel

However, that activity was impracticable due to the above-mentioned reasons.

3.2. The Conceptual Framework of the Study

The theoretical perspective of the Unified Theory of Acceptance and Use of Technology (UTAUT) formulated by Venkatesh *et al*. (2003) was adopted. The model uses four key determinants of ICT use and intention: performance expectancy, which is "the degree to which an individual believes that using the system will help him or her to attain gains in job performance" (Venkatesh *et al*. 2003, p .447). The second determinant is effort expectancy, which is "the degree of ease associated with the use of the system" (Venkatesh *et al*. 2003, p. 450). The third determinant is social influence, which is "the degree to which an individual perceives that important others believe he or she should use the new system" (Venkatesh *et al*. 2003, p.451). The fourth determinant is facilitating conditions, which is "the degree to which an individual believes that an organisational and technical infrastructure exists to support the use of the system" (Venkatesh *et al*. 2003, p .453).

The behavioural intention construct, whose core concept is "the subjective probability of a person that he or she will perform the behaviour in question" (Fishbein & Ajzen 1985, p. 288) is the dependent variable. The UTAUT model also considers moderators influencing the four predictors namely, gender, age, experience and voluntariness of use (AlAwadhi & Morris 2008). This study focused on the ICT use determinant of the model, that is, the dependent variable. Rather than study use intention, the actual use behaviour (see Jones, Sundaram & Chin 2002), was investigated because there is a dearth of literature focusing on the ICT use behaviour of Malaysian agribusinesses (Ramayah *et al*. 2016), especially those at Selangor, and this study wants to close that gap.

3.3. Validity and Reliability of ICT Use Model

The degree of internal consistency reliability (ICR) of the scale at the pre-Exploratory Factor Analysis stage, at both pre-test and actual study was very high ($\alpha = 0.965$ and $\alpha = 0.951$) respectively as shown in Table 1. Comparatively, however, the ICR was slightly lower at actual study. Similarly, at the Confirmatory Factor Analysis (CFA) stage, the degree of ICR was very high ($\alpha = 0.907$), though a little lower than it was at the

previous stage of analysis.

Table 1: Reliability Coefficient of Research Instrument

Variable	No. of Items	Cronbach Alpha (α)	
		Pre-test (n = 40)	Actual Study (n = 382)
ICT Usage	17	0.965	0.951

3.4. Factor Analysis of ICT Use Model

3.4.1. Exploratory Factor Analysis of ICT Use Construct

Most of the 17 items in the scale were derived from the literature, rather than adapted. This simply implies that most of the items in the questionnaire were fresh, and therefore, needed some sort of cleansing in order to determine the most valid and reliable items that could measure the problem (see Cudec, 2000). Hence, exploratory factor analysis (EFA) was run. EFA is a statistical method for investigating common but unobserved sources of influence in a collection of variables, and is based on the common factor model (Cudec, 2000). Hair, Black, Babin, Anderson & Tatham (2010) suggested that an item is significant if its factor loading is greater than 0.50. As shown in Appendix A, the factor loadings of the items in the scale ranged from 0.89 to 0.64. This exceeds the threshold recommended by Hair *et al*. (2010) and demonstrates convergent validity at the item level (Teo, Su Luan & Sing, 2008).

3.4.2. Confirmatory Factor Analysis (CFA) of ICT Use Construct

After the EFA, running the CFA reduced the originally 17 items in the scale to eight, and split them into two components (refer to Figure 1). To determine the definition of the selected components (as suggested by Hair *et al*. 2010), the researcher referred back to the literature and it revealed that Component 1, which loaded five items, focused on the communication pattern of ICT use by the agribusinesses (e.g., advertisement/promotion, information and data retrieving and sharing, etc.). Therefore, Component 1 was code-named ICTCom. The literature however, indicates that Component 2 focused on the ICT use in the product processing and production line pattern. Hence, this component was code-named ICTPros as shown in Table 2. Interestingly, the outcome of the CFA dichotomised the ICT use behaviour of the agro-SMEs into two main patterns of use — (i) communication, and (ii) production and processing.

Table 2: Result CFA of ICT Use Model

Indicators	Standardised Factor Loading (>0.5)	Construct Reliability(CR ≥ 0.7)
Component ICTCom		
ICT is used in this enterprise in conducting its commercial transactions.	0.89	0.907
ICT is used in this enterprise in rendering speedy services.	0.86	
ICT is used in this enterprise in communicating with its online customers.	0.81	
ICT is used in this enterprise in guaranteeing trust and reliability.	0.78	
ICT is used in this enterprise in conducting customer services.	0.72	
ICTPros		
ICT is used in this enterprise in conducting its market research/surveys.	0.84	
ICT is used in this enterprise in managing costs of web-based operations.	0.82	
ICT is used in this enterprise in its products promotion/advertising.	0.64	

Furthermore, Figure 1 shows the structural model of the ICT use determinant. The model meets all the fitness requirements to measure the variables adequately. All the factor loadings were above the .050 cut-off point. The relative chi-square (3.94) was < 5.0; therefore, it was good. The chi-square was also good (x^2 = 67.004), the degree of freedom was high (*df* =17) and the *p* value was significant (*p* = 0.000). Furthermore, all the incremental fit parameters: Goodness of Fit Index (GFI), Adjusted Goodness of Fit Index (AGFI), Comparative Fit Index (CFI), Normed Fit Index (NFI) and Tucker-Lewis Index (TLI) measured well above the cut-off point of ≥ 0.90. Although the value of the model's Root Mean Square Error of Approximation (RMSEA) was just slightly above the cut-off point of ≥ 0.08, Kenny (2014) and MacCallum et al. (1996) have suggested

that a RMSEA value of $\geq$ 0.08 falls within the argued range of $\geq$.10. Therefore, the model was confirmed fit and reliable to measure the data.

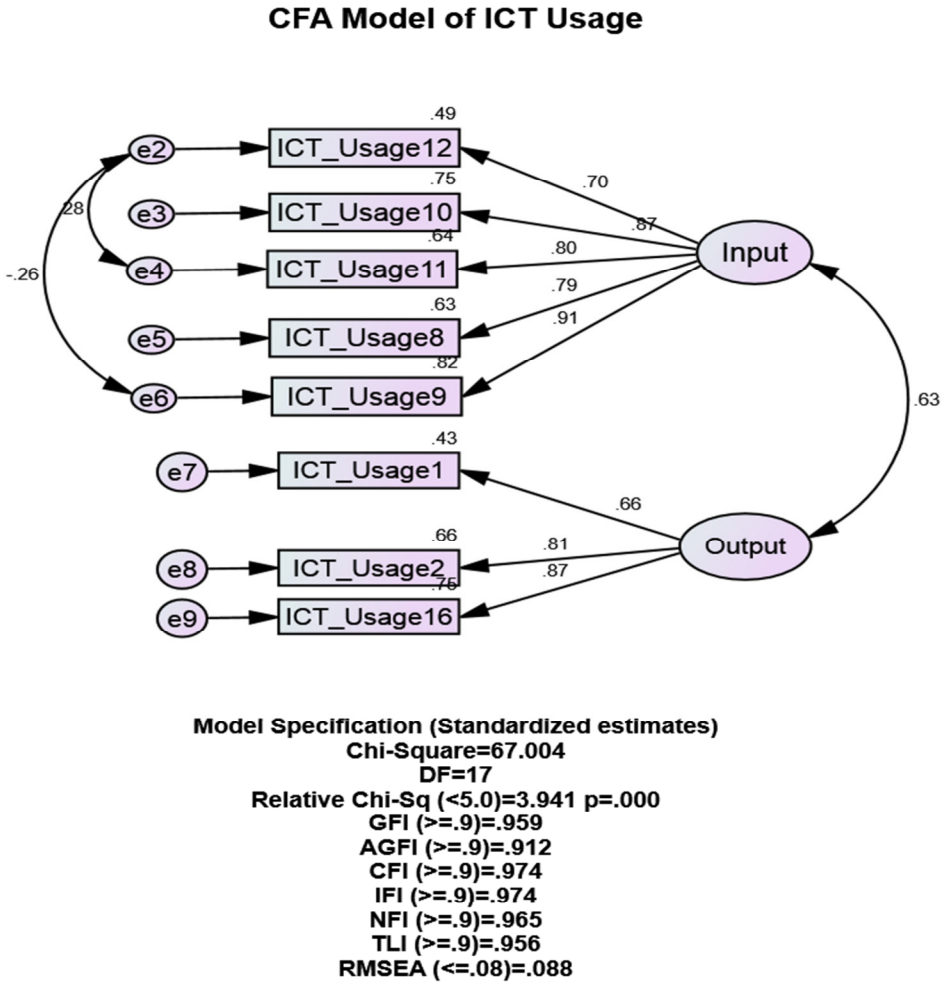

Figure 1: The Structural Model of ICT Usage

4. Results and Discussion

Table 3 shows that in the ICTCom component the result indicates that the use of ICT for communicating with online customers recorded the highest mean value (M = 4.34, SD = 0.95). This finding suggests that most Malaysian agro-SMEs heavily use ICT in entrepreneurial communication activities such as inter-organisational business-to-consumer (B2C) and business-to-business (B2B) communication more than they use ICT in other business purviews. This pattern of ICT use (communication) has been identified as the most prevalent in the ICT use behaviour among ICT users in developing countries, especially the use of mobile phone (see Adamkolo & Adamu 2016).

Furthermore, (as shown in Table 3) the item that sought to gauge the respondents' perceptions of the use of ICT in guaranteeing trust and reliability of (online) business transactions and communication scored the least mean value (M = 3.89, SD = 0.99). This suggests that majority of Malaysian agribusiness enterprises do not invest in the procurement and use of online security and privacy protection software. This further hints that the use of advance Internet-based business technologies such as enterprise resource management (ERM) and ***e***-commerce among the agro-SMEs is minimal. Nawi and Luen (2014), and Ramli *et al*. (2015) support this finding. However, the cumulative mean value of the ICTCom component was very high (M = 4.14, SD = 1.02).

Table 3: CFA of Pattern of ICT Use by Agro-SMEs (n = 382)

S/No	Item	5-Likert Scale (% of frequency)					Mean	SD
		1	2	3	4	5		
		Component 1: ICTCom						
1	ICT is used in this enterprise in communicating with its online customers.	16 (4.2)	7 (1.8)	14 (3.7)	141 (36.9)	204 (53.4)	4.34	0.95
2	ICT is used in this enterprise in conducting its commercial transactions.	21 (5.5)	12 (3.1)	10 (2.6)	132 (34.6)	207 (54.2)	4.29	1.05
3	ICT is used in this enterprise in rendering speedy services.	18 (4.7)	5 (1.3)	19 (5.0)	169 (44.2)	171 (44.8)	4.23	0.96
4	ICT is used in this enterprise in boosting its competence to run business in the market.	28 (7.3)	8 (2.1)	62 (16.2)	134 (35.1)	150 (39.3)	3.97	1.14
5	ICT is used in this enterprise in guaranteeing trust and reliability.	23 (6.0)	5 (1.3)	57 (14.9)	204 (53.4)	93 (24.3)	3.89	0.99
Overall Mean							**4.14**	**1.02**
		Component 2: ICTPros						
1.	ICT is used in this enterprise in its products manufacturing /processing.	14 (3.7)	18 (4.7)	38 (9.9)	182 (47.6)	130 (34.0)	4.04	0.98
2.	ICT is used in this enterprise in the packaging its products.	47 (12.3)	28 (7.3)	37 (9.7)	168 (44.0)	102 (26.7)	3.65	1.28
3.	ICT is used in this enterprise in conducting its market research surveys.	39 (10.2)	68 (17.8)	45 (11.8)	112 (29.3)	118 (30.9)	3.53	1.36
Overall Mean							**3.69**	**1.21**
Total Mean of ICTCom and ICPros Components							**3.92**	**1.12**

Note: Five-Likert scale: 1) Never, 2) Rarely, 3) Occasionally, 4) Frequently and 5) Always
SD = Standard deviation; CFA = Confirmatory factor analysis; n = Sample size

In the ICTPros component the result shows that the item that sought to measure the perceptions of the respondents on the use of ICT in product processing/manufacturing recorded the highest mean value (M = 4.04, SD = 0.98). Whereas, the item that gauged the respondents' perceptions of the use of ICT to conduct (online) market survey recorded the lowest mean value (M = 3.53, SD = 1.36). That indicates the use of technology in product processing and/or manufacturing by the agro-firms was minimal.

Generally, the pattern of ICT use of the agribusinesses shows a high inclination of use behaviour toward exchange of information with customers (consumers), product commercial transactions, ensuring online security, product promotion and service delivery quality. The high cumulative mean value of the model (M = 3.92, SD = 1.21) indicates that the perceptions of the majority of the respondents toward ICT use in doing business was favourable.

This result is consistent with some parts of findings by Higon (2011) and Martin and Matlay (2001) that most SMEs used ICT to communicate with clients, customers and employees through, e.g., ***e***-mail, telephone/mobile phone, mobile instant messaging applications, fax, etc. All these applications have been categorised under the basic pattern of ICT use while web-based entrepreneurial technologies like ***e***-commerce, ERM and free and open-source software (FOSS) have been classified under high technology (see Martin & Matlay, 2001). Therefore, driving from the result, the ICT use pattern of the agro-SMEs largely fell within the basic (low-to-moderate) technology use grade as supported by Abd Rahman *et al*. (2013). Furthermore, the literature indicates that most SMEs are still lagging behind in the use of high business technology.

4.1. Level of ICT Use among Agro-SMEs

Table 4 shows the agro-firms' ICT use level (M = 3.92, SD = 1.12) falls within the moderate use brackets. The highest use level attainable was from M = 4.34 to M = 5.00 while the lowest ICT use level was from M = 1.00 to M = 3.53. The current use level attained by the agro-SMEs (M = 3.92, SD = 1.12) is a value between those two extreme (high and low) values; hence, the ICT use level of the agribusiness enterprises was moderate. Ramayah *et al*. (2016) and Ramli *et al*. (2015) support this finding. This result suggests that majority of Malaysian agro-based SMEs have shifted away from the use of basic technologies to the use of moderately advanced technologies in their businesses.

Table 4: Level of ICT Use among Agro-SMEs (n = 382)

Use Level	%	Mean	SD
ICT Use Level		3.92	1.12
Low (1.00 – 3.53)	5.9		
Moderate (3.54 – 4.33)	88.2		
High (4.34 – 5.00)	5.9		

*Note:*SD = Standard deviation; CFA = Confirmatory factor analysis; n = Sample size

5. Conclusion, Recommendation and Suggestion for Future Research

It is interesting the manner the factor analysis split the ICT use concept into two, clearly dichotomised components, which indicate two categorical ICT use patterns. However, it is not surprising that the use of ICT in business communication was the most important ICT use pattern. Previous studies have suggested that firm employees and managers often use ICT in conducting entrepreneurial inter-organisational (B2B) communication, B2C communication (e.g., online in ***e***-shopping/***e***-tailing environments) and intra-organisational (e.g., inter-departmental networked) communication (see Abd Rahman *et al*. 2013; Nawi & Luen 2014; Rahman & Ramos 2014). Supporting the assertion in the literature that most SMEs are lagging behind in the adoption and use of ICTs especially high technologies in business (see Abd Rahman *et al*. 2013; Higon 2011), the finding of the present study also indicate the use of (advance) ICT in production/processing line is low. This was revealed by the three-factor-loaded component, ICTPros. This, however, is not bias to the find that advance ICT is used by some of the agro-SMEs in their businesses as shown by the three items of ICTPros component.

Furthermore, the findings suggest that many of the agro-based SMEs in Selangor use ICTs in their businesses at a 'mature' moderate level. 'Mature' here means that the moderateness of the level inclines towards high level; that is, M = 3.92 is close to M = 4.34. The difference between M = 3.92 and the upper threshold of the mean value of the high level (M = 4.34) is just the decimal figures, 0.34. Provided the economy and the Government policy are favourable to their growth, many of the agro-SMEs are already ripe to adopt and integrate high business technologies into the product processing and manufacturing lines of their firms.

Considering the relatively low contribution of agro-based SMEs to the country's GDP (see SMECORP 2015) as well as the Government's determination to grow the economy in its aspiration to attain a developed nation status by 2020, this study recommends it is high time the Government realised that Malaysian agro-based SMEs are ripe for high technology use in their businesses. The Malaysian Federal Government should emulate the entrepreneurial support programme introduced by Selangor State Government expand it to become a national scheme and provide free technology use support to many SMEs in the country. The Government of Selangor State initiated the programme in which it aimed to train some 100 entrepreneurs in the use of ***e***-commerce and associated trendy advance entrepreneurial technologies in order to expand their business horizon to reach out to online global markets (Zhe & Chow, September 2, 2015). Finally, this study suggests that future research should focus on determining factors that influence ICT use among the agribusiness SMEs.

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Appendix

Appendix A: Result of Pattern of ICT Use by Agro-SMEs Prior to Running EFA (n = 382)

S/No	Item	5-Point Likert Scale (% of Frequency)					Mean	SD
		1	**2**	**3**	**4**	**5**		
1	ICT is used in this enterprise in communicating with its online customers.	16 (4.2)	7 (1.8)	14 (3.7)	141 (36.9)	204 (53.4)	4.34	.954
2	ICT is used in this enterprise in conducting its commercial transactions.	21 (5.5)	12 (3.1)	10 (2.6)	132 (34.6)	207 (54.2)	4.29	1.05
3	ICT is used in this enterprise in communicating with its online suppliers.	9 (2.4)	16 (4.2)	37 (9.7)	132 (34.6)	188 (49.20)	4.24	.955
4	ICT is used in this enterprise in rendering speedy services.	18 (4.7)	5 (1.3)	19 (5.0)	169 (44.2)	171 (44.8)	4.23	.961
5	ICT is used in this enterprise in its products promotion /advertising.	14 (3.7)	18 (4.7)	38 (9.9)	182 (47.6)	130 (34.0)	4.04	.979
6	ICT is used in this enterprise in its employee/staff management.	24 (6.3)	25 (6.5)	32 (8.4)	137 (35.9)	164 (42.9)	4.03	1.16
7	ICT is used in this enterprise in indicating online its location address (on maps).	23 (6.0)	12 (3.1)	47 (12.3)	152 (39.8)	148 (38.7)	4.02	1.09
8	ICT is used in this enterprise in boosting its competence to run business in the market.	28 (7.3)	8 (2.1)	62 (16.2)	134 (35.1)	150 (39.3)	3.97	1.14
9	ICT is used in this enterprise in protecting its online privacy.	32 (8.4)	19 (5.0)	55 (14.4)	118 (30.9)	158 (41.4)	3.92	1.23
10	ICT is used in this enterprise in ensuring its online security.	32 (8.40)	7 (1.8)	70 (18.3)	124 (32.5)	149 (39.0)	3.92	1.18
11	ICT is used in this enterprise in guaranteeing trust and reliability.	23 (6.0)	5 (1.3)	57 (14.9)	204 (53.4)	93 (24.3)	3.89	.988
12	ICT is used in this enterprise in conducting customer services.	25 (6.5)	10 (2.6)	87 (22.8)	148 (38.7)	112 (29.3)	3.82	1.09
13	ICT is used in this enterprise in its products manufacturing /processing.	35 (9.2)	23 (6.0)	68 (17.8)	141 (36.9)	115 (30.1)	3.73	1.21
14	ICT is used in this enterprise in the packaging its products.	30 (7.9)	25 (6.5)	78 (20.4)	148 (38.7)	101 (26.4)	3.69	1.16
15	ICT is used in this enterprise in conducting its market research/surveys.	47 (12.3)	28 (7.3)	37 (9.7)	168 (44.0)	102 (26.7)	3.65	1.28
16	ICT is used in this enterprise in managing costs of web-based operations.	39 (10.2)	68 (17.8)	45 (11.8)	112 (29.3)	118 (30.9)	3.53	1.36
17	ICT is used in this enterprise in communicating with its online customers.	16 (4.2)	7 (1.8)	14 (3.7)	141 (36.9)	204 (53.4)	3.34	.954
Overall Mean							**3.95**	**.054**

Note: Five-Likert scale: 1) Never, 2) Rarely, 3) Occasionally, 4) Frequently and 5) Always
SD = Standard deviation; EFA = Exploratory factor analysis; n = Sample size