

## **A CONCEPTUAL FRAMEWORK ON THE DYNAMICS THAT PREDICT THE ACCEPTANCE OF E-LEARNING FOR EXTENSION SERVICES TRAINING**

Safaie Mangir<sup>1</sup>  
Zakirah Othman<sup>2</sup>  
Zulkifli Mohamed Udin<sup>3</sup>

<sup>1</sup>School of Technology Management and Logistics, College of Business, Universiti Utara Malaysia

<sup>2</sup>School of Technology Management and Logistics, College of Business, Universiti Utara Malaysia

<sup>3</sup>School of Technology Management and Logistics, College of Business, Universiti Utara Malaysia

Accepted date: 25 August 2016, Published date: 27 September 2016

---

**Abstract:** *Organizations in private or public sector are compelled to continuously strengthen competitive advantages due to changing business challenges and consumer expectation. While changes are inevitable, employee learning and training remain constant for organizations to improve performance and sustain competitiveness. More recently the rapid information technology development has given rise to e-learning as a new way of learning and training of which the application has expanded from traditional educational domain into workplace training. This study intends to examine the dynamics that predict the behavioral intention to use technology innovation such as e-learning in agricultural extension services training. The dimensions that predict the behavioral intention are derived from individual, organizational and external facilitation perspective as the study involves employees in government department of public sector environment. Based on the eminent social and behavioral theories, this study proposes a research model comprising of four constructs that demonstrates the relationship between the predictive dimensions and behavioral intention to use e-learning for extension services' training. The stakeholders and decision-makers alike can certainly benefit from this study as understanding the impact of the predictive factors toward using e-learning will enable them to prepare appropriate action plan to ensure full participation from the intended users and relevant support from the organization and external stakeholders such as suppliers and government for successful implementation and use of the technology.*

**Keywords:** *acceptance, agriculture, e-learning, extension, training.*

---

## **Introduction**

Organizations nowadays are constantly confronted with challenges to maintain competitiveness and constantly making attempt to identify growth opportunities in the face of uncertainties in the ever-increasing borderless environment. The challenges are applicable to both private and public organizations albeit differently such that private organizations care most about the bottom line profitability, while public organizations are concerned more with effective management and efficient delivery of their services (Marr, 2008). With these challenges in place, organizations have acknowledged the critical need for suitable internal resources with the appropriate competencies to deliver the performance expectation. Skill and competency enhancement is an on-going process in the organizations hence the importance of workplace learning and training. The growth of knowledge-economy has established a surge of information and communication technology (ICT) developments in the area of human resource development, motivation and employee engagement shifting away from long-established managerial effectiveness and operational efficiencies (Borotis & Poulymenakou, 2009).

Over time the traditional brick-and-mortar face-to-face type of learning and training has gone through changes as a result of higher demand and expectation for higher quality, faster delivery, easy accessibility and cost-effectiveness in view of employee training. The advent of ICT has forced traditional learning to embrace digital technology giving rise to e-learning that has grown tremendously and expanded into organizational workplace in recent years. This e-learning development has allowed employees of the organizations to experience learning without attending the typical face-to-face classroom type of facility (Ramayah, Ahmad, & Hong, 2012). The prospects of e-learning are enormous and continue to grow at a tremendous rate both in education and training (Abdul Karim & Hashim, 2004). The availability of high-speed broadband facility and advancement of internet usage has created more opportunities and positive development of e-learning in the country (Hussin, Bunyarit, & Hussein, 2009). The landscape of learning is constantly adapting to external drivers, including societal and technological changes, quality standards, and financial constraints and continues to face challenges in ensuring effective teaching and learning in a rapidly changing society (Stepanyan et al, 2013). Information technology has dramatically altered teaching and learning in a big way and e-learning systems have become technology of choice for facilitating teaching and learning processes (Lee, Hsieh, & Ma, 2011). Public organizations have utilized e-learning to facilitate human resource development and training and as well as to enable training management, skill adequacy planning and training budgeting (Saha, Nath, & Sangari, 2010) and help to foster organizational learning culture based on knowledge sharing (Chen & Hsiang, 2007). E-learning has penetrated all forms of education practices and such a remarkable growth has without doubt become an important aspect of all forms and stages of learning (Anderson & Hajhashemi, 2013). In a nutshell, e-learning is an attractive option for developing countries (Maldonado, Khan, Moon, & Rho, 2011) such as Malaysia not only for educational purposes but can also be applicable for training and information sharing in public or private organizations.

The growing importance of the public sector for socio-economic development of the country has motivated this study to focus on agricultural extension services which deeply involve internal resources called extension agents who take up the role of change agent and go-between agricultural experts and farmers delivered (Abdullah & Samah, 2013). Typically, the role of extension services is to provide agricultural producers with timely information covering various issues including but not limited to agricultural technologies, fertilizers and seed varieties, weather information, farm management and to a certain extent sustainable agricultural practices

to help the producers in maintaining production sustainability and profitability (Valsamidis, Kazanidis, Petasakis, & Karakos, 2011).

Extension agents receive training from agricultural research and specialists and also industry experts and then impart the information and knowledge to the farmers to provide them with the awareness, technology, and other related information to help the farmers to improve, increase productivity and manage sustainable agricultural practices (Klerkx & Jansen, 2010; Tiraieyari, Hamzah, Abu Samah, & Uli, 2013). However some scholars such as (Ali & Kumar, 2011) contend that the effectiveness of agricultural extension services has always been a questionable issue. As training is deeply entrenched in extension services, it is purposely appropriate to consider e-learning as delivery method of the training so required by the extension agents that may alleviate some of the issues related to the effectiveness of extension services.

### **Definition of e-learning**

literatures related to e-learning are wide-ranging and so is the definition of e-learning which is becoming confusing and making definition that is mutually and generally acceptable is complicated. It is certainly made more challenging as ICT advancement is integrating into e-learning in more profound manner in recent time (Oblinger & Hawkins, 2005). The e-learning landscape is evolving as ICT progresses however the common definitions and terms are still conflicting and indefinite among the researchers. In past literature, e-learning is also referred as distance learning, online learning, mobile learning, web-based learning, internet-based learning and networked learning (Lowenthal & Wilson, 2010; Moore, Dickson-Deane, & Galyen, 2011; Volery & Lord, 2000). Defined as a teaching and learning process that involves the use of ICT, e-learning was thus hoped to provide information at fingertips, education on demand and just in time learning, to name some of the most prevalent slogans of the time. E-learning gives rise to two different lines of expectations: on the one hand, e-learning was expected to bring more efficient way of learning and teaching and on the other hand, e-learning was expected to bring an increased quality to the learning process (Barth and Burandt, 2013). Unlike traditional in-class learning, e-learning is most likely to reference out-of-classroom educational experiences, although in-class educational activities experienced via ICT can sometimes be described as a form of e-learning (Hur & Im, 2013).

### **E-learning in Malaysia**

E-learning is progressively growing over the past years and the market has achieved about USD32.1 billion in 2010 and the revenue associated with e-learning industry was expected to reach by USD49.9 billion in year 2015 (Renda dos Santos & Okazaki, 2015). In Malaysia e-learning is a common phenomenon. The development of e-learning in Malaysia started during the pre e-learning era when the Educational Technology Division was set up by the Ministry of Education in 1972 (Asirvatham, Kaur, & Abas, 2005). Starting only with basic electronic equipment such as overhead projector, e-learning has evolved to be used as a platform by university lecturers to post online course schedule and lecture notes. The trend continued in education sector when universities in Malaysia started to offer distance education program beginning mid-1990s (Nawawi, Asmuni, & Romiszowski, 2003). The rapid growth of web-based technologies and the high usage of the Internet have made teaching and learning via the Internet, or e-learning, more viable in recent years (Goi & Ng, 2009). Perhaps e-learning is best utilized by Open University of Malaysia which has been recognized as the first open and distant learning institution in Malaysia (Abas, Chng, & Mansor, 2009). In other sector, the Malaysian government has implemented e-learning for public sector (EPSA) to provide learning and training for all civil servants and e-Training which is a special-purpose e-learning

application for Human Resources Ministry (Yunus & Salim, 2013). Beside education sector, Malaysian organizations in public and private sector have implemented e-learning with the expectation to realize the many advantages of this technology innovation.

According to Yunus and Salim, (2013), the existing studies on e-learning in Malaysia only involve some particular public or private higher learning institutions. Hence attempts to evaluate e-learning in the Malaysian public sector should be taken in order to understand how e-learning can appeal learner interest and how learner engagement will affect the effectiveness of e-learning. This study is keen to examine e-learning acceptance among extension agents in Malaysian agricultural sector because the agriculture sector remains a significant development factor and continues to make important contribution to the national economy in Malaysia (Othman & Jafari, 2014; Shah, Asmuni, & Ismail, 2013). In addition, this study also attempts to break away from many previous studies that mostly focus on educational institutions into public sector (Yunus & Salim, 2013). It only makes sense that the target respondents to be extension agents because they receive training from agriculture research and specialists and in turn take up the role of educating and training the farmers hence the competency of extension agents is indeed very important as they form a special role as a change agent and one of the key actors in agriculture industry in Malaysia (Shah et al., 2013). The competency of public servants has a direct impact on the governments' administrative performance, for which governments provide considerable funding and training. Therefore, the behaviors of public servants toward e-learning for extension services training are worth examining (Chung, Lee, & Kuo, 2015).

### **Barriers to e-learning**

ICT adaption in agriculture lags behind due to lack of awareness of the contributions that ICT can make in agriculture, lack of technological infrastructure and perceived high cost of ICT adoption (Awuor et al, 2013). Many ICT initiatives such as e-learning fail and these projects often deplete the resources therefore, are destined to be unsustainable thus making lasting success of e-learning initiatives such a growing concern (Stepanyan et al, 2013). Despite advantages, using e-learning poses many challenges such as the learners must be motivated, self-sufficient, independent and persistence, because the amount of time required to read the notes and discussions that have been uploaded and to do the assignment (Cantoni, Cellario, & Porta, 2004). E-learning is presently regarded with doubts and distrust by many who are not satisfied with e-learning experience despite earlier perception as the ideal solution to education and training needs (Ramayah et al., 2012; Saat et al., 2012). Several problems that impede e-learning implementation in Malaysia include lack of awareness, bandwidth limitation, low quality of e-learning content, technical difficulty and language barrier (Ali, 2004). Lack of organizational and management support, communication and infrastructure facilitation are also reported to hamper the progress of e-learning (Maguire, 2005; Mclean, 2005; Singh & Hardaker, 2014). Despite these challenges, the trend in Malaysia is that many organizations are continuing to rely on e-learning for learning and training because of its potential benefits and advantages are worthy to consider (Ramayah et al., 2012).

### **Factors that influence acceptance of e-learning**

E-learning has achieved tremendous growth and continues to expand further however in spite of the inherent advantages, the efficiency and contribution of e-learning is stalled if the users are not interested to accept the technology thus rendering potential wastage due to lack of use (Tarhini, Hone, & Liu, 2014). The successful development and implementation of e-learning is principally dependent on the users' attitude and willingness to adopt it (Ahmadpour

et al, 2016). In general, actions are preceded by attitudes. Individuals with a general positive attitude towards e-learning are more likely to adopt e-learning and attitude in turn can be influenced by other factors (Sumak, Hericko, & Pusnik, 2011). Consistent with previous findings, employees' perceptions about the individual attitude belief, organizational support and external facilitation have significant effects on their intention to use the system in the work setting (Cheng, Wang, Moormann, Olaniran, & Chen, 2012; Roca & Gagné, 2008; Selim, 2007; Wu, Tennyson, & Hsia, 2010).

Therefore, the literature was reviewed to understand factors that were found to contribute to the formation of learners' acceptance of e-learning. In this article, considering the context of the study that attempts to understand the acceptance of e-learning technology as a training technology for agricultural extension services by extension agents in governmental sector, we classified these factors into three domain i.e. individual attitude belief, organizational support and external facilitation.

### **Individual attitude**

First and foremost, it is very important to first look at individual level with regard to intention to use the technology innovation such as e-learning for extension services training. The key stakeholder is the extension agents who are expected to be the prime users of e-learning. At individual level, several factors are considered that make up the individual attitude belief toward the behavioral intention to use e-learning. Firstly the attitude, which is described according to Ajzen, (1991), as the degree to which behavior performance is positively or negatively viewed; it is formed by behavioral beliefs about the likelihood of the consequences of the behavioral performance. Thus, a person's intention toward a specific behavior is affected by the person's attitude toward that behavioral outcome thus attitude, leads to the intention to use technology and the eventual acceptance (Bhattacharjee, 2001; Davis, Bagozzi, & Warshaw, 1989). Hence attitude is an important aspect of an individual's characteristic that predicts the behavioral intention for e-learning acceptance. The potential users' attitude towards e-learning influences their level of desire to take part in e-learning courses in agricultural extension (Ahmadpour & Soltani, 2012; Yunus & Salim, 2013).

The next factor is compatibility which is one of several determinant factors that determine the rate of technology adoption according to Rogers, (2003). Joo, Lim and Lim, (2014) described compatibility as the extent of which one comprehends technology innovation as being in coherent with one's existing styles, practices, past experiences and desires. Compatibility refers to how much the technology corresponds with one's personal and social life i.e. employing such technology does not need for one to change the routine or habit of existing way of life and at the same time maintaining the social standing among the important people such as close friends, family and colleagues (Flight, D'Souza, & Allaway, 2011). In a recent study on workplace employees in Taiwan, the researchers reported that compatibility along with other attributes significantly affected users' intention to adopt an e-learning system in their workplace (Lee, Hsieh, & Hsu, 2011). Jebeile and Abeysekera, (2010) investigated 485 college students' intention to adopt an online computer-assisted learning module indicated that compatibility significantly predicted learners' intention to adopt the intervention. As confirmed in the study, perceived compatibility and attitude are positively related, which then lead to the behavioral intention to use the education technology (Lu, Liu, & Liao, 2005). It was found that attitudes toward an information system, such as compatibility, had a direct positive influence on behavioral intention and an indirect positive influence on adoption of that system (Taylor &

Todd, 1995). Agarwal and Prasad, (1998) found that perceived characteristics of innovation such as compatibility exerts positive influences on usage of technologies. In this study, in view of the above literature review, compatibility refers to the degree to which the use of e-learning is perceived by an extension agent as being consistent with his or her work.

Also of particular importance to individual attitude is the aspect of perceived ease of use which is defined as "the degree to which a person believes that using a particular system would be free of effort" (Davis, Bagozzi, & Warshaw, 1989, p. 320). Closely associated with perceived ease of use is the element of perceived usefulness which is defined as "the degree to which a person believes that using a particular system would enhance his/her job performance" (Davis, 1989, p. 453). In the TAM, both perceived ease of use and perceived usefulness were theorized as direct determinants of behavioral intention. In the context of e-learning, a number of past literatures provided support to the causal relationship between perceived ease of use and perceived usefulness with behavioral intention such as Spanish university students' acceptance of Moodle learning technology (Escobar-Rodriguez & Monge-Lozano, 2012) and high school students' acceptance of online learning facility in Taiwan (Liu, Chen, Sun, Wible, & Kuo, 2010). Sumak et al., (2011) conducted a meta-analysis on 42 previous research articles from year 2002 to 2011 related to e-learning acceptance reported that perceived ease-of-use and perceived usefulness account for medium to large effect size on behavioral intention for e-learning acceptance and indicated that the path coefficient between perceived ease-of-use and perceived usefulness to behavioral intention remain quite consistent across diverse e-learning technologies and user types.

Self-efficacy, as an internal individual belief factor, is defined by (Bandura, 1997, p. 3) as the belief in "one's capabilities to organize and execute the courses of action required to produce given attainments" thus it resembles a form of self-judgment in comprehending human behavior and performance in a certain tasks. In the context of information technology, (Compeau & Higgins, 1995 p. 191) related self-efficacy as "an individual's perceptions of his or her ability to use computers in the accomplishment of a task rather than reflecting simple component skills" Several past studies have found self-efficacy to be an important determinant that directly influences the user's behavioral intention and actual usage of information technology and e-learning (Chatzoglou, Sarigiannidis, Vraimaki, & Diamantidis, 2009; Downey, 2006; Guo & Barnes, 2007; Hernandez, Jimenez, & Martín, 2009). However, Venkatesh, Morris, Davis, and Davis, (2003) did not find a casual direct relationship between self-efficacy and behavioral intention. Therefore, in this study, computer self-efficacy were posited as one of the factors that were most expected to influence the acceptance of e-learning systems (Lee, Hsieh, & Chen, 2013).

Attitude, compatibility, perceived ease of use, perceived usefulness and self-efficacy are personal belief of individual thus collectively embedded as the dimension for the individual attitude belief.

### **Organizational Support**

In the context of this study, organization support comprises the aspect of communication, management support and training which are inherently under the responsibility of the organization of which the technology is expected to be or has been implemented. Key to organizational support is communication which is an attempt by senior decision-makers to creating awareness and appreciation of new technology to the potential users which transcends horizontally or hierarchically within the organization in view of buying support and subsequent

acceptance of the technology. Therefore lack of technology awareness leads to absence of value, potential, benefit and recognition on part of the new technology (Baker & Bellordre, 2004; Chen & Dimitrova, 2006). Alshihi, (2006) who investigated the development and adoption of e-government services in Oman, found that marketing and awareness-raising campaigns are crucial to inform and educate potential users about current and planned e-government initiatives to mitigate the barriers to adoption related to lack of IT knowledge, awareness and motivation.

Another important aspect of organizational support is management support which refers to the degree to which the top management and managerial level understands the importance of information system to be introduced of which top management and managerial level executives are involved in the activities (Al-Haderi, 2014). Top management support, as one form of organisational support plays a facilitating part in encouraging the use of technology and training by providing the required resources and support (Hazen, Kung, Cegielski, & Jones-Farmer, 2014). In addition, top management support also alters the perception of ease of use and usefulness and improves the attitude toward the technology hence giving positive effect on the acceptance of technology (Davis, 1989; Konradt, Christophersen, & Schaeffer-Kuelz, 2006; Leonard-Barton & Deschamps, 1998). Past studies also revealed that technology acceptance was not successful because top management had failed to manage and render the necessary support to the users thus indicating that management support whether direct or indirect encourages the acceptance or adoption of technology (Al-Haderi, 2014). Therefore, the notion is that top management support has positive effects on technology acceptance and without its support the organization will face problems in developing, planning and usage of technology such as e-learning. In this study the effects of top management support on e-learning acceptance as part of the organizational support dimension is examined through its effects on the behavioral intention toward the actual usage of technology.

As in the past literatures, training has been found as one of the essential measures that the organizations must provide to support the successful implementation of information systems (Compeau & Higgins, 1995; Gallivan, Spitler, & Koufaris, 2005; Sharma & Yetton, 2007) therefore it is quite the norm that considerable training investment always accompanies the implementation of information system (Swan et al., 2005). Organizations in their quest to remain competitive and maximize the return on investment of its technology implementation initiative found that training is an effective way to address the needs of the employees and encourage the acceptance of new technologies among the employees (Sharma and Yetton, 2007) for continuous improvement and productivity. Hazen et al., (2014) assert that with proper training, members of an organization would have the opportunity to understand, appreciate and have the competency to use the technology. Hence, as an intervention, training is often examined in the literature (Mantzana, Themistocleous, & Morabito, 2010; Wickramasinghe & Gunawardena, 2010) as having positive effect on the behavioral intention for technology acceptance.

The aspect of communication, management support and training are viewed as the dynamics for organizational support in this study hence they jointly constitute the dimension for the organizational support factor toward behavioral intention for e-learning acceptance.

### **External facilitation**

External facilitation involves those factors external to the individual and organizational but holds significant impact to the overall behavioral intention for e-learning acceptance. In this

study, the external facilitation dimension is decomposed further into three belief structures i.e. government facilitation, resource facilitation and technology facilitation which is a reflection of this study that involves government employees in public sector setting. Beyond the organization support, there are several external factors that need consideration with regard to acceptance of technology especially in the public sector domain. The role of government is one of the key factors that influence acceptance of technology. The role of the government in developing countries is diverse, and information technology is one of the areas that are receiving increased government resources (Besley & Burgess, 2002). As in the study of government sector in Yemen, employees and managers perception of government support is important in leading up to adoption of the information technology such as the e-government (Al-Haderi, 2014). In Malaysia, the government has been developing ICT infrastructures to provide basic facilities such as mobile communications, computer and Internet access. The government has also implemented a campaign to facilitate computer ownership, tax relief on the purchase of computers, broadband subscription fee reduction, and free notebook to the less fortunate. These are all factors that lead to the facilitating condition to encourage adoption and intention to accept an innovation (Mahbob, Wan Sulaiman, Wan Mahmud, Mustaffa, & Abdullah, 2012).

Besides government facilitation, the external facilitation dimension also considers the factor of resource facilitation especially by the organization, the externally based concept that reflects the availability of resources needed by the users to engage in a behavior (Hsiao & Tang, 2014). Resource facilitation in terms of provisioning of resources and technology support was found to be a strong predictor of students' behavioral intention to adopt e-learning (Leejoeiwara, 2013) hence facilitating resources pose direct influence on information systems usage by the users (Venkatesh et al. 2003).

The technology facilitation variable is operationalized to account for situations in which a user has little or no technological control over the behavioral performance (Ajzen, 1991). Technology facilitation is referred as perception of users on the availability of technical support and assistance provided to the users in the event of technical issues. In addition technology facilitation also acts as an enabler that allows accessibility to hardware, software, application and network connection facility related to the technology services (Tan & Teo, 2000; Thompson, Higgins, & Howell, 1991). Zolait, (2011) explained that technology facilitation along with other facilitating conditions are still significant influencing determinants for behavioral intention. The aspects of government, resource and technology facilitation are viewed as the factors jointly establish the dimension for the organizational support factor.

### **Theoretical background**

Technology acceptance is important if e-learning is to make progress in agricultural sector of Malaysia especially in extension services. Comprehensive review of various models and theories on technology acceptance is required to better evaluate the factors that influence acceptance of e-learning among the extension agents. The most applicable model or theory related to the study will be adapted to serve as the premise of this research and explain the predicting capability of the relationship between the various variables within the research framework. Several well-established behavioral and technology acceptance theories/models are discussed that will provide useful insights to measure the influencing factors that predict the acceptance of e-learning. This study of understanding the factors that influence e-learning acceptance by extension agents closely relates to intention-based model incorporating information about social and behavioral control factors (Mathieson, 1991). Therefore it is



appropriate to examine social and behavioral theories that can serve as underpinning theory for the research framework.

One of the most important social and behavioral theories is the Theory of Reasoned Action (TRA) which is premised along three main variables i.e. attitude, subjective norm being predictor variable and behavioral intention as the criterion variable (Fishbein & Ajzen, 1975). Nevertheless, the TRA merits less predictability if user's behavior is only predicted by intention or attitude (Klein, 1991) and discoveries of other factors such as moral obligation, habit and identity also have some effect to behavioral intention (Eagly & Chaiken, 1993).

In addition to TRA, the Technology Acceptance Model (TAM) by (Davis, 1989) is also referred as it identifies individual characteristics such as perceived ease of use and perceived usefulness to be significant direct determinants of behavioral intention (Davis et al., 1989). The TAM is the most frequently cited and influential model for explaining technology acceptance and adoption. across diverse settings for understanding the user adoption and usage of information technology innovations and a popular IS model that many researchers employ to investigate user acceptance of information systems (Chau, 1996; Teo, 2009). Initially TAM was formulated by only considering those factors related at individual level while other factors external to individual were not taken into account (Cheung & Vogel, 2013). TAM has shown to exert acceptable explanatory power and received extensive empirical support in the information system implementation (Venkatesh & Bala, 2008) including, e-government, e-health and e-learning (Arbaugh et al., 2009; Escobar-Rodriguez & Monge-Lozano, 2012; Lanseng & Andreassen, 2007; Liu et al., 2010; Phang et al., 2006; Sánchez & Hueros, 2010). However there have been some censures regarding the theoretical contributions of the model, specifically its ability to fully explain technology adoption and usage (Benbasat & Barki, 2007; Straub & Burton-Jones, 2007) as it focuses on individual dimension and ignores the aspect of non-volitional control and external factors.

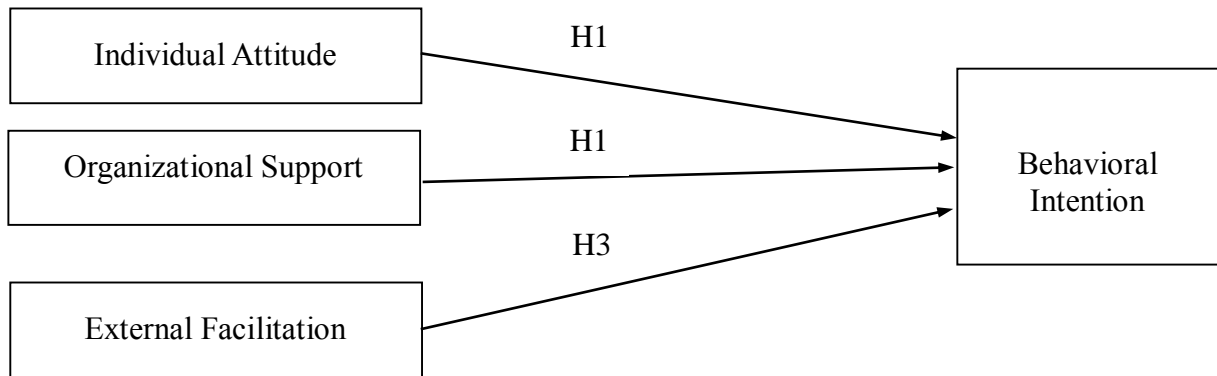
The TRA was further refined into the Theory of Planned Behavior by (Ajzen, 1991) to incorporate perceived behavioral control dimension as additional predictor variable into the theory as substitute for volitional control limitation of the TRA. However the aggregation of beliefs under the respective predictor constructs i.e. attitude, subjective norm and perceived behavioral control is not well-defined, thus the TPB was decomposed further to explain those specific factors that form the beliefs of each of the predictor variables (Taylor & Todd, 1995). Behavioral theory such as decomposed TPB has been widely applied in empirical studies such as tax e-filing (Hastuti, 2014), banking services (Echchabi & Azouzi, 2015), web 2.0 (Lai, 2016), electronic medical record (Hsieh, 2015) and e-learning (dos Santos & Okazaki, 2013).

As TAM is more parsimonious and decomposed TPB give better understanding of behavior hence the development of the research framework in this study is based on the combination of constructs both from the TAM and decomposed TPB to reflect the framework as close as possible to the research setting which is acceptance of e-learning by extension agents for extension services training in government agricultural sector.

## **Research Framework**

The development of research framework as illustrated in Figure 1 is based on decomposed TPB and TAM and in this context of study the predictor variables represent individual, organization and external factor that are expected to exert effect to behavioral

intention for e-learning acceptance. The dimension of individual attitude is a reflection of individual's personal characteristics such as attitude, compatibility, perceived ease of use, perceived usefulness and self-efficacy that are predicted to impact behavioral intention for e-learning acceptance.



**Figure 1**

Research framework

Organizational support dimension reflects the communication (e.g. awareness and promotion), top management support and training. The external facilitation is related to factors outside individual and organization that may also predict the behavioral intention for e-learning acceptance. These factors involve government intervention and resource and technology facilitation.

The research framework attempts to answer the following research questions:

1. Does individual attitude influence acceptance of e-learning among agricultural extension agents;
2. Does organizational support influence acceptance of e-learning among agricultural extension agents;
3. Does external facilitation influence acceptance of e-learning among agricultural extension agents.

Correspondingly the hypotheses are postulated as follow:

H1: Individual attitude (comprising of attitude, compatibility, perceived ease-of-use, perceived usefulness and self-efficacy) significantly predicts behavioral intention for e-learning acceptance;

H2: Organizational support (comprising of communication, management support and training) significantly predicts behavioral intention for e-learning acceptance;

H3: External facilitation (comprising of government facilitation, resource facilitation and technology facilitation) significantly predicts behavioral intention for e-learning acceptance.

## Conclusion

This study is an attempt to provide a comprehensive review of the relationship between individual attitude, organizational support and infrastructure facilitation and behavioral

intention for e-learning acceptance by agricultural extension agents in Malaysia. The TAM and decomposed TPB constructs are referred by the research framework and the three main determinants, namely, individual attitude, organizational support and infrastructure facilitation are put forward as predictor constructs to investigate the extent to which these dimensions affect extension agents' willingness to use e-learning systems for their extension services training in government agricultural department. This article complements to the few studies that take into account the critical role that individual, organizational and external factors play in technology acceptance.

From the theoretical viewpoint, this research will contribute significantly to the body of knowledge through the process of investigating the impact of influencing factors on the e-learning acceptance through the framework of the social and behavioral theory. The study also attempts to prove the significant role of the proposed factors arising from individual, organizational and external dimension and e-learning acceptance of which the respective relationships will be tested for predictive significance. Hence the outcome will be useful for comparison with earlier and future studies in different settings for generalizability of the theory.

From practical perspective, the study will offer an insight into one of the most important issues in Malaysian agricultural sector, which is learning and training for agricultural extension agents. In addition the research findings will help uncover the obstacles to e-learning and identify the factors that promote e-learning acceptance as a tool to support extension services training in Malaysia agricultural sector. The research findings would be beneficial to the decision-makers and policy-makers to attract maximum user engagement by enhancing the organizational support and improving the relevant infrastructure and facilities to widen the availability of e-learning.

## References

- Abas, Z. W., Chng, L. P., & Mansor, N. (2009). a Study on Learner Readiness for Mobile Learning At Open University Malaysia. *Science And Technology*, (ISBN : 978-972-8924-77-55), 151–157. Retrieved from [http://eprints.oum.edu.my/569/1/a\\_study\\_on\\_learner\\_readiness\\_for\\_mobile\\_learning\\_at\\_OUM.pdf](http://eprints.oum.edu.my/569/1/a_study_on_learner_readiness_for_mobile_learning_at_OUM.pdf)
- Abdul Karim, M. R., & Hashim, Y. (2004). The Experience of the E-Learning Implementation at the Universiti Pendidikan Sultan Idris , Malaysia. *Malaysian Online Journal of Instructional Technology*, 1(1), 50–59.
- Abdullah, F. A., & Samah, B. A. (2013). Factors impinging farmers' use of agriculture technology. *Asian Social Science*, 9(3), 120–124. <http://doi.org/10.5539/ass.v9n3p120>
- Agarwal, R., & Prasad, J. (1998). A conceptual and operational definition of personal innovativeness in the domain of information technology. *Information Systems Research*, 9(2), 204–215.
- Ahmadpour, A., & Soltani, S. (2012). Agricultural extension workers' attitude to and experience of e-learning. *African Journal of Agricultural Research*, 7(24), 3534–3540. <http://doi.org/10.5897/AJAR11.1992>
- Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, 50, 179–211. [http://doi.org/10.1016/0749-5978\(91\)90020-T](http://doi.org/10.1016/0749-5978(91)90020-T)
- Al-Haderi, S. (2014). The Influences of Government Support in Accepting the Information Technology in Public Organization Culture. *International Journal of Business and Social Science*, 5(5), 118–124.
- Ali, A. (2004). Issues & Challenges in Implementing E-learning in Malaysia. Retrieved January, 10. Retrieved from [http://eprints.oum.edu.my/145/1/issues\\_and\\_challenges.pdf%5Cnhttp://scholar.google.com/scholar?hl=en&btnG=Search&q=intitle:ISSUES+&+CHALLENGES+IN+IMPLEMENTING+E-LEARNING+IN#0](http://eprints.oum.edu.my/145/1/issues_and_challenges.pdf%5Cnhttp://scholar.google.com/scholar?hl=en&btnG=Search&q=intitle:ISSUES+&+CHALLENGES+IN+IMPLEMENTING+E-LEARNING+IN#0)
- Ali, J., & Kumar, S. (2011). Information and communication technologies (ICTs) and farmers' decision-making across the agricultural supply chain. *International Journal of Information Management*, 31(2), 149–159. <http://doi.org/10.1016/j.ijinfomgt.2010.07.008>
- Alshihi, H. (2006). *Critical Factors in the Adoption and Diffusion of E-government Initiatives in Oman*.
- Anderson, N., & Hajhashemi, K. (2013). Online Learning: From a specialized distance education paradigm to a ubiquitous element of contemporary education. *The 4th International Conference on E-Learning and E-*

*Teaching, ICELET 2013*, 91–94.

- Arbaugh, J. B., Godfrey, M. R., Johnson, M., Pollack, B. L., Niendorf, B., & Wresch, W. (2009). Research in online and blended learning in the business disciplines: Key findings and possible future directions. *Internet and Higher Education*, 12(2), 71–87. <http://doi.org/10.1016/j.iheduc.2009.06.006>
- Baker, P. M. A., & Bellordre, C. (2004). Adoption of Information and Communication Technologies : Key Policy Issues , Barriers and Opportunities for People with Disabilities. In *37th Hawaii International Conference on System Science* (Vol. 0, pp. 1–10).
- Bandura, A. (1997). *Self-efficacy: The exercise of control*. New York, NY: Freeman.
- Benbasat, I., & Barki, H. (2007). Quo vadis, TAM? *Journal of Association for Information System*, 8(4), 211–218.
- Besley, T., & Burgess, R. (2002). The Political Economy of Government Responsiveness: Theory and Evidence from India. *The Quarterly Journal of Economics*, 117(4), 1415–51. <http://doi.org/10.1162/003355302320935061>
- Bhattacharjee, A. (2001). An empirical analysis of the antecedents of electronic commerce service continuance. *Decision Support Systems*, 32, 201–214. [http://doi.org/10.1016/S0167-9236\(01\)00111-7](http://doi.org/10.1016/S0167-9236(01)00111-7)
- Borotis, S., & Poulmenakou, A. (2009). E-learning acceptance in workplace training: The case of a Greek bank. In *17th European Conference on Information Systems (ECIS2009)* (pp. 1–14). <http://doi.org/ECIS2009-0398.R1>
- Cantoni, V., Cellario, M., & Porta, M. (2004). Perspectives and challenges in e-learning: Towards natural interaction paradigms. *Journal of Visual Languages and Computing*, 15(5), 333–345. <http://doi.org/10.1016/j.jvlc.2003.10.002>
- Chatzoglou, P. D., Sarigiannidis, L., Vraimaki, E., & Diamantidis, A. (2009). Investigating Greek employees' intention to use web-based training. *Computers and Education*, 53(3), 877–889. <http://doi.org/10.1016/j.compedu.2009.05.007>
- Chau, P. Y. K. (1996). An Empirical Assessment of a Modified Technology Acceptance Model. *Journal of Management Information Systems*, 13(2), 185–204. <http://doi.org/Article>
- Chen, R.-S., & Hsiang, C.-H. (2007). A study on the critical success factors for corporations embarking on knowledge community-based e-learning. *Information Sciences*, 177(2), 570–586. <http://doi.org/10.1016/j.ins.2006.06.005>
- Chen, Y.-C., & Dimitrova, D. (2006). Electronic Government and Online Engagement : Citizen Interaction with Electronic Government and Online Engagement : *International Journal of Electronic Government Research*, 2(1), 54–76.
- Cheng, B., Wang, M., Moormann, J., Olaniran, B. a., & Chen, N. S. (2012). The effects of organizational learning environment factors on e-learning acceptance. *Computers and Education*, 58(3), 885–899. <http://doi.org/10.1016/j.compedu.2011.10.014>
- Cheung, R., & Vogel, D. (2013). Predicting user acceptance of collaborative technologies: An extension of the technology acceptance model for e-learning. *Computers and Education*, 63(APRIL), 160–175. <http://doi.org/10.1016/j.compedu.2012.12.003>
- Chung, H.-Y., Lee, G.-G., & Kuo, R.-Z. (2015). Determinants of Public Servants' Intention to Adopt E-Government Learning. *Review of Public Personnel Administration*, (28). <http://doi.org/10.1177/0734371X15590482>
- Compeau, D., & Higgins, C. (1995). Application of Social Cognitive Theory to Training for Computer Skills. *Information Systems Research*, 6(2), 118–143. <http://doi.org/Article>
- Compeau, D. R., & Higgins, C. A. (1995). Development of a Measure and Initial Test. *MIS Quarterly*, 19(2), 189–211. Retrieved from <http://www.jstor.org/stable/249688?seq=7>
- Davis, F. (1989). Perceived Usefulness, Perceived East of Use, and User Acceptance of Information Technology. *MIS Quarterly*, 13(3), 319–340. [http://doi.org/10.1016/S0305-0483\(98\)00028-0](http://doi.org/10.1016/S0305-0483(98)00028-0)
- Davis, F. D. (1989). Perceived usefulness , perceived ease of use , and user acceptance. *MIS Quarterly*, 13(3), 319–339. <http://doi.org/10.2307/249008>
- Davis, F. D., Bagozzi, R. P., & Warshaw, P. R. (1989). User acceptance of computer technology: A comparison of two theoretical models. *Management Science*, 35(8), 982–1003. <http://doi.org/10.1287/mnsc.35.8.982>
- dos Santos, L. M. R., & Okazaki, S. (2013). Understanding e-Learning Adoption among Brazilian Universities: An Application of the Decomposed Theory of Planned Behavior. *Journal of Educational Computing Research*, 49(3), 363–379. <http://doi.org/10.2190/EC.49.3.e>
- Downey, J. (2006). Measuring general computer self-efficacy: The surprising comparison of three instruments in predicting performance, attitudes, and usage. *Proceedings of the Annual Hawaii International Conference on System Sciences*, 8(C), 1–10. <http://doi.org/10.1109/HICSS.2006.268>
- Eagly, A., & Chaiken, S. (1993). *The Psychology of Attitudes*. (H. B. Jovanovich, Ed.). Orlando.
- Echchabi, A., & Azouzi, D. (2015). Predicting customers' adoption of Islamic banking services in Tunisia:A Decomposed Theory of Planned Behaviour approach. *Tazkia Islamic Finance and Business Review*, 9(1),

- Escobar-Rodriguez, T., & Monge-Lozano, P. (2012). The acceptance of Moodle technology by business administration students. *Computers and Education*, 58(4), 1085–1093. <http://doi.org/10.1016/j.compedu.2011.11.012>
- Fishbein, M., & Ajzen, I. (1975). *Belief, attitude, intentions and behaviour: An introduction to theory and research*.
- Flight, R. L., D'Souza, G., & Allaway, a W. (2011). Characteristics-based innovation adoption: Scale and model validation. *Journal of Product and Brand Management*, 20(5), 343–355. <http://doi.org/10.1108/10610421111157874>
- Gallivan, M. J., Spittler, V. K., & Koufaris, M. (2005). Does Information Technology Training Really Matter ? A Social Information Processing Analysis of Coworkers' Influence on IT Usage in the Workplace. *Journal of Management Information Systems*, 22(1), 152–192. <http://doi.org/10.1080/07421222.2003.11045830>
- Goi, C. L., & Ng, P. Y. (2009). E-learning in Malaysia : Success Factors in Implementing E-learning Program. *Software Magazine*, 20(2), 237–246.
- Guo, Y., & Barnes, S. (2007). Why people buy virtual items in virtual worlds with real money. *ACM SIGMIS Database*, 38(4), 69. <http://doi.org/10.1145/1314234.1314247>
- Hastuti, S. (2014). Implementation of Decomposed Theory of Planned Behavior on the Adoption of E-Filing Systems Taxation Policy in Indonesia. *Expert Journal of ...*, 2(May), 1–8. Retrieved from [http://business.expertjournals.com/wp-content/uploads/EJBM\\_2014hastuti2014pp1-8.pdf](http://business.expertjournals.com/wp-content/uploads/EJBM_2014hastuti2014pp1-8.pdf)
- Hazen, B. T., Kung, L., Cegielski, C. G., & Jones-Farmer, L. A. (2014). Performance Expectancy and Use of Enterprise Architecture: Training as an Intervention. *Journal of Enterprise Information Management*, 27(2), 180–196. <http://doi.org/10.1108/JEIM-08-2012-0042>
- Hernandez, B., Jimenez, J., & Martín, M. J. (2009). Adoption vs acceptance of e-commerce: two different decisions. *European Journal of Marketing*, 43(9/10), 1232–1245. <http://doi.org/10.1108/03090560910976465>
- Hsiao, C.-H., & Tang, K.-Y. (2014). Explaining undergraduates' behavior intention of e-textbook adoption. *Library Hi Tech*, 32(1), 139–163. <http://doi.org/10.1108/LHT-09-2013-0126>
- Hsieh, P.-J. (2015). Physicians' acceptance of electronic medical records exchange: An extension of the decomposed TPB model with institutional trust and perceived risk. *International Journal of Medical Informatics*, 84(1), 1–14. <http://doi.org/10.1016/j.ijmedinf.2014.08.008>
- Hur, H. M., & Im, Y. (2013). The influence of e-learning on individual and collective empowerment in the public sector: An empirical study of Korean government employees. *International Review of Research in Open and Distance Learning*, 14(4), 191–213.
- Hussin, H., Bunyarit, F., & Hussein, R. (2009). Instructional design and e-learning: Examining learners' perspective in Malaysian institutions of higher learning. *Campus-Wide Information Systems*, 26(1), 4–19. <http://doi.org/10.1108/10650740910921537>
- Jebeile, S. H., & Abeysekera, I. (2010). The spread of ICT innovation in accounting education. *International Journal of Teaching and Learning in Higher Education*, 22, 158–168.
- Joo, Y., Lim, K., & Lim, E. (2014). Investigating the structural relationship among perceived innovation attributes, intention to use and actual use of mobile learning in an online university in South Korea. *Australasian Journal of Educational Technology*, 30(4), 427–439. <http://doi.org/10.14742/ajet.v30i4.681>
- Klerkx, L., & Jansen, J. (2010). Building knowledge systems for sustainable agriculture: supporting private advisors to adequately address sustainable farm management in regular service contacts. *International Journal of Agricultural Sustainability*, 8(3), 148–163. <http://doi.org/10.3763/ijas.2009.0457>
- Konradt, U., Christophersen, T., & Schaeffer-Kuelz, U. (2006). Predicting user satisfaction, strain and system usage of employee self-services. *International Journal of Human Computer Studies*, 64(11), 1141–1153. <http://doi.org/10.1016/j.ijhcs.2006.07.001>
- Lai, H.-J. (2016). Examining Civil Servants Decisions to Use Web 2.0 Tools for Learning, Based on Decomposed Theory of Planned Behavior. *Interactive Learning Environments*, 4820(January), 1–11. <http://doi.org/10.1080/10494820.2015.1121879>
- Lanseng, E. J., & Andreassen, T. W. (2007). Electronic healthcare: a study of people's readiness and attitude toward performing self-diagnosis. *International Journal of Service Industry Management*, 18(4), 394–417. <http://doi.org/10.1108/09564230710778155>
- Lee, Y.-H., Hsieh, Y.-C., & Chen, Y.-H. (2013). An investigation of employees' use of e-learning systems: applying the technology acceptance model. *Behaviour & Information Technology*, 32(2), 1–17. <http://doi.org/10.1080/0144929X.2011.577190>
- Lee, Y.-H., Hsieh, Y.-C., & Hsu, C.-N. (2011). Adding Innovation Diffusion Theory to the Technology Acceptance Model: Supporting Employees' Intentions to use E-Learning Systems. *Educational Technology & Society*, 14(4), 124–137.

- Lee, Y. H., Hsieh, Y. C., & Ma, C. Y. (2011). A model of organizational employees' e-learning systems acceptance. *Knowledge-Based Systems*, 24(3), 355–366. <http://doi.org/10.1016/j.knosys.2010.09.005>
- Leejoeiwara, B. (2013). Modeling Adoption Intention of Online Education in Thailand Using the Extended DTPB. *AU Journal of Management*, 11(2), 13–26.
- Leonard-Barton, D., & Deschamps, I. (1998). Managerial influence in the implementation of new technology. *Management Science*, 34(10), 1252–1265.
- Liu, I.-F., Chen, M. C., Sun, Y. S., Wible, D., & Kuo, C.-H. (2010). Extending the TAM model to explore the factors that affect Intention to Use an Online Learning Community. *Computers & Education*, 54(2), 600–610. <http://doi.org/10.1016/j.compedu.2009.09.009>
- Lowenthal, B. P., & Wilson, B. G. (2010). Labels DO Matter ! A Critique of AECT ' s Redefinition of the Field, 54(1), 297–306.
- Lu, H.-P., Liu, S.-H., & Liao, H.-L. (2005). Factor Influencing the Adoption of E-Learning Website: An Empirical Study. *Issues in Information Systems*, 6(1), 190–196.
- Maguire, L. (2005). Literature review: faculty participation in online distance education: barriers and motivators. *Online Journal of Distance Learning Administration*, 8(1).
- Mahbob, M. H., Wan Sulaiman, W. L., Wan Mahmud, W. A., Mustafa, N., & Abdullah, M. Y. (2012). The elements of behavioral control in facilitating the acceptance of technological innovation on Malaysia on-line government services. *Asian Social Science*, 8(5), 125–131. <http://doi.org/10.5539/ass.v8n5p125>
- Maldonado, U. P. T., Khan, G. F., Moon, J., & Rho, J. J. (2011). E-learning motivation and educational portal acceptance in developing countries. *Online Information Review*, 35(1), 66–85. <http://doi.org/10.1108/14684521111113597>
- Mantzana, V., Themistocleous, M., & Morabito, V. (2010). Healthcare information systems and older employees ' training. *Journal of Enterprise Information Management*, 23(6), 680–693. <http://doi.org/10.1108/17410391011088592>
- Marr, B. (2008). *Managing and Delivering Performance - How government, public sector and not-for-profit organisations can measure and manage what really matters*.
- Mathieson, K. (1991). Predicting user intentions: Comparing the technology acceptance model with the theory of planned behavior. *Information Systems Research*, 2(3), 173–191. <http://doi.org/10.1287/isre.2.3.173>
- McLean, J. (2005). Addressing Faculty Concerns About Distance Learning. *Online Journal of Distance Learning Administration*, 8(4). <http://doi.org/10.1007/s13398-014-0173-7.2>
- Moore, J. L., Dickson-Deane, C., & Galyen, K. (2011). E-Learning, online learning, and distance learning environments: Are they the same? *Internet and Higher Education*, 14(2), 129–135. <http://doi.org/10.1016/j.iheduc.2010.10.001>
- Nawawi, M. H., Asmuni, A., & Romiszowski, A. (2003). Distance education public policy and practice in the higher education : The Case of Malaysia ., 1–12.
- Oblinger, D. G., & Hawkins, B. L. (2005). The Myth about E-Learning. *Educause Review*, July/ Augu, 14–15.
- Othman, J., & Jafari, Y. (2014). Selected issues in the Malaysian agricultural sector. *Jurnal Ekonomi Malaysia*, 48(2), 127–136.
- Phang, C. W. C. W., Sutanto, J., Kankanhalli, A., Li, Y., Tan, B. C. Y. B. C. Y., Teo, H.-H. H.-H., ... Teo, H.-H. H.-H. (2006). Senior citizens' acceptance of information systems: A study in the context of e-government services. *IEEE Transactions on Engineering Management*, 53(4), 555–569. <http://doi.org/10.1109/TEM.2006.883710>
- Ramayah, T., Ahmad, N. H., & Hong, T. S. (2012). An assessment of e-training effectiveness in multinational companies in malaysia. *Educational Technology and Society*, 15(2), 125–137.
- Renda dos Santos, L. M., & Okazaki, S. (2015). Planned e-learning adoption and occupational socialisation in Brazilian higher education. *Studies in Higher Education*, (June 2015), 1–21. <http://doi.org/10.1080/03075079.2015.1007940>
- Roca, J. J. C., & Gagné, M. (2008). Understanding e-learning continuance intention in the workplace: A self-determination theory perspective. *Computers in Human Behavior*, 24, 1585–1604. <http://doi.org/10.1016/j.chb.2007.06.001>
- Rogers, E. . (2003). *Diffusion of Innovations* (Fifth Edit). Free Press.
- Saat, N. Z. M., Chong, P. N., Omar, B., Manaf, Z., Ishak, I., Ramli, N., ... Nasrudin, N. F. (2012). Knowledge, Perception and Practice on the usage of e-learning Among Health Students in Kuala Lumpur. *Procedia - Social and Behavioral Sciences*, 60, 610–614. <http://doi.org/10.1016/j.sbspro.2012.09.430>
- Saha, P., Nath, A., & Sangari, E. (2010). Success of government e-service delivery: Does satisfaction matter? <http://doi.org/10.1007/BF03251472>
- Sánchez, R. A., & Hueros, A. D. (2010). Motivational factors that influence the acceptance of Moodle using TAM. *Computers in Human Behavior*, 26(6), 1632–1640. <http://doi.org/10.1016/j.chb.2010.06.011>
- Selim, H. M. (2007). Critical success factors for e-learning acceptance: Confirmatory factor models. *Computers*

- & *Education*, 49(2), 396–413. <http://doi.org/10.1016/j.compedu.2005.09.004>
- Shah, J. A., Asmuni, A., & Ismail, A. (2013). Roles of extension agents towards agricultural practice in Malaysia. *International Journal on Advanced Science Engineering Information Technology*, 3(1), 59–63. Retrieved from <http://www.insightsociety.org/ojaseit/index.php/ijaseit/article/view/278>
- Sharma, R., & Yetton, P. (2007). The Contingent Effects of Training, Technical Complexity, and Task Interdependence on Successful Information Systems Implementation. *Management Information Systems Quarterly*, 31(2), 219–238. <http://doi.org/Article>
- Singh, G., & Hardaker, G. (2014). Barriers and enablers to adoption and diffusion of eLearning: A systematic review of the literature – a need for an integrative approach. *Education + Training*, 56(2), 105–121. <http://doi.org/10.1108/ET-11-2012-0123>
- Straub, D. W., & Burton-Jones, A. (2007). Veni, Vidi, Vici: Breaking the TAM Logjam. *Journal of the Association for Information Systems*, 8(4), 223–229. <http://doi.org/Article>
- Sumak, B., Hericko, M., & Pusnik, M. (2011). A meta-analysis of e-learning technology acceptance: The role of user types and e-learning technology types. *Computers in Human Behavior*, 27(6), 2067–2077. <http://doi.org/10.1016/j.chb.2011.08.005>
- Swan, J., Newell, S., Scarbrough, H., Hislop, D., Swan, J., Newell, S., & Scarbrough, H. (2005). Knowledge management and innovation : networks and networking Knowledge management and innovation : networks and networking. *Journal of Knowledge Management*.
- Tan, M., & Teo, T. S. H. (2000). Factors influencing the adoption of Internet banking. *Journal of the Association for Information Systems*, 1(1), 1–44. <http://doi.org/10.1016/j.elerap.2008.11.006>
- Tarhini, A., Hone, K., & Liu, X. (2014). Measuring the Moderating Effect of Gender and Age on E-Learning Acceptance in England: A Structural Equation Modeling Approach for an Extended Technology Acceptance Model. *Journal of Educational Computing Research*, 51(2), 163–184. <http://doi.org/10.2190/EC.51.2.b>
- Taylor, S., & Todd, P. (1995). Understanding information technology usage: A test of competing models. *Information Systems Research*, 6(2), 144–176.
- Teo, T. (2009). Is there an attitude problem? Reconsidering the role of attitude in the TAM. *British Journal of Educational Technology*, 40(6), 1139–1141.
- Thompson, R. L., Higgins, C. a., & Howell, J. . (1991). Personal Computing : Toward a Conceptual Model of Utilization. *MIS Quarterly*, 15(1), 124–143. <http://doi.org/10.2307/249443>
- Tiraieyari, N., Hamzah, A., Abu Samah, B., & Uli, J. (2013). Attitudes of Malaysian extension workers towards sustainable agricultural practices. *American Journal of Environmental Sciences*, 9(1), 33–37. <http://doi.org/10.3844/ajessp.2013.33.37>
- Valsamidis, S., Kazanidis, I., Petasakis, I., & Karakos, A. (2011). A Framework for E-Learning in Agricultural Education, (Haicta), 8–11.
- Venkatesh, V., & Bala, H. (2008). Technology acceptance model 3 and a research agenda on interventions. *Decision Sciences*, 39(2), 273–315. <http://doi.org/10.1111/j.1540-5915.2008.00192.x>
- Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. *MIS Quarterly*, 27(3), 425–478. <http://doi.org/10.2307/30036540>
- Volery, T., & Lord, D. (2000). Critical success factors in online education. *International Journal of Educational Management*, 14(5), 216–223. <http://doi.org/10.1108/09513540010344731>
- Wickramasinghe, V., & Gunawardena, V. (2010). Critical elements that discriminate between successful and unsuccessful ERP implementations in Sri Lanka. *Journal of Enterprise Information Management*, 23(4), 466–485. <http://doi.org/10.1108/17410391011061771>
- Wu, J.-H., Tennyson, R. D., & Hsia, T.-L. (2010). A study of student satisfaction in a blended e-learning system environment. *Computers & Education*, 55(1), 155–164. <http://doi.org/10.1016/j.compedu.2009.12.012>
- Yunus, Y., & Salim, J. (2013). E-learning evaluation in Malaysian public sector from the pedagogical perspective: Towards e-learning effectiveness. *Journal of Theoretical and Applied Information Technology*, 51(2), 201–210.
- Zolait, A. H. S. (2011). The nature and components of perceived behavioural control as an element of theory of planned behaviour. *Behaviour & Information Technology*, 33(April 2015), 1–21. <http://doi.org/10.1080/0144929X.2011.630419>