CHAPTER ONE

1.1 BACKGROUND OF THE STUDY

Given the increased level of global competition, rapid change in technology and market conditions as well as continuous demand by consumers for quality products and services, information system (IS) has begun to receive considerable attention as a source that contributes to the growth of the economy and creates competitive advantage opportunities (Kulviwat, Burner II, and Al-Shuridah, 2009; Yu and Tao, 2009; Tushman and O'Reily, 2002). More and more, IS is seen as a necessity to business organisations these days rather than as a luxury in previous days. Adopting an appropriate IS enables business organisations to reach greater heights of competency, see improvements in its performance and ensures that their competitive advantage is retained. Also, it is particularly significant for business entrepreneurs who may also be owners of business as the IS adoption provides opportunities for these entrepreneurs to be innovative, be more efficient and effective, and readily access new domestic and international markets in the current business environment (Ridzuan and Ghani, 2000).

Thus, investment in IS can leads to economic benefits through, for example, more price competition, lower inventory costs, and new distribution channels. There are however, potential threats. For example, market forces that dominate the creation of on-line businesses may inhibit the development of "universal access" to entrepreneurs. Additionally, some of these entrepreneurs are owners of small businesses and thus, they have to compete in the same market with large enterprises that may have competitive edge in terms of resource

availability (i.e., financial and non-financial resources). Historically, the international potential of entrepreneurs haves often been constrained due to their size, lack of resources, and limited ability to identify and work with new customers and trading partners across borders (Lee and Runge, 2001; Thong, 1999). IS may mitigate these constraints, thus opening up global markets. To take full advantage of these global markets, however, entrepreneurs must have an effective strategy for adopting and using IS.

Malaysia has embarked on a major push to convince entrepreneurs, especially small and medium size enterprises' (SMEs) owners to adopt IS as a new, more efficient way of conducting their businesses. There are more than 200,000 business establishments in Malaysia. Ninety-one percent of these establishments are SMEs (Small and Medium Industries Development Corporation of Malaysia, 2011). Government agencies offer funding for these enterprises to upgrade computer system and develop their on-line business. In addition, the Malaysian government has established important strategic technology priorities whereby the government uses element of cloud computing to deliver some government services in Malaysia, with the hope that cloud computing adoption would leads businesses to an advanced economy. Furthermore, the Malaysia Finance Ministry has made it compulsory for government suppliers to be electronic procurement system enabled.

Despite many programs to convince entrepreneurs (especially SMEs owners) to adopt and use IS as a new, more efficient way of performing job, the uptake of IS by entrepreneurs are still very low and slow as most of the entrepreneurs deem IS adoption to be very difficult (Hashim, Murphy, and O'Connor, 2007). According to statistics, 82% of SMEs entrepreneurs only use computers for office work such as billing and invoicing. While 53% of SMEs entrepreneurs do own business website, however they do not have electronic

commerce (e-commerce) capabilities, and 94% of them have no e-commerce exposure (Star online portal, 2009). A recent survey in 2010 shows that only 5% of Malaysian SMEs entrepreneurs have fully automated IS and communication operations and only 30% of them have any form of enterprise level ICT solutions (Malaysian International Report, 2010). A number of possible explanations exist for this lack of adoption/utilisation. First, Malaysia, like many Asian countries, tends to be less technologically developed than their Western counterparts (Kendall et al., 2001). As such, entrepreneurs in Malaysia are still new to the experience of exploiting IS (Ismail et al., 2008). Second, there is a lack of a successful; locally based IS adoption model for these entrepreneurs (Ridzuan and Ghani, 2000).

1.2 INFORMATION SYSTEM ADOPTION BEHAVIOUR MODELS

The decision making process to adopt information system (IS) by individuals and/or organisations has motivated a great deal of research across multiple disciplines (Venkatesh and Zhang, 2010). Numerous theories have arisen, trying to predict IS adoption through personal factors. One of the basic theories in human behaviour and technology acceptance is the theory of reasoned action. Theory of Reason Action (TRA) assumes that behaviour is under volitional control and considers the behaviour is consciously thought of beforehand. Further, TRA posits that individuals would use IS if they could predict positive outcomes related to using the system. Therefore, TRA focuses on attitude behaviour relationship; in which individuals form positive attitude and subsequently, behavioural intention, before performing the said behaviour (Compeau and Higgins, 1995; Leach, Hennessy, and Fishbein, 1994; Venkatesh, Morris, Davis and Davis, 2003; Taylor and Todd, 1995). However, TRA has some limitations related to the confounding nature between attitudes and subjective norms.

The limitations of TRA result in the use of theory of planned behaviour to explain adoption behaviour that is not completely under individuals' control (Ajzen, 1985, 1991). According to Theory of Planned Behaviour (TPB), in order to predict possible behaviour with more accuracy, it is necessary to evaluate intention and the amount of control that individuals have over the behaviour (Ajzen and Madden, 1986; Armida, 2008). Also, in an attempt to mitigate TRA limitations, Davis (1986) modifies the TRA to explain the determinants of IS acceptance and user behaviour by developing a model, known as Technology Acceptance Model.

Technology Acceptance Model (TAM) is spherically developed to predict and understand adoption behaviour of specific IS applications. TAM postulates that individuals' intention to adopt IS is determined by two constructs; (1) perceived usefulness and (2) perceived ease of use. These two constructs are the foundation of TAM. Subsequently, TAM has been extensively used and has become one of the most influential frameworks to explain IS adoption behaviour in different context (Venkatesh and Davis, 2000; Gefen and Straub, 2000; Mathieson, 1991). On that note, Venkatesh and Davis (2000) use TAM as a base theory, and introduce TAM2. TAM2 expands TAM to include additional key determinants, such as social influence process and cognitive instrumental process factors. In addition, subjective norm is added to TAM2 as an additional predictor of behaviour intention, with the purpose to provide an explanation as to how the influence of all these factors (i.e., social and cognitive) change due to increasing individuals' experience over time with the target system.

Throughout the years, IS researchers have adopted, adapted and expanded TAM and TAM2 with other human behaviour theories that may allow better explanations of IS adoption behaviour phenomena. For examples, based on theory of human behaviour (Triandis, 1977), Thompson, Higgins, and Howell (1991) propose a Model of PC Utilisation (MPCU) to predict individuals acceptance and use behaviour. Meanwhile, Moore and Benbasat (1991) design instrument to measure the perceptions of IS innovation adoption based on Rogers' (1995) diffusion of innovation theory (IDT). In the same vein, Compeau and Higgins (1995) extend the social cognitive theory (SCT) to IS adoption research to investigate the role of individuals' beliefs about their skill to competently use computers. Meanwhile, Davis, Bagozzi, and Warshaw (1992) adapt motivation theory to explain how individuals respond to stimuli in IS context. They find in the context of IS, extrinsic and intrinsic motivations are the key drivers for individuals' intention to use the technology (Davis et al., 1992). On the other hand, Taylor and Todd (1995b) combine TAM and TPB in a unified model known as C-TAM-TPB to predict inexperienced users' behaviour with new IS compared to experienced users.

The stream of research in IS adoption behaviour culminates in the unified theory of acceptance and use of technology (UTAUT) develops by Venkatesh et al. in 2003 that synthesizes and merges previous IS acceptance models. The goals of UTAUT are to provide a useful tool for managers to assess the likelihood of success for new IS introductions and help them understand the drivers of IS acceptance by individual employees (Venkatesh et al., 2003). UTAUT consists of five predictors of IS adoption behaviour, with three constructs: (1) performance expectancy, (2) effort expectancy, and (3) social influence postulate to act as direct determinants of behavioural intention. While, two constructs: (1) facilitating conditions and (2) intention to use are postulate as direct determinants of use

behaviour. UTAUT also postulates four variables that moderate the relationships between the five predictors to IS adoption behaviour (i.e. intention to use and use) that include; (1) voluntariness of use, (2) experience with the system, (3) age, and (4) gender. UTAUT provides a more wholesome picture of the IS acceptance process compare to others IS acceptance models, whereby UTAUT is able to explain 50% to 70% of the variance in intention to use. Since UTAUT development in 2003, IS researchers have used and validated UTAUT to investigate the IS adoption behaviour in different context. Research shows that UTAUT is a robust model that have the ability to explain determinants toward IS adoption behviour. Furtheremore, IS adoption researchers have use UTAUT to investigate the use of various IS application to different users population and cultural setting. Most significantly, all these studies reveal UTAUT as a popular base line model employed by these researchers when investigating IS adoption behaviour by individuals. Nonetheless, there are criticisms to UTAUT by some IS researchers (Venkatesh et al., 2008; Straub, 2009).

The first criticism is that in UTAUT intention to use construct is considered as a "reflection of individuals' internal schema of beliefs" and not a representation of the external factors that can affect the performance of use behaviour. According to UTAUT, before individuals act upon an action; it entails a significant planned (intentional) action. In other word, intention precedes actual action. When intention is absent, there will unlikely to be any action (Krueger, 2000). Intention to act is central to understanding the behaviour in which individuals engage. While actual behaviour may differ from intended behaviour, it has been established that individuals' intention to act toward something in a certain manner is the most consistent predictor of actual behaviour, particularly planned behaviour (Krueger, Reilly and Carsrud, 2000). Therefore, in UTAUT, the role of external factors that can potentially facilitate or impede the performance of behaviour (action) is not fully

captured by behavioural intention. However, UTAUT attempts to reflect the influence of external factors through facilitating conditions construct (Venkatesh et al., 2003). Nonetheless, Venkatesh et al. (2008) when investigating the relationship between facilitating conditions and use behaviour find the facilitating conditions construct does not fully consider all possible external factors that can influence behaviour performance. They conclude that in the presence of incomplete information and uncertainty regarding behaviour, the facilitating conditions construct in UTAUT may not be a good factor to predict behaviour (Venkatesh et al., 2008).

The second criticism is that behavioural intention in UTAUT has weak predictive and explanatory ability to deal with uncertainly and unforeseen events (i.e., environmental or organisational limits) that may inhibit the act between the time the intention is formed and the behaviour is performed. Although, in a decision making process, intention is prior to actual behaviour and the link between the two is rather complex. In reality, there are many factors that are exogenous to attitude-intention-behaviour process. Thus, even though intention is important, it is an insufficient prerequisite for successful use behaviour (Wiedemann et al., 2009; Sheeran, 2002). Thus, in such condition, intention is provisional and different exogenous stimuli can change intention drastically over time indicating that intention is inaccurate, unstable, and less predictive of use behaviour. According to Krueger (2007), in the face of new business environment, individuals' belief and intention can change accordingly, and thus, he suggests that the link between intention-behaviour may require more attention.

Moreover, in UTAUT, behavioural intention is limited in its ability to predict behaviour that is not completely within an individual's volitional control (Ajzen, 1985). In the attitude-intention-behaviour process, perceived behavioural control variable reflect the non-volitional control environment. In UTAUT, facilitating conditions construct indirectly would capture non-volitional factor for which behavioural intention is unable to account. In general, in UTAUT, facilitating conditions refers to individuals' perception of the availability of technological and/or organisational resources (i.e., knowledge, resources, and opportunities) that can remove barriers to using IS (Venkatesh et al. 2003). Based on this conceptualisation of facilitating conditions construct, this construct was not fully able to measure uncertainty, and in the volitional environment, uncertainty is the perception of controllability by individuals of any situation (Krueger, 2000). The external factors that Venkatesh et al. (2008) highlight are extensively discussed in the entrepreneurship studies, which are referred to as precipitating events. This precipitating event is one of the constructs in the Entrepreneurial Potential Model which is developed by Krueger and Brazeal (1994). In addition, EPM is able to measure the impact of volitional aspect of behavioural intention through propensity to act construct, whereby this construct facilitates entrepreneurs to evaluate their prior intention when adopting IS related innovation.

The third criticism is that UTAUT does not consider attitude and self-efficacy as direct determinants of behavioural intention (Yuen et al., 2010; Straub, 2009). In UTAUT, self-efficacy is not considered as one of the direct determinants of behavioural intention but more as an indirect construct that relate to overall self-efficacy of IS, rather than a specific self-efficacy of using IS. Therefore, in UTAUT, self-efficacy is captured through effort expectancy. However, empirical evidences show that perceived specific self-efficacy contributes significantly to the motivation and performance of individuals (Bandura and

Locke, 2003; Bandura, 1994, 1997). Furthermore, UTAUT excludes attitude as direct determinant of intention (which is important factor in TRA and TPB), while many studies in other disciplines consider attitude as direct determinant of behavioural intention.

For example, Krueger and Brazeal (1994) argue that favorable attitude and self-efficacy are important factors toward the intention to take action. They argue that starting a new action requires at least a threshold level of perceptions of feasibility (self-efficacy) and desirability (favorable attitude), plus some propensity to actually act upon an opportunity. Furthermore, most prior studies have found both these factors to be salient determinant of behavioural intention (Louho, Kallioja, and Oittinen, 2006; Oshlyansky, Cairns, and Harold, 2007; Dijk, Peters, and Ebbers, 2008; Yuen et al., 2010). With these limitations of UTAUT, relying on UTAUT alone to predict IS adoption behaviour (i.e., intention to use and use behaviour) by entrepreneurs would be inappropriate. Moreover, there is a need to find variables that are able to capture the role of external factors that may affect individuals' decision to adopt and use IS, as well as factors that measure individuals dimension toward IS intention to use and use behaviour, that may explain why entrepreneurs may have the intention to use, but the intention does not translate into actual use behaviour.

1.3 SETTING THE RESEARCH SCENE AND RESEARCH PROBLEMS

Understanding planned human behaviour is a difficult task. Many factors have to be taken into consideration in order to provide appropriate understanding of the planned human behaviour, especially human behaviour related to behavioural intention. Druker (1985) considers the use of IS innovation as one aspect of entrepreneurship and that IS innovation and entrepreneurship work hand in hand to enhance productivity in many countries.

Therefore, it is imperatively important to investigate the entrepreneurs IS adoption behaviour as they are normally considered as IS or IT pioneers. Entrepreneurs usually would use IS or IT as source of opportunity for new ventures creation or to increase job performance in their daily business activities. Most entrepreneurs face different challenges such as legal, financial, and /or personal obstacles that may arise in their daily business activities (Gnyawali and Park, 2009; Damanpour and Schneider, 2006). To certain extend, all these challenges may also affect their intention toward adopting and using IS in their daily business activities.

Entrepreneurs are someone whose role is to do new things or doing things that are already done in a new and innovative way (Schumpeter, 1936). Also, entrepreneurs have higher achievement motivation, and risk takers, and thus, they have more tendencies to changes and more innovated (Steward, Watson, Garland, and Garland, 1998). Accordingly, this study defines entrepreneurs as individuals who apply new idea, practice, service, or object related to IS innovation in their daily business activities. Since entrepreneurs are interested to new opportunities and to bring changes to the society, their role is important for economic growth and society (Wang and Yang, 2005). Therefore, investigating the determinants that encourages entrepreneurs to adopt and use IS related innovation in their daily business activities is noteworthy. It appears that if entrepreneurs are able to use IS effectively, they can grow, potentially reap the benefits from their system, and become more profitable. However, while IS often assist to growth, entrepreneurs often still find difficulties in implementing IS related innovation for variety of reasons (Raymond and Blili, 2005).

Consequently, issues of IS adoption behaviour either by organisations and individuals have become a significant and long-standing research question that can be considered as a mature stream of IS adoption research. Numerous IS adoption models, with the most recent UTAUT have arisen in an effort to explain and predict IS adoption behaviour. Many prior IS adoption studies applied UTAUT by replicating this theory or integrating part of UTAUT in different context and setting (e.g., Nuefeld, Dong and Higgins, 2007; Louho, et al., 2006; Yang, 2010; Foon and Yin Fah, 2011). For example, UTAUT has been employed to examine new technologies, such as collaborative technology, and health information system (e.g., Chang et al., 2007); new user populations, such as healthcare professionals, and consumers (e.g., Yi, Jackson, Park, and Probst, 2006); and new cultural setting, such as in China and India (e.g., Gupta, Dasgupta and Gupta, 2008). Also, UTAUT has been extended by including new constructs to expand the scope of the endogenous theoretical mechanisms (e.g., Chan et al., 2008; Sun, Bhattacherjee, and Ma, 2009) and the exogenous predictors of the UTAUT variables (e.g., Neufeld et al. 2007; Yi et al. 2006). Despite substantial progress of applying UTAUT in answering the question of what are the salient determinants that contribute to IS adoption, arguably, there are still confounding issues related to the theory.

One of the confounding issues is UTAUT has weak predictive and explanatory ability to predict IS behavioural intention that deals with unforeseen events, and uncertainty between the time an intention is formed and behaviour is performed. Although there are few studies that have replicated UTAUT to empirically examine the link between intentionand behaviour, but the link between these two constructs still remain unclear and criticized (Wiedemann et al., 2009; Venkatesh et al., 2008; Sheeran, 2002), particularly, the factors that inhibit the act from the time intention to use IS is formed and use behaviour is performed (Venkatesh et al., 2008). Therefore, the complex and distal nature of decision

making suggests that the linkage between intent and action requires considerable attention (Krueger, 2000; Krueger, 2007). Lack of consideration towards this issue may cause to the link between intention to use and use behaviour to be farther and wider, thus increases the 'intention-behaviour gap'.

With the limitations of UTAUT coupled with challenges faced by entrepreneurs, using UTAUT alone to understand the entrepreneurs IS adoption behaviour may not be appropriate. While there are a variety of prior studies contribute to understanding the utility of UTAUT in different contexts, there is still a need for a systematic investigation and theorisation of the salient factors that would apply to entrepreneurs' IS related innovation adoption behaviour context. This study defines IS related innovation as the idea, practice, or any digital and communications technology that is new and used by entrepreneurs. Therefore, this study considers any new hardware or software related to IS such as Mobile Banking, Online Banking, Mobile Commerce, and Web2 and Enterprise Resource Planning as IS related innovation.

Regarding the limitations related to sampling, previous studies in IS adoption use different samples for investigating IS acceptance and use, and only a few studies consider actual entrepreneurs. In addition, in entrepreneurship context, few studies have actually investigate IS adoption behaviour by entrepreneurs. However, in the entrepreneurship literature the focus are more on investigate of entrepreneurial behaviour intention to create new business venture by potential entrepreneurs (student). At the time of undertaking this study, there is still a scarcity of study that examine IS adoption behaviour by entrepreneurs. Furthermore, to the knowledge of the researcher of this study none of the studies on entrepreneurship have investigated 'actual' entrepreneurs' as unit of analysis. Investigating

entrepreneurs' IS adoption behaviour without using actual entrepreneurs would dampen the understanding of their behavioural intention. However, entrepreneurs and potential entrepreneurs may differ in characteristics, perceptions, and experiences as those actual entrepreneurs are in the work environment, whereas potential entrepreneurs are not (Tang and Koveos, 2004; Doganova and Eyquem-Renault, 2009). In addition, as argued by Meeks (2004) stable career anchors emerge only with work experience.

1.4 RESEARCH QUESTIONS AND OBJECTIVES OF THE STUDY

Based on the aforementioned arguments, the main aim of this study is to investigate entrepreneurs behavioural intention and use behaviour toward IS related innovation adoption. In respect of the UTAUT limitations, this study tried to develop IS adoption model that is able to measure the determinants that may influence entrepreneurs to adopt and use IS related innovation, and capture the effect of external factors on intention to use and use behaviour. To achieve this aim, this study decomposes and integrates the UTAUT (Venkatesh, et al., 2003) and the Entrepreneurial Potential Model (EPM) (Krueger and Brazeal, 1994), and therefore, develops and proposes an integrative UTAUT-EPM IS adoption model for entrepreneurs.

As illustrated in Figure 1.1, the proposed integrative UTAUT-EPM model captures different factors of IS adoption behaviour (e.g., technological, individual, and environmental) by entrepreneurs, and measures the entrepreneurs volitional aspect and well as the unforeseen events that may occur in entrepreneurs daily business activities.

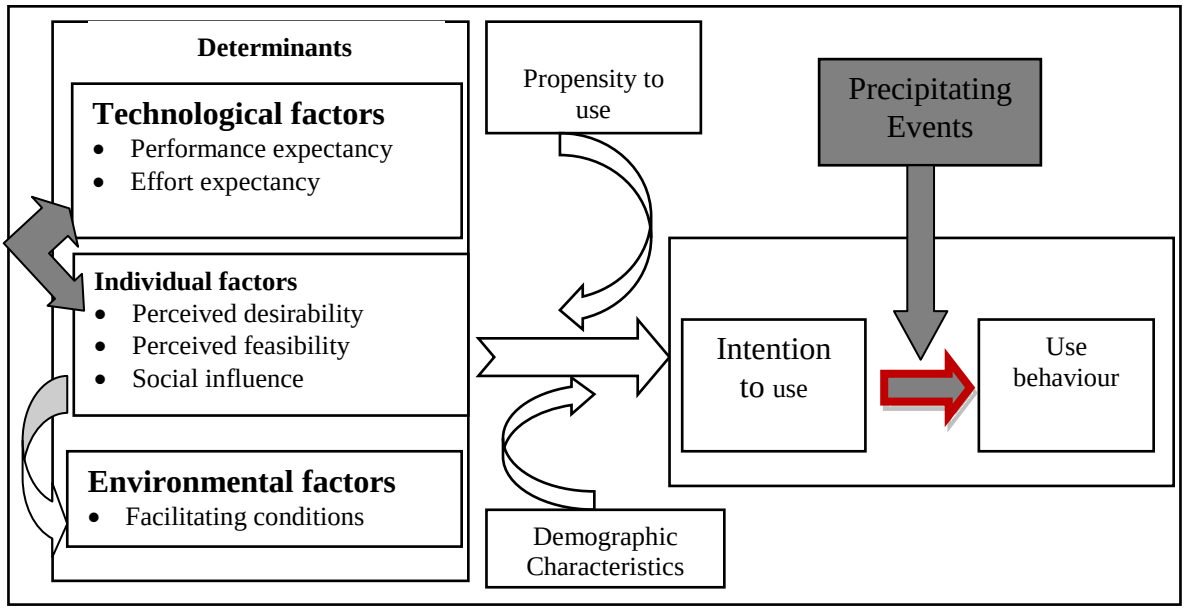

Figure1. 1: Research Issue under Investigation

In line with the above aim, the following research questions are formulated;

1. What are the determinants that influence IS related innovation adoption behaviour by entrepreneurs?
2. What is the role of demographic characteristics of gender and age on the relationships between determinants and IS related innovation adoption behaviour by entrepreneurs?
3. What are the impacts among the determinants of IS related innovation adoption behaviour by entrepreneurs?
4. What is the impact of volitional aspect towards propensity to use of entrepreneurs' behaviour on the relationship between determinants and IS related innovation adoption behaviour by entrepreneurs?
5. How do external factors of precipitating events affect IS related innovation adoption behaviour by entrepreneurs?

The first issue examines the influence of technological factors toward intention to use IS related innovation by entrepreneurs. The technological factors measure characteristics of IS related innovation, that include performance expectancy and effort expectancy. Performance expectancy relates to the benefit of using IS or the expected outcomes such as attain gains in job performance, while effort expectancy relates to the ease of using IS, such as user friendly features. The objective is to investigate the salient effect of these technological factors on entrepreneurs' intention to use IS related innovation. Understanding the role of these technological factors would assist entrepreneurs to focus on deploying a more useful, relevant and easy to use IS related innovation.

The second issue inspects the influence of individual factors toward intention to use IS related innovation by entrepreneurs. The individual factors include perceived desirability, perceived feasibility, and social influence. Perceived feasibility is defined in terms of whether entrepreneurs feel capable of adopting and using IS related innovation, while perceived desirability is concerned with the overall attractiveness of using IS related innovation (Krueger et al., 2000). On the other hand, social influence is the referent of others perception towards IS related innovation adoption. The objective is to examine the importance of individual perceptions on entrepreneurs' intention to use IS related innovation. Understanding the effect of these individual factors, would aid entrepreneurs to evaluate attitudes and belief capabilities of entrepreneurs toward IS related innovation adoption behaviour.

The third issue explores the influence of environmental factor towards use behaviour of IS related innovation by entrepreneurs. The environmental factor is related to environmental infrastructures to support IS related innovation usage. For the purpose of this

study the environmental factor refers to facilitating conditions that includes availability of IS resource, IS knowledge and skill of the entrepreneurs, and the internal or external IS support to use IS related innovation. The objective is to assess the significance of the environmental factor on IS usage by entrepreneurs. Understanding the effect of environmental factor, such as appropriate infrastructures and internal/external supports would allow entrepreneurs can appropriately adapt to the in the current IS environment, and assist policy makers and software's developers to understand the types of IS support to facilitate entrepreneurs to adopt and use IS related innovation.

The fourth issue observes the role of entrepreneurs' demographic variables, particularly the role of gender and age, on the relationships between the technological and individual factors on intention to use IS related innovation, and between environmental factors and use behaviour of IS related innovation. The objective is to investigate the significant roles of gender and age of entrepreneurs in determining their intention to use and use behaviour. Understanding the effect of gender and age on the determinants of IS related innovation adoption behaviour would enable an in depth appraisal as to why different group of entrepreneurs behave differently towards intention to use IS related innovation and use behaviour, and thus different adoption strategy and training can be structured and organised to facilitate the different group of entrepreneurs to adopt and use IS related innovation.

The fifth issue investigates the possibility of the role of some of the factors in the technological, individual, and environmental factors on each other. The objective is to explore the possible relationships between these factors and how each of the factors facilitates entrepreneurs toward their use behaviour of IS related innovation. Understanding the relationships and roles of these factors on each other would provide insight into the

significant of each of these factors, and their relative prominence towards successful adoption and usage of IS related innovation.

The sixth issue investigates the role of volitional aspect of entrepreneurs' behaviour on the relationship between individual factors and intention to use. The volitional aspect of entrepreneurs' behaviour is the propensity to use by entrepreneurs. Entrepreneurs are susceptible in their decision to use IS related innovation, and when they persist to their decision, then it is considered as volitional aspect of their decision. The objective is to examine the impact of the volitional aspect of entrepreneurs' in determining intention to use IS related innovation. Understanding the role of volitional aspect on the impact of individual factors towards behavioural intention to use IS related innovation would facilitate entrepreneurs to evaluate their prior intention when adopting IS related innovation, which then may translate into active use of the system.

The seventh issue examines the link between intention to use and use behaviour of IS related innovation by entrepreneurs. Intention to use is defined as entrepreneurs plan to use or reject IS related innovation. The objective is to investigate the salient effect of intention to use on use behaviour. Understanding the relationship between intention to use and use behaviour would fill the intention-behaviour gap. Furthermore, the effect of exogenous factors on the link between intention to use and use behaviour is investigated. In this study exogenous variable is referred to as precipitating events that facilitate or 'precipitate' the realisation of intention into use behaviour. Here, precipitating events include changes in work situation; changes in work environment, changes technology in entrepreneurs work environment, and changes in entrepreneurs' career prospect. The objective is to assess the effect of the precipitating events that occur in the entrepreneurs' personal and business life

in determining the use behaviour of IS related innovation by entrepreneurs. Understanding the role of precipitating events towards use behaviour would provide new insight to the situations that entrepreneurs are currently facing. It shows that how entrepreneurs cope with these IS related adoption behaviour when these changes occur which may have also affected their adoption behaviour.

1.5 MOTIVATIONS OF THE STUDY

In recent years, there has been an increasing interest on the issue of entrepreneurs and entrepreneurship both among the academics and in practice. This interest stems from the importance of entrepreneurial activity for economic growth in the new global economy (Kirchhoff and Spencer, 2008; Drnovesek and Erikson, 2006). This study is motivated by the need for an integrated and empirically tested model to support IS related innovation adoption behaviour by entrepreneurs.

One of the motivations for investigating the critical determinants that activate and stimulate entrepreneurs to adopt and actively use IS related innovation is to assist entrepreneurs achieve the benefits of using IS related innovation as a strategic tool. Information system (IS) provides opportunities for entrepreneurs to be innovative, be more efficient and effective, and be more readily to access new domestic and international markets in the current business environment (Ridzuan and Ghani, 2000). Entrepreneurs activities, particularly those entrepreneurs in small- and medium sized enterprises (SMEs) are the most active economic growing forces in nearly all countries, playing significant role in economic growth, thus can be considerd the backbone of industrial development (Wang and Yang, 2005; Guriting and Ndubisi, 2006; Ramayah, Jantan, Noor, and Ling, 2003;

Alam, 2009), therefore, investigating the determinants that encourage entrepreneurs to adopt and use IS related innovation in their daily business activities is a critical issue.

Many prior researches have been conducted in the IS innovation field to understand the factors that may inhibit or facilitate IS adoption and the diffusion of arising IS-based processes or products within potential IS adopters (Fichman, 2004). The IS innovation literature identifies different variables as determinants of individual and organisation adoption of IS related innovation. These prior studies resulted in exposing various determinants that activate and stimulate individuals and organisations toward IS related adoption behaviour. In addition, empirical results from prior studies show mixed support for some of the determinants of individuals and organisation adoption behaviour (e.g., Dewar and Dutton, 1986; Legris, Ingham, Collerette, 2003; Sabherwal, Jeyaraj, and Chowa, 2006). Thus, while some prior studies are able to validate and confirm the determinants, some studies have mixed results on the determinants toward IS related innovation adoption behaviour.

A possible reason for these mixed results could be the failure to specifically consider external variables, and individual factors, since Weill (1992) comments that it is likely that the link between the determinants and IS adoption behaviour is contingent on external variables and individual characteristic as well as the context of the adopters. Based on Weill (1992) comment, it is likely that the link between determinants and IS adoption behaviour (i.e., intention to use and use behaviour) are influenced by a number of external factors, whereby some are controllable factors and some are uncontrollable factors (Venkatesh et al., 2008). Furthermore, since IS related innovation now is seen more as strategic tool, rather than administrative tool, therefore, external variables such as precipitating events is likely to

play a considerable role (Schindehutte, Morris, and Kuratko, 2000). The lack of prior studies on IS adoption behaviour to explicitly consider these external variables and individual characteristics may contribute to the mixed results. These mixed results indicate that more research is needed to identify, validate and confirm the critical determinants toward IS related adoption behaviour. Therefore, this study is motivated to examine, identify, validate and confirm the critical determinants; specifically a study that narrates to entrepreneurs IS adoption behaviour (Thong, 1999).

Moreover, most entrepreneurs are normally small and medium-sized business owners, with have higher achievement motivation and are risk takers, and therefore they are more incline toward adoption of innovation and changes. Understanding entrepreneurs behaviour and clarifying the situations or events that may have an impact on entrepreneurs planned behaviour will aid entrepreneurs in their decision making process to attain benefits of adopting IS related innovation as new opportunity in their daily business activities and as a tool to enhance their performance. With this argument, there is a need for a robust and parsimonious model to understand how entrepreneurs actually make decisions and take actions, and how precipitating events such as being jobless or other situational condition events such as government policy, financial crisis, new markets, and financial resources influence the entrepreneurs' IS adoption behaviour (i.e., intention to use and use behaviour).

1.6 CONTRIBUTIONS OF THE STUDY

1.6.1 Theoretical Contributions

This study is expected to make crucial theoretical and practical contributions. This study draws on confluence of the IS adoption literature and entrepreneurship literature to develop IS related innovation adoption model for entrepreneurs. Given the well-established theoretical rational of UTAUT from IS adoption literature and entrepreneurial potential model (EPM) from the entrepreneurship literature in the ability of EPM in mitigating UTAUT limitations, this study integrates these two intentional models and proposes an integrative UTAUT-EPM model to predict and understand IS adoption behaviour by entrepreneurs. With the integrative UTAUT-EPM model, the limitations within UTAUT will be overcome, therefore the integrative model provides a comprehensive understanding of determinants that affect IS related innovation adoption among entrepreneurs. This study places greater emphasis on examining key factors of technological, individuals and environmental that activate and stimulate entrepreneurs behavioural intention to use and use behaviour of IS related innovation to its fullest potential. By building on and extending prior work in these two streams of research, with the development of the proposed integrative UTAUT-EPM model of IS adoption behaviour for entrepreneurs, this study expects to make four key theoretical contributions.

First, from the IS adoption literature, this study focuses on the determinants of UTAUT such as technological factors of performance expectancy and effort expectancy; and individual factor of social influence toward intention to use IS related innovation, while intention to use and environmental factor of facilitating conditions are determinants of use behaviour IS related innovation by entrepreneurs. In addition, from the entrepreneurship

literature, this study includes two other elements of individual factors of perceived desirability and perceived feasibility to UTAUT. In the entrepreneurship literature, intention is related with the attitudes, and more concretely concerning the attitude elements of perceived desirability and perceived feasibility (e.g., Gatewood, Shaver, and Gartner, 1995). Taken together, these two elements provide evidence of entrepreneurs' perceived credibility for new venture creation (Krueger and Carsrud, 1993). Alternative, adopting and using IS related innovation can be considered as a new venture creation, and as these elements are distinct to the entrepreneurs planned behaviour (Shapero, 1982; Krueger and Brazeal, 1994). Furtheremore, the influences of perceived desirability and perceived feasibility toward intention to use IS related innovation of entrepreneur are analysed. Incorporating these two constructs (i.e., perceived desirability and perceived feasibility) as determinants in the IS adoption model contributes to a more systematic framework that is unique to entrepreneurs. Therefore, the integrative UTAUT-EPM model provides an extention to the understanding of IS related innovation adoption behaviour by entrepreneurs. Moreover, the inclusion of these two elements is expected to extent further knowledge on IS adoption behaviour research, and thus, the proposed integrative UTAUT-EPM model will be more parsimonious, that can be generalisable to different context, which would be an important step to advances in knowledge on IS adoption behaviour research.

Second, from the entrepreneurship literature, entrepreneurial intention model is a process model, thus as a process, displacement can happen to individuals. Displacement events can be a positive situation, such as opportunity is presented to get into business for oneself, or a negative situation, such as being laid off from a job, or more neutral as in life-transition situations, such as graduating from college (Shapero and Sokol, 1982). The entrepreneurship literature proposes that any action being considered had to be perceived as

not only desirable but feasible, and that there had to be some general propensity to act on an alternative. In their view, an individuals' conclusion that an alternative was attractive and doable was an insufficient condition to action; hence, their beliefs that there must be some predisposition to act on opportunities for a new venture start up to actually take place. In other words, the propensity to act is the personal disposition to act on one's decisions, thus reflecting volitional aspects of intentions "I will do it".

The conceptualisation of propensity to act in the entrepreneurship literature is being recognised in this study. As mentioned previously, in UTAUT, the intention to use could not actually predict adoption behaviour in a completely volitional control condition. Thus, in an attempt to establish and reflect volitional aspects of intention (I will do it) by entrepreneurs; in this study, propensity to act from the entrepreneurship literature is incorporated to the proposed model as a moderating variable on the link between individual factors (i.e., perceived desirability and perceived feasibility) and intention to use. Understanding the effect of volitional aspect of the behaviour of propensity to act on entrepreneurs (who are also individuals) intention to use IS innovation is another imperative issue which very few studies have examined in the context of IS adoption. This study uses propensity to use as moderator to the integrative UTAUT-EPM IS adoption model to respond to calls for research to develop a continuous assessment of individuals' volitional control, and reduce the limitations of behaviour intention to use in its ability to predict behaviour that is not completely within individuals' volitional control (Ajzen, 1985).

Third, from the entrepreneurship literature, the possibility of the moderating effect of precipitating events on the link between intention to use and use behaviour is included to the proposed integrative UTAUT-EPM model of IS related innovation adoption behaviour by

entrepreneurs. This study identifies four significant precipitating events that the entrepreneurs experience that may moderate the link between intention to use and use behaviour; that include (1) changes in work situation such as being offered a big contract, declining profit, availability of financial resource, new investment, rising cost, and new product; (2) changes in work environment, such as new government policy, financial crisis, customer or new market, supplier request, industry or market change, and declining market share; (3) changes in entrepreneurs career prospects due to recent opportunity or lack of opportunity in work situation, such as the competitive nature of business environment, competitor threat or action, strategic growth target, perception of increasing risk, attract new customer, and international opportunities; and (4) technological change in entrepreneurs work environment, such as availability of new IS, new IS in accounting practice, and availability of on line system (Kruger, 2000; Krueger and Brazeal, 1994; Krueger, 2008; Schindehutte et al., 2000).

These precipitating events variable will be able to capture the effect of exogenous factors on the link between intention to use and use behaviour. The inclusion of this moderating variable to the integrative UTAUT-EPM model will mitigate the limitations arising from UTAUT, particularly UTAUT limitation in capturing and dealing with its predictive ability to deal with unforeseen events (i.e., environmental or organisational limits) that may inhibit the act between the time the intention is formed and the behaviour is performed. With the proposed integrative UTAUT-EPM model, the 'distal nature' between IS related innovation of intention to use and use behaviour may be reduced, thus, decreasing the 'intention-behaviour gap'. Understanding the effect of precipitating events would provide new insight to the situational conditions that are facing entrepreneurs, and how these

situation conditions may impact entrepreneurs' decision towards use behaviour of IS related innovation.

Four, this study uses longitudinal data set with relatively unobtrusive measures for precipitating events and use behaviour to tested the proposed IS related innovation model for entrepreneurs. This data set provides continuous and unobtrusive measures of precipitating events and use to obviate some of the inherent limitations of survey based approaches, which can suffer from reactive measurement and the potential of research and questionnaire design affecting the research outcome (Webb, 1966).

1.6.2 Practical Contributions

There are three significant practical contributions expected from this study to the policy makers and entrepreneurs. First, this study expects that the findings will be useful to policy makers in assisting them to identify individual, technological and environmental issues face by entrepreneurs. By understanding the individual, technological and environmental issues that significantly affect entrepreneurs IS adoption behaviour, policy makers can provide appropriate IS strategy that would encourage or convince entrepreneurs to adopt and use IS once they venture into business community. For example, if the findings indicate that the technological factors (such performance expectancy) impact differently for entrepreneurs in various demographic groups when making decision to adopt IS related innovation, then different training, workshops, and seminars to be conducted for these entrepreneurs. Therefore entrepreneurs who have issues within these technological factors are able to gauge the IS related innovation with more ease and have a better understanding of the usefulness and benefits of adopting and using the system.

Second, this study expects the findings will provide an important and deeper understanding on the roles among different categories of precipitating events, (i.e., changes in work situation, changes in work environment, changes in entrepreneurs' career prospects, technological changes in entrepreneurs work environment) toward use behaviour by entrepreneurs.Understanding which of these precipitating events is more important to act as levers to transform intention to use to actualisation of the performed behaviour (i.e., use behaviour). When policy makers understand that precipitating events act as a precedent for intention to use and use behaviour is a fundamental platform and precedes development of use behaviour, policy makers will be able to provide proper incentives to entrepreneurs in such events or situations. For examples, if the findings indicate that changes in work situations such as declining profit and availability of financial resource highly impact entrepreneurs intention to use towards use behaviour. Thus, in such situation abandon their initial intention to use IS related innovation, as these entrepreneur would think investing in IS related innovation merely as a utility (Carr, 2003), and that why they abandon their initial intention to use the system.

To ensure that entrepreneurs carry out their planned behaviour, educational programs for entrepreneurs to ensure that investment of IS related innovation is not a utility, but rather an imperative capital investment in the long run. Even though entrepreneurs may experience negative precipitating events, in the long run investment in IS related innovation would be more beneficial. Thus, the role of the policy makers is encourage entrepreneurs to view IS related innovation as an important tool for strategic transformation of their daily business activities. Governance bodies should rearticulate and re-specify their agendas by incorporating these insights from the findings of this study and related studies to highlight the role and importance of adopting and using IS related innovation. Thus, understanding the

precipitating events, such as personal, political or economic events that happen and how these events impact entrepreneurs' intention to use towards use behaviour will enable policy makers to provide appropriate guidance and counseling. Also, policy makers can formulate strategies so that entrepreneurs get enough support if the events were to really affect their IS adoption behaviour decision.

Third, from the entrepreneurs' point of view, this study expects to shed some light on adoption behaviour and to clarify to entrepreneurs of the capabilities and abilities they need to acquire if they want to successfully adopt and use IS related innovation. In addition, by understanding which precipitating events affect entrepreneurs the most, would provide foundation for entrepreneurs on how best they should address these situational conditions in order to be successful in their daily business activities and tasks, and to be in the forefront with IS related innovation usage in the global market place.

1.7 ORGANISATION OF THE THESIS

This thesis consists of eight chapters. Chapter One introduces the background and foundation of this study. This chapter discusses the current global economy and how business environment has changed and now IS is seen as a necessity in today business environment. This chapter also highlights the current IS adoption behaviour by entrepreneurs in Malaysia, whereby the uptake of IS related innovation is still relatively low. This chapter also discusses issues related to IS adoption model, research problems, research questions, research objectives, motivations and expected theoretical and practical contributions of this study. The remainder of this thesis is structured as follows.

Chapters Two and three present the theoretical foundations for the proposed integrative UTAUT-EPM model of IS related innovation adoption by entrepreneurs and hypotheses development. In detail, Chapter two extensively reviews literature related to IS adoption research and entrepreneurship research upon which the proposed integrative UTAUT-EPM model is formulated. While, Chapter Three articulates and addresses the integrative UTAUT-EPM model in which testable hypotheses to validate and confirm the proposed integrative model. Chapter Four details the research method employed in this study, which include the overview of the research process, the research techniques, and data collection methods.

Chapter Five presents the preparation of data to be used in this study. The chapter also reports the results of multivariate assumptions scale reliability and validity test. Chapter Five further describes the data analysis technique of covariance-based structural equation modeling (SEM) approach use to test the proposed integrative UTAUT-EPM model for entrepreneurs. Chapter Six presents the results of the hypotheses testing, while Chapter Seven discusses in detail the findings of the integrative UTAUT-EPM model. Finally, Chapter Eight concludes the thesis by presenting an overview of this study and discussing the limitations and future directions of research based on the findings of this study. The chapter also stipulates the theoretical contributions and managerial implications based on the findings of this study.

CHAPTER TWO

THEORETICAL FOUNDATIONS

INTRODUCTION

This chapter presents the literature review and discusses the theoretical foundations for the development of the integrative UTAUT-EPM model. In this chapter, several theories and models from IS adoption literature and entrepreneurship literature are discussed. This chapter is divided into eight main sections. Section one presents an overview of the IS adoption behaviour models being developed in IS discipline. Section two discusses in detail Unified Theory of Acceptance and Use of Technology (UTAUT), which this study uses as a basis to develop the integrative UTAUT-EPM model. Section three reviews prior studies on IS adoption behaviour research using UTAUT. Section four put forward the criticisms associated with UTAUT. Section five presents a review of prior studies that investigate IS adoption behaviour by entrepreneurs. Section six examines and reviews literature related to entrepreneurship, particularly two main entrepreneurial intention models, entrepreneurial event model and Entrepreneurial Potential Model (EPM). Section seven explains the parallel similarity and differences between UTAUT and EPM, whereby these two models are the base models adopted to formulate the integrative UTAUT-EPM model of IS adoption behaviour by entrepreneurs. Finally, Section eight presents the integrative UTAUT-EPM model to investigate the IS related innovation adoption behaviour by entrepreneurs. This chapter concludes with summary of the chapter.

2.1 INFORMATION SYSTEM ADOPTION BEHAVIOUR RESEARCH

During the last decades, IS researchers have focused on understanding the IS adoption behaviour by individuals and organisations. As consequences several IS adoption models have been developed and proposed to explain users' acceptance and use of IS (e.g., Davis, 1989; Tornatzky and Fleischer, 1990; Venkatesh and Zhang, 2010). Subsequently, all these IS adoption models were tested in various contexts (i.e., employees, students, consumers, professional), setting (i.e., small- and medium size enterprises, large organisations), and different countries (i.e., Europe, America, Asia) to understand and measure users intention towards adopting IS.

As consequences, IS researchers have proposed variety of determinants that may influence IS adoption behaviour. For examples, Tornatzky and Fleischer (1990) point out that the factors that affect IS adoption can be categorised into three main factors; (1) organisational, (2) technological and (3) environmental. While, Kimberly and Evanisko (1981) when investigating organisational adoption of two types of innovation by hospitals suggestorganisational leaders characteristics, organisation characteristics, and environmental characteristics are determinants of IS innovation adoption. Interestingly, Thong (1999) when investigate IS adoption in small businesses find that the key factors as suggested by Kimberly and Evanisko (1981) are also applicable to small businesses. Other researchers argue that IS adoption is multidimensional that include the technology, the people and organisation (resources and infrastructures). Therefore, the adoption behaviour by users are influenced by factors within these different dimensions, such as attributes of the innovation for the technology dimension; contextual or characteristic of individuals for the people

dimension and environmental factors for the organisations dimension (Roger, 1995; Tornatzky and Fleischer,1990; Damanpour and Schneider, 2006).

Based on the above arguments and to answer the question of how and why individuals adopt new IS, and predict IS use through personal factors numerous theories rose, specifically from information science literature (such as sociology and psychology) (Venkatesh et al., 2003; Straub, 2009). One of the base theories in human behaviour that are adopted to the technology acceptance is the TRA on that is developed by Fishbein and Ajzen (1975), and validated in sociology and psychology. Theory of Reason Action (TRA) is the backbone of studies associated with attitude behaviour relationship that explains behaviour is partially determined by the intention of individuals to perform that behaviour. In turn, individuals' intention to perform a behaviour is determined by individuals subjective norms and attitude toward the behaviour.

Most of the studies related to IS adoption begin with the TRA to investigate the determinants of IS adoption (e.g., Han, 2003; Karahanna et al., 1999; Muduganti et al., 2005; Vijayasarathy, 2004; Kolekofski and Heminger, 2003; Zheng et al., 2007; Kim et al., 2007; Jeffries and Becker, 2008; Hsu and Chuan-Chuan Lin, 2008; Abd Aziz et al., 2010). In IS area, TRA posits that individuals would use IS if they could predict a positive outcome related to using the system (Compeau and Higgins, 1995; Leach et al., 1994; Venkatesh et al., 2003; Taylor and Todd, 1995b). As shown in Table 2.1 Information system (IS) researchers often use TRA to examine determinants of adoption behaviour in different context.

Table 2.1: Prior Studies on IS Adoption using Theory of Reasoned Action (TRA)

Author	Context/ Subject	Findings
Liker and Sindi (1997)	Expert system/Accountants	Extend TRA in the context of accounting firm and finding shows that social norms have positive direct effect on intention to use the system. Attitudes were strongly related to ease of system use, but general attitude were not predictor of intentions to use the system.
Shepperd, Hartwick, and Warshaw (1988)	Meta Analysis/ Individuals	Conduct Two meta analyses to investigate the effectiveness of TRA. The finding supports predictive utility of the model even when utilized to investigate situations that do not fall within the boundary conditions originally specified for the model.
Korzaan (2003)	Online purchasing/ Consumers	Use TRA as base theory and results shows that attitude, flow and exploratory behaviour had significant influence on intention
Bock, Zmud, and Kim (2005)	Knowledge management system/ Consumers	Extend and modify TRA to understanding factors which underlie knowledge workers' attitude toward and intentions regarding knowledge sharing behaviours. The results indicate that attitude and subjective norm has positive influence on intention to share knowledge.
Ramayah et al. (2009)	Internet stock trading/ Tax-paying Employees	Use Theory of reason Action as a theoretical basis to explain variation in intention to use. Finding reveals that attitude and subjective norm have a direct positive effect on behaviour intention to use internet stock trading.

Although many studies on IS adoption by individuals have been conducted using TRA, and findings of these studies provide some understanding, there are still criticisms to the use of TRA to examine IS adoption behaviour. Ajzen and Fishbein (1985) claim that TRA has some limitations, particularly, that relate to the confounding nature between attitudes and subjective norms, whereby in TRA subjective norms is some times being reframed as attitude and visa versa. Moreover, TRA assumes that behaviour is under volitional control, and thus, TRA considers behaviour that is consciously thought of beforehand (Al-Qeisi, 2009). With this notion, when individuals form an intention to act, they will be free to act without limitations. In reality, there are many factors such as environmental or organisational limits, unforeseen events, time and ability that inhibit the act. Al-Qeisi (2009) argues that TRA was not able to capture effects of these factors and that may delimit individuals to act upon the intention. Ajzen (1991) tries to improve these

limitations of TRA by adding perceived behavioural control to the Theory of Planned Behaviour.

TPB assumes that the individuals' behaviour intention is guided by three considerations: (1) attitude towards specific behaviour (2) subjective norms (3) perceived behavioural control (Ajzen, 1991). Ajzen adds perceived behavioural control due to the limitation in TRA to account for situations in which individuals lack substantial control for carrying out the targeted behaviour. In order to execute any planned behaviour, individuals need to be in control of the possibility to execute that behaviour (Wang, Wu, and Wang, 2007; Peace, Galletta, and Thong, 2003). Therefore, in order to predict any possible behaviour it is necessary to evaluate intention and the amount of control that individuals have over the behaviour (Ajzen and Madden, 1986; Armida, 2008; Schifter and Ajzen and Fishbein, 1985; Ajzen, 1991). A lot of external and internal factors can influence such control, for examples, abilities, knowledge, planning or skills, time, opportunity or others' cooperation (Sheppard et al., 1988).

According to Peace et al. (2003), perceived behavioural control factor in TPB is determined by control beliefs which are related to the individuals' perception of resources and opportunities necessary to perform the act. Ajzen (1991) argues that perceived behaviour control is most compatible with Bandura's (1977) concept of self-efficacy. TPB has been adopted by IS researcher to investigate the IS adoption behaviour in different contexts and IS applications. For example, Pavlou and Fygenson (2006) use TPB to investigate e-commerce adoption by faculty, staff, and students. In the same vein, Lee (2008) uses TPB to investigate the adoption of online banking in Taiwan. Table 2.2 shows IS adoption behaviour research using TPB in different context.

Table 2.2: Prior Studies on IS Adoption Using Theory of Planned Behaviour

Author	Context/ Subject	Findings
Taylor and Todd (1995b)	Computer Resource Centre/ Users	Compare TAM and TPB and find that inexperience users put emphasis on perceived usefulness. Social norm and perceived behavioural control have significant influence on intention to use computer.
Morris and Venkatesh (2000)	New Software System/ Consumer Account Representative	Test TPB and find that younger people were influenced by attitude and older people by subjective norm.
Chau and Hu (2000)	Telemedicine Technoloigies/ Hospital Physicians	Result showed that attitude; perceived behavioural control and perceived usefulness were significant determinants of intention.
Ramayah et al. (2009)	Internet Tax Filling/ Tax-paying Employees	Use TPB to investigate internet tax filling and found support for TPB construct in the context of Malaysia. Social norm and perceived behavioural control were found important determinants of using e-filling intention.
Lee et al. (2010)	Educational Technology/ Teachers	Use TPB to investigate teachers' acceptance of educational technology and found that attitude, social norm and perceived behavioural control were significant predictors of teacher intentions.

In further extension of TRA, Davis et al. (1989) develop the Technology Acceptance Model. This Technology Acceptance Model (TAM) is the first of the IS adoption models that specifically develops for IS adoption research to explain the determinants of IS acceptance by individuals. The main purpose of developing TAM is to explain individuals' IS behaviour towards their decision to accept and adopt IS (Davis et al., 1989). TAM posits that users' intention to use is determined by two constructs, that act as the foundation for TAM; (1) perceived usefulness and (2) perceived ease of use. Davis (1989) considers both perceived usefulness and perceived ease of use as determinants of attitude and intention to use. Both TRA and TAM have strong behavioural elements to explain individuals' attitudes.

In general, TAM tries to explain that if a decision maker perceives an IS innovation to be useful and easy to use; the most likely that this IS innovation will be adopted and used.

TAM demonstrates that when individuals form an intention to act, they will be freer to act. However, TAM does not include subjective norms construct as found in TRA, as this construct is considered to be the least understood aspect of TRA (Venkatesh and Davis, 2000). Furthermore, IS researchers argue that disentangling direct effect of the subjective norm from the indirect effect through attitude is difficult, and thus, this construct was excluded in TAM (Davis and Venkatesh, 1996; Conrad, 2009; Armida, 2008). As such, as shown in Table 2.3, most IS adoption behaviour researches have revised and extended TAM to include the external variables, while few other IS researchers integrate TAM with other behaviour theories and models.

Table 2.3: Prior Studies on IS Adoption Behaviour using Technology Acceptance Model (TAM)

Author	Context/ Subject	Findings
Venkatesh and Morris (2000)	Data retrieval system/Users	Add social norm to TAM and examine the effect of gender on the model. The effect of usefulness was more important for men while the effect of ease of use was more important for women.
Venkatesh and Davis (2000)	Various Information System/Users	Extend the orginal TAM and add perceived usefulness antecedents. Voluntariness and experience add as moderators and results showed that antecedents are significant.
Gefen and Straub (2000)	Ecommerce/ Knowledge workers	Revise TAM and intrinsic characteristics of IT related to perceived ease of use. The result shows that perceived ease of use is dynamic variable with varying levels and effect depending upon whether the type of use is intrinsic or extrinsic to the IT. Perceived usefulness support as the primary belief affecting intentions to use IT.
Lai and Li (2004)	Internet banking/ Consumers	Use TAM and argue that TAM construct invariant for different gender, age, and IT competence subgroups.
Yu and Tao (2009)	E-marketplace /Managers	Extend TAM to business level innovation technology adoption and result shows that perceived usefulness, ease of use , subjective norm and firm characteristics are important factors toward attitudes of businesses at pre adoption stage.
Hossain and Silva (2009)	Social Network /Users	Extend TAM to incorporate the impact of the different type of social ties as a new theoretical construct and found that weak and strong social ties influence technology acceptance.
Sanchez-Franco (2009)	WebCT/ Students	Extend TAM and add perceived effective quality to the model. The results support that perceived usefulness, ease of use and flow increase learners intention to use WebCT.

Over the years, TAM has proven to be a robust and parsimonious model to investigate the IS adoption behaviour by individuals, and are frequently use in different context of IS adoption because of its simplicity (Venkatesh and Davis, 2000). The use of TAM also extends to investigate IS adoption in variety of organisational setting, such as small- and medium sized enterprises and large organisations to identify crucial determinants of individuals' intention towards accepting or adopting the IS in organisations (e.g., Parveen and Sulaiman, 2008; Gefen and Straub, 2000; Mathieson, 1991). Although, TAM can be considered as a robust and parsimonious model, IS researchers note that TAM has weakness in its lack of explicit inclusion of external variables (Lee et al., 2003; Hossain and Silva, 2006). As the IS adoption research progress these models has become less popular and researcher tried to use other models such as decomposed theory of planned behaviour and augmented TAM or combined TAM and TPB., which are stronger to predict technology acceptance.

Due to the criticisms on all these models (i.e., TRA, TPB, and TAM), Taylor and Todd (1995a) combine TPB and TAM in order to predict IS adoption behaviour. Taylor and Todd (1995a) add perceived ease of use and perceived usefulness to TPB to create a new model to predict inexperienced user's behaviour in the face of new technology compared to experienced users. They refer the model as augmented TAM or combined TAM and TPB. This combined TAM and TPB (C-TAM-TPB) has the capacity to predict IS usage behaviour for individuals who have never used IS before, as well as individuals who have used IS, or for those individuals who are familiar with IS (e.g., Mathieson, 1991; Moore and Benbasat, 1991; Taylor and Todd, 1995a; Thompson et al., 1991). Decomposed TPB and C-TAM-TPB have been successfully applied to explain the individuals process of IS acceptance and usage in different contexts (Schifter and Ajzen, 1985; Ajzen, 1991; Wang et al., 2007).

In another study by Taylor and Todd (1995b), they compare the TRA and TPB and make several criticisms to these models. They argue that these models require individuals to be motivated to perform certain behaviour; however, these models do not fully capture these phenomena. As a consequence, Taylor and Todd (1995b) explore dimensions of attitude belief, perceived behavioural control, and subjective norm by decomposing them into specific belief dimensions to capture the individual motivation to perform behaviour.

As a result, they decompose perceived behaviour control into three main constructs: (1) self-efficacy, (2) resource facilitating conditions; and (3) technology facilitating conditions and propose a decomposed theory of planned behaviour (DTPB). In both TPB and DTPB, perceived behavioural control considers two points of view: (1) self-efficacy as effort requirement perspective and individuals perception of the ease of completion of a task that is individuals opinion of their ability (Bandura, 1977), and (2) facilitating conditions as the perception that resources will be available to complete the task, and that include resource facilitating conditions and technology facilitating conditions (Compeau and Higgins, 1995, Agarwal and Karahanna, 2000). As shown in Table 2.4, the DTPB have extensively and widely been applied to investigate IS adoption behaviour in different context and population.

Table 2.4: Prior Studies of IS Adoption Using Decomposed Theory of Planned Behaviour (DTPB)

Author	Context/ Subject	Findings
Taylor and Todd (1995a)	VCR-Plus^{+TM}/ Students	Use DTPB in predicting intention. They found that DTPB improved prediction. The new model examined the interrelationships between the set of antecedents and attitude, social norm and perceived behavioural control.
Chau and Hu (2002)	Telemedicine Technologies /Physicians	Result shows that attitude; perceived behavioural control and perceived usefulness were significant determinants of intention.
Lau (2002)	Online Trading/Investors	Compare DTPB with TRA, TAM, TPB, and IDT and results showed that DTPB have high predictive power with all significant relationships.
Pavlou and Fygenson (2006)	e-commerce/ University Faculty/Staff/and Students	Extend TPB to predict the process of e-commerce adoption behaviour by customer. They decompose PBC, controllability and self efficacy. Results justify the integration of trust and technology adoption variables within the TPB framework.
Shih and Fang (2004)	Internet banking/ Consumers	Compare TPB and DTPB with TRA and result show that the decomposed TPB has better explanatory power for behavioural intention attitude and subjective norm than TRA and TPB models.

Apart from TRA, TPB, TAM, and DTPB, other theories have been adopted and adapted to investigate the system IS adoption behaviour. Davis (1992) employs the motivation theory to investigate the role of intrinsic and extrinsic motivation to explain how individuals respond to IS adoption in the healthcare. The intrinsic motivation refers to perceived enjoyment of using technology and is the degree of pleasure individuals experience in using the computers per se. On the other hand, extrinsic motivation support by anticipated reward and explain how computer can be useful to enhance individuals work performance (Davis et al., 1992; Venkatesh and Speier, 1999). In the context of IS acceptance research, individuals intention to use IS in their work place are mostly influenced by their perception of intrinsic and extrinsic motivations. Igbaria, Parasuraman, and Baroudi (1996) apply the motivation theory by conceptualising motivations into three main factors; (1) perceived usefulness, (2) perceived playfulness, and (3) social pressures to investigate individual use of microcomputers. Their empirical findings confirm previous studies regarding the key motivational of perceived usefulness in promoting microcomputers usage.

Venkatesh (1999) adopts motivation theory by comparing training method by including a component that aims at enhancing intrinsic motivation with traditional methods. Venkatesh (1999) posits that users in game-based training intervention that had a more enjoyable experience during training are more likely to perceive the system to be easier to use, which lead to increased behavioural intention. In another study, Venkatesh and Speier (1999) examine the role of negative and positive mood in the motivational model and their influence on employees' motivation to use specific computer technology. They found that positive mood at the time of training increases intrinsic motivation and intention to use technology. Meanwhile, Thompson et al. (1991) propose the Model of Personal Computer Utilization to predict individual acceptance and use behaviours. This theory is based on the Triandis (1977) Theory of Human Behaviour. The Model of Personal Computer Utilization (MPCU) focuses on the link between IS environment and use behaviour rather than intention. The MPCU was found to be suitable in predicting individual acceptance and use of various types of IS.

To understand individuals' initial attitudes toward adopting IS and to understand the process, Roger (1995) develops the Innovation Diffusion Theory (IDT). He posits there are five general attributes of innovation that can persuade individuals to adopt an innovation: (1) relative advantage, (2) complexity, (3) trialability, (4) observability, and (5) compatibility. Karahanna, Straub, and Chervany (1999) combine these aspects of IDT into TRA to investigate potential adopters and users of windows application. They found that there are significant differences among pre-adoption and post-adoption antecedents of behavioural intention. As consequences, IDT has been adopted, adapted and integrated into other IS

adoption models such as TAM. Table 2.5 shows the variations use of IDT to examine IS adoption behaviour in different context and population.

Table 2.5: Prior Studies of IS Adoption using Innovation Diffusion Theory (IDT)

Author	Context/ Subject	Findings
Agarwal and Prasad (1997)	World Wide Web/Users	Use IDT and TAM. Results reveal that innovation characteristics visibility, compatibility, trialability, and voluntariness explain current usage while relative advantage and result demonstrability are relevant to future use.
Karahanna et al. (1999)	Windows 3.1/ PC Users	Integrate TAM and IDT to investigate financial end user adoption of windows. Potential adopter intention is determined by attitude while user attitude is based on instrumentality beliefs of the usefulness and perceptions of image enhancement.
Agarwal and Karahana (2000)	World Wide Web/ E-mail Users	Use IDT, TAM and flow theory, social cognitive theory to investigate student adoption of Word wide web. Result shows that cognitive absorption is antecedent of perceived usefulness and ease of use. Personal innovativeness and playfulness are determinants of cognitive absorption.
Chen, Gillenson, and Sherrell (2002)	Online purchasing/Consumers	Combine IDT and TAM to examine consumer acceptance of virtual store. Results indicate that consumer intention determined by their attitude while compatibility, usefulness, and ease of use are determinants of consumer attitude toward using virtual stores.
Wu and Wang (2005)	Mobile Commerce/ Customers	Integrate TAM with IDT and found that all variables except ease of use predict customer behavioural intent while compatibility had most significant influence.
England and Stewart (2007)	IT Innovation/ Senior Health Executives	Used IDT to investigate senior health executive's adoption of IT innovation and results indicate that health executive hold a range of views that potentially inhibit the increased adoption of IT in health.
Choudhury and Karahanna (2008)	Electronic Channels/ Consumers	Use IDT to study consumer adoption of electronic channels and results show that consumers consider the relative advantage of channels at gathering information stage and executing the transaction.
Yu and Tao (2009)	Electronic Business/ Managers	Combine TAM and IDT to investigate electronic business adoption and result indicates that perceived usefulness, subjective norm, perceived ease of use and firm characteristics are important factors which influence attitude of business at the pre adoption stage while perceived usefulness and subjective norm effect attitudes of businesses in decision stage.
Erbil and Akinciturk (2010)	IS innovation/ Senior Managers	Use IDT to investigate factors influencing the dissemination of innovation within architecture firms. The whole process of innovation investigated through qualitative study and content analysis.

Another essential theory that IS researchers have extensively used to examine IS adoption behaviour is the social cognitive theory. This social cognitive theory (SCT) is

developed by Bandura (1986) to understand, predict, and change human behaviour. SCT is a broad theory of human behaviour that stems from social learning theory which it background dating back to the late 1800s (Peters, 2009). The theory posits that human behaviour as an interaction of personal factors, the environment and behaviour. Compeau and Higgins (1995) extend the SCT, and include the concept of computer self-efficacy to the model, and apply it to IS that investigate the role of people's beliefs about their skill to competently use computers.

Table 2.6: Prior Studies of IS Adoption using Social Cognitive Theory (SCT)

Author	**Subject/ Context**	**Findings**
Compeau, Hinggins and Huff (1999)	PC/ Users	Develop a model base on Bandura's SCT to investigate the influence of computer self efficacy, affect, anxiety, and outcome expectations, on computer usage. Performance outcomes influence affect and use while affect was related to use. Self efficacy and outcome expectations impact on an individual's affective and behavioural reaction to IT.
Agarwal and Karahana (2000)	World Wide Web/ Students	Use SCT together with IDT, TAM and flow theory, to investigate student adoption of Word wide web. Result show that cognitive absorption is antecedent of perceived usefulness and ease of use. Personal innovativeness and playfulness are determinants of cognitive absorption.
Lewis, Agarwal, and Sambamurthy (2003)	World Wide Web/ Faculty Members	Integrate SCT, social information processing theory, IDT, and TAM to investigate faculty members at public university about IT use. Result reveals that management commitment to new technology and personal innovativeness influence usefulness and ease of use beliefs, while self efficacy influences ease of use.
Yi and Hwang (2003)	Web Base Information System/ Students	Use SCT together with TRA to investigate the effect of self efficacy and behavioural intention on actual use of web base information system. Result supports the effect of self efficacy, enjoyment and learning goal orientation in determining actual usage of the system
Peters (2009)	Mobile Communication Technology/ Mobile Phone Users	Use SCT to investigate the triadic relationship between expected outcomes, habit strength, and mobile communication technology adoption and use. Result shows that habit strength effect mobile phone use and outcome expectation influence intention to adopt mobile phone.
Zhu, Sangwan , and Lu (2010)	Mobile Auction/ Undergraduate Students	Use SCT to investigate consumer behaviour in term of reciprocal causation among value, self efficacy and adoption constructs. Results show that perceived functional, emotional and social values are significant influence on perceived value. Perceived cost negatively related to perceived value and positively related to attitude.

From the above review of the literature, it appears that several IS adoption theories/models have been developed to investigate the IS adoption behaviour by individuals. Some of these thoeries and/or models are adapted and modified from existing theories in various disciplines (e.g., pyschology, sociology, politic) with variations of existing and new contructs being added or introduced to these models.

In 2003, Venkatesh et al. compare and review eight most prominent IS adoption models adopted and adapted by IS researchers to predict IS adoption behaviour throughout the decades. The eight models that Venkatesh reviews include TRA, TAM, Motivational Model, TPB, C-TAM-TPB, MPCU, IDT and SCT. Venkatesh et al. (2003) assess these models based on conceptual and empirical similarities, and find that although the eight models have been used to predict IS acceptance behaviour, they can only explain less than 50% of the variance in user intention to use IS. As a result of the comparisons and reviews of all the eight prominent models, Venkatesh et al. (2003) merge all these eight models in association with their core constructs, beliefs, and moderators that they refer to as Unified Theory of Acceptance and Use of Technology (UTAUT). The goals of UTAUT are to provide a useful tool for managers to assess the likelihood of success for new IS introductions and aid IS researchers to understand the drivers of IS acceptance by employees in organisations and UTAUT is able to explain 70% of variances of why individuals accept and/or use IS (Venkatesh et al., 2003). As a result, the stream of IS research culminates in using UTAUT that synthesizes previous IS adoption models to investigate IS adoption behaviour by entrepreneurs (Chan et al., 2010).

2.2 UNIFIED THEORY OF ACCEPTANCE AND USE OF TECHNOLOGY

In an attempt to form a unified model for understanding IS acceptance, Venkatesh et al. (2003) design a comprehensive model based on empirical similarities across eight prominent acceptance models by combining the more salient characteristics from each of these models. Ventakesh et al. (2003) name the model as Unified Theory of Acceptance and Use of Technology (UTAUT). As illustrated in Table 2.7, UTAUT consists of six constructs that were generated from thirty-two main factors from prominent eight behaviour models that are extensively use in IS adoption research. UTAUT main purpose is to determine individuals' IS acceptance and use. UTAUT provides a new perspective on how the variables are related to behavioural intention to use and use behaviour.

Table 2.7: Constructs in Basic UTAUT

Constructs	Models	UTAUT Constructs
Performance expectancy	TAM, TAM2, C-TAM, TPB, MM MPCU IDT SCT	Perceived Usefulness Extrinsic Motivation Job-fit Relative Advantage Outcome Expectations
Effort expectancy	TAM, TAM2 MPCU IDT	Perceived Ease of Use Complexity Ease of Use
Social influence	TRA, TAM2, C-TAM, TPB/DTPB MPCU, IDT	Subjective Norm Social Factors Image
Facilitating conditions	TPB/DTPB, C-TAM-TPB MPCU IDT	Perceived behavioural control Facilitating conditions Compatibility
Intention to Use	TRA, C-TAM, TPB/DTPB MM	Attitude Toward Behaviour Intrinsic Motivation
Use behaviour	MPCU SCT	Attitudes

As presented in Figure 2.1, there are five core constructs in UTAUT: (1) performance expectancy, (2) effort expectancy, and (3) social influence. These constructs are postulated to act as direct determinants of behavioural intention, while two other cores construct: (4) facilitating conditions and (5) behavioural intention are postulated as direct determinants of

use behaviour. In addition, UTAUT postulates that there are four variables that moderate the relationship between the predictor of behavioural intention and use behaviour that include; (1) voluntariness of use, (2) experience, (3) age, and (4) gender.

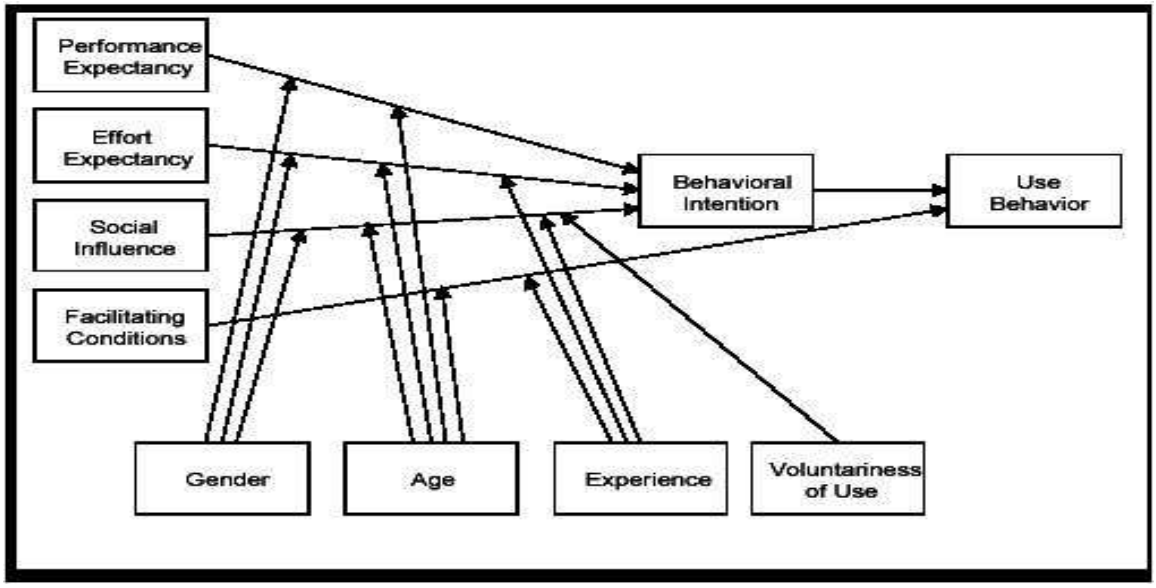

Figure 2.1: Unified Theory of Acceptance and Use of Technology Venkatesh et al., 2003

UTAUT provides a more wholesome picture of the acceptance process compared to the previous IS acceptance models, as UTAUT is able to explain 70% of the variances in intention and use behaviour better that other IS acceptance models, with only 17% to 53 (Venkatesh et al., 2003). According to Venkatesh et al. (2003), in comparison to previous IS adoption models, UTAUT focuses more on the dependent variables, that are 'intention of use' and 'actual use', and thus provide a better understanding on the IS adoption behaviour, particularly the use behaviour.

2.2.1 Performance Expectancy

The first core construct in UTAUT is performance expectancy. This construct is derived from constructs developed in other models that include perceived usefulness from TAM and TAM2, extrinsic motivation from motivational model, job-fit from MPCU, relative advantage from IDT and outcomes expectations from SCT. In UTAUT, performance expectancy is defined as the degree to which individuals believe that using the system will help them to attain gains in job performance. Venkatesh et al. (2003) introduce performance expectancy as the strongest predictor of behavioural intention and the construct still remains significant at all points of measurement. The relationship between performance expectancy and behavioural intention is moderated by gender and age, whereby the effect is stronger in male users than female individuals as male individuals are more task oriented. The impact of performance expectancy towards behavioural intention is also greater for younger individuals, where extrinsic reward is more important (Morris and Venkatesh, 2000; Venkatesh et al., 2003).

2.2.2 Effort Expectancy

The second core construct in UTAUT is effort expectancy. This construct is derived from constructs developed in other models that include perceived ease of use from TAM and TAM2, complexity from MPCU and ease of use from IDT. In UTAUT, effort expectancy is defined as the degree of ease associated with the use of the system. The relationship between effort expectancy and behavioural intention is moderated by gender, age, and experience whereby effort expectancy is more salient in the early stage of use and becoming insignificant with periods of extended usage when individuals learn to effectively operate the new technology (Venkatesh et al., 2003). According to Venkatesh et al. (2003), effort

expectancy is more salient in female individuals compare to male individuals, as well as in older individuals with relatively little experience with IS.

2.2.3 Social Influence

The third core construct in UTAUT is social influence. This construct is derived from constructs developed in other models that includes; subjective norm from TRA, TPB, and C-TAM-TPB, social factors from MPCU, and image from IDT. In UTAUT, social influence is defined as the degree to which individuals perceive that important others believe they should use the new system (Venkatesh et al., 2003). Based on Venkatesh and Davis (2000) social influence construct is not significant in voluntary situations and only becomes significant when use is mandated by organisations. The relationship between social influence and behavioural intention is moderated by gender, age, experience, and voluntariness of use, whereby social influence is important in a voluntary context, and at early stage of the individuals experience with the IS. Furthermore, the effect of social influence is more salient in female individuals when forming the intention to use new IS, as well as in older individuals (Venkatesh et al., 2003).

2.2.4 Facilitating Conditions

The fourth core construct in UTAUT is facilitating conditions. This construct is derived from constructs developed in other models that include; perceived behavioural control from TAM and TPB, facilitating conditions from MPCU and compatibility from IDT (Venkatesh et al., 2003). Facilitating conditions is defined as the degree to which individuals believe that appropriate organisational and technical infrastructure should be in existence to support use of the system. According Venkatesh et al. (2003), facilitating conditions would

expect to become predictor of behavioural intention if effort expectancy is not present in the model. On the other hand, if performance expectancy and effort expectancy constructs are present in the model, facilitating conditions construct becomes non-significant in predicting behavioural intention (Venkatesh et al., 2003). The relationship between facilitating conditions and use behaviour is moderated by age and experience, whereby individuals with less experience would need assistance or help from other individuals, and also more salient to older individuals (Morris and Venkatesh, 2000; Venkatesh et al., 2003).

2.2.5 Behavioural Intention

The fifth core construct in UTAUT is behavioural intention. This construct is derived from constructs adapted from Davis et al. (1989). Davis et al. (1989) define behavioural intention as a "measure of the strength of individuals' intention to perform a specified behaviour". Behaviour intention measures how individuals are willing to try and exert effort in order to perform the use behaviour. Davis (1989) hypothesises that behavioural intention to use the system has an influence on the actual use. When intention become stronger, individuals are more likely to perform the use behaviour (Ajzen, 1991; Taylor and Todd, 1995; Venkatesh et al., 2003).

2.2.6 Use Behaviour

The sixth core construct in UTAUT is use behaviour. In UTAUT, this construct is considered as system usage (i.e., log in to the system). There are a lot of arguments in the context of IS acceptance research related to system use. System use has been measured in many different ways and researchers have divided them into two main categories; (1) objective that log into the system (e.g., Davis, 1989; Venkatesh et al., 2003) and (2)

subjective that is individuals' assessments of duration, frequency, or intensity of use (e.g., Venkatesh et al., 2008; Taylor and Todd, 1995). There are three general concepts of system use that include frequency of use, duration of use, and intensity of use (Davis, 1989; Venkatesh et al., 2008). Most IS adoption behaviour researches defined system use within these three concepts of frequency, duration, and intensity of individuals interaction with a particular IS related innovation (Venkatesh et al., 2008).

2.3 IS BEHAVIOUR RESEARCH USING UTAUT

As exhibited in Table 2.8, since UTAUT development in 2003, IS researchers have used and validated the robustness of UTAUT when investigating IS adoption behaviour in different context, subjects, and cultural settings. Venkatesh et al. (2012) also report the extensive use of UTAUT in IS research since it development. They find that throughout the decade UTAUT has been extended and integrated to other human behaviour models. Moreover, some IS researchers have added and introduced new constructs in order to expand the scope of the endogenous theoretical mechanism outline in UTAUT. Also, some IS researchers have attempted to include exogenous predictors of the UTAUT variables, while others examine UTAUT in new context such as new technologies, new user populations, and new cultural settings. Oshlyansky (2007) conducts a study among nine culturally-diverse countries to validate the UTAUT model and reports that UTAUT is robust enough to withstand translation and be used in other countries.

Table 2.8: Prior Studies Using Unified Theory of Acceptance and Use of Technology

Study	Context	Subject	Cultural Setting
Curtis et al., 2010	Social Media	Employees	United States
Murphy, Cover, and Owen, 2011	University Smart Card System	Students	Australia
Ibrahim, Khalil, and Jaafar, 2011	Educational games	Students	Malaysia
Barry, Schail, Dixon, and Martin, 2011	Video Capture Game Technology	University Staff and Student	England
Neo, Yeow, Eze, and Loo, 2012	Identity card	Organisations	Malaysia
Sambasivan, Patrik, and Rose, 2010	Electronic Procurement System	Ministries Employees	Malaysia
Musawa and Wahab, 2012	Electronic Data Interchange	Owners of SMEs	Nigeria
Lessa, Negash, and Amoroso, 2011	WoredaNet E-government	Civil Servant	Ethiopia
IM, Hong, and Kang, 2011	MP3 Player And Internet Banking	Students	Korea and United States
Foon and Yin Fah, 2011	Internet Banking	Organisation	Malaysia
Huang, Choi, and Chengalur-Smith, 2010	Clinical Decision Support System	Healthcare Organisation	Taiwan and United States
Dulle and Majanja, 2011	Open Access System	University Researchers	Tanzania
Chen and Chang, 2011	Near-field Communication	Users	Taiwan
Venkatesh, Sykes, and Zhang, 2011	Electronic Medical Record	Doctors	United States
Oye, Noorminshah, and Ab.Rahim, 2011	ICT Usage	University Academic Staff	Nigeria
Zhou, Lu, and Wang, 2010	Mobile Banking		
Yoo, Han, and Huang, 2012	E-learning	Employees	South Korea
Teo and Noyes, 2012	Information Technology	Teachers	Singapore
Pahnila, Siponen, and Zheng, 2011	Chinese eBay	Students	China
Aoun, Vatanasakdakul, and Li, 2010	Accounting Information System	Accountants	Australia
Ho, Huang, and Chen, 2012	Mobile Phone Messaging	Teachers	Taiwan
Pardamean and Susanto, 2012	Blog Technology	Students	Indonesia
Oye, Iahad, and Ab.Rahim, 2012	ICT	University Academic Staffs	Nigeria

2.3.1 UTAUT in Different Context

As shown in Table 2.9, UTAUT has been extensively applied in different contexts and cultural setting, such as Finland, India, Malaysia, and China.

Table 2.9: Prior Studies Using UTAUT in New Context, New User Populations and New Cultural Settings

Studies	
Cultural Setting: India, China, Taiwan, Malaysia, Australia, Jordan, Saudi Arabia, Kuwait, Netherland	Moghavvemi et al., 2012; Venkatesh and Zhang, 2010; Foon and Yin Fah, 2011; Abushanab and Pearson , 2007; Al-Gahtani, Hubona, and Wang, 2007; Alawadhi and Morris , 2008; Dijk et al., 2008; Gupta et al., 2008; Qingfei et al., 2008; Wang and Shin, 2009
New user population: University Student, University Faculty members, doctors, educators, lawyers, College teacher, Investors, SMEs, Bank customer, Knowledge IBS user	Park et al., 2007; Oshlyansky et al., 2007; Wang, Liu, Tseng, and Tsai, 2010; Anderson et al., 2006; Laumer, Eckhardt, and Trunk, 2010, Tibenderana, Ogao, Ikoja-Odongo, and Wokadala, 2010; El-Gayar, Moran, and Hawkes, 2010; Fillion, Braham, and Ekionea, 2010;Yamin and Lee, 2010; Chen et al., 2008; Loebbecke, Powell, and Weiss, 2010; Heerink, Krose, Evers, and Wielinga, 2010
New context: e-health; ICT, Websites; Social media; Mobile banking; Internet banking; blog technology;	Koivumaki, Ristola, and Kesti, 2006; Wang and Wang, 2010 Duyck, Pynoo, Devolder, Voet, Adang, and Vercruysse, 2010; Carlsson, Carlsson, Hyvonen, Puhakainen, and Walden, 2006; Hanson,West,Neiger,Thackeray,Barnes, and Mclntyre, 2011; Bandyopadhyay, 2007; Loke, 2008; louho et al., 2006; Yang, 2010; Yuen et al., 2010; Yeow and Loo, 2009; Shu and Chuang, 2011; Sanford and Hyunok, 2010;

For example, Koivumaki et al. (2008) investigate mobile service usage in Finland and consider facilitating conditions as moderators that influence other determinants in the model. Their results show the impact of device familiarity and consumers skills on the perceptions of mobile service usage, however, the duration of the usage does not influence consumers' perceptions. Al-Gahtani et al. (2007) investigate knowledge workers in Saudi Arabia in

using desktop computer applications. They consider the effect of power distance and individualism in Saudi Arabia as a cultural dimension to investigate technology acceptance using UTAUT. They report that performance expectancy has a positive effect on intention with no interaction effect with age or gender on behavioural intention. In the presence of interaction with moderating variable, effort expectancy did not have a significant influence on behavioural intention.

In similar manner, Abushanab and Pearson (2007) investigate the determinants of Internet banking adoption in Jordan, and report that performance expectancy has the strongest contribution in explaining variance in behavioural intention follow by effort expectancy and social influence. Meanwhile, Alawadhi and Morris (2008) find that the influence of performance expectancy on behavioural intention was significant only for a limited time and towards adoption of e-government service among students in Kuwait, but not for a much longer time. On the other hand, Bandyopadhyay (2007) examine the effect of culture through social influence factor of UTAUT on user acceptance of IT based innovation in India.

Venkatesh and Zhang (2010) conduct a research to extend understanding of cultural differences as a boundary condition in IS adoption based on UTAUT via longitudinal study among employees in a single organisation that operated in China and United States. Their findings indicate the importance of social influence among all employees in China without possibilities related to age, voluntariness, and gender, which is different from what is theorised in the United States. Therefore, their study reveals UTAUT works differently in China and United States, which indicate the important of culture in the study of IS adoption behaviour. Yuen et al. (2010) apply UTAUT to compare consumers' acceptance of Internet

banking service in developed countries (i.e., United States and Australia) and in developing country (i.e., Malaysia). Also, their study reveals that different between developed and developing countries is the individuals' perception of perceived credibility of referent others about Internet banking, which is important for developed countries.

Kijsanayotin et al. (2009) investigate variables that influence health IT adoption in a community e-health centre in Thailand, and their findings indicate that that performance expectancy and perception of freedom of choice have positive influence on intention to use the e-health centre. The results revealed that individuals will use new IS if it is useful. Another important factor which effect using information technology is social influence and important for others who think about using the new IS. Loebbecke et al. (2010) when investigating sellers and buyers behaviour towards eMarketplaces, find that performance expectancy, effort expectancy and facilitating conditions as determinants toward repeated use. Similar findings are obtained by Duyck et al. (2008), whereby performance expectancy and facilitating conditions are significant factors in predicting behavioural intention towards acceptance of a picture archiving and communication system by hospital physicians and radiologists in Belgian university hospital. Chen et al. (2008) in their study on e-learning adoption by college students in Taiwan find that students would adopt IT if they expect it to increase their academic performance. On that note Wang and Shin (2009) confirm the salient important of all the core constructs in UTAUT in the study on users' acceptance of information Kiosk in Taiwan. Their study reveals that user friendliness is an important factor to use new technology and that people will use the information kiosk if others use it too. Their study also uncovers that there are differences between men and women as well as different ages to use information kiosks.

Anderson et al. (2006) investigate acceptance of Tablet PC among fifty business faculty members in United States find performance expectancy and voluntariness are the most important variables toward use of new IS, whereby faculty members focus on the benefits that the faculty gains from new IS. However, in their study, effort expectancy, social influence and facilitating conditions are not significant predictors of use Tablet PC. Park et al. (2007) employ UTAUT to investigate mobile communication technology adoption among 221 Chinese users by theorising that performance expectancy, effort expectancy, and social influence are the determinants of attitude, while facilitating conditions predict intention towards mobile technology. Their study reveals that performance expectancy is more significant to shape Chinese users' attitude followed by effort expectancy. The moderating variables of age, gender, and education demonstrate significant moderating impacts on the relationships between determinants and attitude toward using mobile technology. Most notably, their study reveals for mobile communication technology adoption the most crucial determinants are performance expectancy, the importance of cultural background and disposition of individuals towards behavioural intention.

On the other hand, Loke (2008) finds no relationships between behavioural intention and use behaviour of credit card payment system acceptance in Malaysia. Loke (2008) study reveals that acceptance of credit cards payment system is stimulated by profit maximizing behaviour as well as peer pressure, and that older merchants who used to pay cash are more resistant in accepting credit card payment, but the behavioural intention does not necessary lead to use behaviours by these merchants. Gupta et al. (2008) find similar results when examining acceptance of ICT among full time government employees in India. Their study reveals government employees will use ICT if ICT can enhance their job performance, if

ICT is easy to use as well as if others want them to use it. However, they did not find significant relationship between behavioural intention and use behaviour. In similar vein, Shu and Chuang (2011) in their study on Wiki adoption and use behaviour among Wikipedia users, also find no significant relationship between behavioural intention and use behaviour of Wikis. They argue that behavioural intention may not translate to use behaviour as users do not find that it is necessary for them to use Wikipedia.

All the above studies provide evidences that UTAUT is a robust model that have the ability to explain determinants toward IS adoption behviour, particularly behavioural intention in different IS applications. It seems that UTAUT have been used to measure adoption and use of different IS applications, such as mobile commerce, mobile banking, information kiosk, e-health to name a few. Apart from its ability to apply to investigate various IS application, IS adoption researchers have use them to investigate the use of these various IS application to different users population and cultural setting. Most significantly, all these studies reveal UTAUT as a popular base line model employed by these researchers when investigating IS adoption behaviour by individuals. Most notably, prior studies using UTAUT reveal mixed results on the role of other core determinants toward behavioural intention, and the predictive ability of behavioural intention toward use behaviour by individuals.

Evidently, all these studies reveal the significant of performance expectancy as the most crucial determinant of behavioural intention and moderating variables of gender and age on the determinants toward behavioural intention. These studies also project the importance of cultural background and disposition of individuals toward their initial intention to use the related IS. However, other core constructs such as effort expectancy, and

social influences indicate mixed results. Some studies reveal the significant of these constructs as determinants towards behavioural intention, while majority of prior studies find no significant roles of effort expectancy and social influence toward behavioural intention. On that note prior studies also reveal that the determinants toward behavioural intention may be significant to behavioural intention, however, the initial intention to use does not influence use behaviour. The above reviews of prior studies indicate the importance to further investigate and validate UTAUT.

2.3.2 Extension of UTAUT

As shown in Table 2.9, many IS adoption behaviour studies has also extended UTAUT by introducing new constructs to UTAUT and integrating UTAUT with other human behaviour theories and IS adoption (e.g., Wang and Yang, 2005; Cody-Allen and Kishore, 2006; Yi et al., 2006; Chan et al., 2010; Venkatesh et al., 2012). Wang and Yang (2005) integrate theory of personality traits with UTAUT to examine the role of personality traits among 240 investors in the online stocking. They find that extraversion trait affects behavioural intention through performance expectancy, effort expectancy, social influence and facilitating conditions, while openness affected behavioural intention through effort expectancy and facilitating conditions. In the same manner, Neufeld et al. (2007) integrate UTAUT with charismatic leadership theory to examine the role of project champions on IS adoption. Their study reveals project champion charisma is positively associated with increased employees' perception of performance expectancy, effort expectancy, social influence and facilitating conditions. These four factors account for 44% of behavioural intention and 52% of use behaviour. In a recent study by Venkatesh et al. (2012), they add three constructs of hedonic motivation, price value, and habit to UTAUT and developed

UTAUT2 to tailor to IS adoption behaviour by consumers. Their study reveals that UTAUT2 produce a substantial improvement in the variance explained in behavioural intention and use of IT by consumers with for 74% of variances explained in behavioural intention and 52% in use behaviour.

IS researchers have also introduced and added new variables to UTAUT to provide greater understanding of IS adoption behaviour by individuals, particularly when these researchers are investigating IS adoption behaviour in different context, population and cultural setting. Dijk et al. (2008) study government Internet services acceptance by Dutch people modify UTAUT by adding different psychological and social demographic variables, such as digital media preference, digital media access, supply service, educational level, societal position, and family position. Their study reveals that availability of Internet services, knowledge relate to this availability, ability and experience to use Internet services, and preference to use digital channel are the primary conditions to use government service while UTAUT variables of performance expectancy and effort expectancy were not strong.

Louho et al. (2006) apply UTAUT and add three new constructs; attitude, user activity, and fear of technology to investigate factors affecting the use of hybrid media application among users of code reading application. They found that attitude towards this technology is the most significant factor to behavioural intention, followed by performance expectancy; effort expectancy, facilitating conditions, user activity and fear of technology. In similar vein, Wang et al. (2010) add perceived sacrifice to UTAUT and found that perceived sacrifice has a negative influence on intention to use new system. Yeow and Loo (2009) investigate the acceptance of transit application (Touch n Go) and automated teller machine (ATM) among 500 Malaysians using UTAUT by adding these two constructs of

perceived anxiety and perceived credibility. Their study reveals perceived anxiety, effort expectancy, social influence, performance expectancy and perceived credibility have positive influence on behavioural intention, except for facilitating conditions, with anxiety having the greatest influence on intention. All these five variables were able to explain 82% of the variance of intention to use My Card ATM application. Evidently, their study reveals the eminent determinants in the acceptance of transit application (Touch n Go) and automated teller machine (ATM) is the individual factor of anxiety. On the other hand, Wang et al. (2010) in their study examine the acceptance of mobile learning by adding two new constructs of perceived self-management of learning and perceived playfulness to UTAUT. They report that all core determinants were significant in intention to use mobile learning, with performance expectancy was the strongest determinant toward behavioural intention, and that the two new addition constructs of perceived self-management of learning and perceived playfulness have strong effects on behavioural intention as well. In addition, their study reveals age and gender moderates the impact of social influence and self-management of learning toward mobile learning behavioural intention.

All the above studies provide evidences that UTAUT have been extensively integrated with other human behaviour theories to improve UTAUT predictive ability towards IS adoption behaviour. In addition, IS researchers introduce new variables to UTAUT together with their core constructs. These prior studies reveal that apart from the core constructs in UTAUT, there are other variables that may predict IS adoption behaviour by individuals, and thus provide a better understanding of the IS adoption behaviour phenomena. Most notably, these prior studies reveal the salient importance of individual factors such as perceived anxiety, perceived playfulness, and perceived sacrifice to affective belief factors. The above reviews of prior studies indicate the importance to further

investigate the affective beliefs of individual factors on their salient roles toward IS adoption behaviour.

2.4 CRITICISMS ON UTAUT

From the aforementioned discussion, UTAUT hase been extensively used and validated in different contexts and settings. Although UTAUT is a robust model, there are still criticisms from IS researchers that UTAUT reduces the system use behaviour's prediction accuracy. In a study conducted by Venkatesh et al. (2008) on UTAUT, they uncover three limitations on the linkage between behavioural intention and use behaviour. The first limitation is that in UTAUT, behavioural intention is considered as "a reflection of an individuals' internal schema of beliefs" and thus, UTAUT does not capture and measure the external factors that can affect the performance of use behaviour. Thus, the role of external variable that can potentially impede or facilitate the performance of behaviour is not fully captured by behavioural intention. Second, behavioural intention has weak predictive and explanatory ability due to UTAUT not being able to deal with uncertainly and unforeseen events between the time the intention is formed and the time the behaviour is performed. In the face of new information, individuals' beliefs and behavioural intention can change accordingly. In this condition, behavioural intention is provisional and different external and internal stimuli can change intention drastically over time. Hence behavioural intention becomes inaccurate, unstable, and less predictive of use behaviour. Third, behavioural intention has weak ability to predict behaviour that is not completely within an individual "volitional control" (Ajzen and Fishbein, 1985; Venkatesh et al., 2008).

These limitations exist in UTAUT is rooted in the Theory of Reasoned Action (TRA) related to the confounding issues between attitudes and subjective norms, such as environmental or organisational limit, unforeseen events, time and ability, which inhibit the act. Ajzen (1991) proposes Theory of Planned Behaviour (TPB) try to improve these limitations and add perceived behavioural control to TPB. In 2003, Venkatesh et al. develop UTAUT and assume facilitating conditions may have the ability to capture the influence of these factors by integrating perceived behavioural control from TPB and facilitating conditions from the model of personal computer utilization and conceptualise a new facilitating conditions as variable that reflects the perception about individual control over behaviour into UTAUT, with the hope that this new facilitating conditions is able to address the role of external factors. However, there are still criticisms by some IS researchers as prior studies on IS adoption behaviour reveal that this facilitating conditions could not still capture and measure the effect of external factors and could not actually account for incomplete information (e.g., Sheeran, Trafimow, and Armitage, 2003; Venkatesh et al., 2008). In general, facilitating conditions refers to people's perception about technical and organisational resources availability that can remove barriers from using IS (Venkatesh and Zhang, 2010). In the presence of incomplete and uncertain information regarding behaviour, the facilitating conditions may not be a good factor to predict IS adoption behaviour (Venkatesh et al., 2008). In order for facilitating conditions to predict IS adoption behaviour, individuals' perception about these conditions should accurately and realistically reflect their actual behaviour (Venakatesh et al., 2008; Ajzen and Madden, 1986).

One other criticism of UTAUT is that UTAUT do not measure self-efficacy as one of its core construct. In UTAUT, self-efficacy is considered as an indirect determinant of behavioural intention through effort expectancy. Straub (2009) when comparing and

contrasting TAM and UTAUT, argues that UTAUT is measuring the overall computer self-efficacy and not a specific self-efficacy towards a particular technology. According to Straub (2009), self-efficacy refers to individuals' belief of their ability to complete a specific task, given a set of circumstances. Therefore, it is about individuals' ability and judgments about their capability to complete technological tasks that influence computer attitudes which is linked to future technology use.

Furthermore, evidences from prior studies indicate that perceived self-efficacy contributes significantly to the motivation and performance of individuals (Bandura and Locke, 2003; Bandura, 1994, 1997). Yuen et al. (2010) argue IS innovation is viewed as complex by inexperienced users. Confidence in the users' ability to handle the IS innovation has significant influence on individuals acceptance (Yuen et al., 2010). Individuals' intention to adopt and use innovation will increase if they feel they have more capability and skill to use such innovation. People normally avoid tasks that they perceiveto be outside their ability.

In addition, many models/theories (i.e., TRA, TPB, TAM) test the effect of attitude on behavioural intention, and findings show that attitude is an important factor towards behavioural intention. Yuen et al. (2010) find that attitude is the most important factor towards using Internet banking services in developed and developing countries. Other researchers measure the effect of attitude in UTAUT and findings confirm that attitude do significantly influences behavioural intention (Louho et al., 2006; Oshlyansky et al., 2007; Dijk et al., 2008; Yuen et al., 2010). Thus, IS researchers collectively agreed that UTAUT should be further validated and replicated.

Form the above discussion; it appears when using UTAUT to investigate the adoption behaviour by individuals, one should view in depth on the context and setting of the phenomenon under investigation. With limitations the UTAUT have, and the exclusion of other relevant variables (e.g., self-efficacy, attitudes), applying UTAUT in order to test an entrepreneurs' IS acceptance and use may not thrive in totally capturing the effect of external factors that may influence entrepreneurs' intention to use towards use behaviour of IS related innovation in their daily business activities. Entrepreneurs face different challenges (i.e., regulation, restriction on capital or information, and crisis) and opportunities (i.e., information, resource and technology) to use IS related innovation that may significantly influence their decision making process (Damanpour and Schneider, 2006).

Since entrepreneurs have unique characteristics and features; using UTAUT alone to investigate their IS related innovation adoption behaviour may not be adequate. There is a need to explore and delve the variables that may be able to capture the role of external factors that affect entrepreneurs' decision to adopt and use IS related innovation, as well as factors that measure individual factors toward behavioural intention. Therefore, apart from the use of a well-developed literature in IS adoption behaviour, theoretical perspectives from other fields should be taken into consideration to shed some light on entrepreneurs' IS adoption behaviour.

Krueger and Brazeal (1994) develop EPM to measure individuals' perception toward intention to start a new venture or use a new technology in existing companies, and theorise precipitating events as moderating variables that capture the role of external factors. The external factors that Venkatesh et al. (2008) highlight are extensively discussed in the entrepreneurship studies, which are referred to as precipitating events. This precipitating

event is one of the constructs in the EPM developed by Krueger and Brazeal (1994), which has also rooted in Theory of Planned Behaviour (TPB). Another advantage of EPM is that the model is able to measure and capture the impact of volitional aspect of behavioural intention through propensity to act construct, whereby this construct facilitates entrepreneurs to evaluate their prior intention when adopting IS related innovation. Furthermore, EPM is also able to measure the individual factors such as perceived desirability and perceived feasibility toward behavioural intention to take action. Hence the EPM may provide the solution to mitigate the criticisms face with UTAUT, and thus, assist in providing a better understanding of the IS adoption behaviour, particularly by entrepreneurs.

Before this study discusses and reviews in detail this entrepreneurship literature associated to behavioural intention, the following section reviews the literature of prior studies conducted on IS adoption by small- and medium-sized enterprises to unearth whether these prior studies have taken in consideration the entrepreneurial characteristics embedded in these enterprises. The appraisal of on these prior studies on IS adoption by these enterprises is to provide clarification on the development of the proposed integrative IS related innovation behaviour model for entrepreneurs.

2.5 IS ADOPTION BY SMEs/ENTREPRENEURS

A substantial amount of research in IS uses different models and theories to investigate the determinants towards IS adoption by entrepreneurs, such as small- and medium-sized enterprises (SMEs) owners (e.g., Ramdani, Kawalek, and Lorenzo, 2009; Tan, Chong, Lin, and Eze, 2009; Simmons, Durkin, Paurik, and Armstrong, 2007; Marasini, Ions, and Ahmad, 2007; Franquesa and Brandyberry, 2009; Nguyen, 2008; Shih, 2004). Most of these prior studies adopted the Technology Acceptance Model (TAM) to investigate

SMEs IS adoption behaviour (e.g., Riemenschneider, Harrison, and Mykytyn, 2003; Yu and Tao, 2009). While other studies on SMEs employ the TPB to investigate SMEs adoption of IS (e.g., Riemenschneider and McKinney, 2001).

Much prior researches also extend most of the IS adoption models such as Innovation Diffusion Theory(IDT), Technology Acceptance Model (TAM), and Unified Theory of Acceptance and Use of Technology (UTAUT) to investigate IS acceptance in SMEs. For example, Yu and Tao (2009) extend TAM to assess electronic business usage by SMEs and find that SMEs attitudes toward the adoption of IT/IS innovation as a critical factors for executing electronic business strategy. Ramdani, Kawalek and Lorenzo (2009) integrate some factors from TAM, TAM2, IDT, UTAUT, resource base view and stage theory to develop a model to investigate SMEs adoption of ERP, CRM, SCM, and e-procurement. Their study reveals technological and organisational factors effect SMEs adoption of enterprise system more than environmental factors. From their study SMEs with greater perceived relative advantage, greater top management support, greater organisational readiness are predicted to become adopters of enterprise system. Meanwhile Tan et al.(2009) apply innovation diffusion theory (IDT) to investigate Internet-based ICT adoption by Malaysian SMEs. Their study uncovers compatibility, relative advantage, complexity, observability, and security are significant factors influencing Internet-based ICT adoption. While, Basoglu, Daim and Kerimoglu (2007) extend TAM to investigate organisational adoption of ERP system, and disclose that core TAM variables (i.e., perceived usefulness and ease of use of ERP system), satisfaction, and common actors such as technology, user, organisation, and project management of an EPR project as determinants of organisational adoption of ERP. While Nasco, Toledo, and Mykytyn (2007) apply TPB to investigate e-commerce intentions in small and mediun size enterprises, and report subjective norms and

attitude constructs positively relate to behavioural intention, but not perceived behavioural control.

Most of prior studies on IS adoption behaviour by these entrepreneurial enterprises seems to adopt variables (i.e., IS skills and knowledge, managerial charateristics) that measure large organisations towards IS adoption behaviour. Eventhough these variables can be used to measure entrepreneurial intention. Moreover, findings of prior studies on SMEs indicate mixed results on the determinants toward SMEs IS adoption behaviour. entreprises IS adoption behaviour, relying on large organisational factors may be less affective. According to Lee and Runge (2001), most entrepreneurs tend to have simple and highly centralised structures with the chief executive officers (CEOs), who are also often the owners, making many of the critical decisions (Lee and Runge, 2001; Thong, 2002). They rely on short-term rather than long-term strategic plans (Levy and Powell, 2003; Lee and Runge, 2001), have fewer bureaucratic procedures, less complex interpersonal and political relations, and less organisational inertia (Chau and Hui, 2001). In addition, the decision making process of entrepreneurs' top managers and/or owners are more intuitive and less dependent on formal decision models (Dandridge, 1979). Based on the above reviews of prior studies on IS adoption by entrepreneurial enterprises, it appears that various IS adoption models and theories have been adopted, adapted and integrated to explain their IS adoption phenomena. However, there are still limitations of these studies in their attempt to provide understanding of IS adoption behaviour by entrepreneurs.

Reviews of literature indicate that there are still lack of studies that solely focus on IS adoption behaviour by entrepreneurs per se, and thus, the need to consider variables that truly measure the entrepreneurial perceptions towards IS adoption behaviour. By referring to

the entrepreneurship literature would allow this study to grasp a better understanding of IS adoption behaviour by entrepreneurs, particularly on the entrepreneurs behavioural intention, and thus, has a much improved model of IS adoption by entrepreneurs, and moreover, mitigate the criticisms of UTAUT. The following section presents an overview of behavioural intention models from the entrepreneurship literature to investigate entrepreneurs' behavioural intention.

2.6 ENTREPRENEURIAL RESEARCH

2.6.1 Prior Studies on Entrepreneurs Behavioural Intention

There is growing body of literature explaining entepreneurs intention behaviour. According to Krueger (2000), intention is the best predictor of any planned behaviour, including entrepreneurship. An action is highly unlikely when intention is absent. Entrepreneurial intention is aimed at either creating a new venture or creating new values in existing ventures. Krueger (2000) indicates that intention represents the belief of I will perform a certain behaviour or I will act; and from intention, precedes action. Some of the theories that are extentsively used in the area of enterpreneurship to investigate entrepreneurs intention to take action are entrepreneurial event model (Shapero, 1982), theory of planned behaviour (Ajzen, 1991), entrepreneurial attitude orientation (Robinson et al., 1991), intentional basic model (Krueger and Carsrud, 1993), entrepreneurial potential model (Krueger and Brazeal, 1994) and Davidsson model (Davidsson, 1995).

Researchers in entrepreneurship context use these various model and theories to investigate entrepreneurial intention. For example, Kolvereid and Isaken (2008) apply the TRA and TPB to study new business venture and self employment. Segal et al. (2005)

present a new model of entrepreneurial motivation based on entrepreneurial intention model to understand the motivation to become entrepreneurs. They propose net desirability for self-employment, tolerance for risk of propensity to act, and perceived feasibility (self-efficacy) in the model as determinants towards self-employment intention.

Linan and Santos (2007) apply the EPM and revise the model by considering cognitive factors (bonding cognitive social capital, and bridging cognitive social capital) that influence the formation of entrepreneurial intentions. They argue that the relationship between bonding cognitive social capital with perceived feasibility was not strong. The relationships between bridging cognitive social capital and perceived desirability and perceived feasibility were significant and support the model. Nasurdin, Ahmad, and Lin (2009) use entrepreneurial event model and posit that perceived desirability mediates the relationship between role models, social identification and social norms towards entrepreneurial intention. They found that role models and social norms have positive relationships toward entrepreneurial intention. These findings support the mediating effect of perceived desirability. Shook and Bratianu (2010) found that self-efficacy and desirability associated with creating a venture were positively related to entrepreneurial intent by students, and that the more supportive the students' referents were, it would be more likely for the students to have intentions of starting a business.

Veciana, Aponte, and Urbano (2005) use entrepreneurial potential model (EPM) to assess and compare the attitudes of preceived desirability and perceived feasibility of university students and found that they have favourable perception of desirability of new venture creation, while their perception of feasibility was unfavourable (negative relationship). Guerrero, Rialp, and Urbando (2008) apply EPM to analyse the relationships

between perceived desirability and feasibility on university students' intention to create a new firm. Their study also reveals the same findings as Guerrero et al. (2008) that most university students consider it desirable to create a new firm, although the perception of feasibility is not positive. While, Devonish, Alleyne, Charles-Soverall, Marshall, and Pounder (2010) validate Entrepreneurial Intention Model in the Caribbean and found that prior exposure to entrepreneurial experiences has a direct and positive effect on both perceived desirability and feasibility, which in turn has a positive and direct effect on entrepreneurial intentions. Fitzsimmons and Douglas (2011) when investigating MBA students' entrepreneurial intention find that entrepreneurial intentions depend on perceptions of desirability and feasibility. The findings of all these prior studies reveal that entrepreneurial intention may be high even when one of the two main determinants perceived desirability or perceived feasibility are relatively low.

In addition, prior studies have also investigate entrepreneurs' behaviour by assessing the entrepreneurs characteristics and their role in job performance (e.g., Hongrone, 2008; Wong, Ho, and Autio, 2005; Tang and Koveos, 2004; Vankataraman, 2003; Doganova and Eyquem-Renault, 2009). Findings of these studies indicate decision making process of IS adoption by these types of entrepreneurs are usually more intuitive and less dependent on formal decision models (Dandridge, 1979). Most of the entrepreneurs are small business owners, but they have higher achievement motivation and risk taking, and thus fore are inclined to innovation and change. They rely on short-term rather than long-term strategic plans (Levy and Powell, 2003; Lee and Runge, 2001), have fewer bureaucratic procedures, less complex interpersonal and political relations, and less organisational inertia (Chau and Hui, 2001).

Based on the about reviews of prior studies, majority of the enterpreneurial intention models are largely homologous. Furtermore, most of these theories or models entirely focus on the pre-entrepreneurial events by potential entrepreneurs. Moreover, some entrepreneurship studies argue most entrepreneurs intention model focus on either individual or situational variables, however, both individual and situational variables are important to determine entrepreneurial intentions (Bird, 1988; Shapero, 1982; Zampetakis, 2008). Notably, all these prior studies on entrepreneurial intentions have provide evidences on the eminent roles of perceived desirability and perceived feasibility toward entrepreneurial intention to venture into new business. Most distintively, reviews on these studies indicate the mixed results on the role of perceived feasibility, whereby some studies found perceived feasibility has signifcant positive relationship on entrepreneurial intention, however there are studies that indicate otherwise. These mixed results encourage for further empirical testing on the individual perceptions of desirability and perceived feasibility towards behavioural intention by entrepreneurs. The following section discusses two (2) of the prominent theories or models developed to understand and predict entreprenuership behavoiural intention that are closely related to the objectives of this study. The two entreprenuership models are are (1) entrepreneurial event model and (2) entrepreneurial potential model that set as the theoretical foundations together with UTAUT to examine the IS adoption behaviour by entrepreneur.

2.6.2 Entrepreneurial Event Model

One of the earliest intention based model for entrepreneurs is the Entrepreneurial Event Model (EEM) developed by Shapero (1982). As shown in Figure 2.2, the premise of EEM is that the decision to perform an entrepreneurial activity requires a pre-existing

attitude toward the activity to be be seen as desirable and feasible, as well as the propensity to act on opportunity (Shapero, 1982; Krueger and Brazeal, 1994; Krueger, 2000, 1993). It means that without perceiving a likelihood of taking action, an individual is unlikely to has a serious intention toward a behaviour. In EEM, Shapero add volitional element of propensity to act to behavioural intention, to account for this phenomenon of taking action (Kruger, 1993; Krueger et al., 2000). Therefore, it shows volitional aspect of intention of I will do it. However, when propensity to act is high, taking action is more likely seen as feasible and desirable (Krueger, 1993).

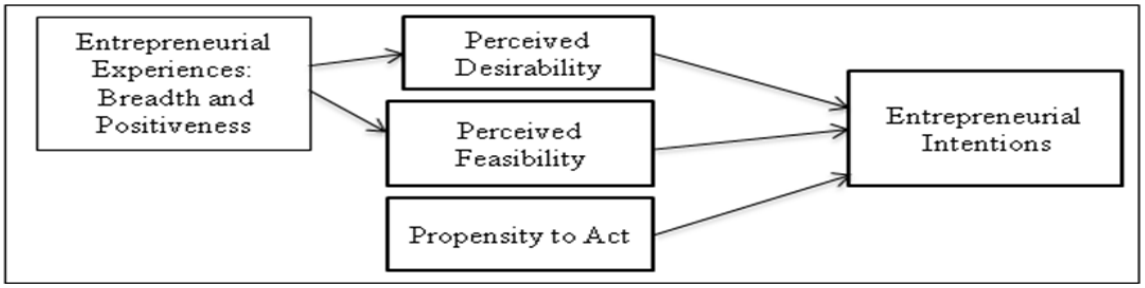

Figure 2.2: Entrepreneurial Event Model, Shapero (1982)

Shapero (1982) futher argues that inertia guides human behaviour until something interrupts or displaces that inertia. It means that human may has the tendency to do nothing or to remain unchanged unless there is something that interrupts or displaces the tendency of doing nothing or remain unchanged into some forms of action. Displacements can be negative, such as job loss, divorce, job dissatisfaction, or positive, such as getting an inheritance, winning a lottery, support from a customer or partner that atrract individuals toward the innovation and initiate action. These displacements accelerate a change in individuals behaviour and these individuals look for the best opportunity available from their enacted set of options (Krueger and Brazeal, 1994). The final choice depends on the relative credibility of alternative behaviours plus some propensity to act.

Credibility requires that the behaviour be seen as both desirable and feasible. Thus, the EEM model posits that the entrepreneurial event requires the potential to act, such as credibility to exist prior to the displacements along with the disposition to act after being displaced. According to Shapero (1982), perceptions are critical and that individuals had not changed, only their perceptions of the new circumstances had. Further, Shapero (1982) explains in the model how perception is critical in this process and how new circumstances may change the perception of individuals (e.g. subjective circumstance change, fortieth birthday). The potential to be entrepreneurs is there, but it requires some sort of displacements for the potential to surface (Krueger and Brazeal, 1994). Shapero (1982) defines perceived desirability as a degree to which individuals find the prospect of starting a business to be attractive. Perceived desirability is similar to social norms, and it is related to what significant others (friends, peer groups, family) think of the behaviour. Meanwhile perceived feasibility refers to the extent to which an individual feels personally capable of starting a business or performing the task. Propensity to act is defined as the personal disposition to act on one's decisions (Shapero, 1982). The EEM has been used in enterpreneurship studies and are able to explain more than 50% of entrepreneurs behavioural intention (Krueger and Brazeal, 1994).

The TPB and Shapero's model of EEM overlap in some parts (Krueger et al., 2000; Krueger and Brazeal, 1994). Both models contain an aspect of self-efficacy (perceived behavioural control in TPB and perceived feasibility in EEM), attitude, and social norms. Social norms and attitude in TPB correspond to perceived desirability in Shapero's model. Both EEM and TPB suggest the same meaning in different name, EEM posits entrepreneurial intention depend on the perception of personal desirability, feasibility, and

propensity to act, while Ajzen (1991) postulates intention in general depend on perceptions of personal attitude (attractiveness), social norms, and perceived behavioural control (perceived feasibility).

2.6.3 Entrepreneurial Potential Model

As EEM is largely homogolous to TPB, Krueger and Brazeal (1994) refine the EEM and TPB, and thus fore, propose the EPM. In developing EPM, Krueger and Brazeal (1994) define entrepreneurship as *the pursuit of an opportunity irrespective of existing resources,* and entrepreneurs as *those who perceived themselves as pursuing such opportunities*. As shown in Figure 2.3, they emphasise the constructs of perceived desirability and perceived feasibility into EPM, by integrating the conceptualisation of these constructs from the EEM and TPB (Krueger and Brazeal, 1994; Krueger, 2000) as both EEM and TPB are largely correspondant or similar in position to each other.

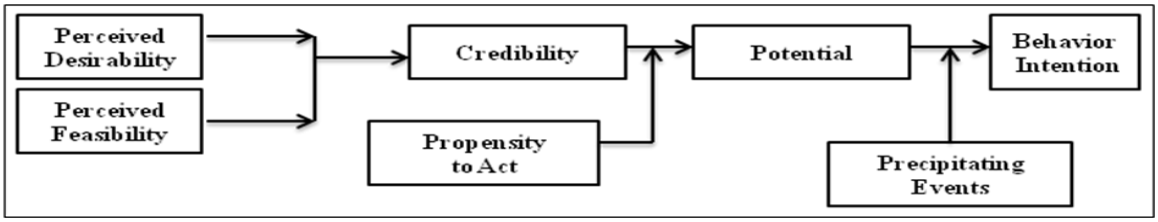

Figure 2.3: Entrepreneurial Potential Model, Krueger and Brazeal (1994)

As illustrated in Figure 2.3, credibility requires that the behaviour to be seen both feasible and desirable. These antecedents affect the intention toward the behaviour or action. The EPM conjectures is although individuals perceive the new venture creation desirable and feasible, and therefore credible, these individuals have no intention to realise the behaviour because the precipitating events may be lacking (Krueger and Brazeal, 1994; Krueger et al., 2000; Coduras et al., 2008; Veciana, et al., 2005). Thus fore, EPM postulates

that there are two variables that moderate the relationships between determinants and intention that include; (1) propensity to act (2) and precipitating events.

2.6.3.1 Perceived Desirability

According to Krueger and Brazeal, this construct embraces the two elements of attitude towards the act and social norms from Theory of Planned Behaviour. Theory of Planned Behaviour posits that behaviour is a function of beliefs relevent to the behaviour. Beliefs are assumed to impact attitudes towards the behaviour, and link behaviour to a certain outcome. Individuals from favorable attitudes towards behaviours believe to have desirable concequence and negative attitudes associated with undesirable consequences (Ajzen, 1991). Regarding subjective norms, normative beliefs constitute their underlying determinants. Normative beliefs is related to the likelihood that important referrent individuals or groups disapprove or approve of performing a given behaviour (Ajzen, 1991). Perceived desirability is shaped through family, peers, culture, colleagues and mentors (Shapero and Sokol, 1982). While, Shapero (1982) posits that perceived desirability and credibility of an entrepreneurial action for an individual's established through family and culture. In an attempt to improve the perceived desirability construct, in EPM, perceived desirability is redefined as the degree of attraction an individual perceives towards a specific behaviour, such as becoming an entrepreneur through affective belief, rather than normative belief as posted in TPB and EEM (Krueger and Brazeal, 1994; Krueger et al., 2000).

2.6.3.2 Perceived Feasibility

Shapero's (1982) terminology on perceived feasibility corresponds to perceived behavioural control in the TPB, and much like Bandura's self efficacy (Krueger, 1993). Perceived behavioural control in TPB is defined as the individuals' perception of the ease or

difficulty of performing the behaviour of interest (Ajzen, 1991) by considering these two points of view of effort requirement perspective and facilitating conditions. Shapero (1982) emphasises the perception of the availability of financial support, other support as advice, consultation and education that make the act feasible to the individuals. In addition, this contruct of perceived feasibility is derived from Bandura (1986, 1995), who argue that taking action requires consideration of not just outcome expectation (i.e., perceived desirability) but also perceived self efficacy (i.e., feasibility). From Bandura's argument, perceived feasibility reflects the perception of a personal capability to do a particular job or set of tasks. Therefore, Krueger and Brazeal (1994) redefine perceived feasibility in EPM as the perception regarding individuals own ability to carry out a specific behaviour. According to Krueger and Brazeal (1994) if people do not believe that they have the skill and capability to take action, they will not even try to embark towards certain behavioural intention. Thus fore in EPM, perceived feasibility reflects the intrinsic interest of individuals (Krueger and Brazeal, 1994; Krueger et al., 2000).

2.6.3.3 Credibility

In EPM, credibility is unobserved construct that requires the behaviour be seen as both desirable and feasible (Krueger and Brazeal, 1994). Credibility in entrepreneurship means that to perform behaviour of starting a new business must be seen as believable therefore requires threshold level of perceptions of both feasibility and desirability upon the opportunity.

2.6.3.4 Propensity to Act

Shapero (1982) defines propensity to act as the individuals' disposition to act on individuals' decisions, such as stable personal characteristics that reflect volitional aspect of

intention I will do it. Krueger and Brazeal (1994) consider that propensity to act is very eminent in understanding entrepreneurial behavioural intention and argue that it is hard to envision well-formed intention without some propensity to act. Individuals may have great potential to take action without corresponding intention. Therefore, it shows that appropriate affective or normative beliefs may not be enough. Conceptually, propensity to act on an opportunity depends on individuals' control perceptions that wish to get control by taking action. In EPM, propensity to act is conceptualised as a stable personality characteristic and is closely related to locus of control (Krueger, 1993). The propensity to act on an opportunity depends on the desire to gain control by taking action. According to Krueger and Brazeal (1994) desire for control is closely linked with initiating and maintaining goal directed toward behaviour and is significantly associated with entrepreneurial intention.

In EEM, propensity to act is viewed as direct determinant of behavioural intention with the argument that serious intention towards behaviour is unlikely without perceiving a probability of taking action. However in EPM, Krueger and Brazeal (1994) consider propensity to act as moderator and suggest that propensity to act may affect intention through influence on experiences and attitudes respectively. With low propensity to act, attitudes may be less predictive of intention and action. In the condition that propensity to act is high, experience has more effect on attitude and taking action is more desirable. Thus, propensity to act might be better viewed as a moderating impact than a direct determinant (Krueger, 1993).

2.6.3.5 Precipitating Events

Shapero (1982) states that significant life events such as job loss, migration can cause a sizable increase in entrepreneurial activity and change individuals' perception of new

circumstance (Shapero, 1982; Krueger and Brazeal, 1994). Triggering events create sudden changes in individuals' life and work conditions by changing their needs. These tangible barriers and subtleness of cognitive barriers can be obstacles to prevent an intention from coming to fruition (Shapero, 1982; Kruger, 2000; Krueger and Brazeal, 1994). Moreover, Shapero (1982) argues that our reaction to life events is related to our perception of the influence of that event, and thus the precipitating events come in different guises and is different in the eye of beholder. Shapero (1982) did not consider this factor into EEM.

Krueger and Brazeal (1994) in developing EPM consider this construct of precipitating events as salient moderating variable on the determinants towards entrepreneurial behavioural intention. They argue that exogenous variables of precipitating events may serve to inhibit individuals from realising the intent to take action. Krueger (1993) also posits that precipitating event could be divided as the appearance (or acquisition) of a perceived facilitating factor or the removal (or avoidance) of a perceived inhibiting factor (Krueger et al., 2000 Krueger and Brazeal 1994). Therefore, based on the Shapero definition, in EPM, Krueger and Brazeal (1994) consider precipitating events as moderating variable in the relationship between predictors and entrepreneurial intention. Few years later, Krueger et al. (2000) argue that exogenous variables moderate the relationship between intentions and behaviour. Therefore, Krueger et al. (2000) redefine precipitating events in EPM as certain exogenous variables which facilitate or 'precipitate' the realisation of intention into behaviour.

2.6.3.6 Intention

According to Krueger et al. (2000) intention is the best predictor of human behaviour. Based on EEM Krueger and Brazeal (1994) define intention as individuals'

willingness to pursue a given behaviour and represent individuals' commitment towards target behaviour (Shapero, 1982; Krueger and Brazeal, 1994). According to Krueger (1993) action is unlikely if intention is absent. Understanding intention is valuable when the phenomenon is obscure, rare, or involves unpredictable time lags. Intention serves as conduit to better understanding of the act itself (Krueger, et al., 2000).

Form the above review of the EPM, it appears that EPM is one of the latest robust and parsimonious model that has the ability to measure entrepreneurs perceptions of desirability and feasibility towards intention to take action and capture the effect of exogenous factor on the relationship between intention and performed behaviour. EPM has the ability to measure the volitional aspect of the behavioural intention. Also, from the above discussion, it seems that for entrepreneurs, the eminent determinants toward behavioural intention by entrepreneurs are the intrinsic interest and beliefs of perceived desirability and perceived feasibility, while precipitaiting events and propensity to act may disrupt entrepreneurs inertia towards the behaviour.

2.7 RELATIONSHIP BETWEEN UTAUT AND EPM

As previously discussed in this chapter there are many adoption behaviour models/theories being developed in the IS research disciplines, with UTAUT being considered as the most robust model to understand IS adoption behaviour. In the meantime, many studies have also been conducted to understand entrepreneurs' behavioural intention, with EPM being considered as one of the robust model in entrepreneurship context. As stated in Chapter One, the main aim of this study is to investigate entrepreneurs' determinants of intention to use towards use behaviour of IS related innovation. Thus, there

is a need to develop IS adoption model that uniquely focus on these potential adopters and users (i.e., entrepreneurs), and assess different factors that are relevant to the adoption of IS related innovation by these entrepreneurs.

Applying UTAUT to empirically examine IS related innovation adoption by entrepreneurs may not capture the effect of external factors such as changes in work situation, change in work environment, technological change, and change in entrepreneurs career prospects that are relatively important on the determinants toward IS adoption behaviour. On the other hand, applying EPM alone to investigate entrepreneurs' behaviour will only capture the individual perceptions of perceived desirability and perceived feasibility toward intention to take action and the external factors such as the precipitating events. EPM does not capture the technological and environmental effect, which are salient determinants of IS related innovation adoption regardless of who the adopters are. Therefore, this study proposes to develop a research model by integrating UTAUT and EPM to predict IS related innovation adoption behaviour (i.e., intention to use and use behaviour) by entrepreneurs. As shown in Figure (2.4), although both UTAUT and EPM focus on intention to take action, there are obvious parallels and differences between these two models.

As illustrated in Figure (2.4), both UTAUT and EPM models root in the TPB and both models are intentional models which measure the individuals' intention to take action. Venkatesh et al. (2003) integrate TPB and other seven models and develop UTAUT model while Krueger and Brazeal (1994) integrate TPB and EEM to develop EPM. UTAUT assesses pre-adoption and use behaviour of new system, while EPM evaluate pre-entrepreneurial intention. Both models are intentional and consider determinants towards

intention to take action, but both models take different perspectives towards intention to take action.

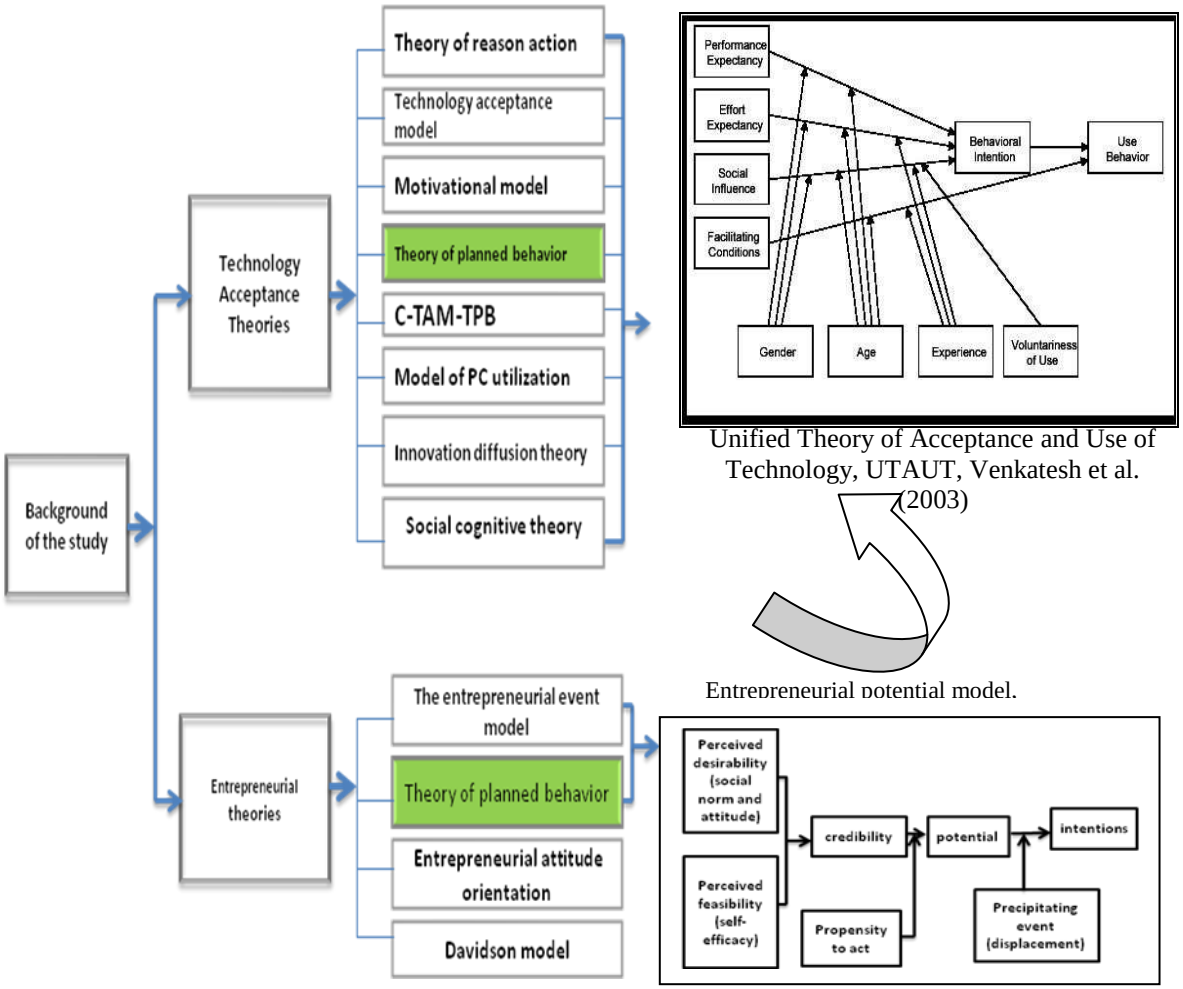

Figure 2.4: Theoretical Foundation of UTAUT and EPM

UTAUT measures the technological, individual and environmental factors towards intention to use and use behaviour respectively, while EPM measures the individual and situational factors towards intention. UTAUT considers technological of performance expectancy and effort expectancy; individual factor of social influence, and environmental factor of facilitating conditions as the core determinants towards IS related innovation adoption behaviour. Whereas, EPM considers individual perceptions of perceived

desirability and perceived feasibility, propensity to act, and precipitating events in predicting behavioural intention.

Furthermore, UTAUT does not consider self-efficacy as direct determinant of intention that has been criticised by few IS researchers. On the other hand, EPM considers perceived feasibility that reflects the individuals' self-efficacy of skill and ability as important determinants of behavioural intention. Bandura (1986, 1995) argues that taking action requires consideration of not just outcome expectation of perceived desirability, but also perceived self efficacy (feasibility). In the TPB perceived behavioural control consider two points of view: (1) as effort requirement perspective and individual's perception of the ease of completion of a task, which influence the individual's opinion of his or her ability to complete it and, (2) as facilitating conditions (resource, technology) perspective, which is the perception that resources will be available to complete the task (Chan et al., 2010). Based on the assumption from TPB, Venkatesh et al. (2003) emphasise more on the facilitating conditions aspect of self-efficacy in UTAUT (Compeau and Higgins 1995, Agarwal and Prasad, 2000), while Krueger and Brazeal (1994) emphasise more on perceived feasibility of effort requirement and individuals' perception of their ability to complete a task.

Finally, UTAUT does not consider attitudes as direct determinant of behavioural intention but integrates the attitudes to social influence, and measure as individual factor of social influence. EPM measures attitudes towards behavioural intention through perceived desirability (Ajzen, 1991; Krueger and Brazeal, 1994). Last but not least, UTAUT has limitation in the relationship between behavioural intention and use behaviour known as intention-behaviour gap. UTAUT is not able to capture the influence of external factors that

further widen the intention-behaviour gap, and this limitation can be mitigated by measuring the effect of precipitating events as postulate in EPM.

From the above discussions using one or the other models separately to measure and assess determinants toward IS related innovation adoption behaviour by entrepreneurs may not be adequate. First, UTAUT does not wholly measure the individual factors of perceived desirability (attitude) and perceived feasibility toward behavioural intention to use IS (self-efficacy), while research shows that these factors are salient in predicting behavioural intention. Second, the limitations that exist in the relationship between behavioural intention and use behaviour widen the intention-behaviour gap. Third, EPM has the ability to measure the impact of individual factors towards behavioural intention through propensity to act; and the impact of intention to use towards use behaviour through precipitating events. Therefore, based upon these three logical reasons, this study proposes an integrative UTAUT-EPM model of IS related innovation adoption behaviour for entrepreneurs.

By integrating the UTAUT and EPM into one theoretical model, this study expects that the limitations identify in UTAUT can be mitigated, particularly limitations related to the intention-behaviour that are salient to the entrepreneurs. Furthermore, with the proposed integrative model, this study expects that the model is able to capture the role of external variables that can potentially impede or facilitate the performance of IS adoption behaviour of entrepreneurs, particularly, the relationship between intention to use and use behaviour.

2.8 THE PROPOSED INTEGRATIVE UTAUT-EPM IS ADOPTION MODEL

Based on the above discussions, this study proposes an integrative model. As illustrated in Figure 2.5, the integrative UTAUT-EPM model posits two core factors as determinants towards intention to use IS related innovation by entrepreneurs. The first core factor is the technological factors, that consist of the performance expectancy and effort expectancy from UTAUT. Second core factor is the individual factors that consist of perceived desirability and perceived feasibility from EPM, and social influence from UTAUT. Perceived desirability measures the attractiveness of using IS related innovation which shaped through intrinsic interests of entrepreneurs. While, perceived feasibility measures the entrepreneurs perceived self-efficacy towards intention to use. On the other hand, social influence will measure how important is others (family, peers, culture, colleagues and mentors) believe towards adoption and use of IS related innovation. These two factors accompanying with social influence will test individual perceptions towards intention to use.

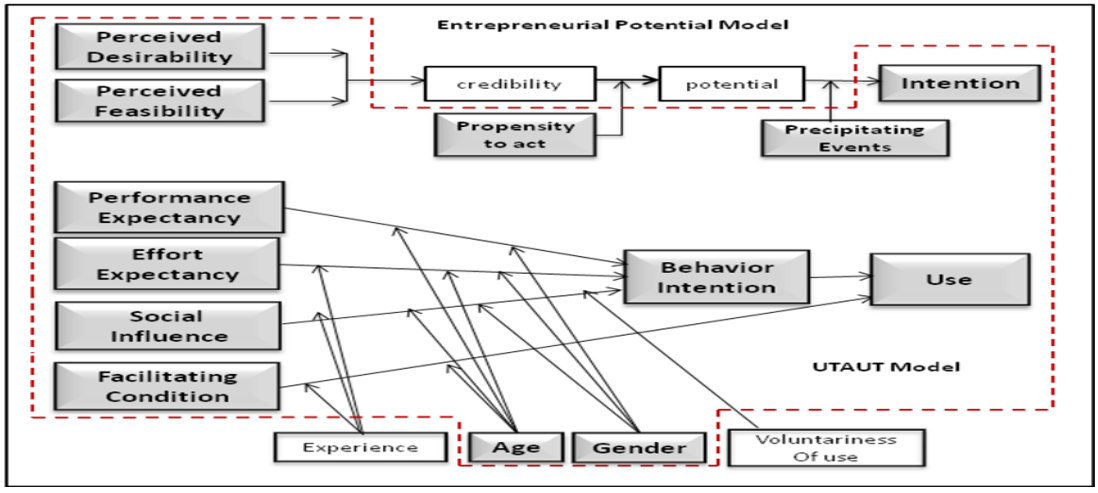

Figure 2.5: Integrative Framework

All these variables are considered in the integrative UTAUT-EPM model due to the ability of these variables (i.e., performance expectancy, effort expectancy, perceived desirability, perceived feasibility and social influence) to predict and explain IS intention to use by entrepreneurs. Prior studies using UTAUT have provide evidences on the importance of the technological factors that is performance expectancy and effort expectancy and individual factors that is social influences as determinants of intention to use. While the EPM has provided evidences on the salient importance of the individual factors that is perceived desirability and perceived feasibility. The relationships between all these determinants to intention to use is moderated by the demographic charactersitics of gender and age as suggested in UTAUT.

The other two moderating demographic characteristics; that is experience and voluntariness in UTAUT are excluded in this integrative UTAUT-EPM model. Voluntariness is also excluded from the model because the effect of volitional aspect of entrepreneurs behaviour will be measured through propensity to act adopted from EPM. Since IS related innovation is a new venture creation in entrepreneurs job, this study omits experience as moderating variable from the integrative model. Instead other moderating variable that is more salient in predicting the relationships between individual factors and intention to use are included in the integrative UTAUT-EPM model. From the EPM model, propensity to act is one of the contributing variable that is related to individual factors to entrepreneurial intention, whereby propensity to act increase the predictive ability of intention to actual behaviour. Based on EPM assumption on propensity to act, this study asserts that propensity to act moderate the relationship between individual factors and intention to use. However, rather than the term propensity to act, this study uses the term propensity to use to represent entrepreneurs strong decision to use IS related innovation.

As with UTAUT, the integrative UTAUT-EPM model posits there are two core determinants towards use behaviour by entrepreneurs. The first determinants of use behaviour is the environmental factors, that include facilitating conditions. As posited in UTAUT, in the integrative UTAUT-EPM model, the link between environmental factors, that is facilitating conditions is moderated by demographic characteristics of gender and age. This study recognises the prominent role of intention to use as percursor of use behaviour, and thus, the integrative UTAUT-EPM posits that intention to use as determinant of use behaviour. In addition to the link between intention to use and use behaviour, the integrative UTAUT-EPM model posits that the link between these two constructs are moderated by precipitating events, as asserted by EPM. The precipitating events construct is considered as promising factor that may reduce the intention-behaviour gap.

2.9 CHAPTER SUMMARY

In summary, this chapter discusses literature of prior studies on IS adoption research and on entrepreneurship research. This chapter begins by reviewing relevant theories in both of these research disciplines in detail. The two prominent model of behaviour intention in the area of IS discipline (i.e., UTAUT) and entrepreneurship (i.e., EPM), have been extensively reviews. As a result an integrative UTAUT-EPM model of IS related innovation adoption behaviour by entrepreneur isproposed and briefly discuss. In the following Chapter Three, the integrative UTAUT-EPM model will be further discussed. The following chapter will also present the testable hypotheses to assess the integrative UTAUT-EPM model of IS related innovation adoption behaviour by entrepreneurs.

CHAPTER THREE

DEVELOPMENT OF HYPOTHESES

INTRODUCTION

This chapter presents the integrative UTAUT-EPM model develop based on some aspects of the UTAUT and some aspects of EPM. This chapter is divided in two main sections. Section one discusses the integrative research model, that include the constructs, and the relationships between each of the constructs. Section two discusses the hypotheses development on the direct relationships between predictors (i.e., individual, technological and environmental factors) and dependent variables (i.e., intention to use and use behaviour). Section two also discusses the development of hypotheses related to the moderating effect of gender, age, and propensity to act on the relationships between individual, technological and environmental factors towards intention to use and use behaviour. Further, Section two discusses the development of moderating effect of precipitating events on the relationship between intentions to use and use behaviour. Finally, Section two discusses the development of hypotheses on the relationships among some of the independent variables (i.e., individual, technological and environmental factors). This chapter concludes with a summary of the chapter.

3.1 INTEGRATIVE UTAUT-EPM MODEL

This section presents the integrative UTAUT_EPM model depicting the determinants that activate and stimulate adoption behaviours of IS related innovation by entrepreneurs. The integrative UTAUT-EPM model that is developed based on some aspects of UTAUT (Venkatesh et al., 2003) and some aspects of EPM (Krueger and Brazeal, 1994) to the

entrepreneurs' context. The constructs for the integrative UTAUT-EPM model that are taken into considerations from the UTAUT are (1) performance expectancy, (2) effort expectancy, (3) social influence, (4) facilitating conditions, (5) intention to use and (6) use behaviour. The moderating effects of gender and age from UTAUT are also being considered in the integrative UTAUT-EPM model While, the aspects that are taken into considerations from EPM are the individual aspects that include; (1) perceived desirability and (2) perceived feasibility.

Other aspects of EPM such as the volitional aspect of human behaviour through propensity to act are also taken in consideration. In IS related innovation context, the term is referred to propensity to use in the integrative UTAUT-EPM model. Furthermore, the integrative UTAUT-EPM model also considers the external factors aspect. These external factor aspect refer to precipitating events in EPM. These precipitating event has on it effect on the relationship between intention to use and use behaviour of IS related innovation by entrepreneurs. The integrative UTAUT-EPM model is developed to provide a comprehensive understanding of the determinants that affect the adoption and utilisation of IS related innovation by entrepreneurs. Figure 3.1 presents the conceptual framework within which the integrative UTAUT-EPM model is formulated.

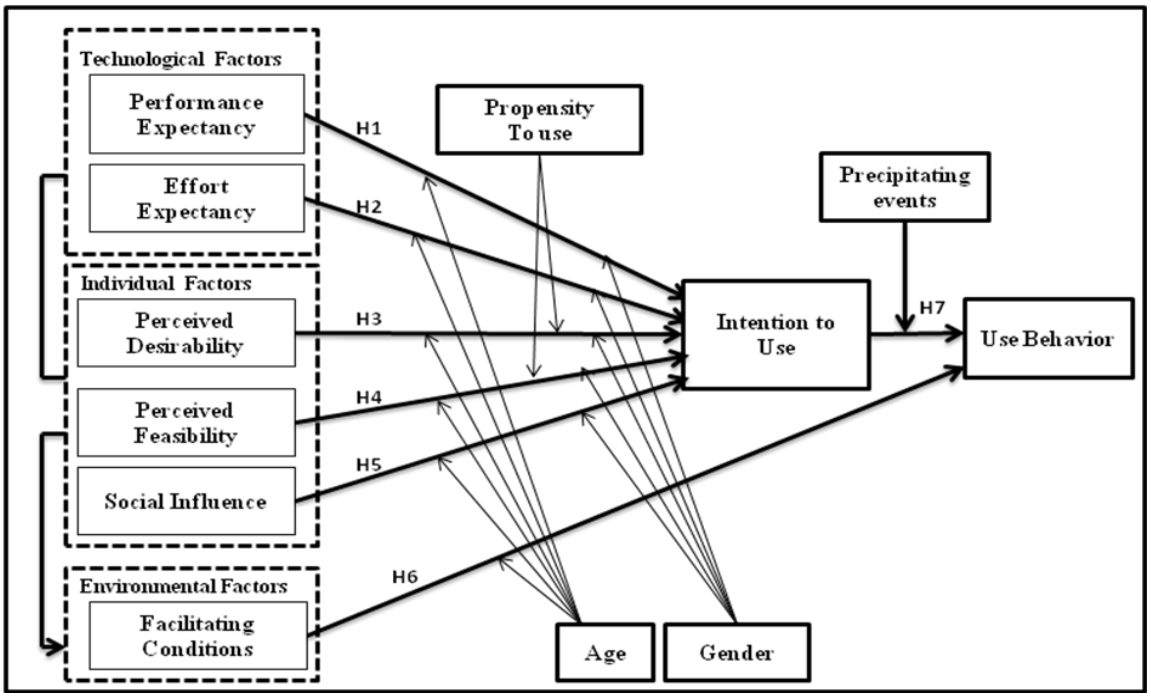

Figure 3.1: The Integrative UTAUT-EPM Model

The integrative UTAUT model theorises that there are two stages of adoption process; (1) intention to use and (2) use behaviour. At the intention to use stage, the technological factors are theorised to affect the initial intention to use. Thus, technological factors of performance expectancy and effort expectancy are theorised to influence intention to use. Also, three individual factors are posited to have direct influence on intention to use. The three individual factors are: (1) perceived desirability, (2) perceived feasibility, and (3) social influence are predicted to affect intention to use, and that the links between perceived desirability and perceived feasibility are moderated by propensity to use. All the relationships between these two factors (i.e., technological and individual factors) and intention to use are moderated by age and gender. Hence, the model provides an initial prediction of the determinants that activate entrepreneurs' intention to adopt and use IS related innovation.

Meanwhile, the decision to adopt and use a system is one aspect of adoption. Adoption also includes the assimilation of the IS within the organisations. With IS related innovation, this assimilation requires entrepreneurs to ultimately use the system in their daily business activities. Hence, entrepreneurs' *a priori* intention to use is predicted to affect use behaviour. Entrepreneurs whohave the intention to use IS related innovation, are likely take action and perform the act of using the system. Therefore, the integrative UTAUT-EPM theorises that entrepreneurs' intention to use IS related innovation will have an effect on the entrepreneurs use behaviour. Applying prior literature, the integrative UTAUT-EPM model postulates precipitating events will capture the role of external variables that can potentially impede or facilitate the performance of use behaviour. This study expects that, precipitating events moderates the relationship between intention to use and use behaviour. Apart from the intention to use, the integrative UTAUT-EPM model theorises that the environmental factor of facilitating conditions influence use behaviour and that the link between them are moderated by age. Finally, the integrative UTAUT-EPM model postulates the interrelationship with one or more among the determinants toward IS adoption behaviour (i.e., intention to use and use behaviour). The integrative model postulates that there perceived desirability has an association with technological factors of performance expectancy and effort expectancy, while perceived feasibility has an association with effort expectancy and facilitating conditions.

3.2 HYPOTHESIS DEVELOPMENT

This section discusses a number of empirically testable hypotheses from the proposed integrative UTAUT-EPM model. These hypotheses describe the relationships between each of the technological factors and individual factors on intention to use. As asserted earlier, intention to use is expected to facilitate the use behaviour of IS related innovation.

Furthermore, entrepreneurs within certain environmental factors are also expected to facilitate use behaviour of IS related innovation directly. This section also presents the hypotheses formulated on the effect of moderating variables of gender, age, propensity to act, and precipitating events towards IS related innovation adoption behaviour by entrepreneurs. Finally, the development of hypotheses among determinants of IS related innovation adoption is discussed.

3.2.1 Determinants of Intention to Use

3.2.1.1 Performance Expectancy and Intention to Use

This study expects performance expectancy affects intention to use IS related innovation by entrepreneurs. In UTAUT, performance expectancy is defined as "the degree to which an individual believes that using the system will help him or her to attain gain in job performance" (Venkatesh et al., 2003). Based on UTAUT, performance expectancy is related to expect an outcome in using IS, and thus, performance expectancy has a strong influence on users' intention to use new system, and still remain significant at all points of measurement in both mandatory and voluntary settings. UTAUT postulates that performance expectancy has significant effect on behavioural intention to use new system.

Prior studies validate and support the significant effect of performance expectancy on behavioural intention (Davis, 1989; Davis et al., 1989; Venkatesh and Davis, 2000; Venkatesh and Zhang, 2010; Dijk et al., 2008; Alawadhi and Morris, 2008; Thomas, 2008). For example, Anderson et al. (2006) find that performance expectancy has a significant positive influence on the use of PCs. Thomas (2008) in his study also found that the more the individual believes that using the system will help her/him achieve gains in job

performance, the more likely the individual intends to use the system. This postulation in further validated and supported in a study by Wang et al. (2010), whereby they find significant and positive effect of performance expectancy on individual intention to use mobile-learning. While, Wang and Shih (2009) in their study argue that performance expectancy has a significant positive influence on behavioural intention to use information Kiosks. Kijsanayotin et al. (2009), in their study on the use of health IT found that performance expectancy as the strongest predicting factor towards behavioural intention, and thus posit that the intention to use health IT is a function of the perception that health IT is useful. The salient role of performance expectancy on behavioural intention is also prevailing across time. Alawadhi and Morris (2008) in their study provide evidence on the effect of performance expectancy on behavioural intention to be significant for the time span of next three months and in the near future.

Extending the above findings to this study, it is expected that entrepreneurs would consider using IS related innovation if it is useful and could enhance their job performance. Typically, entrepreneurs are more concerned about the benefits they can gain from new opportunities and enhancing enterprise performance (Tsai, 2009). Therefore, together with all the above arguments, performance expectancy will likely increase the entrepreneurs' intention to use IS related innovation in their daily business activities. Furthermore, it is expected that performance expectancy has a high positive influence on entrepreneurs' intention to use IS related innovation in their business activities. Accordingly, based on the UTAUT and empirical evidences from prior studies that support that performance expectancy is generally a necessary precursor to behavioural intention, this study hypothesises that:

H1: Performance expectancy has a positive effect affect on entrepreneurs' intention to use IS related innovation.

3.2.1.2 Effort Expectancy and Intention to Use

This study expects effort expectancy affects intention to "use IS" related innovation by entrepreneurs. In UTAUT, effort expectancy refers to the ease associated with the use of the IS (Venkatesh et al., 2003). UTAUT posits that the effort necessary to learn and use new IS will affect its acceptance and use (Venkatesh et al., 2003; Gefen et al., 2000). In other words, users intention will increase if they perceive that a particular IS is easy to use, thus, if IS is relatively easy to use, it will lead to higher intention to use the system by users (Venkatesh et al., 2003; Carlsson et al., 2006; He and Lu, 2007). In addition, effort expectancy is significant in all the IS adoption models that for both mandatory and voluntary use context (Venkatesh et al., 2003).

Many studies have shown that effort expectancy has a significant influence on behavioural intention (Wang and Shih, 2009; Venkatesh and Zhang, 2010; Dijk et al., 2008; Chen et al., 2008). For example, Yeow and Loo (2009) find that effort expectancy has a significant influence on behavioural intention to use MyKad ATM. Furthermore, in the same study, Yeow and Loo (2009) indicate that effort expectancy is a significant determinant of behavioural intention to use MyKad and Touch n' Go. While, Wang and Shih (2009) in their study on the intention to use information Kiosks conclude that user friendliness is an important factor in information Kiosks interaction and has significant influence on individuals' intention to use information Kiosks. Kijsanayotin et al. (2009) also find significant relationship between effort expectancy (ease of use) and use of health IT.

According to Wang et al. (2010) effort expectancy has significant influence on individual intention to use mobile-learning.

Based on these prior studies, and extending these prior findings to this study, effort expectancy will stimulate entrepreneurs' intention to use IS related innovation. In other words, when entrepreneurs' level of ease of usability is high, this will lead to higher level of intention to use IS related innovation. Accordingly, given, the well established rationale and empirical support for an effect of effort expectancy on behavioural intention, this study hypothesises that:

H2: Effort expectancy has a positive effect on entrepreneurs' intention to use IS related innovation.

3.2.1.3 Perceived Desirability and Intention to Use

This study expects perceived desirability effect intention to use IS related innovation by entrepreneurs. In the EPM, perceived desirability is the strongest determinant towards behavioural intention. In EPM, perceived desirability is defined as the degree of attraction an individual perceives towards a specific behaviour (Krueger and Brazeal, 1994).

Prior studies support the effect of perceived desirability on behavioural intention and indicate that perceived desirability is strongest determinants of intention to take action (Shapero, 1982; Krueger, 1993; Krueger and Brazeal, 1994; Devonish et al., 2010). According to Fitzsimmons and Douglas (2011), perceived desirability is a strong determinant of entrepreneurial intention whereby, entrepreneurs with strong perception of desirability (i.e., the system are attractive) may form the intention to act entrepreneurially

even when they perceive themselves as not having adequate skills and knowledge to do so. Thus, a higher level of perceived desirability will lead to a higher level of behavioural intention to take action (Fitzsimmons and Douglas, 2011; Krueger, 1993). Furthermore, Shook and Bratianu (2010), in their study find strong evidence of the significant of perceived desirability in creating individual entrepreneurial venture intention. In the same vein, Linan and Santos (2007) find perceived desirability as strongest factor for the formation of entrepreneurial intention. Other prior studies also find that perceived desirability has a positive effect on intention to take action (e.g., Devonish et al., 2010; Nasurdin et al. , 2009; Guerrero et al., 2008; Zampetakis, 2008; Krueger, 2000; Krueger et al., 2000).

Review of prior studies shows that attractiveness of starting new action is an important factor which influences intention and use behaviour. Conceptualising these findings to IS adoption context, this study expects that attractiveness of using IS related innovation is one of the important factors that influence entrepreneurs to accept or reject IS related innovation, as making decision to use IS related innovation can be considered as entrepreneurial act. It captures the perceived attractiveness of using IS related innovation. In other words, attractiveness of IS related innovation motivates entrepreneurs to use such innovation. Therefore, based on the all these arguments, entrepreneurs' perceived desirability to use IS related innovation will affect their intention to use IS related innovation.

Extending the above findings to this study, it is potulated that perceived desirability has significant positive influence on entrepreneurs' intention to use IS related innovation. Thus, a higher level of perceived desirability leads to a higher level of intention to use IS

related innovations. Accordingly, following the above rationale, this study hypothesises that:

H3: Perceived desirability has a positive effect on entrepreneurs' intention to use IS related innovation.

3.2.1.4 Perceived Feasibility and Intention to Use

This study expects perceived feasibility affect intention to use IS related innovation by entrepreneurs. Perceived feasibility in EPM is defined as "the degree to which one feels personally capable of performing a task". It reflects the perception of personal capability to do a particular job or set of tasks (Krueger and Brazeal, 1994; Krueger et al., 2000). According to EPM, perceived feasibility has a significant effect on behavioural intention to take action (Krueger and Brazeal, 1994; Krugear, 1993, Krueger et al., 2000; Linan and Santos, 2007; Shook and Bratianu, 2010). The EPM postulates that perceived feasibility has significant effect on behaviour intention to start new business or take action.

Numerous studies have reported significant empirical relationships between perceived feasibility and behavioural intention across a wide range of behavioural domains. For example, Guerrero et al.(2006) in their study report that perceived feasibility is the second significant factor towards intention to create a new venture. While, Devonish et al.(2010) found that perceived feasibility has significant positive effect on entrepreneurial intention, and the effect is stronger than perceived desirability. Recently, Fitzsimmons and Douglas (2011), in their study on entrepreneurial intention by MBA students find that perceived feasibility is a significant determinant of entrepreneurial intention and conclude that individuals may form intention to act entrepreneurially if they perceive themselves as

having sufficient perceived feasibility to do so. Brazeal et al. (2008), in his study on organisational context find a correlation between perceived feasibility and behavioural intention and conclude that entrepreneurs with higher self-efficacy exhibit a strong belief in their capabilities will choose challenging goals, will spend a significant amount of time in the activities, and will prevail in the face of insurmountable obstacles. According to Bandura's (1986), perceived feasibility of particular course of action overlaps to a large extent with notion of self-efficacy, whereby perceived self-efficacy is related to person's ability to execute some target behaviour, which fits to the definition of perceived feasibility in EPM.

In IS research, the construct self-efficacy seems to have similar definition, whereby self-efficacy in IS context is defined as "people's judgments of their capabilities to organize and execute course of action required to attain designated types of performance" (Bandura, 1986). This construct is concerned not only with skills individuals have but also with the judgments of what individuals can do with whatever skills they possess (Cheung et al., 2002). Prior researches in the IS adoption context found that computer self-efficacy has a positive effect on computer usage behaviour (Thong et al., 2002; Venkatesh and Davis, 1996; Venkatesh, 2000). Thus, high level of self-efficacy will lead to a high level of IS intention to use (Compeau and Higgins, 1995, Agarwal and Prasad, 2000). Therefore, with this higher level of self-efficacy leads to increased initiatives and persistence, and subsequently better performance (Krueger, 1998). On the other hand, a low level of self-efficacy reduces effort and performance.

Extending prior researches and the EPM postulation on this study, perceived feasibility is theorised to impact entrepreneurs' intention to use IS related innovation. If

entrepreneurs have adequate skill, knowledge, and ability to work with IS related innovation, their intention to use IS innovation would be stronger. Thus, a high level of perceived feasibility will increase the level of entrepreneurs' intention to use IS related innovation. Given that perceived feasibility is theorised as distinct proximal determinant of behavioural intention, this study hypothesises that:

H4: Perceived feasibility has a positive effect on entrepreneurs' intention to use IS related innovation.

3.2.1.5 Social Influence and Intention to Use

This study expects social influence to affect intention to use IS related innovation by entrepreneurs. UTAUT defines social influence as "the degree to which individuals perceive the important others believe whether individuals should use the IS related innovation". Contrary to Davis et al. (1989) that believe subjective norms has no effect on IS acceptance, Venkatesh et al. (2003) believe that social influence does have an effect on behavioural intention, however, the construct is only influencial in mandatory setting. Thus, in UTAUT, social influence is the perception of what people of significance in the individuals or users lives think about performing the particular behaviour (i.e., adopting IS related innovation). Some studies find social influence has significant influence towards behavioural intention (Wang and Shih, 2009; Chen et al., 2008; Kijsanayotin et al., 2009; Bandyopadhyay and Fraccastoro, 2007). For example, Wang et al. (2010) find social influence has a significant influence on teacher's intention to use distance learning. Yeow and Loo (2009) investigate acceptance of ATM in Malaysia and find that social influence is significantly related to behavioural intention.

With concern to prior research, this study defines social influence as the degree to which entrepreneurs perceive it is important that others believe they should use IS related innovation, and this study thus argues that the effect of social influence on intention to use is positive and significant. Accordingly, based on UTAUT and evidences from prior studies, this study hypothesises that:

H5: Social influence has a positive effect on entrepreneur's intention to use IS related innovation.

3.2.2 Determinant of Use Behaviour

3.2.2.1 Facilitating Conditions and Use Behaviour

This study expects facilitating conditions effect use behaviour of IS related innovation by entrepreneurs. In UTAUT, facilitating conditions is defined as "the degree to which an individual's believe that the organisational and technical infrastructures existence is needed to support the use of the system" (Venkatesh et al., 2003). UTAUT postulates that the relationship between facilitating conditions and behavioural intention is not significant in the present of performance expectancy and effort expectancy. Therefore, Venkatesh et al. (2003) suggest that facilitating conditions has a direct effect on use behaviour beyond that explained by intention alone. This assumption is consistence with TPB and decomposed TPB. Prior studies find that facilitating conditions has significant influence towards use behaviour (Kijsanayotin et al., 2009; Venkatesh and Zhang, 2010; Alawadhi and Morris, 2008). Yeow and Loo (2009) in their study on the use of smartcards (i.e., MyKad and Touch 'n Go) find facilitating conditions has a positive significant influence on behavioural intention to use MyKad Touch 'n Go. While, Wang and Shih (2009) when investigating

user's behaviour of information kiosks found significant positive influence of facilitating conditions on use behaviour. They posit that if information kiosks planners provide citizens with required facilities to use the kiosks they will use the Kiosks. While, Kijsanayotin et al. (2009) in their study on health IT adoption find that facilitating conditions is stronger determinant of use behaviour. Meanwhile, Venkatesh and Zhang (2010) and Alawadhi and Morris (2008) also find support on the effect of facilitating conditions on use behaviour and find that users who believe that there are organisational and environmental supports to use new technology are more interested to use IS related innovation.

With concern to prior researches, this study argues that the effect of facilitating conditions on use behaviour is positive and significant. When entrepreneurs recognise that the environmental conditions support their use of IS related innovation they would be more inclined to use the IS related innovation. Thus, entrepreneurs that have high support and sufficient existence of infrastructure will probably have high level of use of IS related innovation. Consistent with this view, this study hypothesises that:

H6: Facilitating conditions has a positive effect on entrepreneurs use behaviour of IS related innovation

3.2.2.2 Intention to Use and Use Behaviour

This study expects intention to use to affect use behaviour of IS related innovation by entrepreneurs. The integrative UTAUT-EPM model includes IS adoption behaviour that measured both intention to use and actual use. In this study intention to use is defined as **"**entrepreneurs' willingness to pursue a given behaviour and this behavioural intention represents entrepreneurs' commitment toward target behaviour" (Shapero, 1982; Krueger

and Brazeal, 1994; Stopford and Baden-Fuller, 1994; Krueger, 2000). On the other hand, use behaviour is defined as "the frequency, duration, and intensity of entrepreneurs' interactions with a particular system" (Venkatesh et al., 2008). A vast amount of prior studies on IS adoption consider behavioural intention as dependent variable and assume that intention to use as proximity of use behaviour (Davis et al., 1992; Venkatesh et al., 2003; Compeau and Higgins, 1995).

On the contrary, in recent development of IS adoption researches, many prior studies extended their researches by considering intention to use as mediator to use behaviour. These studies find significant relationship between behavioural intention and use behaviour (e.g., Ajzen, 1991; Taylor and Todd, 1995; Venkatesh et al., 2003). Many of these studies have empirically tested and find support on the relationship between behavioural intention and use behaviour (Davis et al., 1989; Jackson et al., 1997; Taylor and Todd, 1995; Venkatesh et al., 2003; Venkatesh et al., 2008). They argue that, the action is unlikely if intention is absent, therefore, intent precedes action (Krueger, 2000; Krueger, 1993). They further argue that intent is a state of mind that directs attention and action towards a specific goal (Drnovsek et al., 2010). Davis et al. (1989), argue that that intention is the best predictor of use behaviour towards a particular technology or system and argue that the higher the intention to use certain IS related innovation, the higher is the probability of using IS related innovation. Moreover, most of the models that Venkatesh et al. (2003) integrate to develop UTAUT model, specifically on IS adoption behaviour indicate that there is significant relationship between behavioural intentions and use behaviour. Consistent with the UTAUT and other underlying intention models, this study postulates that behaviour intention is an important factor to predict action. Therefore, the higher level of intention will increase the probability to use IS related innovation. Thus, this study hypothesises that:

H7: Intention to use has positive effect on entrepreneurs IS related innovation use behaviour.

3.2.3 Effect among Determinants of IS Related Adoption Behaviour

This study expects the existence of relationships among technological factors, individual factors, and environmental factors, and how these relationships affect their impact on intention to use IS related innovation, whereby some of these determinants will decrease or increase in the effects toward intention to use IS related innovation. Therefore, a possible number of empirically testable hypotheses from the integrative UTAUT_EPM model are formulated. These hypotheses describe the relationships between some factors of the technological factors (i.e., performance expectancy, and effort expectancy), individual factors (perceived desirability and perceived feasibility) and environmental factors (i.e., facilitating conditions) on each other. The following subsection discusses the development of these hypotheses in detail.

3.2.3.1 Impact of Performance Expectancy on Perceived Desirability

This study expects that performance expectancy has an influence on perceived desirability towards intention to use by entrepreneurs. Davis (1989) argues that if individuals perceive an innovation to be useful, they would be more interested to use it and that innovation will most likely be adopted. Numerous researches show that perceived usefulness have a positive effect on attitude towards expected use and actual use (e.g., Adams et al., 1992; Agarwal and Prasad, 1999, 1997; Shin, 2004; Kim et al., 2007). According to Hossain and Silva (2009), users formulate a positive attitude towards the IS if they perceive the system to be useful. Liker and Sindi (1997) when investigating the use of expert system use by individuals found strong direct relation between the usefulness of the system and attitude

towards the system. While, Shih (2004) also in his study on electronic shopping finds that perceived usefulness of trading on line has a significant influence on individuals' attitudes toward e-shopping. Findings from prior studies seem to indicate that usefulness of the IS innovation will be more attractive to users, and will be more desirable for users to use the innovation.

Since perceived desirability in EPM is developed by integrating attitude and social norm, and extending the above findings to this study, performance expectancy is theorised to affect entrepreneurs' desirability towards intention to use IS related innovation. A higher level of performance expectancy will lead to higher perceived desirability to use IS related innovation. If IS related innovation is useful and can improve entrepreneurs' job performance, they would have more desire to use it and the system is more attractive for entrepreneurs. Thus, this study hypothesises that:

H8: Performance expectancy has a positive effect on entrepreneurs' perceived desirability towards intention to use IS related innovation.

3.2.3.2 Impact of Effort Expectancy on Perceived Desirability

This study expects that effort expectancy affects perceived desirability towards intention to use IS related innovation by entrepreneurs. TAM posits that perceived ease of use predicts attitudes towards IS adoption (Davis et al., 1989; Devonish et al., 2010; Agarwal and Prasad, 1998, 1997; Shin, 2004; Kim et al., 2007). Liker and Sindi (1997) investigate expert system use and argue that perceived ease of use has strong effect on attitudes toward the system. According to the Shih (2004), perceived ease of use of trading on line significantly determined individuals' attitudes toward e-shopping. While, Lederer et

al. (2000) argue that ease of understanding of Web technology have a positive influence on attitudes toward using the Web technology. Since perceived desirability is closely related to attitude, this study hypothesises that effort expectancy would influence perceived desirability (i.e., attractiveness) of using IS related innovation by entrepreneurs. If entrepreneurs perceive IS related innovation is easy to use and less effort is needed to use IS related innovation, they would be more interested to use the innovation, and as such the system will be more appealing and attractive to them. Based on this assumption, this study suggests that effort expectancy has a significant influence on perceived desirability of the IS related innovation to entrepreneurs. Thus, this study hypothesises that:

H9: Effort expectancy will have a significant effect on entrepreneurs' perceived desirability towards intention to use IS related innovation.

3.2.3.3 Impact of Perceived Feasibility on Effort Expectancy and Facilitating Conditions

This study expects that entrepreneurs perceived feasibility will affect effort expectancy and facilitating conditions of IS related innovation adoption by entrepreneurs. IS researchers state that self-efficacy is a factor that precedes ease of use, which then influences intention to use IS innovation. For example, Chan et al. (2010) and Hasan (2006) argue that computer self-efficacy leads to perception that less effort is needed in using the IS related innovation, and thus the level of acceptance by users will be higher. It appears that individuals who have high level of self-efficacy are more likely to possess the knowledge and a baseline skill to use IS related innovation compared to those individuals with lower self-efficacy. Moreover, with more knowledge and skills that act as a facilitating resource, would enable users to have greater control over IS related innovation use behaviour. Chan et

al. (2010) when investigating the mandatory adoption of electronic government find that self-efficacy has significant influence on effort expectancy and facilitating conditions.

Extending the above arguments and findings to this study, perceived feasibility is theorised to influence effort expectancy and facilitating conditions. Therefore, self-efficacy (i.e., perceived feasibility) is expected to influence effort expectancy and facilitating conditions as these two beliefs are related to individuals expectations about effort requirements and possession of resources that facilitate IS adoption behaviour (Chan et al., 2010). High level of perceived feasibility leads to lower barriers to use IS related innovation in terms of required effort and access to resource. This study measures the effect of perceived feasibility on effort expectancy and facilitating conditions, and hypothesises that:

H10: Perceived feasibility has a positive effect on effort expectancy towards intention to use IS related innovation.

H11: Perceived feasibility has a positive effect on facilitating conditions towards using IS related innovation.

3.2.4 Effects of Moderating Variables on Intention to Use

This section discusses a number of moderating variables of empirically testable hypotheses proposed from the integrative UTAUT-EPM model. These hypotheses describe the role of gender and age on the relationships between technological factors of performance expectancy and effort expectancy, and individual factors of perceived desirability and perceived feasibility on intention to use IS related innovation. Furthermore, the moderating

role of propensity to use on the relationship between individual factors and intention to use IS related innovation by entrepreneurs will discussed. However, the integrative UTAUT-EPM model postulates that the impact of these individual factors on intention to use is stronger when entrepreneurs propensity to use that is act upon using IS related innovation is highly volitional. As asserted earlier in previous section, entrepreneurs within certain environments are also expected to facilitate use behaviours indirectly, and the integrative UTAUT-EPM model also proposes the role of precipitating events as having a moderating effect on the relationship between intention to use and use behaviour of IS related innovation by entrepreneurs.

3.2.4.1 Impacts of Performance Expectancy Moderated by Gender and Age

This study expects the impact of performance expectancy on intention to use IS related innovation to be moderated by gender and age. According to UTAUT, the effect of performance expectancy on behavioural intention is moderated by gender and age (Venkatesh et al., 2003). Venkatesh et al., (2003) elaborate that men tend to be highly task-oriented, therefore performance expectancy that focuses on task accomplishment, are likely to be salient in men. Venkatesh and Zhang, (2010) further find support on the moderating effect of gender and age, and argue that men are more interested in performance accomplishments compared to women.

UTAUT also posits that younger individuals may place more importance on extrinsic rewards; therefore performance expectancy would be more salient in younger workers while effort expectancy is more salient for older individuals in early stage of experience (Venkatesh et al., 2003). According to Venkatesh and Zhang, (2010), younger individuals have stronger desire to be successful in their job compared to older workers. On that note,

UTAUT postulated that younger men have the strongest desire for material success when they perform certain task or job, such as performance achievement. Therefore, in such a scenario, gender and age are likely to significantly impact the effect of performance expectancy on the level of entrepreneurs' intention to use IS related innovation. Thus, this study hypothesises that:

H1a: In a situation when entrepreneurs make decision to use IS related innovation, gender will moderate the relationship between performance expectancy and entrepreneurs' intention to use IS related innovation.

H1b: In a situation when entrepreneurs make decision to use IS related innovation, age will moderate the relationship between performance expectancy and entrepreneurs' intention to use IS related innovation.

3.2.4.2 Impacts of Effort Expectancy Moderated by Gender and Age

This study expects the impact of effort expectancy on intention to use IS related innovation to be moderated by gender and age of entrepreneurs. According to UTAUT, the impact of effort expectancy on behavioural intention is moderated by gender and age, whereby the impact of effort expectancy, is more prominent for women, in the determinants of individuals' intention to use IS related innovation (Venkatesh and Morris, 2000; Venkatesh, 2000; Venkatesh et al., 2003). However, there seems to be mixed results on the moderating effect of gender on the link between effort expectancy and intention to use IS by individuals. For example, Wang et al. (2010) in their investigation on the acceptance of mobile learning find that the effect of effort expectancy is stronger in men compared to women which is the opposite of the Venkatesh et al. (2003) finding. On the contrary, Wang

and Shih (2009) in their study of information Kiosks usage find that the effect of effort expectancy towards intention to use does not differ between men and women.

In addition, those individuals who are much older have been shown to be associated with difficulty in processing complex stimuli and allocating attention towards processing information about new task or job (Venkatesh et al., 2012). Wang and Shih (2009) in their study report that effort expectancy is strongest determinant of behaviour intention to use Kiosks system for older age individuals compared to younger individuals. Moreover, a study on acceptance of mobile learning by Wang et al. (2009) shows that the effect of effort expectancy is stronger in older individuals than younger individuals of IS related innovation. Based on previous findings, this study theorises that gender and age are likely to have significant effects on the link between effort expectancy and intention to use IS related innovation by entrepreneurs. Even though there are mixed results on the role of gender and their effect on the link between effort expectancy and intention to use, this study recognises the salient role of gender as postulated in UTAUT, and to further test the significant role of gender in understanding IS adoption behaviour. Thus, this study hypothesises that:

H2a: In a situation when entrepreneurs make decision to use IS related innovation, gender will moderate the relationship between effort expectancy and entrepreneurs' intention to use IS related innovation.

H2b: In a situation when entrepreneurs make decision to use IS related innovation, age will moderate the relationship between effort expectancy and entrepreneurs' intention to use IS related innovation.

3.2.4.3 Impacts of Perceived Desirability and Perceived Feasibility Moderated by Gender and Age

This study expects the effects of perceived desirability and perceived feasibility on intention to use to be moderated by gender and age of entrepreneurs. Krueger and Brazeal (1994) in EPM did not examine the effect of gender and age on perceived desirability and perceived feasibility towards entrepreneurial behavioural intention. However, there are prior studies on entrepreneurship and business ownerships that have examined gender differences (e.g., Isakova et al., 2006; Yordanoa and Davidkov, 2009). For example Yordanoa and Tarrazon (2011) argues that there are differences between men and women in entrepreneurial intention, whereby women have lower entrepreneurial intention compared to men. It appears that female entrepreneurs will not undertake new challenges if they sense that they have doubt concerning their skills or capabilities to partake in the challenge (Moore, 2003). Scherer et al. (1990) indicate that women possess lower self-efficacy because they lacked '*the necessary personal and vocational resource'*.

Moreover, most studies in IS context have shown strong evidences on gender differences for different levels of computing self-efficacy expectations (e.g., Harrison and Rainer, 1992; Busch, 1995). For example, Murphy et al. (1989) in their study on the effect of self-efficacy on behavioural intention to use computer find that the difference between women and men is highest particularly, when computer is used at an advanced level. Although there are scarcities of studies on effect of age in the entrepreneurship, this study assumes that entrepreneurs' age may affect the individual perceptions differently. Extending the above arguments, this study posits that gender and age to play a role in the link between perceived desirability and perceived feasibility on intention to use IS related innovation by entrepreneurs. Thus, this study hypothesises that:

H3a: In a situation when an entrepreneurs make decision to use IS related innovation, gender will moderate the relationship between perceived desirability and entrepreneurs' intention to use IS related innovation.

H3b: In a situation when entrepreneurs make decision to use IS related innovation, age will moderate the relationship between perceived desirability and entrepreneurs' intention to use IS related innovation.

H4a: In a situation when entrepreneurs make decision to use IS related innovation, gender will moderate the relationship between perceived feasibility and entrepreneurs' intention to use IS related innovation.

H4b: In a situation when entrepreneurs make decision to use IS related innovation, age will moderate the relationship between perceived feasibility and entrepreneur intention to use IS related innovation.

3.2.4.4 Impacts of Social Influence Moderated by Gender and Age

This study expects the effect of social influence on intention to use IS related innovation by entrepreneurs to be moderated by gender and age of entrepreneurs. UTAUT postulates that the effect of social influence on behavioural intention is moderated by gender and age. UTAUT posits that women tend to be more sensitive to others opinions and therefore effects of social influence are more salient for them when forming intention to use new technology. Therefore, the effect will decline with more experience (Venkatesh et al., 2003). The effect of social influence is the strongest for older women in the early stages of

experience when usage is mandatory (Venkatesh et al. 2003). UTAUT further postulates that affiliation needs increase with age, therefore older individuals are more likely to place increased salience on social influence, and the effect declining with experience.

Most prior studies support these arguments and have provide empirical evidences and supports (e.g., Abushanab and Pearson, 2007; Chen et al., 2008; Wang and Shih, 2009). For example, Abushanab and Person (2007) find effect of social influence to adopt Internet banking is stronger for female individuals than male individuals. In the same vein, Wang and Shih (2009) indicate that gender moderates the relationship between social influence and intention to use Information Kiosk and the effect is stronger for women compared to men. Bandyopadhyay and Fraccastoro (2007) find evidence that the effect of social influence is stronger for older consumers to use Prepayment Metering System. Consistent with prior researches, this study hypothesises that:

H5a: In a situation when entrepreneurs make decision to use IS related innovation, gender will moderate the relationship between social influence and entrepreneurs' intention to use IS related innovation.

H5b: In a situation when entrepreneur make decision to use IS related innovation, age will moderate the relationship between social influence and entrepreneurs' intention to use IS related innovation.

3.2.4.5 Impacts of Facilitating Conditions Moderated by Age

According to Venkatesh et al. (2003), based on organisational psychologists, receiving help and assistance on the job is more importance for older individuals. UTAUT postulates that facilitating conditions is moderated by age, and therefore, availability of

technical and organisational supports would have greater influence on older individuals towards using IS related innovation (Venkatesh et al., 2003; Venkatesh and Zhang 2010). Venkatesh et al. (2012) in their study of using new technologies by consumers found that older consumers tend to face more difficulty in processing complex or new information, thus affecting their learning of new technologies. Venkatesh et al. (2003) found that older workers are more receptive to accept help and assistance with the IS related job and/or task compared to younger workers. Based on the findings of these prior studies, it seems that older individuals place greater importance on the availability of adequate IS support. In additions, other prior studies using UTAUT have provided empirical evidences and support on the role of age on the link between facilitating conditions and use behaviour. Extending these arguments, this study theorises that age moderates the relationship between facilitating conditions and use behaviour. Thus, this study hypothesises that:

H6a: In a situation when entrepreneurs make decision to use IS related innovation, age will moderate the relationship between facilitating conditions and entrepreneurs' use of IS related innovation.

3.2.4.6 Impacts of Perceived Desirability and Perceived Feasibility Moderated by Propensity to Use

This study expects the effect of perceived desirability and perceived feasibility on intention to use IS related innovation by entrepreneurs to be moderated by propensity to use. Shapero (1982) defines propensity to act as "the individuals' disposition to act on individuals' decisions which reflects volitional aspect of intention I will do it". The construct is conceptualised as a stable personality trait and is closely related to locus of control (Krueger, 2000). In the EEM propensity to act is viewed from two perspectives: (1) as direct

determinant and (2) as a moderator (Shapero, 1982). In 1993, Krueger investigate entrepreneurial intention towards new venture creation and consider propensity to act as direct determinants of intention, whereby he finds significant and positive relationship between propensity to act and entrepreneurial intention.

The role of propensity to act in its' ability to predict entrepreneurial intention was further examined by Krueger and Brazeal (1994) when comparing the TPB and EEM. They find significant and positive relationship between propensity to act and behaviour intention. Based on these findings Krueger and Brazeal (1994) when developing the EPM include the propensity to act as moderating variable between the link between individual factors of perceived desirability and perceived feasibility and entrepreneurial intention. In testing the EPM, they found support for the moderating effect of propensity to act.

Extending the above findings to this study, it is expected that propensity to use has moderating effect on the link between individual factors (i.e., perceived desirability and perceived feasibility) and intention to use IS related innovation. In this context, propensity to use indicates entrepreneurs' tendency toward using IS related innovation, that is the degree to which entrepreneurs to act upon achieve their goals to use IS related innovation is greater. This study expects that entrepreneurs with proactive tendency to act upon the action have a higher level of desirability, and feasibility to use IS related innovation in their business activities. In other word, higher propensity to use increases the level of perceived desirability and perceived feasibility, and increases entrepreneurs' intention to use IS related innovation. If entrepreneurs decide to use IS related innovation and persevere in their decision, they perceive more capability and using IS related innovation is more attractive to them. This study theorises that propensity to use IS related innovation moderates the relationship

between perceived desirability and perceived feasibility toward intention to use IS related innovation by entrepreneurs, thus lead to greater level of entrepreneurs' intention to use IS related innovation. Thus, study hypothesizes that:

H3c: In a situation when entrepreneurs intend to use IS related innovation, propensity to use will moderate the relationship between perceived desirability and entrepreneurs' intention to use IS related innovation.

H4c: In a situation when entrepreneurs intend to use IS related innovation, propensity to use will moderate the relationship between perceived feasibility and entrepreneurs' intention to use IS related innovation.

3.2.4.7 Impacts of Intention to Use Moderated by Precipitating Events

This study expects the effect of intention to use on use behaviour IS related innovation by entrepreneurs to be moderated by precipitating events. Krueger et al. (2000) argue that exogenous factors of precipitating events impacts attitudes and may moderate the relationship between behavioural intentions. For example, exogenous factors inhibit a person from realizing the intent to be an entrepreneur. On that note, Shapero (1982) posits how significant life events such as job loss, migration, referred to precipitating events can cause or trigger a sizable increase in entrepreneurial activity and change individuals' perception of new circumstance (Shapero, 1982; Kruger, 2000; Krueger and Brazeal, 1994; Krueger, 2008). Schindehutte et al. (2000) divide entrepreneurial triggers into five key dimensions that are subjected to the individuals' perceptions such as (1) internal versus external, (2) opportunity-driven versus threat-driven, (3) market pull versus technology push, (4) top-down versus bottom-up, (5) systematic/deliberate search versus chance/opportunism.

However, in entrepreneurship literature precipitating events are distinguished into two perspectives.

The first perspective of precipitating events is the technology push versus market pull factors. Gilad and Levine (1986) propose the push and pull theory and argue that individuals push into entrepreneurship by negative external forces of job dissatisfaction, inflexible work schedule or attracted into entrepreneurial activities of self-fulfillment, wealth or other desirable outcome. Some positive events, such as incredible opportunity might pull individuals towards action, compared to some negative pressure such as job loss or forced migration of job that might push individuals towards self-employment. Assessment of push and pull factors is subjective, in that individuals might perceive a disastrous circumstance as a pull factor towards taking action, while other individuals perceive a great opportunity as a threat that is forcing them into unwanted action (Krueger, 2008).

The second perspective of precipitating events which is commonly taken by entrepreneurship researchers is the facilitators versus inhibitors factors. In this facilitator versus inhibitor factors perspective, precipitating events may be the emergence of something that entrepreneurs perceive as a facilitating action or the removal of perceived barrier (Shapero, 1982; Krueger, 2008). In this aspect, the precipitating events is considered as the appearance (or acquisition) of a perceived facilitating factor, for example access to expert advice, or the removal of a perceived inhibiting factor, for example absence of financing (Krueger et al., 2000 Krueger and Brazeal 1994 Kruger and Brazeal, 1994; Schindehutte et al., 2000). Researches in IS suggest government policy and regulation, industry and market structure, national and/or organisational culture, and specific organisational and group

arrangements and practice as situational factors which predict IS innovation adoption and use behaviour (Wang and Swanson, 2007).

Based on the above arguments from the entrepreneurship and IS literature on the different perspectives of precipitating events and their role in the predicting behaviour intention, this study theorises that over time without precipitating events intention to use IS related innovation may affect use behaviour slowly. In other words, intention to use is considered as salient precursor of use behaviour, and precipitating events act as the push or pull factors, or as facilitators or barriers that trigger entrepreneurs to take action.

Extending the above arguments and prior studies, this study posits that external factors such as unforeseen events (i.e., being offered a big contract, losing the market, financial resource, resource availability, cost, product, government policy, financial crisis, customer or new market, supplier, incentive loan, better opportunity available) can change entrepreneurs' intention to use IS related innovation in the time that intention to use is formed and use behaviour is performed. During the time the intention to use IS related innovation is formed and the use of IS related innovation is performed; if some precipitating events happen to entrepreneurs, this precipitating event may facilitate or inhibit the performance of use behaviour by entrepreneurs. Thus, this study hypothesises that:

H7a: In a situation when entrepreneurs make decision to use IS related innovation, precipitating events will moderate the relationship between the entrepreneurs' intention to use and use of IS related innovation

3.3 CHAPTER SUMMARY

In summary, this chapter presents the generic integrative UTAUT-EPM model developed in Chapter Two and hypotheses development based from the model. This chapter begins by describing the core constructs of the integrative UTAUT-EPM model and the moderating variables, followed by the discussion on the roles and relationships among the constructs. This chapter then progresses with the formulation and development of empirical testable hypotheses. The following Chapter Four will present the research methodology adopted in this study, which includes the research process, rational of this study, development of measurements, and questionnaire design. The following chapter will also present results of preliminary analysis of the survey data related to measurement reliability and validation, non-response bias, and demographic of participants of this study.

CHAPTER FOUR

RESEARCH METHODOLOGY

INTRODUCTION

This chapter presents the research methodology adopted for this study. This chapter is divided into five main sections. Section one describes the rational for the chosen research approach and the overview of the research design. Section two discusses the development and operationalisation of all constructs contain within integrative UTAUT-EPM model and the pre-test conducted to determine that the scale validity (i.e., face validity and content validity). Section three describes the development of the questionnaire, the pilot test results, and the instruments for the final survey. Section four describes the administration of the longitudinal survey approach employed in this study. While, section five presents the initial assessment of the survey data such as data preparation, multivariate assumption, non-response bias and comparison of mean constructs within the three main ethnic groups in Malaysia. This chapter concludes with a summary of the chapter.

4.1 OVERVIEW OF RESEARCH DESIGN AND PROCESS

The research design is the first step of a research study to gather essential data that will then be analysed to arrive at possible solutions. Research design involves a series of rational decision making choices associated with the purpose of the study; where the study would be conducted, type of study, unit of analysis, time horizon, the extent to which the researcher manipulates and controls the study, data collection process, and how variables will be measured and last but not least the data analysis (Sekaran, 2003).

The most important thing to conduct the research for researches is to reflect his/her most fundamental beliefs regarding the nature of the world in which he/she lives and how he perceives it. However the way researcher views the world will has a tremendous impact on the way he/she views his/her subjects and the environment, the way of data is collected, and the manner in which results are interpreted (Alexander, 2002). A "paradigm is a fundamental set of assumptions that when is adopted by a professional community would allows its member to share similar perceptions (Hirschheim and Klein, 1989). Paradigm can be categorized based on ontological and epistemological assumptions.

An ontological assumption is related to a researcher's view of the social and technical world while an epistemological assumption related to knowledge and knowledge-acquisition (Hirschheim and Klein, 1989). An epistemological assumption can be subjective or objective (positivism and interpretivism). However when researcher assumes that all aspects of reality can be fully described and measured with the aid of observed-independent instruments he/she has objective view of reality. This view treats the social world as if it were the natural world (Burrell and Morgan, 1979). On the other hand, the subjective propositions view every person has a unique view of the world which can only partially be communicated or extracted (Alexander, 2002). Thus, in this study, if one had to examine the epistemological assumptions of the predictive models featured in the chapter three of this thesis, one would realize that the researcher of this study generally share an objective view of the world.

All researches are based on underlying assumptions about what constitutes valid research and which methods are appropriate. This study attempts to explain how things work and focuses on the verification of the hypotheses based on the integrative UTAUT-EPM model developed in Chapter Two and Chapter Three. Due to the nature of hypothesis testing

in this study, a positivist approach is deemed appropriate to understand how to obtain the required knowledge, enhance understanding of the relationships that exist among independent and dependent variables, and in turn provide significant outcomes. As such this study takes the refinement of the positivism philosophy to investigate empirically complex range of technological, individual, and environmental factors towards IS related innovation adoption behaviour by entrepreneurs in their business activities. A positivist approach for this study is consistent with the view of contemporary researchers in the field of IS (e.g., Chatterjee et al., 2002; Karahanna and Straub, 1999; Benbasat and Zmud, 1999).

Moreover, this study is a co-relational study that attempts to delineate the important variables that are associated with the research problem. The hypothesis testing approach is conducted to explain the nature of certain relationships between the determinants, moderators and dependent variables, and seeks to discover the direction and degree of the relationships among factors through certain type of co-relation or regression analysis. Furthermore, this study examines a number of aspects of the entrepreneurs' intention to use and use behaviour of IS related innovation, and where entrepreneurs daily works proceed normally. With this in mind, the context in which the adoption and utilisation practices exist and also the experiences of entrepreneurs are important. Thus, this study is carried out in a non-contrived setting of entrepreneur's natural environment. This type of empirical research strategy will minimize interface by the researcher with the normal flow of the work by the entrepreneurs.

In addition, a longitudinal survey approach is performed as this study concentrates on particular aspects of technological, individuals, environmental of IS adoption behaviour by entrepreneurs, and as such, a research method that gathers a large dataset on each of these

aspects is deemed appropriate. The main justification for choosing the longitudinal survey design is that this research design allows the researcher to test the overall fit of the integrative UTAUT-EPM model, and to test the hypothesised relationships between the determinants, moderators, and dependent variables. Longitudinal survey method is concerned with drawing a sample of subjects from a population and studying the sample in order to make interfaces about the population, whereby longitudinal survey design has the ability to collect opinions and perceptions about events or objects over a period of time (Hussey and Hussey, 1997). Therefore, longitudinal survey allows collection of data across a length of time frame to gather data and to understand changes surrounding the phenomena. Thus, as demonstrate in Figure 4.1, the final research design adopted forthis study consists of three main phases. Phase I involve an in-depth literature survey for the theoretical foundations underpinning the integrative UTAUT-EPM model and the preparation, pre-testing, and pilot testing of the proposed instrument.

The outcomes of Phase I establishe the suitability, effectiveness, and adequacy of the research instrument prior to the commencement of Phase II. Phase II involves surveying a large number of entrepreneurs that are directly involved with the IS strategic decision making. Questionnaires were distributed directly to entrepreneurs. Phase III involves analysing the data collected and confirming the results of survey data to produce an adequate image of reliability and validation (Erzberger and Prein, 1997; Scandura and Williams, 2000).

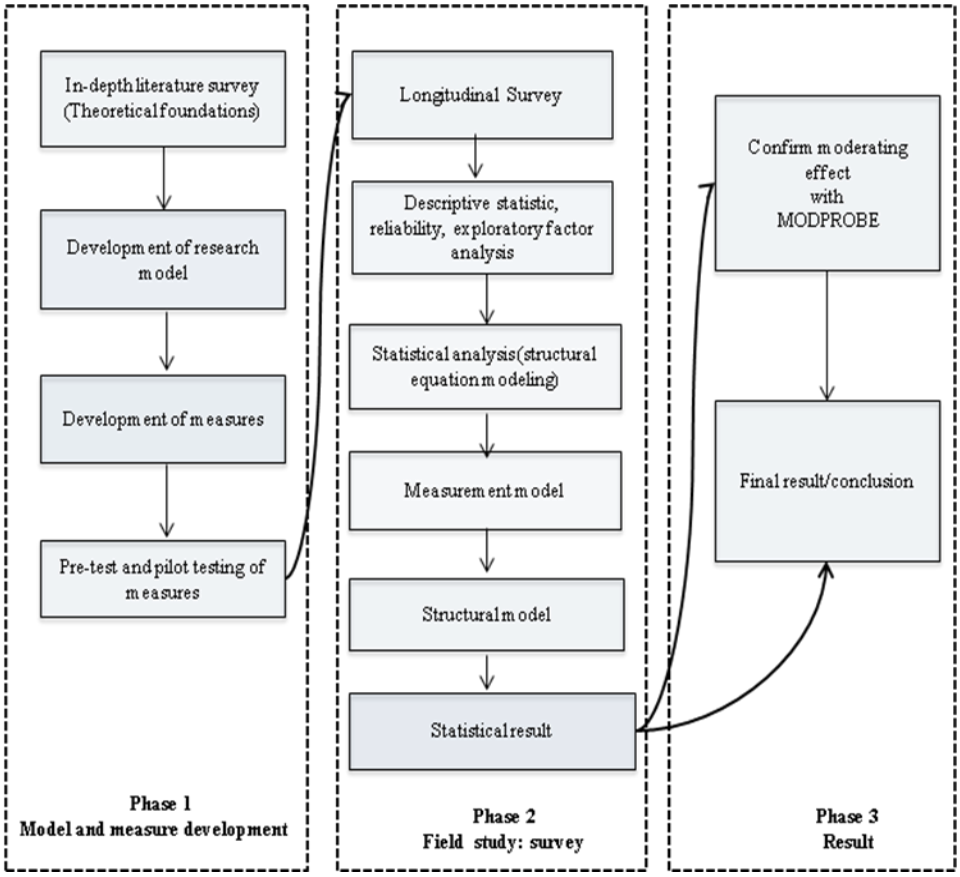

Figure 4.1: The Research Process

In detail, Phase I involves an in depth literature reviews to obtain information and knowledge in the IS acceptance and entrepreneurship context. Reviewing these two areas of knowledge gives additional insights to various possibilities for extending the existing theories and knowledge in the area of IS adoption behaviour research, particularly, IS adoption behaviour by entrepreneurs. In the theory formulation stage, this study reviews literature in entrepreneurship context to find the relevant theories and/or models that are able to measure entrepreneurial intention toward taking action. In addition, theories from IS adoption and entrepreneurship contexts are compared and contrasted, and all factors contributing to intention to use and use behaviour by individuals and entrepreneurs are reviewed and analysed. This approach is taken in an attempt to integrate the relevant theories

and summaries these theories into a logical manner that allows to improve prediction of IS adoption behaviour by entrepreneurs.

The UTAUT from IS adoption context and Entrepreneurial Potential Model (EPM) from entrepreneurship context are considered as relevant in order to achieve the objectives of this study as stated in Chapter One. As a result, an integrative IS adoption model that consist of some aspects of UTAUT and some aspects of EPM is proposed to predict entrepreneurs intention to use and their use of IS related innovation. As the integrative UTAUT-EPM model takes into consideration the IS adoption behaviour and entrepreneurship intention behaviour, the integrative UTAUT-EPM model is infered to have the ability and robustness in its capability to predict entrepreneurs IS adoption behaviour (i.e., intention to use and use behaviour). From the integrative UTAUT-EPM model several hypotheses are generated to examine and validate the model. Phase I also involved the development of the research measurements and instrument (i.e., questionnaire) to collect data to enable validation of the integrative UTAUT-EPM model. The research measurements and instrument were developed based on these two models that are UTAUT and EPM.

Questionnaires were sent to academic experts and practitioners to establish the suitability, effectiveness, and adequacy of research measurements and instrument. The outcomes of Phase I established the suitability, effectiveness, and adequacy of the research instrument prior to the commencement of Phase II. Phase II involves surveying a large number of entrepreneurs who are involve in small, medium and large companies via self-administered longitudinal survey. The main method of data collection is using a structured questionnaire survey. Longitudinal survey was conducted on 1200 entrepreneurs in Malaysia

based on convenience random sampling. Data obtained from the questionnaire survey are analysed using statistical applications such as SPSS, MODPROBE, and AMOS for structural equation modeling. SPSS was employed to provide descriptive statistics and inferential statistics (e.g. mean, standard deviation, correlation, exploratory factor analysis, measure common method bias, assessment of multivariate assumptions), while AMOS was employed to run the structural equation modeling to test the validation of the measurement, confirmatory factor analysis, reliability and test hypotheses via structural analysis of the integrative UTAUT-EPM model. Moderating variables are tested through multigroup analysis in AMOS, while MODPROBE is used to confirm moderating effects of the continuous moderating variables of propensity to use and precipitating events.

Phase III presents the findings of longitudinal survey data that produce an adequate image of reality and validation of the integrative UTAUT-EPM model, thus concludes this study. The important goals of this study are validating and confirming the integrative UTAUT-EPM model in the context of IS adoption behaviour by entrepreneurs. Phase III is the phase where this study reaches to the interpretation of the findings, and conclusion of the study.

4.2 DEVELOPMENT AND OPERATIONALISATION OF MEASURES

4.2.1 Developing the Measures

The literature review conducted in Chapter Two guides the development and operationalisation of the constructs in the integrative UTAUT-EPM model. The first step was a literature review to determine how other researchers have operationalised these constructs. Measurement items for performance expectancy, effort expectancy, social

influence, facilitating conditions, intention to use and use behaviour are adapted from IS adoption literature, particularly, from UTAUT (e.g., Venkatesh et al., 2003; Venkatesh et al., 2008; Taylor and Todd, 1995). Four other constructs such as perceived desirability, perceived feasibility, propensity to use and precipitating events are adapted from entrepreneurship literature, particularly, from EPM (Krueger, 1993; Kruger and Brazeal, 1994; Schindehutte et al., 2000).

In this study, the multi-item measures for each construct have been adapted to the issues surrounding the IS adoption behaviour (i.e., intention to use and use behaviour), target (i.e. entrepreneurs), context (i.e., IS related innovation) and time. Whenever possible, multi-items within each construct were developed and adapted from existing scales previously validated within IS and entrepreneurship literature. All items are measured using 7-point Likert scales representing a range from (1) strongly disagree to (7) strongly agree, with the exception of IS related innovation use behaviours and precipitating events. All items for IS related innovation use behaviour represent a range of (hourly, daily and weekly) frequency of use from not at all to more than five hours. While for precipitating events all items are measured using 7-point Likert scales representing a range from (1) extremely unimportant to (7) extremely important. The list of constructs name, constructs definitions, constructs measure, and relevant literature are shown in Table 4.1.

Table 4.1: Measurement of Constructs

Constructs	Definition	Measure Assessment	Sources
Performance expectancy	Degree to which entrepreneurs perceive that using the IS related innovation will help him or her attain gain in job performance.	To measure the effect of entrepreneurs perception of benefit derived when using IS related	Venkatesh et al. (2003)
Effort expectancy	Degree to which entrepreneurs perceive that using IS related innovation is relatively ease and effortless.	To measure the effect of entrepreneurs perception of effort and ease use when using IS related innovation.	Venkatesh et al. (2003)
Social influence	Degree to which entrepreneurs perceive that important others believe he or she should use the IS-related innovation	To measure the effect of entrepreneurs perception of important others believe to use IS related innovation.	Venkatesh et al. (2003)
Facilitating conditions	Degree to which entrepreneurs perceive- that the existence of organisational and technical infrastructure to support the use of IS related innovation.	To measure the effect of entrepreneurs' perception concerning the availability of facilitating conditions when using IS related innovation.	Venkatesh et al. (2003)
Perceived desirability	Degree to which entrepreneurs perceive the attractiveness of using IS related innovation	To measure the effect of attractiveness of IS related innovation on entrepreneurs' intention to use the system.	Krueger (1993)
Perceived feasibility	Degree to which entrepreneurs perceive that he or she has personal ability and capability to use IS related innovation.	To measure the effect of perception entrepreneurs concerning his or herself skill, knowledge and ability when using IS related innovation.	Krueger (1993)
Intention to use	Degree to which the entrepreneurs willingness to commitment toward using IS related innovation in future.	To measures entrepreneurs' conscious plans either to use or reject IS related innovation in future.	Venkatesh et al. (2003)
Propensity to use	Degree to which entrepreneurs' disposition to act on his or her decisions (stable personal characteristics) that are reflected by volitional aspects.	To measure volitional aspects of entrepreneurs' intentions (I will use it).	Krueger (1993)
Precipitating events	Degree to which certain external factors (e.g., work situation, environment, technical condition) which facilitate or 'precipitate' the realisation of intention into behaviour.	To measure the effect of external factors (e.g., work situation, environment, technical condition) on the relationship between intention to use and use behaviour.	Kruger and Brazeal (1994) Schindehutte et al.(2000)
Use behaviour	Degree to which the entrepreneurs use IS related innovation to perform their daily business activities	To measure the frequency of using IS related innovation by entrepreneurs	Venkatesh et al., 2008; Taylor and Todd, 1995

4.2.2 Pre-Testing the Measures

Conversely, there are limitations to using a survey questionnaire instrument as the major means of gathering data. Questionnaire instrument is prone to the validity issues

inherent in each research method such as internal consistency and reliability, construct validity, and external validity. In addition, the survey questionnaire data are also prone to the threat of mono-method bias (Campbell and Stanley, 1966). This study has taken precaution to mitigate the common threats of measurement errors and the common method bias. In addition, a series of pre-tests are conducted to ensure the reliability and validity of the measurements. The pre-tests are designed and developed to ensure that the measures used are logically consistent, complete, and valid. The pre-tests are performed to ensure that the response of categories is adequate and the wording of each question in the questionnaire is unambiguous, in other words to ensure content validity. Figure 4.2 illustrates the series of process performed to ensure validity of the measures.

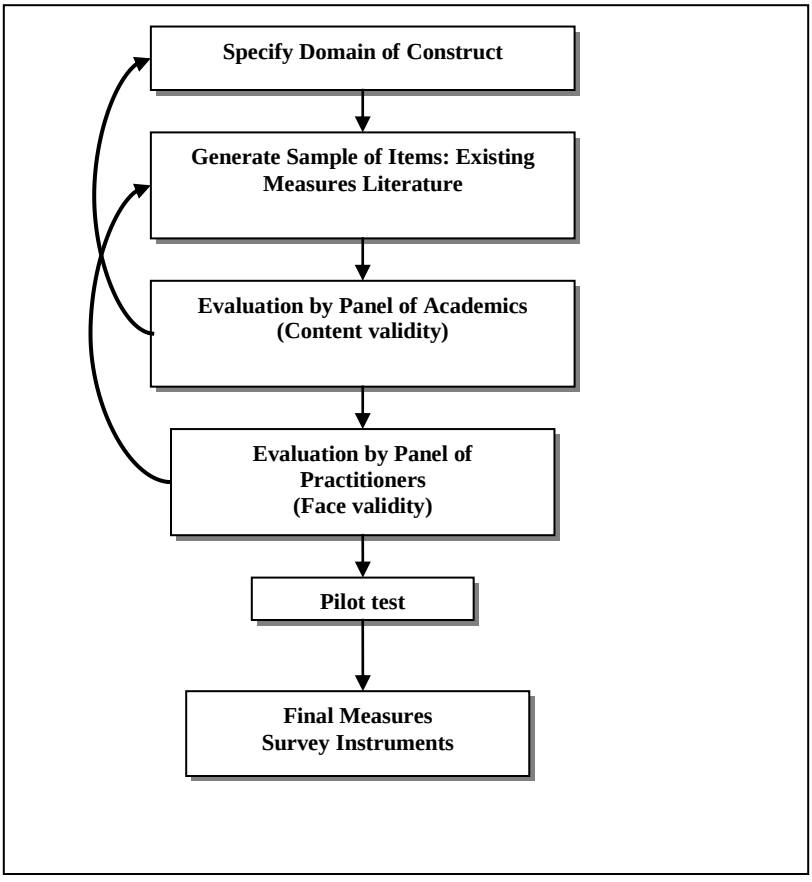

Figure 4.2: Framework for Development of Measures (Adapted from Malhotra and Grover, 1998)

Content validity was conducted to ensure that the measures include an adequate and representative set of items that tap the concepts (Cavana et al., 2001). Content validity is accessed via two ways. First, content validity was achieved through literature review and using original theories and measurements which are pre-validated through previous studies. Second, content validity was conducted by evaluations through panel of academics, potential entrepreneurs and entrepreneurs. Thus, the first pre-test was conducted among academics; while the second pre-test was conducted among entrepreneurs to ensure that the subject's interpretation of each question is clear, thus achieving face validity. Face validity was conducted to confirm that the items being presented on the questionnaire are understandable and clear to the subject (Cavana et al., 2001). Therefore, the measurements are tested by giving the questionnaire to a sample of potential entrepreneurs and entrepreneurs to evaluate their reaction to the items.

4.2.2.1 Evaluation by Panel of Academics

A panel consisting of twenty senior academics from relevant backgrounds was selected to establish content validity of the constructs. The panel of academics is selected based on their familiarity with the research area and the constructs to be examined. A covering letter together (Appendix A-1) with their concepts that include the construct name, construct definitions and measurements (Appendix A-2) are sent to these twenty experts in system IS and entrepreneurship disciplines to provide their judgments on the measurements and whether the items correspond with the concepts. Each academic is asked on the scale of (1) very weak estimate to (7) very strong estimate, their opinion on how well the set of items represent and capture the constructs under consideration. The academics are also asked to include any additional comments they consider necessary. Out of twenty academics, eleven of them responded. Based on their judgments, some items were deleted, some words were

changed and some sentences rephrased and reworded to make these items more understandable and representative of the constructs. Two items from effort expectancy, two items from performance expectancy, and one item from perceived feasibility were omitted from their measurements. For example, in effort expectancy, one item, which is '*I would find that working with IS related innovation is fun and enjoyable for me*' is taken out from the measurements of this construct as the academics are in the opinion that this item is not a measurement of 'ease of use of IS innovation'. While some items were rephrased based on the academics suggestions, for example, the word '*gain*' was replaced with '*to obtain*'. Results of the panel of academics are shown in Table 4.2.

4.2.2.2 Evaluation by Panel of Practitioners

After rephrasing and changes are made to the all the measurements based on the panel of academic experts comments and suggestions, pre test are performed among postgraduate students and practitioners to evaluate the face validity of the measurements. The first pre-test is conducted with potential entrepreneurs that consist of thirty post graduate students (i.e., PhD and MBA students) from University of Malaya. Post graduate students can be used as proxy for potential entrepreneurs as prior studies published since 1985 have used students to study entrepreneurial intention (Meeks, 2004). A covering letter together (Appendix A-3) with their concepts that include the construct name, construct definitions and measurements were distributed to these post graduate students. Each panel is asked on the scale of (1) very difficult to complete to (7) very easy to complete, their opinion on the ease of answerability of the set of items for all constructs under consideration.

In the second stage, in order to detect problems in the design or instructions of the questionnaire, to check ambiguous or biased questions, and to identify whether entrepreneurs will have any difficulty understanding the contents (face validity), ten entrepreneurs are selected to be interviewed face to face based on convenience sampling. The duration of interview was around thirty minutes. They were asked to read and complete the questionnaire (the same questionnaire that distributed topost graduate students-Appendix A-3) to indicate their understanding about all the questions, and to indicate the degree of ease or difficulty related to each question in the questionnaire. During the interview, notes are taken to ensure that no comments or feedbacks are missed by the researcher. After the interview, their responses are analysed to see if the comments and feedbacks can be used to improve the understandability of the questionnaire, and with that the same necessary changes are conducted to the related items. Results of all the pretest are as shown in Table 4.2.

Table: 4.2: Results of the Pre-Test by Panel of Academics and Practitioners

Constructs	**Results of pre-test Rate from 5**	
	Panel of Academics (11) (Content validity)	**Panel of Practitioners (40) (Ease of answerability)**
Performance expectancy	4	3.5
Effort expectancy	4	3.3
Social influence	4	3.6
Facilitating conditions	4.5	4
Perceived desirability	4	4
Perceived feasibility	4	3.2
Intention to use	4	3.5
Use behaviour	5	4
Propensity to use	4	3.5
Precipitating events	4	3.4

4.2.3 Operationalising the Measures

4.2.3.1 Performance Expectancy

Based on prior studies, performance expectancy is conceptualised in this study as the degree to which entrepreneurs perceive using IS related innovation will be useful for them and helps them to attain benefit in their business (Venkatesh et al., 2003; Venkatesh and Zhang, 2010). The conceptualisation of performance expectancy towards intention to use is measured using five items adapted and modified from Venkatesh et al. (2003). For ease of comprehension by respondents, this study employs a 7-point Likert scale with anchors ranging from 1 = strongly disagree to 7 = strongly agree to evaluate the entrepreneurs' perception about usefulness of IS related innovation. The wordings of the items and items scale are shown in Table 4.3.

Table 4.3: Scales Items Related to Performance Expectancy

Performance Expectancy	Strongly Disagree Moderate Strongly Agree
a. I find the IS related innovation to be useful in my business.	1-----2-----3-----4----5----6----7
b. Using the IS related innovations enable me to accomplish tasks more quickly.	1-----2-----3-----4----5----6----7
c. Using IS related innovation increases my productivity.	1-----2-----3-----4----5----6----7
d. Using IS related innovation, increase my chances of getting more benefit in my business.	1-----2-----3-----4----5----6----7
e. Using IS related innovation gives me competitiveness power in my business.	1-----2-----3-----4----5----6----7

Performance expectancy construct is described to the panel of academics and practitioners as degree to which entrepreneurs perceive that using the IS related innovation will help them attain gain in job performance. This construct is operationalised to measure the effect of entrepreneurs' perception of benefit derived when using IS related innovation. The panel of academics rated content validity of this construct at an average of 4 (maximum

score of 5.00), whereas the panel of practitioners rated ease of answerability of this construct at average of 3.5 (maximum score of 5.00).

4.2.3.2 Effort Expectancy

Based on the prior studies, effort expectancy is conceptualised in this study as the degree to which entrepreneurs' perceived that using IS-related innovation would be free of effort or takes less effort or easy to use (Venkatesh et al., 2003). The construct is considered as the degree of complexity of new IS. The operationalisation of effort expectancy is measured using four items adapted and modified from Venkatesh et al. (2003). In this construct four items summed up to obtain the measure of effort expectancy. For the ease of comprehension by respondents, this study employs a 7-point Likert scale with anchors ranging from 1= strongly disagree to 7 = strongly agree to evaluate the perception about ease or difficulty of IS related innovation. The wordings of the items and items scale are shown in Table 4.4.

Table 4.4: Scales Items Related To Effort Expectancy

Effort Expectancy	Strongly Disagree Moderate Strongly Agree
a. My interaction with the IS related innovation would be clear and understandable.	1-----2-----3-----4----5----6----7
b. It would be easy for me to become skilful at using IS related innovation in my business.	1-----2-----3-----4----5----6----7
c. Learning to operate the IS related innovation is easy for me.	1-----2-----3-----4----5----6----7
d. I would find the IS related innovation easy to use.	1-----2-----3-----4----5----6----7

Effort expectancy construct is described to the panels of academics and practitioners as the degree to which entrepreneurs perceive that using IS related innovation is relatively ease and effortless. This construct is operationalised to measure the effect of entrepreneur's perception of effort and ease of use when using IS related innovation. The panel of

academics rated content validity of the construct at an average of 4 (maximum score of 5.00), whereas the panel of practitioners rated ease of answerability of the construct at an average of 3.3 (maximum score of 5.00).

4.2.3.3 Social Influence

In the UTAUT, social influence is defined as "the degree to which an individual perceive that important others believe he or she should use the new system" (Venkatesh et al., 2003). UTAUT argued that there is a positive relationship between social influence and intention to use new system in mandatory context in the early stage of experience. Prior research support the relationship between social influence and behavioural intention (Wang and Shih, 2009; Kijsanayotin et al., 2009; Wang and Yang, 2005). Based on prior research social influences is conceptualised in this study as the social pressure felt by entrepreneurs to use IS related innovation. The social pressure generated from those individuals that the entrepreneurs perceived to be important to influence their decision to use IS related innovation. This construct was measured using four items that were adapted and modified from Venkatesh et al. (2003). Respondents were asked to consider others individuals thinking about them using IS related innovation. For the ease of comprehension by respondents, this study employs a 7-point Likert scale with anchors ranging from 1= strongly disagree to 7 = strongly agree to evaluate the perception about social influence towards IS related innovation adoption. The wordings of the items and items scale are shown in Table 4.5.

Table 4.5: Scales Items Related To Social Influence

Social Influence	Strongly Disagree Moderate Strongly Agree
a. People who influence my behaviour think that I should use the IS related innovation in my business.	1-----2-----3-----4----5----6----7
b. People who are important to me think that I should use the IS related innovation in my business.	1-----2-----3-----4----5----6----7
c. The IT expert in the business has been helpful in the use of the IS related innovation in my business.	1-----2-----3-----4----5----6----7
d. In general, the whole organisation has supported the use of the IS related innovation in my business.	1-----2-----3-----4----5----6----7

Social influence construct is described to the panels of academics and practitioners as the degree to which entrepreneurs perceive the important others believe they should use the IS related innovation. This construct is operationalised to measure the effect of entrepreneurs perception of important others believe to use IS related innovation. The panel of academics rated content validity of the construct at an average of 4 (maximum score of 5.00), whereas the panel of practitioners rated ease of answerability of the construct at average of 3.6 (maximum score of 5.00).

4.2.3.4 Facilitating Conditions

Facilitating conditions is important construct in predicting use behaviour in UTAUT, and this construct is concerned with the degree to which entrepreneurs' perceive that factors in the environment do support and facilitate the use of IS related innovation. In IS adoption context, IS researchers suggest that users who believe that there is organisational and environmental support to use new IS are more likely to use the system (Yeow and Loo, 2009; Kijsanayotin et al., 2009; Venkatesh and Zhang, 2010; Alawadhi and Morris, 2008). Venkatesh et al. (2003) argue that facilitating conditions have a significant influence on use of new IS. Based on prior studies facilitating conditions are conceptualised as the degree to which entrepreneurs perceive that factors in the environment do support and facilitate the

use of IS related innovation. This construct is measured directly using five items adapted from Venkatesh et al. (2003). Respondents indicate their view about existence of facilities and infrastructures to support them to use IS related innovations on a 7-point Likert scale ranging from 1= strongly disagree to 7 = strongly agree. It is related to entrepreneurs' perception that there is enough technical and organisational support if they want to use IS related innovation. The wordings of the items and items scale are shown in Table 4.6.

Table 4.6: Scale Items Related To Facilitating Conditions

Facilitating Conditions	Strongly Disagree Moderate Strongly Agree
a. I have resource necessary to use the IS related innovation in my business.	1-----2-----3-----4----5----6----7
b. I have the knowledge necessary to use the IS related innovation.	1-----2-----3-----4----5----6----7
c. There is external/internal support group available for assistance with IS related innovation difficulties.	1-----2-----3-----4----5----6----7
d. New innovation is not compatible with other IS system I use.	1-----2-----3-----4----5----6----7
e. There are special allocations (i.e. loan, intensive) for using IS related innovation for entrepreneurs, from government.	1-----2-----3-----4----5----6----7

Facilitating conditions construct is described to the panels of academics and practitioners as the degree to which entrepreneurs perceive that the existence of organisational and technical infrastructures to support the use of IS related innovation. This construct is operationalised to measure the effect of entrepreneurs' perception concerning the availability of facilitating conditions when using IS related innovation. The panel of academics rated content validity of the construct at an average of 4.50 (maximum score of 5.00), whereas the panel of practitioners rated ease of answerability of the construct at an average of 4 (maximum score of 5.00).

4.2.3.5 Perceived Desirability

Perceived desirability is the strongest factor in predicting the behavioural intention in the EPM. This construct is defined as the "degree of attraction an individual perceives towards a specific behaviour" (Krueger and Brazeal, 1994; Krueger, 1993; Krueger et al., 2000). In the context of entrepreneurship, perceived desirability examines the attractiveness of behaviour and indirectly depends on the outcome of performing said behaviour. Prior studies argue that high level of perceived desirability will lead to high level of intention to use IS related innovation (Fitzsimmons and Douglas, 2011; Devonish et al., 2010; Krueger, 1993). Based on prior studies, perceived desirability is conceptualised as the degree of attraction an entrepreneur perceives towards using IS related innovation (Krueger and Brazeal, 1994; Krueger, 1993; Krueger et al., 2000). Respondents are asked to evaluate their perception about attractiveness of using IS related innovations and their desirability to adopt and use it. This variable is measured using seven items that are adapted from Krueger (1993). A 7-point Likert scale ranging from 1 = strongly disagree to 7 = strongly agree is employed to measure the entrepreneurs perceived desirability to adopt IS related innovation. The wordings of the items and item scales are shown in Table 4.7.

Table 4.7: Scale Items Related To Perceived Desirability

Perceived Desirability	Strongly Disagree Moderate Strongly Agree
a. Using IS related innovation in my business is much more desirable for me.	1------2------3-----4-----5----6-----7
b. I would enjoy the personal satisfaction of using IS related innovation in my business.	1------2------3-----4-----5----6-----7
c. Using IS related innovation would increase quality of work in my business.	1------2------3-----4-----5----6-----7
d. Using IS related innovation in my business is an attractive idea.	1------2------3-----4-----5----6-----7
e. I am very enthusiastic to use IS related innovation in my business.	1------2------3-----4-----5----6-----7
f. The success of my business lies in the use of IS related innovation.	1------2------3-----4-----5----6-----7
g. Using IS related innovation would result in a more relax working environment in my business.	1------2------3-----4-----5----6-----7

Perceived desirability construct is described to the panels of academics and practitioners as the degree to which entrepreneurs perceive the attractiveness of using IS related innovation. This construct is operationalised to measure the effect of attractiveness of IS related innovation on entrepreneurs intention to use them. The panel of academics rated content validity of the construct at an average of 4 (maximum score of 5.00), whereas the panel of practitioners rated ease of answerability of the construct at an average of 4 (maximum score of 5.00).

4.2.3.6 Perceived Feasibility

In the context of entrepreneurship perceived feasibility is defined as the perception regarding their ability to carry out a specific behaviour (Krueger and Brazeal, 1994; Krueger, 1993; Shapero, 1985). Perceived feasibility is derived from Bandura (1986, 1995) who argue that taking action requires consideration of not just outcome expectation (perceived desirability) but also perceived self efficacy (feasibility). Therefore, in this study perceived feasibility is conceptualised as the degree to which entrepreneurs perceive that they are capable and have required skill to use IS related innovation in their job. Respondents are asked to consider there is skill and ability of adopting and using IS related innovations in their business. Further, respondents are asked to evaluate their perception about their capability and skill of using IS related innovation. This variable was measured using six items that are adapted and modified from Krueger (1993). A 7-point Likert scale ranging from 1 = strongly disagree to 7 = strongly agree is employed to measure the entrepreneurs self-efficacy to use IS related innovation. The wordings of the items and item scales are shown in Table 4.8.

Table 4.8: Scale Items Related To Perceived Feasibility

Perceived Feasibility	Strongly Disagree Moderate Strongly Agree
a. I am able to use the IS related innovation even if there is no one around to show me how to use it.	1-----2-----3-----4----5----6----7
b. I would feel comfortable using IS related innovation in my business.	1-----2-----3-----4----5----6----7
c. I have the skills and capabilities required to use IS related innovation.	1-----2-----3-----4----5----6----7
d. I am confident I can put in the effort needed to use new IS related innovation in my business.	1-----2-----3-----4----5----6----7
e. It would be very practical for me to use new IS related innovation in my business.	1-----2-----3-----4----5----6----7
f. It would be very feasible for me to use IS related innovation in my business.	1-----2-----3-----4----5----6----7

Perceived feasibility construct is described to the panels of academics and practitioners as the degree to which entrepreneurs perceived that they have personal ability and capability to use IS related innovation. This construct is operationalised to measure the effect of entrepreneurs' perception concerning their skill, knowledge and ability when using IS related innovation. The panel of academics rated content validity of the construct at an average of 4 (maximum score of 5.00), whereas the panel of practitioners rated ease of answerability of the construct at average of 3.2 (maximum score of 5.00).

4.2.3.7 Intention to Use

In IS adoption context Venkatesh et al. (2003) defines intention to use as "a person's subjective probability that he will perform some behaviour". Intention to use indicates how people are willing to try, and exert effort in order to perform the use behaviour (Venkatesh, 2000; Ajzen, 1991; Taylor and Todd, 1995; Venkatesh et al., 2003). Prior studies in the entrepreneurship context define intention as a person's willingness to pursue a given behaviour and represent an individual's commitment toward target behaviour (Shapero, 1982; Krueger and Brazeal, 1994; Stopford and Baden-Fuller, 1994; Krueger, 2000; Venkatesh et al., 2003). In this study, intention to use is conceptualised as the degree to

which entrepreneurs has formulated conscious plans to use IS related innovation (e.g., mobile banking, on line banking, Web2, Enterprise Resource Planning, new hardware and software related to digital communication) to improve their daily business activities (Venkatesh et al., 2003). Five items are used to measure this construct. This study employs a 7-point Likert scale with anchors ranging from 1 = strongly disagree to 7 = strongly agree. The wordings of the items and item scales are shown in Table 4.9.

Table 4.9: Scale Items Related To Intention to Use

Intention to Use	Strongly Disagree Moderate Strongly Agree
a. I predict I would use IS related innovation, if it is available in the future.	1-----2-----3-----4----5----6----7
b. My personal philosophy is to do whatever it takes to use IS related innovation in the future.	1-----2-----3-----4----5----6----7
c. I have very seriously thought of using IS related innovation in my business if it available, in next 6 months.	1-----2-----3-----4----5----6----7
d. I plan to use current IS related innovation in my work in the next 8 month.	1-----2-----3-----4----5----6----7
e. I intent to use similar IS related innovation technology in the future.	1-----2-----3-----4----5----6----7

Intention to use construct is described to the panels of academics and practitioners as the degree to which the entrepreneurs' willingness towards commitment of using IS related innovation in future. This construct is operationalised to measure entrepreneurs' conscious plans either to use or reject IS related innovation in future. The academic panel rated content validity of the construct at an average of 4 (maximum score of 5.00), whereas the practitioners rated ease of answerability of the construct at an average of 3.5 (at maximum score of 5.00).

4.2.3.8 Use Behaviour

There are many arguments in the context of IS adoption associated with use behaviour. Prior studies measure use behaviour construct in many ways including: (1) objective (e.g., system logs) and (2) subjective (e.g., user assessments of duration, frequency, or intensity of use) (Taylor and Todd, 1995a; Venkatesh et al., 2003). Other IS researchers conceptualised system use in three ways: (1) frequency of use, (2) duration of use, and (3) intensity of use (Davis, 1989; Venkatesh et al., 2003). Venkatesh et al. (2008) and Taylor and Todd (1995a) define use of the system as the frequency, duration, and intensity of an employee's interactions with a particular system. Actual use behaviour in UTAUT is measured as duration of use via system logs in the context of organisation (Venkatesh et al., 2003).

Table 4.10: Scale Items Related To Use Behaviour

Question	**Response Type**
a. On average, in an ordinary day, how long do you use IS related innovation in your business	□ Not at all □30 minute thru 1 hour □1 to 2 hours □2 to 3 hours □ 3 to 5 hours □More than 5hours
b. On average, ***how frequently***, do you normally use the IS related innovation in your business?	□ Not at all □Less than once a week □About once a week □2 or 3 times a week □4 or 6 times a week □About once a day □More than once a day
c. On average, how much time do you spend on newly purchased IS related innovation in your business, in a day?	□Not at all □30 minute to 1 hour □1 hour to 2 hours □2 hour to 3hour □ 3 hour to 5 hours □ More than 5 hours

Based on prior studies, this study conceptualised use behaviour construct as the degree to which entrepreneurs' use- IS related innovation to improve their job performance or conduct their business activities. Therefore in this study, frequency of use is employed to measure this use behaviour construct (Venkatesh et al., 2008; Taylor and Todd, 1995). Thus,

use behaviour construct is measured by asking respondents to indicate their use behaviour of IS related innovation. The scale is established in the format of nominal scale such as how often do you use in day, or week. The wordings of the items and items scale are shown in Table 4.10. Use behaviour of IS related innovation is described to the panels of academics and practitioners as the degree to which the entrepreneurs use IS related innovation to perform their daily business activities. This construct is operationalised to measure the frequency of using IS related innovation by entrepreneurs. The panel of academics rated content validity of the construct at an average of 5 (maximum score of 5.00), whereas the panel of practitioners rated ease of answerability of the construct at an average of 4 (maximum score of 5.00).

4.2.3.9 Propensity to Use

Propensity to use is considered as moderator in EPM on the relationship between predictor of entrepreneurial intention to start new venture or add new value to current business. This construct is concerned about individuals' pervasive decision to perform the behaviour. Shapero (1982) uses propensity to act as determinant of intention and defines propensity to act as the individuals' disposition to act on individuals' decisions (stable personal characteristics) which reflects volitional aspects of intention (Krueger 1993, Krueger and Brazeal, 1994). Prior studies conceptualised propensity to act as stable personality trait that was closely related to locus of control (Krueger, 2000; Krueger and Brazeal, 1994).

Based on prior studies this study conceptualised propensity to use as the degree to which entrepreneurs perceived disposition to use and it's reflect volitional aspects of their intention. The construct is referred to as propensity to use to conceptualise to the IS adoption

context. Propensity to use is measured using four items adopted from Krueger (1993). A 7-point Likert scale ranging from 1 = strongly disagree to 7 = strongly agree is employed to measure the propensity to use. The construct measures the entrepreneurs potential tendency of the decision they make with regards to use IS related innovation in their businesses. The wordings of the items and items scale are shown in Table 4.11.

Table 4.11: Scale Items Related To Propensity to Use

Propensity to use	Strongly Disagree Moderate Strongly Agree
a. I will learn to operate IS related innovation in my business.	1-----2-----3-----4---5---6----7
b. I will use IS related innovation to achieve more opportunities in my business.	1-----2----3-----4----5---6----7
c. I will use IS related innovation because I cherish the feeling of a useful service.	1-----2-----3----4----5----6---7
d. I will use IS related innovations that enable me to run my business successfully.	1-----2----3----4----5----6----7

Propensity to use is described to the panels of academics and practitioners as the degree to which entrepreneurs' disposition to act on his or her decisions (stable personal characteristics) that are reflected by volitional aspect. This construct is operationalised to measure volitional aspect of entrepreneurs' intention of I will use it. The panel of academics rated content validity of the construct at an average of 4 (maximum score of 5.00), whereas the panel of practitioners rated ease of answerability of the construct at an average of 3.5 (maximum score of 5.00).

4.2.3.10 Precipitating Events

Shapero (1982) posits that "significant life events can cause a sizable increase in entrepreneurial activity and change individuals' perception of new circumstance". Furthermore, prior studies suggest that that subtleness of cognitive barriers and tangible

barriers can be obstacles that prevent an intention from coming to fruition (Kruger, 2000; Shapero, 1982; Kruger, 2000; Krueger and Brazeal, 1994; Krueger, 2008). Precipitating events is one important factor in EPM that captures the effect of external factors on entrepreneurs' intention to take action and is considered as moderator on the link between intention and behaviour (Krueger, 2000). Based on prior studies, precipitating events is conceptualised as a certain exogenous variable which facilitates or 'precipitates' the realisation of intention into behaviour.

This construct is measured using four items that are adapted and modified from prior studies on entrepreneurs' intention behaviour (Krueger and Brazeal 1994; Krueger, 1993, Schindehutte et al., 2000). Forconsistency of respondents, this study employs a 7-point Likert scale with anchors ranging from 1 = extremely unimportant to 7 = extremely important. The wordings of the items, and items scale are presented in Table 4.12.

Precipitating events is described to the panels of academics and practitioners as the degree to which certain external factors (e.g., work situation, environment, and technical condition) facilitate or 'precipitate' the realization of intention into behaviour. This construct is operationalised to measure the effect of external factors for example, work situation, environment, and technical condition on the relationship between intention and behaviour. The panel of academics rated content validity of the construct at an average of 4 (maximum score of 5.00), whereas the practitioners panel rated ease of answerability of the construct at an average of 3.4 (maximum score of 5.00).

Table 4.12: Scale Items Related to Precipitating Events

Precipitating Events
a. If you experience any changes in your work situation (e.g., being offered a big contract, declining profit, availability of financial resource, new investment, rising cost, new product), how much have these changes influenced your decision in using IS innovation? Extremely Unimportant □ Quite Unimportant □ Slightly Unimportant □ Neither unimportant Nor important □ Slightly Important □ Quite Important □ Extremely Important □
b. If you experience any change in your work environment (e.g., government policy, financial crisis, customer or new market, supplier request, industry or market change, declining market share), how much have these changes influenced your decision in using IS innovation? Extremely Unimportant □ Quite Unimportant □ Slightly Unimportant □ Neither unimportant Nor important □ Slightly Important □ Quite Important □ Extremely Important □
c. If you decided to change your work situation, due to recent opportunity or lack of opportunity(e.g., competitive nature of environment, competitor threat or action, strategic growth target, perception of increasing risk, attract new customer, international opportunities), how much have these assessments influenced your decision in using IS innovation? Extremely Unimportant □ Quite Unimportant □ Slightly Unimportant □ Neither unimportant Nor important □ Slightly Important □ Quite Important □ Extremely Important □
d. If you experience any technical change in your work environment (e.g., availability of IS innovation, technological change, new technology in accounting practice, availability of on line system), how much have these changes influenced your decision in using IS innovation? Extremely Unimportant □ Quite Unimportant □ Slightly Unimportant □ Neither unimportant Nor important □ Slightly Important □ Quite Important □ Extremely Important □

4.2.3.11 Age and Gender

Gender and age are categorical moderating variables. In this study, gender is categorised into two groups: (1) male and (2) female. While age are categorised into three main groups that are based on generation cohorts: (1) generation baby-boomer, (2) generation X and (3) generation Y. Generation baby-boomer age group is those entrepreneurs born before 1965, and thus, their age group are between 46 years old and above. While generation X is those entrepreneurs born between the years 1965 up to 1980, and therefore, their age group are

between 31 years old to 45 years old. On the other hand, generation Y is those entrepreneurs born after 1980, and thus, their age group are those between 20 years old to 30 years old.

4.3 DEVELOPMENT OF SURVEY INSTRUMENT

4.3.1 Designing the Questionnaire

According to Malhotra (2004) questionnaire is a structured technique for data collection that consists of a series of questions that a respondent answers. The design of a good questionnaire holds the key to obtaining good survey results. Further, Cavana et al. (2001) state that when designing questionnaire, one should focus on these three main areas: (1) the wording of the questions, (2) the planning of issues of how variables will be categorised, scaled, and coded after receiving the responses, and (3) the general appearance of the questionnaire.

Field studies, such as survey research, are exposed to measurement errors. The most important measurement errors that researcher must be aware of when designing the questionnaire is the common method variance. Common methods variance (CMV) is referred to as the amount of spurious co-variance shared among variables due to the fact of common method used in collecting data (Malhotra et al. 2006). According to Hufnagel and Conca (1994) these method biases are problematic because the existence of CMV will make it difficult to differentiate the phenomena under investigation from measurement artifacts. Social desirability, item ambiguity, consistency motif, and scale length can result in common method bias (Tourangeau et al., 2000; Malhotra et al. 2006; Podsakoff et al., 2003; Nederhof, 1985). To avoid CMV, Spector (2006) suggests that the questionnaire is to be

kept short and all independent and dependent variables are placed in separate sections of the questionnaire.

This study takes into consideration the above issues related to the use of survey as the source of data collection when designing the final survey instrument that is the questionnaire. This study carefully and clearly defines all constructs according to the context of this study. The researcher is aware of the meanings of these constructs when considering them in the development and operationalisation of the constructs. Furthermore, items that have been pre-validated and tested in prior studies are adapted and modified accordingly in this study. However, according to Straub (1989), the use of question items developed or validated in the previous studies do not necessarily generate satisfactory reliability and validity. Thus, this study has taken precaution by conducting series of pre-test to minimize CMV.

In addition, this study has taken step to minimize the CMV by structuring the questionnaire as short as possible that however captures all measures. Also, this study makes sure that all independent and dependent variables are placed in separate sections of the questionnaire as suggested by Spector (2006). Further, this study has carefully taken care of the wording of the questions and general appearance of the questionnaire to ensure reliability of survey data. The researcher also personally categorises, scales and codes the data collected from the survey. Further assessments of CMV and measurement equivalent are discussed further in Chapter Five.

4.3.2 Pilot Testing the Questionnaire

The next stage was a pilot test of questionnaire using participants whose background was similar to the target population of the final survey. Pilot test is conducted to detect weakness in the design of the questionnaire and to ensure that the various measures demonstrate the appropriate level of reliability. Also, the pilot test is conducted to ensure that the questionnaire is worded appropriately, is in proper sequence and layout, is able to engage and to gain familiarity with respondents, and last but not least to ensure that the respondents understand all the items in the questionnaire.

For this pilot test, questionnaires are distributed in two national conferences within the Klang Valley, Malaysia that are specifically conducted and organised for entrepreneurs (see Appendix A-7). To ensure that this study captures the actually population, the researcher of this study personally attend these conferences, and participants of the conference are approached and are asked whether they consider themselves as entrepreneurs. If they answered yes, then the researcher distributes the questionnaire to the participants. More than one hundred entrepreneurs are conveniently and randomly selected, with eighty questionnaires are completed and returned on the day itself. The time taken to complete the questionnaire is between 20 to 25 minutes, with the researcher present at all times. No significant comments are made about the length and the duration in answering the questionnaire. Moreover, no significant comments are made about the difficulty in answering all the items in the questionnaire. Thus, no major modification and/or correction were made to any of the items. Additionally, no major comments were made about the timing, format and structure. Therefore the layout and presentation of the questionnaire was not altered and are maintained for the final survey.

Data collected from the pilot test is also tested for scale reliability for each construct using basic scale reliability test in SPSS. Internal reliability analysis helps to assess the goodness of fit (Cavana, 2001). The most popular assessment of inter-item consistency reliability is the Cronbach's alpha, thus the Cronbach alpha test is employed for these pilot data. According to Cavana (2001), Cronbach alpha value of less than 0.60 is considered poor, while a Cronbach alpha value of over 0.70 is considered good. As shown on Table 4.13, results of the reliability analysis on the pilot data reveal that the Cronbach alpha values for all measurement items are greater than 0.70, which is within the recommended value (Cavana, 2001), with the exception of one item from perceived feasibility (i.e., I am able to use the IS related innovation even if there is no one around to show me how to use it). Therefore, this item is removed from the scale of perceived feasibility construct. The final number of items for all constructs is as shown in Table 4.13.

Table 4.13: Cronbach'Alpha

Constructs	Items	Cronbach' Alpha
Performance expectancy	5	0.937
Effort expectancy	5	0.944
Social influence	4	0.885
Facilitating conditions	5	0.901
Perceived desirability	7	0.954
Perceived feasibility	5	0.945
Behavioural intention	5	0.937
Use behaviour	3	0.897
Propensity to use	4	0.883
Precipitating events	4	0.877

These high values of Cronbach alpha (i.e., greater than 0.70) indicate that all items in each construct are positively co-related to one another within the constructs and shows adequacy in construct measurements. Also, the results of reliability test indicate that all measures are without mono-method bias and offers consistent measurements across time and across the various items in the questionnaires.

4.3.3 Finalising the Questionnaire

As this is a longitudinal survey study, two sets of questionnaires are prepared and are distributed at different time frames but to the same participants/subjects. The first set of questionnaire contains all demographic questions and items related to the determinants towards IS adoption behaviour by entrepreneurs, that include performance expectancy, effort expectancy, social influence, perceived desirability, perceived feasibility and facilitating conditions. The questionnaire also contains the mediating variable of intention to use, and the continuous moderator of propensity to use. The questionnaire is designed to measure the entrepreneurs' perception about the determinants of IS related innovation adoption, their propensity to use, and entrepreneurs plan or intention to use IS related innovation in their businesses. The questionnaire comprises five separate sections (refer to Appendix A-5 for the final of version of the complete questionnaire). The average time to complete the survey is approximately twenty minutes. On the first page of the questionnaire, the term entrepreneurs and IS related innovation are stated to ensure that participants have clear understanding of what term entrepreneurs and IS related innovation refer to.

Section A consists of sixteen questions that are related to entrepreneurs background, such as the entrepreneurs' age, gender, race, education, types of industry and business they venture into, the year they venture into their business, the number of employees and their total annual revenue. Section B includes questions about entrepreneurs' perception on predictors of intention to use such as performance expectancy, effort expectancy, perceived desirability, perceived feasibility, social influence, and facilitating conditions. Section C relates to the entrepreneurs' intention to use IS related innovation, while Section D consists the continuous moderating variable, propensity to use. The last Section E contains free space for participant to provide comments that maybe useful information during interpretation and

discussion of the findings. Participants were also asked to write their contact number or email to facilitate the second stage of data collection.

The second set of questionnaire contains items related to the use behaviour of IS related innovations and precipitating events that may happen during the time intention to use is formed and use behaviour of IS related innovation was performed. The second set of questionnaire consists of three sections (refer to Appendix A-6 for the final of version of the complete questionnaire). Again, in the first page of the questionnaire IS related innovation definition is stated to remind participants of the terms entrepreneurs and IS related innovation. The average time to complete the survey is approximately five minutes. Section A consists of items related to use behaviour. Section B includes the precipitating events that relate entrepreneurs' job, work situations, environment situations, and technological changes in the entrepreneurs' environment. The last Section C is a free space for participants to provide comments that maybe useful information during interpretation and discussion of the findings.

4.4 ADMINISTRATION OF LONGITUDINAL SURVEY

4.4.1 Participants

The population that the researcher considers for this study is entrepreneurs within Malaysia. As mentioned before, there is a difference in term of definition for entrepreneurs in the entrepreneurship literature. Based on McDaniel (2000) definition, not all managers or owners of business are entrepreneurs because one can run a business without trying new ways of doing business. Thus, an entrepreneur is someone whose role is to do new things or doing things that are already done in an innovative way (Schumpeter, 1936).Therefore, the

target population of this study is entrepreneurs that brings ideas, new practice (product, service or method of production), or innovation in their job, start new business, or market new innovation. On that note, this study defines IS related innovation as the idea, practice, or any digital and communications technology that is new by individuals or other unit of adoption. As such, this study considered any new hardware or software which related to IS such as Mobile Banking, Online Banking, Mobile Commerce, Web2 and Enterprise Resource Planning as IS related innovation.

There are relatively many entrepreneurs that may fit the definition as "entrepreneurial businesses", however there are no statistical data related to these entrepreneurs. With these limitations, this study finds difficulty in identifying the exact number of actual entrepreneurs in Malaysia. In the peril of searching for appropriate entrepreneurs reveals that there are different conferences, seminars, gatherings and workshops organised by government agencies or private sectors for entrepreneurs in Malaysia, with most of these gatherings are held within the Federal Territory of Klang Valley, Malaysia.

In an attempt to identify whether these avenues would provide this study with the appropriate target population, the researcher contacts and approaches the organisers, audiences and speakers, and realises that these gatherings do provide an appropriate avenue to locate entrepreneurs. These gatherings normally invited famous and successful entrepreneurs with entrepreneurs as audiences and participants. Several seminars were also organised where entrepreneurs can share information about their successes. There are also several workshops that were conducted to guide entrepreneurs on how to be successful in their business ventures, their career and work.

It was important that the target population is entrepreneurs and that their work places are in Malaysia to ensure that the data collected are actually from Malaysian entrepreneurs. The sampling frame is entrepreneurs involved in providing products and services in the areas of manufacturing, and services in Malaysia. As it was difficult to find the number of entrepreneurs' population in Malaysia, this study uses the total population of attendees in different workshops, seminars, and conferences as the target population. This study seeks the assistance of organisers of these gatherings to distribute the questionnaires during the gatherings. Thus, the questionnaires are distributed personally to the participants during these gatherings. The unavailability of an accurate sampling frame leads this study to use convenience random sampling. The first page of the questionnaire describes the terms entrepreneurs and IS related innovation, as well as the aim of this study. This declaration is to ensure respondents understand the terms entrepreneurs and IS related innovation, and the purpose of this study. The willing respondents are first classified based on the entrepreneurs and non-entrepreneurs. In addition, the participants of these gatherings are requested to state the area of their contribution (refer to Appendix A-5).

4.4.2 Data Collection Process

The distribution of questionnaires and collection of data are conducted in two different phases and time frames. The first phase of data collection begins in February 2010 that focus on first process of IS adoption behavioural of intention to use. In the first phase, 1200 questionnaires were distributed personally to participants during the entrepreneurs' gatherings.) They were asked to fill and return the questionnaires after the end of the gatherings. In total, 640 responses were received, with a response rate 53.3%. The returned questionnaires are checked for any missing data or incomplete data. Of these responses,

thirty-eight are incomplete, and therefore are not eligible for the second phase of data collection. Only 602 of respondents in Phase I of the field study are eligible for Phase II of field study. Out of these 602 respondents 512 identify themselves as entrepreneurs, while ninety respondents do not consider themselves as entrepreneurs.

The second phase of data collection begins in June 2011, which is ten months later after the first phase of data collection. All 602 respondents were contacted to be reintroduced to this study via emails and telephone calls. In Phase II, emails were used to distribute the 602 questionnaires that focus on the second process of IS adoption behaviour of use behaviour and precipitating events that may occur in entrepreneurs daily work and business.

In this second phase of data collection, 412 completed responses were received, with a response rate of 68.4%; with 329 respondents identify themselves as entrepreneurs, while eighty-three of respondents indicate that they are non-entrepreneurs. Therefore the final number of respondents for this study is 329 respondents who are actual entrepreneurs and they participated in both Phase I and Phase II of the field survey. Thus, the final response rate of this study is 54.7%. Demographic details about the respondents in the final sample are presented below.

4.4.3 Demographic Analysis of Respondents

Table 4.14 presents the demographic details of entrepreneurs participate in this study. Summary of the demographic data reveals that the number of male entrepreneurs is more than female entrepreneurs, with 75.7% of the entrepreneurs were male and the remaining

24.3% of the entrepreneurs were female. All respondents were 18 years of age and above. Those between 46 years old and above accounted for 29.5% of the entrepreneurs, while the younger entrepreneurs between the ages of 18 years old to 45 years old, and accounted for the remaining 70.5%. Of the younger group, 12.5% of them were between 40 years old to 45 years old, 29.8% of entrepreneurs were between 31 years old to 39 years old and 28.2%of entrepreneurs were in the youngest age group, between 18 years old to 30 years old.

Seventy-two percent (72%) of entrepreneurs have completed university or college with certificates, diplomas, and degrees. A smaller percentage, 17.9% has completed with Master degree. About 5.2% completed with PhD, and only 5%completed primary school or secondary school. In term of races, 42.2% of entrepreneurs were Chinese, with 38.9% of the entrepreneurs were Malay, 14.3% of the entrepreneurs were Indian, and 4.6% were Non-Malay Bumiputera or another racial type not presented by the researcher. To a certain extend the distributions of the variation of races among entrepreneurs are a reflection of the actual profile of business population in Malaysia.

Table 4.14: Demographic Summary of Survey Respondents (329)

Demographic variables	Number of Entrepreneur	Percent (%)
Age		
18~20	30	9.1
21~ 30	63	19.1
31 ~ 39	98	29.8
40 ~ 45	41	12.5
46+	97	29.5
Gender		
Male	249	75.7
Female	80	24.3
Race		
Malay~1	128	38.9
Chinese~2	139	42.2
Indian~3	47	14.3
Others~4	15	4.6
Type of Industry		
Manufacturing	124	37.6
Service	205	62.3
Size		
Small	173	52.6
Medium	122	37.1
large	34	10.3
Education		
Primary/Secondary school	15	4.6
Diploma	93	28.3
Undergraduate	145	44.1
Masters	59	17.9
PhD	17	5.2
Experience with IT		
Experience	271	82.4
No experience	58	17.6
Educational Background		
IT education	126	38.3
Non IT Education	203	61.7

The number of entrepreneurs in the service industry is the high percentage, with 62.3%, while the number of entrepreneurs involved in manufacturing was 37.6%. The number of entrepreneurs in the small size companies has the highest percentage, with 52.2%, while the lowest percentage belongs to the large companies with 10.3%. Eighty-two percent (82%) of entrepreneurs have prior experiences with using IS, while approximately 28% of the entrepreneurs do not have any experience in using IS. In relation to IS educational

background, findings reveal that 38.3% do have IS educational background, while 61.7% of entrepreneurs do not have any form IS educational background.

4.5 PRELIMINARY ASSESSMENT OF SURVEY DATA

4.5.1 Assessment of Potential Non-Response Bias

Non-response bias is an important issue in social science, and occurs when actual survey respondents differ from sampled respondents, that is respondent that refuse to participate (Malhotra and Grover, 1998). Therefore, it is necessary to ensure that non-response bias will not affect this study. The ultimate method for reducing non-response bias is to increase the number of respondents which is only possible to a certain degree (Armstrong and Overton, 1977). Based on Armstrong and Overton (1977), in this study, the possibility of non-response bias is minimal due to high response rate of 53.3% in Phase I and 68.4% in Phase II.

Although the possibility of non-response bias is minimal, to further assess the possibility of non-response bias, this study examines the non-response bias by comparing mean scores differences of all constructs between early respondents and late respondents, whereby the late respondents are used as proxy for those that do not response to the study (Armstrong and Overton, 1977). According to Armstrong and Overton (1977) and Miller and Smith (1983), late respondents are appropriate proxy as non respondents, as these late respondents could potentially not response to the survey. They only responded to the survey because they were reminded and/or persisted by researcher. This form of testing for potential non-response bias has been adopted in many research disciplines, including IS researches (e.g., Chau and Jim, 2002; Karahanna et al., 1999). Therefore, the respondents in this study are categorised in these two different groups: (1) early respondents whereby those that

responded with one to three weeks; and (2) late respondents whereby those that responded after 6 weeks. Means and standard deviations of all the ten constructs are examined to test for non-response bias.

Table 4.15: Analysis of Non-Response Bias

Constructs	Respondents	N	Mean	Std. Deviation	T-Statistics	P value (2-Tailed)
Performance expectancy	Early	156	5.75	1.0	.204	.662
	Late	64	5.81	.90		
Effort expectancy	Early	156	5.35	.89	.104	.067
	Late	64	5.14	.75		
Social influence	Early	156	4.84	1.1	.695	.234
	Late	64	5.02	1.1		
Facilitating conditions	Early	156	5.12	.98	.135	.732
	Late	64	5.17	.87		
Perceived desirability	Early	156	5.86	.95	.341	.737
	Late	64	5.90	.87		
Perceived feasibility	Early	156	5.62	1.0	.10	.167
	Late	64	5.43	.88		
Intention to use	Early	156	5.72	1.0	.123	.422
	Late	64	5.84	.90		
Use behaviour	Early	156	5.43	.88	.23	.750
	Late	64	5.47	.70		
Propensity to use	Early	156	5.52	1.1	.000	.000
	Late	64	6.00	.81		
Precipitating events	Early	156	4.98	1.3	.123	.422
	Late	64	4.57	1.1		

As shown in Table 4.15, there are no significant differences of the means and standard deviation used between early respondents and late respondents for most of the constructs, with the exception of propensity to use. These results indicate that those entrepreneurs that do not response to the survey are likely to have same perceptions of the constructs to those entrepreneurs that response to the survey, except for the perception of propensity to use. Based on the results it is expected that entrepreneurs may have differences

regarding their propensity to use IS related innovation. Therefore this study concludes that there were no substantial differences in the makeup of the actual survey entrepreneurs and the sampled respondents. Therefore, non-response bias is not a problem of this study.

4.5.2 Comparison of Construct Means between Ethnic Group

There are three main ethnic groups in Malaysia; (1) Malay, (2) Chinese and (3) Indian. Thus, it is important to investigate whether there are significant differences about the perceptions of all the constructs in this study among these ethnic groups. An independent-sample T-test is performed to evaluate whether there are significant difference of perceptions on all constructs between the groups. In this study the number of Malay entrepreneurs are 128 respondents, while the Chinese entrepreneurs make up to a number of 139 respondents, and Indian entrepreneurs with a total of 47 respondents.

Interestingly, the proportion of these ethnic groups for this study represents the population of the ethnic groups' distribution in Malaysia. This study first compares mean constructs related to perceptions towards IS adoption behaviours between the Chinese entrepreneurs and the Malay entrepreneurs. Then this study compares the mean constructs related to perceptions towards IS adoption behaviours between Malay entrepreneurs and Indian entrepreneurs. Lastly, this study compares the mean constructs related to perceptions towards IS adoption behaviours between Chinese entrepreneurs and Indian entrepreneurs.

Table 4.16: Results of the Independent T-test between Malay Entrepreneurs and Chinese Entrepreneurs

Measures		Malay (Mean)	Chinese (Mean)	T-Value	Sig. (2-tailed)
Performance expectancy					
PE1	I find the IS related innovation to be useful in my business.	5.63	5.99	2.668	0.008
PE2	Using the IS related innovation enable me to accomplish tasks more quickly.	5.68	6.00	2.492	0.015
Facilitating conditions					
FC1	I have resource necessary to use IS related innovation in my business.	5.30	5.62	2.682	0.008
FC4	New innovation is not compatible with other IS related system I use.	4.47	5.12	2.929	0.004
Perceived desirability					
PD1	Using IS related innovation in my business is much more desirable for me.	5.72	6.07	2.779	0.006

As shown in Table 4.16, the results of Independent t-test indicate that there are significant differences in term of mean constructs between Chinese entrepreneurs and Malay entrepreneurs in five of the items related to the perceptions towards IS adoption behaviour, that include two items from performance expectancy, one item from perceived desirability and two items from facilitating conditions. Although, the results clearly indicate that these items were significantly different between these two groups, the overall perceptions towards IS adoption behaviour are equivalent as the results reveals only five out of twenty seven items, with only represent 19%.

As shown in Table 4.17, the results of Independent t-test indicate that there are differences between Malay entrepreneurs and Indian entrepreneurs in five of the items related to the perceptions towards IS adoption behaviour, that include one items from performance expectancy, two item from perceived desirability and two items from facilitating conditions. The results clearly show that these items were significantly different between these two groups. However, the overall perceptions towards IS adoption behaviour

are equivalent as the results reveals only five out of twenty seven items, which represents only 19%.

Table 4.17: Results of the Independent T-test for Malay Entrepreneurs and Indian Entrepreneurs

Measures	Malay (Mean)	Indian (Mean)	T-Value	Sig. (2-tailed)
Performance expectancy				
PE1) I find the IS related innovation to be useful in my business.	5.63	6.11	3.054	0.003
Facilitating conditions				
FC1) I have resource necessary to use IS related innovation in my business.	5.30	5.81	2.818	0.005
FC4) new innovation is not compatible with other IS related system I use.	4.74	5.26	2.721	0.007
Perceived desirability				
PD1) Using IS related innovation in my business is much more desirable for me.	5.72	6.13	2.380	0.019
PD5) I am very enthusiastic to use IS related innovation.	5.79	6.32	3.257	0.001

As shown in Table 4.18, the results of Independent t-test indicate that there are differences between Chinese and Indian entrepreneurs in one of the items related to the perceptions towards IS adoption behaviour, that include one items from effort expectancy. The results clearly show that this item was significantly different between these two groups. However, the overall perceptions towards IS adoption behaviour are equivalent as the results reveals only one out of twenty seven items (i.e., only 3%).

Table 4.18: Results of the Independent T-test between Chinese Entrepreneurs and Indian Entrepreneurs

Measures	Chinese (Mean)	Indian (Mean)	t-value	Sig. (2-tailed)
Effort Expectancy				
EF4) I would find the IT related innovation easy to use.	5.20	5.60	2.682	0.022

In conclusion, results of the Independent t-test reveal that there are no substantial differences between three main ethnic groups of entrepreneurs related to perceptions towards IS adoption behaviour. Therefore, the results demonstrate that all entrepreneurs regardless of to which ethnic groups that they belong to, they have similar understanding and issues related to the perceptions towards IS adoption behaviour. Further assessment of measurement equivalent is conducted using SEM, throughCFA. The results of the assessment of the measurement equivalent among these ethnic groups of entrepreneurs are further discussed in Chapter Six.

4.6 CHAPTER SUMMARY

In summary, this chapter presents the research methodology in detail. This chapter begins by describing the overview of research design and process. This chapter then progresses with the development and operationalisation of the measures for each constructs. The overall research process for developing the questionnaire and gathering data to test the hypothesis are also discussed in this chapter. This chapter also discusses the target population, sampling, and administration of the survey. The chapter concludes with assessment of non-response bias and comparison of mean constructs among different ethnic group. Chapter Five will present the data preparation before data analysis, the multivariate assumption analysis, the validity and reliability of data and preliminary findings. The chapter will present procedures of SEM that include the procedures for adequacy of measurement model and adequacy of structural model.

CHAPTER FIVE

PRELIMINARY ANALYSIS AND SEM PROCEDURES

INTRODUCTION

This chapter describes the data preparation, reliability and validity assessment of measurements, and the techniques employed in this study to validate the integrative UTAUT-EPM model and test the hypotheses. This chapter is divided into five main sections. Section one describes the pre checking of the data, outliers, and multivariate assumption prior to commencing the statistical analysis. Section two presents the assessment of reliability and validity through SPSS. Section three describes the preliminary analysis of the of the Pearson correlations. Section four discusses and examines the common method variance using Harman's single-factor test (i.e., exploratory factor analysis (EFA) and confirmatory factor analysis (CFA). Section five presents structural equation modeling (SEM) approach employed to validate and confirm the integrative UTAUT-EPM model and hypotheses that include the criteria used to assess the measurement model and structural model. This chapter concludes with a summary of the chapter.

5.1 DATA PREPARATION

5.1.1 Data Coding and Data Editing

Data preparation involves checking the data for accuracy, entering the data, and developing and documenting a database structure that integrate the various measures using standard statistical programs (i.e., SPSS). Out of the 1200 questionnaires, 640 responses were received. Using this 640 dataset, all response items in the questionnaire are converted

into a specific code for data analysis purposes. The cleaning processes of data for all variables are examined to detect any extreme values and missing data in the data set. In order to ensure reliability, completeness, and consistency, data are checked for errors, omissions, and consistency. An exploratory descriptive analysis is performed. The frequency and descriptive tables indicate there are thirty-eight cases that contain some extreme values, and/or missing data or values, for examples, there are respondents that did not fully complete the demographic section and some of these respondents only respons to one or two sections of the questionnaire, therefore the thirty-eight cases are dropped in this study.

Hence, only 602 responses are eligible for the Phase II of data collection, which is conducted ten months later. Out of these 602 participants in Phase II of data collection, 412 responses are received which 329 of these responses are from those who indicate that they are entrepreneurs, while 83 of these responses are from those that sill consider themselves as non-entrepreneurs. Hence, this study decides to only use the 329 responses that represent actual entrepreneurs, which is the main focus of this study. The same data preparation procedures are conducted on these 329 responses. These data are checked for data accuracy and are coded, and then are entered, developed and documented to a database structure that integrates the various measures using standard statistical programs (i.e., SPSS). Frequency and descriptive analysis are performed to identify extreme values and/or missing data. Results indicate there are no prominent and significant missing value and/or data, and thus, the data analysis of this study is based on the 329 cases. Further preliminary testing such as examination of outliers, assessment of multivariate assumptions, and evaluation of scale reliability and validation are performed on the 329 cases. Preliminary analyses, such as the mean scores of all constructs and Pearson correlation are also performed.

5.1.2 Examination of Outliers

Outliers are defined as "an observation (such as extreme value) that is substantially different from the other observations on one or more variables" (Hair et al., 2006). It is important to differentiate between the outliers that can be deleted and those that cannot be deleted and check whether the scores for outliers are real values or not. In this study, the presence of outliers was examined using histogram, normal Q-Q plot, the detrended normal Q-Q plot, and box plot. The analysis of the histograms, normal Q-Q plots and detrended normal Q-Q plots in this study indicate there are presences of data that can be considered as outliers (refer to Appendix B-1). To further examine the presence of outliers identified using histogram, normal Q-Q plot, the detrended normal Q-Q plot, and box plot, all constructs are compared against their original mean and the 5% trimmed mean.

As shown in Table 5.1, results indicate that the 5% trimmed mean for all constructs do not depart much further from their original mean, thus indicating if there are cases that are different from other observations, the outlying cases do not have lot of influence on the mean (Pallant, 2005). Therefore, this study concludes that there are not cases that are substantially different from one another.

Table 5.1: Mean, and 5 percent Trimmed Mean-outliers

Constructs	Mean	5% Trimmed Mean	Std.Error
Performance expectancy	5.86	5.92	0.92
Effort expectancy	5.31	5.31	0.83
Social influence	4.95	4.98	0.26
Facilitating conditions	5.26	5.26	0.87
Perceived desirability	5.97	6.03	0.85
Perceived feasibility	5.62	5.64	0.91
Intention to use	5.85	5.90	0.92
Use	5.47	5.53	0.79

Furthermore, this study performs multivariate assumption tests of data sets for all observations designated as with outliers and data sets for observations without outliers, results of multivariate analysis for dataset of observations with outliers are similar enough to the dataset of observations without outliers. Due to the small sample size of 329, all cases/observations that contain outliers are retained and included for further data analysis, and findings of this study are based on the all assessments of outliers. To maintain credibility of this study, all statistical tests are performed on dataset with and without outliers. However, this study only reports findings of dataset that consist outliers, while findings of dataset without outliers are only reported when their findings lead to differences in interpretations.

5.1.3 Assessment of Multivariate Assumptions

5.1.3.1 Testing for Normality

Normality refers to the shape of the data distribution for an individual metric variable and its correspondence to the normal distribution (Hair et al., 2006). The distribution of data is examined using Skewness and Kurtosis values. The Skewness value provides an indication of the symmetry of the distribution and Skewness of '1' indicates moderate Skewness. According to Hair et al. (2006), if the calculated z value for Skewness exceeds the critical value of ±2.58, at significance level of $p < 0.01$; or ±1.96, at significant level of $p < 0.05$, the distribution of the data is considered non-normal. On the other hand, kurtosis provides information about peakedness of the distribution. The Kurtosis is the measurement of the peak of the curve, but does not have large effect on analyses. Negative Kurtosis represents a flatter distribution while positive value denotes a peaked distribution. Any Kurtosis value less than 1 are negligible, and any value from one to ten indicates moderate

non-normality. For perfectly normal distribution, the Kurtosis and Skewness should be equal to zero (Pallant, 2007).

Table 5.2: Normality, Skewness and Kurtosis

Constructs	Mean	SD	Skewness	Kurtosis
Performance expectancy	5.85	0.91	-0.864	-0.046
Effort expectancy	5.30	0.81	-0.128	0.004
Social influence	4.95	1.22	-0.348	-0.368
Facilitating conditions	5.25	0.86	-0.114	-0.327
Perceived desirability	5.96	0.84	-0.784	-0.120
Perceived feasibility	5.60	0.89	-0.379	-0.602
Propensity to use	5.73	1.06	-0.501	-0.718
Precipitating events	4.54	1.44	-0.804	0.349
Intention to use	5.82	0.94	-0.577	0.514
Use behaviour	5.48	0.79	1.037	0.526

As demonstrated in Figure 5.2, results indicate that most of the skewness and kurtosis values of variables are less than one and negative, except for use behaviour construct with skewness value of 1.037. However, the skewness value for use behaviour construct is within the acceptable value for normal skewness. From the kurtosis values, the results also reveal that the distribution is relatively flat and in the right hand side of the graph. The results show that the dataset has normal distribution. Thus, the dataset did not violate the multivariate assumption of normality.

5.1.3.2 Testing for Homosedasticity

Homoscedasticity refers to the assumption that the dependent variables exhibit equal level of variance across the range of independent variables (Hair, et al., 2006). Homoscedasticity and normality assumptions are related, and it has been acknowledged that all constructs are within the range of normal distribution. Thus, the visual inspection of the scatter plot did not show any pattern of increasing or decreasing residuals (refer to Appendix

B-2). Therefore, homoscedasticity in this study is achieved and did not violate the multivariate assumption of homoscedasticity.

5.1.3.3 Testing for Linearity

Linearity in this study is assessed by running a series of simple linear regression analysis. It is expected that the points would be almost a straight line around the diagonal axis so as not to violate the assumptions on the randomness of the residuals. Results show that score cluster uniformly around the regression line (refer to Appendix B-2). Therefore the results confirm the expectations and thus, there no violation of the multivariate assumption of linearity.

5.1.3.4 Testing for Multicollinearity

Multicollinearity refers to a situation where two or more of the independent variables are highly correlated (Pallant, 2005). A low multicollinearity indicates that the dependent variables (e.g., intention to use and use behaviour) are independent of each other. This study makes comparison of the Tolerance index (TI) and variance of inflation factor (VIF) (Hair, et al., 2006). If the tolerance index is less than 0.1, a problem with multicollinearity is present. In addition, the bigger the value for VIF, the higher the multicollinearity and a VIF value higher than 10 suggest an existence of multicollinearity problem. As shown in Table 5.3, test for multicolinearity indicates that the Tolerance index values for all constructs are greater than 0.10, while the VIF values are less than 10. Therefore, that data set of this study has not violated the multicolinearity assumption of multicollinerarity.

Table 5.3: Multicollinearity and singularity

Model	(Constant)	Correlations		Colinearity Statistic		
		Zero-order	Partial	Part	Tolerance	VIF
Dependent variable: Intention	Performance expectancy	0.737	0.243	0.136	0.349	2.862
	Effort expectancy	0.420	0.011	0.006	0.746	1.340
	Perceived desirability	0.798	0.481	0.298	0.392	2.552
	Perceived feasibility	0.739	0.210	0.117	0.322	3.107
	Social influence	0.036	0.044	0.024	0.991	1.010
Dependent variable: Use behaviour	Intention to use	0.576	0.459	0.417	0.727	1.376
	Facilitating conditions	0.422	0.173	0.142	0.727	1.376

5.2 ASSESSMENT OF MEASURES

According to Hair et al. (2006), reliability and validity are two important characteristics of instrument measurement. Following the suggestion from Hair et al. (2006), this study assesses the reliability and validity of measurements by conducting inter-item correlation test, reliability test, and exploratory factor analysis (EFA).

5.2.1 Internal Consistency and Reliability of Measures

Cronbach alpha coefficient which is the most popular indicator of internal consistency is employed to assess the reliabilities of the items in the questionnaire. The acceptable value for Cronbach alpha is 0.70 or above (Hair et al., 2006). This study also assesses inter-item correlations (See Appendix B-3). As shown in Table 5.4, results of the internal consistency and reliability of measures reveal Cronbach alpha values for all constructs are between 0.851 and 0.944. Furthermore, as demonstrated in Figure 5.4, the results also reveal that inter-item correlations among items for each of the constructs are within the cut-off value of 0.50. All these values indicate that the items in each construct are positively co-related to one another. Therefore, all these results indicate all constructs

provide adequate coverage of the concepts, all items are understandable and clear, and that the questionnaire is a reliable measurement tool, suggesting adequate internal consistency and reliability of the scale measurement.

Table 5.4: Internal Consistency and Reliability

Measurement items	Items	Cronbach' Alpha	Inter-item Correlation Range
Performance Expectancy	5	0.944	0.664- 0.843
Effort expectancy	4	0.926	0.718- 0.811
Social Influence	4	0.915	0.656-0.804
Perceived Desirability	7	0.932	0.573-0.811
Perceived Feasibility	5	0.939	0.556-0.872
Facilitating Conditions	5	0.881	0.480-0.733
Behavioural Intention	5	0.921	0.602-0.863
Precipitating Events	4	0.844	0.541-0.743
Propensity to use	4	0.863	0.535-0.738
Use behaviour	3	0.851	0.586-0.703

5.2.2 Assessment of Measures Validation

Construct validity testifies to how well the findings obtained from the use of the measure fits the theories around which the integrative UTAUT-EPM model is designed. Construct validity can be conducted through: (1) corelational analysis, (2) factor analysis, and (3) the multigrain-multi method matrix of correlations. There are two forms of construct validity that include convergent validity and discriminant validity. Convergent validity measures the degree to which two measures of the same constructs are co-related. Convergent validity indicates that items that are indicators of a specific construct should converge or share a high proportion of variance in common (Hair et al., 2006). High co-relation among two measures shows that the scale is measuring its intended concept. While, discriminant validity is the extent to which a construct is truly distinct from other constructs

(Hair, et al., 2006). High discriminant validity shows that a construct is unique and captures some phenomena other measures do not (Byrne, 2009).

Factor analysis is one of the techniques that can be used to measure constructs validity (Hair et al., 2006). Factor analysis is used to gather information about inter-relationships among a set of variables (Pallant, 2007). This technique is used to determine the number and nature of common factors needed to account for the pattern of observed co-relation (Fabriger et al, 1999). There are two types of factor analysis for verifying construct validity: (1) exploratory factor analysis (EFA) that is performed in SPSS and (2) confirmatory factor analysis (CFA) that is performed in structural equation modelling. The results of this CFA are discussed in Chapter Six. In EFA, if items load strongly on their associate factors, convergent validity is obtained, and if item load is stronger on its associate factor than other factor, discriminant validity is achieved (Hair, et al., 2006). The results of EFA in this study show that most items factor loadings were greater than 0.50, and each of these items load strongly on their associate factors (see Appendix B-4), thus all constructs represented acceptable convergent and discriminant validity. Moreover, as shown in Table 5.4, the reliability test results show that all items to total co-relations values (Cronbach alpha) are higher than 0.70 and the inter-item correlations are higher than 0.50, thus suggesting convergent validity of the items is met. From the above assessment, this study concludes that all constructs achieved adequate construct validity of convergent validity and discriminant validity.

5.3 PEARSON CORELATIONS

Pearson correlation is employed to measure the relation among a group of constructs. The correlation value (r) of greater than 0.70 indicates very strong relationships among the constructs, while correlation value (r) of 0.50 to 0.70 indicates strong relationship among constructs, correlation value (r) of 0.30 to 0.50 indicates moderate relationship among constructs, and correlation value (r) of 0.10 to 0.30 indicates relatively weak relationship among constructs (Pallant, 2005). Based on suggestion by Pallant (2005) any correlation value (r) of more than 0.80 would perhaps be reason for concern, as any value above 0.80 would indicate the existence of multicolinearity.

Table 5.5: Pearson Correlation

	Mean	**SD**	**PE**	**EF**	**FC**	**PD**	**PF**	**PTU**	**PRE**	**ITU**	**UB**	**SI**
Performance Expectancy(PE)	5.85	0.91										
Effort expectancy(EF)	5.30	0.81	.430**									
Facilitating conditions(FC)	5.25	0.86	.521**	.415**								
Perceived Desirability(PD)	5.95	0.84	.710**	.425**	.549**							
Perceived feasibility(PF)	5.60	0.89	.760**	.476**	.603**	.732**						
Propensity to use(PTC)	5.73	1.06	.667**	.382**	.529**	.699**	.619**					
Precipitating events(PRE)	4.54	1.44	.343**	.264**	.284**	.381**	.363**	.319**				
Intention to use(ITU)	5.82	0.94	.721**	.393**	.505**	.710**	.716**	.695**	.368**			
Use behaviour(UB)	5.48	0.79	.567**	.326**	.435**	.534**	.633**	.533**	.370**	.544**		
Social influence(SI)	4.95	1.22	.078	.047	.084	.012	.056	.094	.154**	.069	.119*	

*: $P \leq 0.05$, * *: $P \leq 0.01$ ** *: $P \leq 0.001$

As shown in Table 5.5, results of Pearson correlations among constructs show that all constructs are significantly correlated ($p < 0.01$), except for social influence with some of some of the constructs. All the correlation values are positive indicating positive relationships among all constructs. The highest correlation value (r) is 0.760, which is the

correlation between performance expectancy and perceived feasibility, and the lowest correlation value (r) is 0.012, which is the correlation between perceived desirability and social influence. Thus, Pearson correlation results reveal no multicollinearity issue should be of concerned among constructs.

Most importantly, as this study postulates that there may exist some relationships among the determinants of IS adoption behaviour, the Pearson correlations results indicate preliminary findings that initially support these hypotheses. As demonstrated in Table 5.5, it appears that there is a very strong relationship between perceived feasibility and performance expectancy (i.e., $r = 0.760$, $p < 0.01$); a strong relationship between perceived feasibility and facilitating conditions (i.e., $r = 0.603$, $p < 0.01$) and a moderate relationship between perceive feasibility and effort expectancy (i.e., $r = 0.476$, $p < 0.01$). There is also a very strong relationship between perceived desirability and performance expectancy (i.e., $r = 0.710$, $p < 0.01$), a strong relationship between perceived desirability and facilitating conditions (i.e., $r = 0.549$, $p < 0.01$), and a moderate relationship between perceived desirability and effort expectancy (i.e., $r = 0.425$, $p < 0.01$).

5.4 ASSESSMENT OF COMMON METHOD VARIANCE

A concern in most study particularly through survey is that it is very difficult to test theorised relationships among constructs directly. Instead, the researcher needs to identify and to measure variables that reflect the observed constructs and based upon these observations; the researcher derives conclusions relative to the theorised relationships (i.e., supporting or not supporting one or more hypotheses). This study is aware that measurement of construct is never perfect, thus this study is also subject to measurement error. Compared to other problems that researchers can encounter for examples, non response bias, reliability

and validity issues and common method variance when conducting survey research common method variance may be the most troublesome. Common method variance (CMV) also known as methodological artefact occurs when the research approach employed affect the accuracy of measurements thus leading to incorrect relationships between constructs. Prior researches indicate that CMV can inflate or deflate observed relationships between constructs, and lead to Type I or Type II error (Podsakoff et al., 2003) wrong conclusions. The merits of researchs design that do not consider and address this CMV issue has been questioned (Kline et al., 2000; Rungtusanatham et al., 2003). Thus, this study takes steps to ensure the issue of CMV is addressed.

First, when designing the questionnaire survey, this study has taken step not to reveal the relationships between independent variables, moderating variables and dependent variables that would allow respondents to guess or make assumptions of the relationships that may exist between the variables. Second, this study assesses CMV through Harman's single factor test (Podsakoff et al., 2003) that is performed using exploratory factor analysis (EFA). In EFA test, CMV is assumed to exist if a single factor account for the majority of covariances among the measures (Podsakoff et al., 2003). Although some researchers (i.e., Richardson et al., 2009) have doubt on the validity of testing CMV using EFA, this study still performs EFA to determine if the results indicate the existence of CMV. Results of EFA reveal no sign of single-factor that account for the majority of covariances thus, confirming that the data is free from by CMV issue.

Craighead et al. (2011) argue that apart from the traditional EFA, confirmatory factor analysis (CFA) is a more robust assessment of CMV because differences between the one-

factor models versus the multifactor model can be tested via the Chi-square difference test. Therefore, the next step is to test CMV via CFA in structural equation modelling (SEM) by performing through adding a single latent variable (common variable) and drawing paths to every observed item in order to determine the common variance among all the variables and partial out any effects of that single factor. Results of the CFA shows that the variance extracted is low and none of the statistically significant paths in measurement model change signs or become not significant thus, suggesting no problem with CMV.

5.5 STRUCTURAL EQUATION MODELING APPROACH

In this study, structural equation modeling is used as a technique to test the integrative UTAUT-EPM research model. SEM is a multivariate technique that combines aspects of multiple regressions, and is able to estimate a series of inter-related dependence relationships simultaneously (Hair et al., 2006; Byrne, 2009). This technique can incorporate both unobserved variables (latent) and observed variables (manifest) in a measurement model and also a structural model. In a structural model, SEM provides the ability to measure the structural relationships between the set of unobserved variables while explaining the amount of unexpected variance (Byrne, 2009). As SEM depicts the structural relationships between variables, therefore it is a model of relationships among constructs that takes a confirmatory approach to the analysis of structural theory relating to some phenomenon. In SEM, the casual process is presented by a series of structural equations, and to enable a clearer conceptualisation of the theory, the structural relations are modelled pictorially (Byrne, 2009).

Moverover, SEM takes a confirmatory approach rather than exploratory approach to data analysis, and can provide explicit estimates of error variance parameters. According to

Hair et al. (2006), SEM is the best multivariate procedure for testing both the construct validity and the theoretical relationships between a set of concepts represented by multiple measured variables. In addition, SEM is a powerful technique that combines the measurement model and structural model into a simultaneous test (Aaker and Bagozzi, 1979; Hair et al., 2006). Due to the nature and purpose of this study that is to predict IS adoption behaviour by entrepreneurs using inter-related dependence relationships, SEM is deemed appropriate to test the integrative UTAUT-EPM model. By using SEM, both the observed and unobserved variables are incorporated into the integrative UTAUT-EPM model, thus provide an explicit estimate of the measurement error; while the estimates are based on the information from the full covariance matrix (Byrne, 2001).

Furthermore, by using SEM, non-standard model can be fit to the model and is flexible in handling longitudinal data, which is the type of data this study is handling. Further, SEM analyses multiple structural relationships simultaneously while maintaining statistical efficiency and combines interdependence and dependence techniques, such as exploratory factor analysis and regression analysis in one step. One important characteristics of SEM is that it is an easily applied method for estimating the direct and indirect effects, which is also the focus of this study (Min and Mentzer, 2004; Hair et al., 2006). Moreover, SEM is appropriate for testing the hypotheses and proposed relationships in the integrative UTAUT-EPM model as this study does not only examine the relationships among independent variables of technological, individual, and environment factors and dependent variables (behaviour intention), but also when this dependent variable becomes an independent variable in another relationship (Hair et al., 2006). Lastly, this study uses SEM to ensure that the assessment of the all the relationships between constructs are

comprehensive through the transition from EFA to CFA. For the purpose of this study, AMOS a type of SEM application is used as the main statistical analysis tool to purify the measurement items and test the hypothesised relationships of the structural analysis. AMOS is an acronym for Analysis of Moment Structure or in the other words, the analysis of mean and covariance structure (Byrne, 2009).

There are several stages in SEM assessment that begin by defining individual constructs, developing the overall measurement model, designing a study to produce empirical results, assessing the measurement model validity, specifying the structural model and finally assessing structural model validity (Hair et al., 2006). Therefore, there are two main assessment of SEM, that consist of assessment of measurement model and assessment of the structural model. Hair, et al. (2006) point out that assessment of the measurement model is important step in SEM. The measurement model provides a basis for assessing the validity of the structural theory, testing the model fit, estimation of model parameter, and construct validity of the proposed measurement model. According to Hair et al. (2006), structural analyses are often unreliable if the measurement model is of low reliability and validity.

5.5.1 Assessment of Measurement Model

Confirmatory Factor Analysis (CFA) are used to assess the measurement model for all constructs, and to explain how measured variables logically and systematically represent constructs in the model (Hair et al., 2006). In the other words, CFA is performed to decrease the number of indicators used to purify the measurement model and validate the measurement model under study. There are commonly two ways used by researchers in

evaluating and validating the measurement model: (1) testing each construct separately, and/or (2) testing all constructs together in one measurement model (Cheng, 2001; Woo et al., 2009). Testing all constructs at once is preferable than to test each construct separately because of the ability to take into account the relationships between the indicators of different constructs (Woo et al., 2009). In this sense, discriminant validity is not only assumed but also statistically tested (Woo et al., 2009). This study takes the second approach of testing the constructs together in one measurement model.

Once the overall measurement model is developed the measurement model needs to be reviewed to determine how well the items associate to the theoretically defined constructs. Further, reliability and validity of constructs is tested through CFA. The examination of the covariance matrix factor pattern and assessment of large residuals is use to check construct validity. Standardised residual and modification indices are other factors which are examined to see whether there is any cross-loading or misspecification in the measurement model. Standardised residuals value less than $\left|2.5\right|$ does not suggest a problem but a standardised residuals value greater than $\left|4.0\right|$ raises a red flag and suggests unacceptable degree of error (Hair et al., 2006). Another important factor in measurement model is factor loading. In the measurement model all factor loadings should be at least 0.50 and ideally 0.70 or higher. Low loadings suggest that a variable is a candidate for deletion from the model (Hair et al, 2006).

One of the major advantages of CFA in SEM is its ability to examine construct validity of measurement model (Hair et al., 2006). CFA describes the extent to which a set of measured items actually reflect the theoretical latent construct those items are designed to measure and shows the accuracy of measurement (Hair et al., 2006). According to Garver

and Mentzer (1999), construct validity comprises of many sub dimensions, including: content validity, unidimentionality, reliability, nomological validity, convergent validity, and discriminant validity (Hair, et al., 2006; Garver and Mentzer, 1999; O'Leary-Kelly and Vokurka, 1998). Nomological validity refers to the ability to correlate with the other standard measures of the same construct (Zikmund, 2003). The popularity of nomological validity vanished when convergent validity is achieved and increased, since nomological validity and convergent validity is synonymous. Therefore, the assessment of the convergent validity will mean that the nomological validity is also assessed (Zikmund, 2003). In this study convergent validity assessment is performed, and with this assessment of convergent validity, the nomological validity of this study is also addressed.

5.5.1.1 Unidimensionality

Unidimentionality involves establishing a set of empirical indicators relating to one and only one construct (O'Leary-Kelly and Vokurka, 1998). According to Hair, et al. (2006) unidimensionality is a necessary condition for construct validity and reliability analysis and can be assessed by using CFA. Unidimensionality refers to the relationship between observed variables and latent variables. The critical ratios of regression weight between the observed indicators and latent variables should be statistically significant (critical ratio is greater than 1.96; at $\alpha \leq 0.05$). There are two ways to assess construct unidimentionality in CFA include: (1) evaluating overall measurement fit; and (2) evaluating components of the measurement model fit.

5.5.1.2 Convergent Validity

According to Anderson and Gerbing (1988), convergent validity can be defined as the "degree to which different methods used to measure the same construct produce similar

results". Convergent validity is used to check the loading of each observed indicators on their underlying latent construct. Convergent validity assesses the overall fit of the measurement model: the magnitude, direction, and statistical significance of the estimated parameters between latent variables and their indicators (Steenkamp and Trijp, 1991; Hair et al., 2006). In SEM, the assessment of convergent validity begins by examining factor loadings through confirmatory factor analysis (CFA) and the correlation matrix. Convergent validity is assumed when factor loadings for each construct are statistically significant and each item co-relates strongly on its theoretical constructs (Gefen et al., 2000). According to Fornell and Larcker (1981) convergent validity is adequate if composite reliability of each construct is greater than 0.80, the average variance extracted (AVE) by each construct is greater than 0.50, and the standardised factor loadings are greater than 0.70. In this study all these assessments are performed to address the convergent validity of measures.

5.5.1.3 Discriminant Validity

Discriminant validity is the extent to which a construct is truly distinct from other constructs (Hair et al., 2006). High discriminant validity shows that a construct is unique and captures some phenomena other measures do not (Byrne, 2009). Relatively low correlations between constructs indicate the presence of discriminant validity. One way of assessing discriminant validity is by examining factor loadings and cross loadings between the individual indicators and the constructs to confirm that each indicator loads highly with its own construct than other constructs. According to Hair et al., (2006, p.778) the better test for discriminant validity is "to compare the square root of each construct AVE to its correlation with other variables" while the average variance extracted (AVE estimated should be lower than the squared AVE correlation estimate. In this study, all these assessments are performed to address the discriminant validity of measures.

5.5.1.4 Construct Reliability

Construct reliability measures the internal consistency of a set of measures rather than the reliability of a single variable. Traditionally, Cronbach alpha is used to assess scale reliability. However, a better choice is composite reliability, which draws on the standardised loadings and measurement error for each item. A popular rule of thumb is that composite reliability value of 0.70 is an acceptable threshold for internal consistency reliability, while each indicator reliability value should be 0.50 or above (Fornell and Larcker, 1981). In SEM, the reliability of measures is initially begins by examining the estimated reflective loadings (standardised parameter estimations) and their accompanying significance levels. If the loadings are not statistically significant, then decision has to be made to eliminate such indicator(s) (Anderson and Gerbing, 1988). The value of composite reliability above 0.70 or higher suggests good reliability and values between 0.60 and 0.70 is considered acceptable. High construct reliability indicates that internal consistency exists (Hair et al., 2006).

A complementary measure of construct reliability is the average variance extracted measure (Garver and Mentzer, 1999). The AVE measures the total amount of variance in the indicators accounted for by the latent variable. The AVE of less than 0.50 or higher is a good rule of thumb, suggesting adequate co-variance, while an AVE of less than 0.50 shows that on average more error remains in the item than variance explained by the latent factor structure imposed on the measure (Hair et al., 2006). In this study, all these assessments are performed to address the construct reliability of measures.

5.5.2 Assessment of the Structural Model

Once all constructs in the measurement model are validated and satisfactory fit has been achieved, the structural model can be tested via assessing path analysis and specifying the regression models for all factors derived in the measurement model (Hair, et al., 2006; Anderson and Gerbing, 1988; Kline, 1998). The structural model presents the relationships between exogenous constructs and endogenous constructs. A structural model is used to capture the linear regression effects of the exogenous constructs on the endogenous constructs, and the regression effects of the endogenous constructs upon one another (Hair et al., 1998). The structural model specifies the pattern of the relationships among the latent constructs (Loehlin, 1998). The structural model is of greater interest to researchers because it offers a direct test of the theory of interest (Cheng, 2001). Estimation of the path coefficient are interpreted as standardised beta weights in a regression model and represent the direct effects of exogenous constructs on the endogenous constructs. To achieve goodness of fit (GIF) for the empirical data, both the measurement and structural model should be at the acceptable level. The requirement of selected indices explained in detail in the following subsections.

5.5.2.1 Fit Indices of Measurement Model and Structural Model

Fit indices signify the degree to which the observed variables represent the constructs in the model, that is the measurement model and structural model. Fit measures are grouped into various types of groups and each type has its specific capability in model evaluation. There are three types of model fit indices measures: (1) parsimonious, (2) incremental, and (3) absolute fit indices. Researchers should choose the model fit indices that represent different measures. According to Hair et al. (2006), researchers should report at least one incremental index and one absolute index, in addition to the Chi-square ($\chi 2$) value, and at

least one of the indices should be badness-of-fit index, rather than goodness-of-fit. Generally, Root Mean Square Error of Approximation (RMSEA) was chosen as the badness-of-fit index to provide consistence results across different estimation approaches (Kline, 1998).

The model fit indices for this study is examined using multiple indices, which include normal Chi-square (χ^2) test which is the minimum value of the discrepancy, the Goodness of Fit Index (GFI), the Root Mean Square Error of Approximation (RMSEA), the Adjusted Goodness-of-Fit Index (AGFI), the Comparative Fit Index (CFI), and the Tucker-Lewis Index (TLI) (Hair et al.,2006; Ahire and Devaraj, 2001; Garver and Mantzer, 1999). The first overall test of model fit indices selected is the Chi-square test; however Chi- square (χ^2) is sensitive to sample size and almost always statistically significant when there is large sample (Byrne, 2009; Hair et al., 2006). Small value of Chi-square indicates a good fit. The value close to one (1) is considered acceptable as correct model. Byrne (2009) suggests that the value of Chi-square should not exceed 3. The acceptable model fit is indicated by a value greater than 0.90 for GFI, CFI, TLI and a value of less than 0.08 for RMESA. Table 5.6 presents a summary of recommended benchmark for model fit indices adopted in this study.

Table 5.6: Benchmark for Model Fit Indices

Fit Measure	Fit Measures' Indicators
Probability	A p-value greater than 0.05 indicates an acceptable fit.
Chi-Square (χ^2)	The value less than 3 indicates an acceptable fit.
CMIN/DF (χ^2/df)	A value close to one and not exceeding 3 indicates a good fit.
RMESA	A value about 0.05 or less indicates a close fit of the model. A value of about 0.08 or less indicates a reasonable error of approximation
TLI	A value between 0 and 1. A value close to 1, indicates a very good fit.
CFI	A value between 0 and 1. A value close to 1 indicates very good fit.
NFI	The value between 0 and 1. A value of 1 indicates a perfect fit.
GFI	The value should always be less than or equal to 1. A value of 1 indicates a perfect fit.
AGFI	A value of 1 and above, whereby the value is bounded by above 1. A value of 1 indicates perfect fit.

Given these backdrops, this study conducts a two-step approach for model construction and assessment (Anderson and Gerbing, 1988; Hair et al., 2006). First, this study assesses the measurement model and tests the data through CFA. Second this study depicts the structural model and tests the integrative UTAUT-EPM model (UTAUT-EPM). Results of all the assessment of the measurement models and structural model, and findings of the hypotheses testing are presented and discussed in Chapter Six.

5.6 CHAPTER SUMMARY

In summary, this chapter discusses the overall process to the data preparation, data entry, and preliminary analysis of the data, such as examination of outliers and the multivariate assumptions. Scale reliability and validation are also presented in this chapter. Preliminary findings based on Pearson correlation are also discussed to capture the relationships between the predictors, the moderators and dependents variables. This chapter also describes the multivariate analysis technique, i.e., SEM for testing the integrative UTAUT-EPM research model and hypotheses. Finally, this chapter discusses the procedures

taken to examine the integrative UTAUT-EPM model using AMOS application for SEM. The following Chapter Six will discuss findings of the hypotheses testing. In the following chapter, the results of the assessment of the measurement model and structural model will be presented. The following chapter will also present findings of hypotheses testing for the integrative UTAUT-EPM model.

CHAPTER SIX

ASSESSMENT OF INTEGRATIVE UTAUT-EPM MODEL

INTRODUCTION

This chapter presents the results of multivariate analysis using SEM. This chapter is divided into five main sections. Section one, assesses the adequacy of the measurement model of the integrative UTAUT-EPM model. The assessment of the measurement model includes the unidimensionality, convergent validity, discriminant validity, and constructs reliability. Section three presents the findings of this study based on the integrative UTAUT-EPM model developed in Chapter Two and the hypotheses postulated in Chapter Three. Section four reports the findings on the effect of continuous variables (i.e., propensity to use, and precipitating events) via MODPROBE. Section five describes the findings of survey data using basic UTAUT. This chapter concludes with a summary of the chapter.

6.1 ADEQUACY OF THE MEASUREMENT MODEL

Once all the scale items have been specified, the next step is to specify the measurement model. In this study, all the final constructs derived from the exploratory factor analysis (EFA) are used in the assessment of the measurement model (Hair et al., 2006). This study performs two step approaches for measurement model construction and testing (Anderson and Gerbing, 1988; Hair et al., 2006). The first step is to assess the goodness-of-fit to conduct assessment of measurement model by examined multiple indices of model fit based on Hair et al. (2006) recommendation as thoroughly discussed in Chapter Five (Section 5.5.3). After the model goodness-of-fit has been established, the next step is to assess the measurement model for construct validation. The assessment of construct

validation of the measurement model is based on the assessment described in Section 5.5.1 of Chapter Five.

6.1.1 Assessment of Goodness of Fit

As shown in Table 6.1, the results of assessment for model fit indices show four of the goodness-of-fit indices, that is the Chi-square (χ^2) value is 2403.777, the $\chi 2$ /df with a value of 2.431, the Comparative Fit Index (CFI) with a value of 0.899, and Root Mean Square Error of Approximation (RMSEA) with a value of 0.066 are within the acceptable level. However, three other assessments of goodness-of-fit indices, the Tucker Lewis Index (TLI), with a value of 0.890, goodness of fit (GFI), with a value of 0.753, and Adjusted Goodness of Fit Index, with a value of 0.719 are less that less than the 0.90, therefore did not yield adequate model fit for the empirical data (Hair et al., 2006).

Table 6.1: Fit Indices for Initial Measurement Model

Chi-Square	CMIN/DF	Probability	χ^2/df	TLI	CFI	RMSEA	GFI	AGFI
2403.777	2.431	0.000	2.431	0.890	0.899	0.066	0.753	0.719

As a consequence, a model re-specification procedure is undertaken for model development with the aim to identify the source of misfit and then generate a measurement model that achieves a better fit of data (Byrne, 2001). In order to achieve an adequate goodness of fit on the measurement model and to identify problems that may existed, this study assesses the path estimates, standardised residuals, and modification indices of the measurement model (Hair et al., 2006).

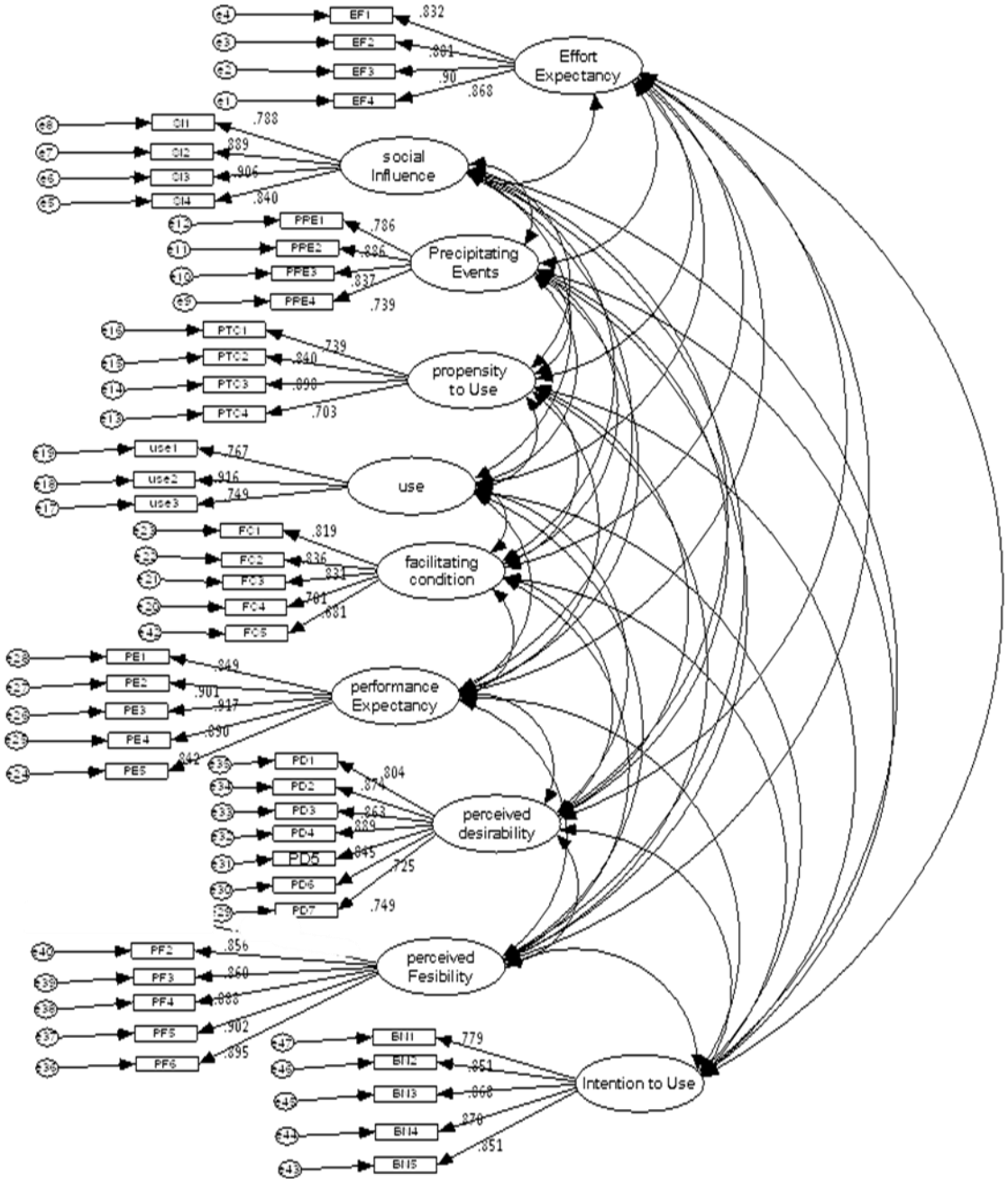

Figure 6.1: Initial Measurement Model

As shown in Figure 6.1 assessment of the standardised regression weight indicates that all items are loaded high within their constructs, which is within the acceptable values of 0.70 and above, except for three items. The three items identified are one item (PF3) from perceived feasibility construct, and two items (FC4, FC5) from facilitating conditions

construct with path estimate values of less than 0.70, and thus, these items are deemed unsatisfactory (Hair et al., 2006).

With regards to the assessment of the standardised residual values, as shown in Table 6.2, the results indicate all items have standardized residual values of less than $\left|2.5\right|$, with the exception of one item (PD7) from perceived desirability construct, one item from performance expectancy (PE2), and two item from intention to use (BI1 and BI5) construct have standardised residual values of more than $\left|2.5\right|$. As recommended in the research methodology literature, any item with standardized residual value of less than $\left|2.5\right|$ is deemed to be adequate (Hair et al., 2006).

While the modification indices assessment shows the co-variance between three of the items that is two from (facilitating conditions construct (FC4 and FC5) and one item from intention to use construct (BI5) have high error of co-variance between these indicators. The estimation of a coefficient may be considered to be dropped from the measurement model if modification indices value is equal to 4 or greater (Hair et al., 2006). The substantial modification indices value is considered as 7.88 for a significant model improvement (Garver and Mentzer, 1999). Based on the results of the above assessments, these seven items are dropped from the initial measurement model in order to improve the model fit. Furthermore, these items add very little explanatory power to the measurement model and thus, they are dropped from further analysis (Hulland, 1999; Nunnally, 1978).

Table 6.2: Items Omitted from the Measurement Model

Constructs	**Items**	Path estimates	Standardize	Modification Indices
Performance expectancy	**PE2**-Using the IS-related innovations enable me to accomplish tasks more quickly.			71.44
Perceived feasibility	**PF3**-I have the skills and capabilities required to use IS-related innovation.	0.694		
Perceived desirability	**PD7**-Using IS-related innovation would result in a more relax working environment in my business.		2.55	
Intention to use	**BI1**-I predict I would use IS-related innovation, if it is available in the future.		2.60	
	BI5 -I intent to use similar IS-related innovation technology in the future.			53.58
Facilitating conditions	**FC4**-New innovation is not compatible with other IS system I use.	0.698		
	FC5-There are special allocations (i.e. loan, intensive) for using IS-related innovation for entrepreneurs, from government.	0.681		

After the removal of these items, the measurement model is once again re-estimated and the solution estimates are re-examined. As shown in Figure 6.2, all items are loaded high on the intended constructs with entire factor loadings above 0.70 (which is above the recommended value of 0.70) with satisfactory standardized residual covariance and acceptable value of modification indices. Therefore the final measurement model indicates adequate goodness of fit. Moreover, assessments for all measurement model fit indices also validate the adequacy of the measurement model goodness of fit.

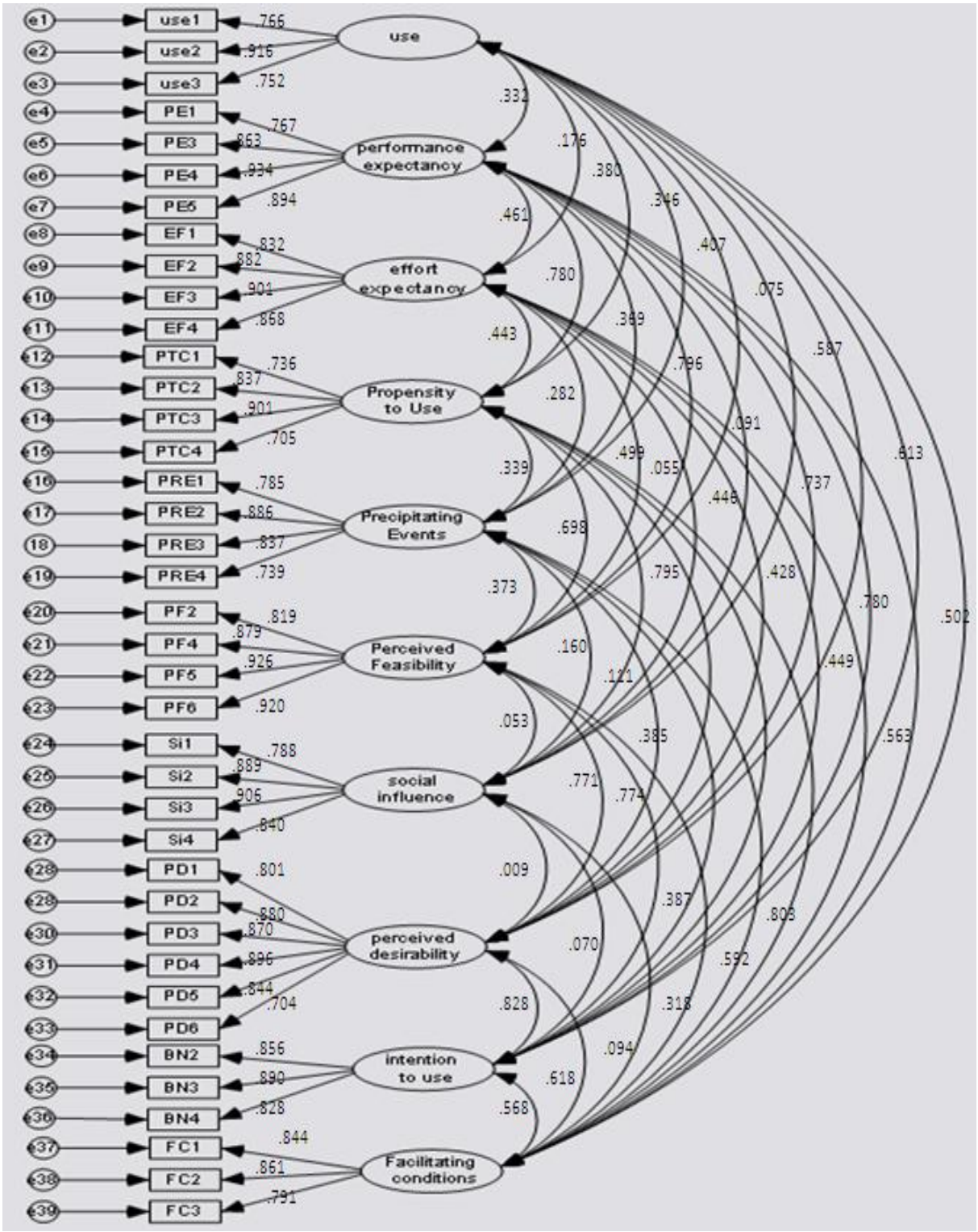

Figure 6.2: Final Measurement Model

As demonstrated in Table 6.3, the results of indices (Chi-square value (χ^2) is 1198.09, the χ^2 /df with a value of 1.826, the Comparative Fit Index (CFI) with a value of 0.950, and Root Mean Square Error of Approximation (RMSEA) with a value of 0.0506) are within the acceptable level. The assessments of goodness of fit indices are now within the acceptable level. Results reveal that (see Table 6.3), the Tucker Lewis Index (TLI) now has a value of 0.944, goodness of fit (GFI), with a value of 0.950, and (Adjusted Goodness of Fit Indices) has a value of 0.81, indicating satisfactory standardized residual covariance and modification indices (Hair et al., 2006).

Table 6.3: Fit Indices for Final Measurement Model

Chi-Square	DF	Probability	χ^2/df	SRMR	TLI	CFI	RMSEA	GFI	AGFI
1198.090	**656**	**0.000**	**1.826**	**0.052**	**0.944**	**0.950**	**0.050**	**0.844**	**0.815**

6.1.2 Construct Reliability and Validity

In this study, content validity was assessed through a series of pre-tests with panels of academics and practitioners (i.e., potential entrepreneurs and entrepreneurs) to determine the relevancy and adequacy of all constructs. The results of the CFA reveal that the data fit to the measurement model very well. The standardised parameter estimates of the measurement model are also higher than 0.70, and the signs of parameter estimation were all in the same direction to measure specific latent variables. Thus, the results suggest that all constructs in this study are unidimensional.

Table 6.4: Regression Weight, Composite Reliability, Average Variance Extracted, Correlation

Construct	Item loading	CR	AVE	1	2	3	4	5	6	7	8	9	10
Performance expectancy		**.923**	**.864**	**.929**									
PE1	.767												
PE3	.863												
PE4	.934												
PE5	.894												
Effort expectancy		**.926**	**.870**	**.430****	**.932**								
EF1	.832												
EF2	.882												
EF3	.901												
EF4	.868												
Facilitating conditions		**.871**	**.832**	**.521****	**.415****	**.912**							
FC1	.844												
FC2	.861												
FC3	.791												
Perceived desirability		**.932**	**.832**	**.710****	**.425****	**.549****	**.912**						
PD1	.801												
PD2	.880												
PD3	.870												
PD4	.896												
PD5	.844												
PD6	.704												
Perceived feasibility		**.936**	**.886**	**.760****	**.476****	**.603****	**.732****	**.941**					
PF2	.819												
PF4	.879												
PF5	.926												
PF6	.920												
Propensity to use		**.874**	**.794**	**.667****	**.382****	**.529****	**.699****	**.619****	**.891**				
PTC1	.736												
PTC2	.837												
PTC3	.901												
PTC4	.705												
Precipitating events		**.886**	**.811**	**.343****	**.264****	**.284****	**.381****	**.363****	**.319****	**.900**			
PRE1	.785												
PRE2	.886												
PRE3	.837												
PRE4	.739												
Intention to use		**.893**	**.858**	**.721****	**.393****	**.505****	**.710****	**.716****	**.695****	**.368****	**.926**		
BI2	.856												
BI3	.890												
BI4	.828												
Use Behaviour		**.854**	**.811**	**.567****	**.326****	**.435****	**.534****	**.633****	**.533****	**.370****	**.544****	**.900**	
Use1	.766												
Use2	.916												
Use3	.752												
Social influence		**.916**	**.855**	**.078**	**.047**	**.084**	**.012**	**.056**	**.094**	**.154****	**.069**	**.119***	**.924**
SI1	.788												
SI2	.889												
SI3	.906												
SI4	.840												

Notes: values on diagonal are square root of AVE; CR= Composite reliability; *: p< .05; **: p< .01.

As shown in Table 6.4, results indicate that for all constructs, standardised parameter estimations were higher than 0.70, while the composite reliabilities exceed 0.80. Therefore, these results support the assumptions of internal consistency and reliability of the measurement model.

This study uses two different assessments to evaluate convergent validity that is the composite reliabilities and AVE. As shown in Table 6.4, results indicate that for all constructs, standardised parameter estimations were higher than 0.70, while the composite reliabilities exceed 0.80. Convergent validity is also assessed using AVE. As demonstrated in Table 6.5, the AVE for all constructs is equal or greater than 0.50. All these results provide evidences that convergent validity for all constructs have been achieved for the measurement model (Fornell and Larcker, 1981).

In order to evaluate discriminant validity, this study examines both the CFA results and a comparison of AVEs with the inter construct correlations. As shown in Table 6.4, results of the assessments also reveal that the square root values (AVE) of each construct are higher, that is between 0.89 and 0.93, than its correlation estimate with other constructs, with the highest correlation of 0.76 that is between perceived feasibility and performance expectancy. While the co-relation results reveal that there no co-relations values among constructs larger than 0.760 and that the co-relations of all constructs in the measurement model are different as none of the co-relations among constructs are larger than 0.80 or 0.90. Thus, the co-relation results demonstrate that all constructs in the measurement model are distinguishable. In addition, an exploratory factor analysis results in SPSS indicate that all items loadings are significantly on their predefined constructs, with low cross-loadings of

less than 0.400. All the above assessments results support the adequacy of discriminant validity of the measurement model.

6.1.3 Measurement Equivalence Analysis

Most of the data collected for this study come from entrepreneurs of three main ethnic groups; the Malay entrepreneurs, the Chinese entrepreneurs and the Indian entrepreneurs. Recall that the results of Independent t-test in Chapter Four, which indicate that all these ethnic group have similar perceptions toward IS related innovation by entrepreneurs, except for two items in performance expectancy (PE1 and PE2), two items in facilitating conditions (FC1 and FC4) and one item in perceived desirability (PD1). In the process of purifying the measurement model via SEM, two of these five items; (1) Using the IS related innovation enable me to accomplish tasks more quickly (PE2), and (2) New innovation is not compatible with other IS system I use (FC4) have been deleted (refer to Section 6.1.1 for detail). For the purpose of clarity, the measurement equivalence is further examined in this chapter before the assessment of the structural model of the integrative UTAUT-EPM and hypotheses testing to confirm that although the respondents are from different ethnic background, to a certain extent; they have similar perceptions, understanding and interpretation of the all items and constructs under investigation.

Craig and Douglas (1983) define equivalence as "data that have, as far as possible, the same meaning or interpretation, and the same level of accuracy, precision of measurement, or reliability in all countries and cultures". They distinguish three forms of equivalence: (1) measurement equivalence, (2) construct equivalence, and (3) equivalence in data collection techniques. Measurement equivalence exists at different levels. According to

Van de Vijver and Harsveld (1994) factorial invariance is prerequisite for higher levels of measurement equivalence. If item responses of different groups, such as male/female, adopters/non-adopters, and undergraduate/post graduate are associated with the same construct and the factor parameter coefficients are not statistically different from each other in group comparison the construct have factorial equivalence or measurement equivalence (Lai and Li, 2005). Meanwhile construct equivalence or structural equivalence also known as "configurial invariance" refers to similarity of structural psychometric properties in data from different cultures and countries (Herk et al., 2003).

The factorial and configurial invariance's assessment begins with estimation of unconstrained model and moves on to the estimation of a fully constrained model (Marsh and Hocevar, 1985). The unconstrained model is estimated without any condition, while for constrained model, one or more specified factor parameters are constrained to have the same values for both groups (Lai and Li, 2005). Other researchers have applied CFA to test factorial invariance by comparing the Chi-square (χ^2) and fit statistic of an unconstrained, with a series of constrains models (e.g., Byrne, 2009). Thus, in this study, testing for factorial and configural equivalences encompasses a series of hierarchical steps that begin with the determination of a baseline model for each groups separately (no between-group constrains). The configural model provides the baseline against which all subsequent tests for invariance are compared, and allows for equivalence tests to be conducted across the two groups simultaneously. Based on Byrne (2009) and Lai and Li (2005), the pattern of factor loadings for each observed measure is tested for its equivalence across the groups. Once it is known which measures are group-invariance, these parameters are constrained to be equal and subsequent tests of the structural parameters are conducted (Byrne, 2009).

Based on the Independent t-test results in Chapter Four, the Indian entrepreneurs have very similar perceptions, understandings and interpretations of all items (except for one items (EF4)) with the Chinese entrepreneurs.. Due to the similarity of the perception between the Indian entrepreneurs and Chinese entrepreneurs, this study decides to only perform equivalent test for the Malay and Chinese entrepreneurs. Therefore, this study assumes that there would not be any issue as well between the Malay entrepreneurs and Indian entrepreneurs, if results of measurement equivalent indicate Malay entrepreneurs and Chinese entrepreneurs have similar perceptions of all constructs in the integrative UTAUT-EPM model. In order to assess the equivalent, two group comparison tests is conducted, whereby the data is divided in to two dataset; (1) Malay entrepreneurs, and (2) Chinese entrepreneurs and these datasets are analysed separately. Next, the baseline model for the two groups is examined. As shown in Table 6.5, based on all fit indices values of Chi square value (χ^2), Normed fit index (NFI), the Comparative Fit Index (CFI), and the Root Mean Square Error of Approximation (RMSEA) values for both the Malay entrepreneurs and Chinese entrepreneurs, the data-set provide adequate goodness of fit for the measurement models for both the Malay entrepreneurs and Chinese entrepreneurs.

Table 6.5: Fit Indices for Malay and Chinese Measurement Model

	Chi-Square (χ^2)	**Probability**	**NFI**	**IFI**	**CFI**	**RMSEA**
Malay	1043.6	0.000	0.817	0.905	0.903	0.084
Chinese	723.1	0.000	0.834	0.947	0.954	0.047

In this study, the configural model incorporates the baseline model (Model 1) for Malay entrepreneurs and Chinese entrepreneurs within the same file. The pattern of fixed and free factor loading is specified to be the same for both groups. As shown in Table 6.6,

the results of goodness of fit for Model 1 (i.e., unconstrained baseline model) indicates the Chi square (χ^2) has a value of 1766.98, with CFI value of 0.925, and RMSEA of 0.048. This configural invariance analysis suggest that the Chi square (χ^2) and fit indices have adequate goodness of fit. Moreover the Chi square (χ^2) value is significant and the degree of freedom to the Chi-Square value is below the recommended threshold of 3.0. These analysis results suggest that it is acceptable to consider the structure of the measurement model is equivalent across the two groups that there is, existence of configural equivalent in Model 1.

Table 6.6: Results of Invariance Analysis for Malay and Chinese

Test	Model	χ^2	**df**	$\Delta\chi^2$	**Δdf**	**CFI**	**ΔCFI**	**RMSEA**
1	Unconstrained baseline model	1766.98	1104			0.925		0.048
2	Constrained Factor loading	1822.79	1131	55.81	27	0.921	.004	0.048

Next, the measurement model constrains the factor loadings to be equal across the two groups and is referring to as Model 2. As shown in the Table (6.6) the Chi square (χ^2) is 1822.79 (df = 1131) and change in χ^2 between Model 2 and baseline model (Model 1) is significant (55.81, Δdf = 27). However, the CFI did not decline by more than the cutoff of 0.01 point as suggested by Cheung and Rensvold (2002) as result yields the ΔCFI=0.004. Cheung and Rensvold (2002) suggest that evidence on no invariance to be based on a difference in CFI value should exhibit a probability < 0.01. However, according to Byrne (2009), the decision of which one to accept (χ^2, or ΔCFI) is rather arbitrary one and relate to the type of the data under study. Based on the Independent t-test result in Chapter Four, and the assessment configural equivalent in Model 1, this study considers the change of CFI (ΔCFI) to assess configural equivalent for Model 2. Thus fore, this study concludes that the measurement of all the five constructs or perceptions of the determinants of IS related

adoption behaviour by entrepreneurs is consistent among the Malay entrepreneurs, Chinese entrepreneurs, and Indian entrepreneurs.

6.2 ADEQUACY OF STRUCTURAL MODEL

The integrative UTAUT-EPM model presents the possibility of influences of determinants toward IS related adoption behaviour (i.e., intention to use and use behaviour) by entrepreneurs. The integrative UTAUT-EPM model classifies the underlying constructs into three groups that include six exogenous constructs of performance expectancy, effort expectancy, social influence, perceived desirability, perceived feasibility, and facilitating conditions; two endogenous constructs of intention to use and use behaviour; and two categorical moderating constructs of gender and age;, and two continuous moderating constructs of propensity to use and precipitating events. The purpose of the integrative UTAUT-EPM model is to test the underlying hypotheses in order to answer the research questions and to achieve the research objectives. Before assessing the integrative UTAUT-EPM model, validity and adequacy of structural model is addressed.

6.2.1 Assessment of Structural Model

This study uses results obtained from the measurement model in Section 6.1 to build the relationships and specify the structural model based on the integrative UTAUT-EPM research model. The same set of fit indices assessments chose to assess the measurement model and evaluate the full structural model. As illustrated in Table 6.7, the results of the fit indices show most of the fit indices are above their recommendation values 0.90, with

RMSEA value of 0.054, indicating that the data fit to the model very well, therefore the structural model isvalid and acceptable.

Table 6.7: Standardized Estimates of UTAUT-EPM Structural Model

	Chi-Square	**Probability**	**χ^2/df**	**SRMR**	**TLI**	**CFI**	**NFI**	**RMSEA**	**GFI**	**AGFI**
Structural model	745.064	0.000	1.800	0.060	0.958	0.963	0.921	0.049	0.875	0.850
Measurement model	1198.090	.000	1.826	0.052	0.944	0.950	0.903	0.050	0.844	0.815

Moreover, the validity of structural model is further assessed by comparing the measurement model fit and the structural model fit (Hair et al., 2006). The structural model lacks validity if the structural model fit is substantially lower than the measurement model fit (Anderson and Gerbing, 1982; Anderson and Gerbing, 1988). As demonstrated in Table 6.7, the goodness-of-fit in the structural model with Chi square value (χ^2) of 745.064, and degree of freedom (χ^2/df) of 1.800 was found to be better than measurement model with Chi square value (χ^2) of 1198.090, and degree of freedom (χ^2/df) of 1.826, thus fore, indicative that the structural model fits the data very well.

As shown in Table 6.8, all these assessments results demonstrate that the structural model validity is achieved. Once the structural model achieved the structural model fit and validity, the testing of the hypotheses can be performed.

Table 6.8: Standardised Regression Weights for Structural Model and Hypotheses

Hypotheses		β	S.E.	C.R.	P
H1	Performance expectancy → Intention to use	0.267	0.091	3.257	**0.001*** **
H2	Effort expectancy → Intention to use	-0.026	0.051	-0.617	**0.537**
H3	Perceived desirability → Intention to use	0.445	0.068	7.034	***
H4	Perceived feasibility → Intention to use	0.270	0.071	3.779	***
H5	Social influence → Intention to use	0.028	0.028	0.792	**0.428**
H6	Facilitating conditions → Use behaviour	0.228	0.050	3.636	***
H7	Intention to use → Use behaviour	0.519	0.049	7.647	***
H8	Performance expectancy → Perceived desirability	0.704	0.064	11.311	***
H9	Effort expectancy → Perceived desirability	0.120	0.053	2.537	**0.011** *
H10	Perceived feasibility → Effort expectancy	0.524	0.047	9.276	***
H11	Perceived feasibility → Facilitaing conditions	0.686	0.051	12.368	***

β: Standardized Regression Weight ;S.E.: Standardized Error; C.R.: Critical Ratio; **p< 0.01; ***p< 0.001

6.3 FINDINGS OF THE HYPOTHESES TESTING

In this study the integrative UTAUT-EPM model tests the influence of performance expectancy, effort expectancy, perceived desirability and perceived feasibility on intention to use. The effects of facilitating conditions and intention to use on use behaviour are examined. As shown in Figure 6.3, after the structural equation model was tested through model fit indices, the regression path weights were examined for all constructs.

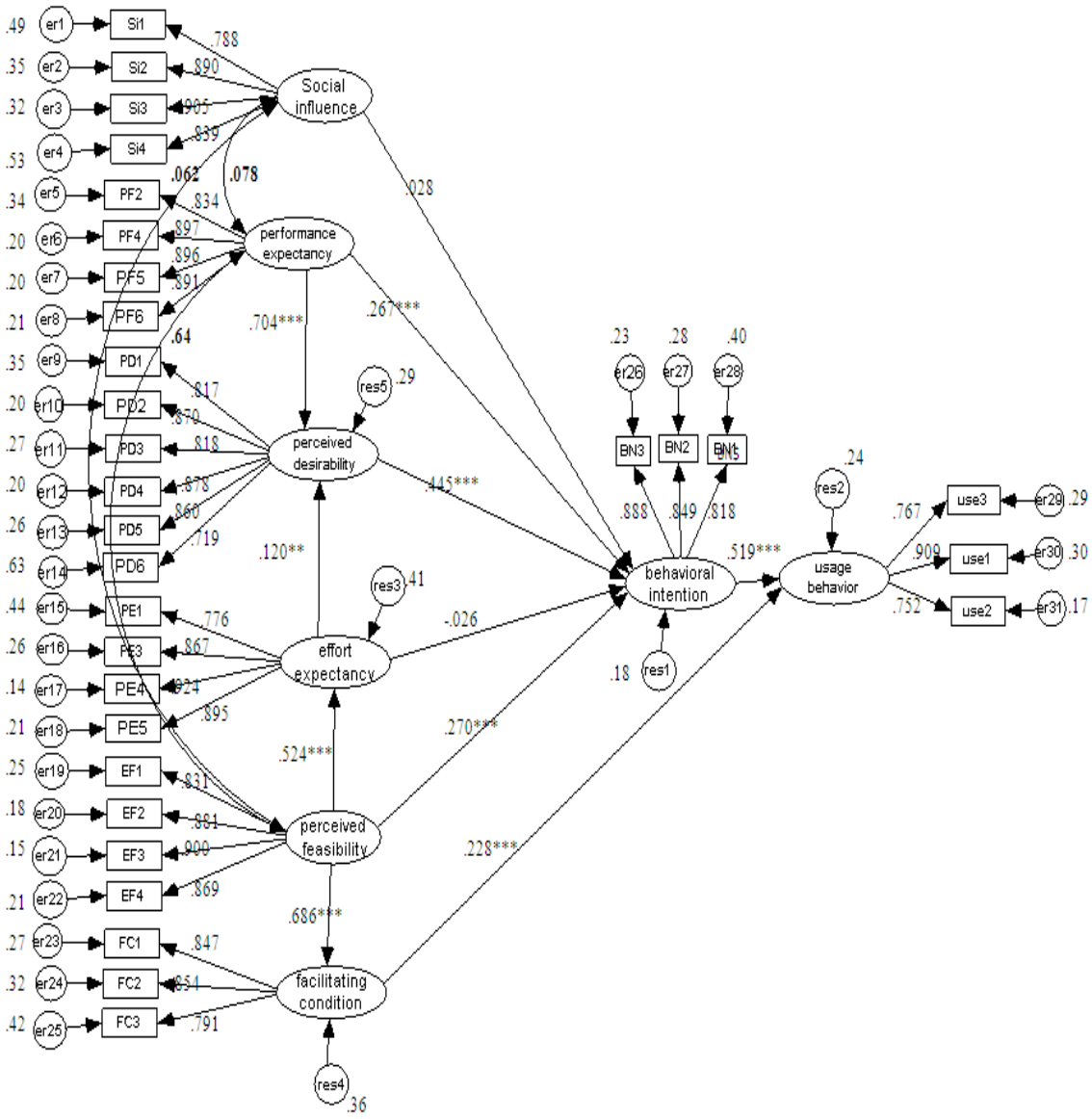

Figure 6.3: UTAUT-EPM Model Standardised Estimates

Figure 6.4 of the integrative UTAUT-EPM model shows the results of the structural equation modeling (SEM) analysis including path coefficients, path significances, and R^2 values. Results reveal that all hypothesised paths from performance expectancy, perceived desirability, and perceived feasibility to intention to use were significant, except for hypothesised paths from social influence and effort expectancy. Therefore three out of five hypotheses on the determinants of intention to use IS related innovation is supported. Taken

together all these three determinants explained 77.4 percent of the variance associated with intention to use IS related innovation by entrepreneurs. The influence of intention to use and facilitating conditions on use behaviour were also positive and significant. Therefore all the hypotheses related to the determinants towards use of IS related innovations by entrepreneurs are supported. Taken together, these two determinants explained 44.5 percent of the variance in use behaviour of IS related innovation by entrepreneurs. These findings provide initial validation that the integrative UTAUT-EPM model is a useful framework for investigating IS related innovation adoption behaviour by entrepreneurs.

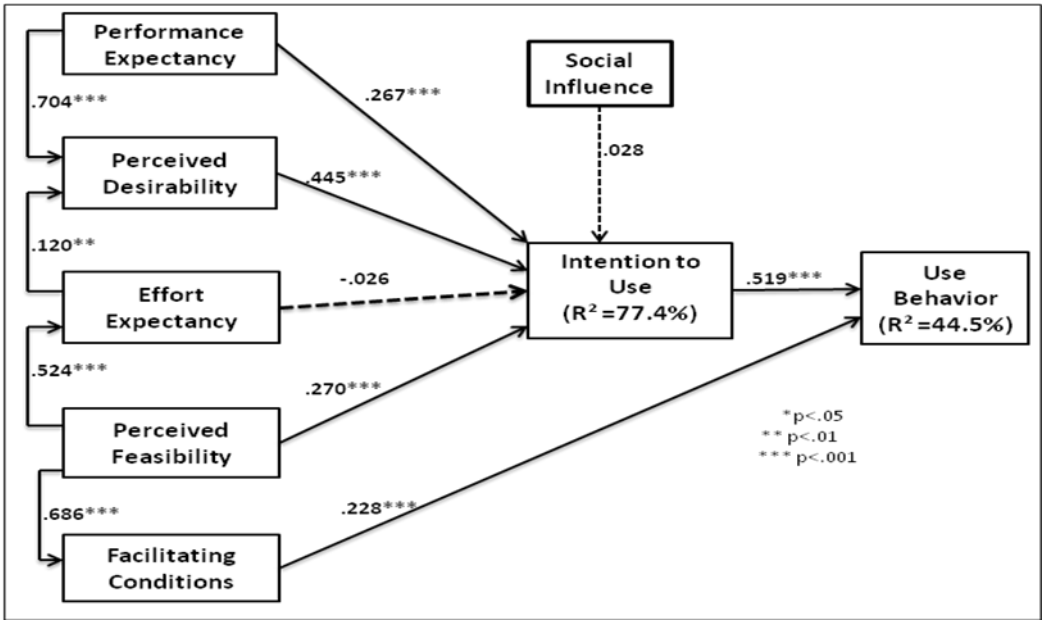

Figure 6.4: Integrative UTAUT-EPM Structural Model

6.3.1 Determinants of Intention to Use IS Related Innovation

6.3.1.1 Effect of Technological Factors on Intention to Use

Regarding the effect of technological factors on intention to use, findings indicate that only hypothesised path from performance expectancy ($\beta = 0.267$, $p < 0.001$) to intention to use is positive and significant. Thus, hypothesis H1 was supported. On the other hand, the hypothesized path from effort expectancy ($\beta = -.026$, $p > 0.05$) is not significant, therefore, hypothesis H2 was not supported. The findings reveal that of the two technological factors, performance expectancy is the most salient predictor of entrepreneurs' intention to use IS related innovation. Based on these findings it can be assumed that entrepreneurs are more willing to use IS related innovation if the system is able to enhance efficiency and effectiveness in their daily business activities. In other word, when entrepreneurs perceive that the IS related innovation are useful and beneficial, which may then increase the performance of their business activities, this perception will encourage entrepreneurs to be more interested in investing IS related innovation, and would likely adopt the system in their daily business activities.

On the other hand, effort expectancy is no longer becoming the salient determinant, probably due to fact the now in this 21th century, whereby IS/IT, particularly the IS applications/software have become relatively easy to use and is much user friendly. Most IT companies have capabilities to conduct extensive research and development to develop and design IS applications/software that allow users to use the IS applications/software effortlessly. Most of the applications/software comes with adequate instructions on how to use new IS. Furthermore, with the advances of Internet, IS applications/software developers have also incorporate self-learning tutorial and helpdesk features in the software, that allows

users to be connected to online services provide by these IS applications/software developers and seek assistance and learn to use the applications/software. Moreover, even though entrepreneurs may find the system to be sophisticated, they are willing to invest the time to learn how to use IS related innovation. They believe that adopting the system would give them leverage when dealing with the daily activities, and as such, any difficulty with using the IS related innovation would not affect their intention to use the system. Furthermore, as entrepreneurs have proactive and entrepreneurial personality, they are not afraid to be considered as early adopters or pioneers of IS related innovation, thus fore; the role of effort expectancy has become insignificant.

6.3.1. 2 Effect of Individual Factors on Intention to Use

Regarding the effect of individual factors on intention to use, findings indicate that both the hypothesized paths from perceived desirability ($\beta = 0.445$, $p < 0.001$) and perceived feasibility ($\beta = 0.270$, $p < 0.001$) to intention were positive and significant. Thus, hypothesis H3 and hypothesis H4 were supported. Contrary to hypothesised paths from perceived desirability and perceived feasibility, the hypothesized path from social influence to intention to use ($\beta = 0.028$, $p > 0.05$) is not significant, therefore, hypothesis H5 was not supported. A possible explanation for social influence not being a determinant of intention to use by entrepreneurs is due to entrepreneurs own entrepreneurial attitude and culture. Once of the characteristic of entrepreneurs is able to take risk and be creative. Thus, the factor that drives entrepreneurs is their own intrinsic motivation of individual factors, rather than the extrinsic motivation of individual factors.

These findings suggest that intention to use may be determined by entrepreneurs own beliefs about the attractiveness of IS related innovation in providing them with new

competitive advantages, and the entrepreneurs own skill and ability to use such IS related innovation. The findings reveal that perceived desirability and perceived feasibility are important predictor of entrepreneurs' intention to use IS related innovation. Based on these findings, it can be assumed that entrepreneurs with favourable attitude towards IS related innovations, have high desirability to use the system, and the probability of these entrepreneurs to use IS related innovation will also be higher. Furthermore, findings demonstrate that entrepreneurs that perceive they have the appropriate skills, knowledge and ability of the IS related innovation would be more interested and willing to adopt IS related innovation. It can be assumed entrepreneurs that perceived themselves be more feasible in their efficacy towards using IS related innovation will have positive behavioural IS intention to use. Of the two individual factors, findings indicate that perceived desirability is the strongest determinant towards intention to use IS related innovation.

6.3.2 Determinants of Use Behaviour of IS Related Innovation

6. 3.2.1 Effect of Environmental Factor on Use behaviour

Regarding the effect of environmental factor on use behaviour; findings indicate that the hypothesised path from facilitating conditions ($\beta = 0.228$, $p < 0.001$) to use behaviour of IS related innovation was positive and significant. Therefore, hypothesis H6 was supported. This finding reveals that once entrepreneurs feel that there are adequate and appropriate resources and infrastructures to support and facilitate an IS condition that enable entrepreneurs to venture into adopting and using IS related innovation, they have higher level of IS related innovation usage.

6.3.2.2. Effect of Intention to Use on Use Behaviour

Regarding the effect of intention to use on use behaviour, findings indicate that hypothesised path from behavioural intention to use to use behaviour of IS related innovation was positive and significant ($\beta = 0.519$, $p < 0.001$). Thus, hypothesis H7 was supported. The finding reveals that intention to use IS related innovation normally transforms into actual utilisation of the system. It can be assumed that once entrepreneurs make decision to adopt and use IS related innovation in their daily business activities, the chances or probability for these entrepreneurs to actively use the system is relatively high.

6.3.3 Relationship among Determinants of IS Adoption

Findings indicate that there is a positive and significant relationship ($\beta = 0.704$, $p < 0.001$) between performance expectancy of IS related innovation and entrepreneur's desirability to use it. Thus, hypothesis H8 was supported. The usefulness of IS related innovation effect entrepreneurs perception about attractiveness of IS related innovation. This finding reveals that if IS related innovation will enhance entrepreneurs' job performance and they are able to realise the benefit from the system, entrepreneurs would have much more desire to use the system. If by using the system entrepreneurs are able to conduct their work more efficiently and effectively, which lead them to enjoy using the system and entrepreneurs will be more enthusiastic about the system, and thus fore, provide entrepreneurs with personal satisfaction in the working environment.

The findings also indicate that there is a significant and positive relationship between effort expectancy and perceived desirability ($\beta = .120$, $p < 0.01$) of IS related innovation. Thus, hypothesis H9 was supported. The findings reveal that when entrepreneurs perceive

interaction with the IS related innovation would be clear and understandable, and the systems is easy to use, entrepreneurs would gain personal satisfaction of using IS related innovation in their business, which then lead to high probability of adopting and using the system.

Regarding the effect of perceived feasibility on effort expectancy and facilitating conditions, findings indicate that both hypothesised paths from perceived feasibility to effort expectancy (β =0.524, $p < .001$) and to facilitating conditions (β =0.686), $p < .001$) were positive and significant. Thus, hypotheses H10 and H11 were supported. Entrepreneurs who have high skill and ability are more likely to perceive that less effort is required to use IS related innovation compared to entrepreneurs with low perceived self efficacy. It seems that entrepreneurs who perceive that they have high level of IS capability and skills, they would consider adopting and using IS related innovation, particularly, if such innovation is not relatively complex and sophisticated. Furthermore, even though these entrepreneurs may possess baseline IS skills and knowledge to use IS related innovation, this baseline self-efficacy allows them to overcome the complexity of the system, and also facilitate conditions for these entrepreneurs to adopt to the IS environments that they are facing with. Thus, as entrepreneurs are feeling very comfortable of using IS related innovation, they would likely have greater control over using IS related innovation, and thus fore they are able to overcome the difficulty and complexity of the system, and turn round the system to be relatively effortless.

6.3.4 Mediating Effect of Intention to Use

Following the original UTAUT, this study does not develop any hypothesis related to mediating effect of behavioural intention to use. In the integrative UTAUT-EPM model, perceived desirability, performance expectancy and perceived feasibility are considered as determinants of intention to use IS related innovation by entrepreneurs, and that intention to use effect use behaviour of IS related innovation. In order to further understand the role of these determinants on issues related to IS adoption behaviour, this study assesses the mediating effects of intention to use in their link between the three significant determinants of intention to use to use behaviour. Hence, this study assesses whether intention to use mediates the relationship between perceived desirability, performance expectancy, and perceived feasibility toward IS related innovation use behaviour. Subsequently, the direct and indirect effect of perceived desirability, performance expectancy and perceived feasibility are tested on use behaviour through bootstrapping using AMOS. As shown in Figure 6.5, the results of the bootstrapping reveal that the direct effect of perceived desirability to use behaviour is not significant, and that intention to use fully mediates the effect of perceived desirability on use behaviour. The results of the bootstrapping also reveal that perceived feasibility and performance expectancy have significant direct effects on intention to use, and at the same time, the links between perceived feasibility and performance expectancy to use behaviour are mediated by intention to use and are significant. Thus, contrary to perceived desirability, intention to use partially mediates the relationships between perceived feasibility and performance expectancy to use behaviour of IS related innovation by entrepreneurs.

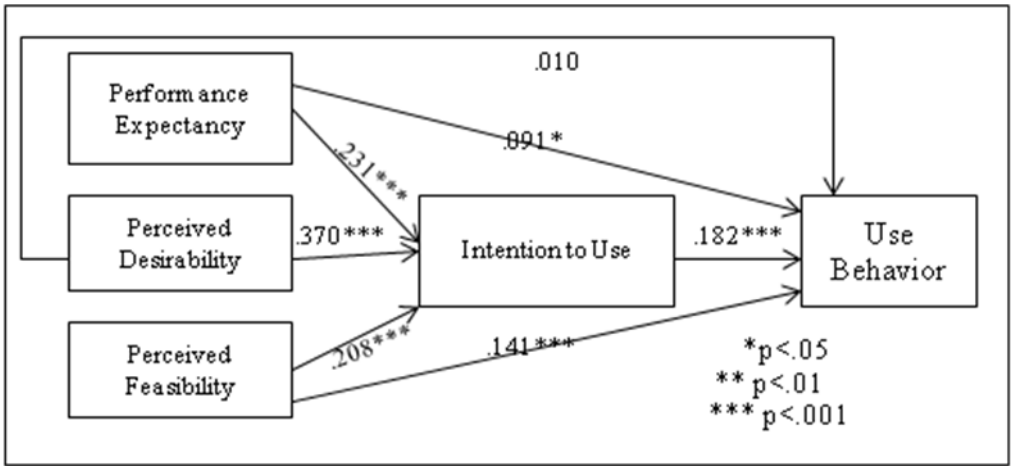

Figure 6.5: Mediating Effect of Intention to Use

6.3.5 Moderating Effect of Gender and Age

Moderation usually involves in research where there are existences of individual differences or situational conditions that may influence the strength of the relationship between a predictor and an outcome. A moderating effect occurs when a third variable changes the effect of the relationship between the determinant and outcome constructs by either reverse the direction or reduce the magnitude of the relationship (Baron and Kenny, 1986; Cohen, 1988; James and Brett, 1984). In this study, there are four main moderators' variables that influence the relationships between determinants and dependent variables. The four moderators are gender, age, propensity to use and precipitating events. Both gender and age are categorical moderator variables, while, propensity to use and precipitating events are continuous moderator variables.

The subsample analysis is commonly used to detect the effects of categorical moderating variables (Hair et al., 2006). Thus, this study chooses the subsample analysis (i.e., multigroup) to detect the moderating effects for the categorical variables of gender and age. The first step in detecting the moderating effects of gender and age is by establishing

relationships between the determinants and intention to use. Findings on the relationships between the determinants and dependent variable indicate all determinants, perceived desirability, performance expectancy, perceived feasibility and facilitating conditions toward IS adoption behaviour were significant, with the exception of social influence and effort expectancy. Therefore, the impacts of these two constructs of social influence and effort expectancy are excluded when detecting the moderating effects of gender and age.

Once the relationships have been established, the data are subdivided on the basis of the values of the potential moderating variables. Therefore, for gender, the data is split into two data sets, the first data set represents the female entrepreneurs (n = 80) and the second data-set represents the male entrepreneurs (n = 249). As for age group, recently, there are many debates that individual from different age group has different set of characteristics and values on how they perceive and deal with certain behaviour, and as a result creates generation gap among these age groups. Due to this prior assumption, three different generations emerged. The first generation is known as baby-boomers, and they are individuals who were born between 1946 and 1964 (i.e., 46 years old and above). The second generation is known as generation X and they are individuals that were born between 1965 and 1980 (i.e., 32 years old to 45 years old). The third generation is known as generation Y, and they are individuals that were born after 1980 (i.e., 31 years old and below). Due to the significant different set of characteristics between the three generations, this study splits the three different age group of entrepreneurs' according to the generations they belong to: (1) generation baby boomers entrepreneurs (n = 97); (2) generation X entrepreneurs(n = 139 cases) and (3) generation Y entrepreneurs (n = 93). Table 6.8 provides detail of the subsample groups according to gender and age group.

Table 6.9: Categories of Moderating Variables

Moderating Variable	Gender		Age		
Subsample	Male	Female	Babyboomer	Generation X	Generation Y
No	249	80	97	139	93

Once the data have been divided in different subsamples, the original two-variable relationships for each of the subsample are reviewed and compared with the relationships found in each of the subsamples. Therefore, the first analysis is to constrain the parameter (i.e., the relationship between the determinants and IS adoption behaviour) to be equal across the groups, and is referred to as Model A. The second analysis is not to constrain the parameter, and is referred to as Model B. The difference in the Chi square value ($\Delta\chi^2$) between the Model A and Model B will determine the effect of the moderating variables on the relationships between the determinants and IS adoption behaviour (i.e., intention to use and use behaviour). The moderating effects would be supported if Chi square differences ($\Delta\chi^2$) are significant, which mean that the model has a better fit when these relationships are allowed to be as a different group based on the moderating variables. The initial test of comparing the changes in Chi squares ($\Delta\chi^2$) between the groups will provide evidence with at least one or more of the direct effects differ significantly across the subsamples.

6.3.5.1 Impact of Gender on Individual and Technological Factors

Regarding the relationship between performance expectancy, perceived desirability and perceived feasibility and intention to use, the value of Chi square difference ($\Delta\chi^2$) support the moderating effect of gender thus hypotheses H1a, H3a, and H4a are supported. Contrary to these hypotheses moderating effect of gender for social influence and effort expectancy are not significant thus, hypotheses H2a and H5a were not supported.

Table 6.10: Hypotheses Testing on Moderating Effects of Gender

	Hypotheses	β	C.R.	P	$\Delta\chi^2$	
Performance expectancy →Intention	**H1a**					Supported
Female		0.232	1. 620	0.105	50.186	
Male		0.291	2.901	0.004**		
Perceived desirability →Intention	**H3a**					Supported
Female		0. 484	4.071	***	35.714	
Male		0.445	5.799	***		
Perceived feasibility →Intention	**H4a**					Supported
Female		0.227	1.726	0.054*	73.394	
Male		0.254	3.010	0.003 **		

Standardized Regression Weights; C.R.: Critical Ratio *: $p \leq 0.05$, **: $p \leq 0.01$ ***: $p \leq 0.001$

The findings in Table 6.10 indicate that the effect of performance expectancy on intention to use IS related innovation is stronger for male entrepreneurs ($\beta = 0.291$, $p < 0.01$) compared to female entrepreneurs ($\beta = 0.232$, $p < 0.01$). Thus, hypothesis H1a was supported. Findings reveal that male entrepreneurs emphasise more on performance accomplishments and have higher achievement motivation. Thus, their perception on the usefulness of IS related innovation will strongly influence their intention to use IS related innovation in their business compared to women entrepreneurs. As shown in Table 6.10, the moderating effect of gender on the relationship between perceived desirability and intention to use, is higher for female entrepreneurs ($\beta = 0.484$, $p < 0.001$) than for male entrepreneurs ($\beta = 0.445$, $p < 0.01$). Therefore, hypothesis H3a was supported. Findings indicate that for female entrepreneurs personal satisfaction of using IS related innovation and as a tool that provides personal satisfaction on their daily tasks influence their decision to adopt the system. Contrary to the effect of gender on perceived desirability, the impact of perceived feasibility on intention to use is more significant for male entrepreneurs ($\beta = 0.254$, $p < 0.01$) than for female entrepreneurs ($\beta = 0.227$, $p < 0.05$). Thus, hypothesis H4a was supported. Findings reveal that men entrepreneurs perceived that if the IS related innovation is perceived to be

practical, feasible and also when entrepreneurs have the confident to acquire the IS capability and skills themselves, their intention to use the system will be greater.

6.3.5.2 Impact of Age on Individual, Technological and Environmental Factors

As illustrated in Table 6.11, the value of Chi-square differences ($\Delta\chi^2$) between baseline model and constrained model validate the moderating effect of age on the relationship between performance expectancy, perceived desirability, and perceived feasibility toward intention, therefore, hypotheses H1b, H3b, and H4b were supported. The Chi square difference ($\Delta\chi^2$) between the base line model and constrained model on the relationship between facilitating conditions and use behaviour also validate the moderating effect of age, thus hypothesis H6a was supported.

The findings in Table 6.11 reveal that the impact of performance expectancy on intention to use IS related innovation is stronger for generation Y entrepreneurs ($\beta = 0.372$, $p < 0.001$) compare to generation X entrepreneurs ($\beta = 0.273$, $p < 0.01$) and generation baby boomers entrepreneurs ($\beta = 0.182$). Therefore, hypothesis H1b was supported. Younger entrepreneurs, specifically, generation Y entrepreneurs may place more importance on performance expectations and have more desire to be successful at their jobs than older entrepreneurs. These generation Y entrepreneurs will use IS related innovation if the system are useful and can improve their job performance. Entrepreneurs belong to generation X are also likely to have the intention to use IS related innovation due to the usefulness of the system for their business survival. Meanwhile for generation baby boomers entrepreneurs, the impact of performance expectancy in intention to use is lesser and not significant.

Table 6.11: Hypotheses Testing on Moderating Effects of Age on Intention to Use

	Hypotheses	β	C.R.	P	
Performance expectancy →Intention	**H1b**				Supported
Generation Y		0.372	2.223	0.026*	
Generation X		0.273	2.174	0.030*	
Baby boomer		0.182	1.718	0.086	
Perceived desirability →Intention	**H3b**				Supported
Generation Y		0.518	3.837	***	
Generation X		0.378	2.852	.004	
Baby boomer		0.386	4.514	***	
Perceived feasibility →Intention	**H4b**				Supported
Generation Y		0.086	0.585	0.558	
Generation X		0.367	3.945	***	
Baby boomer		0.434	2.517	0.012	
Facilitating conditions →Use	**H6a**				Supported
Generation Y		0.114	1.136	0.256	
Generation X		0.232	2.768	0.006**	
Baby boomer		0.408	3.729	***	

β:Standardized Regression Weights; C.R.: Critical Ratio *: $p \leq 0.05$, **: $p \leq 0.01$ ***: $p \leq 0.001$

As demonstrated in Table 6.11, the moderating effect of age on the relationship between perceived desirability and intention to use is higher for generation Y entrepreneurs (β=0.518, $p < 0.001$) compared to generation X and generation baby boomers entrepreneurs. Thus, H3b is supported. However, when compared between baby boomers (β= .386, $p < 0.001$) and generation X (β=0.378, $p < 0.01$), it seems that baby boomers entrepreneurs are more enthusiastic to use IS related innovation in their business and are more incline to use IS related innovation for personal satisfaction. Thus, hypothesis H3b was supported. Information technology (IT) emerges and advances prominently and extensively during the generation Y entrepreneurs time, and thus, they have more exposure and more familiar with IS related innovation, and find that using IS related innovation would increase quality of work and would result in a more relax working environment as these entrepreneurs grow up with the IS.

Contrary to the effect of age on the link between perceived desirability and intention to use, the impact of perceived feasibility on intention to use is significant and positive for generation baby boomers entrepreneurs ($\beta = 0.434$, $p < 0.001$), and generation X entrepreneurs ($\beta = 0.367$, $p < 0.01$) but not for generation Y entrepreneurs ($\beta = 0.086$, $p > 0.05$). Therefore, Hypothesis H4b was supported. Findings indicate that for generation X and generation baby boomers entrepreneurs, the higher the level of their IS skills, capabilities and IS knowledge, the more comfortable their feel about adopting the system. It seems that to the generation Y entrepreneurs, although they may lack the skills and knowledge about the IS related innovation, they are willing to learn and to familiarise themselves with the system.

Furthermore, as illustrated in Table 6.11, findings show that the effect of facilitating conditions on use behaviour is significant for generation X entrepreneurs ($\beta = 0.232$, $p < 0.01$) and generation baby boomers entrepreneurs ($\beta = 0.408$, $p < 0.01$), but not to generation Y entrepreneurs. Therefore, hypothesis H6a was supported. Findings reveal that for generation X and generation baby boomers entrepreneurs, having the proper IS infrastructure and resources in place would create path for them to pave toward using IS related innovation. With proper infrastructures or support, they may want to adopt the system, and will have second thought of using the system. It seems that these older entrepreneurs attach more importance to having the necessary IS resource or receiving internal and external IS support to aid them with IS use. On the other hand, for the younger age group, that is the generation Y entrepreneurs, they would not mind using the system even in condition where there no proper infrastructures or internal and external supports to guide them toward the use of IS related innovation.

6.3.6 The Moderating Effect of Continuous Moderating Variables

There are two alternative approaches for detecting the effect of continuous moderating variables on the link between predictors and dependent variables. The first alternative to detecting continuous moderating effect is the subsample analysis and the second alternative involves computing cross-product indicator analysis (Stone-Romero and Anderson, 1994). The subsample analysis is commonly used to detect the categorical moderating variables, while the cross-product analysis is more appropriate for continuous moderating variables. However, cross product analysis is likely to produce multicollinearity because all indicators for each predictor variable would have to be multiplied to produce all permutations of cross-products (Chin, 1998).

Due to the criticism that cross product analysis would likely produce multicollinearity, this study adopts the subsample analysis (i.e., multigroup SEM model) to test effect of continuous moderating constructs of propensity to use and precipitating events on the determinants of IS adoption behaviour by entrepreneurs. According to Hair et al. (2006) and Zhao and Cavusgil (2006) two group models can be applied to detect the effect of continuous moderating variables that is tested based on these two levels: (1) high and (2) low, through a series of path analysis (Hair et al., 2006). Therefore, in order to test these continuous moderating variables, separate structural equation models were estimated for high and low level of propensity to use and for high impact and low impact of precipitating events. The categorisation of the high/low level and high/low impact can be based on mode, median or in a way that make sense to and justified for the logical grouping (Hair et al., 2006). Some researchers uses mean to form the groups for testing continuous moderator in SEM (Moghavvemi et al., 2012; Moghavvemi and Mohd Salleh, 2011). In addition, MODPROBE, which is a statistical software developed by Hayes and Matthew (2009) can

be used to further clarify the effect of continuous moderating variables in the integrative UTAUT-EPM model. The same procedures of analysis performed to test categorical moderating variable in Section 6.3.5 is performed in detecting continuous moderating variables.

Table 6.12: Categories of Continuous Moderating Variables

Moderating variable	**Propensity to use**		**Precipitating events**	
Subsample	High	Low	High	Low
N	154	175	177	152

For the purpose of this study, the data were split into two groups based on their mean scores on their scale of propensity to use and precipitating events. As illustrated in Table 6.12, respondents whose means scores on the scale of propensity to use are higher than the average mean are grouped as those entrepreneurs with high level of propensity to use (n=154), whereas respondents with mean scores less than or equal to the average mean are grouped as those entrepreneurs with low level of propensity to use (n=175). As for precipitating events, respondents whose mean scores on the scale of precipitating events was above the average mean score are grouped as those entrepreneurs with high impact of precipitating events (n=177), whereas respondents whose mean scores on the scale of precipitating events are less than or equal to the average mean score mean<18 are grouped as those entrepreneurs with low impact of precipitating events (n=152).

Once the groups are identified and categorised, it is necessary to determine the significant Chi square differences in the structural parameters between the high/low level of propensity to use and high/low impact of precipitating events group in the this study. In order to test the hypotheses on the moderating effects, the parameter should be compared in

the low group that is (less or equal to mean and the high group that higher than mean (Hair et al., 2006).

6.3.6.1 Impact of Individual Factors on Intention to Use Moderated by Propensity to Use

As illustrated in Table 6.13 the effect of propensity to use on the relationship between perceived desirability and intention to use is significant since the value of Chi square difference ($\Delta\chi^2$) shows significant difference. The findings show the regression path for low level of propensity to use entrepreneurs ($\beta = 0.257$, $p < 0.05$) and high level of propensity to use entrepreneurs' ($\beta = 0.530$ $p < 0.001$) are all significant. These findings support that the propensity to use have a moderating effect on the relationship between perceived desirability and intention to use, as regression weight (β) is significant, thus, hypothesis H3c was supported. These findings suggest that, entrepreneurs' pervasive decision to use IS related innovation will influence desirability of use and increase their intention to use such innovation. Therefore, using IS related innovation in their business is more attractive for entrepreneurs who have strong decision to use the system. Another possible explanation is that the volitional decision to use IS related innovation effect entrepreneurs perception about attractiveness of using IS innovation in their business.

Table 6.13: Hypotheses Testing on Moderating Effects of Propensity to use

	Hypotheses	**β**	**C.R.**	**P**	$\Delta\chi^2$	
Perceived desirability →Intention	**H3c**					Supported
Low propensity to use group		0.257	2.908	0.004**	47.4	
High propensity to use group		0.530	5.427	***		
Perceived feasibility →Intention	**H4c**					Supported
Low propensity to use group		0.184	2.378	0.017**	84.3	
High propensity to use group		0.325	1.722	0.055*		

β: Standardized Regression Weights; C.R.: Critical Ratio *: $p \leq 0.05$, * *: $p \leq 0.01$ ** *: $p \leq 0.001$

As demonstrated in Table 6.13, regarding the relationship between perceived feasibility and intention to use; the findings support the moderating effect of propensity to use on the relationship as the value of Chi square difference ($\Delta\chi^2$) is significant. Findings indicate that the regression weight for low level propensity to use entrepreneurs ($\beta = 0.184$, $p < 0.05$), and high level propensity to use entrepreneurs ($\beta = 0.325$, $p < 0.01$) are all significant. Therefore, hypothesis H4c was supported. The findings suggest that entrepreneurs who have strong disposition in their decision to use IS related innovation will perceive of having the confidence that they are able to learn and acquire the skills and capability to use such innovation. Entrepreneurs with high level of propensity to use will have high level of perception about their self-efficacy and therefore affect their view on intention to use the new system. In other word, if entrepreneurs believe they have the abilities to acquire the skills and capability to use IS related innovation, they will act upon, which reflect their volitional intention using the system. Thus, this would have greater impact on their intention to use IS related innovation.

6.3.6.2 Impact of Intention to Use on Use Behaviour Moderated by Precipitating Events

As illustrated in Table 6.14, regarding the relationship between intention to use and use behaviour of IS related innovation by entrepreneurs, the value of Chi-square difference ($\Delta\chi^2$) shows significant difference between those entrepreneurs with high impact and low impact of precipitating events. The findings show the regression path for high impact of precipitating events for entrepreneurs ($\beta = 0.327$, $p < 0.001$), and low impact of precipitating events for entrepreneurs ($\beta = 0.592$, $p < 0.001$) are all significant. Therefore, hypothesis H7a was supported.

Table 6.14: Δχ2 of Precipitating Events

	Chi-Square	Probability	χ^2/df	Δχ2
Model B	745.064	.000	1.800	79.074
Model A	824.138	.000	1.986	

These findings support that precipitating events has a moderating effect on the relationship between intention to use and use behaviour as regression weight (β) is significant, thus, hypothesis H7a was supported. These findings suggest that, precipitating events will influence intention to use and increase entrepreneurs intention to use towards use behaviour of IS related innovation.

Table 6.15: Hypotheses Testing on Moderating Effects of Precipitating Events

	Hypotheses	β	S.E.	C.R.	P	$\Delta\chi^2$	
Intention →Use	**H7a**						Supported
Low precipitating events group		0.592	0.081	6.071	***	79.074	
High precipitating events group		0.327	0.071	3.346	***		

β: Standardized Regression Weights; S.E: standard Deviation C.R.: Critical Ratio *: $p \leq 0.05$, **: $p \leq 0.01$,***: $p \leq 0.001$

Most importantly, the regression analysis results of SEM reveal statistically significant relationship between intention to use and use behaviour, with a variance explained (R^2) by intention to use increases from 44.5% to 54.2%. When the precipitating events are added to the integrative UTAUT-EPM model as moderating, the variance explained from use behaviour has increased by 9.7%. Results indicate that effect of precipitating events has strong impact on relationship of intention to use towards behaviour of entrepreneurs.

These findings demonstrate that impact of intention to use on use behaviour is moderated by precipitating events that occur within entrepreneurs' environment. The higher

the impact of these precipitating events on entrepreneurs, the greater is the effect of their transformational behaviour from intention to use to actual use. Form the findings; it seems that precipitating events would influence entrepreneur's decision to transform to actual use much faster. The findings also indicate entrepreneurs who experience low impact of precipitating event will have greater transformational act of intention to use to use behaviour. On the other hand, if entrepreneurs experience high level of precipitating events then, the effect of transformational act from intention to use is lower. It appears that entrepreneurs who experience a high impact of precipitating events that may disrupt their normal work condition will use IS related innovation, but that would not be their immediate coure of action. A possible explanation is that if the level of precipitating events and external effect is low or normal, entrepreneurs' would be able to cope and still handle the situations and/or events they encounter, and thus, would not affect much on their early decision to adopt IS related innovation, so they will proceed and realise their earlier decision to adopt the system.

6.4 POST HOC ANALYSIS ON THE IMPACT OF CONTINUOUS MODERATING VARIABLES

In order to mitigate biasness and to confirm the effects of these continuous moderating variables of propensity to use and precipitating event, this study performs an alternative approach to demonstrate the effects of these continuous moderating variables using MODPROBE application. The MODPROBE application is a computational aide for SPSS for probing moderations through graphical illustration. The MODPROBE application is developed by Hayes and Matthes in 2009. MODPROBE is an aide for probing single degree of freedom interaction in ordinary least square (OLS) and logistic regression.

MODPROBE estimates model coefficients and standard errors in a model including predictor's variable, moderating variable, the product of moderating variable and predictor variable in its effect on the outcome variable.

The MODPROBE produces tests of the conditional effect of the predictor variable on dependent variable at values of moderating variables at specific values of the moderator, using in three different values by default, at mean, one standard deviation above the mean, and one standard deviation below the mean. However, in cases of moderating variable is dichotomous, MODPROBE produces conditional effects for focal variable at the two values of moderating variable (Karademas et al. 2010; Hayes and Matthes, 2009; Matthes et al., 2010)., All these conditional effects values create what is known as simple slopes, and thus their effects are illustrated in the form of graphical format. MODPROBE model can measure the moderation effect, and in addition, produces tests of the conditional effect of the independent variable on the dependent variable in this study. MODPROBE analysis is performed via SPSS to confirm and further validate the continuous moderating variables on the integrative UTAUT-EPM model.

6.4.1 Moderating Effect of Propensity to Use

Regarding the moderating effect of propensity to use on perceived desirability to intention to use IS related innovation, findings indicate that the overall model for the three variables, that are perceived desirability, intention to use, and propensity to use in the regression was statistically significant, with variance explained (R^2) of 64.9% (refer to Appendix C-1 for detail). The findings indicate that perceived desirability has a positive relationship ($\beta = 0.401$, $p < 0.01$) with intention to use. However the interaction between

perceived desirability and intention to use is statistically significant (β = -0.0243, $p<.01$). The conditional effects for propensity to use show change in perceived desirability from 0.5037 to 0.2996 ($p < 0.01$).

As shown in Figure 6.6, the MODPROBE generates conditional effects or simple slopes for perceived desirability at values of propensity to use equal to the sample mean, which represent moderate level of propensity to use, a standard deviation above the sample mean, which represent high level of propensity to use, and below the sample mean which represent low level of propensity to use.

As illustrated in Figure 6.6, the higher the level of perceived desirability, the greater is the level of intention to use. Moreover, Figure 6.6 shows that the impact of perceived desirability on intention to use will be greater if the level of propensity to use by entrepreneurs is higher. Thus, even with low level of perceived desirability of entrepreneurs, but if they are truly and highly committed to their action, that is entrepreneurs have high level of propensity to use, there is greater possibility that they will adopt IS related innovation. However, as the level of perceived desirability is higher, even though entrepreneurs' level of propensity to use IS related innovation is low, they would have greater intention to use IS related innovation.

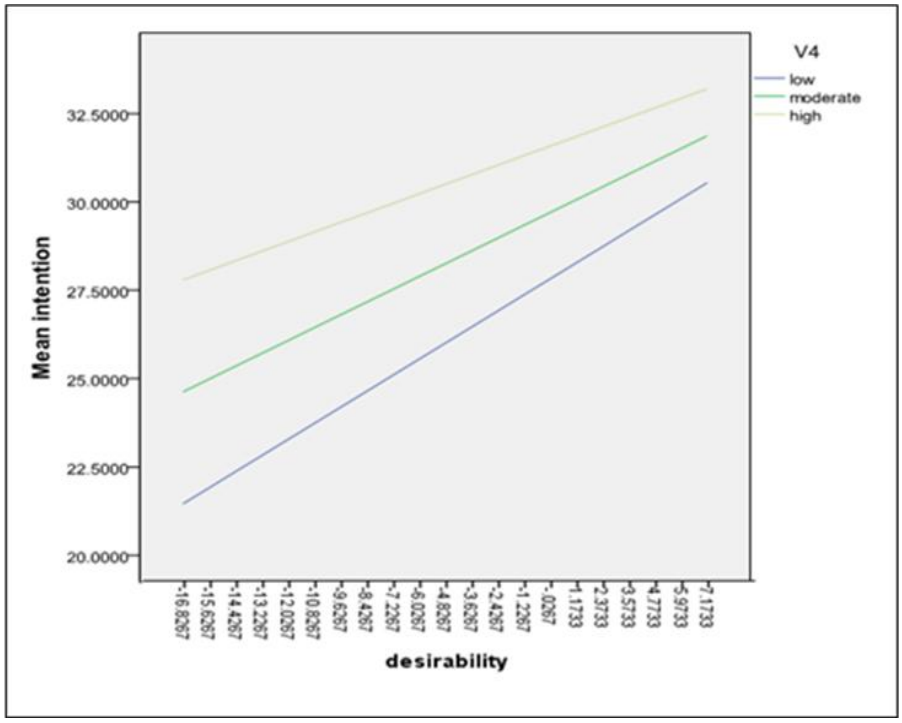

Figure 6.6: Moderating Effect of Propensity to Use on Perceived Desirability

From these findings, it appears that the effect of the propensity to use of entrepreneurs on the relationship between perceived desirability and intention to use will be lesser, when entrepreneurs have high intrinsic interest toward IS related innovation. A possible explanation is that when entrepreneurs have strong emotion towards what they want to do, even with little attractiveness of the tasks/things that want to do, the strong emotion outweighs their perception about the attractiveness of the tasks/things. Thus, these strong emotions lead to their intention to act upon an action. On the other hand, when they have strong intrinsic interest about the tasks/things even though they may not have strong emotion or have the disposition to act upon the action, they will do so as their intrinsic interest manifest in the tasks/things are high, thus increase they intention to use.

Regarding the moderating effect of propensity to use on perceived feasibility to intention to use IS related innovation, findings indicate that the overall model for the three variables, that are perceived feasibility, intention to use, and propensity to use in the regression was statistically significant, with variance explained (R^2) of 68 percent (refer to Appendix C-2 for detail). The findings indicate that perceived feasibility has a positive relationship ($\beta = 0.390$, $p < 0.01$) with intention to use, and that the impact of perceived feasibility on intention to use is moderated by propensity to use ($\beta = -0.0211$, $p < 0.01$). The conditional effects for propensity to use show change in perceived feasibility from 0.4791 to 0.3024 ($p < 0.01$). As shown in Figure 6.7, the MODPROBE generates the conditional effects or simple slopes for perceived feasibility at values of propensity to use equal to the sample mean, which represent moderate level of propensity to use, a standard deviation above the sample mean, which represent high level of propensity to use, and below the sample mean which represent low level of propensity to use.

As illustrated in Figure 6.7, the higher the level of propensity to use, the greater is the level of intention to use. More prominently, Figure 6.7 shows that the impact of perceived feasibility on intention to use will be greater if the level of propensity to use by entrepreneurs is higher. Thus, even with low level of perceived feasibility of entrepreneurs, but if they are truly and highly committed to their action, that is entrepreneurs have high level of propensity to use, there is greater possibility that they will adopt IS related innovation. However, as the level of perceived feasibility is higher, even though entrepreneurs' level of propensity to use IS related innovation is low, they would have greater intention to use IS related innovation. From these findings, it appears that the effect of the propensity to use of entrepreneurs on the relationship between perceived feasibility and intention to use will be lesser, when entrepreneurs have high intrinsic interest, such as

they are able to adapt, learn and feel that they have the necessary skills and knowledge toward IS related innovation.

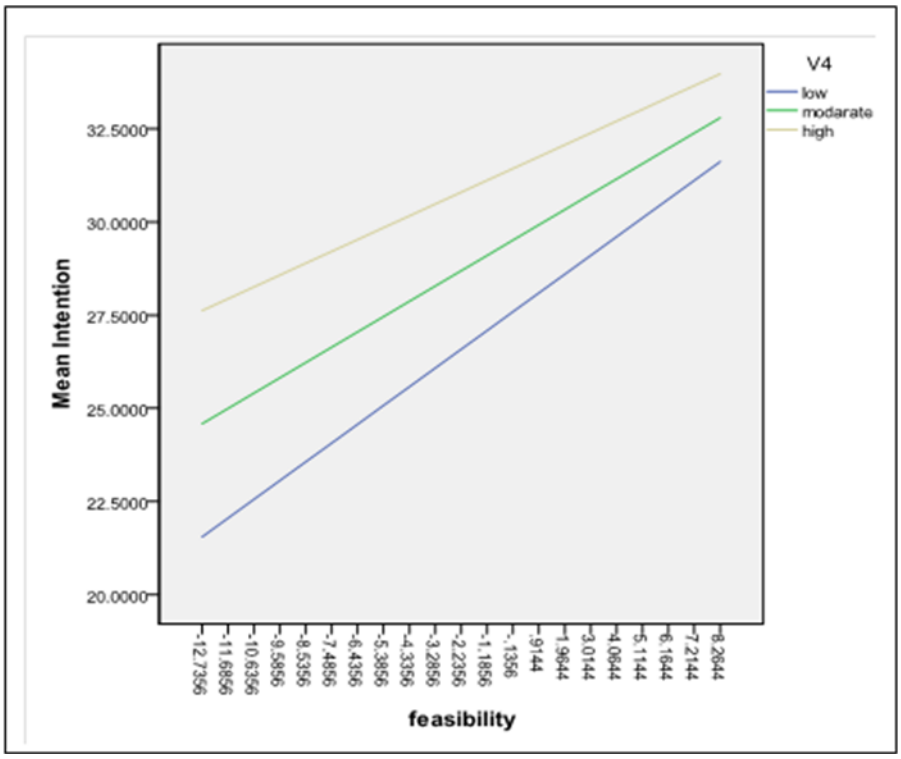

Figure 6.7: Moderating Effect of Propensity to Use on Perceived Feasibility

A possible explanation is that when entrepreneurs have strong emotion towards what they want to do, even with lack of skills and knowledge about the tasks/things, the strong emotion outweighs their perception about the their lack of self-efficacy. The entrepreneurs' strong emotion about the tasks/things would encourage them to acquire the necessary skills and knowledge. Thus fore, this strong emotion leads to their intention to act upon an action. On the other hand, when entrepreneurs have strong intrinsic interest, whereby they believe that they have the ability to learn by themselves, even though with low level of propensity to use the system, the intrinsic interest vested in entrepreneurs' belief, lead them to act upon a decision.

6.4.2 Moderating Effect of Precipitating Events

Examination of precipitating events as moderating variable in the relationship between intention to use and use behaviour involve a series of logistic regressions with intention to use as the focal predictor, and precipitating events as the moderator variable in the relationship between intention and use behaviour. Results of the analyses using MODPROBE via SPSS provide evidences that precipitating events moderates relationship between intention to use and use behaviour (refer to Appendix C-3 for detail).

Regarding the moderating effect of precipitating events on intention to use to use behaviour of IS related innovation, findings indicate that the overall model for the three variables, that is intention to use, use behaviour, and propensity to use in the regression was statistically significant, with variance explained (R^2) of 36.7% (refer to Appendix C-3) The findings indicate that intention to use has a positive relationship ($\beta = 0.250$, $p < 0.01$) with intention to use, and that the impact of intention to use on use behaviour is moderated by precipitating events ($\beta = -0.009$, $p < 0.01$). The conditional effects for precipitating events show change in perceived intention to use from 0.2993 to 0.2009 ($p < 0.01$). As shown in Figure 6.8, the MODPROBE generates the conditional effects or simple slopes for intention to use at values of precipitating events equal to the sample mean, which represent moderate impact of precipitating events, a standard deviation above the sample mean, which represent high impact of precipitating events, and below the sample mean, which represent low impact of precipitating events.

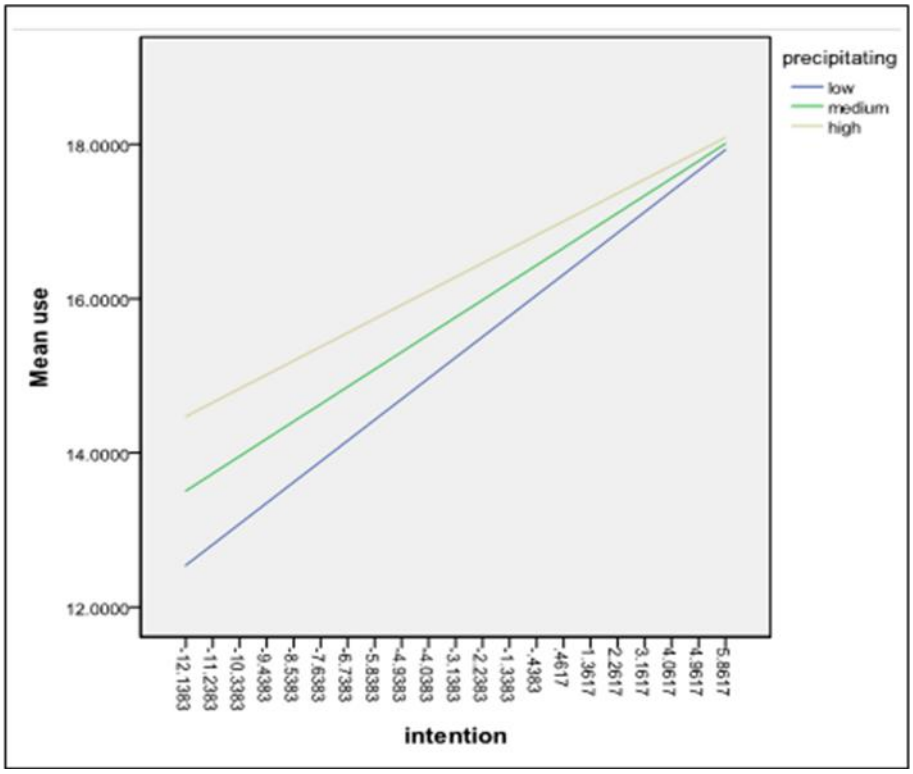

Figure 6.8: Moderating Effects of Precipitating Events on Intention to Use

As illustrated in Figure 6.8, the higher the level of intention to use, the greater is transformational effect to use behaviour of IS related innovation by entrepreneurs. Most signify Figure 6.8 shows that the impact of intention to use to use behaviour will be greater if the precipitating events that occur within the entrepreneurs' environment greatly impact the entrepreneurs. Thus, with the presence of precipitating events, even with low level of intention to use IS related innovation by entrepreneurs, they action towards using IS related innovation will be high. However, if the level of intention to use is lower, regardless of the whether the events occur may highly, moderately, or lowly impact the entrepreneurs daily activities, the transformational effect of intention to use outweighs the precipitating events. These findings indicate as the entrepreneurs have strongly make up their mind on their intention to use IS related innovation, even if there events that may have high impact on

entrepreneurs, they would follow through their intention to use and further act upon the intention, that is to use IS related innovation.

A possible explanation is that when entrepreneurs have strong intention to use IS related innovation, thus means that entrepreneurs probably have conducted thorough research about the system, for example, the benefits and the attractiveness of investing such system. These entrepreneurs may also have careful plan of the cost of investing IS related innovation in their daily business before making their mind whether to adopt or not adopt the system. Hence, with proper planning, and research development management, they are able to encounter any event that may occur during the course of their transformational effect intention to use to actual use.

Recall in Chapter Four, this study has identified four situational conditions for precipitating events construct, that include (1) changes in entrepreneurs work situation; (2) changes in entrepreneurs work environment; (3) decision to changes of entrepreneurs work situation due to recent and/or lack opportunity; and (4) technological changes in entrepreneurs work environment (e.g., availability of IS innovation, new technology in accounting practice, availability of on line system). To investigate the effect of each of these precipitating events, this study performs a more in-depth understanding on each of these four situational conditions for precipitating events moderating role on the link between intention to use and use behaviour of IS related innovation by entrepreneurs. The following section presents the findings of each of these four situational conditions for precipitating events on relationship between entrepreneurs' intention to use and use behaviour of IS related innovation.

6.4.2.1 Moderating Effect of Changes in Entrepreneurs' Work Situation

As illustrated in Figure 6.9, the higher the level of intention to use, the greater is transformational effect to use behaviour of IS related innovation by entrepreneurs. Most prominently, Figure 6.9 shows that the impact of intention to use to use behaviour will be greater if there are changes in entrepreneurs' daily work situation such as being offered a big contract, declining profit, availability of financial resource, new investment, rising cost, and/or new product that occur greatly impact the entrepreneurs. Thus, even with low level of intention to use IS related innovation by entrepreneurs, but if these situational events have great impact on entrepreneurs, their action towards using IS related innovation will be greater. It appears that at the time intention is formed if any changes related to entrepreneurs' work situation will happen (i.e., being offered a big contract or declining profit) these situational events increase the probability of intention to use to be realised into actual use of IS related innovation in higher level.

However, if the level of intention to use is greater, regardless of the whether the events occur may highly, moderately, or lowly impact the entrepreneurs daily activities, the transformational effect of intention to use outweighs the precipitating events. The results indicate that if entrepreneurs have strongly make up their mind on their intention to use IS related innovation, even if there events that may have high impact on entrepreneurs, they would follow through their intention to use and further act upon the intention.. A possible explanation could be as described in Section 6.4.2. When entrepreneurs have strong intention to use IS related innovation, they probably have conducted thorough research about the system, conducted the SWOT analysis, and have proper business plan for the investment of IS related innovation.

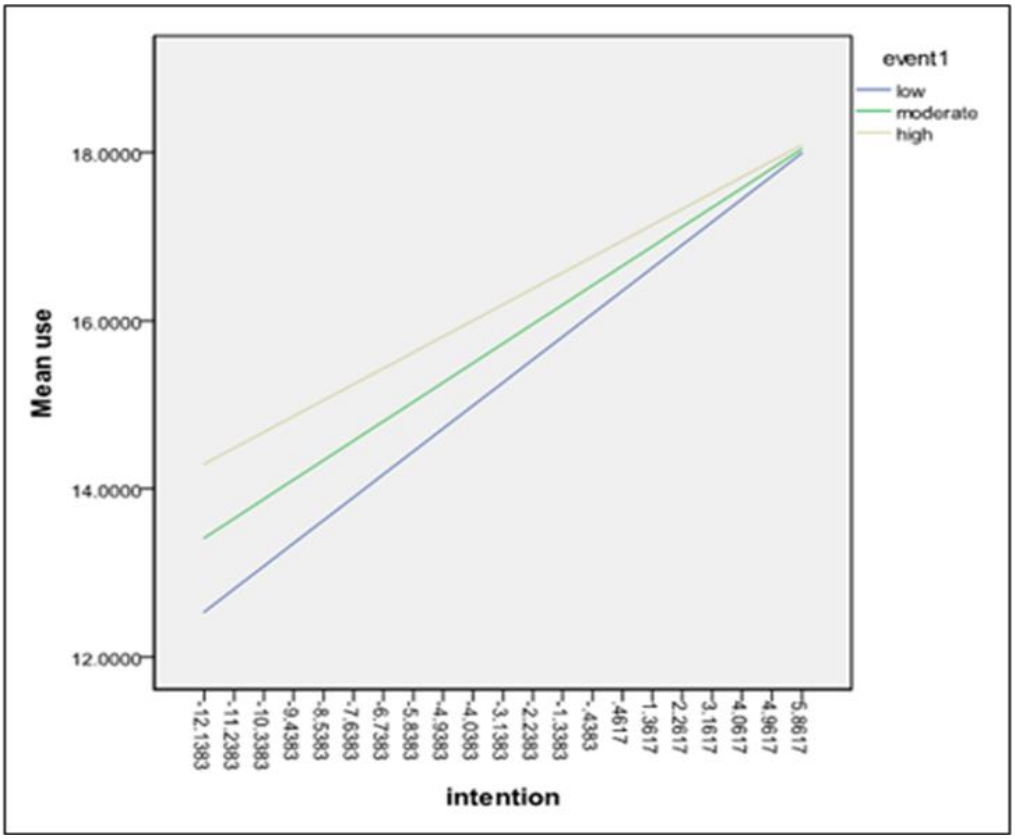

Figure 6.9: Moderating Effects of Work Situation on Intention to Use

From the findings, it appear that when entrepreneurs intention to use is formed and they are being offered good contract, decide to produce new product and extend their market, or they find financial resource/new investment, the probability to use IS related innovation will increase. Thus, they will use IS related innovation in their company. On the other hand, if their profit decline and cost of product increasees they would consider using IS related innovation to decrease the cost and increase the profit. The findings suggest that in the above situational conditions entrepreneurs will use IS related innovation to solve their work related problem, to assist their business, to extend the activity and make more profit or survive in the market. The findings also indicate that as the precipitating events have greatly impacted entrepreneurs, then their intention to use towards use behaviour of IS related

innovation will be less, and the lower impact of precipitating events that they experience will have more impact on entrepreneurs' intention to use towards use behaviour.

6.4.2.2 Moderating Effect of Changes in Entrepreneurs' Work Environment

As illustrated in Figure 6.10, the higher the level of intention to use, the greater is transformational effect to use behaviour of IS related innovation by entrepreneurs. Most saliently, Figure 6.10 shows that the impact of intention to use to use behaviour will be greater if there are changes in entrepreneurs' daily work environment such as new government policy, financial crisis, customer or new market, supplier request, industry or market change, declining market share that occur greatly impact entrepreneurs. Thus, even with low level of intention to use IS related innovation by entrepreneurs, but if these situational events have greatly impact entrepreneurs, their action towards using IS related innovation will be greater. It appears that at the time intention is formed and during that time if any changes related to entrepreneurs' work situation, for example new government policy and financial crisis, the probability of the intention to use to be realised into actual use of IS related innovation is higher but the effect is stronger for entrepreneurs who experience a low and moderate impact of these situational events.

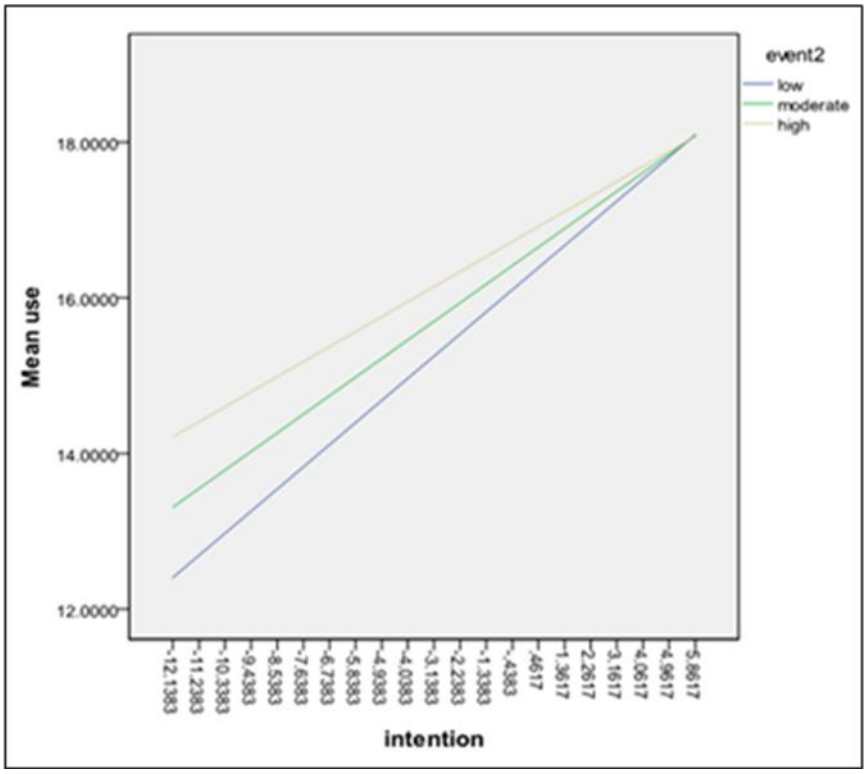

Figure 6.10: Moderating Effect of Work Environment on Intention to Use

The findings indicate that these situational events that entrepreneurs experience in their work environment are salient in which these situational changes affect the impact of intention to use on use behaviour greatly. This suggests that, if government implement new rule for using some type of IS related innovation (on-line business, face book) and they are very strict about it entrepreneurs would use this kind of innovations but in lower level. In addition the findings indicate that even though entrepreneurs are experiencing financial crisis, declining market share, industry and/or market change that occur in their work environment, they need to still carry on with their daily work activities, and thus would use the IS related innovation to solve the problems that they face.

6.4.2.3 Moderating Effect of Entrepreneurs Decision to Change Their Career Perspective

As illustrated in Figure 6.11, the higher the level of intention to use, the greater is transformational effect to use behaviour of IS related innovation by entrepreneurs. Most prominently, Figure 6.11 shows that the impact of intention to use to use behaviour will be greater if entrepreneurs decide to change their career prospects due to the competitive nature of environment, competitor threat or action, strategic growth target, perception of increasing risk, attract new customer, and/or international opportunities greatly impact entrepreneurs. Thus, even with low level of intention to use IS related innovation by entrepreneurs, but if these situational events have greatly impacted entrepreneurs, their action towards using IS related innovation will be greater.

It appears that at the time intention is formed and during that time if any changes related to entrepreneurs' change of careers prospect, for example, venturing into on-line business, the probability of the intention to use to be realised into actual use of IS related innovation is higher. In addition, the findings also indicate that as the degree of entrepreneurs' intention to use is getting higher and if the impact of these situational events on entrepreneurs' is much greater as well, then the possibility that entrepreneurs intention to use formed earlier will lead to actualisation of the use behaviour will decrease. On the other hand, if entrepreneurs experience low impact of these situational events, but they have high level of intention to use, thus fore, the possibility that entrepreneurs intention to use formed earlier will lead to actualisation of the use behaviour will be greater.

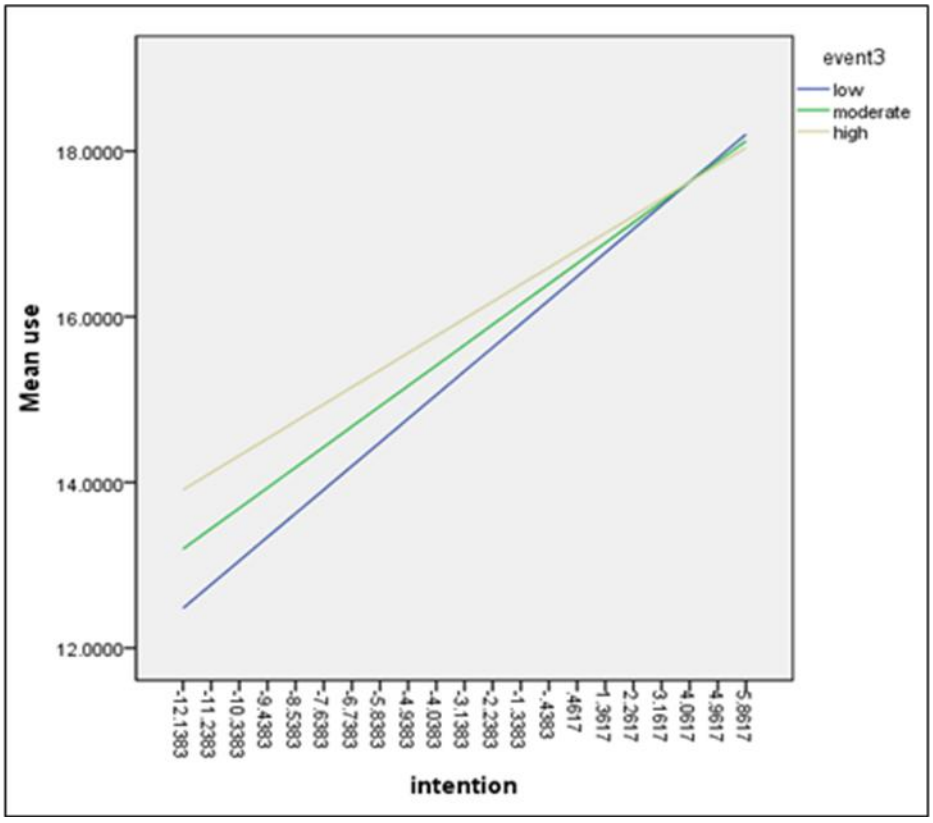

Figure 6.11: Moderating Effect of Career Prospect on Intention to Use

These findings suggest that these situational events play very prominent role in the link between intention to use and use behaviour. In other words, the impact of intention to use on use behaviour is greatly affected by the impact of entrepreneur's decision on the changes that they made on their career prospects. Entrepreneurs need to compete with competitors in the market and thus need to gain more advantage and extend their business. Therefore, when entrepreneurs make decision to change their career prospects they need to be able to gauge the market and using IS related innovation may provide them with sustainable advantage in the market. In the same vein, even though there are changes in term of career prospects, entrepreneurs are interested in using some forms of IS related innovation to improve their business efficiency and effectiveness.

On that note, if the impact of these precipitating events greatly affect entrepreneurs to refocus and restructure their career, then even with high degree of intention to use, the transformation of intention to use to use behaviour of IS related innovation will be much slower. However, if the entrepreneurs degree of intention to use is greater, then the intention to use to transform to use behaviour is greater.

6.4.2.4 Entrepreneurs Experience IS/IT Changes In Their Work Environment

As illustrated in Figure 6.12, the higher the level of intention to use, the greater is transformational effect to use behaviour of IS related innovation. Most prominently, Figure 6.12 shows that the impact of intention to use to use behaviour will be greater if there are changes in technological conditions in entrepreneurs' daily work environment, (i.e., availability of IS innovation, new technology in accounting practice, and availability of on-line business) that occur greatly impact the entrepreneurs. Thus, even with low level of intention to use IS related innovation by entrepreneurs, these situational events have great impact on entrepreneurs, and their action towards using IS related innovation will be greater. It appears that at the time intention is formed if any technological changes related to IS/IT occurs, these situational events will increase the probability of the intention to use to be realised into actual use of IS related innovation.

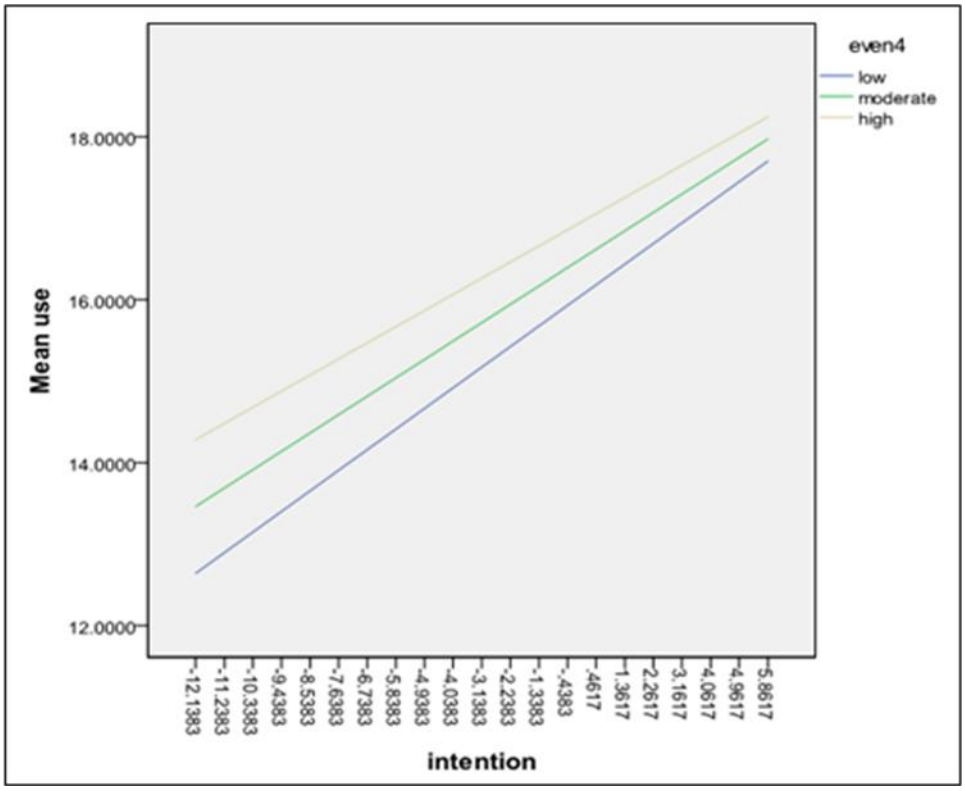

Figure 6.12: Moderating Effect of Technolological Change on Intention to Use

However, if the level of intention to use is greater, regardless of the whether the events occur may highly, moderately, or lowly impact the entrepreneurs daily activities, the transformational effect of intention to use outweighs the precipitating events. These findings indicate as the entrepreneurs have strongly make up their mind on their intention to use IS related innovation, even if there events that may have high impact on entrepreneurs, they would follow through their intention to use and further act upon the intention, that is to use IS related innovation. A possible explanation could be the same as described in Section 6.4.2, and Section 6.4.2.1 that when entrepreneurs have strong intention to use IS related innovation, thus means that entrepreneurs probably have conducted thorough research about the system, have conducted the SWOT analysis, and have proper business plan for the investment of IS related innovation.

From the findings, it appears that IS/IT changes influence entrepreneurs use of IS related innovation strongly. A possible explanation is that if new IS related innovation come to the market and they could assist entrepreneurs for greater efficiency, effectiveness and performance of their daily business, entrepreneurs' use of such innovation will increase. Therefore increase availability of IS innovation and change in the environment encourage entrepreneurs to use such innovation. Change in technical environment is strongest factor which influence entrepreneurs use of IS innovation compared to other three events which happen in the time intention is formed and actual use performed. This suggests that, availability of new technology/IS related innovationinfluences entrepreneurs to use these innovation in their business.

6.5 ASSESSMENT OF BASIC UTAUT

In this study, the UTAUT form the basis foundation for the development of the integrative UTAUT-EPM model. Therefore, this study analyses the dataset collected in this study to empirically test the basic UTAUT, and make comparison of the findings in basic UTAUT and the integrative UTAUT-EPM model. The basic UTAUT is tested using SEM technique and estimated using a maximum likelihood method (MLM). As demonstrated in Table 6.16, the results of the fit indices indicate that the data fit to the model very well.

Table 6.16: Standardized Estimates for Structural Basic UTAUT Model

Chi-Square	Probability	χ^2/df	SRMR	TLI	CFI	NFI	RMSEA	GFI	AGFI	PGFI	PNFI
578.987	**0.000**	**2.201**	**0.046**	**0.942**	**0.949**	**0.911**	**0.072**	**0.874**	**0.844**	**0.707**	**0.798**

Therefore, the adequacy of the measurement model and structural model is achieved for the basic UTAUT as shown in Table 6.17.

Table 6.17: Results of Goodness-of Fit of Basic UTAUT

			Factor loadings	S.E.	C.R.	P
Performance expectancy	→	Intention to use	.749	.056	13.171	***
Effort expectancy	→	Intention to use	.116	.054	2.551	.011
Social influence	→	Intention to use	.004	.039	.099	.921
Facilitating conditions	→	Usage Behaviour	.201	.067	3.472	***
Intention to use	→	Usage Behaviour	.542	.063	8.681	***

As shown in Figure 6.13, the findings indicates that both the hypothesised paths from performance expectancy ($\beta = 0.749$, $p < .001$) and effort expectancy ($\beta = 0.116$, $p > .05$) to intention to use were positive and significant. However, the hypothesised path from social influence ($\beta = 0.004$, $p > .05$) to intention to use was not significant. The findings also indicate that performance expectancy is the strongest determinant of entrepreneurs' intention to use IS related innovation, followed by effort expectancy. Both of performance expectancy and effort expectancy explained 65.3 percent of the variance in intention to use IS related innovation by entrepreneurs.

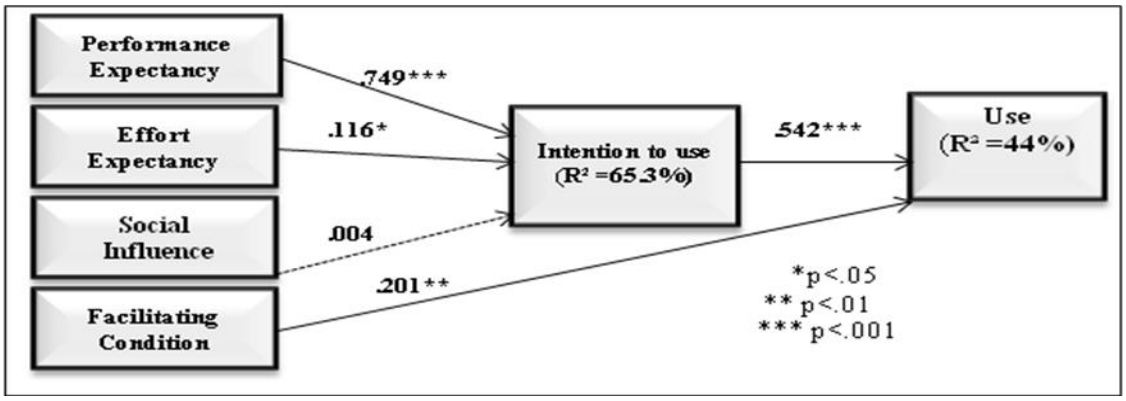

Figure 6.13: Basic Structural Models of UTAUT

Also as demonstrated in Figure 6.13, the hypothesised paths from facilitating conditions ($\beta = 0.201$, $p < 0.01$) and intention to use ($\beta = 0.542$, $p < 0.001$) were positive and significant. Both facilitating conditions and intention to use explained 44 percent of use behaviour of IS related innovation by entrepreneurs. In the study conducted by Venkatesh et al. (2003) that first developed and empirically tested the UTAUT, the determinants to intention to use explained 70 percent of the variance in intention to use, while facilitating conditions intention to use explained 44.1 percent of the variance use behaviour.

Examining the effect of age and gender on the basic UTAUT, findings reveal that effect of performance expectancy on intention to use is significant for both male and female entrepreneurs. However, the effect is stronger in male and younger entrepreneurs. As for the effect of age and gender on link between effort expectancy on intention to use, the findings indicate that the impact of effort expectancy is much stronger and significant for women and younger entrepreneurs. On the other hand, the impact of facilitating conditions on use behaviour is most prominent and significant for both older and younger entrepreneurs, however the impact is much stronger for older entrepreneurs toward using IS related innovation.

6.6 CHAPTER SUMMARY

In summary, this chapter presented the results on the assessments of the measurement model, and structural model of the integrative UTAUT-EPM model. The chapter also discusses the findings of the hypotheses developed based on the integrative UTAUT-EPM model. Both the assessments and hypotheses are performed using SEMvia AMOS. Lastly, this chapter presents the findings for the basic UTAUT using data collected from this study. In the following Chapter, the findings will be presented and discussed in detail. The

following chapter will also provide concluding remarks based on the findings and the compare the findings of the integrative UTAUT-EPM and basic UTAUT.

CHAPTER SEVEN

DISCUSSIONS OF FINDINGS

INTRODUCTION

This chapter discusses in details the findings of the empirical testing of the integrative UTAUT-EPM model and hypotheses. The chapter is divided into four main sections. Section one compares the findings of empirical testing of the basic UTAUT and the integrative UTAUT-EPM model. Section two presents an overview of the research objectives and findings of this study. Section three discusses in details the findings and interpretation of the integrative UTAUT-EPM model of this study. Finally, section four provides the concluding remarks of the findings of the integrative UTAUT-EPM model. The chapter concludes with a summary of the chapter.

7.1 BASIC UTAUT AND INTEGRATIVE UTAUT-EPM MODEL

As demonstrated in Table 7.1, the findings of the basic UTAUT, taken together all the determinants; performance expectancy and effort expectancy explained 65.3% of variance in intention to use IS related innovation by entrepreneurs. While facilitating conditions and intention to use explained 44.1% of variance in use behaviour IS related innovation by entrepreneurs. On the other hand, in the integrative UTAUT-EPM model, taken together the performance expectancy, perceived desirability and perceived feasibility explained 77.4% of the variance in intention to use IS related innovation by entrepreneurs, while facilitating conditions and intention to explained 54.2%of the variance in IS use behaviour of IS related innovation by entrepreneurs.

Table 7.1: Comparison of Findings between the Basic UTAUT model and Integrative UTAUT-EPM Model

	Basic UTAUT			UTAUT - EPM		
Hypotheses	**β**	**P**	Variance Explain	**β**	**P**	Variance Explain
Performance Expectancy → Intention to use	0.749	0.000	**65.3%** In Usage Intention	0.267	0.000	**77.4%** In Usage Intention
Effort Expectancy → Intention to use	0.116	0.011		-0.026	0.537	
Social influence → Intention to use	0.004	0.921		0.028	0.428	
Perceived Desirability → Intention to use	-	-		0.445	0.000	
Perceived Feasibility → Intention to use	-	-		0.270	0.000	
Intention to use → Use	0.542	0.000	**44.1%** in Use Behaviour	0.519	0.000	**54.2%** in Use Behaviour
Facilitating Conditions → Use	0.201	0.000		0.228	0.001	

In basic UTAUT, findings indicate that the technological factors are the salient determinants of IS related intention to use, while the individual factor of social influence does not influence entrepreneurs IS related adoption behaviour. On the other hand, in the integrative UTAUT-EPM model, it appears that the individual factors of perceived desirability and perceived feasibility are salient determinants that influence intention to use by entrepreneurs. Also only the technological factors of performance expectancy influence intention to use IS related innovation by entrepreneurs, while, effort expectancy seems to be diminishing. The increased in the variance explained from 65.3% in basic UTAUT to 77.4% in the integrative UTAUT-EPM model is due to the two variables from the individual factors: (1) perceived desirability and (2) perceived feasibility, indicating the salient roles of these variables in predicting entrepreneurs' intention to use IS related innovation. The findings of the integrative UTAUT-EPM model show that although technological factors of performance expectancy and effort expectancy are determinants of intention to use, in the presence of perceived desirability and perceived feasibility, the technological factors have

less effect on intention to use IS related innovation by entrepreneurs. In the case of entrepreneurs' behaviour intention to use, it seems that the perceptions of individual intrinsic interest of entrepreneurs are the determinants that stimulate entrepreneurs to adopt intention to use IS related innovation.

In addition, by proposing the moderating variable of propensity to use of entrepreneurs disposition to act upon their intention to use into the integrative UTAUT-EPM model provides in-depth understanding of the effects of these individual factors on intention to use. Form the findings of the integrative UTAUT-EPM model, even with the low level of these intrinsic interests of perceived desirability and perceived feasibility, if entrepreneurs are very committed toward decision, the probability of these entrepreneurs intention to use IS related innovation is greater. This finding indicates the prominent role of propensity to use the system when entrepreneurs make decision either to adopt or not adopt IS related innovation. Therefore, the integrative UTAUT-EPM model improves the predictive power of intention to use IS related innovation.

For both the basic UTAUT and integrative UTAUT-EPM models, findings indicate that the environmental factor of facilitating conditions and intention to use are the salient determinants of IS related innovation use behaviour of entrepreneurs. However, the increased in variance explained for use behaviour from 44.1% in basic UTAUT to 54.2% in the integrative UTAUT-EPM can be contributed to the inclusion of precipitating events construct. By including precipitating events construct as a moderator variable, it strengthens the ability of intention to use to predict use behaviour by entrepreneurs. Therefore in the integrative UTAUT-EPM model the effect of intention to use on use behaviour is stronger when compared to the basic UTAUT model. As mentioned previously, intention to use is a

predecessor to use behaviour, and thus the high degree of intention to use will lead to high probability of actual performance of use behaviour as postulated in basic UTAUT. However, the integrative UTAUT-EPM model contributes further to IS adoption behaviour research by providing explanation to circumstances why sometimes with high level of intention to use, the actual performance of use is not realised or materialised. Based on the above findings, it appears that the integrative UTAUT-EPM model is more robust in predicting entrepreneurs IS adoption use behaviour. Moreover, the integrative UTAUT-EPM strengthens the predictive ability of intention to use on use behaviour, which has been a concern of UTAUT by some IS researchers. Table 7.2 and 7.3 provide the summary of the findings of the integrative UTAUT-EPM model.

Table 7.2: Summary of Hypotheses Testing

Hypotheses		**Path Coefficient**	**Supported**
H1	Performance expectancy will have a significant positive effect on entrepreneur's intention to adopt IT-related innovation.	0.267	**Yes**
H2	The level of effort expectancy has a positive effect on entrepreneurs' intention to use IS related innovation.	-0.026	**No**
H3	The level of perceived desirability has a positive effect on entrepreneurs' intention to use IS-related innovation.	0.445	**Yes**
H4	The level of perceived feasibility has a positive effect on entrepreneurs' intention to use IS-related innovation.	0.270	**Yes**
H5	The level of social influence has a positive effect on entrepreneurs' intention to use IS-related innovation.	0.028	**No**
H6	The level of facilitating conditions has a positive effect on entrepreneurs on IS related innovation use behaviour.	0.228	**Yes**
H7	Intention to use has positive effect on entrepreneurs IS related innovation use behaviour.	0.519	**Yes**
H8	The level of performance expectancy has a positive effect on entrepreneurs' perceived desirability to use IS related innovation.	0.704	**Yes**
H9	Effort expectancy will have a significant effect on entrepreneurs' desirability to use IS related innovation.	0.120	**Yes**
H10	Perceived feasibility has a positive effect on effort expectancy toward intention to use IS related innovation.	0.524	**Yes**
H11	Perceived feasibility has a positive effect on facilitating conditions toward using IS related innovation.	0.686	**Yes**

Table 7.3: Summary of Hypotheses Testing on Moderating Effects

	Hypotheses	Path Coefficient	Supported
	The Impact of Determinants Moderated by Gender		
H1a	In a situation when an entrepreneur make decision to use IS related innovation, gender will moderate the relationship between performance expectancy and entrepreneur intention to use IS related innovation.	0.291	**Yes** Stronger for male
H2a	In a situation when an entrepreneur make decision to use IS related innovation, gender will moderate the relationship between effort expectancy and entrepreneur intention to use IS related innovation	-----	**No**
H3a	In a situation when an entrepreneur make decision to use IS related innovation, gender will moderate the relationship between perceived desirability and entrepreneur intention to use IS related innovation.	0.484	**Yes** Stronger for female
H4a	In a situation when an entrepreneur make decision to use IS related innovation, gender will moderate the relationship between perceived feasibility and entrepreneur intention to use IS related innovation.	0.254	**Yes** Stronger for male
H5a	In a situation when an entrepreneur make decision to use IS related innovation, age will moderate the relationship between social influence and entrepreneur intention to use IS related innovation.	------	**No**
	The Impact of Determinants Moderated by Age Group		
H1b	In a situation when an entrepreneur make decision to use IS related innovation, age will moderate the relationship between performance expectancy and entrepreneur intention to use IS related innovation.	0.372	**Yes** Stronger for babyboomers
H2b	In a situation when an entrepreneur make decision to use IS related innovation, age will moderate the relationship between effort expectancy and entrepreneur intention to use IS related innovation.	------	**No**
H3b	In a situation when an entrepreneur make decision to use IS related innovation, age will moderate the relationship between perceived desirability and entrepreneur intention to use IS related innovation.	0.518	**Yes** Stronger for generation Y
H4b	In a situation when an entrepreneur make decision to use IS related innovation, age will moderate the relationship between perceived feasibility and entrepreneur intention to use IS related innovation.	0.434	**Yes** Stronger for babyboomer
H5b	In a situation when an entrepreneur make decision to use IS related innovation, gender will moderate the relationship between social influence and entrepreneur intention to use IS related innovation.	------	**No**
	The Impact of Individual Factors Moderated by Propensity to Act		
H3C	In a situation when entrepreneur intent to use IS related innovation, propensity to use will moderate the relationship between perceived desirability and entrepreneur intention to use IS related innovation.	0.530	**Yes** Stronger for high level
H4C	In a situation when entrepreneur intent to use IS related innovation, propensity to use will moderate the relationship between perceived feasibility and entrepreneur intention to use IS related innovation.	0.325	**Yes** Stronger for high level
	Impact of Environmental Factors Moderated by Age Group		
H6a	In a situation when an entrepreneur decision to use IS related innovation, age will moderate the relationship between facilitating conditions and entrepreneur use of IS related innovation	0.408	**Yes** Stronger for babyboomer
	Impact of Intention to Use Moderated by Precipitating Events		
H7a	In a situation when entrepreneur make decision to use IS related innovation, precipitating events will moderate the relationship between the intention to use and use of IS related innovation.	0.592	**Yes** Stronger with high impact

7.2 OVERVIEW OF RESEARCH OBJECTIVES

This study attempts to extend IS adoption behaviour research by further empirically investigates Unified UTAUT and fills the gap between intention to use and use behaviour, thus improve the limitations of UTAUT as criticised by some IS researchers. Therefore, the aim of this study is to develop a robust and parsimonious IS adoption model that is able to measure different dimensions of entrepreneurs' IS related innovation adoption and use behaviour and eliminating the limitations in UTAUT.

In line with the above aim, this study formulates five main research questions with specific objectives. In summary the objectives of this study are to: (1) investigate the salient effects of technological, individual, and environmental factors on entrepreneurs IS related adoption behaviour (i.e., intention to use and use behaviour), and the significant roles of demographic characteristics (i.e., gender and age group) on the link between the technological, environmental and individual factors towards intention to use and use behaviour; (2) examine the effect of the volitional aspect of entrepreneurs' behaviour (i.e., propensity to use) on individual factors toward intention to use IS related innovation; (3) investigate the salient effect of intention to use on use behaviour and the significant role of precipitating events on the relationship between intention to use and use behaviour of IS related innovation; and finally (4) explore the effect among the determinants of intention to use (i.e., technological factors on individual factors, and individual factors on environmental factors). Table 7.4 summaries the research questions, research objectives and findings of this study.

Table 7.4: Summary of Research Questions, Objectives, Findings

Research questions	Research objectives	Findings
What are the determinants that influence the IS related innovation adoption behaviour by entrepreneurs?	To examine the importance of individual perceptions on entrepreneurs' intention to use innovation.	• Perceived desirability and perceived feasibility are core determinant with perceived desirability being most salient. • Social influence was found to be not the core determinant.
	To investigate the salient effect of technological factors on entrepreneur's intention to use IS innovation.	• Performance expectancy is the core and second salient determinant • Effort expectancy was found to be not the core determinant.
	To assess the significant of the environmental factor on IS usage by entrepreneur.	• Facilitating conditions is the core determinant of use behaviour.
What is the role of demographic characteristics (gender and age) on the relationships between determinants and IS related innovation adoption behaviour by entrepreneurs?	To investigate the significant roles of age, gender and experience with IS of entrepreneurs in determining intention to use and use behaviour.	• Gender and age moderate the links between the core determinants and intention to use • The impact of perceived desirability is greater for female entrepreneurs and those belong in the generation Y entrepreneurs. • The impact of perceived feasibility is greater for male entrepreneurs and those entrepreneurs belong in the baby boomers and generation X age groups. • The impact of performance expectancy is greater for male entrepreneurs and those belong to the generation Y age group. • The impact of facilitating conditions on use behaviour is greater for those entrepreneurs belong in baby-boomers and generation X age group.
What are the impact among the determinants of IS related innovation adoption behaviour by entrepreneurs?	To explore the possible relationships between these factors and how each of the factors facilitates entrepreneurs in their decision to use IS related innovation.	• Effort expectancy and performance expectancy influence perceived desirability of using IS related innovation. • Perceived feasibility influences effort expectancy and facilitating conditions.
What is the impact of volitional aspect (propensity to use) of entrepreneur's behaviour on the relationship between determinants and IS related innovation adoption behaviour by entrepreneurs?	To examine the impact of the volitional aspect of the entrepreneur's in determining the IS usage intention.	• The impacts of desirability and perceived feasibility are greater when entrepreneur propensity to use level is higher and within the volitional control of the entrepreneurs.
How do external factors (precipitating events) affect the IS related innovation adoption behaviour?	To investigate the salient effect of intention on use behaviour to assess the impact of the external variables (that is, precipitating events) that occur in the entrepreneur's personal and business life in determining the IS usage behaviour.	• Intention to use IS related innovation has strong relationship with actual use behaviour. • However, the impact of intention to use to use behaviour is moderated by the level of impact (i.e., low or high) precipitating events has on entrepreneurs.

7.3 DISCUSSION OF FINDINGS

With nine out of eleven main hypotheses and eight out of fourteen sub-hypotheses were supported, the empirical findings of this study provide strong overall validation for the integrative UTAUT-EPM model. The following section discusses the findings in detail.

7.3.1 Determinants of Intention to Use

To investigate the salient determinants of entrepreneurs' intention to use IS innovation; this study predicts that technological factors and individual factors would have positive associations with intention to use IS related innovation. Findings suggest that the performance expectancy from the technological factors and perceived desirability and perceived feasibility, both from the individual factors are significantly related to intention to use. On the contrary, effort expectancy (technological factor) and social influence (individual factor) were found to be not significantly related to intention to use. At the same time, the values of coefficients indicate that perceived desirability has the strongest impact on intention to use, followed by performance expectancy and perceived feasibility respectively. Thus, this study finds support for three out of five hypothesized effects of technological factors and individual factors on intention to use IS related innovation by entrepreneurs.

The finding suggests that perceived desirability is the strongest factor towards intention to use IS related innovation ($p < 0.001$) demonstrating that entrepreneurs when making decision to adopt IS related innovation would take into consideration this factor. This finding can be interpreted that when entrepreneurs find the prospect of adopting IS related innovation to be personally attractive to them; they would form favorable attitudes

towards the system, which then lead to desirable consequence of adopting the system (i.e., intention to use). According to Krueger and Brazeal (1994), perceived desirability embraces the "attractiveness components" of the TPB, that is, behavioural beliefs. This behavioural belief of perceived desirability is assumed to influence attitudes toward the behaviour, which is already valued positively or negatively by the entrepreneurs (Ajzen, 1991). It is this salient belief that is considered to be the prevailing determinant of intention to use IS related innovation by entrepreneurs.

This belief taps perception of what entrepreneurs find personally desirable, which in turn depends likely on the personal impact of outcomes from performing the behaviour. Thus, perception of desirability is related to an intrinsic interest in entrepreneurship and innovation. It seems that they would consider adopting IS related innovation if they believe that by adopting the system they will gain personal satisfaction, increase quality of their business, and success of their business. For example, if mobile banking allows entrepreneurs to access their bank transaction regularly and increase their business quality or save time and money, whereby entrepreneurs achieve personal satisfaction, therefore, using mobile banking is attractive for entrepreneurs, whereby they have the desire to use it and their intention to use the innovation will be higher. The importance of perceived desirability is consistence with EPM (Krueger and Brazeal, 1994). This finding is also consistent with prior studies that argue perceived desirability is the most important factor for entrepreneurs to form intention and take action (e.g., Krueger and Brazeal, 1994; Krugear, 1993, Krueger et al., 2000; Linan and Santos, 2007, Shook and Bratianu, 2010).

The second strongest factor towards intention to use IS related innovation by entrepreneurs is performance expectancy ($p < 0.001$). This finding demonstrates that entrepreneurs will consider adopting IS related innovation if using the system will improve entrepreneurs' job performance and help them to attain tangible and intangible benefits in their business. In other words, IS related innovation is seen as a useful strategic and administrative tool that entrepreneurs can gain benefit from adopting the system, such as in enhancing efficiency and effectiveness of their daily business activities. This finding can be interpreted that by adopting IS related innovation, entrepreneurs expect that they will gain measurable business benefits such as effective marketing (i.e., increase in sales), better access to knowledge (i.e., customers management and supply chain management), and lower cost of doing business (i.e., increased profit, and better cash flow).

Therefore, with this high expectation of the benefits (performance) and usefulness of the system, entrepreneurs are more likely to adopt IS related innovation in their businesses, compared to those entrepreneurs with low expectations of the benefits (performance) or usefulness that can be realised from the system. In contrast to perceived desirability, this factor of performance expectancy is an extrinsic factor that influences entrepreneurs to adopt IS related innovation. For example, if entrepreneurs expect that they gain measurable business benefits, more effective marketing, better access to knowledge, lower cost of doing business, and higher revenues through using Web2 or online banking they will have higher intention to use them in their daily business activities.

This finding is consistence with the basic UTAUT on the salient importance of performance expectancy on intention to use (Venkatesh et al, 2003). The importance of performance expectancy is also consistent with most prior researches that suggest

performance expectancy has a significant impact on intention to use IS innovation (e.g., Venkatesh et al, 2003; Wang and Shih, 2009; Venkatesh and Zhang, 2010; Dijk et al., 2008; Kijsanayotin et al., 2009, Wang et al., 2009). For example, in a study by Abushanab and Pearson (2007), performance expectancy was found to be the most important factor that has the largest unique contribution in explaining the variance in intention to use. It seems that performance expectancy is the strongest factor among the determinants of intention in basic UTAUT. The prominent role of performance expectancy is also validated in the integrative UTAUT-EPM model. However, the integrative model further indicates that when the entrepreneurs have greater intrinsic interest, such that they find IS related innovation to be more desirable, then the extrinsic interest of benefits that can be attained using the system become second fiddle to entrepreneurs.

The third salient determinant of intention to use IS related innovation by entrepreneurs is perceived feasibility, demonstrating a significant relationship to intention to use IS related innovation ($p < 0.001$). From this finding, it seems that when entrepreneurs perceive higher feasibility they are more likely to adopt IS related innovation. The finding can be interpreted that that when entrepreneurs perceive that they have the ability to execute or perform the target behaviour, they have greater intention to use IS related innovation. In IS context, it is the entrepreneurs perceived personal capability to do a specific IS job or set of IS tasks. This finding indicates that it will not be an obstacle for entrepreneurs to adopt IS related innovation, once entrepreneurs feel comfortable about using the system and are confident that they can put in the effort needed to use them in their daily business activities. Therefore, entrepreneurs with well-developed intention towards adopting IS related innovation are more likely to have investigate the system than entrepreneurs for whom intention are not prevalence (Chandler and Jansen, 1992).

This perception of feasibility also taps the intrinsic interest in entrepreneurship and innovation. For example, if by using Web2 or mobile banking is attractive and useful but entrepreneurs do not have confident to learn on their own and acquire the ability and skill to use the system themselves, they may not be interested to use. In other words, If they perceived that they have the ability to use or learn how to use IS related innovation, even though the IS related innovation may be complex, they would still consider adopting the system. The importance of perceived feasibility is consistence with EPM (Krueger and Brazeal, 1994), and Bandura's social cognitive theory that argue perceived feasibility as an important factor for entrepreneurs to form intention and take action (e.g., Krueger and Brazeal, 1994; Krugear, 1993, Krueger et al., 2000; Linan and Santos, 2007, Shook and Bratianu, 2010). In addition, this finding is consistence with prior studies which argue that strong sense of feasibility belief about entrepreneurs' ability plays a large role in their intention to involve in entrepreneurial activities (e.g., Chen et al., 1998; Markman et al. 2002). This finding also confirms prior studies in IS adoption context that argue that self-efficacy is important factors of intention to use the IS innovation (e.g., Thong, et al., 2002; Venkatesh and Davis, 1996; Venkatesh 2000; Compeau and Higgins, 1995, Agarwal and Karahanna, 2000). The importance of perceived feasibility shows that entrepreneurs' skill and ability has strong effect on their intention to use IS related innovation.

Although, this study predicts effort expectancy would have an effect on intention to use IS related innovation, the finding indicates otherwise. There is no statistical support on the effect of effort expectancy on intention to use IS related innovation by entrepreneurs ($p > 0.05$). This finding seems to be contradictory to most prior studies that used UTAUT (e.g., Venkatesh et al, 2003; Wang and Shih, 2009; Venkatesh and Zhang, 2010; Dijk et al., 2008; Wang et al., 2010; Chen et al., 2008). However, this finding is consistence with Yuen et al.

(2010) study that also finds no significant relationship between effort expectancy and intention to adopt Internet banking service. In their study, they report that majority of respondents had prior experience in using Internet; therefore the potential Internet banking services users would have the confidence to use the system. Based on Yuen et al. (2010) finding, the non-significant of effort expectancy in this study could also be due to the prior experiences of entrepreneurs with regards to IS related innovation, whereby these prior experiences allow entrepreneurs be confident to adopt the system. In addition, effort expectancy has becomes insignificant due to the fact the most IS related innovation applications are becoming relatively easy to use and user-friendly. IS developers' companies has invested on research and development to improve usability, and with the latest advances in IS technologies, usability of the IS related innovation can be achieved.

Other explanation could be that entrepreneurs are normally being considered as innovators, and to be exact as pioneers of innovation, therefore, they would be willing to invest the time to learn IS related innovation if the IS related innovation is attractive, feasibile and can improve their business performances. In other words, entrepreneurs are willing to sacrifice some form of ease of use for other importance denominators (i.e., attractiveness, skill and ability, usefulness). As pioneers in adopting and using IS related innovation, entrepreneurs have the tenacity to invest their time to learn about the system and use the opportunity to gain competitive or to be among the first users of any new IS. Therefore, complexity of using IS is not a concern that affect entrepreneurs intention to use IS related innovation.

Also, contrary to this study expectation, the direct impact of social influence on intention to use IS related innovation by entrepreneurs is not significant ($p > 0.05$). To

explain this unexpected finding, this study notes that social influence is a complex undertaking involving large scale changes in deeply entrenched inter-organizational processes and system (Venkatesh et al., 2003). Venkatesh et al. (2003) in their study use UTAUT to understand employees IS acceptance behaviour, in a mandatory setting, whereby organisations introduce or implement new IS. However, this study focuses on entrepreneurs IS adoption behaviour, whereby entrepreneurs have volitional control over their behaviour, hence the social influence factor may become irrelevant. The non-significant relationship between social influence and intention to use could be attributed to the fact that the adoption of IS related innovation by entrepreneurs is voluntary. Entrepreneurs do not need to comply with referent others expectations when those referent others have the ability to punish or reward the desired behaviour (Venkatesh et al., 2003). However, entrepreneurs do not expect any rewards from referent others. This is consistent with the UTAUT study that indicates social influence is significant when the technology is mandatory, whereby individuals are more likely comply to influence of referent others, as these referent others have the ability to punish and reward the desired behaviour.

Another possible explanation is that IS related innovation is relatively new in the market and entrepreneurs consider using it as an opportunity to gain competitive advantage, therefore they want to be pioneer of IS and to be the first to use it, rather than as follower. Therefore, in this condition, effect of social influence is not relevant to them. This finding is consistent with other studies that find the relationship between social influence and intention to use is not significant (e.g., Shu and Chuang, 2011; Yuen et al., 2010). Yuen et al. (2010) when investigating consumer acceptance of Internet banking also find that respondents are neutral over social influence. They report that friends, supervisors, and colleagues have no significant influence on individuals' decision to adopt Internet Banking Services (IBS)

because IBS users are likely to access IBS for security reason, and not because their peers are using them. Anderson et al. (2006) also find not significant relationship between social influences and use when investigate the use of Tablet PC by individuals. The finding of this study and the above prior studies validate the salient role of intrinsic interests on intention to use IS related innovation rather than extrinsic motivation of social influence from referent others such as family members, friends and colleagues.

7.3.1.1 The Relationships among Determinants

Among the determinants on intention to use, as this study expects, effort expectancy and performance expectancy contribute to the formation of entrepreneurs perceived desirability towards intention to use IS related innovation. Although effort expectancy is not a determinant of intention to use IS related innovation, it has significant influence on perceived desirability towards intention to use. This finding suggests that the easier the system the more attractive the system is to entrepreneurs. It seems that ease of use and usefulness of IS related innovation will increase the attractiveness of using the innovation. The finding indicates that if IS related innovation is easy to use and useful in entrepreneurs' job, they would perceive that using IS related innovation in their business is an attractive idea and will be very enthusiastic to adopt use IS related innovation in their daily business.

This finding is consistent with Davis's (1986) argument that if the IS is useful and easy to use, individuals would find a favorable attitude toward using it. This finding suggests that effort expectancy and performance expectancy influence entrepreneurs' attitude about using IS related innovation. Therefore, perception of usefulness and ease of use affects perceived desirability of IS related innovation. For example if entrepreneurs perceive that

using Web2 or mobile banking is useful and is easy to use their desirability to use them will increase and using such innovation is more attractive for them. They will use them without difficulty and gain benefit in their job performance. The finding is consistence with the Davis et al. (1989), and other studies which indicate that perceived ease of use predicts attitudes towards IS adoption (e.g., Devonish et al., 2010; Agarwal and Prasad, 1998, 1997; Shin, 2004; Kim et al., 2007). In a similar vein, Lederer et al. (2000) and Lin (2008) argue that perceived ease of use has a positive influence on attitude toward using the Web. Therefore, if IS related innovation is easy to use it is more attractive to individuals.

As expected, this study finds strong support on the relationship between perceived feasibility and effort expectancy, indicating perceived feasibility is an enabler of effort expectancy. Entrepreneurs who perceive that they are able to use IS related innovation even if there is no one around to show them on how to use the system or they think they have the skills and capabilities required to use IS related innovation, they are more likely to perceive that less effort is required to use them than those entrepreneurs who do not feel comfortable or do not have the confidence to use IS related innovation in their businesses. The finding can be interpreted as although the IS related innovation may be relatively complex and difficult, but if the entrepreneurs are comfortable, confident, and think they have adequate IS skills, knowledge and capabilities, they would be able to learn to use the system with ease.

This finding can also be interpreted that this high level of perceived feasibility leads to increase initiatives and persistence by entrepreneurs to figure out how to use IS related innovation and they will keep trying to outcomes these obstacles. Therefore, strong intrinsic beliefs in their capabilities to use IS related innovation has positive effect on the IS adoption behaviour of entrepreneurs to take action and adopt the system. For example, if using Web2

or mobile banking is attractive and useful but entrepreneurs do not have the necessary ability and confidence to use them, they are not interest to use such innovation. Entrepreneurs who will have a high degree of intention to use perceived that they have the ability and confidense to use IT innovation. Subsequently, this will increases their performance. On the other hand low perceived feasibility reduces their effort and perception on the performance that can be achieved when they adopt the system. This finding is consistent with Chan et al. (2010) that argue individuals who have relatively high self-efficacy are more likely to perceive that less effort is required to use IS related innovation compared to individual with low self-efficacy.

7.3.1.2 The Moderating Effect of Gender and Age Group

As expected, gender and age groups have significant influence on the development of intention to use IS related innovation by entrepreneurs. These findings indicate that the impacts of perceived desirability, performance expectancy, and perceived feasibility on intention to use are moderated by gender and age group. In the case of perceived desirability, the impact of this factor on intention to use is higher for female entrepreneurs than male entrepreneurs. Furthermore, the magnitude of the impact of perceived desirability seems to be higher for those generation Y entrepreneurs. It appears that women entrepreneurs and generation Y entrepreneurs would likely adopt IS related innovation if they gain personal satisfaction when using the system and think that using the system is an attractive idea that leads to successful businesses.

These findings indicate that women and generation Y entrepreneurs place highly on the attractiveness of the system more that the male entrepreneurs and those entrepreneurs who belong in the older age group (baby boomer and generation X). The latest trend in IS

related innovation is consistent with using internet, mobile phone, Web2, on-line business and social media, which normally attract and of interest to those belong in these younger age group. However, the generation Y are very much familiar and keep updating themselves with the latest trend of IS advancement. Thus, they perceive that using IS related innovation would make their business more fashionable and attractive. Although men and the older age group entrepreneurs do consider this factor of attractiveness when making decision to adopt or not adopt IS related innovation, this perception factor is not their main priority or concern. These findings reveal that the impact of perceived desirability towards intention to use IS related innovation is different among male and older entrepreneurs and female and younger entrepreneurs, This study contributes new knowledge in entrepreneurship literature, particularly to the EPM since they did not measure the effect of gender and age group in EPM.

In the case of performance expectancy, the impact of this factor on intention to use is higher for male entrepreneurs rather than female entrepreneurs. Furthermore, the magnitude of the impact of performance expectancy seems to be higher for those generation Y entrepreneurs in compared to generation X entrepreneurs and generation baby boomers entrepreneurs. These findings reveal that male entrepreneurs and generation Y entrepreneurs consider profit and gain in job performance more than other groups when they intend to use IS related innovation. These findings are consistent with basic UTAUT that argues performance expectancy is more important for men and younger individuals, as they may place more importance on the extrinsic rewards. UTAUT posits that male and younger individuals are willing to use IS that enhance effectiveness and improve job performance (e.g., Venkatesh et al., 2003). Moreover, Venkatesh and Zhang (2010) in their study state that male and younger age group normally have stronger desire to be successful and are

more interested in job performance accomplishment as they are ambitious and achievement-oriented. Furthermore, the generation Y entrepreneurs possess an intuitive sense in understanding IS due to the environment in which they have grown up, therefore they perceive the benefits of using IS related innovation to improve their job performance (Venkatesh and Zhang, 2010). The female and older generation (i.e., baby boomer and generation X) have less magnitude on the effect of performance expectancy may be due to that generally these group of entrepreneurs, such as those in the older age group are already at the height of their career, and may have accomplished their goals.

In the case of perceived feasibility, the impact of this factor on intention to use is higher for male entrepreneurs rather than female entrepreneurs. Furthermore, the magnitude of the impact of perceived feasibility seems to be higher for generation X entrepreneurs and generation baby boomers entrepreneurs compared to generation Y entrepreneurs. These findings indicate that having the appropriate skill and ability to use IS related innovation is of concern to male entrepreneurs compares to female entrepreneurs. These findings can be interpreted that for male entrepreneurs this intrinsic interest is much more practical for them compared to the intrinsic interest of attractiveness which is more of concern to female entrepreneurs. These findings are consistent with Murphy et al. (1989) who argue that the difference between female and male individuals is highest in the order to use computer at an advanced level. They report that women and men are different when they want to use computer for professional work.

In addition, for impact of perceived feasibility towards intention to use IS related innovation is greater for the generation Y entrepreneurs due to the fact that their skill and ability to use and their familiarity towards IS related innovation. These generation Y entrepreneurs grew up together with the advances of IS and rely on IS to perform their jobs

better. The IS have always been part of their lives and they may not be ever to imagine a world without ICT, especially, the Internet or cell phone. Generation Y prefers to communicate through e-mail and texting rather than verbal contact. Therefore, skill and capability is not the determinant factor toward intention to use IS related innovation in generation Y entrepreneurs' perception. The possible explanation could be they may have the necessary prior skill and ability to use IS related innovation.

While the magnitudes of the effects of these determinants on intention to use differ according to gender and age group, these findings do not diminish the importance of perceived desirability, performance expectancy, and perceived feasibility on intention to use IS related innovation by entrepreneurs. On the basis of these findings, this study concludes that perceived desirability, performance expectancy and perceived feasibility significantly influence intention to use IS related innovation by entrepreneurs.

7.3.1.3 The Moderating Effect of Propensity to Use

Referring to the moderating effect of propensity to use on the impact of individual factors of perceived desirability and perceived feasibility on intention to use IS related innovation by entrepreneurs, the analysis strongly support the impact of these individual factors are moderated by propensity to use ($p < 0.001$). These findings imply that propensity to use is an important factor that determines the impacts of entrepreneurs' attractiveness and perceived feasibility on intention to use.

These findings reveal that the impact of perceived desirability and perceived feasibility are greater to intention to use, when entrepreneurs have strong tendency to act upon the action that they decide to make. Thus, even with low level of perceived desirability

and perceived feasibility at the initial stage of IS adoption, if the entrepreneurs from the beginning are very much incline to adopt IS related innovation, they would still adopt the system. In other words the high level of propensity to use increases the level of perceived desirability and perceived feasibility of entrepreneurs towards intention to use IS related innovation. These findings can be interpreted as the entrepreneurs' pervasive decision to adopt IS related innovation is less, this lesser pervasive decision becomes an important element that increases their perception about desirability and feasibility towards intention to use. High level of propensity to use will influence entrepreneurs' perception about attractiveness of using IS related innovation, and entrepreneurs skill and capability to use these innovations, lead to well-formed intention to use that predict use behaviour. Therefore, when propensity to use is very low, perceived desirability and feasibility may be less predictive of intention to use IS related innovation.

On the other hand, if propensity to use IS related innovation is high, then using IS related innovation is more likely seen as desirable and feasible and thus lead to higher level of intention to use. These findings confirm prior arguments made by Krueger and Brazeal (1994) and Bagozzi and Yi, 1989) that it is difficult to envision well-formed intentions without some propensity to use by entrepreneurs. For example, entrepreneurs with high level of propensity to use Web2 or mobile banking perceive high feasibility and capability and using them is more attractive for them. Therefore if they have strong decision to use mobile banking in their business and they persist in their decision, this persistence behaviour to really act upon the action will affect their perception about their skill and ability and will increase the attractiveness and entrepreneurs' perceived feasibility towards intention to use such system. Moreover, these findings are consistence with EPM and EEM and other prior studies that demonstrate entrepreneurs with high level of propensity to use have higher

intention to take action (Shapero and Sokol, 1982; Krueger, 1993; Krueger and Brazeal, 1994; Shapero, 1982).

7.3.2 Determinant of Use Behaviour

This study predicts that the environmental factors of facilitating conditions and intention to use would have positive associations with use behaviour of IS related innovation by entrepreneurs. Our analysis strongly supports these hypotheses, implying that facilitating conditions and intention to use are important determinants of IS related innovation use behaviour by entrepreneurs. At the same time the value of coefficient for intention to use is higher than facilitating conditions indicating that intention to use has the strongest impact on use behaviour, followed by facilitating conditions towards use behaviour of IS related innovation by entrepreneurs.

These findings suggest that facilitating conditions is one of the key factor toward use behaviour of IS related innovation ($p < 0.001$), demonstrating that entrepreneurs when using IS related innovation would take into consideration this factor. It seems that when entrepreneurs perceive that there are adequate, proper and appropriate IS infrastructure in the business environment to support and facilitate the use of IS related innovation; entrepreneurs would definitely use the system. Therefore, for entrepreneurs to actively use IS related innovation they must be certain that they have the necessary resources and knowledge of the IS related innovation, and there are external and/or internal support group available that can assist them with any difficulties related to using the system. Most importantly, entrepreneurs would be interested to actively use the system, if there are special allocations (i.e. loan, intensive) from government or from any other external agencies to facilitate them to use IS

related innovation. In other words, if there are enough organizational, technical infrastructures and training to support the use of IS related innovation, entrepreneurs will use IS related innovation in their daily businesses. The importance of facilitating conditions to predict use behaviour is consistent with basic UTAUT model, and prior studies (e.g., Kijsanayotin et al., 2009; Venkatesh and Zhang, 2010; Alawadhi and Morris, 2008; Yeow and Loo, 2009; Venkatesh et al., 2003; Carlsson et al., 2006; He and Lu, 2007).

This study finds strong support for influence of intention to use to use behaviour ($p < 0.001$) indicating that intention to use is predecessor or enabler of use behaviour by entrepreneurs. This study predicts planned behaviour of entrepreneurs towards IS adoption is by observing intention toward that behaviour. These findings indicate that intention to use is the predictor of use behaviour and that there is a significant and positive relationship between intention to use and use behaviour of IS related innovation. These findings reveal that intention to use is still the best predictor of any planned behaviour, including use behaviour of IS related innovation by entrepreneurs. These findings can be interpreted that intention to use is the entrepreneurs conscious plans to use IS related innovation, and hence the higher level of consciousness towards the plan (intention) will lead to high probability to use IS related innovation. These findings are consistent with basic UTAUT and previous studies that report intention to use has a significant positive influence on use behaviour (Davis et al., 1989; Jackson et al., 1997; Taylor and Todd, 1995a; Venkatesh et al., 2003). In the same vein, these findings are consistent with basic EPM that posits behavioural intention to use is an important factor towards taking action (e.g., Krueger and Brazeal 1994; Krueger, 1993; Krueger at al., 2000).

7.3.2.1 The Relationships among Determinants

As this study expects, perceived feasibility was found to be a significant factor that influence facilitating conditions ($p < 0.001$). This finding demonstrates that in the condition that there is no adequate IS support, IS resources, IS knowledge and/or IS infrastructure, but with high level of self-efficacy, the probability of entrepreneurs using IS related innovation is greater. In other words, entrepreneurs with high self-efficacy are more likely to possess the basic IS knowledge and baseline skills and thus are comfortable and confident to use the system even though they do not have the necessary resources and internal or external technical support. Due to the high self-efficacy, these entrepreneurs perceive having greater control over using IS related innovation. Therefore, if entrepreneurs have high skill and ability to use IS related innovation, they have lower barriers to acquire the necessary resources, knowledge, infrastructure, and assistance to facilitate the use of IS related innovation in their business.

For example if entrepreneurs perceive high feasibility and capability to use mobile banking, Web2, or online banking, using these innovation is more easier for them and they have basic skill and knowledge to use them and they do not need help or support anymore. This finding is consistent with Chan et al. (2010) that suggest citizen with higher self-efficacy are more likely to have knowledge to use e-government technologies. Thus, from this finding, this study can conclude that perceived feasibility influences facilitating conditions since this factor is related to entrepreneurs' expectations about possession of resources that facilitate IS related innovation use behaviour.

7.3.2.2 The Moderating Effect of Age Group

As expected, age groups have significant influence on the development of facilitating conditions towards IS related innovation use behaviour by entrepreneurs ($p < 0.001$). This finding indicates that the impact of facilitating conditions on use behaviour of IS related innovation is moderated by age group. The finding reveals the impact of facilitating conditions is higher for generation X and generation baby boomers entrepreneurs. It seems for these generations of entrepreneurs before they begin or embark on using the system, they must make sure that all the necessary resources are available, and also have the necessary knowledge about the system. In addition, entrepreneurs within this age group are also concerned about the internal and external supports that are available once they embark in using the system. For example, if they want to use Web 2, mobile banking, on-line banking, e-commerce, these age groups of entrepreneurs must make sure that there is adequate infrastructure and internal/external resources to support them using these IS related innovation. The existence of facilities and support to use these innovations will effect use of IS related innovation by these entrepreneurs.

Thus fore, if these entrepreneurs have intention to use on-line banking or Web2 but internal and external supports are not provided to enable the use, these entrepreneurs may not want to use such system. This finding is consistent with UTAUT that posits older individuals need more support and infrastructure to use system, as older individuals attach more importance to receiving help and assistance on the jobs/tasks (Venkatesh et al., 2003). Furthermore, this finding confirms Morris and Venkatesh, (2000) argument that availability of technical and organizational support would have greater impact on older people to use technology. Older people tend to face more difficulty in learning and using new or complex

IS related innovation. As argued by Venkatesh et al. (2012), the difficulty may be attributed to the decline in cognitive and memory capabilities associated with the aging process.

7.3.2.3 Moderating Effect of Precipitating Events

Referring to the moderating effect of precipitating events on the impact of intention to use on use behaviour, the analysis strongly supports the impact of the intention to use is moderated by precipitating events ($p < 0.001$). This finding demonstrates that precipitating events moderate the relationship between intention to use and use behaviour. This finding reveals that during the time intention to use IS related innovation is formed, if some unforeseen event happens, it will change entrepreneurs' intention to use IS related innovation and will affect their actual use. The precipitating events that occur within the entrepreneurs' environment will increase the probability of entrepreneurs' use behaviour IS related innovation. Findings also indicate that the greater the impact of precipitating events on entrepreneurs the greater is the probability that entrepreneurs will use IS related innovation, even though in situation whereby the level of entrepreneurs intention to use is lower. On that note, if the entrepreneurs have high intention to use IS towards use behaviour, but the impact of precipitating events that the entrepreneurs experience is higher, probability of intention to use towards use behaviour of IS related innovation is relatively lower.

These findings can be interpreted as when entrepreneurs experience changes, whereby these changes have low impact and are within the acceptable level of changes by entrepreneurs, their prior intention to use will transform in actual utilisation of IS related innovation. However, the probability of intention to use to turn into active ustilisation would be at a higher rate. On the other hand, when entrepreneurs experience changes that greatly impact them, the probability of intention to use towards active use are lower. However, if the

impact of these change is normal, the probability of use behaviour are greater even though they have lower level of intention to use. With high level of intention to use, and high level of changes, probability of use behaviour will be lower. It seems that when the events that occur highly influence the entrepreneurs' daily business activities, entrepreneurs use of IS related innovation increases in different level. These findings suggest that precipitating events (displacement) will disrupt entrepreneurs' inertia and induce a change in their behaviour, therefore, encourage them to seek the best opportunity available. These precipitating events can be positive (e.g., new contract, new customer, market change, international opportunity, availability of IS innovation) or negative (e.g., declining profit, government policy, financial crisis, rising cost), and that the high or low impact levels of these precipitating events drive to encourage entrepreneurs to consider alternative available on the best way to use IS related innovation so that they are able to compete, survive, or gain benefit in their job performance.

The importance of precipitating events as moderator between intention to use and action is consistent with EPM, EEM and previous studies in the entrepreneurship (Shapero's, 1982; Krueger and Brazeal, 1994; Krueger et al., 2000; Krueger, 2008; Coduras et al., 2008). Shapero (1982) argues that precipitating events are important factors to change entrepreneurs inertia to take action. While, Krueger and Brazeal (1994) posits that precipitating events affect entrepreneurs' intention to take action. Hence, these findings indicate the salient role of precipitating events in strengthening the ability of intention to use to predict use behaviour of IS related innovation, level of intention to use and which leads to higher use of IS related in all conditional effects (high, moderate or low level of precipitating events).

Meanwhile, Abetti (2003) provides evidences on examples of precipitating events that change entrepreneurs' intention to take action that is to be entrepreneurs and venture in new business. This study considers four situational changes/conditions of precipitating events that may occur within entrepreneurs environments, that include changes (1) in work situation (e.g., new contract, declining profit, financial resource, rising cost), (2) work environment (e.g., government policy, financial crisis, market change, new customer), (3) in career prospect (e.g., recent opportunity or lack of opportunity, competitive environment, international opportunity), and (4) in technological within the work environment (e.g., latest trend of IS innovation) and measures the effect of each of the these situational conditions on intention to use IS related innovation towards use behaviour.

To clarify the effect of each these precipitating events categories on entrepreneurs intention, this study compares these events and found the effect of work situation (e.g., new contract, declining profit, financial resource, rising cost), and work environment (e.g., government policy, financial crisis, market change, new customer) are the prominent significant factors which impact the entrepreneurs intention to use towards use behaviour of IS related innovation. However, when entrepreneurs are facing with new opportunity or have lack of opportunity to broaden their businesses, whereby they need to consider about their career prospects, the impact of intention to use towards use behaviour is lower. In this situational condition, the greater is its impact on entrepreneurs, even though entrepreneurs have high level of intention to use, the probability of this initial behaviour to actual use behaviour will be at lower rate. It appears that entrepreneurs may have to focus on the other issues more pertinent for them to consider, such as the type business they should now venture, and the investment of this new business venture. Hence, even though entrepreneurs may have high level of intention to use IS related innovation, but due to these changes, their

priority now would be on the investment of resource for these new venture rather than IS investment.

With regards to high and low impact of technological change in work environment (e.g., latest trend of IS innovation), this situational condition impact the intention to use towards use behaviour of IS related innovation by entrepreneurs rapidly. These findings reveal that any technological change that occur within the entrepreneurs work environment, there is high probability that the intention to use will transform into actual use behaviour much faster. The higher the impact of these situational conditions of technological changes on entrepreneurs, the greater is the probability that the entrepreneurs will actually use the system. These finding indicate that changes in the IS trend cause entrepreneurs to consider the benefits of the new IS that may assist in the efficiency and effectiveness of the job performance. For example, they will use IS related innovation to decrease cost, increase benefit, change their career prospect, or improve their competitive advantage or as an opportunity to survive in the market. In other words, technological change and/or introduction of new IS in the market will affect their intention and increase their use of such innovation, whereby they will try to be pioneer of this innovation, as they consider new IS as opportunity to broaden their business (i.e., depending on the type of business entrepreneurs venture). Also, the findings indicate that the probability of entrepreneurs' intention to use to actually use IS related innovations will be higher when there are events such as new regulation from the government (e.g., tax refund/incentives), rising of administrative cost, declining of profit, financial crisis, and market change.

Findings on the effect of precipitating events on link between intention to use and use behaviour reveal that at the time that precipitating events happen if IS related innovation is

available entrepreneurs will be using it, however, the transformation from intention to use behaviour will depend on situational condition of the events has high or low impact on entrepreneurs. Different precipitating events impacts differently on intention to use IS related innovation. Some precipitating events impact intention to use towards use behaviour rapidly, while other events impact intention to use towards use behaviour by entrepreneurs rather slowly.

7.4 CONCLUDING REMARK OF THE FINDINGS

Overall, from the empirical testing of the integrative UTAUT-EPM model, this study reveals that perceived desirability, performance expectancy and perceived feasibility are the key determinants towards intention to use IS related innovation by entrepreneurs. Entrepreneurs' IS related innovation adoption behaviour is grounded on their affective beliefs of perceived desirability and perceived feasibility and cognitive processes of performance expectancy. It seems that entrepreneurs place a balance of these effective beliefs and cognitive processes when making decision to adopt and use IS related innovation. Entrepreneurs would adopt IS related innovation if they find the system is desirable that increase entrepreneurs' personal satisfaction. At the same time, entrepreneurs will adopt IS related innovation if they have high level of confidence and feel very comfortable of using the system. In addition, entrepreneurs when making decision to adopt IS related innovation also consider the cognitive process such as the benefits or usefulness of the system, and the availability of the necessary infrastructures and supports. This study reveals that the impact of these determinants on IS related adoption behaviour is moderated by gender, age group and propensity to use. Moreover, this study reveals that to certain extent these key determinants are interrelated. Therefore, if IS related innovation is attractive

(i.e., high desirability) and useful (i.e., beneficial) entrepreneurs have the appropriate IS skills and abilities (i.e., high level of feasibility), they would feel that using IS related innovation would not be difficult. Thus they would feel that it will be easy to use the system. These findings underscore the need for further understanding of the entrepreneurs intrinsic interest and externalities factors for better understanding of IS related innovation adoption behaviour.

On the other spectrum of IS adoption behaviour, intention to use is still the dominant predecessor of use behaviour. Most importantly, this study provides strong empirical support for the prominent role of precipitating events that occur in the entrepreneurs' environment, and how these events contribute in improving the ability of intention to use to predict use behaviour. These findings underscore the need for further understanding externalities factors that occur during the time the entrepreneurs intention to adopt IS related to the time actual use behaviour is performed.

This study also reveals an interesting issue related to IS adoption behaviour by entrepreneurs. While prior studies tend to focus on technological factors such as perceived usefulness and perceived ease of use, it seems that with the current IS environment of World Wide Web (WWW), the technological factors is no longer an issue, particularly to entrepreneurs. It seems that entrepreneurs adopt and use the system due to the attractiveness and feasibility of the system, which is more related to their entrepreneurial characteristics. They also use the system to in order to adapt to the current environments or find solutions to the current business situation and or problems that they are facing. This study provides the knowledge of the importance of affective factors in understanding IS adoption behaviour. Therefore, it would be interesting to investigate a more holistic model to trace the entire path

from antecedents of the intention to use to intention to different form of use behaviour (e.g., intensity of use and emergent use) and how these affective beliefs affects this spectrum of use behaviour. From the findings it seems that emotion of entrepreneurs play salient role. With the knowledge gathered from this study, future research should examine a more holistic model on perception, attitudes, behaviour, emotions, disposition, precipitating events, and intercommunication. Looking at the more holistic model may assist in further bridging the gap in understanding the expected and actual behaviour of IS related innovation. The implications of these findings are further discussed in Chapter Eight.

7.5 CHAPTER SUMMARY

In summary, this chapter discusses and interprets the integrative UTAUT-EPM model. This chapter also discusses and compares the findings of basic UTAUT and integrative UTAUT-EPM model. It seems that the proposed integrative UTAUT-EPM model is able to better predict and explain the IS adoption behaviour than the basic UTAUT. This chapter also presents the overview of the objectives and findings of this study. In the following Chapter Eight will present the summary and overview of this study. The following chapter will then discuss the limitations and future direction of this study. The following chapter will also discuss the theoretical contribution and managerial implications of this study, and finally concludes the thesis.

CHAPTER EIGHT

CONCLUSIONS

INTRODUCTION

This chapter concludes the thesis. The chapter is divided into four main sections. Section one provides the overview of this study. Section two discusses the limitations of the study, which then set the base for future research directions of this study. Section three examines the theoretical contributions and managerial implications of this. Finally, Section four concludes the thesis.

8.1 OVERVIEW OF THIS STUDY

The importance of entrepreneurs in the world's economy urges for an understanding on their behaviour towards the adoption of IS related innovation. Therefore, this study is motivated by the need to establish an IS adoption behaviour model by entrepreneurs to provide possible explanations of the determinants that encourages entrepreneurs to adopt and further use IS related innovation in their daily business activities. Most importantly, this study is motivated by the need to establish a robust and parsimonious IS adoption model to understand how entrepreneurs actually make decisions and take actions. Therefore, the main aim of this study is to investigate entrepreneurs' behaviour toward IS related innovation adoption behaviour (i.e., intention to use and use). In respect to the criticisms of UTAUT, this study proposes and develops IS adoption behaviour model that measures the determinants that may influence entrepreneurs to adopt and use IS related innovation, and capture the effect of external factors on intention to use and use behaviour. To achieve this aim, this study decomposes and integrates the UTAUT (Venkatesh, et al., 2003) from IS adoption literature and the Entrepreneurial Potential Model (EPM) (Krueger and Brazeal,

1994) from entrepreneurship literature to capture different factors of IS adoption behaviour (e.g., technological, individual, and environmental) by entrepreneurs. Subsequently, this study proposes an integrative UTAUT-EPM model that contains five determinants of intention to use (i.e., performance expectancy, effort expectancy, perceived desirability, perceived feasibility, and social influence), two determinants of use behaviour (intention to use and facilitating conditions), with four moderators (i.e., gender, age, propensity to use, and precipitating events). All these constructs are taken from both UTAUT and EPM after extensive reviewing, analysing and synthesising of IS and entrepreneurship related literature.

In order to empirically test the integrative UTAUT-EPM model, a longitudinal survey was conducted with entrepreneurs ranging between the ages of 18 and above in Malaysia. Data collected were analysed using SEM, by first assessing the adequacy of the measurement model and then the structural model. With the integrative UTAUT-EPM model, this study was able to measure different factors of IS related innovation adoption, such as technological, individual, and environmental factors and capture the effect of external factors (precipitating events) on the relationship between intention and actual use behaviour by entrepreneurs. Most importantly, this study is able to explain how these external factors, such as precipitating events that entrepreneurs encounters affect the entrepreneurs' decision to use IS related innovation to actual use behaviour, therefore filling the intention behaviour gap issue raised by few IS researchers.

8.2 LIMITATION OF THIS STUDY

In the bested interest of establishing validity, this study has taken several steps to mitigate all the potential threats to the above validity. Care was taken to ensure that the procedures for the timing, distribution, and collecting of questionnaires are standardised.

The researcher personally distributed, collected, and entered the data; therefore, any mis-treatment of reliability implementation is minimal. In addition, this study also recognises that selection bias may be presented as this study decides to concentrate and focus on actual entrepreneurs, and identifying the actual entrepreneurs is rather complex. Consequently, this study defines entrepreneurs as those who brings ideas, new practice (product, service or method of production), or innovation in their job, start new business, or market new innovation. Prior studies have used students as proxy for potential entrepreneurs, whereas this study uses actual entrepreneurs. Thus, this definition may delimit the selection bias of this study on the representation of the entrepreneurs' population.

To avoid selection bias, the researcher has contacted government and private agencies that organised seminars, workshops and conferences for entrepreneurs. This study considers those who participate in these seminars, workshops and conferences as sample of the population of entrepreneurs. The sample used in this study consists of entrepreneurs who were participants in different workshops, seminars, and conferences related to entrepreneurship and innovation. This study considers them as target population and samples of entrepreneurs in Malaysia. Again, although care has been taken using this approach by the researcher who has participated in most of the conferences and seminars in the duration of data collection, there are many entrepreneurs who did not participate in such events, and thus, this study is not able to identify them, and therefore may set the limit to this study.

The question of whether the findings can be generalised to other settings (i.e., subject, times, places) is an important concern in all research. The nature of this study focusing on entrepreneurs may restrict the generalisation of the findings in this study to other research settings (i.e., other individuals users and organisations) since entrepreneurs in some aspects are different from organisations and/or individuals users. Entrepreneurs have different

characteristics and personality traits, therefore their behaviour may be different from other individuals' users and organisations. To a certain extend the findings can be generalisable to entrepreneurs in other countries or context with similar organisational and national background and culture.

8.3 FUTURE DIRECTIONS OF THIS STUDY

The aforementioned limitations and findings of this study provide foundations for future directions of this study. This study recognises the limitations of the approach taken to identify the population, and to select the sample of entrepreneurs. Future direction of research can adopt this approach in other research setting to ensure the robustness of this approach to identify actual entrepreneurs. Prior studies on entrepreneurship have used students as potential entrepreneurs to investigate their intention behaviour towards creating new business venture. Thus, it will be more significant to adopt this approach of identifying entrepreneurs' population to ensure that the intention of the actual entrepreneurs is captured.

In addition, future direction of research is to improve the generalisation of the integrative UTAUT-EPM model. In particular, more studies are needed to validate the findings of this study, i.e. by applying the integrative UTAUT-EPM model in different contexts or culture. It will provide the opportunity to test the robustness of the model across cultural boundaries and background. The integrative UTAUT-EPM can be used to investigate IS adoption behaviour by entrepreneurs in different countries (i.e., developed and developing countries), and context (i.e., specific IS adoption, such as e-SCM, e-CRM, e-procurement). By testing the integrative UTAUT-EPM model in other setting would further confirm the validity, robustness and parsimonious of the integrative UTAUT-EPM model.

In addition, comparative study can be conducted using the integrative UTAUT-EPM model, especially between developed and developing countries for example between entrepreneurs in Australia or the United States with Malaysia. Comparative studies could also be conducted among countries within the same region such as between ASEAN countries of Thailand, People Republic of Vietnam, and Indonesia, or within entrepreneurs from countries known as Little Dragon such as Hong Kong, Taiwan, and Singapore, with countries such as Thailand, Indonesia and People Republic of Vietnam. .

More noteworthy, the future direction of this study should further examine the individual factors, which appears to be of great concern to entrepreneurs. Findings of this study reveals that the intrinsic interest or affective beliefs of attractiveness of the system and the confidence of entrepreneurs are salient determinants towards IS adoption beahviour. Thus, examining other intrinsic interest of affective nature such as perceived enjoyment that influence IS adoption behaviour by entrepreneurs would provide in depth understanding of the affective beliefs. The new affective belief variable can be added to the individual factors of the integrative UTAUT-EPM model. Moreover, the integrative UTAUT-EPM model and other models can be adapted to study negative affective beliefs such as fear and integrate with emotional theory.

Findings of this study reveal that affective beliefs are the prominent determinant that activate and stimulate entrepreneurs to use IS related innovation. Thus, it will be of great interest to investigate whether these affective beliefs are also prominent to entrepreneurs in developed countries or other developing countries. Comparative studies may reveals that affective beliefs may be related to certain organizational culture and national background.

Furthermore, indirectly, this study reveals the importance of prior experiences of entrepreneurs or level of engagement with IS related innovation of entrepreneurs may indirectly influence entrepreneurs' perception towards IS related innovation. This study reveals that the affective beliefs of desirability and feasibility are much stronger for younger age group, specifically the generation Y age group, and those in this age group have high level of engagement with IS. Thus, future direction of the study should examine the level of engagement with IS such as using IS for both hedonic and utilitarian purposes will be a wise decision. On the other hand, prior experience of affective could be measured based the goodness or badness of the experience with the use of IS. All these variables can be measured or captured in the integrative UTAUT-EPM model as mediating and moderating variables of determinants towards IS adoption behaviour.

The study also reveals the importance of precipitating events and how these events have significant impact towards intention to use to use behaviour of IS related innovation by entrepreneurs. This study also reveals that different situational conditions impact entrepreneurs intention to use towards adoption differently. Precipitating events related to changes in the environment that force entrepreneurs to change their career prospect seem to affect entrepreneurs intention to use towards use behviour of IS related innovation differently from the other three situational conditions. The greater the impact entrepreneurs experience with the events, even with high level of intention to use, the probability of use is relatively low. Thus, future research direction could examine these situational events role in the integrative UTAUT-EPM model as mediating variable. Moreover, the scale in this study used to measure precipitating events is adapted from entrepreneurs' intention towards new business venture. Therefore, future research direction could focus on redefining and redeveloping the measurement for situational conditions of precipitating events. Specifically

precipitating events relate to IS adoption behaviour environment by using the scale measurements of precipitating events defined and developed in this study as milestone.

This study also reveals the prominent role of propensity to use on the impact of individuals factors towards intention to use IS related innovation by entrepreneurs. Future direction of research could be to consider propensity as one of the core determinant towards use behaviour, by replacing this variable with behavioural intention to use. Prior studies in the entrepreneurship literature have considered propensity to use as having a direct impact and as moderating variable, and there are mixed results on the role of propensity to use. This study has adapted this variable to IS context, and found the significant role of propensity to use as moderating variable. Indirectly, this study also reveals the possibility role of propensity to use as mediating variable. This postulation is made due the fact the propensity to use measures the volitional aspect of behaviour, therefore, the variable may has the ability to mediate the relationship determinants towards use behaviour by entrepreneurs in the integrative UTAUT-EPM model.

Future direction of research could also progresses with the further refining affective beliefs of perceived desirability and perceived feasibility. As these two variables are adapted from the entrepreneurship literature, further validation of the scale could improve the integrative UTAUT-EPM model. Although, this study has defined and conceptualised these constructs in the context of IS adoption and use behaviour, and validation tests reveal that the scales used in the integrative model are adequate, further research could provide support by validating and confirming on strength of these scales in IS adoption behaviour context.

8.4 CONTRIBUTIONS AND IMPLICATIONS OF THIS STUDY

The findings of this study reveal several theoretical contributions and managerial implications. The following subsections discuss each area in turn.

8.4.1 Theoretical Contributions

First, our findings point to the usefulness of the integrative UTAUT-EPM. The integrative UTAUT-EPM model synthesised IS adoption context and entrepreneurship context to capture the causal flow between technological factors, individual factors, and environmental factors in predicting IS adoption behaviour by entrepreneurs. Many IS adoption models have been developed, adapted, extended and integrated to explain IS adoption behaviour in different contexts and settings, but none totally focus on establishing IS adoption model specifically for entrepreneurs. To a certain extend the integrative UTAUT-EPM model does tackle some of the limitations in UTAUT, as the integrative model is able uncover the importance of technological, individual and environmental factors towards intention to use, and improve the ability of intention to use in predicting use behaviour.

Second, this study revises UTAUT to develop a more robust model by including two significant variables; (1) perceived desirability and (2) perceived feasibility, to the individual factors. Both these variables are internal to the entrepreneurs, which is part of the intrinsic motivational factors that encourage entrepreneurs to adopt IS related innovation. These findings point to the role of perceived desirability and perceived feasibility as enablers of intention to use and provide evidence that these individual factors provide as the base factors through which entrepreneurs when making their decision to either adopt or not adopt IS related innovation. In turn, these higher-order individual factors affect entrepreneurs IS use

behaviour. Further research may build on this study to examine how perceived desirability and perceived feasibility to use IS related innovation can influence individual intention to use and use behaviour.

Third, the integrative UTAUT-EPM model is able to capture the causal flow between technological factors and individual factors in predicting intentional behaviour and provides information essential in explaining what promotes IS innovation adoption and usage and what hinders it. Prior research used UTAUT and found that technological factors as the main drivers of employees IS intention to use and use behaviour. In the case of entrepreneurs' acceptance of IS, other drivers come to the fore. The integrative UTAUT-EPM model provides evidence that individual factors, such as perceived desirability and perceived feasibility are found to be a more prominent drivers of intention to use rather than technological factors as in the organisational context. Thus, the integrative UTAUT-EPM model can be used to identify other entrepreneurial variables related to the individual factors in predicting IS adoption behaviour by entrepreneurs. Therefore, this study contributes further towards the collective knowledge about the IS related innovation adoption behaviour, particularly by entrepreneurs, and their entrepreneurial characteristics.

Fourth, the integrative UTAUT-EPM model and the findings point to importance of the volitional aspect of entrepreneurs' behaviour on the relationship between individual factors and intention to use. In this study the volitional aspect is measured through propensity to use that indicate the entrepreneurs tendency toward using IS related innovation. Arguments have been made in prior studies that it is hard to envision well-formed intention without some level of propensity to use by adopters, whereby the adopters must have the desire to gain control by taking action (Krueger et al., 2000). The integrative

UTAUT-EPM model provides evidence that propensity to use is an important factor. In addition, the impact of individual factors (i.e. perceived desirability and perceived feasibility) are greater towards intention to use when entrepreneurs have high level of control to take action (i.e., propensity to act). Thus, this study expands investigation into the impact of volitional aspect on entrepreneurs' intention to use by considering its moderated effect through individual factors.

Fifth, the integrative UTAUT-EPM model and the findings point to the importance of precipitating events to understand the relationship between intention to use and use behaviour. This study expands investigation into precipitating events and considers this variable as moderating variable to overcome UTAUT limitation related to intention-behaviour gap. The integrative UTAUT-EPM model provides an understanding and new insight to the situations that are facing entrepreneurs, and how entrepreneurs have to cope with these situations, such as changes in work situation; change in work environment, and technical change, and at the same time take action on their behaviour intention. As argued by Wiedemann et al. (2010), intention is important, but it is an insufficient prerequisite for successful behaviour, and thus there exist a gap between intention and behaviour, which is known as the '*intention- behaviour gap'.* To a great extent the integrative UTAUT-EPM model improves the intention- behaviour gap in the UTAUT model, as most of the previous researches have focused on the determinants of acceptance or adoption rather than intention-behaviour gap (Davis et al., 1989; Jackson et al., 1997; Taylor and Todd, 1995a; Venkatesh et al., 2003).

Sixth, the integrative UTAUT-EPM model provides evidence on the salient role of precipitating events as promising candidate to overcome the limitation of predictive ability

of behavioural intention in UTAUT, particularly when the focal phenomenon involves unpredictable time lags between the time an intention is formed and actual behaviour is performed. By specifying a model based on prior theories and or models in IS and entrepreneurship, and going beyond merely validating UTAUT, this study paves the way for further theoretically motivated investigation to refine the integrative UTAUT-EPM model and strengthen its rigor and prescription for practice.

On the whole, this study has operationalised the EPM variables (perceived feasibility, and perceived desirability) in IS adoption behaviour context. Two important individual factors that are considered as indirect determinants of intention to use in the UTAUT model (i.e., self-efficacy and attitude) were adapted from entrepreneurship context and added to the proposed integrative UTAUT-EPM model to improve the limitation and to develop more a more robust model which able to measure different factors of IS adoption. Furthermore, this study reveals that EPM as an intentional model that focus on individual factors have the ability to measure IS adoption and use behaviour. On that note, EPM has the ability to measure the effect of external factors on the relationship between intention and behaviour. In addition, this study also considers actual entrepreneurs to investigate IS related adoption. Most of the studies in entrepreneurship consider post graduate students as potential entrepreneurs to investigate intentional model and few studies in IS adoption behaviour consider actual entrepreneurs to investigate IS adoption behaviour. As Venkatesh and Zhang (2010) suggest, the UTAUT model may perform differently and some variables could be less or more important in one culture than others. The findings of this study reveal that UTAUT model perform differently for entrepreneurs who are pioneer in IS adoption and thus, some factors may act as non important determinants of IS adoption (e.g., effort

expectancy), to the entrepreneurs, their individual entrepreneurial characterstics are much more dominant towards IS adoption.

Finally, this study uses SEM and a new application called MODPROBE (Hayes, 2009) to validate continuous moderating variables in order to obtain in-depth interpretation of the findings and different level of moderating variables on the effect of IS adoption behaviour. Few studies in IS adoption behaviour research measure the effect of continuous moderating variables.

8.4.2 Managerial Implications

The future of IS innovation is bright as IS Innovation is considered as the new competitive weapon that is crucial in developing a sustainable competitive advantage. At the same time it is also the primary management tool in competitive market to enhance firms' competitiveness as well as productivity and flexibility. Information system (IS) has the potential to enhance operational efficiency and effectiveness, change the way businesses compete and create strategic opportunities and redraw competitive boundaries. End-users, particularly as this study reveals, entrepreneurs do like new IS related innovation but they may not use it as often. Thus, developers and or inventors of IS related innovation need to understand factors that can influence users' decision to adopt and use IS related innovation. As for entrepreneurs, understanding factors that influence them to use IS related innovation would enhance their sense making on the relative importance of using the system. Hence, the integrative UTAUT-EPM model should assist policy makers and entrepreneurs in the effort to increase the uptake of IS related innovation by entrepreneurs. Therefore, this study has several managerial implications.

First, the integrative UTAUT-EPM model and findings suggest the necessity to recognize individual factors of entrepreneurs as valuable enabling factors towards intention to use IS related innovation. This study suggests that attractiveness and feasibility of IS play significant role in facilitating the intention to use by entrepreneurs and in turn, superior use of IS related innovation. The findings suggest that entrepreneurs with adequate and appropriate IS skills and capabilities have greater intention to use IS related innovation. On the other hand, if entrepreneurs perceive that they do not have adequate and appropriate IS skill and capability to use IS innovation they would not be interested to use it even if these innovation is useful and user friendly. Entrepreneurs are usually small businesses that greatly depend of doing businesses with government agencies and large organisations. Most of them (i.e., government agencies and large organisations) would introduce and impose new system to their small businesses partners when conducting their business activities. Subsequently, these entrepreneurs may have to adopt and adapt to the system being imposed or introduced.

Therefore, using the findings from this study, before imposing the new system to these entrepreneurs, these policy makers (government agencies and large organisations) need to organise workshops or seminars to their small businesses partners. The workshops and seminars could be about educating entrepreneurs on the benefits of using the system, as using the system would increase entrepreneurs' probability of getting new tender or contract, thus creating the attractiveness of using the system. At the same time, during these workshops and/or seminars, the policy makers can demonstrate the use of the system to create confidence and enhance the skills and knowledge of the entrepreneurs about the system. With demonstration, the entrepreneurs would be comfortable and are more feasible

to use the system. The policy makers can also provide training for entrepreneurs on the use of IS related innovation and/or tutored on how to apply this knowledge in their job.

Second, this study provides new information to policy makers (i.e., government agencies) and educational leaders (i.e., business associations, business communities, business groups) that may be useful in understanding entrepreneur's behaviour and acceptance of IS related innovations. The findings of this research should be disseminated to policy makers of MSC Malaysia (Cloud Computing) and government, or other professionals interested in the intention of entrepreneurs (SMEs owners) to use IS related innovations. The findings of this study are useful for policy makers (e.g., government agencies) in understanding entrepreneur's behaviour related to IS related innovation usage. They could provide special plans and programs to educate entrepreneurs and teach them how to use IS innovation. Based on Roger (2002) most individuals evaluate an innovation through subjective evaluation of near-peers who have adopted an innovation not on the basis of scientific research. Therefore government could encourage entrepreneurs as early adopter to adopt and use IT innovation in their business while others look to early adopter and would follow them, thus increase the rate of adoption and use of IS related innovation.

Third, this study provides evidence concerning the role of precipitating events which encourages or inhibits entrepreneurs toward IS related innovation adoption behaviour. The integrative UTAUT-EPM model provides evidence that different phenomena of events, such as changes in work situation, changes in work environment, the decision to changes career perspective, and changes in technology have different effects on their initial intention to use to use behaviour. This study makes clear that of the effect of government policy and environmental factors as well as work situation on entrepreneur's intention to use IS

innovation. For example, new rule for using Web2 (face book), import or export IT product will affect the use of these technology and entrepreneurs intention to adopt and use them. These study may be able to assist policy makers and managers who want to increase use of IS related innovation by turning their efforts to entrepreneurs who are ready to change their work situation, or career perspective and use IS related innovation.

Fourth, this study may assist policy makers view entrepreneurs as pioneers when policy makers introduce new technology in the market. The policy makers can consider a selected entrepreneurs as target sample in the first phase of IS adoption to get the entrepreneurs attention. Once, they are able to convince and success then encourage these selected entrepreneurs to use IS innovation, these selected entrepreneurs can be role model to other entrepreneurs to follow. The selected entrepreneurs can then transfer their knowledge to other entrepreneur on the feasibility and attractiveness of using IS innovation. Furthermore, these findings are useful for policy makers when designing special plan for economic growth and enhance IS innovation usage. In addition, the findings of this study provide useful information for managers needing to assess the possibility of success for the implementation of new IS.

Fifth, the attractiveness of IS related innovation is a factor that IS developers and providers should consider when designing new technology. From the other point of view, when policy makers or developers want to implement new IS innovation they should consider the attractiveness of such innovation. Even though new IS is useful and easy to use, if it is not attractive for user they will not be interested to use it. Furthermore, most of the IS related innovation being introduce can be relate by users if latest improve system is related to the previous system. Therefore entrepreneurs can learn to use the system by themselves.

Nowadays, most people in the world know how to use a mobile phone without training. Hence, if entrepreneurs are empowered about the potential of using mobile phone in SMS banking, mobile banking, they may be more interested in practicing it. Therefore, IS developers need to devote resources into creating a positive entrepreneurs' experience. One example could be through investigation in entrepreneurs training programs.

8.5 CONCLUSIONS

In conclusion, this study develops a conceptual integrative UTAUT-EPM model that links individual, technological and environmental factors to IS related innovation intention to use and use behaviour that are moderated by demographic characteristics, propensity to use and precipitating events. This study proposes the integrative UTAUT-EPM model based on two existing models: Unified Theory of Acceptance and Usage of Technology (UTAUT) (Venkatesh et al., 2003) and the EPM (Krueger and Brazeal, 1994) to explain the IS adoption and use behaviour by entrepreneurs. Combining these two models enables a coherent and consistent explanation for interpreting and understanding IS adoption behaviour by entrepreneurs that consist of both organisational and individual perceptions and attitude. The integrative UTAUT-EPM model has six core determinants toward IS adoption behaviour of entrepreneurs : performance expectancy, effort expectancy, social influence, perceived desirability, perceived feasibility and facilitating conditions, along with four moderators: gender, age, propensity to use, and precipitating events. Propensity to use is added to the model to measure volitional aspect of the entrepreneurs' behaviour.

With concern to UTAUT limitations, this study adds the precipitating events as a moderator to the integrative UTAUT-EPM model to improve the relationship between

behaviour intention and usage behaviour. The precipitating events can be considered as promising candidate to overcome UTAUT limitations and generally improve the intention-behaviour gap. Interaction of precipitating events and intention to use increase the use of IS related innovation. This study uses data collected from entrepreneurs through longitudinal survey that contains unobtrusive measures (individual factors, technological factors, environmental factors, propensity to use, precipitating events, intention to use and use behaviour) to assess entrepreneurs perceptions of IS related innovation before and after use.

This study reveals that performance expectancy, perceived desirability and perceived feasibility have positive associations with intention to use, and that these associations are moderated by gender, age and propensity to use. Perceived desirability was found to be the strongest determinant followed by performance expectancy and perceived feasibility respectively. In the new model perceived desirability is the strongest factor towards intention to use IS related innovation. This study also highlights the importance of volitional aspects of control that entrepreneurs have on their behaviour and the events that occur during the course of their action. This study demonstrates the integrative UTAUT-EPM model outperformed the basic UTAUT with 77.4% of the variance explained in entrepreneurs intention to use an IS related innovation. In turn, intention to use is positively associated to use behaviour and is moderated by precipitating events. The study also finds that environmental factors also influence use behaviour and is moderated by age. The integrative UTAUT-EPM model is able to account for 54.2% of the variance in use behaviour of IS related innovation, a substantial improvement over the basic UTAUT.

In conclusion, the integrative UTAUT-EPM model was able to examine the IS adoption behaviour by entrepreneurs and validate the importance of entrepreneurial

individual factors. Moreover, to a certain degree the integrative UTAUT-EPM model is able to mitigate the limitations UTAUT, and improve the predictive ability of intention to use to use behaviour. Overall, the study significantly enhances our understanding of entrepreneurs voluntary IS innovation adoption and use and serves to further highlight the important role of external variables in predicting use behaviour.