

Towards a Model of the Acceptance of Information and Communication Technology in Rural Small Businesses

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Introduction

The background of this paper is the assumption that the Information and Communication Technology (ICT) development has a positive potential for the Small Business (SB) in rural areas. Most important, it improves the possibility for SBs in rural areas to compete, since it reduces the disadvantage of the distance to markets and customers. It also improves the possibility of business cooperation for the same basic reason. But it is also assumed that the realisation of this potential is by no means self-evident. More precisely, it is assumed that it hinges on the SB's acceptance of the ICT in the first place.

In an earlier survey study of the ICT "maturity" of SBs in rural areas it was found that the "maturity" was generally low – and in particular with enterprises in the tourism sector. This points to a general acceptance problem with these enterprises. The survey study did not delve into the reasons for the lack of ICT "maturity" and hence for the lack of ICT acceptance.

The ambition in this paper is to develop a number of theory derived propositions that may serve as a basis for forthcoming empirical studies of such acceptance with SBs in rural areas.

It is part of the picture that technology acceptance research is a mature field in information systems research (Venkatesh et. al., 2003), with many models and theories developed and tested. However, despite the large volume of work in this area, very little research has been addressing the ICT acceptance of rural SBs.

On The ICT acceptance of Small Business

Research into the impact of IT within the small firm tends to be inconclusive and inconsistent in its findings (Premkumar, and Roberts, 1999; Smith, 1999).

There is little doubt that Information and Communication Technologies (ICTs) will have an impact on the business game in general. But it is questioned whether the impact of technology will be even and whether small business or certain regions (e.g. urban or rural) will be

adversely affected by the technologies (McConnaughey, Nila, and Sloan, 1995; Sandberg, and Vinberg, 2000).

Basically, the changes in ICTs' provide both opportunities and threats to SBs located in rural areas. ICT have made geographic locations and distances irrelevant, especially in the service industry (e.g. tourism). It also opens up new markets that were not previously accessible. Investing in these technologies can lead to economic benefits through more price competition, lower inventory costs, reduced business travel and new distribution channels.

The ICT development might also bring in potential threats to SBs. History has shown that availability of basic infrastructure, such as rivers, railroads and interstate road systems drives local economic development. In an information economy the drivers of economic growth would be the ICT infrastructure. Hence, rural businesses are caught in a vicious cycle — lack of communications infrastructure reduces the demand for communications services, which further constrains future investment in the infrastructure. Another source of threat is that the ICT provide the opportunities for businesses to bypass the rural areas (Chapman, James-Moore, Szczygiel, and Thompson, 2000).

The acceptance of the ICT is a factor that is crucial to the realisation of these benefits of the ICT also when the ICT infrastructure is acceptable, and it is not so self-evident that rural SBs are prone to accept the technology. In an empirical study of the business condition in a rural area in Sweden it is observed that only a small proportion of the SBs in a studied rural area had in fact successfully converted ICT's potential into practice (Sandberg, 2003b).

The SB management's attitude to change is observed to be of relevance in the context. In a study a strong relations were found between the ICT-level of the enterprise and both leader and co-worker change competence in small enterprises (Vinberg et al, 1999; Sandberg and Vinberg, 1999; Sandberg, 2003a).

The SB management's attitude to the strategic value of ICT investments is also pointed to as relevant in the context. It is observed that most SBs do not view the ICT as key to their business strategy (Levy and Powell, 2002). Consequently, they are not prone to invest time and money in the ICT in their enterprises.

Mehrtens et al (2001) suggest three drivers of SBs' decisions to invest in e-business – that is an aspect of the ICT technology that can be regarded as particularly crucial to SB activities in the rural areas. These drivers are (i) perceived benefits, (ii) organisational readiness and (iii) external pressures. It is also concluded that the perceived benefit is the main driver for ICT adoption with some evidence of external pressure, particularly for those SBs with close relationships with their customers.

Three aspects to perceived benefit are emphasised in literature:

- Improved communication using e-mail (Poon, 2000; Poon, and Swatman, 1999; Chapman et al 2000),
- The ability to gather research and competitor information (Chapman et al 2000),
- A modern image and improved SB promotion (Chapman et al, 2000).

The ICT acceptance research – an overview

The problem of user acceptance of information and communication technology (ICT) is focused by researchers in a variety of fields and with different research strategies. As a consequence, the literature on acceptance is broad, ranging from case studies of accepted technologies, to the individual psychological characteristics of acceptors or resisters.

Information and Communication Technology (ICT) acceptance research has also yielded many models, with different sets of acceptance determinants. In this paper, we focus and discuss four prominent such models. The models reviewed are (i) the theory of reasoned action, (ii) the technology acceptance model, and (iii) the unified theory of acceptance and use of technology.

a) *The Theory of Reasoned Action (TRA)*

Fishbein and Ajzen's (Ajzen and Fishbein 1980; Fishbein and Ajzen 1975) Theory of Reasoned Action (TRA) is a well-researched intention model that has proven successful in predicting and explaining behavior across a wide variety of domains – including research of technology acceptance. It is, in fact, a model that is basic to a major part of the research in the area.

The foundation of the TRA conceptual framework is provided by the distinction between beliefs, attitudes, intentions, and behaviours. According to TRA, a person's performance of a specified behaviour is determined by his or her behavioural intention to perform the behaviour, and behaviour is jointly determined by the person's attitude and subjective norms concerning the behaviour in question. (Algahtani and King, 1999)

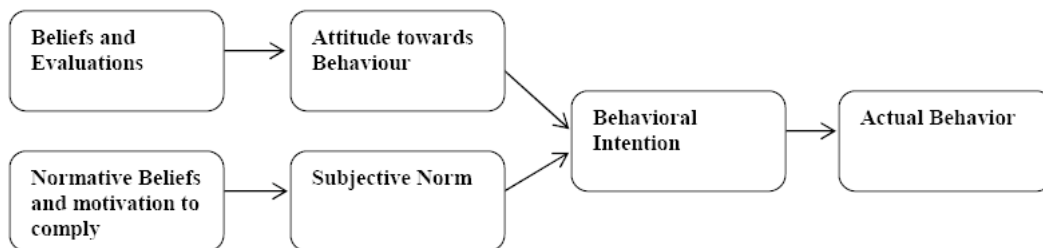


Figure 1. The Theory of Reasoned Action (Fishbein, and Ajzen, 1975).

In figure 1, the belief refers to a person's subjective probability judgment concerning some discriminable aspect of his world; it deals with the person's understanding of himself and his environment. Therefore; belief can be defined as 'the subjective probability of a relation between the object of the belief and some other object, value, concept, or attribute' (Fishbein & Ajzen, 1975). Attitude is defined as an implicit, drive-producing response considered socially significant in the individual's society. This definition states, in effect, that from the psychological point of view, attitude is an implicit response with drive strength which occurs within the individual as a reaction to stimulus patterns and which affects subsequent overt responses.

A person's attitude toward any object can be seen as a function of his beliefs about the object (i.e., the probability or improbability that the object has a specific relationship with some other object, value, concept, or goal) and the evaluative aspects of those beliefs (i.e., the

subject's attitude toward, or evaluation of the related object). However, it should be noted that although this evidence provides strong support for the general hypothesis that an individual's attitude toward any object is a function of his beliefs about the object and their evaluative aspects, it does not imply that any given belief will be correlated with the attitude. Indeed, this relationship between beliefs and attitudes indicates that it is quite probable that an individual will have some beliefs that appear inconsistent with his attitude.

The subjective norm is a person's belief that most of his important others think he should (or should not) perform the behaviour in question (Ajzen and Fishbein, 1980). Subjective norms are internalization and identification. Internalization (Warshaw, 1980) refers to the process by which, when a technology user perceives that an important person like the user's manager thinks that the user should use this new technology, the user will incorporate this person's beliefs into his/her own belief structure.

b) The Technology Acceptance Model (TAM)

The TAM model (see figure 2) is an influential extension of Ajzen and Fishbein's theory of reasoned action (TRA). TAM uses TRA as a theoretical basis for specifying the causal linkages between the two key features: perceived usefulness and perceived ease of use, and users' attitudes, intentions and actual computer adoption behaviour. TAM is considerably less general than TRA, but it can be readily extended to apply to any type of technology. The model in figure 2 suggests that when users are presented with, for instance, a new software package, a number of variables influence their decisions about how and when they will use it. There are two specific variables, perceived usefulness and perceived ease of use, which are hypothesized to be fundamental determinants of user acceptance (Davis and Arbor, 1989).

The TAM model is developed by Davis et al. (1989) to include these findings in the more general TRA model., and to make it more compatible with behaviour in the sphere of technology. The goal of the model is to provide an explanation of the determinants of computer acceptance by tracing the impact of external factors on internal beliefs, attitudes and intentions.

The TAM is nowadays a widely accepted IT acceptance model. TAM is used in very different settings, for example to test the acceptance of: online games (Hsu et al., 2004), Internet utilisation behaviour (Shih, 2004), online shopping (Vijayasathy, 2004), technology in New Zealand dairy farming (Flett et al., 2004), online learning (Saadé et al., 2003), Internet banking (Lai et al., 2005) and so on.

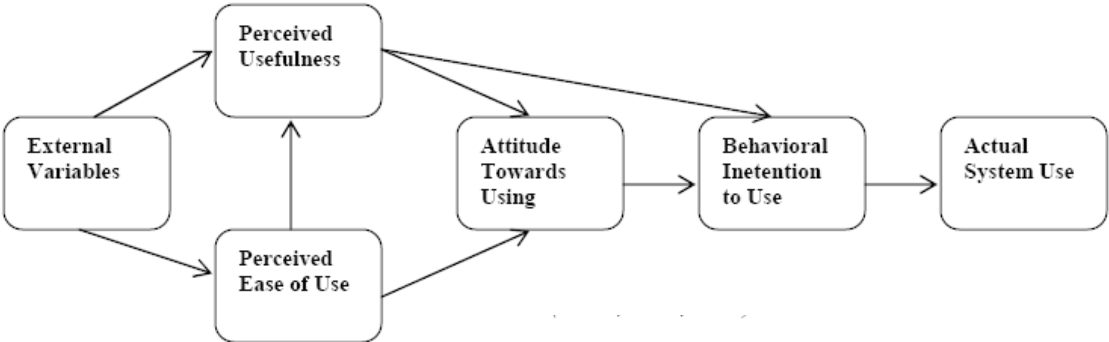


Figure 2. Technology Acceptance Model (Davis, 1989).

Perceived usefulness is defined as the degree to which a person believes that using a particular technology will enhance his or her job performance. People tend to use or not to use an application to the extent they believe it will help them perform their job better (Davis et al., 1989). Perceived usefulness explains the user's perception to the extent that the technology will improve the user's workplace performance (Davis et al. 1989). This means the user has a perception of how useful the technology is in performing his job tasks. This includes decreasing the time for doing the job, more efficiency and accuracy.

Perceived ease of use refers to the degree to which a person believes that using a particular technology will be free of effort. Users believe that a given application is useful, but they may, at the same time, believe that the technology is too hard to use and that the performance benefits of usage are outweighed by the effort of using the application (Davis and Arbor, 1989). Perceived ease of use explains the user's perception of the amount of effort required to utilize the system or the extent to which a user believes that using a particular technology will be effortless. (Davis et al., 1989).

Following Hung-Pin Shih (2004) several studies showed that 'perceived usefulness' has the greatest impact on the individual intention to use. However, in Davis' own research, using TAM to test Internet use, 'perceived ease of use' appears to be more important.

c) The Unified Theory of Acceptance and Use of Technology (UTAUT)

The Unified Theory of Acceptance and Use of Technology (UTAUT) proposed by Venkatesh et al. (2003) extends TAM to take into account several new constructs (Performance Expectancy, Effort Expectancy, and Social Influence) that bear significant influence on behavioural intention and ultimately usage of technologies (see figure 3).

The model was formulated based on conceptual and empirical similarities across eight prominent competing technology acceptance models: Davis' Technology Acceptance Model (TAM) (Davis 1989; Davis, Bagozzi & Warshaw 1989); Roger's Innovation Diffusion Theory (IDT) (Rogers 1995); the Theory of Reasoned Action (TRA) (Fishbein & Ajzen 1975); the Motivation Model (MM) (Davis, Bagozzi & Warshaw 1992); the Theory of Planned Behavior (TPB) (Ajzen 1991); the Combined TAM and TPB (Taylor & Todd 1995); the Model of PC Utilization (MPCU) (Thompson, Higgins & Howell 1991; Triandis 1977); and Social Cognitive Theory (Bandura 1986; Compeau & Higgins 1995a; Compeau & Higgins 1995b; Compeau, Higgins & Huff 1999).

Venkatesh and Davis extended the original TAM model to explain perceived usefulness and usage intentions in terms of social influence and cognitive instrumental processes. (Venkatesh and Davis, 2000). They formulated the Unified Theory of Acceptance and Use of Technology (UTAUT). They state that four elements play a significant role as direct determinants of user acceptance and usage behaviour: performance expectancy, effort expectancy, social influence and facilitating conditions. Subjective norm can be defined as the technology user's belief that most of his/her important others believe he/she should or should not perform the behaviour to accept the technology. Voluntariness is the context in which the user will accept technology voluntarily. This means there is no obligation on the user to accept the technology. Image can be defined as the degree to which accepting new technology is perceived to enhance the person's status in one's social system e.g. inside the person's enterprise.

UTAUT encompasses two additional theoretical mechanisms by which the subjective norm can influence intention indirectly through perceived usefulness: internalization and identification. UTAUT theorizes that subjective norm will positively influence image because, if important members of a person’s social group at work believe that he or she should perform behaviour to accept the new technology it will lead the user to accept this new technology (Venkatesh & Davis, 2000).

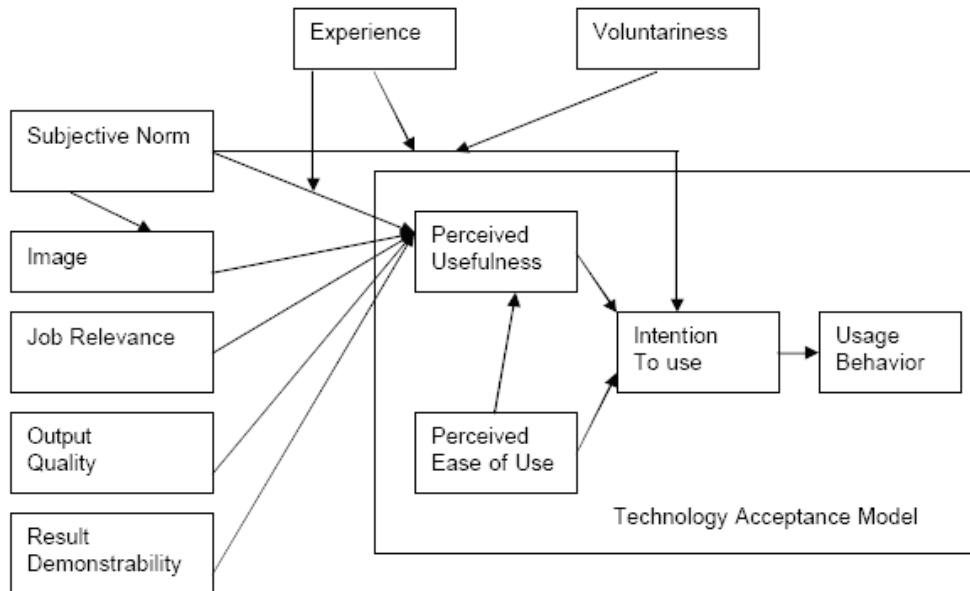


Figure 3. The Unified Theory of Acceptance and Use of Technology (Venkatesh et al. 2003).

UTAUT contains four core determinants of intention and usage – performance expectancy, effort expectancy, social influence and facilitating conditions (Venkatesh et al. 2003). The variables of gender, age, experience and voluntariness of use moderate the key relationships in the model (Venkatesh et al. 2003). As shown in Figure 3, these determinants and moderators have all been adapted for use in the proposed research model.

UTAUT was empirically validated amongst 4 businesses in various industries (the health sector was a notable exception) and cross-validated using data from another 2. UTAUT was able to explain 70% of technology acceptance behaviour, a considerable improvement on previous models which routinely explain over 40% of acceptance (Venkatesh et al. 2003).

Implications for forthcoming empirical studies of ICT acceptance of rural Small Business

The TRA model is central to the research on ICT acceptance. But this model has successively been developed to include elements that are specific to the acceptance of technology. Notable is that the development has resulted in an increased emphasis on the social context of the technology acceptance.

The UTAUT represents a recent step in this development. The model suggests that a SB manager’s ICT acceptance can be explained by factors pertaining to the technological,

individual, and organizational contexts. Specifically, perceived usefulness, perceived ease of use, and perceived efficiency gains are fundamental determinants of the technological context.

Research propositions

Five propositions will serve as points of departure for the research carried out addressing the ICT acceptance of SB managers in rural areas:

- The perceived usefulness of the technology is crucial to the acceptance of the ICT technology. A problem is that the attitude to ICT is more reactive than proactive in many SB. The ICT is not seen as a strategic resource, and this hampers the ICT acceptance.
- The ICT acceptance in SB is hampered by a fundamental lack of usability. The use of the technology requires an initial learning process. This is a problem to the acceptance of the technology since time is a very scarce resource and learning takes time.
- The acceptance of the ICT technology is hampered by a lack of result demonstrability. This makes it difficult to convince SB managers that an investment in ICT is worth while – and worth investment. The efficiency gains of investing in and using the ICT is not clear to these managers.
- In addition to this, the acceptance of the ICT is hampered by the lack of IT infrastructure in rural area contexts. This lack of IT structure makes the use of the technology combined with annoyance and anxiety.

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