Kasetsart Journal of Social Sciences 41 (2020) 256–261

Kasetsart Journal of Social Sciences

journal homepage: http://kjss.kasetsart.org

Antecedents and consequences of e-commerce adoption for SMEs

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Article Info

Article history:
Received 11 April 2018
Revised 22 October 2018
Accepted 24 October 2018
Available online 13 March 2020

Keywords:
e-commerce adoption,
SMEs,
UTAUT

Abstract

The purpose of this research was to identify antecedents and consequences of e-commerce adoption in SMEs. The research was based on a modified UTAUT framework, incorporating existing IT resources and knowledge. A survey of retail SMEs in different stages of technology adoption (n = 88) was analysed using structural equation modelling (SEM). Results showed that performance expectancy and effort expectancy, along with facilitating conditions, contributed to e-commerce adoption. However, social influence did not have a significant influence. The implication of the research is that education about e-commerce benefits, risks, and required resources could assist in technology adoption.

Introduction

E-commerce is defined briefly here as the use of information systems to facilitate commercial activities of a firm, including supplier relationships, inventory and order management, and end customer contact, sales, and post-sales service (Qin, 2009). Historically, e-commerce has included large-scale systems, such as federated order management and order fulfilment systems shared between firms and their suppliers (Qin, 2009). However, modern e-commerce also incorporates customer-focused web-based sales, either direct (through the company's own website) or indirect (through intermediaries such as Amazon or eBay); mobile commerce or m-commerce; and increasingly, social media-based e-commerce (Yan et al., 2016). This explosion of e-commerce platforms and potential activities offers SMEs a wide range of ways to reach their customer base, facilitating service and sales, and offering flexibility in terms of cost and customer contact that are not available through other SME marketing tools (Odoom, Anning-Dorson, & Acheampong, 2017). However, SMEs also have very high barriers to e-commerce technology adoption, including resource constraints such as lack of capital for computing equipment and services and lack of institutional knowledge related to information systems and technologies (Ramdani, Kawalek, & Lorenzo, 2009; Scupola, 2009). Thus, even though SMEs may recognise financial and non-financial benefits from the introduction of e-commerce technologies (Odoom et al., 2017), there is no guarantee that they can take advantage of these benefits effectively. Furthermore, there has historically been inadequate external support for e-commerce development in the UK. SMEs, which have 250 or fewer employees comprise more than 99 percent of registered businesses, about 60 percent of employment and about 47 percent of total turnover (Rhodes, 2016). This makes the SME a critically important part of the British economy. At the same time, it is known that there has historically been a high level of neglect of e-commerce development for SMEs in the UK, with poor distribution of knowledge and policy planning affecting e-commerce adoption in many areas (Harindranath, Dyerson, & Barnes, 2008). However, the adoption decision for UK-based SMEs has not been explored in greater detail. This research uses the Unified Theory of Acceptance and Use of Technology (UTAUT) to examine adoption intentions and adoption of e-commerce (company websites) and the financial outcomes of this adoption decision.

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Peer review under responsibility of Kasetsart University.

https://doi.org/10.34044/j.kjss.2020.41.2.05
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Literature Review

Antecedents of Technology Adoption (UTAUT)

This study used the Unified Theory of Acceptance and Use of Technology (UTAUT) as the basis for identifying antecedents of adoption of technologies like e-commerce. (Venkatesh, Morris, Davies, & Davis, 2003). The UTAUT was derived from a comprehensive survey of user technology adoption models and was intended to move beyond the organizational context of earlier models such as the Technology Acceptance Model (TAM) which were context-specific (Venkatesh et al., 2003). The UTAUT identifies four factors in the adoption of technology. These factors include performance expectancy (or the expected outcome of using the technology); effort expectancy (or the extent to which the user expects to work to use the technology, for example, its perceived learning curve); social influence (the extent to which the technology is adopted within the user's social environment); and facilitating conditions (barriers and facilitators of use) (Venkatesh et al., 2003). The outcomes of the UTAUT, including adoption intention (explicit intention to adopt the technology) and adoption (actual use of the technology), are consistent with measures used in other attitude-behavioural models (Kim, Chun, & Song, 2009). Following this previous research, the relationship between attitudes and perspectives can be expected to be strong but not absolute, as attitude-behaviour gaps are commonplace in technology adoption (Kim et al., 2009).

Performance expectancy

One of the key operational variable related to the UTAUT model is the performance expectancy. It is the system provided by the company aimed to help the employee to improve his performance (Bocconcelli, et al., 2016). An effective performance expectancy system in the SMEs helps the employee to build their skills by making use of platforms provided by the company. According to the study of Dwivedi, Rana, Chen, and Williams (2011) performance expectancy system depends on five variables, which include perceived usefulness, external motivation, relative advantages, job fit, and outcome expectations (Bocconceli et al., 2016).

Effort expectancy

Effort expectancy is another factor lying in the model, and it can be defined as the easiness in the use of the system (Dwivedi et al., 2011). This factor also depends on the complexity of the MPCU, and it is rated as a difficult system to be used in the SMEs because of its complexities (Bocconcelli et al., 2016). According to the research article presented by Harindranath et al. (2008), if a company wants to develop a system, which is easy to use, this factor must be used effectively. However, this factor is complex to use, and demands use of high technology to improve innovation platform (Dwivedi et al., 2011). Therefore, this factor can be applied effectively, if the latest technology is used.

Social influence

Another factor of UTAUT model needed to be explained is a social influence, defined as a degree to which an employee should believe that he should make use of new system developed by the company (Bocconcelli et al., 2016). Therefore, social influence depends on the assessment of the behaviors towards the use of technology or technique (Harindranath et al., 2008). Dwivendi et al. (2011) argue that this theory depends on three concepts in SMEs, which include subjective norms, image, and social factors. Each of the identified factors contributes to the social environment in the workplace, and the behaviors used by the people. Therefore, social factors should be adequate in the SMEs, because they help the company to achieve success by providing collaborative platforms to workers.

The UTAUT has proved to be a flexible and adaptable model for many different research contexts, although it has also been under-utilized in favour of simpler models such as the TAM (Dwivedi et al., 2011). The under-utilization of the UTAUT is one of the reasons for its inclusion in this study since it was desirable to determine whether it could serve as an effective model for firm-level technology adoption in the SME. Furthermore, it has shown resilience in cross-cultural studies, although the effects sizes of the dimensions of technology adoption may vary between cultures (Im, Hong, & Kang, 2011). Thus, the UTAUT was well suited to the current research question.

Facilitating condition

There have been previous studies which have applied the UTAUT to e-commerce adoption by firms including SMEs, although these studies have typically been small and relatively limited in scope. This is consistent with the general state of under-utilization of the UTAUT (Dwivedi et al., 2011). These studies have largely used a standard UTAUT framework, with the main difference being what facilitating conditions were used. Therefore, it is important to understand facilitating conditions.

According to Thomas, Singh, and Gaffar (2013), facilitating condition is described as an extent to which the support of technological and organizational infrastructure is necessary for supporting the system based on technology. The facilitating condition has the tendency to positively influence the behaviour of employees and has great significance for understanding the acceptance and adoption of recent technologies within SMEs.

One study compared e-commerce adoption in Denmark and Australia, comparing four firms and their technology adoption process to identify key factors (Scupola, 2009). The authors found key organizational and technology context factors that influenced e-commerce adoption, which was incorporated into the facilitating conditions of the UTAUT model. The organizational context factors included CEO and top management support, resource constraints, and employee knowledge and attitudes toward information systems. Technological context factors included relative advantage, barriers and benefits of adoption, and related technologies, while the external environment (government and technology support infrastructure) also played a role (Scupola, 2009). Scupola's (2009) study provides valuable evidence for the application of the UTAUT model to e-commerce adoption, but at the same time, the comparative case study approach he used does not provide sufficient evidence to fully justify such

a theory. Another study also focused on organizational influences in technology adoption in a developing country, including gender of individual managers, organization size, management support, information availability, and communications (Uzoka, 2008). This author found that gender (female) could negatively influence e-commerce adoption, while other factors positively influenced technology adoption (Uzoka, 2008). However, since this study focused only on e-commerce adoption within a developing country context and only studied internal facilitating conditions, this study is also of limited application to a broader study of adoption.

There have also been studies conducted outside the UTAUT framework that are nonetheless helpful for understanding what factors may play a role in facilitating conditions for adoption. For example, one author studied SME adoption of enterprise systems, incorporating findings from previous UTAUT-based studies (although the authors did not use the model directly) (Ramdani et al., 2009). These authors identified technological factors (relative advantage, compatibility, complexity, trialability, and observability) along with organizational context factors (management support, organizational readiness, IS experience, and size) and environmental context (industry, market scope, competitive pressure, and external IS support) (Ramdani et al., 2009). A case analysis of SMEs in developing countries also found similar organizational and environmental factors in the adoption of e-commerce (Uzoka, Seleka, & Khengere, 2007). However, because this study is case-based, it does not provide adequate evidence to fully test the importance of these factors. The organisational and environmental factors largely overlap with those identified in UTAUT-based studies, providing additional support for the importance of such factors in the adoption decision. Given this body of research, the facilitating conditions considered in this study will include: top management support, firm size, staff IS knowledge and experience and IS resource availability.

Financial performance

Financial performance is another important factor that must be analysed in order to evaluate the antecedents and consequences of e-commerce in the small and medium-sized enterprise. The financial constraints are the major barrier towards the adoption of e-commerce (Hussein & Baharudin, 2017). If implemented, it must yield financial benefits for the firm or else its implementation is of no value. Moreover, financial performance provides an opportunity to measure the impact of e-commerce on SMEs.

Consequences of e-commerce technology adoption

The consequences of e-commerce technology adoption are also a concern for this study. Previous evidence shows that non-financial and financial consequences of e-commerce adoption are mixed. One study examined whether the use of a company website improved innovation or growth prospects for UK-based SMEs (Thompson, Williams, & Thomas, 2013). These authors studied the outcome of the Lifting the Barriers to Growth survey conducted by the Federation of Small Businesses. Their findings indicated that while firms do have theoretical benefits from websites (such as reducing transaction costs for customer contact), and do show evidence of increased innovation, there is not necessarily strong evidence that simply having a website leads to firm financial growth. A recent study of social media-based e-commerce adoption shows that SMEs may have mixed motivations and effects from such adoptions (Odoom et al., 2017). Their study showed some performance differences between product-based SMEs and service-based SMEs; for example, service SMEs were more concerned with the opportunity for customer interaction provided by social media, while product-based SMEs were attracted by the low cost. The authors did find some positive effects of social media-based e-commerce adoption on financial outcomes, but these effects were not consistent. A study in Spanish manufacturing firms did support a positive financial return (revenues and profits) from the introduction of e-commerce (Soto-Acosta, Popa, & Palacios-Marqués, 2016). These authors found that this was an indirect effect, which was related to the increase in innovation resulting from e-commerce adoption, rather than a direct effect of e-commerce adoption (Soto-Acosta et al., 2016). However, it should be noted that there may be differences in the relationship compared to the current study, since manufacturing SMEs do not sell directly via their e-commerce websites in many cases. Overall, the antecedents of e-commerce adoption for SMEs is under-studied in literature. This is part of a general gap in the literature relating to the use of marketing practices by SMEs, which is a very poorly explored area compared to large firm marketing practices and mainly focuses on entrepreneurial orientation (Bocconcelli et al., 2016). This leaves open the question of whether e-commerce adoption will have a significant effect on the firm's financial performance (as measured by revenue and profit). Financial performance is the final outcome of the study as presented in the theoretical framework. Financial outcomes, rather than non-financial outcomes, were selected because of potential difficulties in firms measuring non-financial outcomes.

Theoretical framework and hypotheses

The theoretical framework of the study is shown below (Figure 1). This theoretical framework is based on the evidence identified above, mainly the UTAUT model and consequence studies. Hypotheses of the study include the following:

Hypothesis 1: Performance expectancy affects e-commerce adoption intention for SMEs.

Hypothesis 2: Effort expectancy affects e-commerce adoption intention for SMEs.

Hypothesis 3: Social influence affects e-commerce adoption intention for SMEs.

Hypothesis 4: Facilitating conditions affect e-commerce adoption intention for SMEs.

Hypothesis 5: Adoption intention affects e-commerce adoption for SMEs.

Hypothesis 6: E-commerce adoption affects SME financial performance.

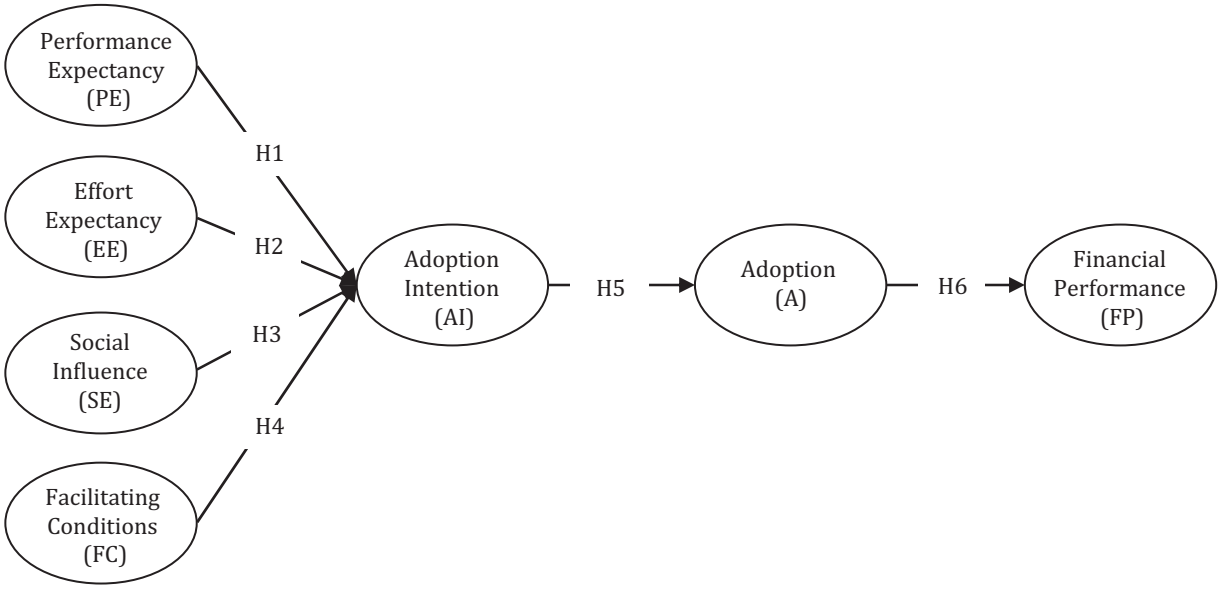

Figure 1 Theoretical framework

Methods

The research consisted of a quantitative survey of small and medium enterprises (SMEs), which measured intention to adopt e-commerce and its outcomes. Data collection for the study was conducted using a questionnaire distributed to business officers or principles of SMEs in the United Kingdom. A combination of mailed paper questionnaires and online recruitment for a Google Docs-based survey was used to collect data, to ensure that businesses that are not online were included and avoid overrepresentation of businesses that are already comfortable with online practice (Sue & Ritter, 2012).

The questionnaire included items measuring the four dimensions of the UTAUT model, along with e-commerce adoption intention, actual adoption, and outcomes. These items were measured using five-point Likert scales, with each scale including five sub-items. Firm characteristics were also collected, including size and turnover. Questionnaires were identical and were merged into a single dataset for analysis. The study was conducted at the firm level, and the population included retail SMEs. In the UK, an SME is a firm that employs less than 250 individuals (Rhodes, 2016). There are about 5.4 million SMEs in the UK (Rhodes, 2016), and no central registry exists, precluding the use of random sampling techniques and requiring the use of a convenience sample. A total of 300 paper questionnaires were distributed. The final sample size was n = 88 firms. Analysis included descriptive statistics and structural equation modelling (SEM), conducted in SPSS AMOS. The SEM approach was used because of its capabilities in identifying a full-model set of relationships and uncovering latent variables (Byrne, 2016). Confirmatory factor analysis (CFA) and the resulting regressions were the main tools used in this analysis. Significance is evaluated at $p < .05$, following standard practice.

The respondents of the study were not provided with any benefits for the participation in the study. The questionnaire developed was self-administered and presented the analysis of the responses received by using factor analysis methodology. The reliability of the questionnaire was tested by using Cronbach Alpha, and the values obtained to makeup the results were higher than 0.8, showing high reliability. Additionally, the wait time for the responses received through questionnaire was around two months.

Results

The descriptive statistics indicated that 72 firms (81.8%) were sole proprietorships or micro-firms (0 to 9 employees); 10 firms (11.4%) were small firms (10 to 49 employees); and 2 firms (2.2%) were medium firms (50 to 249 employees). This is broadly consistent with the distribution of SMEs within the UK (Rhodes, 2016).

Cronbach's alpha was used to test the internal consistency reliability of the scales. The outcomes showed that all scales had consistency of above 0.7, as suggested for initial acceptance of such scales (Bryman & Bell, 2015). Cronbach's alpha scores included: PE (.719); EE (.824); SE (.795); FC (.702); AI (.896); A (.849); and FP (.924).

The exact and relative goodness of fit measures of the model indicated an adequate fit (χ^2= .668, p = .178; CFI = .96, RMSEA = .051). The model R^2 (.463) indicated a moderately strong goodness of fit as well. Table 1 summarizes the regression relationships tested within the model. The regression tests indicated that there were three clusters of significant factors in AI, including PE, EE, and FC, of which FC had the strongest unstandardized effect on the AI outcome. The effect of EE was negative, which was expected given that the measurement of EE was such that higher EE was expected

to lead to lower adoption intention. However, SE was not significant. The regression equations further demonstrated that as expected, AI influenced A and A had a significant positive effect on AI. These findings allow for acceptance of Hypotheses 1, 2, 4, 5, and 6. Factors including performance expectancy, effort expectancy, and facilitating conditions did influence adoption intention, which in turn influenced adoption, while adoption influenced financial performance of the firm. However, Hypothesis 3 is rejected because there was no significant effect of social influence on adoption intention.

If the results obtained in Table 1 are evaluated, it is found that A was positively associated with FP, as regression outcomes show a positive relationship between the two.

Table 1 Cronbach Alpha

Variable	Reliability Statistics	
	Cronbach's Alpha	N of Items
Performance expectancy	0.840	3
Effort expectancy	0.856	3
Social Influence	0.810	3
Facilitating conditions	0.862	3
Financial performance	0.921	3

Discussion

The results of the study largely supported the application of the UTAUT model to e-commerce adoption by SMEs, especially when facilitating conditions were conceptualized as factors like firm size, IS knowledge and capabilities, and resources available for e-commerce adoption. The one relationship that was not accepted was SE, which has been significant in previous tests of UTAUT (Dwivedi et al., 2011). However, it must be considered that as Dwivedi et al. (2011) pointed out, the UTAUT has been substantially underused, even though it is frequently cited in literature. Thus, it is possible that the role of social influence has not been widely enough tested, especially when it comes to the adoption of technology on the firm level. This represents an area that should be subjected to further research to ensure that it can be evaluated properly. Another important aspect of this research was the effect of facilitating conditions, which proved to be the strongest of any relationship. This is significant because SMEs do have significant barriers to adoption of e-commerce and other information technologies, especially related to resource limitations including capital, computing resources, and employee knowledge (Ramdani et al., 2009; Scupola, 2009). In keeping with other research, this study has found a relatively low effect of e-commerce adoption on firm performance (Odoom et al., 2017; Soto-Acosta et al., 2016; Thompson et al., 2013). This could influence whether firms are willing to adopt e-commerce technology, even given the relatively low adoption barriers afforded by social media and increasingly affordable e-commerce tools.

If the results obtained in the study are further explored, it is found that adoptions play an important role in the development of the firm, because of the positive responses for the analysed questionnaire on the financial performance. Similar results were also obtained in the study of Uzoka (2008) who argue that adoption helps in the identification of weak platforms in a company, and the five factors of adoption can be used to remove those weaknesses. In addition, the results obtained in the study show a positive relationship between adoption and performance expectancy. Therefore, based on the assessment of the identified factor, it can be said that the UTAUT model positively influences a company's financial performance.

The results obtained for the second factor, show that AI was not significantly related to effort expectancy, and employees in the company did not want to make efforts for the adoption of the UTAUT model. The results obtained in this study for effort expectancy were found in contrast with the Venkatesh et al. (2003) and Odoom et al. (2017) because, respondents of that study wanted to use technology in the workplace, and EE was positive. On the other hand, the results obtained for the third-factor social influence (SE) indicate that AI has a positive relationship with SE, and firms can improve behaviors of employees by using the platform.

If the assessment of the relationship between AI and FC is presented, it is observed that AI develops facilitating conditions in the workplace of the SMEs, and should be incorporated. A significantly high correlation is noticed between the two variables when compared to other variables. The results were also obtained in the study of Dwivedi et al. (2011), which reported a significant relationship between the two variables. Therefore, it can be said that SMEs should adopt changes because they facilitate positive changes in the firm.

In the assessment of the fifth factor, it is observed that financial performance is positively related to adoption. If a company wants to improve its financial performance, it should make use of adoption platform, and bring necessary changes in the workplace (Bocconcelli et al., 2016). According to the research article presented by Dwivedi et al. (2011) if the plan of adoption is developed by using the identified five factors adequately, the chances of improved financial performance significantly increase. Same results can also be observed in this study too.

Table 2 Summary of regression outcomes

Relationship	Unstandardized Coefficient	*p*
Adoption intent ← Performance expectancy	.164	.003
Adoption intentions ← Effort expectancy	.156	.041
Adoption intentions ← Social influence	.047	.078
Adoption intent ← Facilitating conditions	.310	<.001
Adoption ← Adoption intentions	.465	<.001
Financial performance ← Adoption	.130	.002

Conclusion and Recommendations

This research has studied the antecedents and consequences of e-commerce adoption by SMEs in the UK. It showed that as expected within the UTAUT, factors such as performance expectancy and effort expectancy influenced adoption intention. However, the most important factor was facilitating conditions, a finding that makes sense given the extreme resource limitations that some small firms operate under. Simply, given the relatively small financial benefit of technology adoption for firms, it may not make sense to adopt e-commerce simply to increase sales or improve profits. However, the literature has also shown that there are other benefits the firm may recognise from technology adoption. These include for example an increased ability for service firms to reach and interact with their customers or increased impetus for innovation. Thus, even though this study does not necessarily support a strong financial benefit to the firm, SMEs should still consider adopting e-commerce for these benefits. This is particularly true given the increasingly inexpensive and easy to use e-commerce solutions for end customer contact and service, such as social media-based e-commerce and use of intermediaries for order management and fulfilment. The study does have some significant limitations, including drawing its participants from only one country and having a small sample size, which can affect the reliability of SEM outcomes (Byrne, 2016). Thus, this research provides support for further research into the use of e-commerce by SMEs, even though it does have its limits. The study also supports further use and development of the UTAUT, which although theoretically accepted, has been applied in empirical research relatively infrequently.

Conflict of Interest

There is no conflict of interest.

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