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FACTORS INFLUENCING TECHNOLOGY ADOPTION AMONGST TOURISM SMES

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Abstract

One of the primary challenges for the tourism sector is to communicate with potential customers in a manner that is readily accessible to them. Tourism enterprises must ensure that the tourism product is presented and promoted in the most effective and efficient manner possible. Information and communication technology (ICT) applications play a critical role in overcoming this challenge. The literature in this area suggests that technology is regarded as a main source of sustainable competitive advantage and a strategic weapon for the tourism and hospitality industry. Further investigation has revealed that the level of technology adoption varies significantly amongst tourism enterprises. This issue is especially true amongst micro and small tourism enterprises (SMTEs).

From a comprehensive study of the literature available, it is evident that there is a dearth of research in the area of ICT usage by SMTEs in Ireland. Primary research was deemed necessary to address this gap in knowledge. A three-phase research process, incorporating questionnaire surveys, focus groups and in-depth interviews was undertaken: resulting in a unique methodology from which to investigate ICT adoption amongst SMTEs in Ireland.

This study has specifically examined, in-depth, the significance of the drivers and inhibitors to ICT adoption as perceived by SMTE owner/managers. It has also provided new insights regarding the relative importance of benefits and reasons for ICT adoption amongst SMTEs. The results provide several theoretical contributions to ICT research within the context of tourism SMEs. Analysis of the empirical data (both quantitative and qualitative) generated shows that the needs of the SMTEs (in terms of ICT adoption) can be clustered against the variable that determine use of technology. The findings demonstrate that enterprises, which have the highest levels of ICT utilisation (hotels and bar/restaurants), are further along the ICT adoption process than those enterprises with lower ICT utilisation (self-catering, attractions and the B&B sector.)

Introduction

This paper reports on research into ICT adoption, which is an issue of importance amongst SMTEs. SMTEs represent the majority of businesses in a key industry sector in Ireland. The Tourism Policy Review Group's Report (TPRG, 2003, p.95) 'New Horizons for Irish Tourism – An Agenda for Action' discussed some of the most important aspects of Irish Tourism. The report outlined the factors that need to be addressed if Ireland is to remain competitive in the long term. The TPR Group found that "*The use of internet-based technologies remains at an early stage of development across the majority of operators in Irish tourism*", (ibid: p95).

To address this issue relevant literature pertaining to consumer use of technology and ICT adoption were reviewed. The review highlighted that the rapid changes in technology will place increasing demands on all of society. The increase in ownership of home computers combined with the high levels of connection to the Internet amongst households in Ireland and internationally is a development of great importance to the tourism industry. Technology, specifically the Internet has provided the consumer with the ability to plan and book his/her holiday more efficiently, less expensively and quicker than ever before. The influence of the Internet, on overseas travellers to Ireland, continues to increase. Since 2002, the Internet has been the top planning source for overseas tourists, with 56% using it in this manner in 2006 (Fáilte Ireland, 2006e, p.6). In 2006, an estimated 55% of holidaymakers to the island of Ireland used the Internet to plan and book some element of their holiday (CSO, 2007a). This figure has increased on an annual basis.

Technology Adoption amongst Tourism Enterprises

The literature suggests that technology is regarded as a main source of sustainable competitive advantage and a strategic weapon, especially in the tourism and hospitality industries (Poon, 1993; Sheldon, 1997; Connolly and Olsen, 2000; Rao, Metts and Monge, 2003). Studies (Buhalis and Main, 1998; Evans and Peacock, 1999; Vich-i-Martorell, G.A., 2004; Tang and Louvieris, 2004) have found that the tourism industry in general and the hotel sector in particular, have been very keen to adopt information technology.

Indeed, the nature of the industry, requiring a diverse range of information, has encouraged the widespread use of e-mail and the development of an on-line presence amongst the vast majority of tourism organisations. Buhalis (2003) proposed that the fragmented nature of the hotel industry makes the Internet ideal for selling inventory on-line. Further investigation revealed that the level of technology adoption varies amongst tourism enterprises (Sigala, 2003). A number of empirical studies have shown that e-mail and e-booking services of SMTEs are poor. Inadequate on-line booking facilities are common, with many SMTEs rarely offering this service (Fux et al. (2007). Problems with the answering of e-mails by SMTEs and defensive adoption of e-mail marketing have been cited in a number of studies (Frey et al., 2003; Murphy et al. 2003; Schegg et al. 2006; Schegg et al. 2007).

Over the past number of years, the amount of investment in ICT systems by tourism enterprises, in Ireland, has increased substantially (ITIC, 2004). Tourism enterprises have made such investments to improve both the efficiency and effectiveness of their businesses. Investments in information technology by SMEs have enabled the services sector to gain efficiencies and related cost savings once only available to large organizations (Weller, 2000). From the review of international studies, the benefits of ICT use by small and medium enterprises (SMEs) were noted. For example: improving access to and management of relevant information (Tang and Louvieris, 2004), enhancing communications (Buhalis, 1999). Other benefits include; improving operations through use of accounting software and statistical analysis (Buhalis and Main, 1998), increasing the speed of response to customers (Matlay, 2004) and improving customer service (Tang and Louvieris, 2004; Law and Jogararnam, 2005).

In relation to SMEs, in particular tourism SMEs, the Internet has enabled niche products/services to make up significant shares of total on-line travel and tourism sales (Offutt, 2007). The analysis of the literature relating to ICT adoption and SMTEs revealed a number of salient points. Beyond a certain level of usage/connectivity (e.g. PC, Internet access, on-line information or marketing), not all SMTEs will necessarily adopt ICT to the extent that large tourism organisations have.

Many SMEs may have very low-level ICT requirements and follow 'a non-linear/discontinuous path' in relation to technology usage (Ramsey et al. 2003). For small firms to adopt e-business and e-commerce strategies and tools, benefits must outweigh investment and maintenance costs (Mehrtens et al. 2001; OECD, 2004). Franch et al. (2005) pointed out that the process of transforming business activities through the use of ICT depends on a number of factors, the main ones being managerial capability and a willingness to embrace change. For many, as stated by Martin (2004) a lack of understanding of the value of IT, especially the Internet, to their own enterprises prevents many SMTE operators from fully gaining the benefits of business development and competitive advantage. Griffin (2004) has reported that many small firms are pushed into unplanned adoption of ICT through business partner pressure, customer demands and media hype. In their study of Irish service sector SMEs and 'electronic opportunities' Ramsey et al. (2003, p.261) found that "*many of the SMEs entered the e-commerce market without preparing an e-business case*". Many of the SMEs supported e-commerce as a 'stand-alone activity' that was not integrated into their overall business strategy (ibid).

Background to Research Undertaken

From a comprehensive study of the literature available, it is evident that there is a dearth of research in the area of ICT usage by SMTEs in Ireland. What does exist mostly relates to destination management/marketing systems in Ireland (e.g. O'Connor and Rafferty, 1996; Frew and O'Connor, 1999; Blank and Sussmann, 2000). Frew (2000) specifically points to the absence of Irish research in the area of information technology and tourism. Indeed, in a relevant study Griffin (2001) found that there is a lack of studies of Internet use by the Irish SME sector. In 2007, ITIC commissioned a research project (see O'Toole et al., 2007) specifically focusing on 'Tourism SMEs and the Web' in Ireland, which was the first of its kind on this subject. Many of the studies on ICT and SMTEs are based on UK enterprises (e.g. Buhalis and Keeling, 1999; Baker and Sussmann, 1999; Buick, 2003; Martin, 2004) followed by a number of European studies (e.g. Buhalis and Main, 1998; Evans and Peacock, 1999; Paraskevas and Buhalis, 2002; Franch et al, 2005) and farther a field (e.g. Lituchy and Rail, 2000 [Canada & USA]; Morrison and King, 2002 [Australia]; Croes and Tesone, 2004 [Costa Rica & Nicaragua]).

The research findings (benefits, barriers and implications of ICT usage) from these studies and related theory are highly relevant to Irish SMEs and many parallels can be drawn. However, direct application cannot always be made due to the nature (ownership, size of operations, location of enterprises and seasonal factors) of the tourism industry in Ireland. Moreover, Buhalis (2003, p.77) identified that: “*The importance of and necessity for using ICTs in the tourism industry is a relatively new subject in the literature*”. From a review of literature and secondary sources, the dearth of information regarding ICT usage by SMTEs in Ireland is evident. The level of technology adoption amongst tourism SMTEs in Ireland was assessed via secondary resources. With the exception of hotels, SMTEs in Ireland appear not to be effectively utilising ICT applications.

Research Methods

In terms of this study, the need for both exploratory and explanatory research was evident from a review of the literature and an analysis of both primary and secondary research. Exploratory study is defined as “*research that aims to seek new insights into phenomena, to ask questions and to assess the phenomena in new light*” (Saunders et al., 2007, p.598). Explanatory research is defined as “*research that focuses on studying a situation or a problem in order to explain the relationship between variables*” (ibid). In order to achieve the research objectives, the primary research process was divided into three phases. Figure 1 below presents, in diagrammatic form, an overview of the integrated research process adopted.

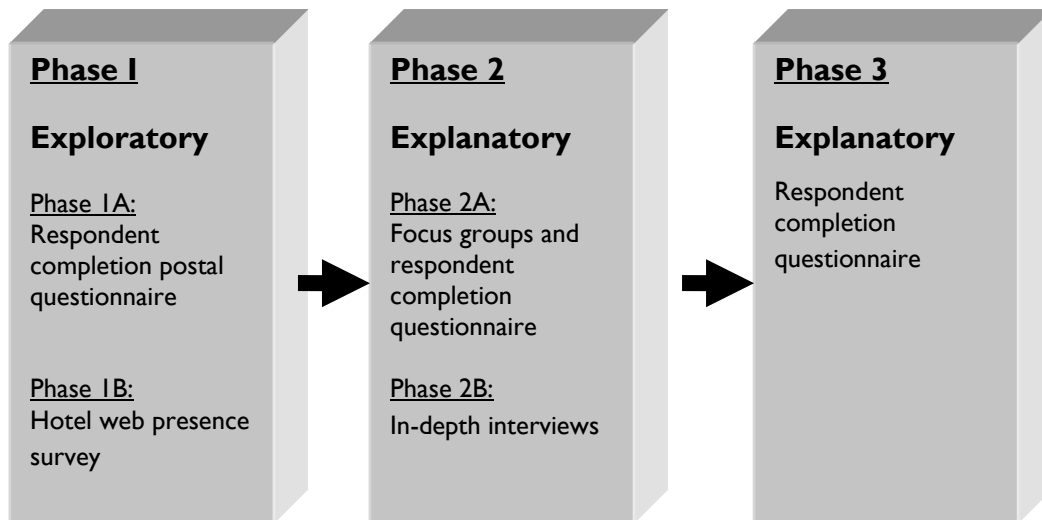


Figure 1 Integrated Research Procedure – Mixed Methods Strategy

Each phase was undertaken in an attempt to address specific research objectives. The samples surveyed, research methods used and research process followed varied between each phase. During each of the three research phases, the researcher gained access to significant numbers of Irish SMTE owner/managers. Each one of the participants was explicitly representative of the wider population of Irish SMTE owner/managers. All respondents/participants/interviewees were directly involved in tourism enterprises/industry. As informants (Bryman, 2004) they were able to recognise and assess the relative importance of ICT adoption for tourism enterprises. A summary of the research methods utilised during each phase of the research is presented in Table 1 alongside the research objectives.

Table I Summary of Research Objectives and Research Methods Utilised

Research Objective	Research Method
[1] To examine the level of awareness and application of ICT amongst rural and peripheral Irish SMTEs	<p>Phase 1A Postal Questionnaire sent to all SMTEs in Co. Donegal (n=891) No. of responses = 166</p> <p>Phase 1B Hotel Web presence survey (n=63)</p>
[2] To uncover and assess the significance of the benefits, barriers and implications of ICT usage amongst Irish SMTEs	<p>Phase 2A 16 Focus Groups with SMTEs (n=139) in six counties in West and North West of Ireland</p> <p>Phase 2B In-depth interviews with trade associations and regional tourism authority executives (n=7)</p> <p>Best Practice SMTE Case Studies (n=8)</p>
[3] To investigate the ICT training needs of Irish SMTEs	
[4] To develop and test an e-business measurement tool designed to determine levels of ICT adoption amongst Irish micro and SMTEs	<p>Phase 3 Questionnaire Survey with 115 SMTE owner/managers from Republic of Ireland</p>

Research Findings

The research undertaken consisted of three distinct but inter-related research phases. A brief overview is provided below.

Phase 1

The literature reviewed showed that there are low levels of ICT usage amongst SMTEs (e.g. OECD, 2004). A review of the tourism industry in Ireland showed that a large number of SMTEs in Ireland operate in rural and peripheral areas that lack an intensive industry base (Fáilte Ireland, 2007b). Furthermore, researchers have found that operating in a peripheral location can be a barrier to ICT adoption for SMTEs (Anckar and Walden, 2001; Braun, 2004). As discussed earlier, the dearth of information regarding ICT usage in Ireland is evident. Taking all of the aforementioned factors into consideration, it was deemed necessary to examine the level of awareness and application of ICT amongst rural and peripheral Irish SMTEs.

SMTEs in Co. Donegal were chosen as the research population for the initial phase of this study as Co. Donegal is a prime example of a peripheral, predominately rural region with a tourism industry dominated by SMTEs. In total, 17 tourism sub-sectors were included in the first phase of the research. A variety of SMTEs were included as tourism is a highly complex and compounded service brought about through the 'assembly' of different services that are being delivered by a network of companies (Go and Appelman, 2001).

All tourism enterprises (n=891) in Co. Donegal were surveyed. In total, 66.2% (n=110) of responses were received within the initial response period. Additional responses accounting for 33.8% (n=56) were received after the response date as a result of reminder letters and phone calls. As recommended by Goode and Stevens (2000) and Daniel and Wilson (2002) the non-response bias in the survey method was checked. Statistical analysis (use of independent t-tests) showed differences between the first and second respondents. The results from the second respondents provide an indication of likely results from non-respondents as a whole.

The analysis suggests that non-respondents had lower levels of connection to the Internet and were less likely to have a computer for business use than the respondents. While responses (n=166) provided good quality data the response rate from some sectors was poor. There was a high level of Internet and e-mail usage amongst the majority of the SMTEs surveyed. The level of use of ICT applications other than Internet and e-mail was low amongst rural/peripheral SMTEs.

The majority of respondents never use applicable ICT applications, for example, database management was not used by 63% of SMTEs, document management (60%), statistical analysis (71%) and accounting software (62%). Only 43% of hotels surveyed updated their websites on a daily or weekly basis, indicating that the majority of the hotels were not using ICT to respond to market changes. They were not exploiting the potential of the Internet in relation to on-line promotion of special offer room rates/availability.

The Phase 1 survey also provided a profile of the SMTE owner/managers. The job titles (for example teacher, accountant, lecturer, postal worker, secretary and farmer) given by the respondents indicates that in some cases those involved in tourism view their position as being part-time in nature.

The web presence of all hotels (n=63) in Co. Donegal was also assessed. A small minority were exploiting the potential of technology in relation to on-line booking capabilities. Only 20% had a booking form and just 8% had real-time direct consumer to hotel on-line booking. Just under one third (29%) facilitated on-line booking through third party booking channels, compared to 50% of European Hotels (e-business watch, 2005). Nearly all (92%) of the hotel websites were only available in English. Lituchy and Rail (2000) found that 44% of web users speak a language other than English. The study also found that only 43% of hotels had any form of hyperlinks. The survey showed that the majority of hotels only used the Internet as a digital brochure and had very limited information on their websites/pages. The findings indicate that the hotels had not exploited the Internet to its full potential and for most; e-commerce applications still represented a further stage of ICT adoption.

Considering the low level of engagement from some tourism sub-sectors and the overall low levels of usage of ICT applications, further research was deemed necessary to explore the benefits, barriers and implications of adopting ICT for Irish SMTEs. The complexities of the level of engagement of SMTEs with ICT pointed towards the need for the employment of research methods that would allow direct access to the research subjects in order to ask and follow up on specific questions of SMTE owner/operators. This was undertaken during Phase 2 of the research project, through the use of focus groups and in-depth interviews.

Phase 2

Good quality primary data was generated from Phase 1, which in turn improved our understanding of this area considerably. However, caution must be noted in relation to generalising from the findings. Although the study was in depth, it was limited to Co. Donegal. This issue was successfully addressed in Phase 2 when SMTEs from six counties, in the West and North West of Ireland were represented.

Uncovering the factors driving ICT adoption and diffusion is important and relevant for the development of tourism policy. In contrast with a well-established theoretical literature on new technology adoption and diffusion, Haller and Traistaru-Siedschlag (2007, p.3) found that “*firm level empirical evidence on ICT adoption and diffusion is very limited.*” Secondary research showed that this is especially the case with regard to Irish SMTEs.

The first stage of Phase 2 consisted of focus groups with four core tourism sub-sectors (Bed & Breakfast providers, Self-catering operators, Activities & Attractions and Small Hotels). Towards the end of each of the focus groups, a one-page respondent completion questionnaire (five point Likert scale) was distributed to participants. The second stage (Phase 2B) involved seven in-depth interviews with representatives from the regional tourism authorities and tourism trade associations. The findings from Phase 2 relating to the factors influencing ICT adoption and their level of significance are presented in Table 2. Statistical analysis provided evidence of some differences between the SMTE sub-sectors regarding the ranking of certain barriers to ICT adoption. In general, the smaller enterprises (B&Bs, SC sector and Activities and Attractions) regard the barriers as being of higher significance when compared to medium-sized tourism sub-sectors (hotels).

The findings from Phase 1 and 2 added to the understanding of the levels of ICT adoption and uncovered variables that determine levels of adoption. The research highlighted difficulties surrounding the measurement of ICT adoption and a lack of an applicable measurement tool. An accurate measure is needed which would give a clear picture of the level of ICT adoption amongst SMTEs. Such a measurement instrument could be used to benchmark ICT adoption amongst SMTEs and identify adoption levels/changes over time. This issue was successfully addressed during the third and final phase of the research.

Phase 3

The E-Business Scorecard Questionnaire (EBSQ) was developed and tested on 115 SMTEs from all over the republic of Ireland.

The EBSQ gathered data on the level of ICT adoption from both an external and internal perspective categorised into four indices (A) ICT infrastructure and basic connectivity, (B) Internal e-integration, (C) E-procurement and supply side integration, and (D) E-marketing and sales. The findings from the EBSQ were aggregated and illustrated the levels of e-business intensity on a continuum from 0 – 16. The final score was expressed as an E-business Index (EBI).

Discussion of Research Findings

The technology acceptance model (TAM) has been used to explain and predict consumers' individual willingness to adopt new technologies. A number of models of the TAM process have been proposed (e.g. Davis, 1989; Venkatesh et al., 2003). The central premise underlying TAM is that an individual's intention to purchase a technology product or service is determined by two factors (i) perceived usefulness and (ii) ease of use (Wang and Qualls, 2007). Table 2 places the TAM factors with other issues effecting ICT adoption alongside the barriers to ICT adoption, which have emerged from this research. In addition, the levels of significance of the barriers for Irish SMTEs are presented. Using the quantitative data generated from the focus group questionnaires; mean scores for the barriers are illustrated.

This research has shown that the barriers: fear of technology, over expectation of technology, lack of training and low level of knowledge of ICT applications all have a high impact on SMTEs. Fear of technology and over expectations of technology are inhibitors that effect micro and small tourism enterprises to a greater degree than medium-sized enterprises. The four barriers referenced here directly relate to the two main factors (i) perceived usefulness and (ii) ease of use that comprise the TAM.

Table 2 Significance of Factors Influencing Technology Adoption in SMTEs

	Factors influencing ICT adoption	Level of significance of factors SMTEs (Mean scores)
Technology Acceptance Model (TAM)		
	Perceived usefulness (Davis, 1989; Venkatesh et al, 2003; Wang and Qualls, 2007)	
	Ease of use (Davis, 1989; Venkatesh et al, 2003; Wang and Qualls, 2007)	
Other issues effecting technology adoption		
	Organisational readiness, External pressure (Iacovou et al, 1995; Mehrtens et al., 2001; Grandon and Pearson, 2004)	
	Internal expertise, support of owner/manager, user participation, efficient and effective use of any external expertise (Carter and Jones-Evans, 2000)	
Further barriers to ICT adoption which emerged from primary research	Peripheral/rural location	Moderate to low for all SMTEs (3.17) with the exception of SC sector (2.50)
	Security concerns	Moderate for all SMTEs (3.53)
	Cost issues	Moderate for SMTEs (3.53), higher for Activities and Attractions (3.77), lower for B&B sector (3.16)
	Lack of capital	Moderate to high for SMTEs (3.55), higher for Activities and Attractions sector (3.91)
	Personal background/situation	High for micro enterprises especially B&B and SC sector
	Issues specific to SMTEs	
	- Seasonality	High for all SMTEs especially hotels
- Lack of ICT applications for micro and small tourism enterprises	High for all SMTEs	
- Design, maintenance and integration of old/new ICT systems	Moderate to high for SMTEs (3.81) especially Activities and Attractions (4.02)	

The findings, both quantitative and qualitative, have shown that factors governing ICT adoption cannot be restricted to the two TAM issues. Evidence from the literature review has shown that there are a number of other factors, which effect technology adoption. These factors include organisational readiness, external pressure, internal expertise, support of owner/manager, user participation, efficient and effective use of any external expertise. The barriers which were uncovered by the research: IT management training, dependency on outside experts and size and scale of enterprise are all directly related to the ‘other’ factors which influence ICT adoption. The level of influence/significance of these barriers varies between the tourism sub-sectors surveyed. The significance of the barriers is shown in Table 2.

In addition to the TAM and other factors governing ICT adoption, this study has added new knowledge in term of the significance of a number of further barriers to ICT adoption. They include peripheral/rural location, security concerns, cost issues, lack of capital, personal background/situation of the owner manager and issues specific to SMTEs. The research has shown that the significance of these further barriers varies from moderate to high for the SMTEs.

This study has also provided new insights regarding the relative importance of benefits and reasons for ICT adoption amongst SMTEs. This research has primarily focused on assessing the ICT adoption levels of Irish SMTEs. A summary of the findings are presented in Figure 2. The figure summarises both the secondary and primary research findings and illustrates the contribution to theory and knowledge.

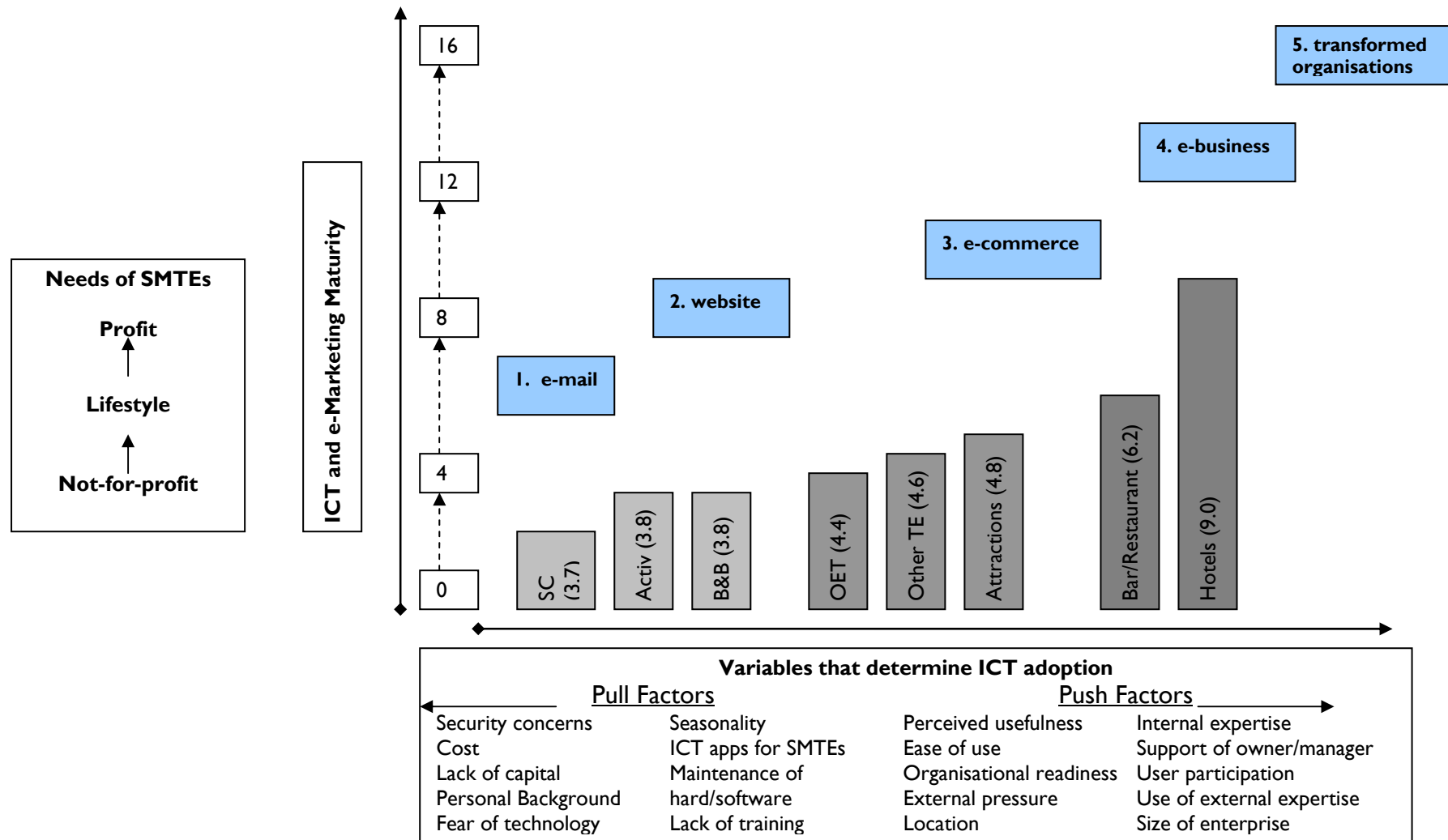


Figure 2 Needs of SMTEs V Variables that determine ICT adoption

Figure 2 was initially developed based on the foundations of the e-adoption ladder. The e-adoption ladder (Martin and Matlay, 2001 adapted from Cisco, 2000) provides a clear illustration for enterprise owners/managers of the benefits of gradual ICT deployment. Many SMTEs may have very low-level ICT requirements and as stated earlier follow ‘a non-linear/discontinuous path’ in relation to technology usage (Ramsey et al., 2003).

The results of this study provide several theoretical contributions to ICT adoption research with the context of tourism SMEs. First, analysis of the empirical data (both quantitative and qualitative) generated during each of the research phases shows that the needs of SMTEs (in terms of ICT adoption) can be clustered against the variables that determine use of technology (Figure 2). The figure illustrates (on the ‘y’ axis) the needs of the SMTE, which are graduated from not-for-profit enterprises (e.g. community based heritage centre) to lifestyle (rural B&B/tourism activity enterprise) to profit making SMTEs along side the e-marketing maturity of the SMTEs. This has been measured using the e-business index (Phase 3). The ‘x’ axis shows the drivers (push factors) and inhibitors (pull factors) of ICT adoption amongst SMTEs. The figure demonstrates that the enterprises, which have the highest levels of ICT utilisation (hotels and bar/restaurants), are further along the axis than those enterprises with lower ICT utilisation (self-catering, attractions and the B&Bs sector).

Secondly, the study identified through secondary and primary research, the main pull factors (inhibitors) as security concerns, seasonality, cost, lack of ICT applications for SMTEs, lack of capital, maintenance of hardware and software, personal background of SMTE owner/manager, lack of training and fear of technology. The main push factors (drivers) identified are perceived usefulness and ease of use of ICT, availability of internal expertise, support of owner/manager, organisational readiness, user participation, external pressure, positive use of external expertise. Contrary to previous studies (Werthner and Klein, 1999; Anckar and Walden, 2001; Braun, 2004; Lassnig and Markus 2007; Selhofer, 2007) the empirical findings enable the placing of peripheral/rural location and size and scale of enterprise as drivers rather than inhibitors to ICT adoption.

Based on the research findings, it has been possible to assess where various tourism sub-sectors could be ranked in terms of ICT and e-marketing maturity as shown in Figure 2. While it is recognised that there will be variations within sub-sectors, in terms of SMTEs, hotels and the bar/restaurant sector exhibit relatively higher levels of ICT usage, smaller enterprises (self-catering, attractions and the B&B sector) can be considered to be at the early stages in terms of their ICT adoption levels. Outside of the SMTE sector, larger tourism enterprises such as transport carriers and international hotel chains would be examples of tourism enterprises with high levels of ICT adoption. In most cases (especially in the case of airlines) their operating models would have been radically transformed by ICT and would be considered to be e-Business enabled.

This study has uncovered perceived factors, which influence SMTE decisions to support or reject ICT applications. Such an understanding can lead to more informed and successful policy making regarding ICT utilisation by SMTEs. The findings suggest that enterprises, which successfully overcome the majority of barriers to ICT adoption, tend to have higher e-business index scores and are at a more advanced stage of ICT adoption. The research presented showed that micro and small tourism enterprises tend to utilise ICT applications less than larger tourism enterprises for two main reasons. Firstly, the cost of using the technology may not be affordable and the level of utility of ICT applications may be minimal. Secondly, for micro and smaller tourism enterprises the inhibitors of ICT adoption tend to have a more profound effect on their enterprise due to the enterprise size, scale and lack of knowledge of the owner/manager.

Conclusion

The variables that determine ICT adoption, presented in this paper, have been developed from a critical review of relevant literature and from the primary research. This research has made a contribution to theory insofar as the primary research findings uncovered the significance (using qualitative and quantitative data) of the factors that influence ICT adoption for SMTEs. In addition, a further series of factors, which effect technology adoption for micro and SMTEs, emerged from the primary research.

The findings from this research together with those from the literature review confirm that ICT adoption by SMTEs is not a straightforward linear process. In reality, a number of factors influence the final decision to adopt or not to adopt ICT applications. It is also important to emphasise that the level of ICT adoption by SMTE varies within and between tourism sub-sectors. Ultimately, the cost of ICT applications needs to be balanced against the projected utility of such applications and a decision regarding ICT usage must then be made by the individual SMTE owner/manager.

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