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A Review of Key Factors Affecting the Adoption of Self-Service Technologies in Tourism.

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A REVIEW OF KEY FACTORS AFFECTING CONSUMER'S ADOPTION AND USAGE OF SELF-SERVICE TECHNOLOGIES IN TOURISM

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1.0 INTRODUCTION

Self-service technologies (SSTs) are attracting research attention in services marketing and management (Curran and Meuter, 2005; Bitner, Ostrom and Meuter, 2002) because when they are implemented successfully they have proven to offer efficient and effective service standards without any traditional employee involvement. Some SST examples include the ATM, e-commerce websites such as Amazon.com and the online booking engines on airline websites. The aim of this paper is to present the factors affecting consumer adoption and usage of SSTs. A literature review of seven adoption factors and two adoption models identifies some key gaps which may be used as directions for further research into SST adoption.

2.0 LITERATURE REVIEW

2.1 Definition

The term 'self-service technologies' was first used by Meuter, Ostrom, Roundtree and Bitner (2000, p.50) who defined them as 'technological interfaces that enable customers to produce a service independent of direct service employee involvement'. This term and definition gained wide acceptance in subsequent research by other authors (Makarem, Mudambi and Podoshen, 2009; Dean, 2008; Forbes, 2008; Shamdasani, Mukherjee and Malhotra, 2008; Beatson, Lee and Coote, 2007; Curran and Meuter, 2005).

2.2 Classifications of SSTs

The growing research into SSTs brought the need for the development of a classification system. Meuter *et al*. (2000) devised a classification of SSTs in order to facilitate their research based on a review of the existing examples in the academic literature. Their classification divides SSTs along two dimensions: interface (telephone/interactive voice response; online/internet; interactive kiosks; video/CD) and purpose (customer service, transactions, self-help). The need for a classification of SSTs by interface and purpose was confirmed when Curran and Meuter (2005) and Walker and Johnson (2006) tested adoption factor models across different SSTs and reported that the influence of the tested adoption factors varied by SST type. An alternative

classification is provided by Forbes (2008) who divided SSTs in two groups – Internet and non-Internet SSTs, suggesting that the two types have numerous differences which need to be understood by marketers.

Cunningham, Young and Gerlach (2008) offer a different perspective by researching how consumers view SSTs. Cunningham *et al*. (2008) tested 11 classifying dimensions including: 1)physical product component; 2)customer-employee contact; 3)production of service is separable/inseparable from consumption; 4)risk level; 5)switching barriers; 6)service is performed on person/object; 7)relationship between service provider and customer (formal/informal); 8)process of service delivery is continuous/discrete transactions; 9)customization of service; 10)the contact employee's judgment on choice of service provided; 11)convenience of receiving the service. The following SSTs were classified from consumer's point of view: 'online banking, distance education, airline reservations, tax software, retail self-scanning, online auctions, pay at the pump, ATMs, online brokerage, interactive phone, Internet search and online car buying (Cunningham *et al*., 2008, p.723). Two main dimensions along which consumers classed SSTs were *customized-standardized* and *separable-inseparable*. Table 2.1 below reveals how consumers classified the suggested SSTs.

Table 2.1 Customer-based SSTs Classification

	Customized	Standardized
Separable from product/service	• Airline reservations • Online car buying • Online auctions	
Moderately separable	• Distance education • Online banking	• Pay at the pump • Retail self-scanning • Internet search • Tax software • ATMs
Inseparable from product/service	• Online brokerage	• Interactive phone

Source: Cunningham, L., Young, C. and Gerlach, J.(2008) Consumer Views of Self-Service Technologies, *The Service Industries Journal*, 28(6), pp.719-32.

2.3 Advantages and Disadvantages of SSTs

Some of the main advantages of SSTs as identified by consumers relate to a 'better than the alternative' theme including: ease of use; avoid service personnel; saved time; saved money; time and place convenience (Meuter *et al*., 2000, p.56). Dabholkar, Bobbitt and Lee (2003) propose that customers also enjoy the SST interaction. Further more, SSTs can improve service quality perceptions, offer flexibility and customize services to individual consumer needs (Bitner, Brown and Meuter, 2000). On the negative side, consumers reject SSTs because of 'technology failure', 'process failure', 'poor design' and 'customer-driven failure' (Meuter *et al*., 2000, p.56). Even people who have favorable attitudes towards technology may avoid SSTs because they can not replace the personal interaction (Dabholkar *et al*., 2003; Lee and Allaway, 2002) or they require a radical change in their consumer behaviour (Curran and Meuter, 2007). SSTs also require higher levels of consumer participation and responsibility, so they are perceived as riskier than personal services (Lee and Allaway, 2002).

The main benefits to service providers from successfully implementing SSTs are: operational cost reduction; increasing customer satisfaction and loyalty; and reaching of new markets (Bitner, Ostrom and Meuter, 2002). SSTs allow staff to be relieved from routine duties and concentrate on aspects of the service delivery where personal touch is more valuable (Lee and Allaway, 2002). The limitations of SSTs from a service provider perspective are related to investment expenses, and staff and consumer training (Bitner *et al*., 2002; Lee and Allaway, 2002). If the service technology does not gain adoption with consumers, the company may face increased expenses because it needs to keep the operational staff, as well as pay for the new technology (Lee and Allaway, 2002). SSTs also reduce the points of customer contact during the service delivery process which leaves fewer chances for early detection of complaints and opportunities for service recovery (Laws, 2004).

2.4 SST Adoption Factors

The successful implementation of SSTs is dependent on wide consumer adoption in order to justify the investment cost (Lee and Allaway, 2002). The need to understand consumer decisions regarding SSTs have attracted research attention into the factors which would facilitate consumer

adoption (Curran and Meuter, 2005). A review of the SST literature from the past 10 years identified 60 publications relating to research into SST adoption factors. This review produced 29 different SST adoption factors and this paper suggests that there is no evidence of a widely agreed SST model of adoption. For the purposes of this paper, the authors examine seven key factors, namely perceived risk, trust, perceived ease of use, perceived usefulness, technology readiness, preference for personal contact and demographic variables. Those factors were chosen because of their frequent inclusion in SST adoption research projects.

2.4.1 Perceived Risk

The risk variable is examined mainly in the e-commerce literature in connection with the buying process (Cunningham, Gerlach, Harper and Young, 2005; Cunningham, Gerlach and Harper, 2004; Forsythe and Shi, 2003; Cases, 2002). Risks in Internet shopping were researched in varying shopping contexts: shopping for clothes (Cases, 2002), airplane tickets (Kim, Qu and Kim, 2009; Cunningham *et al*., 2004) and Internet shopping in general (Forsythe and Shi 2003; Liebermann and Stashevsky, 2002).

Kim *et al*. (2009) studied the perceived risk and risk reduction in purchasing air-tickets online. They included risk dimension variables derived from the literature to date including performance risk, security risk, financial risk, physical risk, psychological risk, time risk and found that security risk was of primary importance. This finding is similar to previous research which found that payment and privacy security appeared as a major risk factors in Internet shopping settings (Forsythe and Shi, 2003; Cases, 2002; Liebermann and Stashevsky, 2002).

Risk in travel and tourism is further intensified by the specific characteristics of the tourism product (Kim *et al*., 2009). Kim *et al*. (2009) summarize four characteristics of the tourism products which contribute to its relatively higher perceived riskiness in comparison to other products: 1) intangibility, 2) the product is purchased before experience, 3) variations in performance due to dependence on situational variables like weather, performance of the different components of the package and other tourists, 4) perishability as the product quality is largely dependent on fluctuations in demand.

Recent studies on risk report as a common weakness the usage of non-generalisable student samples and single measures (Kim *et al*., 2009; Cunningham *et al*., 2005). Cases (2002) studied risk within a very specific research context, i.e. clothes shopping online, which she recognized as a shortcoming of the research.

2.4.2 Trust

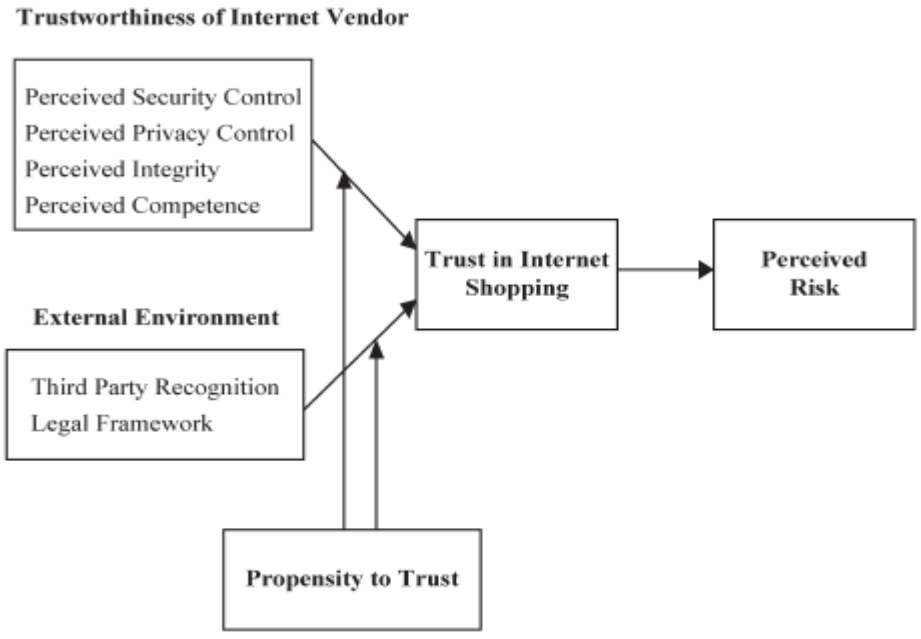
Bitner *et al*. (2000) recognize that the infusion of technologies in service encounters may not be welcomed by consumers, regardless of the obvious benefits. They propose two main concerns to the adoption of SSTs by customers: the preferences of some customers for interpersonal encounters during service, and the issue of privacy and confidentiality. Meuter *et al*. (2000) also suggest that developing trust in non-employee atmosphere could be an avenue for further research in the area of SSTs. The importance of gaining consumers' trust is further emphasized by findings from research that trust is a direct antecedent of behavioural intentions in electronic environments (Yousafzai, Pallister and Foxhall, 2009; McKnight, Choudhury and Kacmar, 2002).

The trust construct is regarded in the literature as hard to measure as a one dimensional phenomenon (McKnight *et al*. 2002). McKnight *et al*. (2002) review the extant literature on trust and construct a conceptual model, which was empirically tested on 1403 undergraduate and graduate students at three large US universities. Their model examined how *disposition to trust* and *institution-based trust* affect *trusting beliefs* and *trusting intentions*. The measures for the different dimensions of trust are derived from an extant review of the most common measures of trusting beliefs employed in research. The three measures which emerged as important include competence, benevolence and integrity. The research included testing of initial trust in a specially constructed advice service experiment website. The findings from statistical analysis identified a relationship between disposition to trust and trusting beliefs and trusting beliefs and trusting intentions (McKnight *et al*., 2002). None of the paths from institution based trust to the other variables were supported. This finding was not expected and it was interpreted as a shortcoming of the definition of institution based trust as a general belief in the Internet rather than a specific website context (McKnight *et al*., 2002). Institution based trust therefore needs further research attention (McKnight *et al*., 2002). The authors suggest that the model could be

tested in the e-vendor context and examined for changes beyond the initial trust and moving into on-going commercial relationships.

Factors influencing trust in Internet shopping in Ireland were tested by Connolly and Bannister (2008). They employed, as a measurement instrument, the conceptual model developed by Cheung and Lee (2000), which is shown in Figure 2.1 below. Their empirical testing of the model argues that external environment factors have a very weak influence on consumer trust and that the moderating effect of propensity to trust is non-existent. In an Irish context, the trustworthiness of the Internet vendor, combined with previous experience (which is part of the propensity to trust variable) were the two direct antecedents of trust while higher technical awareness led to the perception of higher trustworthiness of the Internet vendor. Connolly and Bannister (2008) concluded that the difference in findings of the two studies indicates that the Cheung and Lee model is not culture independent, and they call for further research into global factors influencing consumer trust in Internet shopping.

Figure 2.1. Trust in Internet Shopping, Cheung and Lee (2000) Model



Source: Cheung, C. and Lee, M.(2000) Trust in Internet Shopping: A Proposed Model and Measurement Instrument, *Proceedings of the 6th Americas Conference on IS*, Long Beach, CA.

The latest trend in consumer trust research is a shifting towards exploring trust in virtual communities and social networks, as the new environment for e-commerce (Rayport, 2009; Wu and Tsang, 2008). Wu and Tsang (2008) adapted the McKnight *et al*. (2002) trust building model to measure trust in virtual communities. The outcomes of their research support the hypothesis that trust in websites, has a behavioural influence on the intention of members to visit them.

2.4.3 Perceived Ease of Use and Perceived Usefulness

Davis, Bagozzi and Warshaw (1989), introduced the two variables of perceived usefulness and perceived ease of use in a conceptual model called Technology Acceptance Model (TAM). Davis (1989) justified the choice of perceived ease of use and perceived usefulness as key determinants of behavior, based on a literature review of multiple disciplines dealing with behavior and innovation adoption. Perceived ease of use is introduced in the information systems literature by Davis (1989, p.320) and defined as 'the degree to which a person believes that using a particular system would be free of effort'. He further defined perceived usefulness as 'the degree to which a person believes that using a particular system would enhance his or her job performance' (p.320). TAM and its application in SST adoption literature will be discussed in Section 2.5.1.

2.4.4 Technology Readiness

Technology readiness (TR) is defined by Parasuraman (2000, p.308) as 'people's propensity to embrace and use new technologies for accomplishing goals in home life and at work'. Parasuraman (2000) based the components of TR on the notion that people harbor positive and negative feelings towards technology, as identified by Mick and Fournier (1998). Mick and Fournier (1998) listed eight technology paradoxes with which consumers have to cope: control/chaos, freedom/enslavement, new/obsolete, competence/incompetence, efficiency/inefficiency, fulfills/creates needs, assimilation/isolation and engaging/disengaging. Parasuraman (2000) identified four groups of beliefs which impact on the technological readiness of individuals. He contends that *optimism* and *innovativeness* are contributors to TR whilst *discomfort* and *insecurity* are inhibitors to TR.

Parasuraman (2000) points to the need to investigate the antecedents and consequences of TR in a model where TR is the core construct. This research avenue was followed by Lin and Hsieh (2005) who empirically tested how TR influenced satisfaction and behavioural intentions. Their research found that TR had an influence on how consumers perceived the quality of SST interactions and determined their intentions to use them. Further more another study by Zhu, Nakata, Sivakumar and Grewal (2007) empirically tested the influence of TR on the effectiveness of technology interfaces and found that the level of TR influenced the cognitive processing of interface design features. Therefore TR is a critical factor as it is directly related to perceptions of service quality (Zeithaml, Parasuraman and Malhorta, 2002).

Chiu, Fang and Tseng (2010) and Liljander, Gillberg, Gummerus and Riel (2006) challenge the importance of TR in explaining SST adoption behavior. TR of adopters and non-adopters of self-service check-in did not differ significantly while other factors such as efficiency of service, control, perceived benefits, preference for personal contact and convenience emerged as stronger predictors (Liljander *et al*., 2006). The differences in findings were attributed to the TR measurements which may need to be adapted for the specific research contexts (Chiu *et al*., 2010; Liljander *et al*., 2006).

2.4.5 Preference for Personal Contact

A common construct included in researched models for SST adoption is the preference for personal contact (Lee *et al*., 2010; Walker and Johnson, 2006; Curran and Meuter, 2005; Meuter *et al*., 2005; Dabholkar *et al*., 2003). This construct is researched in more detail by Simon and Usunier (2007). Their research concluded that a cognitive style (rational/experiential) had the strongest influence on the preference for the personal contact construct. This fact confirms the view of Dabholkar and Bagozzi (2002) that personal traits are the basis of forming consumer attitudes and behavioural intentions. Lee *et al*. (2010) confirmed the effect of consumer personality traits, such as the need for interaction, on the intention to use SSTs but their results also proved that age is an antecedent to the preference for the personal contact construct. Preference for personal contact grew stronger with age (Lee *et al*., 2010; Simon and Usunier, 2007). Walker and Johnson (2006) reported that 35% of the respondents to their survey preferred personal contact and 65% preferred it in some occasions, including when they had a specific

issue which needed prompt resolution, or when they wanted to make a complaint. Consumers develop negative attitudes towards a service provider if they are left with only an SST option and they expect to have personal backup if something goes wrong (Reinders, Dabholkar and Frambach, 2008).

2.4.6 Demographic Variables

Some of the most common demographic variables researched in relation to SSTs include age, gender, education and income, since they offer good grounds for traditional marketing segmentation (Lee *et al*., 2010; Nilsson, 2007; Chang and Samuel, 2004; Wu, 2003). Demographics have been examined as direct antecedents of usage (Nilsson 2007; Chang and Samuel, 2004), as influencing beliefs and attitudes (Elliott and Hall, 2005; Wu, 2003) or personality traits (Lee *et al*., 2010). Dabholkar and Bagozzi (2002) expressed a view that demographic factors are not of interest in understanding consumer behaviour towards SSTs but research has produced varying results which will be discussed below.

A comparative research of Estonian and Swedish customers' use of online banking undertaken by Nilsson (2007) found that demographic profiles of consumers in Western markets were wider than in developing Eastern markets. The typical user of online banking in Estonia emerged as a young, well-educated male with a high income, while in Sweden no sizable differences is usage were identified across age, gender, education and income groups. In another study, Taiwanese men in the age group 36-40 showed better attitude towards online shopping (Wu, 2003).

Some authors have concluded that age starts to matter less with experience and wider dissemination of technology in one's everyday social and business life (Nilsson, 2007; Dabholkar *et al*., 2003; Dabholkar and Bagozzi, 2002) while other studies confirm differences associated with age (Lee *et al*., 2010; Dean, 2008; Simon and Usunier, 2007; Chang and Samuel, 2004).

Dabholkar *et al*. (2003) found that shopper age had little influence on adoption of self-scanning in grocery shops. In contrast, a study specifically of the age variable by Dean (2008), found that there are differences in the adoption of SSTs between the different age groups. Dean divided his sample into three age groups: 18-28; 29-48 and 49+. The study concluded that increasing age has

a negative effect on three variables: preferences for SST to human contact; confidence to use SSTs; and belief in the benefit from using technology.

The interaction between demographics (e.g. age, gender, education and income) and personality traits (e.g. technology anxiety, need for interaction and technology innovativeness) and their effect on intentions to use SSTs was researched by Lee *et al*. (2010). Their findings show that consumer demographics influenced SST usage intentions through the mediating effect of personality traits (Lee *et al*., 2010). For example, men exhibited a greater level of technology innovativeness and less technology anxiety; older people needed more personal contact, showed more technology anxiety and less technology innovativeness; while consumers with higher income were less anxious about technology. The education construct is the only one which did not affect any of the tested personality traits (Lee *et al*., 2010).

The varying results of the SST research into demographics may be explained to some extent by the cross-cultural differences (Nilsson, 2007) or the changing influence of different demographic features over time based on changes in society (Chang and Samuel, 2004).

2.5 Adoption models

SST adoption has been researched by organizing various factors in testable conceptual models (Baron, Patterson and Harris, 2006). In this paper, two models will be presented, i.e. the Technology Acceptance Model (TAM) and the Bitner *et al*. (2002) SST Adoption Model.

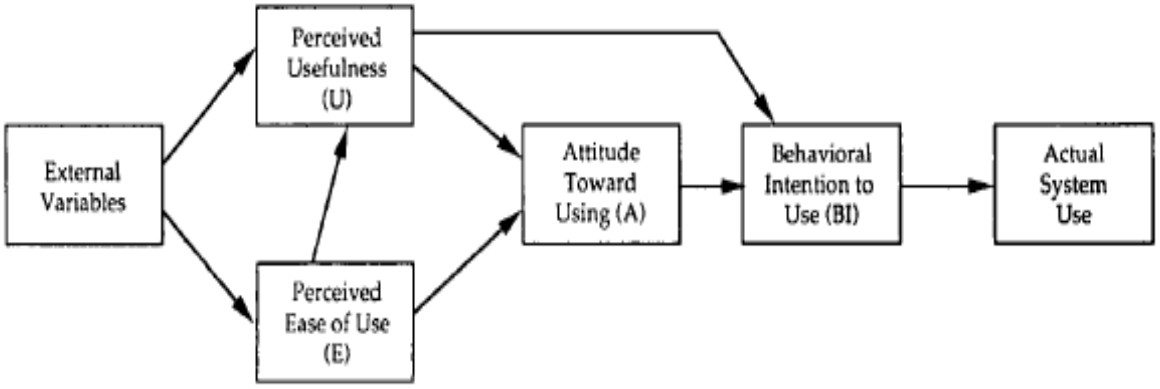
2.5.1 Technology Acceptance Model

One of the most influential adoption models in the SST literature is the Technology Acceptance Model (TAM) by Davis, Bagozzi and Warshaw (1989), which is illustrated in Figure 2.2 below. The model was originally developed to predict technology systems usage in the workplace. TAM was developed on the basis of the much studied Theory of Reasoned Action by Fishbein and Ajzen (Davis *et al*., 1989). TAM proposes that the beliefs of perceived usefulness and perceived ease of use are fundamental in forming an attitude towards an information system, which in turn forms a behavioral intention, followed by actual system use (Davis *et al*., 1989). Other factors such as demographics, personal traits and technology attributes were suggested to be included in

a group of external variables which affect attitudes only through the mediating TAM variables of perceived usefulness and perceived ease of use (Davis *et al*., 1989).

TAM has been researched in different technology contexts and its extensive testing to date has proven that it is a scientifically robust model (Gefen, Karahanna and Straub, 2003). The adaptability of TAM to different contexts was a justification to adapt it for SST research (Lu and Su, 2009; Shen and Eder, 2009; Gefen *et al*., 2003). Findings show that the position of TAM which states that system usage is predicted by perceived ease of use and perceived usefulness, could not explain fully SST adoption (Curran and Meuter, 2005; Gefen *et al*., 2003).

Figure 2.2 Technology Acceptance Model



Source: Davis, F., Bagozzi, R. and Warshaw, P.(1989) User Acceptance of Computer Technology: A Comparison of Two Theoretical Models, *Management Science*, 35(8), pp.982-1003.

Gefen *et al*. (2003) found empirical evidence that, in an online shopping context, trust was significantly related to usage independent of the TAM variables. Similarly, Curran and Meuter (2005) found that the adoption of online banking was more influenced by consumers' perceptions of risk, than by their perceptions of its usefulness or ease of use. These findings can be explained in part by the statement that SST adoption involves two elements, adoption of the service technology as well as adoption of the self-service concept (Bobbitt and Dabholkar, 2001).

Baron *et al*. (2006) offer a qualitative approach to analyzing TAM and the issue of explaining and predicting technology adoption. The authors recognize the predominantly quantitative and

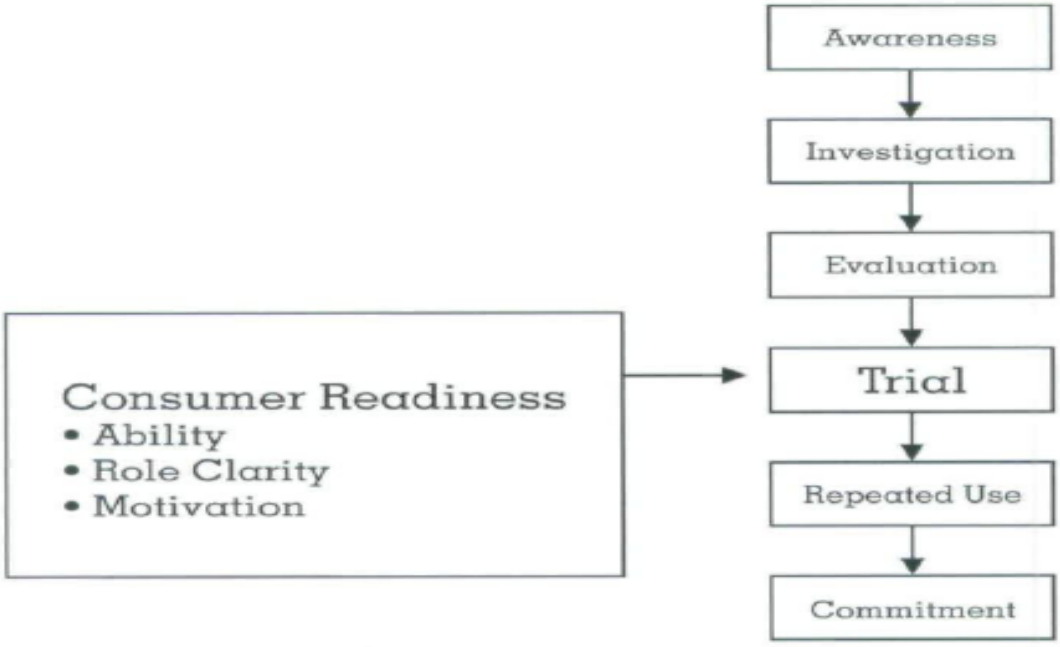
rational approaches into researching technology adoption in consumer markets. They conclude that quantitative model verifications based on TAM have been exhausted but there is still room for more research into adoption as TAM fails to explain situations where SSTs are deeply influenced by social context and consumer co-creation of value. Baron *et al*. (2006) chose to employ consumer diary writing as a research instrument in the context of mobile text messaging. The study revealed that technology paradoxes and coping strategies (from Mick and Fournier, 1998), as well as consumer co-creating of value and embracement of text messaging services provided new nuances to consumer technology-based service adoption.

2.5.2 Bitner, Brown and Meuter (2002) SST Adoption Model

SST adoption is recognized as a consumer decision process by Bitner *et al*. (2002) who proposed a conceptual model including six stages namely, awareness, investigation, evaluation, trial, repeated use and commitment. Please, refer to their model in Figure 2.3. The model was tested by conducting 22 in-depth interviews with customers of a healthcare company which was in the process of trying to implement a voice response ordering system for prescription refills (Bitner *et al*., 2002). The results showed that firstly, the customers needed to be aware that the SST existed, and then they collected additional information on the basis of which they made an evaluation. If the evaluation was positive, the customer was likely to try the SST. The outcome of the trial would then determine if the usage was repeated (Bitner *et al*., 2002).

Meuter *et al*. (2005) determined that the trial stage of the Bitner *et al*. (2002) adoption model deserved most attention as it is crucial for adoption. The model tested by Meuter *et al*. (2005) is shown in Figure 2.4. A set of factors predicting trial was derived from previous adoption literature. Those antecedents included - innovation characteristics (compatibility, relative advantage, complexity, observability, triability and perceived risk), individual differences (inertia, technology anxiety, need for interaction, previous experience, age, gender, education and income). The set of predictors was hypothesized to be mediated by the consumer readiness construct which is conceptualized as role clarity, motivation and ability (Meuter *et al*., 2005).

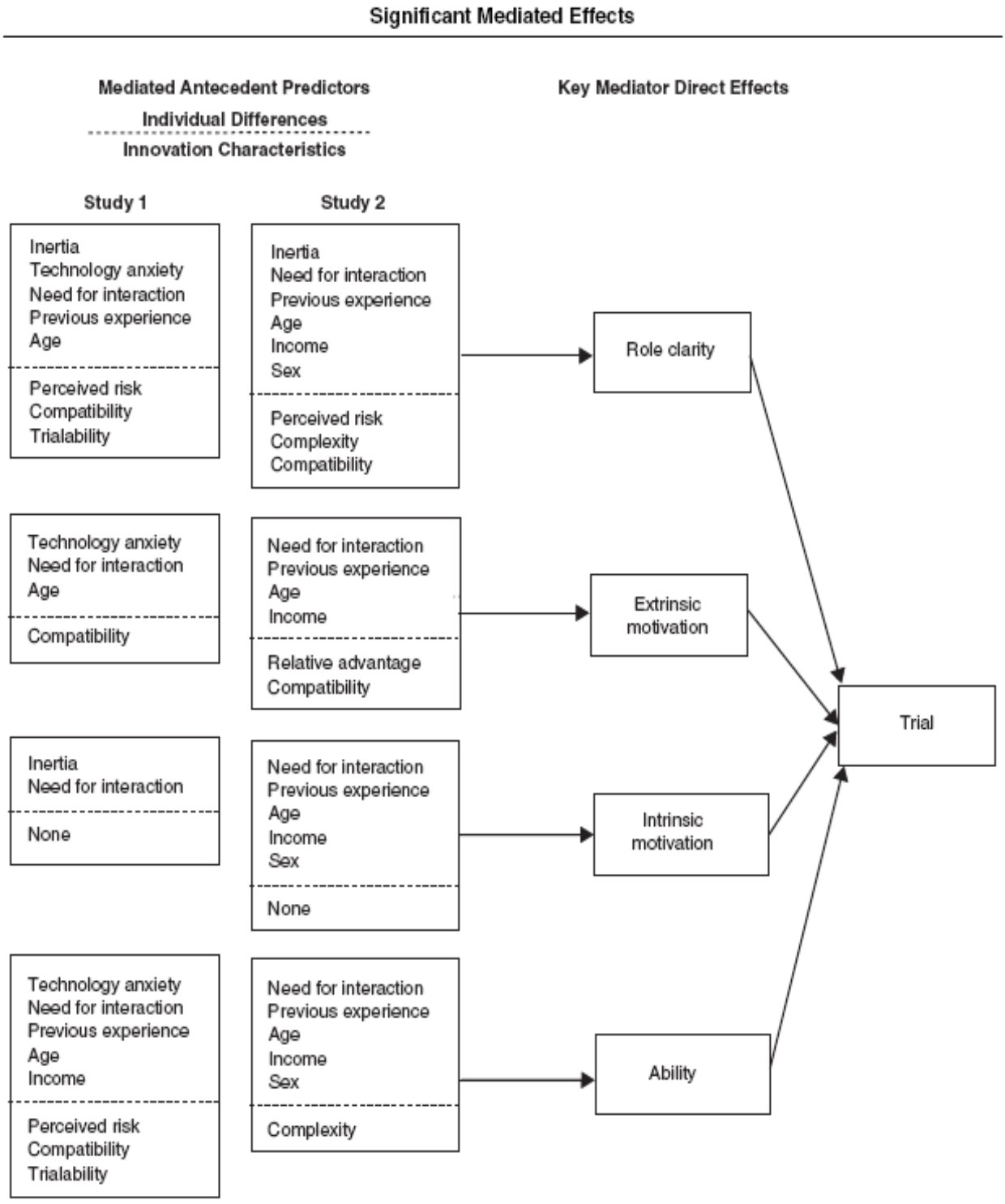
Figure 2.3. Model of SST Adoption



Source: Bitner, M., Brown, S. and Meuter, M.(2000) Technology Infusion in Service Encounters, *Journal of the Academy of Marketing Science*, 28(1), pp.138-49.

The research confirmed that the dimensions of the readiness construct mediated the set of individual differences and innovation characteristics tested. *Role clarity* and *extrinsic motivation* emerged as the consumer readiness factors which mediated the largest amount of antecedent predictors. The authors suggest further research regarding the exploration of the other steps of the adoption process from awareness to commitment, as well as in-depth research of the most influential mediator of role clarity.

Figure 2.4 Model for Adoption of SSTs



Source: Meuter, M., Bitner, M., Ostrom, A., and Brown, S.(2005) Choosing Among Alternative Service Delivery Modes: An Investigation of Customer Trial of Self-Service Technologies, *Journal of Marketing*, 69(April), pp.61-83.

3.0 CONCLUSION

This paper provided an overview of the relatively new area of SSTs, concentrating on consumer adoption. This area of research has been attracting attention since there are obvious advantages that SSTs offer to both consumers and service providers, whilst certain drawbacks are to be taken into consideration. This paper identified a lack of an agreed SSTs classification. Classifications range from very basic such as Forbes (2008) – Internet and non-Internet, to more sophisticated multi-dimension ones such as Cunningham *et al*. (2008).

The review of the key SST adoption factors and models to date revealed a number of gaps which call for further research. SST adoption has been researched predominantly at a 'trial' level, i.e. Stage 4 of Bitner *et al*'s six stage process. There are three stages preceding trial (awareness, information search and evaluation) and no factors have been identified which may improve awareness of SSTs or influence towards a better evaluation. Similarly, beyond the trial stage, research has been interested mainly in satisfaction outcomes but has not investigated other factors contributing to repeated usage (Beatson *et al*., 2007).

The strategic importance of understanding SST adoption factors is essential in service industries, especially if large investments are involved (Anitsal and Schumann, 2007). Some SSTs do not gain adoption because service providers do not take into consideration that a high level of consumer participation is involved, and sometimes the consumer is not rewarded for his input (Anitsal and Schumann, 2007). Therefore, an understanding of the consumer perspective is of importance in terms of awareness, adoption, repeated usage and commitment to SSTs.

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