The SST Co-Production: Consumer Readiness and Its Effect on the Relationships between Hedonic, Utilitarian, Security Factors, Satisfaction with, Attitudes Towards and Repeated Use of SSTs

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10. Australian supermarkets
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12. Consumer readiness

Abstract

Self-service technologies (SSTs) have radically changed how businesses interact with customers and offer benefits to consumers and organizations. Because using SSTs is a form of co-production, the successful deployment of SSTs not only relies upon factors related to SSTs but also consumers' participation in self-service. Previous research indicates that hedonic, utilitarian and security factors of SSTs, such as perceived control, fun/enjoyment, ease of use, usefulness, perceived risk and anonymity, have the potential to influence the repeated use of SSTs. However, how these factors affect the repeated use of SSTs in retailing is unclear because insufficient research regarding the SST co-production process and the mediators of the repeated use of SSTs has been conducted.

Meuter et al. (2005) conducted pioneer studies to understand the SST co-production process and found that consumer readiness, comprising ability, role clarity and motivation, was an important mediator of SST trials. However, the dimensions and generalisability of consumer readiness are still open to question. To date, the co-production process at the consumer decision stage entailing the repeated use of SSTs has gained limited attention from previous SST research. Thus, we argue that consumer readiness should be re-conceptualized as consisting of trust, self-determined motivation, ability and role clarity; it should also be considered an important mediator of the repeated use of SSTs. Given that attitudes towards and satisfaction with SSTs are also important antecedents to the repeated use of SSTs, consumer readiness is hypothesized to mediate the relationships between hedonic, utilitarian and security factors and attitudes towards, satisfaction with and repeated use of SSTs. Attitudes towards and satisfaction with SSTs are hypothesized to mediate the relationship between consumer readiness and repeated use of SSTs.

In this study, emails were sent to a targeted audience, and 361 respondents completed an online questionnaire. The collected data were analysed by SPSS, PROCESS and AMOS, and a structural equation model (SEM) was formed. The results indicate that trust, self-determined motivation, ability and role clarity are inter-related. Trust, self-determined motivation and ability demonstrate differential mediating effects on the relationships between hedonic, utilitarian and security factors and attitudes towards, satisfaction with and repeated use of SSTs, whereas role clarity does not mediate any relationships between hedonic, utilitarian and security factors and attitudes towards, satisfaction with and repeated use of SSTs. Additionally, attitudes towards and satisfaction with SSTs demonstrate differential mediating effects on the relationship between consumer readiness and the repeated use of SSTs.

The SEM model further reveals that hedonic and security factors are positively and negatively associated with consumer readiness, whereas utilitarian factors are not associated with consumer readiness. While consumer readiness is positively associated with attitudes towards, satisfaction with and the repeated use of SSTs and attitudes towards SSTs are positively associated with the repeated use of SSTs, satisfaction with SSTs is not associated with the repeated use of SSTs. Although consumer readiness enhances satisfaction with, attitudes towards and the repeated use of SSTs, the results imply that SST co-production is a complicated process, and the dimensions of consumer readiness may need to be re-considered at the repeated use of SSTs consumer decision stage. The results also suggest that consumers play important roles in self-service in retailing. In addition to the hedonic, utilitarian and security factors of SSTs, managers should also aim at building trust, nurturing self-determined motivation and enhancing customers' ability and positive attitudes to further facilitate the use of SSTs. The current study is important because

it further unravels customers' participatory roles in the SST co-production process and suggests that customers are important co-producers. Thus, firms can use customers' talents, skills and knowledge to improve their organizations' competitiveness.

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Statement of Original Authorship

This work contained in this thesis has not been previously submitted for a degree or diploma at any other higher education institution. To the best of my knowledge and belief, the thesis contains no material previously published or written by another person except where due reference is made.

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Publications

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CHAPTER 1

INTRODUCTION

1.1 Introduction to the Chapter

This chapter provides an overview of the thesis. It begins with a discussion of the importance of self-service technologies (SSTs) to organisations and consumers. The chapter then discusses the antecedents to the repeated use of SSTs, such as hedonic, utilitarian and security factors; potential mediators, such as consumer readiness, attitudes towards and satisfaction with SSTs; and the outcome: the repeated use of SSTs. This is followed by an outline of the significance of the research, research questions, the objectives of the current research and expected academic and managerial contributions.

1.2 Introduction to the Study

Self-service technologies (SSTs) are defined as "*technological interfaces that enable customers to produce a service independent of direct service employee involvement"* (Meuter et al., 2000, p. 50). Examples of SSTs include Automated Teller Machines (ATMs), pay-at-the pump machines, automated hotel and grocery store checkouts, telephone banking, airline check-in systems for e-ticket holders, in-store kiosks for product information, web-based purchasing, Internet transactions and supermarket self-checkout systems (Yang & Klassen, 2008). SSTs have been implemented in different industries, such as airline, banking, travel, hotel, financial and retailing, and have radically changed how businesses interact with customers (Bitner, Brown, & Meuter, 2000). The popularity of SSTs in retailing industries

has increased (Meuter et al., 2000). The assumption is that SSTs deployed in different countries offer many benefits to organizations and customers (Palmer, 2008; Hays, 2003).

While the successful deployment of SSTs is subject to various factors (Hsieh, 2005), managers are mostly concerned about the economic advantages of SSTs, such as cost savings and efficiency (Bendapudi & Leone, 2003). However, customer participation is also vital because customers are co-producers (Bendapudi & Leone, 2003) who can customize the consumption experience for themselves (Firat, Dabholkar, & Venkatesh, 1995). How customers make sense of the role they play is essential to successful SST co-production (Bitner, Brown, & Meuter, 2000; Hilton & Hughes, 2012) because customers are important sources of competitive advantage in terms of resources, knowledge and skills (Vargo & Lusch, 2008). Self-service consumption can be considered direct and indirect ways of transferring knowledge and skills (Vargo & Lusch, 2004) because customers provide resources, capabilities and knowledge while they use SSTs (Blazevic & Lievens, 2008). Customers knowing what they are expected to do (role clarity), being motivated (motivation) and having necessary knowledge and skills (ability) are essential to the successful deployment of SSTs (Meuter et al., 2005; Bettencourt et al., 2002; Lengnick-Hall, 1996).

Meuter et al. (2005) conceptualized consumer readiness as being composed of role clarity, motivation and ability and found it drives customer trials in SSTs. However, further research is needed to verify its dimensions and generalisability (Meuter et al., 2005). In addition, trust and autonomy offered to customers are also found to drive customers' participation in SST co-production (Geyskens, Steenkamp, & Kumar, 1998; Lusch, Brown, & Burnswick, 1992; Venkatraman & Subramaniam, 2002; Auh et al., 2007; Gruen, Summers, & Acito, 2000; Yeh & Li, 2009; Collier & Sherrell, 2010; Bendapudi & Leone, 2003; Liu, 2012). Thus,

introducing trust and self-determination theory, which links the degree of autonomy to different forms of motivation, to explain the co-production process in SST contexts is needed (Deci & Ryan, 1991). The current study aims to gain more insight into the role of customers' participation in SST co-production by re-conceptualising consumer readiness as being composed of trust, self-determined motivation, ability and role clarity. The study also aims to investigate how hedonic, utilitarian and security factors relevant to SSTs affect the repeated use of SSTs through consumer readiness, attitudes towards and satisfaction with SSTs as shown in Figure 1.1.

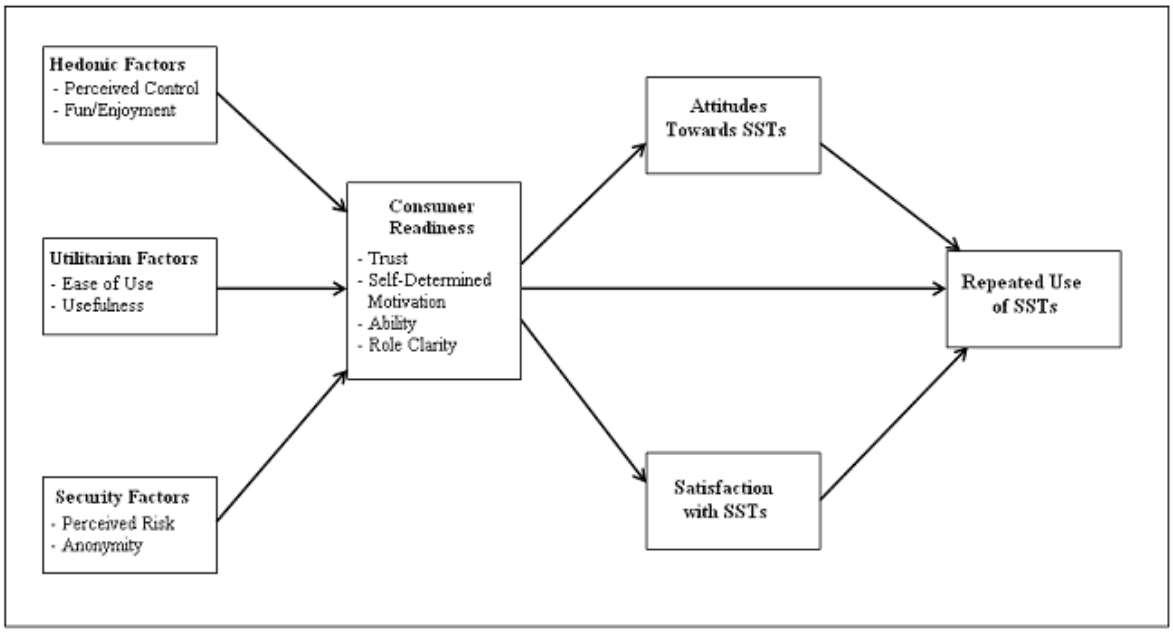


Figure 1.1. Conceptual Model of the Repeated Use of SSTs.

1.3 Background to the Study

Technology has radically changed the business landscape in recent years (Gallaugher, 2010). By using technology, organisations can reduce costs as well as increase access to and

exchange of information (Parham, Roberts, & Sun, 2001). Amongst different technologies, SSTs have attracted a great deal of attention from marketing academics and practitioners (Kelly, Lawlor, & Mulvey, 2010). As SSTs replace human-to-human contact with human-machine interaction (Parasuraman, 2000), consumers' perceptions of how services are conceived, developed and delivered have changed (Meuter et al., 2005). Consumers become co-producers because they are responsible for their own satisfaction in the self-service delivery process (Bendapudi & Leone, 2003).

SSTs are becoming increasingly popular (Proenca & Rodrigues, 2011). In the United States, 70% of face-to-face interaction has shifted to phone-based interaction (Campbell, 2008). Over 50% of the transactions in contact centres are completed via human voice, and nearly 15.5% of calls are handled by interactive voice response (IVR) (Campbell, 2008). SSTs are driving forces in the banking industry (Pikkarainen et al., 2004), with 80 billion transactions handled by ATMs (ATM Marketplace, 2009) and only 10% of U.S. banking transactions handled by in-bank teller services (Yang & Klassen, 2008). By 2012, over 30,333 ATM terminals had been installed throughout Australia (APCA, 2012). American consumers spent over US$525 billion in self-checkout lanes, ticketing kiosks and other self-service machines, and this figure has grown over 18% each year (IHL Consulting Group, 2007). In the retailing industry, self-checkouts have become popular, leading supermarkets such as Woolworths and Coles to install 3,000 self-service checkouts in 500 and 545 stores respectively (Silmalis, 2013), resulting in 40% of transactions at Coles being completed at self-checkouts (Chieftech, 2013). However, as SSTs have become popular, they have brought benefits as well as problems to organisations.

SSTs are important because they help organisations serve more customers at higher speeds with fewer resources (Yang & Klassen, 2008). Therefore, SSTs help businesses reduce training, real estate, equipment and communication costs (Canbase, 2009; Hall, 2004). In some businesses, replacing call agents with IVR technology reduces costs by 85% (Campbell, 2008) because IVR is five times cheaper than live agents are (Campbell, 2008). Some businesses have reduced costs by shifting telephone services to online self-services. For example, IBM shifted its telephone services online and reduced costs by US$2 billion (Burrows, 2001). McKinsey & Company moved its billing and service online and saved US$40 million (Meuter et al., 2005). It is estimated that the airline industry can reduce costs by as much as 12% per client by using SSTs (Griffy-Brown, Chun, & Machen, 2008). In the retail industry, SSTs help grocery stores cut costs and reduce head counts by reducing the number of service staff from four to one with self-service registers (Rosen, 2001).

By replacing service representatives with SSTs, organisations can offer cost-effective and improved services (Cunningham, Young, & Gerlach, 2008) as well as more consistent and stable services without being affected by fluctuations in service demands and employee moods (Weijters et al., 2007). SSTs can also increase customers' satisfaction and loyalty and enable organisations to effectively reach new customer segments (Bitner, Ostrom, & Meuter, 2002). In addition to improving efficiency, SSTs can empower customers and employees (Hsieh, 2005) because they add customer value by increasing place and time convenience (Yang & Klassen, 2008). Within the banking industry, Internet banking has helped banks retain customers and enhance market share (Gardener, Howcroft, & Williams, 1999) because Internet banking attracts higher profit market segments compared to offline banking (Johnson, 2007). Virtual customer environments also enhance the customer shopping experience in the retailing sector (Nambisan & Baron, 2007). Retailers can use SSTs to better satisfy the needs

of specific groups of customers or markets by using less innovatively furnished stores (Dean, 2008).

SSTs benefit consumers by providing advantages in convenience, ubiquitous availability, time and cost efficiency (Cunningham, Young, & Gerlach, 2008). By using SSTs, consumers receive experiences that are faster, more reliable, easier to navigate and more enjoyable while gaining greater control of their shopping experiences (Dabholkar, Bobbit, & Lee, 2003; Meuter et al., 2000). Some consumers enjoy the impersonal value of SSTs because this makes them feel more in control than when they are served by live agents (Griffy-Brown, Chun, & Machen, 2008). SSTs offer a wider variety of choices, mass customisation and immediate service (Griffy-Brown, Chun, & Machen, 2008) and reduce consumer anxiety caused by judgmental service representatives (Bitner, 2001; Meuter et al., 2000). This view is shared by Stephen P. Boddon, an executive in the travel department at IBM, who stated that consumers serviced at live counters, such as when they visit their school principals, experienced greater discomfort (Griffy-Brown, Chun, & Machen, 2008). Some consumers perceive using SSTs as superior to traditional human interaction because they are considered a 'quality service' (Yang & Klassen, 2008). Therefore, high-value customers often prefer using SSTs to pay bills or view their balances when live agents are not necessary for those transactions (Campbell, 2008). SSTs offer efficient processing through the simple touch of a button and allow customers to avoid long queues in hotels, airline check-in, and making inquiries or paying the bills (Griffy-Brown, Chun, & Machen, 2008). Although SSTs are beneficial to organisations and customers, they have disadvantages as well.

SSTs require additional resources for staff and consumer training (Bitner, Ostrom, & Meuter, 2002; Lee & Allaway, 2002). Additional resources, such as operational staff and expenses for

equipment maintenance, are wasted if customers do not accept SSTs (Lee & Allaway, 2002). Organisations also have lower chances of detecting complaints and fewer opportunities for service recovery because SSTs reduce direct contact between staff and customers during the service delivery process (Nakata & Zhu, 2003). The risks of service failure and employee resentment are also problems (Curran, Meuter, & Surprenant, 2003; Meuter et al., 2000) because customers tend to recall service failures rather than successes in using SSTs (Nakata & Zhu, 2003). Nearly 96% of customers blame organisations rather than technology or themselves for service failures whilst using SSTs (Nakata & Zhu, 2003). Some customers do not use SSTs (Bashier & Zakaria, 2010) because they prefer direct interactions with service staff (Curran & Meuter, 2007). Some may feel frustrated using SSTs if they are not familiar with the technology (Griffy-Brown, Chun, & Machen, 2008) or if they have to change their behaviour to adopt SSTs (Curran & Meuter, 2007). Some customers may feel uncomfortable with SSTs if they are techno-phobic (Oyedele & Simpson, 2007) or experience technology anxiety (Meuter et al., 2003). Some customers may not consider SSTs an improvement (Meuter et al., 2003) and feel dissatisfied with the self-service experience (Alcock & Millard, 2006; Poenca & Rodrigues, 2011). Other customers simply consider employee service more important (Beatson, Coote, & Rudd, 2006). Customer misperceptions about SSTs are also common, such as design flaws, security issues, lack of customisation options, complexity, practicality and inconvenience (Curran & Meuter, 2007). Because higher levels of customer participation and responsibility are required, SSTs are also perceived to be riskier than personal services (Lee & Allaway, 2002). Some SSTs are simply not accessible for elderly or disabled individuals; therefore, SSTs may not be helpful to some customers (ICCHP, 2012).

Despite their increasing popularity, SSTs have disadvantages. Managers have to justify the benefits and problems introduced by SSTs before deploying them (Hsieh, 2005). However,

once SSTs are deployed, it is essential for managers to know how to enhance customer use of SSTs to ensure such investments are worthwhile. Previous research has mainly focused on initial adoption but ignored understandings of the repeated use of SSTs (Beatson, Lee, & Coote, 2007). Additionally, customers play important roles in the self-service delivery process, and further research is needed in this area (Hilton & Hughes, 2012; Meuter et al., 2005). Prior research suggests that consumer readiness, which is composed of motivation, ability and role clarity, is one of most relevant factors affecting customer trials in SSTs; however, the dimensions and generalisability of consumer readiness to other consumer decision stages, e.g., the repeated use of SSTs, are questionable (Meuter et al., 2005). In addition, trust, self-determined motivation, role clarity and ability appear to be mediators of the repeated use of SSTs (Meuter et al., 2005; Halvari et al., 2010; Techatassanasoontorn & Tanvisuth, 2008; Collier & Sherrell, 2010). These factors are considered to be inter-related (Deci & Ryan, 2000a; Kim, Kim, & Hwang, 2009; Hahn & Kim, 2009; Lee & Lin, 2009; Mayer, Davis, & Schoorman, 1995; Harrison & Smith, 2004; Jaasma & Koper, 1999; Sargeant & Lee, 2001) and drive customers' participation in SST co-production (Geyskens, Steenkamp, & Kumar, 1998; Lusch et al., 1992; Venkatraman & Subramaniam, 2002; Auh et al., 2007; Gruen, Summers, & Acito, 2000; Etgar, 2006; Brennan & Turnbull, 1999; Garbarino & Johnson, 1999; Hakansson & Snehota, 1995; Xue and Harker, 2002; Crespin-Mazet & Ghauri, 2007; Hitt et al., 2000; Lusch, Vargo, & O'Brien, 2007; Miles & Snow, 2007; Subramani & Venkatraman, 2003; Meuter et. al., 2005). Considering these points, we argue that consumer readiness should be re-conceptualized to include trust, self-determined motivation, ability and role clarity at the repeated use of SSTs consumer decision stage. Thus, we investigate the effects of hedonic, utilitarian and security factors on the repeated use of SSTs through mediators such as consumer readiness, satisfaction with and attitudes towards SSTs.

1.3.1 Hedonic, Utilitarian and Security Factors as Antecedents to Attitudes towards, Satisfaction with and Repeated Use of SSTs

Prior studies have identified different determinants affecting the initial adoption and repeated use of SSTs; however, not all determinants are relevant to the retailing self-service context (Weijters et al., 2007). Perceived control, fun/enjoyment, ease of use, usefulness, perceived risk and anonymity are potential determinants of the repeated use of retailing SSTs. These determinants are classified under three categories: hedonic, utilitarian and security factors. Hedonic factors refer to the affective motives customers have to use SSTs in terms of the sphere of feelings and personal goals (Guido, 2006). Utilitarian factors refer to the rational motives to use SSTs that underlie logical cognitive processes (Guido, 2006), whilst security factors are defined as motives to use or not to use SSTs emanating from the challenge of reconciling internal and external threats (Thomas & Tow, 2002).

Hedonic factors. Hedonic factors, such as perceived consumer control and fun/enjoyment, have been found to influence attitudes towards SSTs (Weijters, Rangarajan, & Falk, 2005). Perceived control is an important driver of consumer behaviour. It is based on the theory of planned behaviour (TPB) (Ajzen, 1991; Gollwitzer, 1999; Ajzen, 2002; Armitage & Conner, 1999, 2001; Schifter & Ajzen, 1985; Sheeran, 2002), consumer intentions to use technology (Collier & Sherrell, 2010; Dabholkar, 1996; Kuan, Ho, & Chang, 2011; Zeithaml. Parasuraman, & Malhotra, 2002; Zhu et al., 2007) and consumer satisfaction with using SSTs (Chen & Chen, 2009; Dabholkar & Bogazzi, 2002; Marzocchi & Zammit, 2006; Yen & Gwinner, 2003; Wang, 2012). Fun/enjoyment is an important antecedent to the repeated use of SSTs (Dabholkar & Bagozzi, 2002; Eighmey & McCord, 1998; Heijden, 2003; Curran & Meuter, 2005), attitudes

towards SSTs (Weijters et al., 2007) and satisfaction with SSTs (Dabholkar & Bogazzi, 2002; Meuter et al., 2000).

Utilitarian factors. Utilitarian factors, perceived usefulness and ease of use drive the use of technology based on the technology acceptance model (TAM) (Guriting & Ndubisi, 2006; Hernan-dez & Mazzon, 2007; Wang et al., 2003; Venkatesh, 2000). Additionally, perceived usefulness has a significant positive effect on the adoption of SSTs (Chen & Barnes, 2007; Guriting & Ndubisi, 2006; Lin & Chang, 2011). Perceived usefulness is positively related to customers' attitudes towards SSTs (Weijters et al., 2007) and user satisfaction (Liu, Chen, & Zhou, 2006; Meuter et al., 2000). Ease of use drives consumer intentions to use SSTs (Guriting & Ndubisi, 2006; Hernan-dez & Mazzon, 2007; Venkatesch, 2000; Venkatesh & Davis, 2000; Wang et al., 2003) as well as attitudes towards (Weijters, Rangarajan, & Falk, 2005) and satisfaction with using SSTs (Dabholkar & Bogazzi, 2002; Meuter et al., 2000).

Security factors. Security factors, perceived risk and anxiety negatively influence customers' participation in SST co-production based on the theory of co-production (Dowling & Staelin, 1994). Perceived risk has also been found to negatively affect consumer acceptance of innovation (Black et al., 2001), willingness to try new technologies (Walker et al., 2002) and attitudes towards SSTs (Bobbitt & Dabholkar, 2001; Dabhbolkar, 1996). A security factor such as perceived anonymity is expected to increase self-esteem and reduce anxiety (Joinson, 1999). As social anxiety is negatively related to the use of technology (Kumar et al., 2007), perceived anonymity is expected to have a positive effect on consumers' satisfaction with, attitudes towards, and repeated use of SSTs.

Whilst hedonic, utilitarian and security factors influence consumers' attitudes towards, satisfaction with, and repeated use of SSTs to varying degrees, the link may not be clear. Consumer readiness, satisfaction with and attitudes towards SSTs are potential mediators of the repeated use of SSTs, as discussed in the following section.

1.3.2 Consumer Readiness as a Mediator between Hedonic, Utilitarian, and Security Factors and Attitudes towards, Satisfaction with and Repeated Use of SSTs

When a third variable/construct intervenes between two other related variables, a mediating effect may exist (Hair et al., 2006). Baron and Kenny (1986) proposed that to qualify as a mediator, the construct must fulfil three basic conditions: 1) the independent variable must be related to the mediator; 2) the mediator must be related to the dependent variable; and 3) the relationship between the independent and dependent variables must be reduced from significant to insignificant (full mediation) or must remain significant but be weakened (partial mediation). However, the latest literature suggests that fulfilling conditions 1 and 2 is sufficient to show the mediating effect (Judd & Kenny, 2010; Zhao, Lynch, & Chen, 2010). Thus, the mediating effect of consumer readiness can be justified based on its relationships with hedonic, utilitarian and security factors as well as its relationships with attitudes towards, satisfaction with and repeated use of SSTs. The mediating effect of consumer readiness (composed of trust, self-determined motivation, ability and role clarity) and its relationships with hedonic, utilitarian and security factors in addition to attitudes towards, satisfaction with and repeated use of SSTs are justified below.

Perceived control (a hedonic factor) has a positive effect on trust and self-determined motivation because customers' ability to control the service enables them to customize their

experience; therefore, they are more motivated to explore the options they need (Collier & Sherrell, 2010). This also enhances customers' perceived role clarity (Meuter et al., 2005), ability (Hahn & Kim, 2009; Lee & Lin, 2009; Mayer, Davis, & Schoorman, 1995) and trust (Kim, Kim, & Hwang, 2009). Fun/enjoyment (a hedonic factor) is expected to meet customers' lifestyle (Koufaris, 2002). This also enhances their self-determined motivation (Dabholkar, 1996; Risch Rodie & Schultz Kleine, 2000) and affects their willingness to learn, thus increasing customers' perceived role clarity, ability and trust (Meuter et al., 2005; Harrison & Smith, 2004). Therefore, it is anticipated that hedonic factors directly affect consumer readiness.

Ease of use (a utilitarian factor) enhances customer trust because the procedures are less ambiguous when the proper options are easier to find (Wen, Prybutok, & Xu, 2011). This also affects customers' perceived role clarity, trust and self-determined motivation (Hahn & Kim, 2009, Lee & Lin, 2009; Mayer, Davis, & Schoorman, 1995; Harrison & Smith, 2004; Jaasma & Koper, 1999; Sargeant & Lee, 2004). Perceived usefulness (a utilitarian factor) also affects the perceived ability of using SSTs (Igbaria & Iivari, 1995; Ramayah, Aafaqi, & Ignatius, 2004). Customers are more willing to learn how to use SSTs if they have more advantages (Meuter et al., 2005). This helps customers reduce uncertainty and ambiguity and enhances their perceived role clarity, ability (Abel & Larkin, 1990; Bohlin & Hunt, 1995; Mamassis & Doganis, 2004) and trust (Harrison & Smith, 2004). Therefore, the direct effects of utilitarian factors on consumer readiness are inferred.

Perceived risk (a security factor) is considered to be related to trust (Morgan & Hunt, 1994) because it is caused by uncertainty or ambiguity (Zinkhan & Karande, 1991). Such uncertainty or ambiguity is related to perceived role clarity (Harrison & Smith, 2004), ability

(Hahn & Kim, 2009; Lee & Lin, 2009; Mayer, Davis, & Schoorman, 1995) and self-determined motivation (Jaasma & Koper, 1999; Sargeant & Lee, 2004). Moreover, perceived anonymity (a security factor) reduces anxiety (Joinson, 1999). Anxiety has a negative impact on perceived ability (Abel & Larkin, 1990; Bohlin & Hunt, 1995; Mamassis & Doganis, 2004), role clarity, self-determined motivation (Shore & Shannon, 2017; Zakaria & Nordin, 2008) and trust (Oh et al., 2013; Lu, Wang, & Hayes, 2012). Thus, it can be postulated that security factors directly affect consumer readiness.

Furthermore, trust is positively related to the use of online systems (Wang, 2012) and the future use of SSTs (Collier & Sherrell, 2010). Self-determined motivation is related to the acceptance and use of Information and Communication Technology (ICT) (Techatassanasoontorn & Tanvisuth, 2008); ability is related to computer use (Compeau & Higgins, 1995), the usage of web-based systems (Yi & Hwang, 2003) and the future use of SSTs (Rose & Fogarty, 2006; Wang, Harris, & Patterson, 2013). Role clarity positively affects initial adoption (Meuter et al., 2005) and the future use of restaurant kiosks (Kim, Christodoulidou, & Choo, 2013). Thus, it can be anticipated that consumer readiness also has a direct effect on the repeated use of SSTs.

Based on the above justifications, hedonic, utilitarian and security factors have direct effects on consumer readiness, and consumer readiness has a direct effect on the repeated use of SSTs. Thus, the mediating effect of consumer readiness on the relationship between hedonic, utilitarian and security factors and the repeated use of SSTs is inferred.

As justified above, hedonic, utilitarian and security factors are expected to directly affect consumer readiness. Based on the theory of reasoned action (TRA) (Fishbein & Ajzen, 1975),

attitudes towards SSTs are positively related to the repeated use of SSTs (Dabholkar & Bagozzi, 2002; Lee, Castellanos, & Choi, 2012; Wang & Namen, 2004; Xie, Shen, & Zheng, 2011). If consumer readiness has a positive impact on the repeated use of SSTs, it is proposed that a relationship exists between consumer readiness and attitudes towards SSTs. Thus, we argue that consumer readiness also mediates the relationship between hedonic, utilitarian and security factors and attitudes towards SSTs. Also, if hedonic, utilitarian and security factors directly affect consumer readiness, consumer readiness directly affects the repeated use of SSTs, as justified previously, and satisfaction with SSTs is positively related to the repeated use of SSTs (Bhattacherjee, 2001; Chen & Chen, 2009; Wang, 2012), it can be anticipated that consumer readiness is also associated with satisfaction with SSTs. Therefore, the mediating effect of consumer readiness between hedonic, utilitarian and security factors and satisfaction with SSTs is inferred.

1.3.3 Satisfaction with and Attitudes towards SSTs as Mediators between Consumer Readiness and Repeated Use of SSTs

The mediating effects of satisfaction with and attitudes towards SSTs are justified below based on their relationships with consumer readiness and the repeated use of SSTs (Judd & Kenny, 2010; Zhao, Lynch, & Chen, 2010).

As justified, consumer readiness mediates the relationships between hedonic, utilitarian and security factors and attitudes towards SSTs; therefore, this paper proposes that a relationship exists between consumer readiness and attitudes towards SSTs. In addition, attitudes towards SSTs are positively related to the repeated use of SSTs based on TRA (Ajzen, 1991; Fishbein & Ajzen, 1975; Dabholkar & Bagozzi, 2002; Lee, Castellanos, & Choi, 2012; Wang &

Namen, 2004). Thus, the mediating effect of attitudes towards SSTs on the relationship between consumer readiness and the repeated use of SSTs is inferred.

As also justified, consumer readiness mediates the relationships between hedonic, utilitarian and security factors and satisfaction with SSTs. Consumer readiness is expected to have a direct effect on satisfaction with SSTs. As evidenced, satisfaction with SSTs also positively influences the repeated use of SSTs (Bhattacherjee, 2001; Chen & Chen, 2009; Wang, 2012). Thus, the mediating effect of satisfaction with SSTs on the relationship between consumer readiness and the repeated use of SSTs is also inferred.

1.3.4 Research Context: Supermarket Self-Checkouts

Supermarket self-checkouts are considered a suitable research context for the current study. First, self-checkout systems are becoming more popular (Maras, 2006). Nearly 94% of consumers in the U.S. market have used a supermarket self-checkout system (Maras, 2006). The total sales transaction per year through self-checkouts was US$450 billion in 2008. The popularity of supermarket self-checkouts in the United States has also expanded to other countries, such as the United Kingdom, Japan and Australia (Cosgrove-Mather, 2004). In 2008, 70 Woolworth's stores installed self-checkout systems that handled nearly 20% of the purchase transactions in Australia (Palmer, 2008). By 2012, Woolworth's had installed 3000 self-service checkouts in 500 stores and Coles had 3000 in 545 stores (Silmalis, 2013). In 2013, 40% of the transactions at Coles were handled by self-checkouts (Chieftech, 2013). Second, the supermarket is responsible for a significant proportion of the Australian economy. Estimates suggest supermarkets offered 70,000 full-time, part-time and casual employment opportunities in Australia and represented AU$12 billion in retail sales in 2008 (Master

Grocers Australia, 2008). In 2012, supermarkets employed 115,000 staff and generated annual sales of AU$13 billion, which made their contribution to the Australian economy significant (Master Grocers Australia, 2012).

1.4 Research Problem

Understanding customers' participatory roles in the self-service delivery process is essential because using SSTs is a co-production process (Hilton & Hughes, 2012). In a co-production process, customers' participation is vital for the successful deployment of SSTs (Hilton & Hughes, 2012). Consumer readiness as a critical determinant of customers' participation in the self-service needs further research because its dimensions and generalisability to other consumer decision stages and contexts have not been investigated (Meuter et al., 2005). Prior research indicates that consumer satisfaction with SSTs (Bhattacherjee, 2001; Chen & Chen, 2009; Wang, 2012) and attitudes towards SSTs (Dabholkar & Bagozzi, 2002; Lee, Castellanos & Choi, 2012; Wang & Namen, 2004; Xie, Shen, & Zheng, 2011) influence the repeated use of SSTs. Consumer readiness factors, such as trust, self-determined motivation, ability and role clarity, are anticipated to influence customers' participation in SST co-production and have links between hedonic, utilitarian and security factors as well as attitudes towards and satisfaction with SSTs. However, how these factors interact with each other to affect the repeated use of SSTs has received limited attention in prior research. Thus, the current study is aimed at answering the following questions.

i) Do hedonic, utilitarian and security factors affect attitudes towards, satisfaction with and repeated use of SSTs?

ii) Does consumer readiness mediate the link between hedonic, utilitarian and security factors and satisfaction with, attitudes towards and repeated use of SSTS?

iii) How do attitudes towards and satisfaction with SSTs influence the relationship between consumer readiness and the repeated use of SSTs?

1.5 The Objectives of the Study

The principal objective of the current study is to understand the SST co-production process at the repeated use of SSTs consumer decision stage in retailing. Therefore, the effects of hedonic, utilitarian and security factors on the repeated use of SSTs through potential mediators, such as consumer readiness and attitudes towards and satisfaction with SSTs, are investigated. Therefore, the objectives of the thesis are as follows:

i) investigate the effects of hedonic, utilitarian and security factors on the repeated use of SSTs and attitudes towards and satisfaction with SSTs;

ii) determine whether consumer readiness mediates the effects between hedonic, utilitarian and security factors and satisfaction with, attitudes towards and repeated use of SSTs; and

iii) investigate whether attitudes towards and satisfaction with SSTs mediate the relationship between consumer readiness and the repeated use of SSTs.

1.6 Conceptual Model

The relationships proposed above have led to the development of a conceptual model (see Figure 1.1). The conceptual model shows the mediating effect of consumer readiness on the

link between hedonic, utilitarian and security factors and satisfaction with, attitudes towards and repeated use of SSTs. The conceptual model also shows the mediating effect of attitudes towards and satisfaction with SSTs on the link between consumer readiness and the repeated use of SSTs.

1.7 Justification of the Study

The theory of reasoned action (TRA) suggests that attitude towards a specific behaviour and subjective norms can predict behavioural intentions (Fishbein & Ajzen, 1975). The theory of planned behaviour (TPB) extends TRA and adds perceived behavioural control as an additional predictor of human behaviour (Ajzen, 1991). The technology acceptance model (TAM) explains the effect of external variables (perceived usefulness and perceived ease of use) on users' acceptance of PC-based applications (Davis, 1986). In contrast, the innovations of diffusion theory (IDT) explains the process by which innovations and ideas become diffused and adopted by wider social networks (Rogers, 2003). In addition to the current theories, Straub (2009) also proposed that theories of technology adoption should be used to explain cognitive and emotional aspects of human behaviour. Thus, in this study, the theory of co-production and self-determination theory are used as theoretical frameworks to explain the role of customers' participation in the self-service delivery process.

Bitner, Ostrom, and Meuter (2002) identified six stages of consumer decision processes in the SST context: awareness, investigation, evaluation, trial, repeated use and commitment (Bitner, Ostrom, & Meuter, 2002). Previous SST research predominantly investigated initial adoption but ignored the repeated use of SSTs (Beatson, Lee, & Coote, 2007). Understanding customers' repeated use of SSTs is important because encouraging repeated use is easier than

attracting first-time SST users (Bitner, Ostrom, & Meuter, 2002). Acquiring a new customer is five times more expensive than retaining a current customer (Bhattacherjee, 2001) because additional operational costs are needed (Hsieh, 2005). By retaining 5% of customers, an organization can save up to 18% in operational costs (Bhattachejee, 2001). Meuter et al. (2005) and Bitner, Ostrom, and Meuter (2002) also proposed that future research should understand the phenomenon beyond the initial SST adoption stage. The current research fills this research gap and identifies antecedents and mediators to the repeated use of SSTs.

Attitudes towards SSTs and satisfaction with SSTs have been found to have positive effects on the repeated use of SSTs (Dabholkar & Bagozzi, 2002; Wang & Namen, 2004; Lee, Castellanos, & Choi, 2012; Xie, Shen, & Zheng, 2011; Bhattacherjee, 2001; Chen & Chen, 2009; Wang, 2012). In retailing, perceived control positively affects the repeated use of SSTs (Dabholkar, 1996). Fun/enjoyment also affects customer satisfaction with SSTs (Wang, 2012). Perceived ease of use and usefulness affect attitudes towards SSTs (Childers et al., 2001; Rangarajan, Falk, & Schillewaert, 2007). Perceived risk and anonymity are possible determinants for the repeated use of SSTs (Black et al., 2001; Walker et al., 2002; Joinson, 1999; Kumar et al., 2007). However, the relationships between hedonic, utilitarian and security factors and customer attitudes towards, satisfaction with and repeated use of SSTs have not been empirically integrated. Beatson, Lee and Coote (2007) also suggested that beyond the trial stage, SST studies mainly focus on customer satisfaction as the outcome. Thus, the current study investigates the effects of hedonic, utilitarian and security factors on attitudes towards, satisfaction with and repeated use of SSTs in a retailing context.

Limited research on the relationships between hedonic, utilitarian and security factors and attitudes toward, satisfaction with and repeated use of SSTs points to the necessity of

identifying mediators involved in the process. Preacher and Hayes (2004) suggested that mediators help researchers gain a deeper understanding of the process beyond descriptive relationships. However, prior studies on the repeated use of SSTs have not focused on mediation analyses (e.g., Chen, Chen, & Chen, 2009; Wang, 2012; Zhao, Mattila, & Tao, 2007; Curran, Meuter, & Surprenant, 2003; Lee, Hsieh, & Hsu, 2011; Weijters et al., 2007).

Meuter et al. (2005) and Bitner, Ostrom and Meuter (2002) identified consumer readiness, which comprises ability, role clarity and motivation, as an important mediator of consumer trials in SSTs. Other researchers found attitudes towards and satisfaction with SSTs to be potential mediators of the repeated use of SSTs (e.g., Chen, Chen, & Chen, 2009; Wang, 2012; Curran, Meuter, & Surprenant, 2003; Lee, Hsieh, & Hsu, 2011; Weijters et al., 2007). However, the links between these mediators have not been investigated. Raykov and Marcoulides (2000) and Holbert and Stephenson (2003) proposed that identifying mediators is important so the relationships amongst factors in the co-production process can be further determined. Thus, the current research aims to understand the mediating roles of consumer readiness, attitudes towards and satisfaction with SSTs.

Furthermore, whether the dimensions of consumer readiness are generalisable to other consumer decision stages (Bitner, Ostrom, & Meuter, 2002) and different contexts is questionable. Meuter et al. (2005) and Bitner, Ostrom and Meuter (2002) proposed that consumer readiness dimensions and their differential influence on SST adoption should be further investigated. Thus, we reconceptualise the consumer readiness dimensions and investigate their mediating effects on the relationships between hedonic, utilitarian and security factors and attitudes towards, satisfaction with and repeated use of SSTs.

1.8 Significance of the Research

This research will make a significant contribution to industry practitioners and extend current knowledge on factors that determine the repeated use of SSTs in the retailing sector.

1.8.1 Academic Contribution

As the process of co-production and the repeated use of SSTs are further investigated, the current study extends the depth and breadth of knowledge from the current literature. Customers are actually 'customizing consumers' and co-producers (Bendapudi & Leone, 2003) because customers are able to customize the consumption experience for themselves (Firat, Dabholkar, & Venkatesh, 1995). In addition to the impact of the hedonic, utilitarian and security factors on the repeated use of SSTs, the current study investigates the underlying process of customer decisions at the repeated use of SSTs stage and extends our understanding of consumers' participatory roles in SST co-production in retailing.

The current study also extends our knowledge of the links between different mediators such as consumer readiness, attitudes towards SSTs and satisfaction with SSTs (e.g., Chen, Chen, & Chen, 2009; Wang, 2012; Curran, Meuter, & Surprenant, 2003; Lee, Hsieh, & Hsu, 2011; Weijters et al., 2007) and their impact on the relationships between hedonic, utilitarian and security factors and the repeated use of SSTs.

Because the consumer readiness dimensions proposed by Meuter et al. (2005) are reconceptualised in the current study, the generalisability and consumer readiness dimensions at another consumer decision stage, the repeated use of SSTs is better known. Using

self-determination theory to explain the use of SSTs also sheds light on extending the theory of co-production and linking current technology adoption theories in marketing to psychological theories.

1.8.2 Managerial Contribution

Since the process involving the repeated use of SSTs is further investigated here, the current study provides different aspects of managerial contributions.

Managers can make better decisions when they have knowledge of how hedonic, utilitarian and security factors drive or hinder the repeated use of SSTs. Because self-service is a co-production process (Hilton & Hughes, 2012), the current study extends knowledge of SST co-production and the role of customers' participation in the self-service. Managers can deploy SSTs more successfully by targeting customers' needs and using customers' talents to further enhance the competitiveness of the organisation (Lengnick-Hall, 1996). More importantly, such knowledge enhances the marketing strategies available to managers. For example, instead of replacing the hedonic, utilitarian and security features of SSTs, managers can consider increasing the repeated use of SSTs by enhancing customer trust, self-determined motivation, role clarity and ability. Thus, managers can manage the organisation more strategically and better tackle future challenges.

As the role of customers' participation in self-service is further clarified, the delivery of self-service can be more customer-focused. Harrison and Smith (2004) suggested that customers should not only expect the job to be done but also examine how well the job is done and whether their satisfaction and well-being are concerned. The current study not only

helps managers enhance the use of SSTs but also helps them enhance the use of SSTs in more humanistic ways. When the delivery of self-service is more customer-focused, managers can save operational costs because the repeated use of and satisfaction with SSTs can be enhanced by customers' resources, knowledge and skills (Hilton & Hughes, 2012). Therefore, organizations' competitiveness can be further improved with minimal effort (Lee, Hsieh, & Hsu, 2011; Bhattachejee, 2001).

1.9 Limitations of the Research

Whilst a number of academic and managerial implications of the study are identified, several limitations to the research are also outlined.

i) Because the current research used a cross-sectional design, the internal validity may be limited. Consequently, a longitudinal or an experimental research design can offer more insights for this study.

ii) As the current study focused on the supermarket retail context, the results may not be generalisable to other contexts.

iii) The sample was limited to Australian consumers who had been exposed to SSTs. The results may not be applicable to other countries and other groups of customers.

iv) This study focused on a limited number of antecedents and mediators. Other demographic and situational variables may affect the results.

1.10 Outline of Research Methodology

The current research used a positivist research paradigm. A conclusive and descriptive research approach was used to test the conceptual model with the supermarket self-checkout system. A cross-sectional research approach was used in the current study. The measures of perceived control, newness, ease of use, usefulness, perceived anonymity, perceived risks, trust, ability, role clarity, self-determined motivation, attitudes towards, satisfaction with and repeated use of SSTs were adapted from previous research. A sample of 361 shoppers was used to test the SEM model. Emails were sent to potential respondents through Qualtrics, which is a market research company. Respondents were invited to fill in the online questionnaire. Data were collected and analysed using SPSS and AMOS software.

1.11Structure of the Thesis

The thesis begins with a literature review in Chapter 2. The review introduces technology adoption theories, such as the theory of reasoned action (TRA), the theory of planned behaviour (TPB), the technology acceptance model (TAM), and the innovations of diffusion theory (IDT); the review also introduces the theory of co-production and the self-determination theory (SDT) as new avenues to explain the use of technology. Thereafter, independent variables in the current study, such as hedonic, utilitarian and security factors are reviewed. Then, potential mediators such as consumer readiness, satisfaction with and attitudes towards SSTs, as well as the dependent variable repeated use of SSTs, are presented. A conceptual model is proposed, and propositions are outlined. Finally, the study context is presented and justified. In Chapter 3, the methodology is presented. The research designs and pilot study are also presented. Following this, the measures and how to operationalize the

constructs for the current study are discussed. The next section discusses the sampling design and the development of the measurements. The purification, reliability and validity will also be presented. The chapter concludes with a discussion of the demographic characteristics of respondents. In Chapters 4, 5 and 6, the sub-model results and the mediating effects of consumer readiness, attitude towards and satisfaction with SSTs are discussed. In Chapter 7, the integrated co-production model is tested and discussed. A summary of results, research implications and limitations as well as future research directions are discussed in Chapter 8.

1.12 Chapter Summary

In this section, the importance and benefits of SSTs to organisations and consumers were outlined. This was followed by the conceptual model. The objectives, justification and contribution of the current study were discussed. Finally, the thesis structure was presented. In the next chapter, the theoretical frameworks underpinning the current study and the study variables will be reviewed.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

In this chapter, literature related to the adoption, diffusion and use of technology is reviewed. The chapter starts with a review of current theories of technology acceptance and adoption, such as the theory of reasoned action (TRA), the theory of planned behaviour (TPB), the technology acceptance model (TAM) and the innovations of diffusion (IDT) theory. The importance of introducing the theory of co-production and the self-determination theory (SDT) in SST contexts is also discussed. After presenting the theoretical framework, literature relevant to the study variables is reviewed. Important determinants of the repeated use of SSTs, such as attitudes towards and satisfaction with SSTs, are covered. Other determinants of the repeated use of SSTs, such as hedonic, utilitarian and security factors, are presented. Mediators of the repeated use of SSTs are also discussed. This leads to the identification of the research gap and significance of the current study. In the final section, the propositions and conceptual model are outlined.

2.2 The Adoption and Diffusion of Technology

Rogers (1962) first defined the adoption of technology as a mental process in which an individual passes from first hearing about innovation to final adoption. The adoption of technology is also defined as a quantitative measure of the degree of use of technology in the long term (Feder, Just, & Zilberman, 1985). The adoption of technology has a similar meaning to technology diffusion, except that the adoption of technology deals with

psychological processes rather than an aggregate market process. Technology diffusion is '…the process by which an innovation is communicated through certain channels over time among the members of a social system' (Rogers, 2003, p. 161). Theories on the adoption and diffusion of technology are presented in the following section.

2.3 Theoretical Framework

2.3.1 Theories on the Adoption and Diffusion of Technology

Theories used in prior research to explain technology adoption, use and diffusion include the following: (i) theory of reasoned action (TRA); (ii) theory of planned behaviour (TPB); (iii) technology acceptance model (TAM); (iv) diffusion of innovation theory (IDT); (v) theory of co-production; and (vi) self-determination theory (SDT). These theories are anticipated to be relevant to the adoption and use of SSTs and are discussed below.

Theory of reasoned action (TRA). Various technology adoption models are based on TRA (e.g., Curran, Meuter, & Surprenant, 2003; Curran & Meuter, 2005; Lee, Castellanos, & Choi, 2012). TRA suggests that attitude towards a specific behaviour and subjective norms can predict behaviour. Attitude towards specific behaviour refers to 'a person's general feeling of favourableness or unfavourableness for that behaviour' (Ajzen & Fishbein, 1980, p. 67), whereas subjective norms are '...a person's perception that most people who are important to him think he should or should not perform the behaviour in question' (Ajzen & Fishbein, 1980, p. 67).

TRA has applied to diverse contexts, such as blood donation, birth control pill usage (Liker & Sindi, 1997), other health-related behaviours (Beadnell et al., 2008; Guo et al., 2007; Weber et al., 2007), fast food restaurant patronage (Bagozzi et al., 2000), software piracy behaviours (Aleassa, Pearson, & McClurg, 2010) and travel decisions (Kim, Kim & Goh, 2011; Ryu & Han, 2010). A meta-analysis by Sheppard, Hartwick and Warshow (1998) indicates that TRA has strong predictive power across different contexts. Because TRA has been used to model the acceptance of new technology (e.g., Scannell, 1999; Yousafzai, Foxall, & Pallister, 2010), it is applied in the current study to predict the repeated use of SSTs. However, the predictive power of TRA is reduced when the behaviour under study is not under volitional control (i.e., behaviours over which the individual does not have full control) (Gentry & Calantone, 2002). Due to the failure of TRA to explain consumer behaviour, another researcher introduced an alternative theory that is an extension of TRA: the theory of planned behaviour (TPB) (Ajzen, 1991).

Theory of planned behaviour (TPB). TPB is an extension of the TRA model in which perceived behavioural control is added as an additional construct to predict human behaviour (Ajzen, 1991; Gollwitzer, 1999; Ajzen, 2002; Armitage & Conner, 2001, 1999; Schifter & Ajzen, 1985; Sheeran, 2002). Human attitude in this model is viewed as an outcome of behavioural belief and evaluation of outcomes (Mathieson, 1991). TPB has been also found to predict behaviour in different situations (Mathieson, 1991; Quelch & Klein, 1996). For example, Chang (1998) found that behavioural control could better predict behaviour than attitudes.

TPB is viewed as a more appropriate theoretical framework than the theory of reasoned action for explaining online grocery shopping behaviour. Hansen, Jensen and Solgaard (2004)

compared TRA to the modified TPB, in which a path from subjective norms to attitude is included. Modified TPB could better predict online grocery buyers' purchase intentions. TPB has also been used to explain health-related behaviours (Jemmott III et al., 2007; McEachan et al., 2011; Moan & Rise, 2007; Plotnikoff et al., 2010), driving behaviours (Elliott, Armitage, & Baughan, 2007), sustainable agricultural practices (Fielding et al., 2011), digital piracy (Yoon, 2011), food purchasing behaviours (Alam & Sayuti, 2011) and the use of social network websites (Pelling & White, 2009). As perceived control influences the future use of SSTs in a retailing context (Oyedele & Simpson, 2007), TPB is also used to predict the repeated use of SSTs in the current study. However, whilst TPB is reviewed as having better predictability than TRA, another model, called the technology acceptance model (TAM), has also been used to predict the use of technology (Gentry & Calantone, 2002).

Technology acceptance model (TAM). The most extensively used theoretical framework regarding the adoption of technology is the technology acceptance model (TAM) proposed by Davis (1989). TAM is used to explain how external variables, such as perceived usefulness and perceived ease of use, can affect users' acceptance of technology and consumers' current and future usage (Davis, 1989). Empirical evidence suggests a strong relationship between usefulness, ease of use and the use of technology (Guriting & Ndubisi, 2006; Hernan-dez & Mazzon, 2007; Wang, 2003; Venkatesh, 2000). The reliability and validity of ease of use and usefulness have been tested in different settings and samples (Adams, Nelson, & Todd, 1992); they show high test-retest reliability (Hendrickson, Massey, & Cronan, 1993) and predictive validity (Szajna, 1994).

TAM's ability to predict actual behaviour is inferred by TRA and TPB. However, it was anticipated that the underlying concept in TAM would be different from TRA and TPB. TAM

posits that attitudes and beliefs both have a direct impact on human behaviour, whilst TRA and TPB suggest that attitudes are mediators of beliefs and behaviour (Davis, Bagozzi, & Warshaw, 1989). In the retail setting, perceived usefulness and ease of use have been found to be major factors in forming attitudes towards SSTs (Childers et al., 2001; Rangarajan, Falk, & Schillewaert, 2007). Therefore, TAM is particularly relevant to the current study context and is adopted to predict the use of retailing SSTs. Given that TRA and TPB can only explain parts of technology adoption phenomena and that TAM considers consumers as passive audiences solely driven by technological advantages, another theoretical framework regarding the technology diffusion process and characteristics of adopters, place and culture, known as the innovations of diffusion theory, has been suggested.

Innovations diffusion theory (IDT). IDT (Rogers, 2003) has been used to explain the process through which innovations and ideas become diffused and adopted within the wider social network. Diffusion refers to the process in which innovation is communicated among the members of a social system through different channels (Rogers, 2003), whereas innovations are ideas, practices or objects perceived as new by individuals or other units of adoption (Rogers, 2003).

IDT posits that four elements are present in the diffusion process: a) innovation; b) communication channels through which the innovation is diffused; c) time; and d) social system (Rogers, 2003). Different characteristics of the innovation, communication channels and social system are likely to have varying influences at different times throughout the diffusion process (Rogers, 2004). IDT suggests that technological innovation passes through five stages: knowledge (exposure to its existence and understanding of its functions); persuasion (forming a favourable attitude to it); decision (commitment to its adoption);

implementation (putting to use); and confirmation (reinforcement based on positive outcomes from it). The results of diffusion are adoption, implementation and institutionalization (Dusenbury & Hansen, 2004).

IDT also posits that innovation diffusion is a general process that is not bound by the types of innovations but by the characteristics of adopters, place and culture (Rogers, 2003) and innovation attributes such as relative advantage, compatibility and complexity (Tornatzky & Klein, 1982). IDT divides adopters into five categories: innovators, early adopters, early majority, late majority and laggards (Rogers, 2003). Different categories of adopters have different characteristics and adopt innovations at different rates. Evidence suggests that earlier adopters tend to have more years of education, higher social status and aspirations, upward social mobility, larger organisations, less dogmatism, greater empathy and ability to deal with abstractions, greater rationality and intelligence, greater ability to cope with uncertainty and risk, more contact with other people, greater exposure to mass media and interpersonal communication channels and engage in more active information seeking (Woo, Jung, & Wei, 2012; Chau & Hui, 1998).

IDT is used to successfully predict factors influencing academic staff's motivation and adoption decisions in using electronic technologies in the classroom (Medlin, 2001), professors' acceptance of web technology (Surendra, 2001), adoption decisions of eXtensible business reporting language (XBRL) (Doolin & Troshani, 2007), employees' intentions to use e-learning systems (Lee, Hsieh, & Hsu, 2011), twitter hashtag use (Chang, 2011), mobile banking adoption (Lin, 2011) and energy conservation interventions (Vollink, Meertens, & Midden, 2002). However, IDT is concerned about the formation of favourable and unfavourable attitudes and how they evolve into the accept/reject decision, and TAM is

concerned about beliefs, attitude, intention and action (Chen, Gillenson, & Sherrell, 2002). Furthermore, relative advantage and complexity in IDT are both similar to perceived ease of use in TAM. TAM and IDT have similarities and complement each other, and TAM can compromise the deficiency of IDT (Chen, Gillenson, & Sherrell, 2001). Therefore, TAM and IDT are integrated to better predict the results of the current study. IDT can explain how different adopters accept innovations at different rates (Rogers, 1983), but it only considers customers as passive audiences driven by place, culture and innovation attributes. However, customers are 'customizing consumers' and active co-producers (Bendapudi & Leone, 2003) who are able to customize the consumption experience for themselves (Firat, Dabholkar, & Venkatesh, 1995). Firms should understand the roles of customers' participation in the service and use their talents to improve their competitiveness in the market (Lengnick-Hall, 1996). Thus, it is essential to introduce the theory of co-production to SST contexts.

The theory of co-production. Marketing scholars have recently shifted focus from creating value for customers to creating value with customers (Wikström, 1996) because service consumption can be considered a form of production (Curtain & Gaither, 2005). Customers as active agents (Prahalad &Ramasway, 2000, 2004) and producers create value during the service consumption process (Lusch, Vargo, & O'Brien, 2007). It becomes clear that customers and producers are less able to be distinguished when customers become more involved in the service process (Humphreys & Grayson, 2008) and customers as co-producers are important in service provision (Vargo & Lusch, 2004). Especially in the case of self-services, SSTs have changed how customers interact with organisations and the social roles of customers begin losing their utility (Humphreys & Grayson, 2008).

Customers are collaborative partners or co-producers who can co-create values for organisations during the service production (Cutcher, 2010; Lusch, Vargo, & O'Brien, 2007, p. 6). Co-production is a process in which customers act as active participants in the organisation's work (Auh et al., 2007). Co-creation is described as "*...involving a high level of customer participation in customising the product or service, which requires collaboration with customers for the purpose of innovation*" (Kristensson, Matthing, & Johansson, 2008, p. 475). In SST contexts, customers act as active participants rather than participate in customising the service, thus the concept of co-production is considered more appropriate to the current context.

During self-service, customers engage in service consumption activities and co-produce their service experience (Vargo & Lusch, 2004). Because organisations do not possess all the resources and capabilities necessary to deploy self-service successfully, the exploitation of resources by customers is also important (Möller & Syahn, 2006; Ulaga & Eggert, 2006). Customers become embedded in the self-service process and ultimately add value to these services (Vargo & Lusch, 2004). Self-service consumption can be considered direct and indirect ways of transferring knowledge and skills (Vargo & Lusch, 2004) because customers provide resources, capabilities and knowledge when using self-services (Blazevic & Lievens, 2008). The production of self-services cannot be completed if customers do not integrate their own resources during the service production process (Anand, Garden, & Morris, 2007).

The co-production process benefits customers as well as firms because it enhances speed and operating efficiencies, offers customized service offerings and lower costs, and increases the service value (Claycomb, Lengnick-Hall, & Inks, 2001; Auh et al., 2007). Involving customers in value-creation may reduce the cost of service production, and the perceived

value of the service may increase if customers are asked to engage in consumption process activities (Humphreys & Grayson, 2008). Thus, a company can channel customers' activities in ways that add value to the firm (Zwick, Bonsu, & Darmody, 2008; Cutcher, 2010; Prahalad & Ramaswamy, 2000, 2004). Engaging customers as co-producers allows firms to reduce labour costs (Sturdy, 2001) and gain greater control of the consumption process (Lengnick-Hall, 1996) because customers can act as co-producers and co-workers in self-service production and consumption (Lengnick-Hall, Claycomb, & Inks, 2000). Thus, customers' participation in co-production is a key successful driver of service production because customers play decisive roles in such processes (Abramovici & Bancel-Charensol, 2004; Alam, 2006). Successful co-production is important to nurturing not only customers' loyalty but also their positive attitudes and satisfaction (Auh et al., 2007; Bendapudi & Leone, 2003; Hunt, Geiger-oneto & Varca, 2012). Thus, customers should be brought into the focus of attention. However, the theory of co-production has gained limited attention in SST research (Meuter et al., 2005) because various factors are suggested to affect customers' participation in co-production (Chen, Tsou & Ching, 2011).

Participating in the co-production process requires consumers' resources, knowledge and skills. For example, the availability of time is an important resource and is essential for customers' participation in co-production (Etgar, 2006; Lusch, Vargo, & O'Brien, 2007). When consumers have more spare time, they have more chances to become involved in co-production (Etgar, 2006). Co-production also implies participation in networking structures, and coordination skills such as overcoming cultural differences between partners, motivating partners and sidestepping potential conflict-generating situations may be required (Palmer, 2005; Gutterman, 2002).

Since information technology is more common today, knowledge and skills in using computer and electronic communications technology are also crucial for customers becoming involved in co-production (Pralahad & Ramaswamy, 2004). Product attributes also affect consumers' engagement in co-production. For example, consumers are more willing to participate in co-production if the product has a higher number of possible permutations of product characteristics because customers try to achieve customization through co-production (Etgar, 2007). The product has less attraction to customers when they cannot alter its characteristics to meet their needs (Etgar, 2007). When altering the product attributes provides greater impact, customers are more interested in participating in co-production (Etgar, 2007).

Participating in co-production is also related to brand personality (Ries & Trout, 2000; Aaker, 1996). When brand personality best meets consumers' needs, they are less likely to participate in co-production to change the characteristics of the product for fear of losing its major advantages (Etgar, 2007). Cultural compatibility between consumers and organisations is also important because differences in values, norms and behaviour patterns may lead to conflicts; thus, cooperation efforts may eventually dissolve (Gutterman, 2002). Consumers' personalities also affect their participation in co-production, e.g. when consumers are more empathetic, they will participate more in co-production because they expect to find more empathetic partners (Gronroos, 1983; Etgar, 2007). Consumer-partner relationships also play a role in facilitating customers' participation in co-production when they believe advantages exist in maintaining such relationships and interaction (Venkatraman & Subramaniam, 2002).

Participating in co-production also requires specific skills, e.g. skills to handle specific tasks (Lusch, Brown, & Brunswick, 1992; Xue & Harker, 2002; Auh et al., 2007; Crespin-Mazet &

Ghauri, 2007; Hitt et al., 2000; Lusch et al., 2007; Miles & Snow, 2007; Subramani & Venkatraman, 2003). Such skills can improve through repeated use and accumulated experience (Etgar, 2007). When customers understand what is required of them in service production, they are also more willing to participate in co-production (Auh et al., 2007; Meuter et al., 2005). Emotional preconditions such as trust, e.g. when consumers believe their partners will perform required tasks as promised, lead consumers to be more eager to participate in co-production (Geyskens, Steenkamp, & Kumar, 1998; Lusch, Brown, & Brunswick, 1992; Venkatraman & Subramaniam, 2003; Auh et al., 2007; Gruen et al., 2000).

Motivational forces, such as psychological, economic and social incentives, are essential to driving customers to participate in co-production (Etgar, 2006, 2007; Brennan & Turnbull, 1999; Garbarino & Johnson, 1999; Hakansson & Snehota, 1995). For example, customers may enjoy the psychic benefits of self-confidence when they are 'able to get things done' (Lusch, Brown, & Brunswick, 1992). Customers tend to participate in co-production if it helps them reduce perceived risks and anxiety (Dowling & Staelin, 1994). Co-production may sometimes reduce perceived risks by enabling direct control over the production process (Dowling & Staelin, 1994).

Although various factors are suggested to affect customers' participation in co-production, only some of them are relevant to SST contexts. For example, motivation, ability and task/role clarity are found to affect SST adoption (Meuter et al., 2005). Trust has been shown to positively affect the use of SSTs (Li & Yeh, 2009; Collier & Sherrell, 2010). Additionally, perceived risk and/or anxiety negatively affect the patronage of online retailing (Mitchell & Harris, 2005; Joinson, 1999; Kumar et al., 2007). Since using SSTs is a co-production process (Hilton & Hughes, 2012), we propose applying the theory of co-production to the current

study context in addition to TRA, TPB, TAM and IDT. Factors such as motivation, ability, task/role clarity, trust, perceived risk and anxiety are particularly relevant. Nevertheless, the theory of co-production is also subject to some major weaknesses. Although various factors have been suggested to affect customers' participation in co-production, the theory of co-production has not actually addressed the relationships between the factors and the roles they play in the co-production process. Additionally, Bendapudi and Leone (2003) argued that customers who feel forced to participate in co-production form negative opinions about co-production. In SST contexts, forced use was found to have a negative impact on customer satisfaction with and adoption of SSTs (Liu, 2012). Thus, to apply the theory of co-production in the current study context, autonomy offered to customers to use SSTs should also be considered. Given that self-determination theory (SDT) links the degree of autonomy to different forms of motivation, SDT can be considered a more relevant motivational theory to SST contexts and extends the theory of co-production as discussed below.

Self-determination theory (SDT). SDT is a motivational theory explaining how humans achieve their goals or perform activities according to their psychological or cognitive responses to different levels of autonomy. In terms of SDT, these psychological or cognitive responses constitute different forms of motivation on a continuum (Deci & Ryan, 1991; Ryan & Connell, 1989). SDT does not define instrumental rewards, such as money or food, as extrinsic motivation. Instead, it respects humans as individuals who actively interact with their environment.

Extrinsic motivations are psychological or cognitive responses regulated by different levels of a sense of choice or volition or by coerced interpersonal or intra-psychic forces (Deci & Ryan, 2000a, 2012; Ryan & Connell, 1989). Extrinsic motivations comprise two forms of

motivation: controlled and autonomous (Deci & Ryan, 1985, 1991). When behaviour is not highly controlled or regulated by intrinsic reasons, such as a sense of choice or volition, motivation is said to be autonomous or self-determined. By contrast, when behaviour is regulated by external reasons, such as coerced interpersonal or intra-psychic forces, motivation is regarded as controlled or less self-determined (Deci & Ryan, 2000b, 2012; Gagne & Deci, 2005). Controlled and autonomous motivations do not exist in single forms. Controlled motivation comprises external and introjected regulations, and autonomous motivation comprises identified and integrated regulations (Deci & Ryan, 1985, 2000b).

External regulation refers to behaviour regulated by tangible and intangible rewards or punishment (Deci & Ryan, 2000b, 2012; Gagne & Deci, 2005). Introjected regulation refers to behaviour regulated by contingent consequences that are internal to individuals (Deci & Ryan, 2000b, 2012). Identified regulation is present when the underlying value of an individual's behaviour is accepted and recognized (Deci & Ryan, 2000b; Gagne & Deci, 2005). Integrated regulation is present when an individual's behaviour is internalized, consistent and fully integrated within his/her sense of self (Deci & Ryan, 1985, 2000b, 2012).

Extrinsic and intrinsic motivations are inter-related, as shown in Figure 2.1 (Deci & Ryan, 2000a, 2012; Gagne & Deci, 2005; Ryan & Connell, 1989). Intrinsic motivation refers to behaviour initiated for an individual's own sake that leads to interest and excitement. When extrinsic motivation is autonomous, it is closely related to intrinsic motivation (Deci & Ryan, 1991). Amotivated individuals are not motivated at all; amotivation is thus the farthest type from intrinsic motivation. Human behaviour is driven by different forms and combinations of these forms of motivation (Deci & Ryan, 2000a, 2012; Gagne & Deci, 2005). When motivation is more self-determined, behaviour is more internalized (Deci & Ryan, 2000b,

2012; Gagne & Deci, 2005). The combined form is referred to as self-determined motivation. SDT posits that human behaviour is driven by different levels of self-determined motivation (Deci & Ryan, 2000a, 2012).

Empirical evidence suggests that self-determined motivation positively affects human well-being (Ryan & Deci, 2000; Deci & Ryan, 2008) and is important to students' learning, perceived competence and school performance (Deci, Koestner, & Ryan, 2001; Vallerand et al., 1992, 1993; Fortier, Vallerand, & Guay, 1995). It also affects school principals' success (Fernet, 2011), dental clinics' patient attendance (Halvari et al., 2010) and the use of information and communication technology (ICT) (Techatassanasoontorn & Tanvisuth, 2008).

Figure 2.1. Continuum of Motivations in SDT.

According to SDT, an individual's sense of volition nurtures behaviour and human well-being (Deci & Ryan, 2000a). Autonomy, competence and relatedness are universal human needs fostering the process of internalization, volitional forms of self-determined motivation and individuals' engagement in activities (Deci & Ryan, 2000b, 2012). Internalization is a process in which extrinsic motivation is actively transformed into a personally endorsed value, which

allows individuals to assimilate motivation that was originally externally regulated (Ryan, 1995).

Autonomy is defined as a situation 'in which significant others offer choice, provide a meaningful rationale, minimize pressure, and acknowledge the target individual's feelings and perspectives' (Williams et al., 1998, p. 117). SDT suggests that controlling social contexts impair internalization, whereas autonomous social contexts enhance internalization (Deci & Ryan, 2000b). When behaviour is internalized, self-determined motivation is enhanced, thus increasing the likelihood that individuals will engage in uninteresting activities (Deci et al., 1994; Deci & Ryan, 2000a, 2012). Competence or self-efficacy represents an individual's beliefs about his/her capability to perform a task (Bandura, 1997). When individuals feel more competent, they feel their behaviour is more effective and they have a sense of satisfaction when they engage in activities (Deci & Ryan, 2000a). This sense of satisfaction enhances internalization and thus increases self-determined motivation (Deci & Ryan, 2000a). Relatedness is the need to feel connected to others (Deci & Ryan, 2000a). Relatedness enhances the sense of belonging and facilitates the process of internalization (Deci & Ryan, 2000b, 2012). Individuals tend to internalize the values and practices of those to whom they are connected (Deci & Ryan, 2000a, 2012).

SDT provides an extension to the theory of co-production because it links expertise skills, choices offered to customers, relatedness with service staff and different forms of motivation to form a unique motivational theory relevant to SST contexts. Thus, the triangulation of SDT, the theory of co-production, TAM, TPB, TRA and IDT is needed to predict the repeated use of SSTs in the current study. The importance of the repeated use of SSTs to retailing is discussed in the following section.

2.4 The Importance of the Repeated Use of SSTs to Retailing

Increasingly, organisations are trying to reduce operational and investment costs and maximize service quality, performance and competitiveness (Lau & Zhang, 2006; Yang, Liu, & Ding, 2012). Thus, more attention should be drawn to understanding the repeated use of SSTs for the following reasons (Bhattacherjee, 2001). First, acquiring first-time users is more difficult than encouraging the repeated use of SSTs (Bitner et al., 2002) because customers have to change their behaviour. Second, literature suggests that acquiring a new customer is five times more expensive than retaining a current one (Bhattacherjee, 2001) because additional operational costs are needed, such as training additional staff and coaching new customers to use the technology (Hsieh, 2005). Finally yet importantly, organisations can save up to 18% of operational costs by retaining 5% of current customers (Bhattachejee, 2001). Although promoting the continued use of SSTs is important, many organisations have overlooked the necessity of enhancing the repeated use of SSTs in existing customers (Bitner et al., 2002). Previous research has also predominantly investigated initial adoption, but limited attention has been paid to understanding the determinants of the repeated use of SSTs (Beatson, Lee, & Coote, 2007).

The repeated use of SSTs is defined as the continued use of SSTs on a regular basis (Bitner et al., 2002). Prior studies have used adoption and behavioural intentions to predict the repeated use of SSTs (Frambach, Herk, & Agarwal, 2003). Adoption intentions are a form of behavioural intentions (Frambach, Herk, & Agarwal, 2003) that refer to how likely a consumer is to use a given technological service in the future (Chen, Chen, & Chen, 2009; Frambach, Herk, & Agarwal, 2003). Behavioural intentions are a general concept referring to individuals' readiness to perform a given behaviour based on TRA (Ajzen, 2002). In order to

avoid the confusion arising from these terminologies, we use the terms repeated or continued use of SSTs through the entire thesis to represent the probability of customers' continued use of SSTs on a regular basis in the future.

Prior studies have found a range of antecedents to the repeated use of SSTs. Attitudes have been found to be positively related to the continued use of SSTs (Dabholkar, 1994; Dabholkar & Bagozzi, 2002). Consumer satisfaction with SSTs also positively affects the repeated use of SSTs (Bhattacherjee, 2001; Chen, Chen, & Chen, 2009, Chen & Chen, 2009; Lee, Castellanos, & Choi, 2012). Consumer traits and demographics are also predictors of the continued use of airline kiosks and retailing self-checkouts (Lee et al., 2010). However, when consumers show more positive attitudes towards service staff, they are less likely to use SSTs (Curran, Meuter, & Surprenant, 2003). Literature also indicates that the link between antecedents and the repeated use of SSTs could be moderated by other factors (Bobbitt & Dabholkar, 2001; Dabholkar & Bagozzi, 2002).

Product categories have been found to moderate the relationship between consumer attitudes and the use of Internet shopping (Bobbitt & Dabholkar, 2001). Individual differences, such as the need for interaction, inherent novelty seeking and self-consciousness, as well as situational factors, such as perceived waiting time, were shown to be moderators on the relationships between attitudes towards and repeated use of SSTs (Dabholkar & Bagozzi, 2002). Since the determinants and moderators of the repeated use of SSTs have been identified, factors such as attitudes towards SSTs and satisfaction with SSTs are of particular importance to the repeated use of SSTs.

2.5 Important Determinants of the Repeated Use of SSTs

Attitudes towards and satisfaction with SSTs have been identified as major factors driving consumers to use SSTs (e.g., Dabholkar & Bagozzi, 2002; Wang & Namen, 2004; Lee, Castellanos, & Choi, 2012; Xie, Shen, & Zheng, 2011; Bhattacherjee, 2001; Chen & Chen, 2009; Wang, 2012). These two factors drive consumers to use SSTs in different ways, as discussed in the following sections.

2.5.1 Attitudes towards SSTs

Consumers can form different attitudes towards different elements of a service, such as the firm (Andreassen, 2001), frontline staff (Sparks, Bradley, & Callan, 1997) and co-producing a retailing service (Eastlick et al., 2012); they can also form more than one attitude towards a service (Easgly & Chaiken, 1993). According to Easgly and Chaiken (1993, p.1), attitude is "...a psychological tendency that is expressed by evaluating a particular entity with some degree of favour or disfavour". When consumers make decisions based on multiple attitudes, these different attitudes result in different levels of priorities (Easgly & Chaiken, 1993) and a hierarchy of consumer attitudes because some attitudes can be antecedents to other attitudes (Kinney & McDaniel, 1996). Parasuraman, Berry and Zeithaml (1994) suggested that when consumers accumulate experience in using a service, they form a global evaluation of the service based on the hierarchy of their attitudes. Consumers form attitudes towards technology before they actually use it. Moreover, once they form positive attitudes, it is difficult to change their preferences (Curran, Meuter, & Suprenant, 2003). Thus, positive attitudes towards SSTs can enhance their use (Dabholkar & Bagozzi, 2002; Wang & Namen, 2004; Lee, Castellanos, & Choi, 2012; Xie, Shen, & Zheng, 2011).

The literature also found major antecedents to attitudes towards SSTs, such as positive attitudes towards technology resulting in positive attitudes towards SSTs (Dabholkar, 1996). Perceived ease of use, usefulness, fun and control were found to positively influence attitudes towards SSTs (Weijters et al., 2005). Attitudes towards using technology are also positively related to attitudes towards using SSTs (Bobbitt & Dabholkar, 2001). Negative attitudes towards SSTs are formed when consumers perceive higher risks involved in using SSTs (Bobbitt & Dabholkar, 2001). However, such relationships are subject to the influence of other factors.

The product category, perceived behaviour control, familiarity with using SSTs, technology readiness and user experience are moderators of attitudes towards SSTs (Bobbitt & Dabholkar, 2001; Wang & Namen, 2004; Lin & Chang, 2011; Cho, 2011). Further, the links between attitudinal factors and the adoption of SSTs are moderated by demographic factors such as age, gender and education (Daholkar, Bobbitt & Lee, 2003; Dean, 2008). However, due to the changes in the economic situation, consumers have become more familiar with technology. Demographic factors, such as consumers' genders, ages, education levels and incomes, are considered less relevant (Dabholkar & Bagozzi, 2002). While attitudes towards SSTs have a close link to the repeated use of SSTs, customer satisfaction with SSTs also drives customers to use SSTs.

2.5.2 Satisfaction with SSTs

The concept of satisfaction is based on the disconfirmation theory (Oliver, 1980). The disconfirmation theory predicts that satisfaction is a function of perceived performance and expectation and that when perceived performance is lower than expectations, customers are

dissatisfied (Chen, 2005). On the other hand, when perceived performance matches or is higher than expectations, customers feel satisfied (Chen, 2005). Higher confirmation is often associated with lower expectations or better than anticipated service performance and contributes to positive consumer satisfaction (Bhattacherjee, 2001). The expectancy disconfirmation paradigm assumes that satisfaction is a process of psychological evaluation in which consumers' expectations, desires, experiences and service performances interact to affect consumer attitudes (Lee & Joshi, 2006).

Literature suggests that highly satisfied consumers show a lower propensity to switch and higher levels of loyalty than less satisfied ones (Chen, 2005; Taylor & Hunter, 2002; Yang & Peterson, 2004; Yen & Gwinner, 2003). The future performance and profitability of a company are determined by the level of customer satisfaction. Better-performing companies with higher profits normally have more satisfied customers than poorer ones (Mano & Oliver, 1993). Therefore, customer satisfaction affects customers' intentions to patronize a store (Marzocchi & Zammit, 2006) and the use of other services (Brady et al., 2005; Cronin, Brady, & Hult, 2000). Satisfied buyers tend to continue using SSTs (Bhattacherjee, 2001; Chen & Chen, 2009; Wang, 2012) and other technologies (Gianni & Franceschini, 2003; Pare et al., 2005).

Oliver (1997) defined customer satisfaction as a consumer's sense of a service that provides outcomes of pleasure or displeasure, while for Cronin, Brady and Hult (2000), satisfaction reflects the degree of positive feelings consumers have after using a service. For Kotler (2000), satisfaction is consumers' feelings of pleasure or disappointment when considering a service's performance. Devaraj, Fan and Kohli (2002) viewed satisfaction as an ex-post evaluation of consumers' experiences using a service that returns positive, indifferent or

negative feelings. Other scholars define overall satisfaction as an affective state or emotional reaction to a service experience (Giese & Cote, 2000; Spreng, MacKenzie, & Olshavsky, 1996). Giese and Cote (2000) suggested definitions of satisfaction from previous literature and concluded that there were more than twenty definitions in literature, none of which provided any consensus. Thus, Giese and Cote argued that the definition of satisfaction should be context-specific. In the current study, an integrated definition is incorporated from Kotler (2000) and Cronin et al.'s (2000) studies, and satisfaction with SSTs is defined as the degree of positive feelings and disappointment customers have after using SSTs.

Customer satisfaction can be affected by factors such as service quality, product quality, price and location (Skoglan & Siguaw, 2004) as well as site design and payment methods (Cho & Park, 2001). Other predictors of satisfaction with SSTs are waiting time, control and hedonic factors (Marzocchi & Zammit, 2006). Moreover, efficiency, ease of use, perceived enjoyment, perceived usefulness, subjective norm, perceived control, convenience and human touch also affect consumer satisfaction in the SST context (Chen & Chen, 2009; Dabholkar & Boagozzi, 2002; Makarem, Mudambi, & Podoshen, 2009; Meuter et al., 2000; Yen & Gwinner, 2003; Wang, 2012). Furthermore, technology readiness dimensions, such as innovativeness and optimism, have a positive effect on satisfaction with SSTs (Abdullah et al., 2012; Lin & Hsieh, 2006). On the other hand, technology failure, process failure, poor design, customer-driven failure and forced use of SSTs are major dissatisfiers related to using SSTs (Jamal, 2004; Liu, 2012).

Customer satisfaction with and attitudes towards SSTs are important determinants of the repeated use of SSTs. Other factors, such as perceived control, fun/enjoyment, ease of use,

usefulness, perceived risk and anonymity, are also possible determinants of the repeated use of SSTs in the retailing context and are discussed in the following section.

2.6 Determinants of the Repeated Use of SSTs in the Retailing Self-Service Context

Different determinants of the repeated use of SSTs have been identified in previous studies. The determinants of initial adoption can also be antecedents to the repeated use of SSTs (Meuter et al., 2005; Bitner et al., 2002). However, not all factors are relevant to the retailing self-service context. The following section reviews the possible determinants relevant to the retailing SST context, such as perceived control, fun/enjoyment, ease of use, usefulness, perceived risk and anonymity. These are classified under three categories: hedonic, utilitarian and security factors.

2.6.1 Hedonic Factors

Hedonic factors are the affective motives to use SSTs regarding the sphere of feelings and personal goals (Guido, 2006). These factors do not offer any practical benefits to consumers but instead drive the internal gratification generated by consumers themselves (Guido, 2006). Two hedonic factors that affect the repeated use of SSTs in retailing are perceived control and fun or enjoyment.

2.6.1.1 Perceived Control of SSTs

Perceived control is a critical element in customers' appraisal because it drives their intentions to use technologies (Collier & Sherrell, 2010; Kuan, Ho, & Chang, 2011; Zeithaml,

Parasuraman, & Malhotra, 2002). SSTs that are viewed as having higher perceived control have lower perceived risk and higher perceived value (Zhu, Nakata, & Sivakumar, 2007). Dabholkar (1996) defined perceived control as the amount of control a customer feels and thinks he/she has over the process and the results. Lee and Allaway (2002) conceptualized controllability as a two dimensional construct composed of (a) one's perception of an opportunity to determine or design the service for him/herself rather than uniformly take what is offered, and (b) one's perception of flexibility in modifying his/her commitment to the SST by changing or reversing their decisions associated with its adoption (Lee & Allaway, 2002).

SSTs are perceived to be more controllable when customers are able to determine, design the service for themselves and flexibly change their decisions (Lee & Allaway, 2002). In the retailing context, perceived control is an intrinsic feeling of independence (Meuter et al., 2000) that can enhance consumers' evaluations of the self-service option and increase consumers' motivations (Collier & Sherrell, 2010) and the continued use of SSTs (Dabholkar, 1996). Additionally, the relationship between perceived control and the continued use of SSTs is moderated by waiting time (Daholkar, 1996). Perceived control is an important determinant of the repeated use of SSTs. Another hedonic factor, perceived fun/enjoyment, is also considered relevant in the retailing self-service context, as discussed in the next section.

2.6.1.2 Fun or Enjoyment of SSTs

Consumers not only feel satisfied with the extrinsic rewards of purchasing products or services but also need emotional rewards, such as purchasing-derived pleasure (Ahn, Ryu, & Han, 2007). Fun or enjoyment refers to the enjoyment a user experiences when they use technology-based self-service options (Dabholkar, 1994), and it is an intrinsic response of

consumers interacting with SSTs (Dabholkar, 1996). Davis, Bagozzi and Warshaw (1992) conceptualised fun or enjoyment using dimensions such as 'enjoyable', 'fun' and 'pleasant'. In addition to these dimensions, Dabholkar (1996) added 'entertaining' and 'interesting' to define fun or enjoyment and suggested that dimensions capturing novelty aspects of fun or enjoyment should be included in the context of service innovation.

Customers value the aspect of fun (Davis, Bagozzi, & Warshaw, 1992); when the option is more enjoyable, they are more likely to use the SST option (Koufaris, 2002). Novelty or anticipated enjoyment is likely to motivate customers to use SSTs (Dabholkar, 1996; Risch Rodie & Schultz Kleine, 2000). Fun or enjoyment is also an important antecedent of online shopping (Dabholkar & Bagozzi, 2002), Internet patronage (Eighmey & McCord, 1998), the intention to use a portal site (Heijden, 2003) and the adoption of Internet banking (Curren & Meuter, 2005). When consumers choose technology to shop, fun is a crucial and desirable outcome (Wolfinbarger & Gilly, 2001). Thus, consumers use SSTs because they are more pleasurable, fun or entertaining than the traditional shopping methods (Curran & Meuter, 2005). Wang (2012) found that fun and enjoyment has a positive effect on customer satisfaction in retailing SST contexts. Satisfaction is also positively associated with the usage of SSTs (Bhattacherjee, 2001; Chen & Chen, 2009; Wang, 2012). Therefore, it is reasonable to view fun or enjoyment as affecting the repeated use of SSTs within the retailing context.

However, the link between fun or enjoyment and attitudes towards SST usage can be moderated by factors such as human interaction and personal innovativeness in information technology (Collier, 2006) as well as the need for interaction with service employees, self-consciousness, perceived waiting time and social anxiety (Dabholkar & Bagozzi, 2002). In addition to hedonic factors, such as perceived control and enjoyment, as possible

determinants of the repeated use of SSTs, utilitarian factors, such as perceived ease of use and usefulness, are crucial determinants of the repeated use of SSTs in the retailing context.

2.6.2 Utilitarian Factors

Utilitarian factors refer to the rational motives to use SSTs behind logical cognitive processes (Guido, 2006). Previous studies have identified a wide range of factors affecting the adoption and use of SSTs (Table 2.1).

Table 2.1

Utilitarian Factors That Affect the Adoption and Use of SSTs

Constructs	**Definitions**	
Perceived complexity	The number and intricacy of steps required to perform the service and the degree of freedom allowed in a particular sequence of the process	Black, Lockett, Winklhofer & Ennew (2001)
Perceived relative advantage	The degree to which an innovation is perceived as being better than the idea it supersedes	Wang & Namen (2004)
Observability	The degree to which others can observe the result of innovation	Wang & Namen (2004)
Speed	The time taken for active delivery of a service	Dabholkar (1996)
Performance	Reliability and accuracy characteristics of a service	Dabholkar & Bagozzi (2002)

(Table 2.1 continues)

(Table 2.1 continued)

Constructs	**Definitions**	
Convenience	Ease of finding items	Dabholkar & Bagozzi (2002)
Reliability	The process and its result are reliable and accurate	Dabholkar & Bagozzi (2002)
Ease of use	The degree to which a person believes a particular system will be free of effort	Davis, Bagozzi, & Warshaw (1992)
Usefulness	The degree to which a person believes a particular system would enhance his or her job performance	Davis, Bagozzi, & Warshaw (1992)

Not all utilitarian factors examined in the previous studies are important to the current study context. In the retailing self-service context, perceived usefulness is a major determinant of attitudes towards SSTs (Childers et al., 2001). Perceived ease of use is an important driver of consumers' attitudes towards using SSTs (Rangarajan, Falk, & Schillewaert, 2007). Therefore, perceived ease of use and usefulness are the major utilitarian factors chosen in the current study context. Another reason for choosing perceived ease of use and perceived usefulness as important utilitarian factors is that these two constructs have been tested vigorously in the previous research and show high levels of validity and reliability applicable to the retailing context (Adams, Nelson, & Todd, 1992). In the following sections, these two major constructs are reviewed.

2.6.2.1 Perceived Ease of Use of SSTs

Customers tend to feel more satisfied when SSTs are easy to use (Meuter et al., 2000). When an innovation is easy to understand or use, it can be considered as possessing perceived ease of use (Zeithaml, Parasuraman, & Malhotra, 2002). Perceived ease of use is the degree to which a person believes a particular system is free of effort (Davis, 1986). Davis (1986) conceptualized ease of use as having dimensions such as clarity, ease and simplicity. Other researchers used different dimensions, such as effortless and user friendly, to define perceived ease of use (Weijters, Rangarajan, & Falk, 2005). Other dimensions are also added; for example, Dabholkar and Bagozzi's (2002) conceptualization of perceived ease of use in a library self-checkout setting added items related to instructions for using SSTs, e.g. "If instructions were provided in the X library, it would make it easier to operate the self-checkout machines" (p. 198). Although different researchers use different dimensions to conceptualize perceived ease of use, the definitions appear to be similar. Thus, in this study, we adopt the concept of ease of use from Dabholkar and Bagozzi's (2002) study because the library self-checkout has similarities to the current study context in that library and supermarket self-checkout machines are both used to facilitate transactions.

Perceived ease of use has positive effects on attitudes towards SSTs (Kim, Chun, & Song, 2009; Lanseng & Andreassen, 2007). However, its effect may be context-specific (Curran & Meuter, 2005). For example, perceived ease of use is an important factor for attitudes towards ATMs but not in the phone and Internet banking context (Curran & Meuter, 2005). Perceived ease of use also has positive effects on the usage of SSTs in different contexts (Guriting & Ndubisi, 2006; Hernan-dez & Mazzon, 2007; Wang et al., 2003; Venkatesh, 2000; Venkatesh & Davis, 1996). However, the effect of perceived ease of use on attitudes towards SSTs can

be moderated by technology readiness (Lin & Chang, 2011). Consumer traits, such as self-efficacy, have been found to reduce the effects between ease of use and attitudes towards using self-service ordering or verbal ordering in a restaurant (Dabholkar & Bagozzi, 2002). The relationship between ease of use and attitudes towards using self-services has been shown to be stronger when customers have higher needs for interaction with service employees (Dabholkar & Bagozzi, 2002).

Situational factors, such as waiting time, can negatively influence the relationship between ease of use and attitudes towards SSTs (Dabholkar & Bagozzi, 2002). Social anxiety negatively influences the link between ease of use and attitudes towards self-service ordering (Dabholkar & Bagozzi, 2002). However, training enhances users' perception of ease of use by increasing their self-efficacy in using library self-checkout machines (Zhao, Mattila, & Tao, 2008). In retailing, when consumers can easily handle technology, they exhibit positive attitudes towards SSTs (Rangarajan, Falk, & Schillewaert, 2007). As attitudes towards SSTs are antecedents to the repeated use of SSTs (Dabholkar & Bagozzi, 2002; Wang & Namen, 2004; Lee, Castellanos, & Choi, 2012; Xie, Shen, & Zhen, 2011), perceived ease of use will be used as a determinant of the continued use of SSTs in the current study. Whilst perceived ease of use is important in the retailing self-service context, perceived usefulness is also viewed as an important antecedent to the repeated use of SSTs in the retailing context.

2.6.2.2 Perceived Usefulness of SSTs

When technology is easier to use, customers perceive technology to be more useful because they do not have to figure out how to use it and can complete their tasks more efficiently (Bruner & Kumar, 2005). Perceived usefulness is the degree to which a person believes a

particular system would enhance his or her job performance (Davis, 1986). Perceived usefulness is also defined as the degree to which a particular system boosts job performance (Mathwick, Rigdon, & Malhotra, 2001) and the subjective probability of using a technology to help a user complete a task (Eriksson, Bagozzi, & Warshaw, 2001; Guriting & Ndubisi, 2006; Jaruwachirathanakul & Fink, 2005; Laforet & Li, 2005; Liao & Cheung, 2002; Polatoglu & Ekin, 2001). In the current study, an integrated concept of perceived usefulness stating that the degree of a particular system improves performance and assists a user in completing a task is adopted because SSTs are purposed to facilitate customers' purchase transactions (Weijters, Rangarajan, & Falk, 2005).

Perceived usefulness has a positive effect on the adoption of SSTs (Chen & Barnes, 2007; Guriting & Ndubisi, 2006). Moreover, it also has the highest positive correlation with customers' attitudes towards SSTs compared to perceived ease of use, reliability and fun (Weijters et al., 2007) and is one of the most important predictors of users' satisfaction in using government online services (Liu, Chen, & Zhou, 2006). Users' continued use of Internet banking can also be positively affected by the usefulness of the SST service (Eriksson & Nilsson, 2007). However, perceived usefulness has different effects in different SST contexts (Curran & Meuter, 2005). For instance, Curran and Meuter (2005) tested factors affecting attitudes towards three different self-service technologies—Internet, phone banking and ATMs—and found that the effect of perceived usefulness varied within different self-service technologies. For example, perceived usefulness is an important factor in attitudes towards ATMs and phone banking but not Internet banking.

Perceived usefulness can positively affect attitudes towards (Childers et al., 2001) and continued use of SSTs in the retailing context (Lin & Chang, 2011). Because consumers tend

to choose services with more potential benefits, SSTs perceived to be useful attract more consumers to use them (Meuter et al., 2000; Parasuraman, Zeithaml, & Malhotra, 2005). In addition to the importance of utilitarian factors, such as perceived ease of use and usefulness, to the retailing context, security factors, such as perceived risk and anonymity, can also affect the continued use of SSTs in the retailing context.

2.6.3 Security Factors

In addition to hedonic and utilitarian factors, customers tend not to use SSTs if they increase perceived risk and anxiety (Dowling & Staelin, 1994). Security factors are defined as motives to use or not use SSTs emanating from the challenge of reconciling internal and external threats (Thomas & Tow, 2002). Given that security factors, such as privacy, security and perceived risk, have been identified as important to the continued use of SSTs in previous studies (Albesa, 2007; Janda, Trocchia, & Gwinner, 2002; Pikkarainen et al., 2003), the definitions of privacy and security tend to be similar (Janda, Trocchia, & Gwinner, 2002). For example, privacy is defined as 'users' worries about the acquisition and subsequent use of information generated or acquired about them' (Albesa, 2007, p. 495), whereas security is divided into financial security and non-financial security (Janda, Trocchia, & Gwinner, 2002). Financial security refers to user's worries '...pertaining to conveying financial information (e.g., credit card number)' (Janda, Trocchia, & Gwinner, 2002, p. 418), whilst non-financial security refers to users' worries about 'revealing personal information (e.g., a telephone number)' (Janda, Trocchia, & Gwinner, 2002, p. 418).

In addition, a dimension of perceived risk, such as a privacy risk, also has a definition similar to privacy and security, e.g. customers worrying about loss or misuse of personal data (Zhao,

Mattila, & Tao, 2008). To avoid the duplication of these concepts, only perceived risk is used as one of the security factors in the current study. Another factor, perceived anonymity, potentially drives customers to use SSTs in retailing by reducing social threats (Joinson, 1999). This factor has a close relationship with perceived risk, therefore it is also classified as a security factor in the current study. Perceived risk and anonymity are both possible determinants of the repeated use of SSTs in the retailing context.

2.6.3.1 Perceived Risk of SSTs

Uncertainty of social and economic consequences leads to the perception of risk in some individuals (Zinkhan & Karande, 1991). Most consumers seek sufficient information to avoid the negative consequences of a purchase in the service context, and lack of sufficient information results in perceived risk (Murray, 1991). Consumers invest time, money and mental and physical energy to purchase a product or service; when uncertainty surrounds the outcome of the purchase, the consequences are perceived risk (Michell & Harris, 2005). Perceived risk is a multidimensional construct conceptualized as six types of risk: financial, performance, social, psychological, security and time/convenience (Black et al., 2001; Lee & Allaway, 2002). Perceived risk affects consumers' acceptance of innovation (Black et al., 2001) and willingness to try new technologies (Walker et al., 2002). Predictability, controllability and outcome desirability of consumers are also determinants of perceived risk and consumers' adoption of an innovation (Lee & Allaway, 2002).

In the retailing context, consumers' motives to patronize a store depend on the level of perceived risk (Mitchell & Harris, 2005). Retailers reducing the perceived risk in consumers can be vital to building a market share (Davidson, Sweeney, & Stampfl, 1988). Zhao, Mattila

and Tao (2008, p. 510) suggest eight dimensions of perceived risk to cover a wider perspective of perceived risk: financial, psychological, performance, psychosocial, time/convenience, security, privacy and physical risks. Four dimensions of risk—financial, psychosocial and physical—are particularly relevant to the retailing context (Mitchell & Harris, 2005). Whilst perceived risk is important to retailing contexts, anonymity is another possible determinant of the repeated use of SSTs in the retailing context.

2.6.3.2 Perceived Anonymity of SSTs

The theory of anonymity stems from the theory of de-individuation in social psychology (Postmes & Spears, 1998). De-individuation is a psychological state in which a person's self-evaluation and evaluation apprehension decrease, thus causing anti-normative or dis-inhibited behaviours in a social group environment (Diener, 1980). Diener (1980) further explained the phenomenon as when a person's attention is drawn outward and his/her self-awareness is decreased, thereby undermining conscious behaviour and decreasing a person's capacity to monitor planned behaviours in terms of internal standards. Anonymity is considered to be associated with self-awareness (Gomez, 2003); low self-awareness is affected by high anonymity (Kinney, Smith, & Donzella, 2001). Because self-awareness is related to de-individuation (Reicher, Spears, & Postmes, 1995; Spears & Lea, 1992, 1994), anonymity is also thought to be related to behaviour of humans in a crowd (Postmes & Spears, 1998).

Anonymity is defined as a '...condition that frees individuals from social evaluation or scrutiny' (Posonneault & Heppel, 1998, p. 95). Gomez (2003) suggested that individuals have no fear of social judgment when they perceive themselves to be anonymous. Prior research

has identified two kinds of anonymity: in-group and out-group anonymity (Reicher & Levine, 1994; Reicher, Spears, & Postmes, 1995). In-group anonymity refers to a situation in which respondents under observation are anonymous to other participants, whereas out-group anonymity involves respondents under observation who are anonymous to the experimenter/researchers (Reicher, Spears, & Postmes, 1995).

Anonymity can be either visual or nominal anonymity (Spears, Lea, & Rogers, 2001). Visual anonymity involves individuals who are not visually identified, and nominal anonymity involves individuals who are not identified by name (Spears, Lea, & Rogers, 2001). In computer science research, other forms of anonymity, such as source anonymity, are added when the source of the message is not identified and the message is transferred (Kahai, Avolio, & Sosik, 1998). Scott argued that individuals perceive anonymity as affected by visual cues but not physical distance. Scott (1999) suggested that there is a heightened perception of anonymity when individuals communicate with each other in different locations because participants are not physically visible to each other. Face-to-face communication is considered to have a low level of anonymity (Gomez, 2003). Thus, consumers can choose to use SSTs because they need more anonymity and do not want face-to-face contact with service employees (Gomez, 2003).

Prior online studies have examined self-consciousness, social anxiety, self-esteem and social desirability in anonymous and non-anonymous situations (Joinson, 1999). Participants using the Internet under anonymous situations had lower social anxiety, greater feelings of social desirability and higher self-esteem (Joinson, 1999). Social anxiety is negatively related to attitudes towards SSTs and behavioural intentions (Kumar et al., 2007). Moreover, participants with different levels of autonomy and affiliation demonstrate different desires for

anonymity (Morio & Buchholz, 2006). Morio and Bushholz found that Eastern cultures need more anonymity than Western cultures. Although anonymity may be subject to cultural differences, these two studies revealed anonymity characteristics worth further investigation in the SST context. Because perceived anonymity reduces social anxiety and increases self-esteem (Joinson, 1999), it is anticipated that anonymity influences the repeated use of SSTs in the retailing context. Consumers are likely to feel more comfortable using SSTs under lower social anxiety, higher self-esteem and anonymous conditions.

Perceived anonymity is considered a dimension of security factors because it is likely to be associated with perceived psychosocial risk. Psychological risk is a dimension of perceived risk in which consumers experience social embarrassment and loss of self-esteem. Consumers perceiving low anonymity consistently have higher social anxiety and lower self-esteem (Joinson, 1999). Perceived anonymity and perceived psychosocial risk are anticipated to be associated. Therefore, anonymity is also classified as a dimension of security factors in the current study.

Hedonic, utilitarian and security factors are relevant to the retailing self-service context. The hedonic factor perceived control has been found to affect the repeated use of SSTs. Moreover, fun/enjoyment affects customer satisfaction with SSTs. The utilitarian factors perceived ease of use and usefulness affect attitudes towards SSTs. Furthermore, the security factors perceived risk and anonymity are possible determinants of the repeated use of SSTs. Although attitudes towards and satisfaction with SSTs are important determinants of the continued use of SSTs, the knowledge of how hedonic, utilitarian and security factors affect the repeated use of SSTs is insufficient. This indicates the importance of understanding the mediators of the repeated use of SSTs.

2.7 Mediators of the Repeated Use of SSTs

A mediating effect exists when a third variable/construct intervenes between two other related variables (Hair et al., 2006). Baron and Kenny (1986) proposed that to qualify as a mediator, the construct must fulfil three basic conditions: (a) the independent variable must be related to the mediator; (b) the mediator must be related to the dependent variable; and (c) the relationship between the independent variable and the dependent variable must be reduced from significant to insignificant (full mediation) or must remain significant but be weakened (partial mediation). Baron and Kenny (1986) further asserted that there must be X-Y, i.e. a total effect between independent to dependent variable, to be mediated. Otherwise, mediation never exists.

However, showing mediation by testing the significance of total effect was later found to be erroneous because there may be suppressor effects (Judd & Kenny, 2010; MacKinnon & Luecken, 2008; MacKinnon et al., 2002; Shrout & Bolger, 2002). A suppressor effect exists when the indirect effect and the direct effect are both significant and have opposite signs (Zhao, Lynch, & Chen, 2010). In this case, the total effect is insignificant when mediation still exists (e.g. when X is an independent variable, M is a mediator and Y is a dependent variable, an indirect effect is the product effect of X->M and M->Y; a direct effect is the effect of X->Y when the effects of X->M and M->Y are controlled) (Zhao, Lynch, & Chen, 2010). Thus, researchers argue that testing the total effect in attesting mediation is inessential or is incorrect. Instead, mediation should only be shown by testing the significance of the indirect effects (Judd & Kenny, 2010; MacKinnon & Luecken, 2008; MacKinnon et al., 2002; Shrout & Bolger, 2002; Zhao, Lynch, & Chen, 2010).

Although the criteria set by Baron and Kenny (1986) has been criticized, identifying mediators is important to marketing research (Mitchell & Olson, 2000). Mediation analysis helps researchers understand how and by what means a causal effect occurs between independent and dependent variables (Preacher & Hayes, 2008) and provides a deeper understanding of the process beyond merely descriptive relationships (Preacher & Hayes, 2004). Mediation analysis is also important to understanding the co-production process because the relationships amongst factors related to customers' participation in co-production can also be considered and the underlying process can be further known (Raykov & Marcoulides, 2000). Thus, mediation analysis is considered essential in SST contexts because using SSTs is a commonly existing co-production process (Hilton & Hughes, 2012).

Despite the importance of mediation analysis, most prior SST studies only showed relationships between independent variables and mediators and between mediators and dependent variables; standard statistical procedures for testing mediation were not conducted. For instance, significant positive relationships were found between perceived usefulness, perceived ease of use, optimism, innovativeness, perceived control, convenience and satisfaction with SSTs and between satisfaction with and continued use of SSTs (Chen, Chen, & Chen, 2009; Wang, 2012). Other relationships were also verified. Self-efficacy has been found to have a positive effect on perceived ease of use, and perceived ease of use affects the repeated use of SSTs (Zhao, Mattila, & Tao, 2007). Additionally, perceived ease of use has positive relationships with self-efficacy, technology discomfort, perceived risk and personal contact, and these factors eventually affect the continued use of SSTs (Rose & Fogarty, 2006).

Attitudes towards staff demonstrate a positive relationship with global attitudes towards the firm, and these attitudes eventually positively influence the repeated use of ATMs (Curren, Meuter, & Surprenant, 2003). Attitude towards ATMs, phone and online banking positively affect the global attitude towards SSTs and positively influence the continued use of ATMs, banking by phone and online banking (Curren, Meuter, & Surprenant, 2003). In the retailing context, ease of use, usefulness and enjoyment are positively related to attitudes towards SSTs, and these attitudes positively affect the repeated use of SSTs (Lee, Hsieh, & Hsu, 2011; Weijters et al., 2007). Although these relationships may imply mediating effects between constructs, standard statistical procedures for mediation analysis were not conducted. Without conducting proper statistical procedures to test mediation, the relationships between variables and the co-production process of using SSTs may not be fully considered (Raykov & Marcoulides, 2000).

A recent article used proper statistical procedures to test the mediating effect and found that speed of transaction, exploration and trust mediated the relationship between perceived control, convenience and the future use of SSTs (Collier & Sherrell, 2010). However, this paper was not designed to argue for the mediating effect and the existence of co-production process in the SST context; instead, it only presented the results of mediation analysis for referencing purposes. However, Meuter et al. (2005) used Baron and Kenny's (1986) procedures to argue for the existence of co-production by testing the mediating effect of consumer readiness in different SST contexts. Meuter et al. (2005) proposed consumer readiness as a mediator on the relationships between the innovative characteristics of SSTs, individual differences and SST trials; this mediator comprises key factors to effective co-production such as motivation, ability and role clarity (Bettencourt et al., 2002; Legnick-Hall, 1996; Auh et al., 2007).

Effective co-production nurtures customers' loyalty and positive attitudes towards SSTs (Auh et al., 2007) as well as customer satisfaction (Legnick-Hall, 1996); it also enhances customers' willingness to try SSTs (Meuter et al., 2005). When the mediating roles of these consumers participating in the process of trying SSTs are known, the co-production process is better understood (Meuter et al., 2005). Meuter et al. (2005) conducted two studies testing the mediating effect of consumer readiness on the link between innovative characteristics such as compatibility, relative advantage, complexity, observability, trialability, perceived risk and SST trials. They found a mediating effect of consumer readiness on the link between individual differences such as inertia, technology anxiety, need for interaction, previous experience, demographics and SST trials. However, the relationship between relative advantage and SST trials was not mediated by consumer readiness. Consumer readiness was a stronger predictor of consumers' preparedness to try SSTs than innovation characteristics and individual differences. Further, role clarity and extrinsic motivation were found to be the dominant dimensions of consumer readiness, whilst intrinsic motivation only had a marginal effect on SST trials.

Meuter et al.'s (2005) studies are important because they pioneered the investigation of the mediating effect in the SST context and reminded researchers to pay more attention to identifying mediators to better understand the SST adoption process. These studies also explicitly indicate the need to conduct further studies on the co-productive process of using SSTs because successful deployment of SSTs relies not only on the SST but also on consumers' contribution to the co-production process. Thus, understanding the interactions between the factors related to SSTs and co-producers is essential. Nevertheless, Meuter et al.'s (2005) studies indicate the scarceness of mediation studies related to SST contexts. First, the mediation analysis procedures used in Meuter et al.'s (2005) studies, based on Baron and

Kenny (1986), should be updated. Meuter et al. (2005) only verified the relationships between independent variables, mediators and dependent variables to infer the existence of mediation. Second, initial trials and the repeated use of SSTs are two different consumer decision stages (Bitner et al., 2002); whether Meuter et al.'s (2005) findings are generalized to the stage of the repeated use of SSTs is questionable.

Factors affecting customers' participation in co-production are not limited to motivation, ability and role clarity. Other factors relevant to SST co-production, e.g. trust as an important factor affecting the use of SSTs, should also be examined (Yeh & Li, 2009; Collier & Sherrell, 2010). Finally, Meuter et al.'s (2005) model did not mention customers' autonomy in choosing SST options. Given that forced use of SSTs negatively affects the use of SSTs (Liu, 2012) and customers' participation in co-production (Bendapudi & Leone, 2003), the theory of motivation incorporated by Meuter et al. (2005) should be updated to SDT (Deci & Ryan, 2000a) because SDT links the degree of autonomy to different forms of motivation (Deci & Ryan, 2000a). Despite these weaknesses, Meuter et al.'s (2005) studies have recently gained attention from Kim, Christodoulidou, and Choo (2013), who also found that consumer readiness was composed of ability and role clarity as well as intrinsic and extrinsic motivation to significantly mediate the relationship between customers' previous experiences and the future use of restaurant kiosks. Although this study analysed the mediating effect using more appropriate statistical procedures, such as bootstrapping method (Preacher & Hayes, 2008), the individual mediating effect of each consumer readiness dimension on the relationship between independent and dependent variables was not tested. Consumer readiness dimensions were also not re-conceptualised according to different consumer decision stages (e.g. the repeated use of SSTs) and the latest development of motivational theories. Thus, the specific effects of mediators of the repeated use of SSTs were overlooked.

Understanding the repeated use of SSTs and identifying relevant mediators are important, yet they receive limited attention in SST research. Therefore, the current study contributes to the literature by addressing this important gap and re-conceptualizing the consumer readiness dimensions according to the repeated use of SSTs consumer decision stage and the latest developments in motivational theories.

2.8 Re-conceptualize Consumer Readiness at the Repeated Use of SSTs Stage

Consumer readiness is a condition or state in which a consumer is prepared and likely to use an innovation for the first time (Meuter et al., 2005). In addition to consumer readiness, prior SST studies have investigated technology readiness. Since these two terms are similar and easily confused, their differences should be clarified. Technology readiness (TR) refers to people's propensity to embrace and use new technologies to accomplish goals in their home life and at work (Parasuraman, 2000). TR is concerned with consumers' propensities to embrace technology, while consumer readiness is concerned with whether consumers are prepared to use technology. Thus, these two concepts are different. Because the repeated use of SSTs is investigated in the current study, the definition of consumer readiness should be further modified to a condition or state in which a consumer is prepared to use an innovation in the future. The necessity of differentiating the initial trial and repeated use of SSTs is attested by Bitner et al. (2002).

Bitner et al. (2002) identified six stages of the decision process in an SST context: awareness, investigation, evaluation, trial, repeated use and commitment. Customers must be aware of the existence of an SST service. Next, they collect relevant information and evaluate the

service. After the evaluations, they can try the service and commit to using it (Bitner et al., 2002).

Although initial adoption and the repeated use of SSTs are related, they are actually two different consumer decision stages that deserve attention (Bitner et al., 2002). Meuter et al. (2005) suggested that further research is needed to explore other stages of consumer decisions beyond the initial trial stage. Considering these points, we argue that the consumer readiness dimensions incorporated by Meuter et al. (2005) should be re-conceptualized at the repeated use of SSTs consumer decision stage. Due to the importance of trust in driving customers' participation in co-production (Geyskens, Steenkamp, & Kumar, 1998; Lusch, Brown, & Brunswick, 1992; Venkatraman & Subramaniam, 2002; Auh et al., 2007; Gruen, Summers, & Acito, 2000) relevant to SST contexts (Yeh & Li, 2009; Collier & Sherrell, 2010) and the latest SDT development (Deci & Ryan, 2000a, 2000b), we re-conceptualize consumer readiness as having four dimensions: trust, self-determined motivation, ability and role clarity. The importance of these dimensions to the repeated use of SSTs consumer decision stage is discussed and justified below.

Trust. Trust is a complex, multi-disciplinary concept (Arnott, 2007; McAllister, 1995; Mukherjee & Nath, 2007). Rosseau et al. (1998) defined trust as a 'psychological state comprising the intention to accept vulnerability based on positive expectations of the intentions or behaviours of another' (p. 395). Arnott (2007) defined trust as '...a belief in the reliability of a third party, particularly when there is an element of personal risk' (p. 15). Mayer, David and Schoorman (1995) defined trust as

> ...the willingness of a party to be vulnerable to the actions of another party based on the expectation that the other will perform a particular action important to the trustor, irrespective of the ability to monitor or control that other party. (p. 36)

There appears to be no universal definition of trust accepted by all scholars (Rosseau et al., 1998). However, Doney, Cannon and Mullen (1998) and Wicks, Berman and Jones (1999) suggest that the definition of trust differs in different cultural settings. Mayer, Davis and Schoorman (1995) also proposed that trust be defined according to different disciplines, such as interpersonal and organisational disciplines, and different situations, such as stakes involved, the balance of power, the level of perceived risk and alternatives available to the trustor. Therefore, trust should be defined specifically according to different contexts.

McAllister (1995) proposed two dimensions of trust: cognitive trust based on reasoning and affective trust based on underlying feelings. Other dimensions of trust have been suggested in previous literature (Bart et al., 2005; Newhom et al., 2004; Yoon, 2002). For example, some researchers view confidence as an important dimension of trust (Moorman, Deshpande, & Zaltman, 1993; Morgan & Hunt, 1994). As consumers develop trust, they have confidence in an exchange partner's reliability and integrity (Morgan & Hunt, 1994). Consumer confidence arises when they judge the overall quality or character of a service as trustworthy (Malaga, 2001). Thus, the ability or competence of the service provider is viewed as another dimension of trust since consumer trust is related to how well the service provider affects the service (Lee & Turban, 2001; Sitkin & Roth, 1993). Other scholars believe that perceived risk is associated with trust (Coleman, 1990). Johnson-George and Swap (1982) suggested that trust increases people’s willingness to take risks. Moreover, Mouzas, Hennerberg and Naude (2008) conceptualize reliance as another dimension of trust and then conceptualize reliance as the

degree to which businesses are tied together by need. Lee and Trim (2006) suggested that successful partnerships depend on mutuality and resilience as well as trust.

Morgan and Hunt (1994) linked trust to commitment. Relationship commitment is an enduring desire to maintain a valued relationship (Moorman, Deshpande, & Zaltman, 1993). Morgan and Hunt's (1994) commitment-trust theory suggested that business partners who value trust in a relationship would commit themselves to such relationships. The commitment-trust theory suggests that relationship commitment and trust are mediators between antecedents (e.g. relationship termination cost, relationship benefits, shared values, communication and opportunistic behaviours) and five outcomes (e.g. acquiescence, propensity to leave, co-operation, functional conflict and decision-making uncertainty) (Morgan & Hunt, 1994). Commitment-trust theory also posits that successful relationships in marketing are built on trust and relationship commitment (Morgan & Hunt, 1994). Trust and relationship commitment reduce perceived risk and short-term shifting behaviour by exchanging long-term benefits because business partners attempt to preserve relationship investments (Morgan & Hunt, 1994). Prior research showed that in countries such as Sweden, Australia and the United Kingdom, service firms maintain international relations through trust and commitment (Friman et al., 2002). Relationships in non-profit organisations also rely on trust and commitment, although material benefits and termination costs are replaced by non-material benefits and termination costs (MacMillan et al., 2005).

In SST contexts, Mukherjee and Nath (2007) found that in online environments, privacy and security features are key antecedents to trust instead of the antecedents proposed by Morgan and Hunt's (1994) commitment-trust theory; in addition, the repeated use of online services was a consequence of trust and relationship commitment. Egger (2000) found that the major

psychological barriers to consumer online purchasing were linked to the difficulty of using the technology and the reluctance to trust online payment methods. Customer trust in technology is also influenced by different performance measures, such as reliability, navigability, order fulfilment, speed and customization of electronic transactions (Lee & Turban, 2001). Trust was also positively related to perceived ease of use and usefulness in an online purchase context (Wen, Prybutok, & Xu, 2011). Moreover, perceived user trust is a strong determinant of user satisfaction (Lu, Wang, & Hayes, 2012) and continued use of an online tax system (Wang, 2003). Trust in technology has a direct impact on attitudes towards Internet banking (Selvan, Arasu, & Sivagnanasundaram, 2011). However, these online performance measures are not ready to be adapted to the current study context.

Although trust has been researched in online SST settings, it has been under-researched in other SST contexts. Because trust is context-specific, it should be investigated in other SST settings. In the current retailing context, consumer trust is understood as '...contribut[ing] to satisfaction and long-term orientation over and beyond the effects of economic outcomes of the relationship' (Geyskens, Steenkamp, & Kumar, 1998, p. 67). Trust in technology is defined as '...the subjective probability by which an organisation believes that the underlying technology infrastructure and control mechanisms are capable of facilitating inter-organisational transactions according to its confident expectations' (Ratnasingam & Pavlou, 2003, p. 25). High-trust relationships lead to higher profits and flexibility in organisations (Arnott, 2007) and achieve long-term mutual benefits of relationships (Doney, Cannon, & Mullan, 1998; Wicks, Berman, & Jones, 1999). Thus, we argue that trust is important to the repeated use of SSTs consumer decision stage.

Trust has been shown to be a mediator between component attitudes and future intentions in high relational customers (consistent subscribers) buying theatre tickets (Garbarina & Johnson, 1999). In technology settings, trust has been found to mediate the relationship between satisfaction with and the continued use of 3G services (Yeh & Li, 2009). In SST contexts, trust has been identified as a mediator for relationships between perceived control and the repeated use of SSTs (Collier & Sherrell, 2010) as well as between convenience and the future use of SSTs (Collier & Sherrell, 2010). Based on this evidence, the current study argues that trust is an important factor driving customers' participation in co-production (Geyskens, Steenkamp, & Kumar, 1998; Lusch, Brown, & Brunswick, 1992; Venkatraman & Subramaniam, 2002; Auh et al., 2007; Gruen, Summers, & Acito, 2000). In addition, it should be considered as a mediator of the repeated use of SSTs and added as a consumer readiness dimension in the current study context. In addition to trust, self-determined motivation can also be viewed as important to the repeated use of SSTs.

Self-determined motivation. Self-determined motivation proposed by SDT is composed of a continuum of motivation, whilst motivation has traditionally been divided into intrinsic and extrinsic motivation (Deci & Ryan, 1991). For instance, Meuter et al. (2005) considered intrinsic and extrinsic motivation as separate, unrelated constructs and extrinsic motivation as a self-interest factor driven by time saving and higher efficiency, thereby contradicting self-determination theory. However, some researchers argue that defining extrinsic motivation as driven by self-interests, independent of intrinsic motivation, is relatively simplistic (Deci & Ryan, 1991) because evidence shows that extrinsic motivation enhances or diminishes intrinsic motivation (Koestner et al., 1984; Ryan, Mims, & Koestner, 1983). Such evidence suggests that intrinsic and extrinsic motivations are inter-related. Thus, the concept of intrinsic and extrinsic motivation used by Metuer et al. (2005) needs further investigation.

The application of SDT could shed light on further understanding the SST co-production process because it links intrinsic motivation to extrinsic motivation and the degree of autonomy to different forms of motivation (Deci & Ryan, 2000a, 2000b).

Self-determined motivation is important to the repeated use of SSTs because it is related to the internalization process, which has a positive effect on an individual's engagement in activities (Deci & Ryan, 2000b). Empirically, self-determined motivation enhances persistence (Teixera et al., 2012), student competence and school performance (Fortier, Vallerand, & Guay, 1995; Deci, Koestner, & Ryan, 1999; Vallerand et al., 1992, 1993). Given that self-determined motivation affects an individual's persistent behaviour and that motivational forces are important drivers for customers' participation in co-production (Etgar, 2006; Brennan & Turnbull, 1999; Garbarino & Johnson, 1999; Hakansson & Snehota, 1995), it is likely that self-determined motivation affects the repeated use of SSTs. Further, self-determined motivation has been identified as a mediator in different contexts, such as dental clinic attendance (Halvari et al., 2010) as well as the acceptance and use of ICT (Techatassanasoontorn & Tanvisuth, 2008). Considering the above factors, self-determined motivation can be considered a potential mediator of the repeated use of SSTs. Thus, in the current study, the motivational theory used by Meuter et al. (2005) is replaced by self-determination theory (SDT). Self-determined motivation is a potential mediator that is likely to affect the repeated use of SSTs. Another important factor affecting the continued use of SSTs is ability.

Ability. Ability is another term for self-efficacy (Meuter et al., 2005). Self-efficacy refers to individuals' beliefs about their capabilities to perform a task (Bandura, 1997). Meuter et al. (2005) defined ability as the level of knowledge and skill customers have to confidently

perform a task. Thus, these two concepts are similar and inter-changeable throughout this thesis. Theoretically, ability or self-efficacy affects effort, expenditure and perseverance (Bandura, 1986). With high levels of ability or self-efficacy, individuals exert more effort and demonstrate behaviour that is more persistent (Bandura, 1994).

According to Meuter et al. (2005), ability is what customers are capable of doing instead of what they know or want to do. It is essential for driving customers' participation in co-production (Lusch, Brown, & Brunswick, 1992; Xue & Harker, 2002; Auh et al., 2007; Crespin-Mazet & Ghauri, 2007; Hitt et al., 2000; Lusch, Vargo, & O'Brien, 2007; Miles & Snow, 2007; Subramani & Venkatraman, 2003). When consumers believe they are capable of performing a task, they use a service; otherwise, they stop using it (Meuter et al., 2005). Self-efficacy is positively associated with job satisfaction (Shoemaker, 1999).

In technology settings, self-efficacy has a negative effect on job burnout levels (Salanova, Peiro, & Schaufeli, 2002) and positively affects experiences using technology (Kinzie, Delcourt, & Powers, 1994) as well as expectations for the outcomes of using computers, emotional reactions to computers and actual computer use (Compeau & Higgins, 1995). Self-efficacy has also been found to positively affect ease of use and usefulness (Igabria & IIvari, 1995; Ramayah, Aafaqi, & Ignatius, 2004), the usage of web-based systems (Yi & Hwang, 2003) and the continued use of SSTs (Wang, Harris, & Patterson, 2013). Ability is also a mediator of initial adoption (Meuter et al., 2005) and the future use of SSTs (Rose & Fogarty, 2006). Considering the above evidence, ability not only affects initial adoption (Meuter et al., 2005) but also the continued use of SSTs. Therefore, ability is an important factor in the current context. In addition to ability, Meuter et al. (2005) proposed another

consumer readiness dimension, role clarity, which potentially affects the repeated use of SSTs.

Role clarity. Individuals need to understand the information required to perform a job (Kelly & Hise, 1980). Meuter et al. (2005) defined role clarity as the degree of a customer knowing what is expected of him/her in trying SSTs. Consumers who do not have a clear understanding of what to do are less likely to use SSTs (Meuter et al., 2005). When customers understand what is required of them in service production, they have a higher chance of participating in co-production (Auh et al., 2007). Role clarity has been found to influence work performance (Churchill et al., 1985), participation in services (Larsson & Bowen, 1989) and the future use of restaurant kiosks (Kim, Christodoulidou, & Choo, 2013). Role clarity has also emerged as a mediator in the relationship between the innovative characteristics of SSTs, individual differences and SST trials (Meuter et al., 2005). Because SST trials are related to the repeated use of SSTs (Bitner et al., 2002) and role clarity positively influences the future use of restaurant kiosks (Kim, Christodoulidou, & Choo, 2013), it is also expected to have a positive impact on the repeated use of SSTs. In addition to role clarity, ability, self-determined motivation and trust are important to the repeated use of SSTs. These factors are also expected to be inter-related.

2.9 The Linkages between Trust, Self-determined Motivation, Role Clarity and Ability

Customers are more motivated to use a service when their behaviour is internalized (Deci & Ryan, 2000b). This internalization process is affected by customers' perceived ability (Deci & Ryan, 2000a). Intrinsic motivation also affects customers' willingness to learn, and this

learning process affects their perceived role clarity (Meuter et al., 2005). Thus, self-determined motivation, ability and role clarity are expected to be related.

When customers encounter uncertainty, ambiguous situations and procedures, they are more anxious (Duronto, Nishida, & Nakayama, 2005). As anxiety rises, customers feel less confident, have lower perceived ability (Abel & Larkin, 1990; Bohlin & Hunt, 1995; Mamassis & Doganis, 2004) and are less intrinsically motivated to use the service (Zakaria & Nordin, 2008; Shore & Shannon, 2010). Thus, role clarity, ability and self-determined motivation should also be related.

Failed experiences using SSTs affect consumers' self-evaluation and their judgment on whether the services are reliable and secure (Kim, Kim, & Hwang, 2009). Consumers form reactions and evaluations towards services based on their own perceived abilities (Wood & Bandura, 1989). When consumers have lower perceived abilities, consumer trust is also reduced and they are less intrinsically motivated to use services (Kim, Kim, & Hwang, 2009). Thus, ability, trust and self-determined motivation are related.

Customers not only consider whether the job is done but also how well the job is done and whether their satisfaction and well-being are concerned (Harrison & Smith, 2004). When these factors are not considered, customers lose trust (Harrison & Smith, 2004). Trust is also affected by uncertainties and ambiguities (Harrison & Smith, 2004). When uncertainties and ambiguities are present, customers do not trust services (Harrison & Smith, 2004). When customers do not trust services, they have lower intrinsic motivation to use those services (Jaasma & Koper, 1999; Sargeant & Lee, 2001). The reduction of customers' trust also decreases their confidence and perceived ability of using services (Hahn & Kim, 2009; Lee &

Lin, 2009; Mayer, Davis, & Schoorman, 1995). Therefore, trust, ability, role clarity and self-determined motivation should have close links.

As discussed above, trust, self-determined motivation, role clarity and ability are anticipated to be inter-related. They are also important drivers of customers' participation in co-production and mediators of the repeated use of SSTs. Thus, consumer readiness, which composed of trust, self-determination, ability and role clarity, is an important determinant of the repeated use of SSTs. Given that attitudes towards and satisfaction with SSTs have close links with the repeated use of SSTs, we expect that trust, self-determined motivation, role clarity and ability also enhance customers' attitudes towards and satisfaction with SSTs. Thus, we argue that consumer readiness plays a mediating role on the relationships between the hedonic, utilitarian and security factors of SSTs and customers' attitudes toward, satisfaction with and repeated use of SSTs.

2.10 Summary

Understanding the repeated use of SSTs is important in SST contexts. Attitudes towards and satisfaction with SSTs have positive effects on the repeated use of SSTs. Hedonic, utilitarian and security factors are possible determinants of the repeated use of SSTs in retailing contexts. However, how hedonic, utilitarian and security factors affect the repeated use of SSTs is unknown. Identifying mediators of the repeated use of SSTs is essential because this provides a deeper understanding of the co-production process and why customers continue to use SSTs.

Although satisfaction with and attitudes towards SSTs have been found to be possible mediators of the repeated use of SSTs, previous research has largely ignored mediation analysis. Meuter et al. (2005) conducted two pioneering mediation studies related to consumer readiness. However, the relative importance and generalisability of each consumer readiness dimension are unknown. To fill this research gap, the current study re-conceptualizes consumer readiness and includes trust, self-determined motivation, ability and role clarity as essential dimensions in the construct, which potentially influence customers' participation in co-production and the repeated use of SSTs.

Trust, self-determined motivation, ability and role clarity are anticipated to be inter-related drivers of customers' participation in co-production and potential mediators of the repeated use of SSTs. Because attitudes towards and satisfaction with SSTs have close links to the repeated use of SSTs, it can be postulated that trust, self-determined motivation, ability and role clarity constitute a new consumer readiness that mediates the relationship between hedonic, utilitarian and security factors and attitudes towards, satisfaction with and repeated use of SSTs. In addition, attitudes towards and satisfaction with SSTs also mediate the relationship between consumer readiness and the repeated use of SSTs. Thus, the relationships between these factors, the conceptual model and propositions are presented in the following section.

2.11 Conceptual Framework and Propositions

In this section, the conceptual framework and propositions are justified. Although the direct relationships between hedonic, utilitarian and security factors on attitudes towards, satisfaction with and repeated use of SSTs are not important for showing mediating effects

(Judd & Kenny, 2010, MacKinnon & Luecken, 2008; MacKinnon et al., 2002; Shrout & Bolger, 2002; Zhao, Lynch, & Chen, 2010), they are important to the current study. The justification of the mediating effects of consumer readiness, attitudes towards and satisfaction with SSTs is based on the indirect effects of independent variables on dependent variables through the mediators. In other words, based on empirical evidence, we argue that links are present between the independent variables, e.g. hedonic, utilitarian and security factors, and the mediators, e.g. consumer readiness. We also argue that links are present between the mediators, e.g. consumer readiness, and the dependent variables, e.g. repeated use of SSTs (Judd & Kenny, 2010; MacKinnon & Luecken, 2008; MacKinnon et al., 2002; Shrout & Bolger, 2002; Zhao, Lynch, & Chen, 2010). These justifications and the related propositions are presented in the following sections.

2.11.1 The Mediating Effect of Consumer Readiness on the Relationship between Hedonic Factors, Utilitarian Factors and Security Factors and the Repeated Use of SSTs

According to TPB, perceived control (a hedonic factor) is an important driver of consumer behaviour (Ajzen, 1991; Gollwitzer, 1999; Ajzen, 2002; Armitage & Conner, 1999, 2001; Schifter & Ajzen, 1985; Sheeran, 2002) and a critical element in driving the continued use of technology (Collier & Sherrell, 2010; Dabholkar, 1996; Kuan, Ho, & Chang, 2011; Zeithaml, Parasuraman, & Malhotra, 2002; Zhu et al., 2007). Fun/enjoyment positively influences consumers' intentions to use online shopping (Dabholkar & Bagozzi, 2002), Internet patronage (Eighmey & McCord, 1998) and portal site usage (Heijden, 2003). Fun/enjoyment also positively affects the adoption of Internet banking (Curran & Meuter, 2005). Moreover, perceived usefulness and ease of use (utilitarian factors) have positive impacts on the use of technology, based on TAM (Guriting & Ndubisi, 2006; Hernan-dez & Mazzon, 2007; Wang

et al., 2003; Venkatesh, 2000). Perceived ease of use positively affects the usage of SSTs in various contexts (Guriting & Ndubisi, 2006; Hernan-dez & Mazzon, 2007; Venkatesh, 2000; Venkatesh & Davis, 2000; Wang et al., 2003). Research also suggests that perceived usefulness has a significant positive effect on consumers' intentions to adopt SSTs (Chen & Barnes, 2007; Guriting & Ndubisi, 2006; Lin & Chang, 2011). In addition, perceived risk and anxiety (security factors) have negative impacts on customers' participation in SST co-production, according to the theory of co-production (Dowling & Staelin, 1994). Perceived risk has been found to negatively affect consumer acceptance of innovation (Balck et al., 2001) and willingness to try new technologies (Walker et al., 2002). Perceived anonymity is expected to increase self-esteem and reduce anxiety (Joinson, 1999). Thus, perceived anonymity is expected to have a positive effect on the repeated use of SSTs. We argue that hedonic, utilitarian and security factors have direct effects on the repeated use of SSTs.

Perceived control (a hedonic factor) has been shown to have a positive effect on intrinsic motivation (Collier & Sherrell, 2010). Customers are more intrinsically motivated when they can customize their experience (Collier & Sherrell, 2010). When customers feel they are in control, their perceived role clarity (Meuter et al., 2005), perceived ability (Hahn & Kim, 2009; Lee & Lin, 2009; Mayer, Davis, & Schoorman, 1995) and trust (Kim, Kim, & Hwang, 2009) are also enhanced. Moreover, fun/enjoyment of SSTs meets customers' lifestyle demands and motivates customers to use SSTs (Dabholkar, 1996; Risch Rodie & Schultz Kleine, 2000). It also affects customers' willingness to learn to use SSTs (Meuter et al., 2005; Harrison & Smith, 2004). When customers are more willing to learn, their perceived role clarity, ability (Meuter et al., 2005) and trust are also enhanced (Harrison & Smith, 2004). Therefore, perceived control and fun/enjoyment (hedonic factors) are anticipated to have

positive effects on trust, self-determined motivation, ability and role clarity. Thus, the direct effects of hedonic factors on consumer readiness are inferred.

Ease of use (a utilitarian factor) positively affects customer trust when options are more easily found and procedures are less ambiguous (Wen, Prybutok, & Xu, 2011). Ambiguous procedures negatively affect customers' perceived role clarity (Meuter et al., 2005), trust (Hahn & Kim, 2009; Lee & Lin, 2009), intrinsic motivation (Jaasma & Koper, 1999; Sargeant & Lee, 2004) and ability (Abel & Larkin, 1990, Bohlin & Hunt, 1995, Mamassis & Doganis, 2004). Perceived usefulness (a utilitarian factor) also positively affects customers' perceived ability to use SSTs (Igbaria & IIvari, 1995; Ramayah & Aafaqi, 2004). Customers are more willing to learn how to use SSTs if they find the technology useful and advantageous (Meuter et al., 2005). This reduces the uncertainty and ambiguity of using SSTs and enhances customers' perceived role clarity (Meuter et al., 2005), ability (Abel & Larkin, 1990; Bohlin & Hunt, 1995; Mamassis & Doganis, 2004) and trust (Harrison & Smith, 2004). Considering these points, the direct effects of utilitarian factors, such as ease of use and usefulness, on trust, self-determined motivation, ability and role clarity are expected, and the direct effects of these utilitarian factors on consumer readiness are inferred.

Perceived risk (a security factor) reduces customers' trust of services (Morgan & Hunt, 1994). When customers perceive risk in services, they feel uncertain and do not trust services (Zinkhan & Karande, 1991). Such uncertainty or ambiguity reduces customers' intrinsic motivation to learn how to use services (Jaasma & Koper, 1999; Sargeant & Lee, 2001) and eventually affects their confidence (perceived ability) (Hahn & Kim, 2009; Lee & Lin, 2009; Mayer, Davis, & Schoorman, 1995) and understanding of using services (perceived role clarity) (Harrison & Smith, 2004). Additionally, perceived anonymity (a security factor)

reduces customer anxiety (Joinson, 1999). Anxiety not only reduces customer confidence in using SSTs (Abel & Larkin, 1990; Bohlin & Hunt, 1995; Mamassis & Doganis, 2004) but also reduces their understanding of and motivation to use SSTs (Shore & Shannon, 2010; Zakaria & Nordin, 2008) and trust (Oh et al., 2013; Lu, Wang, & Hayes, 2012). Thus, it is anticipated that security factors, such as perceived risk and anonymity, have direct impacts on self-determined motivation, ability, role clarity and trust, and the direct effects of security factors on consumer readiness are inferred.

Additionally, trust positively influences the future use of online systems (Wang, 2012) and SSTs (Collier & Sherrell, 2010); self-determined motivation has a positive impact on the acceptance and use of ICT (Techatassanasoontorn & Tanvisuth, 2008); and ability positively affects computer use (Compeau & Higgins, 1995), usage of web-based systems (Yi & Hwang, 2003) and the future use of SSTs (Rose & Fogarty, 2006; Wang, Harris, & Patterson, 2013). Role clarity has a positive effect on the initial adoption of SSTs (Meuter et al., 2005) and the future use of restaurant kiosks (Kim, Christodoulidou, & Choo, 2013).

Trust (Geyskens, Steenkamp, & Kumar, 1998; Lusch, Brown, & Brunswick, 1992; Venkatraman & Subramaniam, 2002; Auh et al., 2007; Gruen et al., 2000), different motivational forces (Etgar, 2006; Brennan & Turnbull, 1999; Garbarino & Johnson, 1999; Hakansson & Snehota, 1995), ability (Lusch, Brown, & Brunswick, 1992; Xue and Harker, 2002; Auh et al., 2007; Crespin-Mazet & Ghauri, 2007; Hitt et al., 2000; Lusch, Vargo, & O'Brien, 2007; Miles & Snow, 2007; Subramani & Venkatraman, 2003) and role clarity (Auh et al., 2007; Meuter et al., 2005) are important factors driving customers' participation in co-production. Given that using SSTs is a form of co-production in which customers must perform tasks and customize their consumption experience (Bendapudi & Leone, 2003; Firat,

Dabholkar, & Venkatesh, 1995; Lengnick-Hall, 1996) and that their probability of participating in co-production activities is expected to affect their future use of SSTs, we argue that consumer readiness, comprised of trust, self-determination, ability and role clarity, has a direct effect on the repeated use of SSTs.

Based on the above justifications, hedonic, utilitarian and security factors have direct effects on consumer readiness, which in turn can influence the repeated use of SSTs. Thus, the mediating effect of consumer readiness on the relationship between hedonic, utilitarian and security factors and the repeated use of SSTs can be inferred. Therefore, it is proposed that

P1: Customer readiness mediates the relationships between hedonic, utilitarian and security factors and the repeated use of SSTs.

2.11.2 The Mediating Effect of Consumer Readiness on the Relationship between Hedonic Factors, Utilitarian Factors and Security Factors and Attitudes towards SSTs

Previous literature indicates that hedonic and utilitarian factors, such as fun/enjoyment, perceived control, perceived ease of use and usefulness, positively affect attitudes towards SSTs (Weijters, Rangarajan, & Falk, 2005), although perceived usefulness showed the highest correlation with customers' attitudes towards SSTs compared to perceived ease of use and fun (Weijters et al., 2007). Perceived risk was found to have a negative impact on attitudes towards SSTs (Bobbitt & Dabholkar, 2001; Dabholkar, 1996). Because perceived anonymity reduces social anxiety (Joinson, 1999) and social anxiety negatively affects attitudes towards SSTs (Kumar et al., 2007), perceived anonymity is also expected to have a positive effect on

attitudes towards SSTs. Thus, we argue that hedonic, utilitarian and security factors have direct effects on attitudes towards SSTs.

As shown in section 2.11.1, hedonic, utilitarian and security factors are expected to have direct effects on consumer readiness. In addition, based on TRA (Fishbein & Ajzen, 1975; Ajzen & Fishbein, 1980) and previous evidence, attitudes towards SSTs have positive effects on the repeated use of SSTs (Dabholkar & Bagozzi, 2002; Lee, Castellanos, & Choi, 2012; Wang & Namen, 2004; Xie, Shen, & Zheng, 2011). If consumer readiness has a positive relationship with the repeated use of SSTs, it is anticipated that a relationship exists between consumer readiness and attitudes towards SSTs. Thus, it is also expected that consumer readiness mediates the relationship between hedonic, utilitarian and security factors and attitudes towards SSTs. Therefore, it is proposed that

P2: Customer readiness mediates the relationships between hedonic, utilitarian and security factors and attitudes towards SSTs.

2.11.3 The Mediating Effect of Consumer Readiness on the Relationship between Hedonic Factors, Utilitarian Factors and Security Factors and Satisfaction with SSTs

Previous literature suggests that hedonic factors, such as perceived control, positively affect the satisfaction of customers using SSTs (Marzocchi & Zammit, 2006; Wang, 2012; Dabholkar & Bogazzi, 2002; Chen & Chen, 2009; Yen & Gwinner, 2003). The hedonic factor fun/enjoyment also has a positive impact on customer satisfaction with SSTs (Wang, 2012; Dabholkar & Bogazzi, 2002). Utilitarian factors, such as ease of use, positively influence satisfaction with SSTs (Dabholkar & Bogazzi, 2002; Meuter et al., 2000). Moreover,

utilitarian factors, such as perceived usefulness, are among the most important factors that positively affect user satisfaction with SSTs (Liu, Chen, & Zhou, 2006; Meuter et al., 2000).

Although the literature did not demonstrate relationships between security factors, such as perceived risk, anonymity and satisfaction with SSTs, perceived risk and anonymity are expected to influence the repeated use of SSTs. Because customer satisfaction with SSTs is positively associated with the repeated use of SSTs (Bhattacherjee, 2001; Chen & Chen, 2009; Wang, 2012), it can be anticipated that perceived risk and anonymity also have positive impacts on customer satisfaction with SSTs. Therefore, the direct effects of hedonic, utilitarian and security factors on satisfaction with SSTs are also inferred.

As shown in section 2.11.1, it is expected that hedonic, utilitarian and security factors directly affect consumer readiness and that consumer readiness have a direct effect on the repeated use of SSTs. Given that satisfaction with SSTs is an important antecedent to the repeated use of SSTs (Bhattacherjee, 2001; Chen & Chen, 2009; Wang, 2012), it can be anticipated that consumer readiness also has a positive impact on satisfaction with SSTs. Therefore, the mediating effect of consumer readiness on the relationships between hedonic, utilitarian and security factors and satisfaction with SSTs is inferred. It is proposed that

P3: Customer readiness mediates the relationships between hedonic, utilitarian and security factors and satisfaction with SSTs.

2.11.4 The Mediating Effect of Attitudes towards SSTs on the Relationship between Consumer Readiness and the Repeated Use of SSTs

Given that consumer readiness mediates the relationships between hedonic, utilitarian and security factors and attitudes towards SSTs, consumer readiness is expected to have a direct effect on attitudes towards SSTs. According to TRA (Ajzen, 1991; Fishbein & Ajzen, 1975), attitudes towards SSTs positively influence the repeated use of SSTs (Dabholkar & Bagozzi, 2002; Lee, Castellanos, & Choi, 2012; Wang & Namen, 2004; Xie, Shen, & Zheng, 2011). Thus, it is anticipated that relationships exist between consumer readiness and attitudes towards SSTs and between attitudes towards SSTs and the repeated use of SSTs. Therefore, the mediating effect of attitudes towards SSTs on the relationship between consumer readiness and the repeated use of SSTs is inferred. Therefore, it is proposed that

P4: Attitudes towards SSTs mediate the relationships between consumer readiness and the repeated use of SSTs.

2.11.5 The Mediating Effect of Satisfaction with SSTs on the Relationship between Consumer Readiness and the Repeated Use of SSTs

As shown in section 2.11.3, consumer readiness mediates the relationships between hedonic, utilitarian and security factors and satisfaction with SSTs. It is expected that consumer readiness has a direct effect on satisfaction with SSTs. Because satisfaction with SSTs has a positive effect on the repeated use of SSTs (Bhattacherjee, 2001; Chen & Chen, 2009; Wang, 2012), consumer readiness is anticipated to affect the repeated use of SSTs through satisfaction with SSTs. Thus, the mediating effect of satisfaction with SSTs on the

relationship between consumer readiness and the repeated use of SSTs is inferred. Therefore, it is proposed that

P5: Satisfaction with SSTs mediates the relationships between consumer readiness and the repeated use of SSTs.

A conceptual model is formed based on propositions 1–5 (Figure 2.2). In this model, hedonic, utilitarian and security factors have direct effects on consumer readiness. Moreover, consumer readiness has a direct impact on satisfaction with, attitudes towards and repeated use of SSTs. Satisfaction with and attitudes towards SSTs also have direct effects on the repeated use of SSTs.

As the conceptual model is formed, a proper context must be selected for the current study. The study context and classification of SSTs are discussed below.

2.12 Study Context

Self-checkouts are becoming more popular throughout the world. In the United States, almost 31% of grocers surveyed planned to install a self-checkout system in 2005 and 50% planned to do so by 2006 (Tenn, 2005). Tenn (2006) reported that 21% of grocers purchased store systems, 32% invested in infrastructure, 18% in supply chain management systems, 44% in new workforce management solutions, and nearly 60% were planning to deploy self-checkout kiosk in stores by June 2007. Only 6% of supermarkets used self-checkout systems in 1999 when the systems were first introduced in the market (Calif, 2003). However, the installation

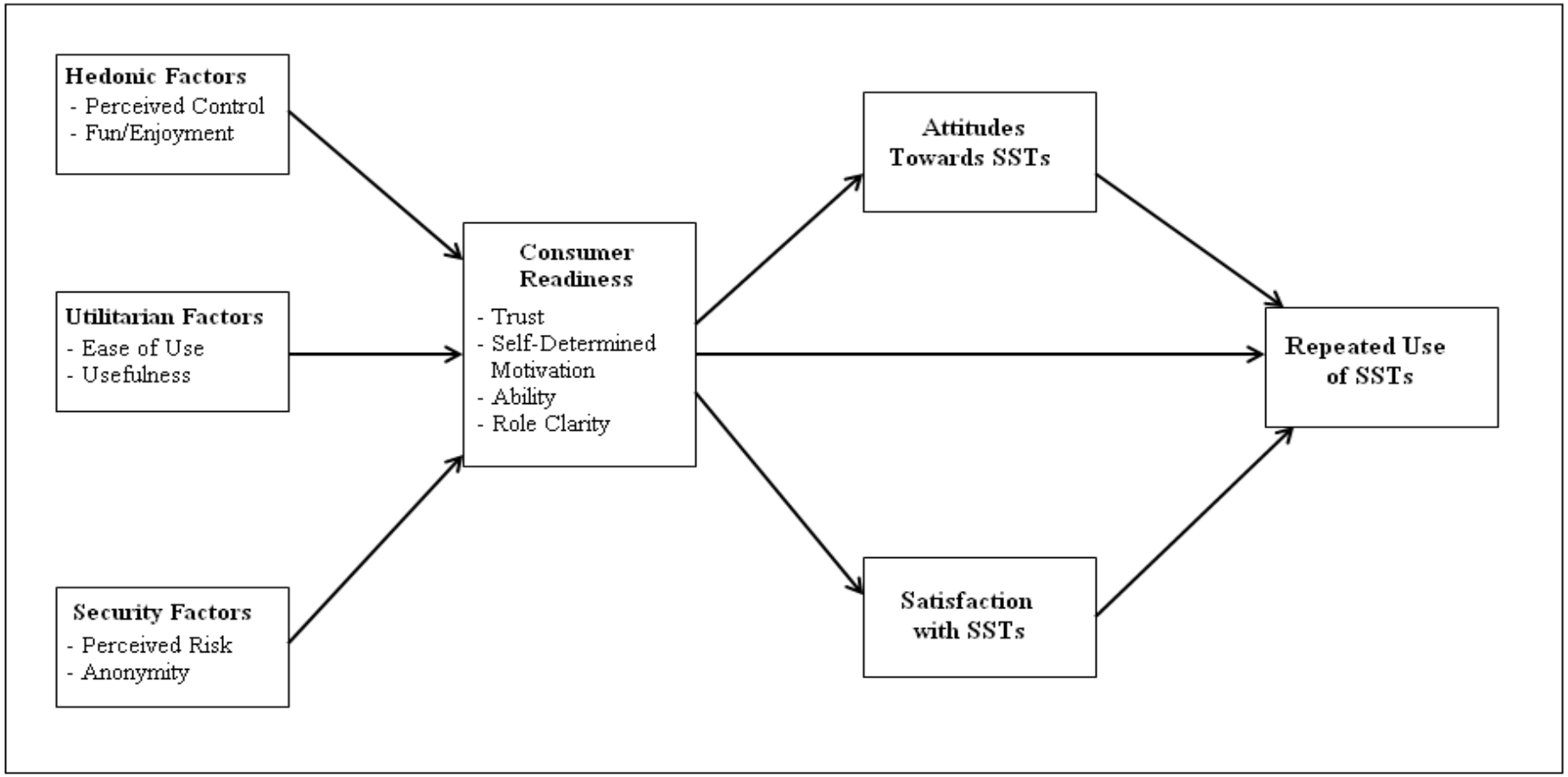


Figure 2.2. Conceptual Model of the Repeated Use of SSTs.

of self-checkout systems grew by 47% from 2001 to 2002 (Thompson, 2003), and sales transactions through self-checkout scanners in supermarkets increased to US$128 billion in 2003 (Hirst, 2004). This figure reached US$450 billion in 2008 (Tenn, 2005). Moreover, 25% of U.S. retailers had self-checkouts, and 90% of U.S. supermarkets had already deployed self-checkout scanners by 2008 (HKTDC, 2003). The U.K. market had approximately the same percentage of growth in 2005 (Hirst, 2004). Nearly 25% to 40% of transactions were completed at self-checkout scanners in 2004 (Tenn, 2004). Dreyfuss (2004) reported that only 34,000 machines were used in 2003, and the number of machines grew to 244,000 in 2007 in the United Kingdom.

In 2004, Wal-Mart installed approximately 840 self-checkout systems in more than 3,000 stores (Dreyfuss, 2004). Home Depot deployed self-checkout systems in its 1,287 stores in the United States throughout 2003 (HKTDC, 2003) and more than 3,200 self-checkout lanes serviced customers in 2004 (Patterson, 2004). One of Ireland's most widely recognised supermarkets, Superquinn, deployed self-checkout systems in its 19 stores in 2007 (NCR, 2007). Hy-Vee also deployed self-checkout in all its stores in 2006 (WRAL, 2006). Ahold's Giant Food Stores of Carlisle installed self-checkout systems in all its 90 stores in 2005 (Fujitsu, 2005).

In 2009, high street supermarket chain Spar installed self-checkouts in its 2,700 stores in the UK (Green, 2009). However, statistics show that the use of self-checkouts has declined in the United States in recent years (FMI, 2010). In Australia, the deployment of self-checkout machines is relatively slow (Palmer, 2008). Woolworth's also decided to deploy self-checkout technology in 16 outlets before 2008 and expanded to 70 of its supermarkets by June 2008 (Palmer, 2008). By the end of June 2009, 200 Woolworth's stores had installed self-checkout

machines to serve their customers (Palmer, 2008). Nearly 20% of transactions were handled by self-checkout machines by the end of 2009 (Palmer, 2008). Coles also first deployed self-checkouts in 2008 (Palmer, 2008). In 2012, Woolworth's installed 3000 self-service checkouts in 500 stores and Coles installed 3000 in 545 stores (Silmalis, 2013). In 2013, 40% of Coles' transactions were handled by self-checkouts (Chieftech, 2013).

More than 50% of supermarket customers used self-checkout scanners for less than 15 items in 2004 (Dreyfuss, 2004). The average number was 6.7 items for each self-checkout transaction in 2006 (Marras, 2006). More than 80% of consumers said they would be likely or very likely to use self-checkouts, and 40% of consumers said they were more likely to shop in stores equipped with self-checkout systems (Patterson, 2004). In a survey of 350 consumers in 2006, 94% of the respondents said they had used self-checkout scanners at least once and 27% of the respondents reported using self-checkout scanners 70% of the time to process their transactions. In another survey, nearly 18% of the respondents said they used self-checkouts all the time and 29% of respondents said they used self-checkouts when there were lines at the other lanes (Marras, 2006). On average, each person spent approximately US$32.85 at each self-checkout transaction (Lofshult, 2007). Nearly 55% of the respondents said their major dislike about self-checkouts was employee interventions because nearly one in three transactions required help from employees (Marras, 2006).

Self-checkout systems have scanners affixed to the shopping cart with a monitor screen (Schenone, 2007). When consumers pick up items, they can scan the items in the system. If items have to be weighed, such as vegetables or fruits, customers can print out a bar code and attach it to the bag. When they proceed to the front of the store, they can weigh the items for the total and swipe their credit card to pay the money (Scheonone, 2007). The checkout

systems are equipped with security systems. The system detects whether the items being put in a bag have been scanned or not. If the standard weight does not match the weight of the item scanned, an alert system is sounded to notify store employees. Video cameras are also installed at the front of the store to detect discrepancies if any customers arrive at the station and initiate the checkout process (Lake, 2002).

The advantages of self-checkout systems are similar to other SSTs. Supermarkets value the speed of self-checkouts, the advantage of minimising the labour costs for checkers and baggers (Hays, 2003) and the convenience (Gerba, 2006). Self-checkouts provide more service and require fewer employees than conventional checkouts (Lake, 2002). On estimation, only one attendant is required to run four to six self-checkout lanes at one time (Miletic, 2008). A completely automated store need only employ a third of the staff required in traditional supermarkets (International Automatic Systems, 2007). Customers also enjoy shorter lines at the self-checkout counter as opposed to express lanes (IHL Consulting Group, 2006). The personal involvement of using the self-checkout also creates an active process for customers (IHL Consulting Group, 2006). Another advantage for customers is that they do not have to deal with service employees. This gives them a sense of privacy and anonymity (Miletic, 2008).

Previous SST studies have predominantly studied self-service banking, e.g. ATMs, phone banking and Internet banking (e.g., Shamdasani, Mukherjee, & Malhotra, 2008; Anitsal & Schumann, 2007). Other studies have focused on online shopping (e.g., Hwang & Kim, 2007; Miyazaki, 2008), self-ordering systems (e.g., Dabholka, 1994), self-checkout library systems (e.g., Dabholkar & Bagozzi, 2002; Zhao, Mattila, & Tao, 2008) and self-scanning in a grocery retailing context (e.g. Weijters et al., 2007). After reviewing previous study contexts,

supermarket self-checkouts have been chosen for this study for three reasons. First, supermarket self-checkouts have received limited attention in prior literature. Second, self-checkout machines are gaining popularity in Australian supermarkets. Third, supermarkets contribute significantly to Australia's economy. Estimates suggest supermarkets offered 70,000 full-time, part-time and casual employment opportunities in Australia and represented AU$12 billion in retail sales in 2008 (Master Grocers Australia, 2008). In 2012, supermarkets employed 115,000 staff and generated annual sales of $13 billion, which made their contribution to the Australian economy significant (Master Grocers Australia, 2012). Thus, SSTs in the retailing sector, especially supermarket self-checkouts, provide an appropriate study context. The classification of supermarket self-checkouts is discussed in the following section.

2.13 Classification of Supermarket Self-checkout

Previous literature has proposed several SST classification schemes. Kelley, Donney, & Skinner (1990) proposed an SST classification scheme incorporating a two-by-three matrix, to compare factors such as the level of customization and the nature of service act (person versus object). Dabholkar (1994) suggested that SSTs could be classified using service locations and delivery methods and proposed a three-dimensional classification scheme. The first dimension involves people who get involved in the service, e.g. service employees, customers or both. The second dimension captures the location of the service, e.g. home, service site or work. The last dimension is concerned with physical proximity, e.g. face-to-face contact, telephone or other electronic communication. SSTs can also be classified based on their purposes, such as customer service, transactional or self-help, and their technological interface, such as interactive telephone, Internet, kiosks and video/CD

(Meuter et al., 2000). The major difference between Dabholkar's (1994) and Meuter et al.'s (2000) classification schemes was the location of service versus purpose (Chunningham, Young, & Gerlach, 2008). Although the classification scheme proposed by Meuter et al. (2000) captured the mode of interaction that replaces direct face-to-face communications and the information processing nature of SSTs (Meuter et al., 2000), other researchers argued that such a classification scheme overlooked the consumer view of SSTs. Thus, Chunningham, Young and Gerlach (2008) conducted an empirical study and formed a consumer-based perceptual map of SSTs in two dimensions, such as customization/standardization versus separability/inseparability. This classification scheme is similar to the one proposed by Kelley, Donnelly, & Skinner (1990) (Table 2.1). Given that Chunningham, Young and Gerlach's (2008) classification scheme has empirical support and can be considered more objective, we classify supermarket self-checkouts (retail self-scanning) as moderately separable, standardized SSTs in the current study (Chunningham, Young, & Gerlach, 2008).

Table 2.1

Customer-based SSTs classification (Chunningham, Young, & Gerlach, 2008,p.18)

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

2.14 Chapter Conclusion and Empirical Research Approach

In this chapter, the theoretical framework underpinning the current study and the antecedents to the repeated use of SSTs, such as satisfaction with, attitudes towards SSTs and hedonic, utilitarian and security factors, were reviewed. The importance of mediation studies in SST research was justified. Meuter et al.'s (2005) studies were introduced, and the research gap was identified. The importance of the current research was discussed. Propositions were advanced leading to the development of a conceptual model. The study context and classification of SSTs were also presented. In the next chapter, the methodology advanced in this chapter will be discussed.

Chapter 3

METHODOLOGY

3.1 Introduction

In this chapter, the methodology used to test the propositions advanced in Chapter 2 is discussed. The chapter starts with the justification of the research design and the operationalisation of the constructs. The pilot study is then presented, and data collection and purification procedures are discussed. The chapter concludes by outlining the respondents' demographic profiles.

3.2 Interpretivist and Positivist Research Paradigms

A research paradigm 'provides a conceptual framework for seeing and making sense of the social world' (William, 1998, p. 43). Glesne and Peshkin (1992) assert that the purpose of interpretivist research is to contextualise, interpret and understand actors' perspectives, whereas positivist research is aimed at generalising, predicting and forming causal explanations. Interpretivist research is naturalistic, inductive and seeks pluralism and complexity. Positivist research is experimental, deductive and seeks consensus and norms. Cupchik (2001) suggests that although the individuals' and communities' interpretations in interpretivist research might represent relative values and interests of events, the existence of underlying phenomena do not rely only on these interpretations. Therefore, the positivist paradigm is adopted in the current study. To test a new model, the experimental and deductive properties of positivist research are appropriate for this study. In addition, the objective of the current study is to test the norm but not to interpret the phenomena related to individuals or

communities. Therefore, the interpretivist paradigm is an inappropriate approach for the current research. Choosing the right research paradigm is important in explaining the phenomenon being studied, and a proper research design is needed. Thus, the research design adopted for the current study is outlined and justified.

3.3 Research Design

Malhotra (2006) states, 'A research design is a framework or blueprint for conducting the marketing research project' (p. 82). Research designs should match the objectives of the research (Burns & Bush, 2006). In determining which research design was most appropriate for the current study, a deductive model was used (Figure 3.1). The different stages of the research process chosen for the current study are illustrated in this model in dotted lines and blue boxes.

Research design can be further divided into exploratory and conclusive designs (Burns & Bush, 2006). These two research designs are discussed in the next section.

3.3.1 Exploratory Research Approach

Lukas et al. (2005) note that 'an exploratory research design focuses on collecting either secondary or primary data and uses an unstructured format or informal procedure to interpret them' (Lukas et al., 2005, p.662). An exploratory research design was used to gain insight into the research problem because this research design does not have formally defined information or research processes, is usually unstructured (Malhotra, 2006) and is used when the problem has not been clearly defined (Kotler et al., 2006).

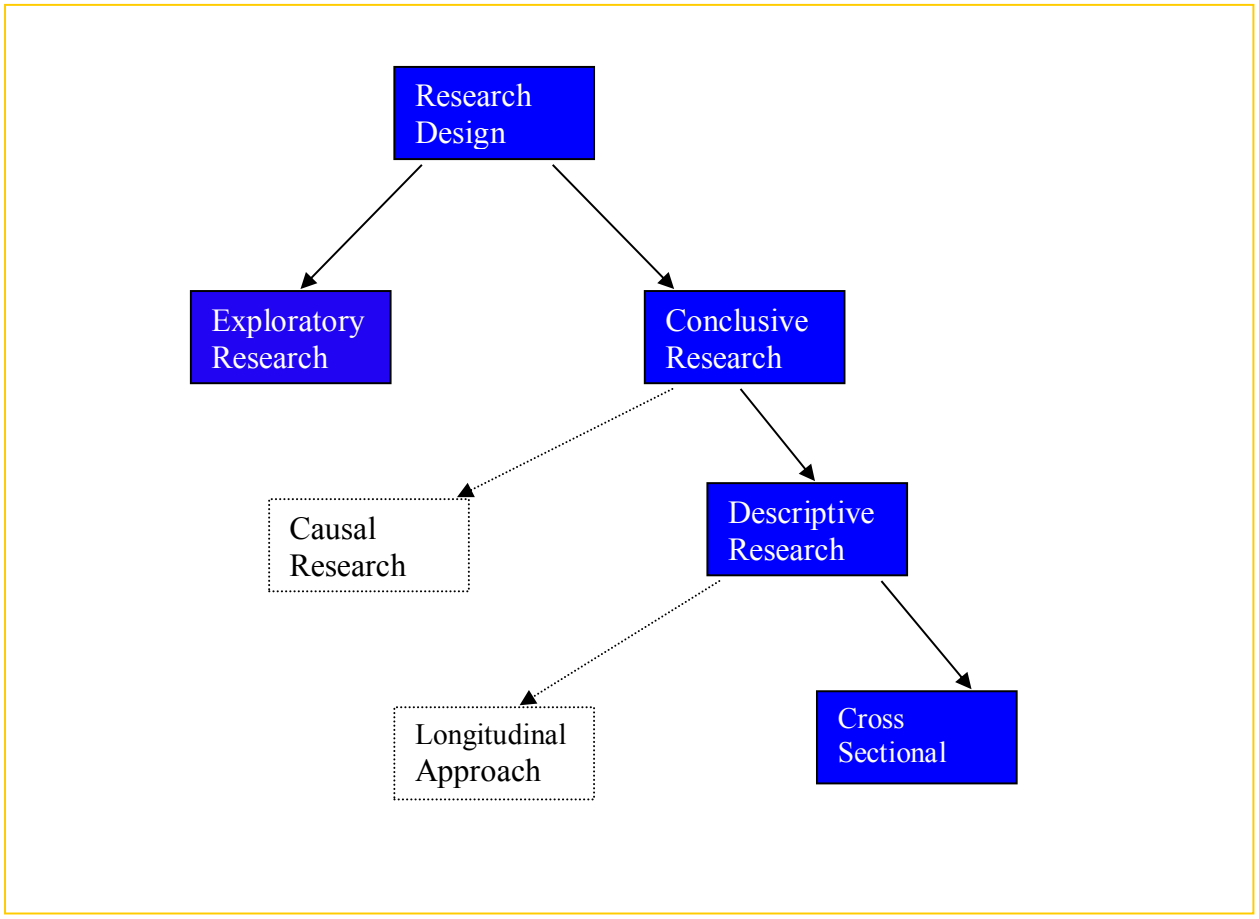


Figure 3.1. Deductive Model of the Current Study (Malhotra, 2006, p. 82).

In addition, exploratory research results are not useful for decision making because they yield qualitative results such as 'why', 'how', and 'when' instead of quantitative results answering the questions 'how often' and 'how many' (Kotler et al., 2006). Exploratory research results also cannot be generalised to the population at large (Lukas et al., 2005). Because understanding 'why' and 'how' customers use SSTs in the current study context was important to further studies (Malhotra, 2006), an exploratory pilot study was conducted to gain a basic insight into the phenomenon of the use of supermarket self-checkouts.

The Pilot Study. In order to understand why and how supermarket customers use SSTs, a pilot study was conducted. Semi-structured, in-depth telephone interviews with key informants were used for data collection. Supermarkets in different Australian states were selected to enhance the reliability of the study (Healy & Perry, 2000). Supermarket store managers were selected as key informants. Two managers did not give sufficient data due to

time pressure from other tasks; therefore, only the information provided by the remaining 11 managers was analysed.

All the interviews took approximately 25–30 minutes, and they were audio-taped. All the interviews were transcribed. A protocol with lead questions was used in all interviews, as well as in cross-case analysis, to facilitate standardisation (Eisenhardt, 1989). The interview started with a brief explanation of the purpose of the project. The purpose of the interview was to discover why organisations deployed SSTs and why customers used or did not use SSTs. The interviewers did not always follow the exact wording of the lead questions. The basic purpose of the interviews was to investigate the relevant topics. At the end of the interviews, the respondents were asked to provide basic information about the store, such as its location and the number of employees.

According to the in-depth interviews, the decision to install SSTs was based on the reduction of queues, efforts of management and shopping volume. Some managers indicated that supermarkets with the 'highest basket volume' or 'high customer flow' were selected. Comparing to trolley volumes, customers using baskets bought fewer items during a shopping trip that could be faster using SSTs than service staff. Some interviewees saw SSTs as the way of the future. According to managers, 'every store is going to have self-checkouts'.

Managers indicated that SSTs had to be 'quicker', 'convenient', 'more efficient', 'fast', and have a 'smooth flow'. These findings suggest that the major reason for SSTs is expediting the purchasing process. Some interviewees said SSTs saved space and served more customers at the same time, thereby reducing queuing time and enhancing employee job performance.

These findings support prior research that identified convenience and perceived usefulness as crucial determinants. With respect to ease of use, interviewees indicated that SSTs are 'easy to use'.

Whilst perceived control and fun/enjoyment have been identified in previous studies as influencing consumer's intentions to use SSTs (Dabholkar, 1996) and attitudes towards using SSTs (Dabholkar, 1996), managers said self-checkout systems "give customers a choice of using checkout to do their own transaction", "they like putting it through themselves, like to make an independent purchase", and "customers want to serve themselves". These findings are consistent with the definition of perceived control advanced by Dabholkar (1996).

Interviewees also indicated that customers were interested in using 'new gadgets' or 'new technology'. According to some interviewees, novelty, rather than fun/enjoyment, emerged as an important feature of SSTs. As one interviewee stated, 'kids think of them as novelty'. Dabholkar (1996) included novelty aspects in the definition of fun/enjoyment, and the current study identified newness as an important determinant of the intention to use SSTs. Managers did not describe SSTs as 'enjoyable', 'entertaining' or 'interesting', which suggests that their views of SSTs may be mostly focused on resolving practical problems rather than enhancing the shopping experience. Additionally, SSTs in supermarkets may not have been designed to entertain customers.

Mitchell and Harris (2005) found that financial, psychological and physical risks influenced the use of technology in retailing. The findings of this study only partially supported these prior findings. Most interviewees reported that customers did not use SSTs because 'they were scared of the technology', 'they don't want to do it as they are set in their way and they

won't do it', or 'they follow their comfort zone'. According to some managers, 'students want ten dollars cash out but they can't get it out' and 'the scale problem' might cause them to lose money. Two managers even suggested that customers were worried that the machine 'doesn't take cash; they think they have to pay with cards'. These findings suggest that psychological, financial, psychosocial and privacy risks influenced customers not to use SSTs. Performance risk was also identified, with some interviewees indicating that customers were worried about 'things going wrong and holding up the line significantly'. Interviewees also indicated that 'coin jams', 'weighting problems' and 'hardware problems' could at times harm customers' shopping experiences.

The current study supports the findings from the prior literature. Perceived usefulness, ease of use and perceived control emerged as important determinants of the intention to use SSTs. Fun/enjoyment and perceived risks yielded mixed results. Only newness, financial, performance, psychosocial, time/convenience and privacy risks were found to be relevant to the use of SSTs. Thus, newness is more relevant to the current context, and fun/enjoyment should be replaced with newness as one of the important hedonic factors in the current study because it does not offer any practical benefits but only internal gratification to consumers. In addition, Dabholkar (1996) argued that the novelty aspect of SSTs should be added as a dimension of fun/enjoyment. It is reasonable to expect that the effect of newness is similar to fun/enjoyment and that it demonstrates positive impacts on consumer readiness, satisfaction with, attitudes towards and repeated use of SSTs. Newness was overlooked in the conceptual model because it had only gained limited attention in the previous SST research. Weijters, Rangarajan and Falk (2005) found that newness was slightly positively related to attitudes towards SSTs in higher educated customers. However, other effects of newness are subject to further investigation.

3.3.2 Conclusive Research Approach

Conclusive research is a formal, structured approach used to describe and measure marketing phenomena (Burns & Bush, 2006). This approach uses large representative samples and data collected for quantitative analysis (Malhotra, 2006). The objective of conclusive research is clear, well defined (Burns & Bush, 2006) and provides reliable and representative data of the population when valid research instruments are used (Kotler et al., 2006). A new model was tested, and a large representative sample was used in the current study. The research aimed at yielding quantitative results describing the characteristics of consumers using SST; therefore, a conclusive research approach was viewed as appropriate for this study. Conclusive research design can be further divided into descriptive and causal research designs.

3.3.3 Descriptive and Causal Research Design

The descriptive research design is used in describing market characteristics and functions of relevant groups, such as percentage in a specified population, product characteristics and the degree to which marketing variables are associated (Malhotra, 2006). Descriptive research design is also used to make specific predictions (Malhotra, 2006). Causal research design is used to test cause-and-effect relationships (Lukas et al., 2005), whilst descriptive research tests the norm using large representative samples. Causal research uses experiments to manipulate variables under control conditions to determine causal relationships (Burns & Bush, 2006) and causality. Other variables must be kept constant to ascertain the causal relationships between the variables under study (Malhotra, 2006). However, it is difficult to keep variables constant in many circumstances, such as when studying individual attitudes and motivations (Malhotra, 2006). In the current study, the factors that influenced the

repeated use of SSTs were studied, and it was not feasible to keep other variables constant. Therefore, a descriptive research design was viewed as the most appropriate for the current study. Descriptive research design can be sub-divided into cross-sectional and longitudinal research designs. These two research designs are discussed in the next section.

3.3.4 Cross-sectional and Longitudinal Research Design

Longitudinal research design repeatedly measures the same sample units of a population over a period of time (Burns & Bush, 2006) and is normally used to assess population changes over time (Schutt, 2006). Data collection in longitudinal research is taken more than once at different times (Malhotra, 2006). Cross-sectional research design measures units from a population sample at one point in time (Burns & Bush, 2006). The use of longitudinal and cross-sectional research design should match the objective of the research (Burns & Bush, 2006). Longitudinal research aims at finding changes in subjects over time, such as children's language development over a period of time (Altarriba & Heredia, 2008), whilst cross-sectional research aims at comparing characteristics of different groups of subjects at a given moment of time, such as comparing different groups of students' language abilities in a given time (Altarriba & Heredia, 2008). In the current study, time and changes were not major concerns. Instead, discovering factors affecting the repeated use of SSTs was the major purpose; therefore, a cross-sectional research design was deemed more appropriate. A cross-sectional research design can use a survey method to collect data. The survey used in this study is presented in the next section.

3.3.5 Survey Method

Surveys can be administered through telephone, mail, personal or electronic interviews (Burns & Bush, 2006). In a telephone or personal interview, perceived anonymity is lower compared to other survey methods, and the results of these methods are easily affected by interviewer bias (Malhotra, 2006). In addition, the interviewing costs of telephone and personal interviews as well as traditional mail surveys can be high (Lukas et al., 2005). Electronic interviews, such as online surveys, have higher perceived anonymity, lower costs and are more efficient (Malhotra, 2006). Thus, to reduce costs, avoid interviewer bias and increase efficiency, an online survey was adopted in the current study. Choosing an appropriate survey method and obtaining valid and reliable results are important. Therefore, reliable and valid measurements should be selected (Parsian & Dunning, 2009). In the following section, the conceptualisation and operationalisation of the measures are discussed.

3.4 Conceptualisation and Operationalisation of the Measurements

Conceptualisation helps researchers specify abstract terms (Zikmund, 1994). Babbie and Mouton (2001, p. 30) define conceptualisation as 'what we mean and what we don't mean by the abstract term'. Conceptualisation is the process of turning abstract concepts into observable and measurable quantities (Sedgeman, 2009). In the current study, previously used measures were adopted to operationalise the constructs. Hedonic factors (such as perceived control and newness), utilitarian factors (such as ease of use and usefulness) and security factors (such as perceived risk and anonymity) were classified as independent variables. Variables of consumer readiness, attitudes towards and satisfaction with SSTs were classified as mediators in the current study. Further, the repeated use of SSTs was the dependent

variable. These variables are discussed in the following section.

3.4.1 Independent Variables

3.4.1.1 Hedonic Factors

In the following sections, the measurement of the hedonic factors perceived control and newness are discussed, and the justification for using these constructs in this study is advanced.

3.4.1.1.1 Perceived Control

Perceived control is a two-dimensional construct adopted from Averill (1973). The first dimension is the degree to which individuals perceive themselves able to determine or design the service rather than uniformly use it, and the second dimension is the degree to which individuals perceive themselves able to flexibly modify their commitment to change their decisions. Morris and Venkatesh (2000) viewed perceived control as a multi-dimensional construct that explains employees' acceptance of technology in the workplace.

In prior SST research, Lee and Allaway (2002) conceptualised perceived control as a three-dimensional construct composed of predictability, controllability and outcome desirability. Other researchers conceptualised perceived control as a uni-dimensional construct and defined it as the degree of individuals' desire to exhibit mastery over the environment (Dabholkar, 1996; Yen & Gwinner, 2003; Zhu, 2002). In the current study context, the ability to alter the options was not offered to consumers when they used self-checkout services

because consumers were required to master the services by themselves. Therefore, the conceptualization of perceived control in five items used by Dabholkar (1996), Yen and Gwinner (2003) and Zhu (2002) was used for the current study; the measurement items are shown in Appendix I.

3.4.1.1.2 Newness

Newness is the innovativeness of technology perceived by consumers (Blythe, 1999). Newness was used to determine the success of new technological products. For example, Carbonell, Escudero and Aleman (2004) adopted a measure of newness from Cooper (1984) that uses a single-item scale ranging from 1 (technologies sufficiently implemented) to 7 (new or emerging technologies). However, because single-item measurements are subject to reliability problems (Hair et al., 2010), it was not appropriate to adapt this single-item scale to the current study. Newness has not been commonly studied in SST contexts, but Weijters, Rangarajan and Falk (2005) adopted the concept of newness from Blythe (1999) and used three five-point semantic differentials to measure the degree of innovativeness of SSTs in the retailing context. As we also conducted a study in the retailing context, the current study adapted measurement items from Weijters, Rangarajan and Falk (2005), and five items were used to measure newness (Appendix I).

3.4.1.2 Utilitarian Factors

In the following section, the two utilitarian factors perceived ease of use and perceived usefulness are discussed.

3.4.1.2.1 Perceived Ease of Use

Perceived ease of use is the degree to which a person believes a particular system is free of effort (Davis, 1986). Prior research on online environments measured ease of use as the ease of searching and navigating in cyberspace and websites (Santos, 2003). Ease of use is measured as the degree to which the consumer understands and operates the SST in self-service banking (Rose & Fogarty, 2006). Dolen and de Ruyter (2002) measured ease of use as the degree of complication in using electronic banking services. In using self-scanning technologies, Weijters, Rangarajan and Falk (2005) operationalised ease of use as the degree of friendliness and effort related to using the SST. Ease of use is also viewed as the degree of complication and confusion of using the SST in library self-checkouts (Dabholkar & Bagozzi, 2002; Zhao et al., 2008). Due to the similarity between library and supermarket self-checkouts, the measure of ease of use from Dabholkar and Bagozzi (2002) and Zhao et al. (2008) was adopted for the current study. Five measurement items were used to measure ease of use (Appendix I).

3.4.1.2.2 Usefulness

Usefulness is the degree to which a person believes a particular system would enhance his or her job performance (Davis, 1986). Prior research in self-service banking measured usefulness as how useful and easy the SST would be in improving the way customers use the service (Curran & Meuter, 2005). Other online banking researchers measured usefulness as how effective and fast the SST would be and how it would increase productivity (Pikarainen et al., 2004). Other researchers measure usefulness as the degree to which the service offers better prices, convenience and speed (Eriksson & Nilsson, 2007). In the self-scanning

context, Weijters, Rangarajan and Falk (2005) measured usefulness as the efficiency, speed of shopping and waiting time associated with using self-scanning. As library and supermarket self-checkouts serve similar purposes, the measure of perceived usefulness from Weijters, Rangarajan and Falk (2005) was adapted for the current study. Four measurement items were used to measure usefulness (Appendix I).

3.4.1.3 Security Factors

In the following section, the security factors perceived risk and anonymity are discussed.

3.4.1.3.1 Perceived Risk

In disciplines such as economics, finance, decision science, risk and insurance, public policy, decision science and psychology, perceived risk is measured differently (Conchar et al., 2004). In marketing, the conceptualization of perceived risk has evolved over time. Early works viewed perceived risk as consumers' expectations of losses (Mowen, 1992; Venkatraman, 1989). However, Chaudhuri (2000) suggested that different dimensions, such as loss of time and convenience, should be added to this conceptualization. The measurement of perceived risk is approached from two angles. The first approach measures perceived risk by assessing the degree of riskiness and ignores uncertainty and consequences (Peter & Ryan, 1976), whilst the second approach assesses the importance of losses as well as the probabilities of loss (Fishhoff et al., 1990). Berkman, Lindquish and Sirgy (1996) operationalised perceived risk as a multidimensional construct focusing on the probability distribution of losses. Zhao et al. (2008) incorporated the concept of uncertainty and consequences into the assessment of perceived risk and measured perceived risk as having

eight dimensions in an online SST context: performance, security, financial, privacy, time/convenience, psychological, social and physical risk. As the resemblance of context, Zhao et al.'s (2008) measure was adapted to the current study. The current study used 20 measurement items to measure perceived risk (Appendix I).

3.4.1.3.2 Perceived Anonymity

Perceived anonymity has been measured in computer science and psychological research (Toth, Hornak, & Vajda, 2004; Prentice-Dunn & Rogers, 1982, 1989). In computer science studies, perceived anonymity is perceived as 'how much additional information an attacker needs in order to definitely identify the user corresponding to the message' (Toth, Hornak, & Vajda, 2004). However, the measures of perceived anonymity used in computer or IT research are not easily adapted to marketing research. In social psychology, self-awareness concepts have been viewed as similar to perceived anonymity (Prentice-Dunn & Rogers, 1982; 1989). Smith, Terry and Hogg (2007) measured perceived anonymity using the social identity concept and conceptualised it as the degree to which a person feels he/she belongs to and shares similar attitudes and beliefs with a group. Other researchers have measured perceived anonymity both from the perception of others in the group and from the perception of how the group can identify with a respondent (Smith, Terry, & Hogg, 2007). For example, Gomez (2003) used a six-item measure of perceived anonymity of self. Gomez's (2003) concept of perceived anonymity was particularly relevant to the current study context since the SST in the supermarket context is aimed at measuring the degree to which a person feels he/she has been identified by other shoppers and service employees. Therefore, Gomez's (2003) measure was adopted for the current study, and five measurement items of perceived anonymity were used (Appendix I).

3.4.2 The Mediators

3.4.2.1 Consumer Readiness

Consumer readiness was first operationalised in Internet adoption literature as a two-dimensional construct composed of dimensions such as consumer willingness and Internet penetration (Zhu, Kraemer, & Xu, 2003). Consumer willingness measures the extent to which consumers engage in online shopping, and Internet penetration measures the diffusion of PCs and the Internet in the population (Zhu, Kraemer, & Xu, 2003). For example, consumer willingness is measured by the percentage of the population using online shopping and the percentage of the population willing to use e-cash payment for online shopping in each country. Internet penetration is measured by the percentage of the population using the Internet and the percentage of households with Internet access in each country (Zhu, Kraemer, & Xu, 2003). Bitner, Ostrom and Meuter (2002) and Meuter et al. (2005) operationalised consumer readiness as being composed of factors representing the consumer aspects involved in SST adoption in four dimensions, namely ability, role clarity, intrinsic and extrinsic motivation, using multiple-item measures on seven-point Likert scales with the endpoints 'strongly disagree' and 'strongly agree'. In the current research, consumer readiness is re-conceptualised in four dimensions, namely trust, self-determined motivation, ability and role clarity, representing the consumer aspects involved in the repeated use of SSTs.

Role Clarity. In management literature, role clarity is operationalised in terms of role ambiguity, which measures the predictability of the outcome of or responses to one's behaviour and the existence or clarity of behavioural requirements providing guidance to

appropriate behaviour. The measurement items reflect certainty about duties, authority, allocation of time and relationships with others; the clarity or existence of guides, directives and policies; and the ability to predict sanctions as outcomes of behaviour in a seven-point scale ranging from very false to very true (Ivancevich & Donnelly, 1974; Rizzo, House, & Lirtzman, 1970; Kohli, 1985; Busch & Bush, 1978; Locke, 1983). Bliese and Castro (2000) and Hall (2008) measured role clarity using a three-item scale and operationalised the construct as the degree of an individual's understanding of what is expected in his/her job. Using a 23-item scale, role clarity is operationalised as a multidimensional construct, such as leadership behaviour on the part of the sales manager. This is expected to affect whether the roles assigned by the company are clear, whether the supervisor communicates role expectations effectively, whether salespeople understand how management prefers their roles to be carried out in responding to customers and whether salespeople know what ethical conduct is expected (Shoemaker, 1999; King & King, 1990; Singh & Rhoads, 1991). In SST contexts, Meuter et al. (2005) and Kim, Christodoulidou and Choo (2013) adapted the measurement items from Rizzo, House and Liertzman (1970) and measured role clarity as the degree to which a person knows how to effectively use SST and the degree to which the SST provides clear instructions to the user. As we also conducted a study in an SST context, five measurement items were adopted from Meuter et al. (2005) and Kim, Christodoulidou and Choo (2013) for the current study (Appendix I).

Ability. Ability has been measured in terms of self-efficacy (Bandura, 1997), and self-efficacy has been measured differently in different contexts (Bandura, 2005). In psychology, it is normally measured as the degree of people's judgements of their abilities to organise and execute courses of action required for attaining designated types of performances (e.g. Bandura, 1986; Ergeneli, Camgoz, & Karapinar, 2010; Schwarzer & Jerusalem, 2000;

Hiemstra et al., 2010; Zhu et al., 2011; Klassen et al., 2009; Joët, Usherm, & Bressoux, 2011). In management literature, self-efficacy has been measured as a multi-dimensional construct, such as individuals' competence and knowledge to achieve certain goals and perform certain tasks, e.g. sales objectives, technical knowledge, providing information, controlling expenses and sales presentations (e.g. Kohli, Shervani, & Challagalla, 1998; Shoemaker, 1999). In health settings, self-efficacy has been operationalised as individuals' confidence in coping effectively with different tasks (e.g. Steffen et al., 2002; Romero-Moreno et al., 2011). In technology settings, self-efficacy has been measured as individuals' confidence in handling technology using a five-point Likert scale, with higher scores indicating a high degree of confidence in individuals' abilities (e.g. Murphy, Coover, & Owen, 1989; Thakur, 2012). In SST contexts, self-efficacy has been measured, using a seven-point Likert scale, as the capability and confidence of a person using the SST in terms of ability (e.g. Meuter et al., 2005; Jones, 1986; Oliver & Bearden, 1985). Given that the current study is an extension of Meuter et al. (2005) study, it is appropriate to adopt the measurement items of ability from Meuter et al. (2005). These five items are shown in Appendix I.

Self-Determined Motivation. Self-determined motivation has been measured using different dimensions in different contexts. In education and training contexts, self-determined motivation was measured using an academic self-regulation questionnaire (Ryan & Connel, 1989; Tan et al., 2009; Hegarty, 2010; Techatassanasoontorn & Tanvisuth, 2008) in which self-determined motivation was measured in six dimensions, namely intrinsic motivation, integrated, identified, introjected, external regulation and amotivation, on a seven-point Likert scale. However, Guay, Vallerand and Blanchard (2000) constructed a situational motivation scale (SIMS) in which only intrinsic motivation, identified regulation, external regulation and amotivation measured self-determined motivation in laboratory settings. In

Richard, Ryan and Connell's (1989) study, external, introjected, identified regulations and intrinsic motivation were used to measure children's self-determined motivation. In a health services setting, Halvari et al.'s (2010) study examined five dimensions: intrinsic motivation, integrated, identified, introjected and external motivation. Given that health and retailing industries are similar and they both serve customers' needs (Halvari et al., 2010; Seider et al., 2005), the current study adopted Halvari et al.'s (2010) self-determination scale. Intrinsic motivation as well as integrated and introjected regulations were measured with five items, identified regulation was measured with six items and external regulation was operationalised as a seven-item measure (Appendix I).

Trust. Trust is '...the reliability of a third party, particularly when there is an element of personal risk … at the heart of the marketing concept' (Arnott, 2007, p. 35). MacAllister (1995) proposed that trust should be measured using cognitive and affective dimensions. Cognitive trust is the reasoning of trust, and affective trust involves underlying feelings of trust (MacAllister, 1995). Trust can be context-specific; for instance, Mukherjee and Nath (2007) proposed that trust in an online environment is different from offline situations because an online environment does not involve physical distance, salespeople, simultaneous existence in time and space, human network attributes, feedback and learning capability. On the other hand, the separation between buyer and products also result in specific characteristics of trust in online environments (Mukherjee & Nath, 2007). In offline environments, Mouzas, Hennebert and Naude (2008) investigated business-to-business relationships to operationalise trust from a new angle as the degree to which businesses are tied together. According to Dwyer and Tanner (2002), trust is '...the belief in the integrity, honesty and reliability of another person'. In consumer and seller situations, Jarvenpaa and Tractinsky (1999) operationalised trust as the 'consumer willingness to rely on the seller and

take action in circumstances where such action makes the consumer vulnerable to the seller'. However, Ratnashingam and Pavlou (2003) pointed out that trust can be categorised into trading partner trust and technology trust. Technology trust is operationalised as '...the subjective probability by which an organisation believes that the underlying technology infrastructure and control mechanisms are capable of facilitating inter-organisational transactions according to its confident expectations' (Ratnasingam & Pavlou, 2003, p. 25). It is believed that technology trust is important in the supermarket self-checkout context because self-checkout is a form of technology. Therefore, the concept of technology trust as operationalised by Ratnasingam and Pavlou (2003) was adopted for the current study. Technology trust was operationalised in the current study as the subjective probability that an individual believes the underlying technology infrastructure and control mechanisms are capable of enhancing the service encounter to meet their expectations. Five items were used to measure this construct (Appendix I).

The concept of consumer readiness was adopted from Meuter et al. (2005) because one of the main purposes of this study was to assess the role of consumer readiness in the repeated use of SSTs. It is important to know more about the effects of consumer readiness on other potential mediators of the repeated use of SSTs, such as attitudes towards and satisfaction with SSTs.

3.4.2.2 Attitudes towards SSTs

An attitude is '...the psychological tendency expressed by evaluating a particular entity with some degree of favour or disfavour' (Eagly & Chalken, 1993, p. 1). In information technology contexts, seven-point semantic differential scales were used to measure attitudes

towards SSTs, such as semantic differential items with endpoints: bad/good, foolish/wise, dislike/like and unpleasant/pleasant (e.g. Harrison, Mykytyn, & Riemenschneider, 1997; Taylor & Todd, 1995). In other online banking studies, attitudes were measured as the degree of how wise the idea was to use the service (Shih & Fang, 2004). Dabholkar (1995) and Dabholkar and Bagozzi (2002) measured attitudes using the degrees of good/bad, pleasant/unpleasant, harmful/beneficial and favourable/unfavourable in a restaurant self-order context. Because other measurements of attitudes towards SSTs were used in online environments, Dabholkar's (1995) and Dabholkar and Bagozzi's (2002) measures were more applicable to the supermarket self-checkout context. Thus, four measurement items were used to measure attitudes towards SSTs (Appendix I).

3.4.2.3 Satisfaction with SSTs

The measurement of satisfaction is context-specific because satisfaction is a form of consumers' affective or emotional response (Lee & Joshi, 2006). In studying Internet banking, Jamal (2004) used a six-item measure for satisfying incidents and a seven-item measure for dissatisfying incidents. For e-service encounters, Dolen and de Ruyter (2007) measured satisfaction in chat rooms using a three-item measurement to assess the degree to which respondents felt satisfied with an advisory service and service provider. However, Eriksson and Nilsson (2007) suggested that online activities cannot be considered isolated activities because consumers may receive information from multi-channels such as offices, mail, telephone and the Internet before the service encounter. Thus, satisfaction with an online service context should be operationalised as the results of multi-channel satisfaction. Eriksson and Nilsson (2007, p. 170) operationalised satisfaction as 'how satisfied the consumers are with the range of banking services into the construct of overall multichannel

satisfaction'. Gronroos (1984) suggested that the measures of satisfaction should consider contextual influence. Within an off-line context such as library self-checkouts, Zhao, Mattila and Tao (2008) used a three-item measure to assess overall satisfaction with the library self-checkout systems, and this measure was adapted for the current study. The seven measurement items are shown in Appendix I.

3.4.3 The Dependent Variable: Repeated Use of SSTs

The future use of SSTs has been measured as '...the willingness that a customer would have in using the innovation' (Lee & Allaway, 2002, p. 12). In self-service banking, the repeated use of SSTs was measured as the likelihood or unlikelihood a customer would use online banking (Curran & Meuter, 2005). Shih and Fang (2004) measured the repeated use of SSTs using 'plan', 'intend', and 'my favourite' to use the SST. Dabholkar and Bagozzi (2002) measured the repeated use of SSTs as the likelihood or unlikelihood and the possibility of an individual using the SST in the library self-checkout context. Because library and supermarket self-checkouts perform similar functions, these two contexts are assumed to be similar. Thus, Dabholkar and Bagozzi's (2002) study was adopted in the current study. The four measurement items for the repeated use of SSTs are shown in Appendix I.

3.5 Data Collection Procedures

The survey method, panel method, observational method and secondary data achieving method are normally used in marketing research (Lukas et al., 2005). The survey method allows data collection in an efficient and economical manner (Burns & Bush, 2006). Data collected through survey methods is simpler and more reliable because the fixed-response

questions reduce variability and simplify the coding, analysis and interpretation processes (Malhotra, 2006). Thus, the current study adopted the survey method to collect the data. In the following section, sampling design and procedure are outlined.

3.5.1 Sampling Design

The sampling design ensures the sample selected is as representative as possible and the sampling bias is minimised (Malhotra, 2006). In the current study, the sampling design included the sampling frame, unit of analysis, key respondents and sampling procedures. The following sub-sections discuss the sampling design.

3.5.1.1 Sampling Frame

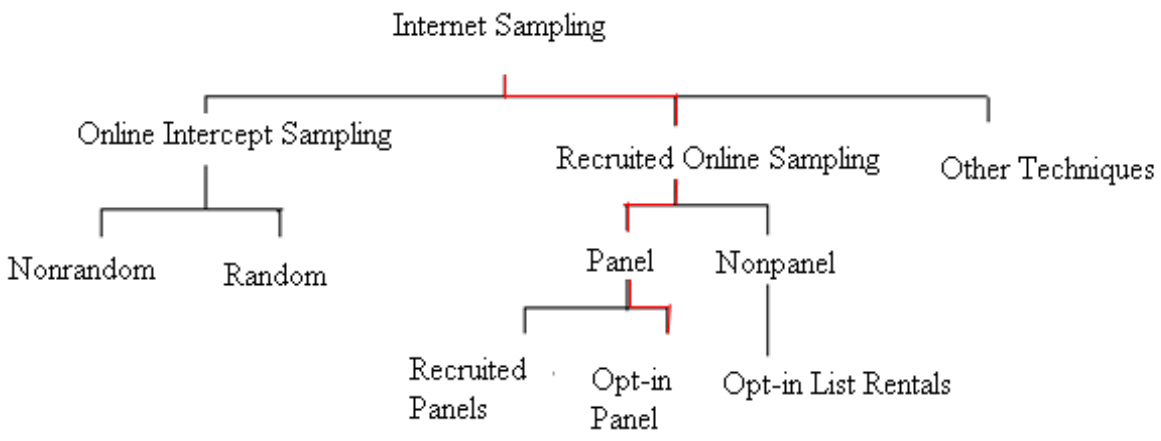
Because the repeated use of SSTs in retailing was investigated and Australia was the only region of interest in the current study, customers who had been exposed to and had the opportunity to use supermarket self-checkouts in the past 12 months in Australia were selected as the sampling frame in this research.

3.5.2 Sampling Procedures

Sampling procedures can be probability-based or non-probability-based (Lukas et al., 2005). Non-probability sampling is a technique in which the sample is arbitrarily determined by the researcher (Malhotra, 2006). Probability sampling is a sampling technique in which the respondents are selected by chance (Malhotra, 2006). In non-probability sampling, the sample selection process is more convenient, but it may or may not be representative, whereas in

probability sampling, researchers are able to judge the representativeness of data being collected (Lukas et al., 2005). Due to the low availability of supermarket self-checkout services in Australia and the difficulties accessing consumers with SST experience at the time this study was undertaken, the non-probability sampling technique was used. In the non-probability sampling technique, databases of consumers with exposure to supermarket self-checkouts were purchased from Qualtrics, which is a marketing research company. In addition, a convenience sampling technique was appropriate for the current study due to the assumption that this group of consumers was homogeneous and the respondents filling out the questionnaires were similar to the overall target population (Lukas et al., 2005). Emails were sent via Qualtrics inviting respondents to complete an online questionnaire. Different online sampling procedures can be used to target an audience to participate in the research.

According to Malhotra (2006), online sampling can be performed through online intercept or recruited online sampling. Online intercept sampling can be sub-divided into random and non-random intercept sampling. In random intercept sampling, a pop-up window randomly invites visitors to fill out the survey when the visitor visits a website. In non-random intercept sampling, every visitor visiting the website is invited to participate in the survey. Recruited online sampling involves panel and non-panel approaches (Malhotra, 2006). In the panel approach, participants can choose to opt in or be recruited, whilst in the non-panel approach, participants are asked to go online to complete the survey. For this study, an opt-in email list of Australian shoppers was purchased from Qualtrics. Figure 3.2 illustrates the Internet sampling procedure in this study. The red line represents the online sampling path that was adopted for this research study.



Source: Malhotra (2006, p.392)

Figure 3.2. Internet Sampling.

Invitation emails with a link for the questionnaire were then sent to the target sample. Although the online survey data collection method has been criticised for leading to declining response rates, causing mistrust about survey uses, raising privacy and security issues, the perception of Internet surveys as spam, skewing Internet population attributes, requiring extremely clear instructions and offering no human contact (Gilbert, 2001; McDaniel et al., 1985; Schleifer, 1986; Jarvis, 2002; Evans & Mathur, 2005), online questionnaires were suitable for the current study for several reasons. First, an Internet survey makes it easy to contact respondents using a single medium (O'Cass & Fenech, 2003; Evans & Mathur, 2005). Second, incomplete or dual-response questions can be prompted by the computer (O'Cass & Fenech, 2003; Evans & Mathur, 2005). Third, the process of returning, completing and collecting the questionnaires is easier (O'Cass & Fenech, 2003; Evans & Mathur, 2005). Finally, the questionnaire is unlikely to overburden respondents, and the data are easily transferred for further analysis (O'Cass & Fenech, 2003; Evans & Mathur, 2005). Thus,

online questionnaires reduce labour costs and time, and they facilitate the manipulation of the data for future analysis (O'Cass & Fenech, 2003).

3.5.3 Sample Size

Sample size is determined by different factors, such as variability in the population, acceptable sample error, level of confidence (Lukas et al., 2005) and the cost of data collection (Burns & Bush, 2006). Preacher and MacCallum (2002) argued that if the number of expected factors is relatively small, the model error is low and communalities are high, small sample sizes are not a major concern. McQuitty (2004) proposed that a sample size of 275–325 should be used to achieve a statistical power of .9 (in the structural modelling equation). The sample size can also be calculated by the number of variables used in the model (Hoyle, 1995). As suggested by Malhotra (2003), the sample size should be 5–10 times the number of variables. However, Chou and Bentler (1995) suggested that the sample size should be determined by the number of variables being studied and the statistical power and degrees of freedom (*df*). A larger sample size is needed when the degrees of freedom are higher (McQuitty, 2004). To achieve a statistical power of .9 in an SEM model, the degrees of freedom should be 50–60 and the sample size should be 275–325 (McQuitty, 2004). Taking into consideration the number of variables, the current study successfully recruited 361 samples; this sample size was viewed as adequate.

3.5.4 Unit of Analysis

A sampling unit is any particular element (e.g. person or object) in the defined target population from which researchers seek data and information (Lukas et al., 2004). Because

independence of observations is presumed in standard measures of variability, sampling units must be unique (Kenny & Judd, 1986). The lack of independent observations can be due to compositional effects, common fate and social interaction. Kenny (1996) suggested that when a unit is analysed, the lowest level at which observation is independent should be determined and used. In the current study, the independence of consumers filling in the questionnaire was assumed because consumers were likely to complete the questionnaire in different locations. Thus, the lowest unit in the current research was the individual that had been exposed to and had the opportunity to use supermarket self-checkout services in the past.

3.5.5 Response Rate and Non-response Bias

According to The Online Survey Process (2007), the response rate for online surveys ranges from 0.1 to 5%. Websites publishing surveys in written forms, such as newsletters, newspapers, postcards and letters, have yielded response rates as low as 5%. In addition, pop-up or pop-under windows yield even lower response rates of around 2–4%. Email surveys yield the highest response rates, ranging from 15% to 80%; however, email surveys may incur legal responsibilities if not sent properly. Thus, in the current study, opt-in emails were utilised to increase the response rate and minimise legal responsibilities. A response rate of approximately 82% was finally achieved.

Non-response bias arises when some of the potential respondents included in the sample do not respond (Malhotra, 2006). In the current research, only consumers who had experience using self-checkouts in supermarkets were invited to participate in the survey. Thus, non-response error was not a concern in the current study.

3.6 Development of the Questionnaire

In the following sections, the format, structure, language and wording and pre-testing procedure are discussed.

3.6.1 Questionnaire Format

According to the Super Survey (2008), the online survey format should be as professional as possible. The format should also be unambiguous and consistent, and the questionnaire web page should not require too much scrolling or have too many pages. These suggestions were considered in the current survey to ensure a professional layout with few pages and consistent question formats in order to increase the response rate of the survey.

3.6.2 Structure of the Questionnaire

According to Yate (2006), the order of questions changes the questionnaire context because thoughts and feelings regarding previous questions may influence answers to and interpretation of subsequent questions. According to Bruce (2008), questions in a questionnaire should start with broad and general interest questions, and more difficult and less interesting questions are placed in the middle. General questions, such as demographic and classification questions related to broad interests, are put at the end of the questionnaire (Bruce, 2008). Leading or prestige bias questions should be avoided, and questions that may trigger bad feelings are socially undesirable (Iarossi, 2006). These suggestions were taken into consideration in the questionnaire for this study. The questionnaire was organised in a systematic way and consisted five parts, titled Sections A through E. In Section A, customers

were asked to rate their perception of perceived control, newness, ease of use, usefulness, perceived risk and perceived anonymity of SSTs. Section B asked customers to rate their motivation, trust, ability and role clarity in using SSTs. Section C asked customers to rate their trust, satisfaction with, attitude towards and repeated use of SSTs. Section D asked customers to provide information about their shopping habits, and Section E collected customers' demographic data.

3.6.3 Language and Wording

Language and wording are important in questionnaire design because participants are sensitive to subtle differences in words and syntax (Martin, 2006). Linguistic factors may affect participants' ability to understand specific questions in a questionnaire (Martin, 2006). In the current research, simple language and wording were used and the language was tailored to the supermarket self-checkout context.

3.6.4 Pre-Testing

Pre-testing the questionnaire ensures that the survey questions, wording, sequences and instructions are appropriate (Burns & Bush, 2006). The characteristics of the sample should be similar to those of the target sample (Malhotra, 2006). In the current study, 10 supermarket shoppers were randomly approached in Adelaide shopping malls and were asked to help evaluate the questionnaire's appearance, feasibility, readability, consistency of style, formatting and clarity of language (Trochim, 2001). Invitation emails were also sent to 10 scholars and 5 supermarket managers in Australia to evaluate the questionnaire. Three SST scholars and one Australian supermarket manager accepted the invitation and provided

comments on the questionnaire through emails. After conducting the pre-test, some shoppers raised issues regarding sentence structures and grammatical mistakes in the questions; some scholars raised the issue that participants selected for the research must have been exposed to and had the opportunity to use self-checkouts within the past 12 months to ensure they could remember their shopping experiences. All the participants were able to complete the questionnaire within 25 minutes. The problems raised during the pre-test were rectified before the actual research was conducted.

3.6.5 Scaling

In the current study, constructs such as hedonic, utilitarian and security factors, consumer readiness, satisfaction with, attitudes towards and repeated use of SSTs were studied. Hedonic factors comprised two variables: perceived control and enjoyment. Utilitarian factors comprised variables such as perceived ease of use and usefulness, and security factors consisted of perceived risk and anonymity. Each variable and construct in the current study was quantified with a proper interval scale. According to Burns and Bush (2006), scale development is the measurement of subjective properties of an object through designing questions and response formats. There are four levels of measurements: nominal, ordinal, interval and ratio. Nominal scales measure the lowest information level, while ratio scales measure the highest level of information (Lukas et al., 2005). The level of measurement is determined by the characteristics of the object being measured (Malhotra, 2006). An interval measure in which responses coded as 1 (strongly disagree) to 7 (strongly agree) (Babbie, 2005) was used because it reflected a sufficient range of score variance without overburdening the respondents compared to a 1 to 5 or 1 to 9 scale to measure the responses (Meyers, Guarino, & Gamst, 2005). The Likert scale was also used because it was more

suitable for multi-variance research (Meyers, Guarino, & Gamst, 2005). Therefore, an interval Likert scale was used to measure most constructs in the current research because multi-variance analytical techniques were used. Ratio and nominal scales were also used to measure the respondents' demographic characteristics, such as sex and age. Closed questions were used in the current research because open questions were too general to meet the objective of this study (Yate, 2006).

3.6.6 Ethics and Confidentiality

Confidentiality protects the privacy of information received, and confidentiality requires that researchers not disclose information received during the data collection process (Donner et al., 2008). Reiter (2012) proposed that the first duty of researchers is to honour the promise of confidentiality. For Internet survey research, every effort must be made to adhere to confidentiality (Reiter, 2012), although security risks such as hacking, security bypasses and backdoors are possible. The consequences of not protecting respondents' confidentiality are serious (Reiter, 2012). It not only violates the laws passed to protect confidentiality but also affects the organisation's reputation that collects the data (Reiter, 2012). To ensure the anonymity of responses, email surveys should be encrypted, and online surveys should be posted back to researchers by email or responses should be written directly to files on researchers' web servers (Cho & Larose, 1999). Additionally, informed consent is an ongoing issue in Internet research (Mohan, 2013). Informed consent is a process for obtaining permission before conducting research that ensures patients, clients and research participants are aware of the risks involved in studies (Mohan, 2013). A written consent form should be used, and it should include a consent statement, purpose and procedures of the research, risks or discomforts, benefits of the research, treatment alternatives, costs of participation,

confidentiality, voluntary participation, right to withdraw and termination of participation (Mohan, 2013). In the current study, respondents were fully informed about the purposes of the study and why the information was being collected. Their confidentiality and privacy were protected and fully explained in an Explanatory Statement, which can be found in Appendix II. The information sent via the Internet was encrypted to ensure privacy and confidentiality. The current research sought approval from the Ethics Committee at Monash University, and participants were advised to contact the Ethics Committee at Monash University for information about confidentiality and privacy.

3.7 Administration of Survey Instruments

After the preliminary questionnaires were prepared and pre-tested, a final questionnaire was formed for the online survey. The questionnaire, explanation statement and demographic questions were hosted on website. An advertisement link was sent via an email displayed on web pages of the Qualtrics site. The target audience was then invited to complete the online questionnaire. The data returned were kept confidential on the Qualtrics computer server. The collected data were then downloaded and stored at Monash University for further data analysis, and the data at Qualtrics were deleted.

3.8 Data Preparation, Coding and Preliminary Analysis

After collecting the data, data preparation, editing and coding were undertaken. The data preparation procedure involved checking for illegibility, completeness, inconsistency and ambiguity in the responses (Burns & Bush, 2008). The data were edited to ensure accuracy and precision and transcribed into SPSS for numerical analysis. SSPS and AMOS were then

used for data analysis.

3.8.1 Missing Responses

Missing responses are questionnaires that are not completely filled out by respondents (Marsh, 2000). Prior researchers advised different ad hoc approaches to handle missing data. For example, replacing missing values with the last measured value and replacing missing values with the mean of the observed values (imputation of missing values)(Carpenter & Kenward, 2007; Sterne et al., 2009). Data imputation has the advantage of easy implementation and minimises the effect of systematic missing data (Parafac, 1997). The imputation method was proposed to handle the missing data. However, 361 questionnaires were completed with no missing values; therefore, handling missing data was not necessary in this study.

3.9 Assumptions for Multivariate Analysis

To prepare for multivariate analysis, assumptions of normality, linearity, multicollinearity and homoscedasticity of variance should be checked to ensure that the data are suitable for hypothesis testing (Doncaster & Davey, 2007).

Normality. Normal distribution is a continuous distribution with a bell-shaped graph with a peak at the mean (Burns & Burns, 2008) when variables cluster around the mean (Ferguson & Takane, 2005). In the current study, skewness and kurtosis for each measurement item were checked to ensure the data met assumption of normality for multivariate analysis. Skewness and kurtosis values between -2.0 and +2.0 (Blanada & Macgillivray, 1988) are

regarded as a normal distribution. The skewness and kurtosis of the scales shown in Table 3.1 were between -2 and +2, whilst the kurtosis value for psychophysical risk (2.2) exceeded the acceptable value +2. The underestimated variance related to positive kurtosis is reduced when the sample is larger than 100 (Tabachnick & Fidell, 2007). As the sample size (N = 361) was sufficiently large, the non-normality was not of great concern for the current study.

Table 3.1

Descriptive Statistics of Scales

Scales	No. of items	Mean	Standard Deviation	Skewness	Kurtosis
Hedonic Factors					
Perceived Control	3	13.01	3.97	-.22	-.16
Newness	3	14.24	4.37	-1.01	.59
Utilitarian Factors					
Ease of Use	3	14.62	4.37	-.57	-.36
Usefulness	3	14.95	4.03	-.82	.44
Security Factors					
Security Risk	4	10.57	5.03	.74	.45
Psychophysical Risk	3	6.43	3.38	1.34	2.20
Performance Risk	3	12.30	4.06	.16	-.38
Perceived Anonymity	3	9.93	3.52	.18	-.18
Consumer Readiness					
Ability	3	16.60	3.50	-1.13	1.52
Role Clarity	3	16.08	3.68	-.76	.35
RAI (Self-Determined Motivation)	12	5.85	13.82	-.34	.32
Trust	3	13.47	3.85	-.55	.38
Outcomes					
Attitude Towards SSTs	3	14.27	4.36	-.84	.39
Satisfaction with SSTs	3	14.61	4.45	-.98	.48
Repeated Use of SSTs	3	14.67	4.22	-.66	.23

Linearity. Linearity is the assumption that the relationship between variables is linear (Fergusion & Takane, 2005). When the relationship is nonlinear but linearity is assumed, the strength of the relationship between variables is underestimated (Doncaster & Davey, 2007).

In the current study, linearity was checked using partial regression plot analysis (Bray & Maxwell, 1985). All plotted graphs were visually inspected, and no curvilinear or other non-linear relationships were found between the dependent and independent variables (Appendix III). Thus, linearity was assumed.

Multicollinearity. Multicollinearity refers to two or more predictors being correlated in a multiple regression model (Fergusion & Takane, 2005). Multicollinearity affects the calculation of individual predictors (Dirk & Bart, 2004), and the multiple regression models may not give valid results of individual predictors (Dirk & Bart, 2004). In the current study, multicollinearity was checked using the variance inflation factor (VIF) in SPSS. VIF is the degree of variance a coefficient (square of the standard deviation) increases where there is collinearity (Rud, 2000). VIF values larger than 4 indicate multicollinearity (Rud, 2000), and variables with high VIF values should not be used in the same multiple-regression model. The VIF values of the independent variables in the current study ranged from 1.23 to 2.86, which was well below the minimum cut-off level of 4.0. Therefore, multicollinearity was not a concern in the current study.

Homoscedasticity. Homoscedasticity of variance is the assumption that the variance within each of the populations is equal (Hall, 2003). Violations of homoscedasticity increase Type I and Type II errors (Lomax, 2001). Homoscedasticity of variance was tested using Levene's tests with one-way ANOVA tests (Bray & Maxwell, 1985). Levene's tests were performed over two nonmetric variables, e.g. income and education. Only variances of psychophysical risk ($F(6, 354) = 3.83$, $p < .01$) were different across different income groups. Variances of ability ($F(6, 353) = 5.11$, $p < .01$) and newness ($F(6, 353) = 2.20$, $p < .05$) were different across different education groups. However, none of these nonmetric variables had more than

two problematic metric variables (Hair et al., 2006). Therefore, the homoscedasticity of data was assumed in the current study.

3.10 Measurement Purification

The reliability and validity of measures were tested to ensure that suitable items for the scale were chosen (Rudner & Shafer, 2001). Reliability is the consistency of a set of measurements (Rudner & Shafer, 2001). Validity refers to the ability of a questionnaire to measure and describe what it intends to measure (Haladyna, 1999). Validity focuses on the way or the process by which a questionnaire is employed, whilst reliability focuses on the characteristics of the questionnaire itself (Briggs, Morrison, & Coleman, 2012). Reliable measurements are not necessarily valid (Beanland et al., 1999). Reliability measures suggest precision, whilst validity suggests accuracy (Haladyna, 1999). A two-step approach has been suggested because it eliminates false inferences in model building (Anderson & Gerbing, 1988). For example, reliability and construct validity should be estimated prior to the estimation of structural sub-models (Anderson & Gerbing, 1988). To eliminate false inferences in model building, the current study also adopted the two-step approach. However, prior to testing the reliability and validity of measures, exploratory and confirmatory factor analyses were first introduced.

3.10.1 Factor Analysis

Factor analysis is undertaken to understand the underlying structure of certain phenomena. Factor analysis includes exploratory and confirmatory factor analyses. The goal of factor analysis is to reduce 'the dimensionality of the original space and to give an interpretation to

the new space, spanned by a reduced number of new dimensions which are supposed to underlie the old ones' (Rietveld & Van Hout, 1993, p. 254). Exploratory factor analysis and confirmation factor analysis are both used for data reduction (Rencher, 2002). Exploratory factor analysis is used when there are no restrictions on the number of factors extracted and when specific relationship patterns exist between measured variables and a common factor (Thompson, 2004), whilst confirmatory factor analysis is used when prior restrictions exist (Thompson, 2004). Thus, the self-determined motivation scale and perceived risk were first analysed by exploratory factor analysis because a specified number of factors is not known in the current context. These two scales were then estimated using confirmatory factor analysis. Because other variables were adopted from previous empirical research and the number of factors was known, confirmatory factor analysis was only undertaken prior to model building.

3.10.1.1 Exploratory Factor Analysis

The exploratory factor analysis method includes principle components analysis (PCA) and common factor analysis (CFA). The major difference between PCA and CFA is the way the communalities are used (Thompson, 2004). PCA "...considers the total variance and derives factors that contain small proportions of unique variance and, in some instances, error variance" (Hair et al., 2006, p. 107). CFA "... assumes that both the unique and error variance are not of interest in defining the structure of the variables" (Hair et al., 2006, p. 107). Thus, common and unique variance is not differentiated in PCA (Doncaster & Davey, 2007). In CFA, unique variance is excluded. Some researchers disagree on whether PCA and CFA should be used (Bentler & Kano, 1990; Widaman, 1993). However, Hair et al. (2006) suggested that PCA should be used when data reduction is a primary concern and error variance is relatively small based on prior knowledge and that CFA should be used when the

primary objective is to identify the latent dimensions or constructs and little is known about the error variance. In the current study, data reduction was a primary concern. Thus, PCA was used. Additionally, rotation methods in exploratory factor analysis include oblique and orthogonal rotation. Oblique rotation produces a simpler structure than the orthogonal rotation method, but the patterns of loading are almost the same in both methods (Doncaster & Davey, 2007). Orthogonal rotation methods are the most widely used rotational methods and are the preferred method for data reduction of uncorrelated measures for subsequent use in other multivariate techniques (Hair et al., 2006). As the constructs of the current study are assumed to be inter-correlated, the oblique rotation method was more appropriate for the current study.

In determining the number of factors to retain, Field (2000) suggested that factor loadings of above .30 and cross factor loadings < .30 should be retained. Hair et al. (2006) suggested that factors with eigenvalues greater than 1 should be retained. Therefore, the current study retained factors with eigenvalues greater than 1 and with factor loading higher than or equal to .40 and with cross factor loadings < .30. In determining the statistical significance of factor loading, a power level of 80% and a .05 significance level were also used (Hair et al., 2006).

3.10.1.1.1 Exploratory Factor Analysis of Self-determined Motivation Scale

The Kaiser-Meyer-Olkin measure yielded .94, which was higher than the acceptable level of .5 (Field, 2009). Butlett's test of sphericity was $\chi 2$ (351) = 8396.36, $p < .001$, indicating the correlations between items were sufficiently large. The self-determined motivation scale composed of 27 items was analysed using principal component factor analysis and rotated with Oblimin using SPSS 13.0. Oblimin was used when the correlations of underlying factors

were evidenced (Mertler & Vannatta, 2005). Because different types of regulations are inter-correlated proposed by self-determined theory (Deci & Ryan, 2002), the Oblimin rotation method was suitable for the current study. Factors were extracted based on the information of eigenvalues, total variance and the conceptual consideration. Items were removed when the factor loading was less than .4 and the cross-loading was higher than .3 (Pett, Lackey, & Sullivan, 2003). The factor analysis was repeated four times until the clustered items were heavily loaded on a single factor with no factor loadings < .40 and cross factor loadings > .30.

The four extracted factors accounted for 77.38% of the total variance. Eigenvalues for factors 1 through 4 were 7.27, 4.01, 3.35 and 6.85, respectively. The communalities ranged from .55 to .90. The integrated regulation items heavily loaded on factor 1 yielded factor loadings from .69–.89; items of introjected regulation heavily loaded on factor 2 yielded factor loadings of .84–.93. Items of external regulation heavily loaded on factor 3 yielded factor loadings of .66–.85, and items of intrinsic motivation heavily loaded on factor 4 yielded factor loadings of .76–.81 (Table 3.2). Only one item of identified regulation was weakly loaded on factor 1 and was therefore retained (factor loading = .58). The exploratory factor analysis of the self-determined motivation scale was completed. The scale, composed of 19 items and 4 dimensions, was further estimated using confirmatory factor analysis. Table 3.2 shows the exploratory factor analysis results for the self-determined motivation scale.

Table 3.2

The Exploratory Factor Analysis of the Self-Determined Motivation Scale

Items	Factor 1	Factor 2	Factor 3	Factor 4
When I go shopping, my family would like me to return home as soon as possible.			**.78**	

(Table 3.2 continues)

(Table 3.2 continued)

Items	Factor 1	Factor 2	Factor 3	Factor 4
I don't want my children to feel too tired when I take them shopping.			**.85**	
I don't want older customers to stand in the shopping queue for too long.			**.69**	
I want other shoppers to complete their shopping faster.			**.66**	
I don't want store personnel to know what I buy when I shop.				
I want my friends to notice that I am up-to-date with the use of technology.				
I don't want service staff to be irritated with me.				
I feel bad about myself if I don't use self-checkout.		**.93**		
I feel dissatisfied with myself if I don't use self-checkout systems.		**.93**		
I feel pressure inside me that compels me to use self-checkout systems.		**.89**		
I feel uncomfortable if I don't use self-checkout systems.		**.84**		
I feel proud of myself when I use self-checkout systems.				
Self-checkout systems are essential for me to effectively complete my shopping.	**.58**			
Using self-checkout systems is a well-established habit of mine.	**.87**			
When I am shopping, it's now quite natural for me to use self-checkout systems.	**.84**			
Using self-checkout systems is now a normal part of my shopping experience.	**.89**			
Using self-checkout system is an important part of my shopping trips.	**.69**			
The use of self-checkout systems is now an entrenched habit of mine.	**.83**			
I think using self-checkout systems is important to me personally.				
It is of great personal significance to me to be able to use self-checkout systems when I go shopping.				
I feel self-checkout systems are necessary in the shopping process.				
Self-checkout systems enable me to complete my shopping as quickly as possible.				
I use self-checkout systems because they are fun.				**.79**
I enjoy using self-checkout systems.				**.76**
I find that using self-checkout systems is a pleasurable experience.				**.81**
I like the feeling of using self-checkout systems.				**.80**
I enjoy not being helped when I make a purchase.				**.80**
Eigenvalue	7.27	4.01	3.35	6.85
Cumulative % of Variance	46.1	63.4	72.4	77.38

*Items with cross-loadings >.3

[1]Scaling from ‘strongly disagree’ to ‘strongly agree’ on a seven-point scale

[2]Items with factor loadings in bold were retained for further analysis.

3.10.1.1.2 Exploratory Factor Analysis of Perceived Risk

The Kaiser-Meyer-Olkin measure of perceived risk items yielded .93, which was higher than the acceptable level of .5 (Field, 2009). Butlett's test of sphericity was $\chi 2$ (190) = 6623.48, $p < .001$, indicating that the correlations between items were sufficiently large. Principal component factor analysis was used to analyse 20 perceived risk items, and they were rotated with Oblimin using SPSS 13.0. Oblimin was used because previous studies suggested that different types of perceived risks were inter-correlated (Evans, 1982). Items were removed when factor loading was less than .4 and the cross-loading was higher than .30 (Pett, Lackey, & Sullivan, 2003). The factor analysis was repeated three times until the clustered items were heavily loaded on a single factor with no factor loadings less than .40 and cross factor loadings larger than .30.

Three factors emerged in the results (Table 3.3). The extracted factors accounted for 74.73% of the total variance. The eigenvalues of factors 1–3 were 6.63, 4.37 and 5.01. Communalities ranged from .34 to .91. The scale of perceived risk was composed of three factors. Clusters of most items were heavily loaded on these three factors, as shown in Table 3.3. Items loaded on factor 1 yielded loadings from .62–.94. Items loaded on factor 2 yielded loadings from .56–.93, and items loaded on factor 3 yielded loadings from .93–.97. The items clustered in the same factor indicated that factor 1 represented psychological, psychosocial and physical risk items, which was renamed psychophysical risk. Factor 2 represented performance risk, and factor 3 represented security risk. Thus, 15 items and 3 perceived risk dimensions were retained for confirmatory factor analysis.

Table 3.3

Factor Analysis Results of Perceived Risk

Items	Factor 1	Factor 2	Factor 3
Self-checkout systems do not always work properly.		**.93**	
Self-checkout systems do not work as well as I expect.		**.87**	
Self-checkout systems have many technical problems.		**.85**	
I find I have to be careful when I use self-checkout systems to avoid making mistakes.		**.56**	
I lose money if I use self-checkout systems.			
Other people may gain access to my bank account if I use self-checkout systems.			**.97**
Others will know my personal details if I use self-checkout systems.			**.93**
Others may misuse my data if I use self-checkout systems.			**.95**
I lose control of my personal data if I use self-checkout systems.			**.93**
I feel anxious when I use self-checkout systems.			
I look foolish in front of others when I use self-checkout systems.	**.62**		
I feel depressed when I use self-checkout systems.	**.83**		
I feel frustrated when I use self-checkout systems.			
My usage of self-checkout systems is judged negatively by others.	**.77**		
My decision to use self-checkout systems is not socially accepted by others.	**.90**		
I get headache when I use self-checkout systems.	**.94**		
My eyesight is affected when I use self-checkout systems.	**.87**		
Using self-checkout systems is inconvenient because there are many service counters staff with personnel in stores.			
I have to spend extra time completing my shopping as self-checkout systems cause delays.			
I am not as efficient in shopping as usual if I do not use self-checkout systems.		**.47**	
Eigenvalue	6.63	4.37	5.01
% of Variance	51.84	66.02	74.73

[1]Scaling from 'strongly disagree' to 'strongly agree' on a seven-point scale

[2]Factor loadings in bold were selected for further analysis

In summary, the exploratory factor analysis results suggest that integrated, introjected and external regulation, intrinsic motivation, performance and security risks are particularly relevant to the current study context, whilst psychological, psychosocial and physical risks should be combined to form psychophysical risk. The identified regulation, financial, privacy and time/convenience risks are relatively unimportant to the current context. After the

exploratory factor analysis, the retained items were analysed using confirmatory factor analysis.

3.10.1.2 Confirmatory Factor Analysis and Model Fit Indices

Confirmatory factor analysis (CFA) is a theory-driven technique (Schreiber et al., 2006) used to investigate relationships between observed variables and latent constructs (Williams, 1995). CFA is used to test whether variables logically or systematically represent a construct in a theoretical model (Hair et al., 2010). CFA is popular because it is a simpler alternative to EFA (Brannick, 1995). However, Hurley et al. (1997) suggested that CFA is only preferred when researchers have knowledge of the theory and/or empirical research prior to examining the expected causal connections between variables (Hurley et al., 1997). Thus, the current study adopted Hurley et al.'s (1997) opinion. Constructs were only estimated using CFA if knowledge of these constructs was gained from the previous literature or if they had been subject to exploratory factor analysis. CFA also enables researchers to compare the population covariance and observed covariance matrix (Schreiber et al., 2006). In order to minimise the differences between estimated and observed matrices, different indices were used to estimate the model fit. Absolute, incremental and parsimony fit indices and a summary of the model fit index cut-off values are discussed below.

Absolute fit indices. Absolute fit indices, such as the chi-square ($\chi 2$) test, root mean square error of approximation (RMSEA), goodness-of-fit statistic (GFI), adjusted goodness-of-fit statistic (AGFI), root mean square residual (RMR) and standardised root mean square residual (SRMR), offer information on priori mode fits of sample data and whether the proposed theory fits the data (McDanald & Ho, 2002). They are direct measures of model fit

without comparing the fit of the substantive model to the null model (Widaman & Thompson, 2003). Most absolute fit indices are poor indicators because their accuracy is sensitive to the sample size (Bentler, 1990; Hu & Bender, 1999). Only the root-mean-square error of approximation (RMSEA) is relatively less sensitive to the sample size (Widaman & Thompson, 2003).

Incremental fit indices. Incremental fit indices, such as the normed-fit index (NFI), the Tucker-Lewis index (TLI) and the comparative fit index (CFI), are also called comparative (Miles & Shevlin, 2007; Hair et al., 2010) or relative fit indices (McDonald & Ho, 2002). In these indices, a substantive model is compared with a null model (Widaman & Thompson, 2003). The null model is a model in which all variables are uncorrelated (McDonald & Ho, 2002). The standard null model also yields unconstrained estimates of the variance (Widaman & Thompson, 2003). Most incremental fit indices are relatively insensitive to the sample size and provide improvement in model fit (Widaman & Thompson, 2003).

Parsimony fit indices. Because models are more complicated and saturated, the theoretical model becomes less rigorous and relies more on sample data (Widaman & Thompson, 2003). Parsimony fit indices consider the model fit relative to its complexity and provide information on the best model relative to the competing ones (Hair et al., 2010). Two examples of parsimony fit indices are the adjusted goodness-of-fit index (AGFI) and the parsimonious normed fit index (PNFI) (Mulaik et al., 1989; Hair et al., 2010). AGFI and PNFI are based on GFI and NFI with adjusted degrees of freedom (Mulaik et al., 1989; Hair et al., 2010). These indices may be lower than other goodness-of-fit indices because they penalise for model complexity (Mulaik et al., 1989).

Reporting fit indices is highly debated, and no consistent guidelines have been developed (Hair et al., 2010). Thompson (2004) suggested that it is necessary to report a variety of indices because they reflect different aspects of model fit. Hooper et al. (2008) emphasised the index sophistication and suggested including the $\chi 2$ statistic, degrees of freedom and p value, the RMSEA and its confidence interval, the SRMR, the CFI and one parsimony fit index. Based on Thompson (2004) and Hooper et al.'s (2008) suggestions, the current study reported the chi-square statistic; the degree of freedom and p value; RMSEA; the NFI and CFI incremental indices; and the AGFI parsimony fit index. The incremental indices IFI and TLI were also reported to reflect wider aspects of the model fit. Although GFI is not considered sophisticated enough, it was also included as a referencing index for on historical reasons (McDonald & Ho, 2002). Because SRMR value was not included in the current AMOS version, it is not reported in the current study.

Different literature also used different cut-off values for fit indices (Hair et al., 2010). The cut-off values for fit indices vary according to various factors, e.g., sample sizes, model complexity and the degrees of error in model specification (Hu & Bentler, 1999). Because the model fit had to be evaluated in the current study, it was essential to justify it with certain cut-off values. Schreiber et al. (2008) suggested a practical guideline for the cut-off values of fit indices used in the current study (see Table 3.4).

Table 3.4

Model Fit Index Cut-Off Values (Schreiber et al., 2008, p.330)

Indexes	Shorthand	General rule for acceptable fit if data are continuous
Absolute/Predictive Fit Chi-square	$\chi 2$	Ratio of $\chi 2$ to df $\leq$ 2 or 3, useful for nested models/model trimming

(Table 3.4 continues)

(Table 3.4 continued)

Indexes	Shorthand	General rule for acceptable fit if data are continuous
Normed fit index	NFI	≥ .95 for acceptance
Incremental fit index	IFI	≥ .95 for acceptance
Tucker-Lewis index	TLI	≥ .95 can be 0> TLI>1 for acceptance
Comparative fit index	CFI	≥ .95 for acceptance
Parsimonious fit		
Parsimony-adjusted NFI	PNFI	Very sensitive to model size
Parsimony-adjusted CFI	PCFI	Sensitive to model size
Parsimony-adjusted GFI	PGFI	Closer to 1 the better, though typically lower than other indexes and sensitive to model size
Other		
Goodness-of-fit index	GFI	≥ .95 Not generally recommended
Adjusted GFI	AGFI	≥ .95 Performance poor in simulation studies
Root mean square residual	RMR	Smaller, the better, 0 indicates perfect fit
Standardised RMR	SRMR	≤ .08
Root mean square error of approximation	RMSEA	< .06 to .08 with confidence interval

3.10.1.2.1 Confirmatory Factor Analysis of Self-Determined Motivation Scale

Arnold and Reynolds (2003) proposed that the psychometric measurement properties of a scale should be improved by re-specification of the confirmatory model. A 19-item, four-dimensional confirmatory model was analysed using SPSS AMOS 18, which resulted in a chi-square value ($\chi2$ (146) = 478.12, p < .001), $\chi2$/df = 3.28, RMSEA = .790 (pclose < .001), GFI = .86, AGFI = .82, NFI = .93 and CFI = .95. The standardised factor loadings ranged from .44 to .93. Absolute goodness-of-fit indices, e.g. $\chi2$/df > 3 and RMSEA > .05, indicated that the data did not fit the model well. Incremental goodness-of-fit indices, e.g., NFI < .95, also supported the insufficient model fit of the data. Thus, the model had to be re-examined according to the modification index. To ensure the uni-dimensionality of the factors, each item was inspected for domain representativeness (Nunnally & Bernstein, 1994). The model

was retested after removing five items with high modification indices, which resulted in an acceptable model with a chi-square value ($\chi2$ (71) = 115.6, $p < .001$), $\chi2/df = 1.628$, RMSEA = .420 (pclose < .830), GFI = .96, AGFI = .94, NFI = .97 and CFI = .99. The modification index further indicated that two more items needed to be removed because they were not sufficiently representative. This resulted in a good model fit with a chi-square value ($\chi2$ (48) = 93.40, $p < .001$), $\chi2/df = 1.946$, RMSEA = .051 (pclose = .426), GFI = .96, AGFI = .93, NFI = .97 and CFI = .99 because the $\chi2/df < 3.0$, RMSEA < .06 and the incremental indices, e.g. NFI and CFI, were above .95. Thus, 12 items were retained in the final self-determined motivation scale. It should be noted that all identified regulation items were removed after CFA. This indicated that identified regulation was not adaptable to the current study context. One plausible explanation for this result may be that customers do not think using supermarket self-checkouts is important or essential in their shopping because other personnel service counters are also available. The confirmatory factor analysis results are shown in Table 3.5 and illustrated in Figure 3.3.

Table 3.5

Confirmatory Factor Analysis of the Self-Determined Motivation Scale

Items	**SFL**	**t-Value**
External Regulation		
When I go shopping, my family would like me to return home as soon as possible.	**.70**	**8.60**
I don't want my children to feel too tired when I take them shopping.	**.72**	**8.03**
I don't want older customers to stand in the shopping queue for too long.	**.63**	**10.27**
*I want other shoppers to complete their shopping faster.		
Introjected Regulation		
I feel bad about myself if I don't use self-checkout systems.	**.94**	**4.69**
I feel dissatisfied with myself if I don't use self-checkout systems.	**.91**	**6.34**

(Table 3.5 continues)

(Table 3.5 continued)

Items	SFL	t-Value
I feel uncomfortable if I don't use self-checkout systems.	**.74**	**12.14**
*I feel pressure inside me that compels me to use self-checkout systems.		
Integrated Regulation		
Using self-checkout systems is a well-established habit of mine.	**.94**	**6.57**
When I am shopping, it's now quite natural for me to use self-checkout systems.	**.85**	**11.07**
The use of self-checkout systems is now an entrenched habit of mine.	**.89**	**9.60**
*Using self-checkout systems is now a normal part of my shopping experience.		
*Using self-checkout systems is an important part of my shopping trips.		
Intrinsic Motivation		
I enjoy using self-checkout systems.	**.97**	**6.42**
I find that using self-checkout systems is a pleasurable experience.	**.95**	**9.01**
I like the feeling of using self-checkout systems.	**.93**	**10.52**
*I use self-checkout systems because they are fun.		
*I enjoy not being helped when I make a purchase.		
($\chi2$ (48) =93.40, p<.001), $\chi2$/df=1.946, RMSEA=.051 (pclose=.426),		
GFI=.96, AGFI=.93, NFI=.97, and CFI=.99		

[1]Scaling from ‘strongly disagree’ to ‘strongly agree’ on a seven-point scale
[2]12 items in bold compose the final self-determined motivation scale
[3] Items in bold retained for further analysis.
Notes: SFL= standardised factor loading

Figure 3.3. Confirmatory Factor Analysis of Self-Determined Motivation.

3.10.1.2.2 Confirmatory Factor Analysis of Perceived Risk

The preliminary confirmatory factor analysis of 15 items of perceived risk resulted in a chi-square value ($\chi2$ (87) = 458.56, p < .001), $\chi2$/df = 5.270, RMSEA = .11 (pclose < .001), GFI = .86, AGFI = .80, NFI = .91 and CFI = .92. Absolute goodness-of-fit indices, e.g. $\chi2$/df > 3 and RMSEA > .05, indicated that the data did not fit the model well. Incremental goodness-of-fit indices, e.g. GFI < .95 and NFI < .95, also suggested that the data did not fit the model

adequately. After the re-specification of the confirmatory model according to the modification index (MI), five items were removed (see Table 3.6) resulting in a model ($\chi2$ (32) = 64.280, p < .001), $\chi2$/df = 2.010, RMSEA = .530 (pclose = .370), GFI = .97, AGFI = .94, NFI = .98 and CFI = .99. $\chi2$/df < 3 and RMSEA < .06 were within the range of a good model fit, and pclose was significant at > .05. These indicators suggested that the model was close to fit. Incremental indices such as NFI and CFI were also over the acceptable level of .95. The general goodness-of-fit of the model was adequate. Thus, a 10-item, four-dimensional model of perceived risk was retained for further analysis. Table 3.6 and Figure 3.4 show the confirmatory factor analysis results of perceived risk.

Table 3.6

Confirmatory Factor Analysis of Perceived Risk

Items	SFL	t-Value
Performance Risk		
Self-checkout systems do not always work properly.	**.77**	**7.48**
Self-checkout systems do not work as well as I expect.	**.86**	**11.16**
Self-checkout systems have many technical problems.	**.89**	**8.90**
*I find I have to be careful when I use self-checkout systems to avoid making mistakes.		
Security Risk		
Other people may gain access to my bank account if I use self-checkout systems.	**.92**	**11.01**
Others will know my personal details if I use self-checkout systems.	**.94**	**9.68**
Others may misuse my data if I use self-checkout systems.	**.94**	**9.75**
I lose control of my personal data if I use self-checkout systems.	**.95**	**7.48**
Psychophysical Risk		
*I look foolish in front of others when I use self-checkout systems.		
I feel depressed when I use self-checkout systems.	**.89**	**6.27**
*My usage of self-checkout systems is judged negatively by others.		
My decision to use self-checkout systems is not socially accepted by others.	**.77**	**5.47**
*I get headache when I use self-checkout systems.		
My eyesight is affected when I use self-checkout systems.	**.85**	**12.45**
*I am not as efficient as usual if I do not use self-checkout systems.		

(Table 3.6 continues)

(Table 3.6 continued)

Items	SFL	t-Value
(χ2 (32) =64.280, p<.001), χ2/df=2.010, RMSEA=.530 (pclose=.370), GFI=.97, AGFI=.94, NFI=.98, and CFI=.99		

[1]Scaling from 'strongly disagree' to 'strongly agree' on a seven-point scale
[2]10 items in bold compose the final perceived risk scale
[3] Items in bold retained for further analysis and with asterisk were deleted.
Notes: SFL= standardised factor loading

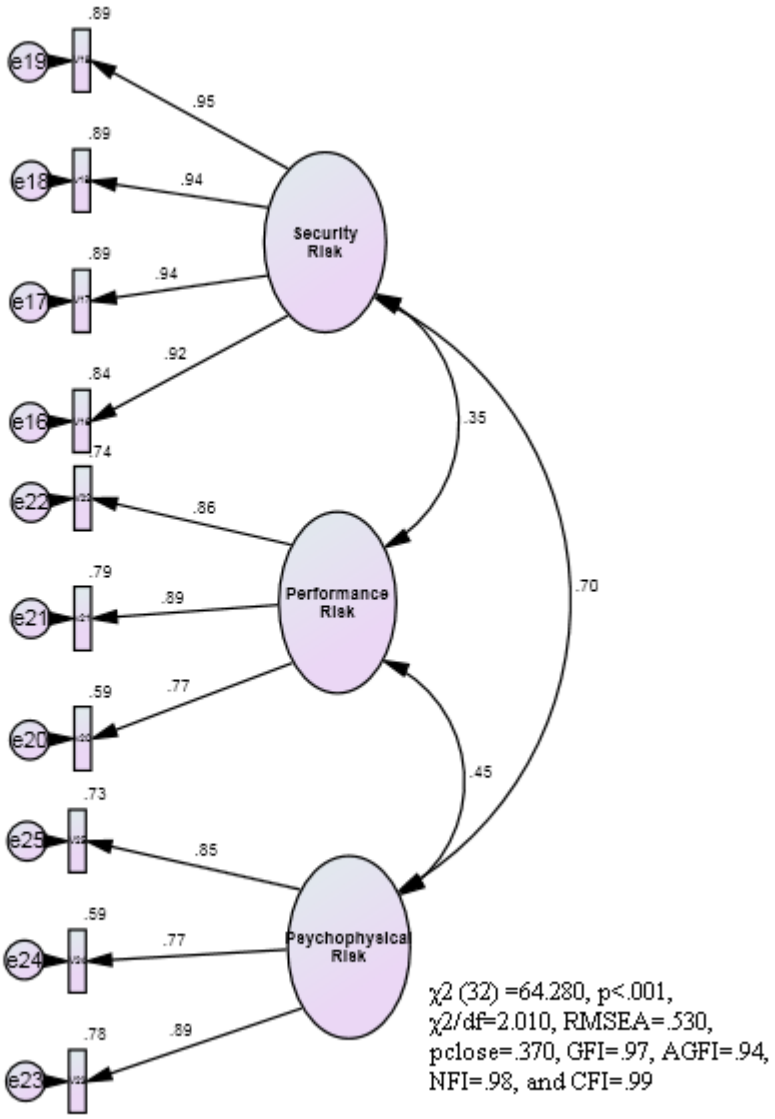


Figure 3.4. Confirmatory Analysis Results of Perceived Risk.

Because self-determined motivation and perceived risk were purified, grouped constructs were further purified with CFA. Analysing constructs in groups is better than analysing them individually because CFA model fits should be used to assess a measurement model rather than an individual construct (Williams, Malos, & Palmer, 2002). The following section presents the procedure for analysing constructs with CFA in groups.

3.10.1.2.3 Confirmatory Factor Analysis of Constructs in Groups

In order to simplify the confirmatory model, three measurement models were formed: independent variables, consumer readiness and outcomes of using SSTs. The first measurement model included independent variables such as ease of use, usefulness, perceived control, newness, perceived anonymity and three dimensions of perceived risk. The second measurement model included factors of consumer readiness such as ability, role clarity, trust and four dimensions of self-determined motivation. The final measurement model included the outcomes of using SSTS such as satisfaction with, attitude towards and repeated use of SSTs. All measurement models were estimated by confirmatory factor analysis.

3.10.1.2.4 Confirmatory Factor Analysis of Independent Variables

In all, 24 independent variables, such as ease of use, usefulness, perceived control, newness and perceived anonymity, combined with three performance risk items, four security risk items and three psychophysical risk items were estimated using confirmatory factor analysis. The results were as follows: ($\chi2$ (499) = 2018.15, $p < .001$), $\chi2/df = 4.044$, RMSEA = .092, pclose < .001, GFI = .74, AGFI = .69, NFI = .82 and CFI = .86. Absolute goodness-of-fit

indices, e.g. $\chi 2/df > 3$ and RMSEA > .050, were not adequate. All the incremental goodness-of-fit indices, e.g. NFI and CFI < .95, indicated that the data did not sufficiently fit the model. Removing nine items according to the modification index resulted in a chi-square value ($\chi 2$ (247) = 569.242, p < .001), $\chi 2/df = 2.305$, RMSEA = .060, pclose < .005, GFI = .89, AGFI = .86, NFI = .93 and CFI = .96 (IFI = .96, TLI = .95). Absolute goodness-of-fit indices, e.g. $\chi 2/df < 3$ and RMSEA = .060, and incremental fit indices, e.g. TLI and CFI > .95, indicated an acceptable model fit. Thus, 25 items were retained in the independent variables for further analysis, as shown in Table 3.7 and Figure 3.5.

Table 3.7

The Confirmatory Factor Analysis Results of Independent Variables

Items	SFL	t-Value
Control AVE=.72 CR=.89		
I feel more in control when I use the self-checkout option to complete my purchase.	**.89**	**8.06**
Self-checkout systems give me more control when purchasing in stores.	**.92**	**6.18**
I have more flexibility when I use self-checkout systems.	**.75**	**11.75**
*Self-checkout systems offer me more options when purchasing in stores.		
*I don't have to depend on service staff when I purchase something using self-checkout systems.		
Newness AVE=.85 CR=.94		
I am interesting in using self-checkout systems because they are		
Progressive	**.93**	**8.22**
Innovative	**.95**	**6.20**
Modern	**.87**	**11.07**
*Trendy		
*New gadgets		
Ease of Use AVE=.79 CR=.92		
Using self-checkout systems is complicated.	**.93**	**7.65**
Using self-checkout systems is confusing.	**.95**	**5.96**
Using self-checkout systems takes a lot of effort.	**.81**	**12.00**
*Using self-checkout systems requires little work.		
*Using self-checkout systems takes longer to complete my shopping.		
Usefulness AVE=.77 CR=.91		
Self-checkout systems allow me to shop faster.	**.76**	**12.15**

(Table 3.7 continues)

(Table 3.7 continued)

Items	SFL	t-Value
Self-checkout systems shorten queues.	**.91**	**7.68**
Self-checkout systems reduce the waiting time at cash registers.	**.94**	**4.97**
*Self-checkout systems are more efficient.		
Anonymity AVE=.57 CR=.80		
Self-checkout systems help me avoid being identified when I purchase certain things in stores.	**.54**	**12.46**
I do not want people to remember me after I purchase things in stores.	**.92**	**2.68**
I don't want to be recognised during the purchasing process.	**.77**	**8.23**
*My shopping is not affected by what people think of the thing I buy.		
*Others will not be able to judge me on the basis of things I buy.		
Performance Risk AVE=.71 CR=.88		
Self-checkout systems do not always work properly.	**.75**	**11.35**
Self-checkout systems do not work as well as I expect.	**.91**	**5.83**
Self-checkout systems have many technical problems.	**.84**	**9.23**
Security Risk AVE=.88 CR=.97		
Other people may gain access to my bank account if I use self-checkout systems.	**.92**	**11.01**
Others will know my personal details if I use self-checkout systems.	**.94**	**9.67**
Others may misuse my data if I use self-checkout systems.	**.94**	**9.76**
I lose control of my personal data if I use self-checkout systems.	**.94**	**9.64**
Psychophysical Risk AVE=.71 CR=.88		
I feel depressed when I use self-checkout systems.	**.89**	**7.75**
My decision to use self-checkout systems is not socially accepted by others.	**.77**	**11.23**
My eyesight is affected when I use self-checkout systems.	**.85**	**9.32**
($\chi2$ (247) =569.242, p<.001), $\chi2$/df=2.305, RMSEA=.060, pclose<.005, GFI=.89, AGFI=.86, NFI=.93, and CFI=.96		

Notes: SFL= standardised factor loading; AVE=average variance extract; CR= composite reliability
[1]Scaling from 'strongly disagree' to 'strongly agree' on a seven-point scale
[2]25 items in bold compose the final independent variables
[3]Items in bold retained for further analysis. Items with asterisk were removed due to low factor loadings.

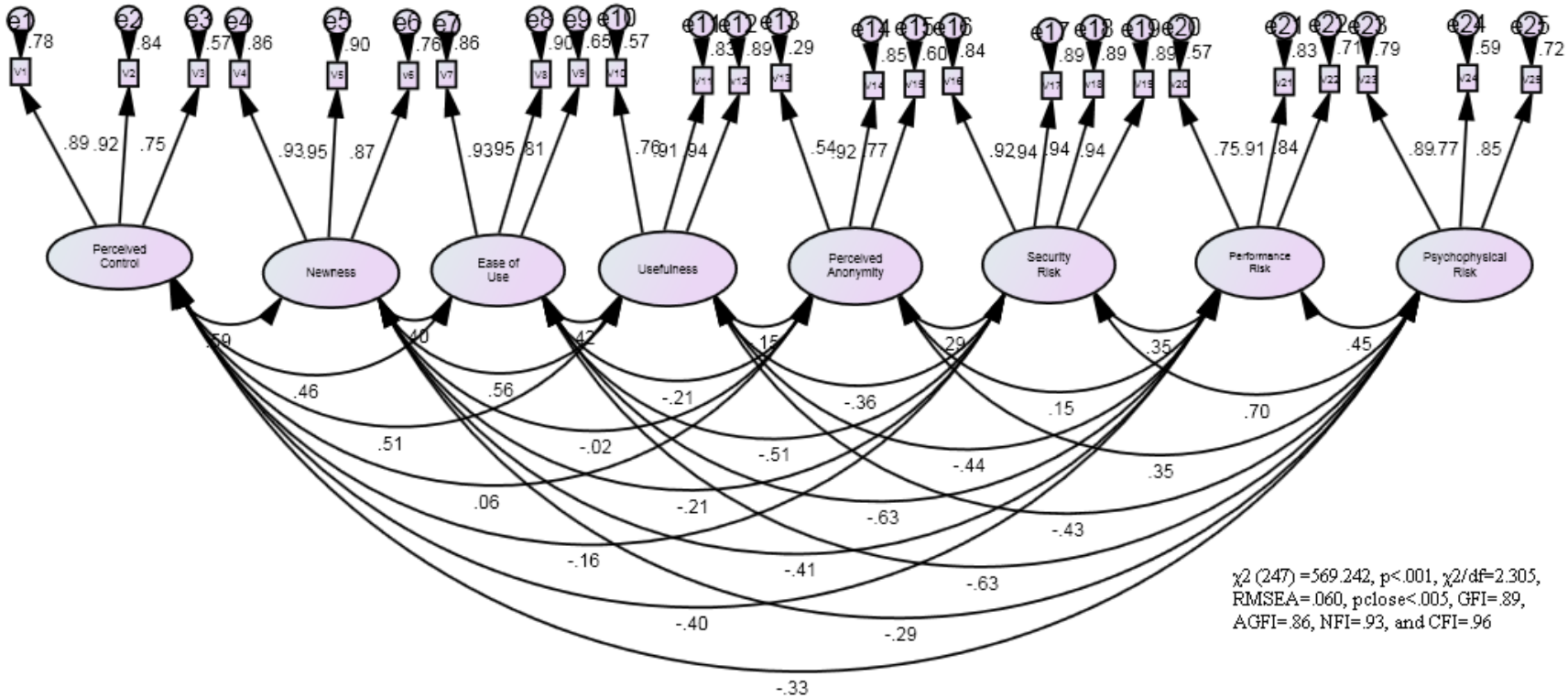


Figure 3.5. Confirmatory Factor Analysis of Independent Variables.

3.10.1.2.5 Confirmatory Factor Analysis of Consumer Readiness

In all, 15 consumer readiness items, such as ability, role clarity and trust, combined with three external regulation items, three introjected regulation items, three integrated regulation items and three intrinsic motivation items were analysed using confirmatory factor analysis. The results were as follows: ($\chi2$ (254) = 754.393, $p < .001$), $\chi2/df$ = 2.970, RMSEA = .074, pclose < .000, GFI = .85, AGFI = .81, NFI = .90 and CFI = .93. Removing six items according to the modification index resulted in ($\chi2$ (168) = 384.96, $p < .001$), $\chi2/df$ = 2.291, RMSEA = .060, pclose = .020, GFI = .91, AGFI = .88, NFI = .94 and CFI = .97 (IFI =.97, TLI = .96). The model fit was also acceptable with $\chi2/df < 3$, RMSEA = .06 and the incremental goodness-of fit indices IFI, TLI and CFI > .95. Thus, 21 items and 6 consumer readiness factors were retained for further analysis, as shown in Table 3.8 and Figure 3.6.

Table 3.8

Confirmatory Factor Analysis of Consumer Readiness

Items	SFL	t-Value
Role Clarity AVE=.72 CR=.88		
I am not sure how to use self-checkout systems properly.	**.92**	**8.38**
I am certain about how to effectively use self-checkout systems.	**.97**	**2.98**
The steps in the use of self-checkout systems are clear to me.	**.61**	**13.08**
*I know what is expected of me when I use self-checkout systems.		
*I find the instructions on self-checkouts to be vague.		
Ability AVE=.72 CR=.88		
I am fully capable of using self-checkout systems.	**.86**	**9.57**
I am confident in my ability to use self-checkout systems.	**.87**	**9.22**
My past experience increases my confidence in successfully using self-checkout systems.	**.82**	**10.66**

(Table 3.8 continues)

(Table 3.8 continued)

Items	SFL	t-Value
*I do not feel I am qualified to complete my purchase using self-checkout systems.		
*Using self-checkout systems sometimes involves things that I am not capable of handling.		
Trust AVE=.67 CR=.86		
I trust self-checkout systems because they provide many benefits when I am shopping.	**.84**	**9.36**
Self-checkout systems have more advantages than disadvantages if they deliver the service properly.	**.79**	**10.66**
Self-checkout systems provide better services to customers when they shop.	**.82**	**10.07**
*I am cautious about using self-checkout systems when I shop.		
*I can rely on self-checkout systems to complete my purchase.		
External Regulation AVE=.47 CR=.73		
I don't want my children to feel too tired when I take them shopping.	**.69**	**8.89**
When I go shopping, my family would like me to return home as soon as possible.	**.73**	**8.02**
I don't want older customers to stand in the shopping queue for too long.	**.63**	**10.20**
Introjected Regulation AVE=.76 CR=.90		
I feel bad about myself if I don't use self-checkout.	**.94**	**4.73**
I feel dissatisfied with myself if I don't use self-checkout systems.	**.91**	**6.83**
I feel uncomfortable if I don't use self-checkout systems.	**.74**	**12.17**
Integrated Regulation AVE=.79 CR=.92		
Using self-checkout systems is a well-established habit of mine.	**.94**	**7.02**
When I am shopping, it's now quite natural for me to use self-checkout systems.	**.85**	**11.12**
The use of self-checkout systems is now an entrenched habit of mine.	**.89**	**9.74**
Intrinsic Motivation AVE=.90 CR=.97		
I find that using self-checkout systems is a pleasurable experience.	**.97**	**7.01**
I like the feeling of using self-checkout systems.	**.95**	**9.21**
I enjoy not being helped when I make a purchase.	**.93**	**10.56**
($\chi2$ (168) =384.96, p<.001), $\chi2$/df=2.291, RMSEA=.060, pclose=.020, GFI=.91, AGFI=.88, NFI=.94 and CFI=.97		

Notes: SFL= standardised factor loading; AVE=average variance extract; CR= composite reliability
[1] Scaling from "strongly disagree" to 'strongly agree' on a seven-point scale
[2] 21 items in bold compose the final independent variables
[3] Items in bold retained for further analysis. Items with asterisk were removed due to low factor loadings.

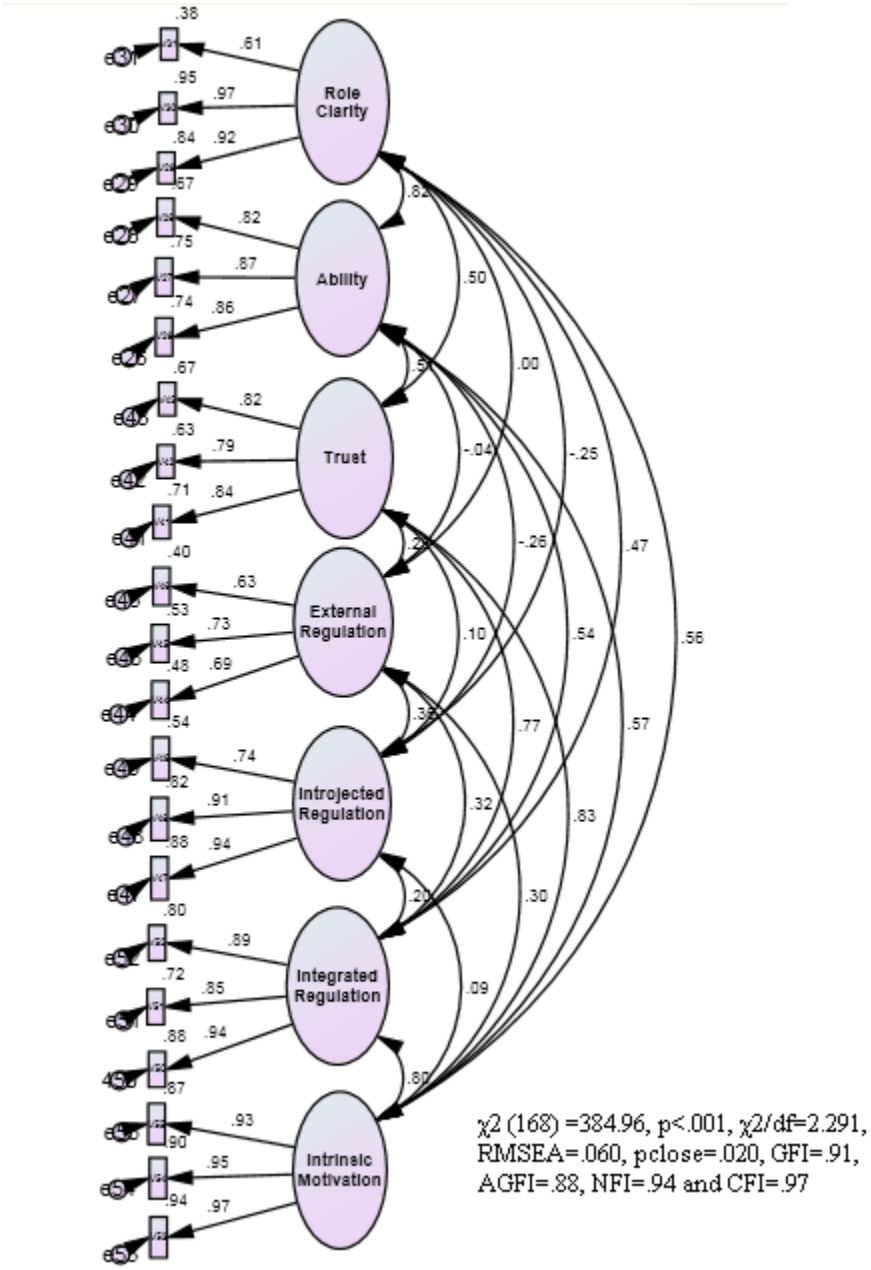


Figure 3.6. Confirmatory Factor Analysis of Consumer Readiness.

3.10.1.2.6 Confirmatory Factor Analysis of Outcomes of Using SSTs

Six satisfaction items, four attitude towards SSTs items and four repeated use of SSTs items were analysed with confirmatory factor analysis; they resulted in a chi-square value ($\chi2$ (87) = 465.61, p < .001), $\chi2$/df = 5.352, RMSEA = .110, pclose < .001, GFI = .84, AGFI = .77, NFI = .94 and CFI = .95. According to the modification index, five items were removed, which resulted in a chi-square value ($\chi2$ (24) = 384.58, p < .001), $\chi2$/df = 3.524, RMSEA = .084, pclose = .002, GFI = .95, AGFI = .91, NFI = .98 and CFI = .99. The absolute and incremental indices, e.g. GFI, NFI and CFI >.95, indicated an acceptable model fit. Thus, only three satisfaction items, three attitude towards SSTs items, and three repeated use of SSTs items were retained in dependent variables for further analysis. Table 3.9 and Figure 3.7 show the confirmatory factor analysis of outcomes of using SSTs.

Table 3.9

Confirmatory Factor Analysis of Outcomes of Using SSTs

Items	SFL	t-Value
Satisfaction with SSTs AVE=.87 CR=.95		
Self-checkout systems meet my expectations.	**.92**	**10.03**
I am really satisfied with self-checkout systems.	**.94**	**8.93**
In general, I am satisfied with the service I get from self-checkout systems.	**.94**	**8.81**
*I am satisfied with the quality of service delivered by self-checkout systems relative to my expectation.		
*In the past, self-checkout systems have provided worse services than I expected.		
*Self-checkout systems provide better services than I expected.		
*In general, I am satisfied with self-checkout systems.		

(Table 3.9 continues)

(Table 3.9 continued)

Items		SFL	t-Value
Attitudes Towards SST	AVE=.88 CR=.96		
Using self-checkout systems is a wise idea when shopping.		**.92**	**11.28**
I like the idea of using self-checkout systems when shopping.		**.96**	**7.92**
Using self-checkout systems is beneficial when I shop.		**.95**	**9.57**
*Using self-checkout systems during shopping is a good idea.			
Repeated Use of SSTs	AVE=.79 CR=.92		
I expect I will continue to use self-checkout systems in the future.		**.95**	**7.68**
I plan to use more self-checkout systems when I go shopping.		**.90**	**10.76**
I will strongly recommend others to use self-checkout systems during shopping.		**.81**	**12.3**
*I am certain I will use self-checkout systems again.			
($\chi2$ (24) =384.58, p<.001), $\chi2$/df=3.524, RMSEA=.084, pclose=.002, GFI=.95, AGFI=.91, NFI=.98, and CFI=.99			

Notes: SFL= standardised factor loading; AVE=average variance extract; CR= composite reliability
[1]Scaling from 'strongly disagree' to 'strongly agree' on a seven-point scale
[2]9 items in bold compose the final independent variables
[3]Items in bold retained for further analysis. Items with asterisk were removed due to low factor loadings.

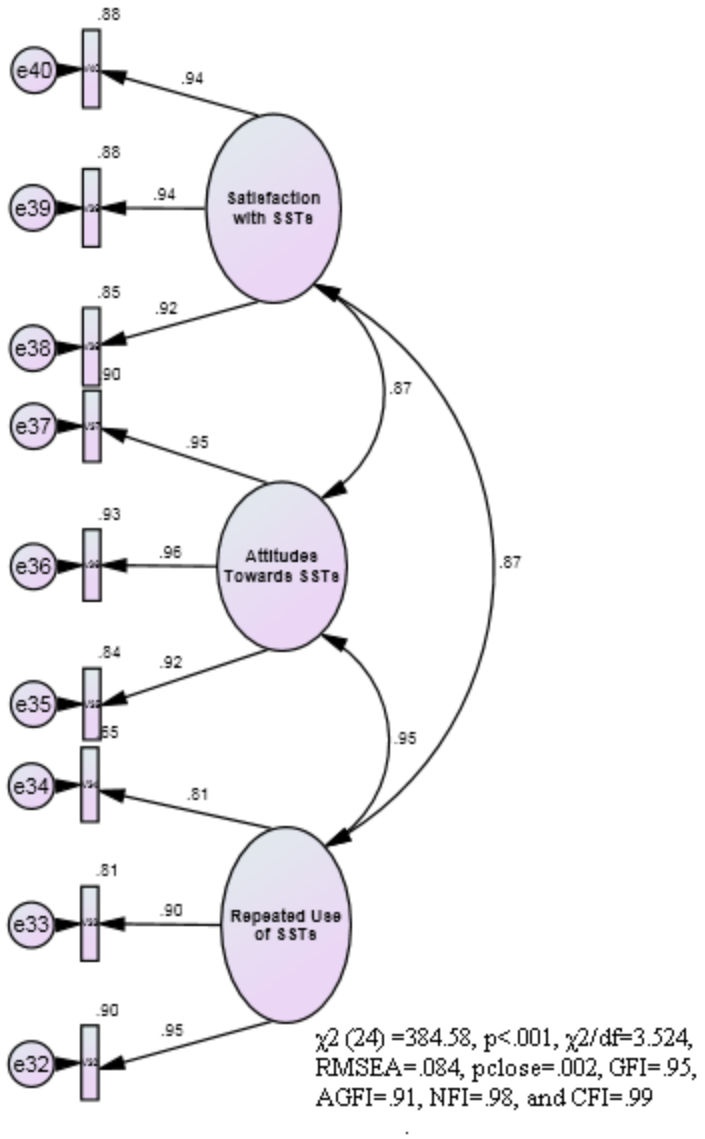


Figure 3.7. Confirmatory Factor Analysis of Outcomes of Using SSTs.

3.10.2 Test for Reliability

Reliability is the consistency of a set of measurements (Hair et al., 2010). Reliability was assessed using composite reliability (CR) and p-values of factor loadings in the current study (Zheng, 2006). Composite reliability is a measure of the overall reliability of a

collection of heterogeneous items with similar characteristics (Fornell & Larcker, 1981). Cronbach's alpha was not used in the current study because it does not allow for correlated error of measurements and the influence of more than one latent variable (Bollen, 1989). Because constructs were mostly correlated in the current study, using composite reliability was more appropriate. The composite reliability of constructs in the current study ranged from .73 to .97, which exceeded the acceptable level of .70 (Fornell & Larcker, 1981) (Table 3.10). All factor loadings were also highly significant, with p-values less than or equal to .001. Thus, the reliabilities of the constructs were in the acceptable range and indicated that all measures had sufficient consistency.

3.10.3 Validating the Measurements

Validity refers to the ability of a measure to describe what it intends to measure (Haladyna, 1999). For example, in the current study, we measured hedonic, utilitarian and security factors, consumer readiness, satisfaction with, attitudes towards and repeated use of SSTs. The questionnaire had to correctly identify these constructs and no other concepts (Thompson, 2004). In validating the measurements, the convergent and discriminant validity of constructs had to be established (Steenkamp & Van Trijp, 1991).

Uni-dimensionality. Uni-dimensionality is the existence of a single trait underlying a set of measures (Hattie, 1985). Uni-dimensionality can be assessed through estimating measurement models by model fits using CFA. A better model fit indicates a higher level of uni-dimensionality of the constructs in a scale (Anderson & Gerbing, 1988). In the

current study, three measurement models were specified for independent variables, consumer readiness and outcomes of SSTs. The model fit indices suggested that all three models were good or acceptable. Thus, the uni-dimensionality of constructs was established.

Convergent validity. Convergent validity is a measure of the convergence of items of a construct. Convergent validity can be assessed using the average variances extracted (AVEs) (Fornell & Larker, 1981) and the t-test for factor loadings (Anderson & Gerbing, 1988). AVEs are the average amount of variation of related observed variables explained by a latent construct (Farrell, 2009). The AVEs of the constructs in the current study ranged from .47 to .90. Because AVE is a more conservative test, AVEs above or close to the cut-off point of 0.5 indicated sufficient convergent validity (Batra & Sinha, 2000). Additionally, all factor loadings were more than twice their standard errors and the t-values ranged from 2.98 to 13.08. Thus, the convergent validity of the constructs was acceptable.

Discriminant validity. Discriminant validity is the assessment of whether a construct can be discriminated from other constructs (Farrell, 2009). Discriminant validity can be assessed by comparing the correlations of constructs (Bagozzi & Heatherton, 1994) and comparing the AVE of each construct with its highest shared variance (Farrell, 2009). The correlations of all constructs were significantly less than 1 (Table 3.10).

As shown in Table 3.10, the square root of AVE of repeated use of SSTs (.89) was lower

than its correlations with trust (.92) and attitude towards SSTs (.95). The square root of AVE of trust (.82) was lower than its correlations with intrinsic motivation (.83), satisfaction with SSTs (.88), attitude towards SSTs (.92) and repeated use of SSTs (.91). The square root of AVE of attitude towards SSTs (.94) was also lower than its correlation with repeated use of SSTs (.95). Therefore, the constructs of repeated use of SSTs, trust and attitude towards SSTs had lower AVEs than their highest shared variances.

However, the AVE test is a more conservative test (Batra & Sinha, 2000). Constructs were also tested with the $\chi 2$ difference test in which constrained and unconstrained models of each pair of constructs were compared (Anderson & Gerbing, 1988). The results showed that the chi-square differences between the unconstrained models and constrained models of each construct were not significant. Thus, the discriminant validity of the constructs was sufficient. In other words, the chi-square difference between repeated use of SSTs and trust was ($\chi 2$ = 51.68, df = 1,p = .001), between repeated use of SSTs and attitude towards SSTs was ($\chi 2$ = 61.82, df = 1, p = .001), between trust and satisfaction was ($\chi 2$ = 80.97, df = 1,p = .001), between trust and intrinsic motivation was ($\chi 2$ = 139.91, df = 1, p = .001) and between trust and attitude was ($\chi 2$ = 49.77, df = 1, p = .001).

Table 3.10

Correlation Matrix (N = 361)

Constructs	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1. Control	**.85**																	
2 Newness	.59**	**.92**.																
3. Ease of Use	.47**	.41**	**.89**															
4. Usefulness	.52**	.57**	.42**	**.88**														
5. Anonymity	.08	- .01	- .21**	- .14	**.76**													
6. Security Risk	- .16**	- .21**	- .51**	- .36**	.30**	**.94**												
7. Performance Risk	- .40**	- .41**	- .63**	- .44**	.15*	.35**	**.84**											
8. Psychophysical Risk	- .33**	- .29**	- .63**	- .43**	.35**	.70**	.45**	**.84**										
9. Role Clarity	.35**	.29**	.65**	.34**	- .12*	- .44**	- .35**	- .58**	**.85**									
10. Ability	.43**	.32**	.78**	.40**	- .16*	- .44**	- .41**	- .59**	.83**	**.85**								
11. Repeated Use of SSTs	.70**	.65**	.56**	.65**	.06	- .35**	- .53**	- .50**	.53**	.54**	**.89**							
12. Attitudes Towards SSTs	.67**	.67**	.56**	.68**	.01	- .37**	- .50**	- .53**	.54**	.50**	.95**	**.94**						
13. Satisfaction with SSTs	.58**	.62**	.64**	.65**	.05	- .38**	- .65**	- .52**	.63**	.61**	.87**	.87**	**.93**					
14. Trust	.67**	.61**	.50**	.69**	.02	- .37**	- .50**	- .44**	.50**	.50**	.91**	.92**	.88**	**.82**				
15. External Regulation	.31**	.25**	- .04	.18**	.46**	.14*	- .01	.13	.06	.01	.33**	.25**	.14*	.24**	**.69**			
16. Introjected Regulation	.21**	.14**	- .24**	.03	.35**	.36**	.09	.41**	- .27**	- .25**	.12*	.08	- .03	.10	.35**	**.87**		
17. Integrated Regulation	.69**	.59**	.53**	.60**	.08	- .27**	- .41**	- .35**	.54**	.47**	.83**	.80**	.71**	.77**	.32**	.21**	**.89**	
18. Intrinsic Motivation	.67**	.68**	.56**	.60**	.08	- .33**	- .53**	- .43**	.56**	.56**	.89**	.88**	.84**	.83**	.29**	.09	.80**	**.95**
Mean	12.74	14.24	14.62	14.95	9.93	10.57	12.30	6.43	16.07	16.60	14.67	14.27	14.61	13.47	12.29	7.51	12.01	12.97
SD	4.14	4.37	4.37	4.03	3.52	5.03	4.06	3.38	3.67	3.50	4.22	4.36	4.45	3.85	3.76	3.86	4.80	4.49
Composite Reliability	.89	.94	.92	.91	.80	.97	.88	.88	.88	.88	.92	.96	.95	.86	.73	.90	.92	.97
AVE	.72	.85	.79	.77	.57	.88	.71	.71	.72	.72	.79	.88	.87	.67	.47	.76	.79	.90
Square root of AVE	.85	.92	.89	.88	.76	.94	.84	.84	.85	.85	.89	.94	.93	.82	.69	.87	.89	.95

Notes: Sample size =361, **p<0.01, *p<0.05

[1]Diagonal of the matrix is the square root of AVE (figures in bold)

3.10.4 Testing the Simplex Structure of Self-determined Motivation Scale

To quantify self-determined motivation, a relative autonomous index (RAI) formula was used, e.g. RAI = external regulation x (-2) + introjected regulation x (-1) + integrated regulation x (+1) + intrinsic motivation x (+2) (Ryan & Connell, 1989). Positive and negative relative autonomous indices represented high and low levels of self-determined motivation. The RAI was formed only if the correlations of different dimensions of self-determined motivation scale conformed to a simplex structure (Guttman, 1954). A simplex structure is a correlation matrix of constructs in which the correlated constructs have ordered relations (Guttman, 1954) (Table 3.11).

In a simplex matrix, the correlations decrease when the correlations are more distant from the diagonal. Guttman (1954) argued that a simplex structure is formed if a set of constructs is ordered on an underlying uni-dimensional scale. In the case of a self-determined motivation scale, ordered constructs formed a continuum of motivation when a simplex structure of correlations between constructs existed.

Table 3.11

Guttman Verbal Test Simplex Structure

Spelling	1.00					
Punctuation	.621	1.00				
Grammar	.564	.742	1.00			
Vocabulary	.476	.503	.577	1.00		
Literature	.394	.461	.472	.688	1.00	
Foreign Literature	.389	.411	.429	.548	.639	1.00

Source: (Guttman, 1954, p. 11)

In showing the simplex structure, previous studies visually inspected the simplex pattern (Ryan & Connell, 1989). However, Li and Harmer (1996) argued that visual inspection did not provide a direct test of the simplex structure. They proposed that structural equation modelling (SEM) should be used to test the existence of the simplex structure instead. Li and Harmer hypothesised that when a simplex structure exists, the lower level of constructs should have stronger significant direct effects on the adjacent constructs than the indirect effects on distant constructs. The current study followed the procedure suggested by Li and Harmer (1996) to test the existence of the simplex structure on self-determined motivation scale. The direct effects of each construct were added to its adjacent constructs to form an analytical model. This model, which was further analysed using SPSS AMOS 18 with maximum likelihood estimation (MLE), yielded a chi-square value ($\chi2$ (34) =118.21, $p < .001$), $\chi2/df = 2.32$, RMSEA = .06, pclose = .12, GFI = .95, AGFI = .93, NFI = .97 and CFI = .98. Absolute goodness-of-fit indices, e.g. $\chi2/df < 3$ and pclose > .050, and incremental goodness-of fit indices NFI and CFI > 0.95 indicated that the model fit the data well. The direct and indirect effects of each construct are shown in Table 3.12.

The results surpassed Li and Harmer's (1996) criteria that all direct effects to the adjacent constructs should be significant and all direct effects to the adjacent constructs were stronger than the indirect effects to more distant constructs. For example, external regulation had a significant direct effect of .36 to introjected regulation, and its direct effect was substantially higher than its indirect effects to integrated regulation (.07) and intrinsic motivation (.06) (Table 3.12). Thus, the simplex structure of the self-determined

motivation scale was confirmed. The continuum of motivation was assumed because the constructs could be rank-ordered (Guttman, 1954). The RAI formula, e.g. RAI = external regulation x (-2) + introjected regulation x (-1) + integrated regulation x (+1) + intrinsic motivation x (+2), was used to calculate the summation score of RAI in the current study. Positive indices suggested higher levels of self-determined motivation, and negative indices suggested lower levels of self-determined motivation.

Table 3.12

Direct and Indirect Effects of Constructs

Constructs	Standardised estimates
Direct Effect	
External Regulation -> Introjected Regulation	.36
Introjected Regulation -> Integrated Regulation	.20
Integrated Regulation -> Intrinsic Motivation	.80
Indirect Effects	
External Regulation -> Introjected Regulation -> Integrated Regulation	.07
External Regulation -> Introjected Regulation -> Integrated Regulation -> Intrinsic Motivation	.06
Introjected Regulation -> Integrated Regulation -> Intrinsic Motivation	.16

3.10.5 Common Method Variance

Common method variance is the systematic variance introduced into the measure when the measurement technique is deficient (Baggozi, 2011; Podsakoff et al., 2003; Podsakoff, Mackenzie, & Podsakoff, 2012). The system error variance can bias the observed relationships from true relationships among constructs (Harold, Doty, & Glick, 1998; Podsakoff, Mackenzie, & Podsakoff, 2012). Factors such as wording, scale length

and undesirability of measurements may cause system error variance (Bagozzi, 2011; Malhotra, Kim, & Patil, 2003; Podsakoff, Mackenzie, & Podsakoff, 2012). To minimise the impact of the common method variance, the questionnaire and item design should reduce system errors by avoiding item ambiguity, demand characteristics and social desirability (Podsakoff et al., 2003; Podsakoff, Mackenzie, & Podsakoff, 2012). The conventional assessments of common method bias were through a Harman one-factor test using a common factor confirmatory model (Chang, Witteloostuijn, & Eden, 2010; Bagozzi, 2011). The purified scales in the current study were analysed using exploratory factor analysis rotated with Varimax. The results produced 10 factors that together accounted for 72.1% of the total variance. The largest factor accounted for 38.3% of the total variance. Thus, no general factor was apparent. In addition, a single-factor model analysed with confirmatory factor analysis using maximum likelihood estimation also resulted in a poor model fit $\chi2$ (1430) = 11259.21, $p < .001$), $\chi2/df$ = 7.87, RMSEA = .138, GFI = .34, AGFI = .29, NFI = .49 and CFI = .52. Thus, the results indicated that the common method bias was not of great concern in the current study.

A marker variable technique was also adopted to further evaluate the impact of the common method variance (CMV) in the current research (Lindell & Whitney, 2001). A marker variable unrelated to at least one variable in the current study was used to estimate the effect of CMV on the relationship between predictors and the criterion (Malhotra, Kim, & Patil, 2006). The assumption behind the marker variable technique is that the common method factor has a constant effect on all measured items (Lindell & Whitney 2001; Malhotra, Kim, & Patil, 2006). Lindell and Whitney (2001) proposed that

when a study contains 10 or more variables, the second lowest positive correlation in the full correlation matrix reported in a study can be used as an unbiased proxy for CMV and that the other lowest positive correlations (e.g. third, fourth … *n*th lowest positive correlations in the full correlation matrix) can be used as estimates of the unbiased proxy for further sensitivity analysis. This method has been shown to be as reliable as other methods of evaluating the impact of CMV (e.g. Sharma, Yetton, & Crawford, 2010; Malhotra et al., 2006). Thus, the current research also used the second lowest correlation (correlation between trust and anonymity, R = .02 from Table 3.10) as the unbiased proxy to evaluate the impact of CMV. As evident from Table 3.13, the spurious correlation caused by CMV amounts from 0.00 to 0.02, and all significant positive correlations between the predictors and the criterion (unadjusted R) are above zero and remain significant (adjusted R) when the CMV is controlled. Sensitivity analysis also suggests that nearly all the positive correlations between the predictors and the criterion at different values of the lowest positive correlations (R=.03, .06, .08, .09) are above zero and statistically significant ($p<.01$), except the correlation between introjected regulation (IoR) and the repeated use of SSTs, indicate that the relationships between predictors and the criterion repeated use of SSTs cannot be accounted for by CMV. These findings further attest that CMV only had a marginal effect on the relationships between predictors and the criterion in the current study.

Table 3.13

The Impact of CMV on the Relationships between Predictors and the Criterion

	Predictors																
	CT	NN	EU	UF	AN	SR	PR	PsR	RC	AB	AT	SF	TU	ER	IoR	IeR	IM
Unadjusted R with the criterion: Repeated Use of SSTs	.70**	.65**	.56**	.65**	.06	-.35**	-.53**	-.50**	.53**	.54**	.95**	.87**	.91**	.33**	.12*	.83**	.89**
Adjusted R (2nd Lowest positive R=.02 as proxy)	.69**	.64**	.55**	.64**	.04	-.38**	-.56**	-.53**	.52**	.53**	.95**	.87**	.91**	.32**	.10*	.83**	.89**
Sensitivity Analysis																	
3rd Lowest positive R=.03 as proxy	.69**	.64**	.55**	.64**	.03	-.39**	-.58**	-.55**	.52**	.53**	.95**	.87**	.91**	.31**	.09*	.82**	.89**
4th Lowest positive R=.06 as proxy	.68**	.63**	.53**	.63**	.00	-.44**	-.63**	-.60**	.50**	.51**	.95**	.86**	.90**	.29**	.06	.82**	.88**
5th Lowest positive R=.08 as proxy	.67**	.62**	.52**	.62**	-.02	-.47**	-.66**	-.63**	.49**	.50**	.95**	.86**	.90**	.27**	.04	.82**	.88**
6th Lowest positive R=.09 as proxy	.67**	.62**	.52**	.62**	-.03	-.48**	-.68**	-.65**	.48**	.49**	.95**	.86**	.90**	.26**	.03	.81**	.88**

Note: N=361. *p<.05 **p<.01

CT-control, NN-newness, EU-ease of use, UF-usefulness, AN-anonymity, SR-security risk, PR-performance risk

PsR-psychophysical risk, RC-role clarity, AB-ability, AT-attitudes towards SSTs, SF- satisfaction with SSTs

TU- Trust, ER-external regulation, IoR-introjected regulation, IeR- integrated regulation, IM- intrinsic motivation

3.11 Sample Characteristics and Demographics

Sample characteristics were used to reflect the representativeness of the sample. Information related to the respondents' education levels, genders, ages and occupations was collected.

3.11.1 Demographic Profile of the Respondents

In all, 372 respondents filled out the questionnaires online. Of those, 11 did not expose to and had the opportunity to use supermarket self-checkout systems in the previous 12 months. Therefore, 361 complete questionnaires remained for further analysis.

Table 3.14 shows the demographic information of the respondents. Of the respondents, 51% were female and 49% were male. The respondents ranged in age from 19 years old to over 66 years old. The respondents' incomes ranged from under $20,000 to over $150,000 per annum, and they had different education backgrounds. Of the respondents, 55% reported being Australian or Australian-born; the rest were from different ethnic backgrounds, e.g. Asian, European and African ethnic backgrounds.

Table 3.14

Demographic Profile of Respondents (N = 361)

Gender		**N**
Female	51%	184
Male	49%	177

(Table 3.14 continues)

(Table 3.14 continued)

Age		**N**
19–20	4%	14
21–30	21%	76
31–46	26%	94
47–55	17%	61
56–65	21%	76
Over 66	11%	40
Income		
20,000 and under	14%	51
20,001–40,000	25%	90
40,001–60,000	21%	76
60,001–80,000	13%	47
80,001–100,000	10%	36
100,001–150,000	12%	43
Over 150,000	5%	18
Education Level		
Secondary (Year 7–10)	14%	51
High School (Year 11–12)	22%	79
TAFE/Commercial Institutes/Diplomas	31%	112
Bachelor Degree	22%	79
Post-Graduate Level	9%	32
PhD and above	2%	8
Ethnic Background		
Australian	55%	199
European	28%	101
Asian	3%	11
African	2%	7
New Zealander	1%	4
Russian	1%	4
Torres Strait	1%	4

In all, 52% of the respondents sometimes used self-checkout systems voluntarily. However, 12% of respondents never used self-checkout machines involuntarily. Further, 51% of the respondents had used self-checkout machines five times or more in the past six months. Of the respondents, 45% rarely had problems with self-checkout systems, while 48% of respondents rarely needed help from service staff. See Table 3.15.

Table 3.15

Self-Checkout Usage of Respondents (N = 361)

Used self-checkouts voluntarily	**Percentage**	**N**
Never	12%	43
Rarely	18%	65
Sometimes	52%	188
Always	18%	65
Used self-checkout in past six months		
1	12%	43
2	14%	51
3	14%	51
4	9%	32
5 or above	51%	184
Problems with self-checkouts		
Never	19%	69
Rarely	45%	162
Sometimes	28%	101
Always	8%	29
Need help from service staff		
Never	9%	32
Rarely	48%	173
Sometimes	33%	119
Always	10%	37

Table 3.16 shows the respondents' shopping behaviour. Of the respondents, 50% visited Woolworth's most frequently, and 37% reported that Coles was their most visited supermarket. All other smaller supermarkets such as Safeway, IGA and ALDI were less visited. Most respondents reported shopping 1–3 times per week. Convenience (34%), price (34%) and location (22%) were the most important factors in selecting a supermarket. Respondents mostly described themselves as budget (32%) and in-and-out buyers (22%) whilst also viewing themselves as conscious (19%) and convenience shoppers (12%).

Table 3.16

Shopping Behaviour of Respondents (N = 361)

Frequently visited supermarket		**N**
Woolworth's	50%	181
Safeway	3%	11
Coles	37%	134
IGA	4%	14
ALDI	6%	21
Frequency of shopping		
Every day	3%	11
2–3 times per week	41%	148
Once a week	47%	170
Once a month	5%	18
Twice a month	3%	11
Once a year	1%	3
Main reason for shopping		
Convenience	34%	123
Location	34%	123
Price	22%	79
Service quality	4%	14
Others	6%	22
Types of Buyers		
Impulsive buyers (decide in shop)	8%	29
Procrastinator (slow)	7%	25
In-and-out buyers (quick)	22%	79
Conscious buyers (stick to list)	19%	69
Budget-minded (money first)	32%	116
Convenience (little planning)	12%	43
Social (recommended by friends)	0%	0

3.12 Chapter Summary

In this chapter, the research design was justified. The pilot study was then presented. A conclusive, descriptive, cross-sectional and online survey research design was chosen for the current study. This chapter also discussed how the constructs were conceptualised and

operationalised. The sample design was outlined, and the online, opt-in sampling approach chosen for the current study was discussed. Data collection procedures were then discussed as well as the questionnaire design processes and pre-test procedures. Ethical issues and data purification procedures, such as exploratory and confirmatory factor analysis, were outlined. To conclude, a demographic profile of respondents was presented. In the following chapter, data analysis results will be discussed.

CHAPTER 4

THE MEDIATING EFFECT OF CONSUMER READINESS ON THE RELATIONSHIPS BETWEEN HEDONIC, UTILITARIAN AND SECURITY FACTORS AND THE REPEATED USE OF SSTS

4.1 Introduction

In this chapter, the first part of the conceptual model in Chapter 3 is discussed. Proposition 1, which states that consumer readiness mediates the relationships between hedonic, utilitarian and security factors and the repeated use of SSTs, is investigated. Based on this proposition, hedonic, utilitarian and security factors are predicted to be associated with the repeated use of SSTs; consumer readiness is also associated with the repeated use of SSTs. This chapter investigates the impact of hedonic, utilitarian and security factors on the repeated use of SSTs; the impact of consumer readiness on the repeated use of SSTs; and the mediating effect of consumer readiness on the relationships between hedonic, utilitarian and security factors and the repeated use of SSTs. Conclusions are made at the end of this chapter.

In this chapter, multiple regression was used to analyse the data. Multiple regression is a statistical technique that predicts the change of one variable based on the changes in other variables (Brace, Kemp, & Snelgar, 2006). Multiple regression is used when a set of predictor variables provide an estimation of the criterion variable (Brace, Kemp, & Snelgar, 2006). Multiple regression allows researchers to know the magnitude, sign and statistical significance of each predictor variable (Hair et al., 2010). Thus, the contribution of each predictor variable to the variance in the criterion variable can be assessed (Hair et al., 2010). SEM is not used in this section, because it is a more stringent analysis technique, which is

more suitable for estimating smaller models with fewer variables (Cheng, 2001). For a larger number of estimated parameters e.g. 8 predictor variables were tested in the current analysis, a multiple regression analysis is considered more appropriate (Cheng, 2001). Thus, multiple regression analysis was used in the current study to investigate the impact of hedonic, utilitarian and security factors on the repeated use of SSTs and consumer readiness. The impact of consumer readiness on the repeated use of SSTs was also investigated.

4.2 Results and Discussions

4.2.1 The effects of hedonic, utilitarian and security factors on the repeated use of SSTs

Based on proposition 1, hedonic, utilitarian and security factors were expected to be associated with the repeated use of SSTs. The following hypotheses emerged:

H1: There is a positive association between (a) perceived control, (b) newness and the repeated use of SSTs.

H2: There is a positive association between (a) ease of use, (b) usefulness and the repeated use of SSTs.

H3: There is a positive association between (a) perceived anonymity and the repeated use of SSTs, and a negative association between (b) security risk, (c) performance risk and (d) psychophysical risk and the repeated use of SSTs.

Table 4.1

Effects of Hedonic, Utilitarian and Security Factors on the Repeated Use of SSTs

Independent Variable					
		Repeated Use of SSTs			
	Hypotheses	B	S.E.	t-Value	
Perceived Control	H1a:	.243***	.042	4.92	Supported
Newness	H1b:	.166***	.040	5.27	Supported
Ease of Use	H2a:	.099*	.045	2.62	Supported
Usefulness	H2b:	.295***	.045	8.00	Supported
Perceived Anonymity	H3a:	.192***	.041	4.12	Supported
Security Risk	H3b:	- .012 [a]	.036	- .29	Not Supported
Performance Risk	H3c:	- .075 [a]	.058	- 4.08	Not Supported
Psychophysical Risk	H3d:	- .272***	.041	- 1.02	Supported
F-ratio		87.880***			
R^2		0.666			
Adjusted R^2		0.659			

***p<.001 **p<.01 *p<.05 [a]p≤1.0 B-Unstandardized coefficients S.E.- Standard error

The results shown in Table 4.1 indicate that perceived control, newness, ease of use, usefulness, anonymity and psychophysical risk account for 65.9% of the variance in the repeated use of SSTs.

As hypothesized, perceived control had a positive impact on the repeated use of SSTs (b=.243, p<.001), which provided support for H1a. Newness also positively influenced the repeated use of SSTs (b=.166, p<.001), which provided support for H1b. These results were consistent with Collier and Sherrell (2010), Dabholkar (1996), Kuan, Ho and Chang (2011), Zeithaml, Parasuraman and Malhorta (2002), Zhu et al. (2007) and the predictions of TPB

(Ajzen, 1991) and Gollwitzer (1999), Ajzen (2002), Armitage and Conner (1999,2001), Schifter and Ajzen (1985) and Sheeran (2002) that perceived control enhances the repeated use of SSTs. The results are also consistent with Weijters, Rangarajan and Falk's (2005) findings that newness increases the likelihood of the future use of SSTs in customers. These results support TPB (Mathieson, 1991; Quelch & Klein, 1996) that perceived control affects customers' behaviour, e.g. the repeated use of SSTs. The results indicate that customers' perceptions of being in control and considering SSTs progressive, innovative and modern enhance the future use of SSTs in retailing.

Additionally, the perceived ease of use was positively associated with the repeated use of SSTs (β=.099, $p<.05$), which provided support for H2a. Moreover, usefulness positively affected the repeated use of SSTs (β=.295, $p<.001$), thus providing support for H2b. These findings were consistent with Guriting and Ndubisi (2006), Hernandez and Mazzon (2007), Venkatesh (2000), Venkatesh and Davis (1996) and Wang et al. (2003), who found that perceived ease of use enhanced the future use of SSTs. The results were also consistent with Chen and Barnes (2007), Guriting and Ndubisi (2006) and Lin and Chang (2011), who found that usefulness positively influences the repeated use of SSTs. Finally, the results were consistent with TAM (Davis, 1999) and IDT (Rogers, 2003) that perceived ease of use and usefulness are important drivers of the repeated use of SSTs and indicate that SSTs characterized as user-friendly, non-complicated and able to help customers complete their purchases more efficiently can also enhance the future use of SSTs.

As hypothesized, perceived anonymity showed positive effects on the repeated use of SSTs (β=.192, $p<.001$), which provided support for H3a. Contrary to the hypotheses, security risk and performance risk did not show significant negative effects on the repeated use of SSTs,

although the sign was as anticipated. Thus, H3b and H3c were not supported. As also hypothesized, perceived psychophysical risk was negatively associated with the repeated use of SSTs (β=-.272, $p<.001$), which provided support for H3d. As expected, the security factor perceived anonymity positively influenced the repeated use of SSTs, which was consistent with the prediction based on Joinson (1999) that perceived anonymity reduced anxiety, thus enhanced repeated use of SSTs. This result suggested that customers used self-checkout machines because they did not want them to be recognised and/or their purchases to be scrutinised. Contrary to the prediction based on Black et al. (2001) and Walker et al. (2002), performance risk and security risk were not important in the current context, and only psychophysical risk was negatively associated with the repeated use of SSTs. Customers were not concerned about the security and performance risk of SSTs in retailing. Possible reasons for this may be that service personnel assisted customers when problems arose and customers might have also been used to paying for transactions with their bankcards. Thus, they were not sensitive to the SSTs' security and performance problems. The results were consistent with the theory of co-production that anxiety negatively influences customers' participation in using SSTs (Dowling & Staelin, 1994). However, contrary to the theory of co-production (Dowling & Staelin, 1994), not all dimensions of perceived risk influenced customers' engagement in using SSTs in retailing.

Overall, the results supported the idea that hedonic and utilitarian factors were positively associated with the repeated use of SSTs. However, the results partially supported the idea that security factors were associated with the repeated use of SSTs. Furthermore, usefulness and psychophysical risk had the strongest impact on the repeated use of SSTs. To enhance the use of self-checkout systems by customers, managers can put more emphasis on improving the machines' efficiency and reducing the psychological and physical damages perceived by

customers. However, in addition to the effects of hedonic, utilitarian and security factors on the repeated use of SSTs, they may also affect consumer readiness in retailing.

4.2.2 The Effects of Hedonic, Utilitarian and Security Factors on Consumer Readiness

Based on proposition 1, hedonic, utilitarian and security factors were also predicted to be associated with consumer readiness. The following hypotheses emerged:

H4: There is a positive association between (a) perceived control, (b) newness, (c) ease of use, (d) usefulness, (e) perceived anonymity and trust, and a negative association between (f) security risk, (g) performance risk, (h) psychophysical risk and trust.

H5: There is a positive association between (a) perceived control, (b) newness, (c) ease of use, (d) usefulness, (e) perceived anonymity and self-determined motivation, and a negative association between (f) security risk, (g) performance risk and (h) psychophysical risk and self-determined motivation.

H6: There is a positive association between (a) perceived control, (b) newness, (c) ease of use, (d) usefulness, (e) perceived anonymity and ability, and a negative association between (f) security risk, (g) performance risk and (h) psychophysical risk and ability.

H7: There is a positive association between (a) perceived control, (b) newness, (c) ease of use, (d) usefulness, (e) perceived anonymity and role clarity, and a negative association between (f) security risk, (g) performance risk and (h) psychophysical risk and role clarity.

Given that consumer readiness is considered a crucial factor in determining customers' participation in SST co-production, and hedonic, utilitarian and security factors are potential drivers of the repeated use of SSTs, the relationships between hedonic, utilitarian and security factors and the dimensions of consumer readiness should be tested further. As shown in Table 4.2, perceived control, newness, usefulness, anonymity and security risk accounted for 55.7% of the variance in trust. Newness, ease of use, usefulness, security risk and psychophysical risk accounted for 49.6% of the variance in self-determined motivation. Ease of use, anonymity, security risk and psychophysical risk accounted for 47.2% of the variance in ability. In addition, ease of use, usefulness and performance risk accounted for 40.5% of the variance in role clarity.

As hypothesized, the following had positive effects on trust: the hedonic factors perceived control ($b=.237$, $p<.001$) and newness ($b=.100$, $p<.05$); the utilitarian factor usefulness ($b=.346$, $p<.001$); and the security factors anonymity ($b=.125$, $p<.01$) and security risk had a negative ($b=-.076$, $p<.05$) impact on trust. This provided support for H4a, H4b, H4d, H4e and H4f. However, ease of use, performance risk and psychophysical risk did not have any impact on trust. Thus, H4c, H4g and H4h were not supported. Further, usefulness demonstrated the strongest relationship with trust. Consistent with the prediction based on Kim, Kim and Hwang (2009) and Harrison and Smith (2004), the hedonic factors perceived control and newness enhanced customer trust in SSTs. Also consistent with Harrison and Smith (2004), usefulness had a positive effect on trust. Perceived anonymity also demonstrated a positive effect on trust; this result is consistent with the prediction based on Joinson (1999), Oh et al. (2013) and Lu, Wang and Hayes (2012). Consistent with the prediction based on Morgan and Hunt (1994) and Zinkhan and Karande (1991), security risk is negatively associated with trust. However, contrary to Harrison and Smith's (2004) findings, the utilitarian factor ease of

use was not associated with trust. Also contrary to the prediction based on Morgan and Hunt (1994) and Zinkhan and Karande (1991), the security factors performance risk and psychophysical risk did not influence trust. Overall, usefulness, perceived control, anonymity and newness had a higher impact on trust than ease of use, performance risk and psychophysical risk. This indicates that customer trust can be more easily nurtured by usefulness, perceived control, anonymity and newness in retailing.

As predicted, the hedonic factor newness (b=.464, p<.01) had a positive relation with self-determined motivation. The utilitarian factors ease of use (b=.895, p<.001) and usefulness (b=.553, p<.01) also positively influenced self-determined motivation. The security factors security risk (b=-.279, p<.05) and psychophysical risk (b=-.592, p<.01) were negatively associated with self-determined motivation. Thus, H5b, H5c, H5d, H5f and H5h were supported. However, perceived control, anonymity and performance risk were not related to self-determined motivation. Therefore, H5a, H5e and H5g were not supported. Further, ease of use had the strongest relationship with self-determined motivation. Contrary to the prediction based on Collier and Sherrell (2010), perceived control was not related to self-determined motivation. However, the results were consistent with the prediction based on Dabholkar (1996) and Risch, Roie and Schultz-Kleine (2000) that the hedonic factor, e.g. the newness of SSTs, can enhance customers' lifestyle and therefore their self-determined motivation. This is also consistent with the prediction based on Jaasma and Koper (1999) and Sargeant and Lee (2004) that ease of use enhances self-determined motivation. Usefulness also enhances self-determined motivation; this result was consistent with Meuter et al. (2005). However, contrary to the prediction based on Joinson (1999), Shore and Shannon (2007) and Zakaria and Nordin (2008), the security factor perceived anonymity was not associated with self-determined motivation. However, consistent with the prediction based on

Jaasma and Koper (1999) and Sargeant and Lee (2004), security risk and psychophysical risks reduced self-determined motivation. Contrary to Jaasma and Koper (1999) and Sargeant and Lee (2004), performance risk was not related to self-determined motivation. These results indicate that ease of use, newness and usefulness enhance self-determined motivation, whilst security risk and psychophysical risk reduce self-determined motivation in retailing.

Positive relationships emerged between ease of use and ability (b=.347, p<.001). The security factor perceived anonymity also had a positive impact on ability (b=.090, p<.05). Moreover, security risk (b=-.073, p<.05) and psychophysical risk (b=-.228, p<.001) negatively influenced ability. Thus, the results provided support for H6c, H6e, H6f and H6h. As shown in Table 4.2, perceived control, newness, usefulness and performance risk were not associated with ability. Thus, H6a, H6b, H6d and H6g were not supported. As expected, ease of use had the strongest relationship with ability. Contrary to the prediction based on Hahn and Kim (2009), Lee and Lin (2009) and Mayer, Davis and Schoorman (1995) that perceived control did not influence perceived ability and contrary to the prediction based on Meuter et al. (2005), the hedonic factor newness did not enhance customers' perceived ability of using SSTs. However, consistent with the prediction based on Abel and Larkin (1990), Bohlin and Hunt (1995) and Mamassis and Doganis (2004), ease of use enhanced customers' perceived ability. Contrary to this prediction, usefulness did not enhance perceived ability. In addition, perceived anonymity enhanced perceived ability, which was consistent with the prediction based on Joinson (1999), Abel and Larkin (1990), Bohlin and Hunt (1995) and Mamassis and Doganis (2004). The findings were also consistent with the prediction based on Morgan and Hung (1994), Hahn and Kim (2009), Lee and Lin (2009) and Mayer, Davis and Schoorman (1995) that security and psychophysical risk reduced perceived ability. Contrary to this prediction, performance risk was not related to customers' perceived ability. These findings

indicate that ease of use and perceived anonymity enhance customers' perceived ability whilst security and psychophysical risk reduce it in retailing.

Positive relationships emerged between the utilitarian factors ease of use and usefulness and role clarity (b=.469, p<.001 and b=.102, p<.05), and ease of use had the strongest relationship with role clarity. Performance risk also negatively influenced role clarity (b=-.153, p<.01), which provided support for H7c, H7d and H7g. However, contrary to the hypotheses, the hedonic factors perceived control and newness did not demonstrate relationships with role clarity. Moreover, associations were not found between the security factors perceived anonymity, security risk and psychophysical risks and role clarity. Thus, H7a, H7b, H7e, H7f and H7h were not supported. Contrary to the prediction based on Meuter et al. (2005), hedonic factors such as perceived control and newness were not associated with role clarity. However, consistent with Meuter et al. (2005), ease of use and usefulness enhanced role clarity; contrary to Joinson (1999), Shore and Shannon (2007) and Zakaria and Nordin (2008), perceived anonymity did not influence role clarity. In addition, performance risk reduced role clarity, which was consistent with the prediction based on Morgan and Hunt (1994) and Harrison and Smith (2004). Contrary to this prediction, security and psychophysical risk did not have any impact on role clarity. The results indicate that ease of use and usefulness enhance role clarity whilst performance risk reduced it in retailing.

Overall, the results supported the idea that the hedonic factors perceived control and newness were associated with trust. The utilitarian factors ease of use and usefulness were associated

Table 4.2

The Effects of Hedonic, Utilitarian and Security Factors on Consumer Readiness

Independent Variable																				
	Consumer Readiness																			
	Trust					Self-Determined Motivation					Ability					Role Clarity				
SST Features	H	B	S.E.	t-Value		H	B	S.E.	t-Value		H	B	S.E.	t-Value		H	B	S.E.	t-Value	
Perceived Control	**H4a**	.237***	.043	5.521	**S**	**H5a**	.261 [a]	.164	1.586	**NS**	**H6a**	.015 [a]	.043	.342	**NS**	**H7a**	.087 [a]	.047	1.842	**NS**
Newness	**H4b**	.100*	.040	2.485	**S**	**H5b**	.464**	.154	3.004	**S**	**H6b**	.065 [a]	.040	1.630	**NS**	**H7b**	- .035 [a]	.045	- .775	**NS**
Ease of Use	**H4c**	.030 [a]	.046	.646	**NS**	**H5c**	.895***	.175	5.116	**S**	**H6c**	.347***	.045	7.648	**S**	**H7c**	.469***	.051	9.286	**S**
Usefulness	**H4d**	.346***	.046	7.574	**S**	**H5d**	.553**	.175	3.153	**S**	**H6d**	.077 [a]	.045	1.687	**NS**	**H7d**	.102*	.051	2.021	**S**
Perceived Anonymity	**H4e**	.125**	.041	3.008	**S**	**H5e**	- .279 [a]	.159	- 1.761	**NS**	**H6e**	.090*	.041	2.176	**S**	**H7e**	.056 [a]	.046	1.226	**NS**
Security Risk	**H4f**	- .076*	.036	- 2.104	**S**	**H5f**	- .279*	.139	- 2.004	**S**	**H6f**	- .073*	.036	- 2.033	**S**	**H7f**	- .019 [a]	.040	- .460	**NS**
Performance Risk	**H4g**	- .072 [a]	.042	- 1.729	**NS**	**H5g**	- .111 [a]	.160	- .694	**NS**	**H6g**	- .072 [a]	.042	- 1.729	**NS**	**H7g**	- .153**	.046	- 3.310	**S**
Psychophysical Risk	**H4h**	- .064 [a]	.059	- 1.089	**NS**	**H5h**	- .592**	.225	- 2.628	**S**	**H6h**	- .228***	.058	- 3.903	**S**	**H7h**	- .012 [a]	.065	- 1.887	**NS**
F-ratio		57.531***					45.294***					41.174***					31.683***			
R^2		.567					.507					.483					.419			
Adjusted R^2		.557					.496					.472					.405			

H- Hypotheses, S.E.- Standard error, S-supported, NS-Not Supported, B-Unstandardized coefficients

***p<.001 **p<.01 *p<.05 [a]p≤1.0

with self-determined motivation and role clarity. However, the results partially supported the idea that hedonic factors were associated with self-determined motivation. In addition, the results also partially supported the idea that utilitarian factors positively influenced trust and ability and partially supported the idea that security factors were associated with trust, self-determined motivation, ability and role clarity. However, hedonic factors were not associated with ability and role clarity. The results were mixed. Hedonic, utilitarian and security factors of SSTs demonstrated differential effects on different dimensions of consumer readiness. Such mixed results suggest that customers have different responses to different hedonic, utilitarian and security factors of SSTs. Nevertheless, ease of use demonstrated the highest impact on self-determined motivation, ability and role clarity, and usefulness had the highest impact on trust. Thus, managers should ensure that self-checkout machines are user-friendly for customers in order to enhance customers' internalization processes, confidence and perceived clarity of instructions when using SSTs. Moreover, enhancing customers' trust in SSTs by improving efficiency in completing the purchase should not be overlooked in the current context. As consumer readiness is important to customers' participation in SST co-production, it is also expected to drive the repeated use of SSTs. Thus, the relationship between consumer readiness and the repeated use of SSTs is tested in the following section.

4.2.3 The effects of consumer readiness on the repeated use of SSTs

Based on proposition 1, consumer readiness, which comprises trust, self-determined motivation, ability and role clarity, was predicted to be associated with the repeated use of SSTs. The following hypotheses emerged:

H8: There is a positive association between (a) trust, (b) self-determined motivation, (c) ability, (d) role clarity and the repeated use of SSTs.

Table 4.3

The Effect of Consumer Readiness on the Repeated Use of SSTs

Independent Variable					
		Repeated Use of SSTs			
	Hypotheses	B	S.E.	t-Value	
Trust	H8a	.675***	.039	17.357	**Supported**
Self-Determined Motivation	H8b	.045***	.012	3.834	**Supported**
Ability	H8c	.244***	.052	4.657	**Supported**
Role Clarity	H8d	.010 [a]	.045	.216	**Not Supported**
F-ratio		241.809***			
R^2		.731			
Adjusted R^2		.728			

***p<.001 **p<.01 *p<.05 [a]p≤1.0 B-Unstandardized coefficients S.E.- Standard error

As shown in Table 4.3, the regression equation indicates that trust, self-determined motivation and ability accounted for 72.8% of the variance in the repeated use of SSTs. As hypothesized, trust (b=.675, p<.001), self-determined motivation (b=.045, p<.001) and ability (b=.244, p<.001) positively influenced the repeated use of SSTs. Amongst all factors, trust had the strongest association with the repeated use of SSTs. Thus, H8a, H8b and H8c were supported. Contrary to the hypotheses, role clarity did not show any positive impact on the repeated use of SSTs. Thus, H8d was not supported. The results partially supported the idea that consumer readiness was associated with the repeated use of SSTs.

Consistent with Wang (2002), Collier and Sherrell (2010), Geyskens, Steenkamp and Kumar

(1998), Lusch, Brown and Brunswick (1992), Venkatraman and Subramaniam (2002), Auh et al. (2007) and Gruen et al. (2000), trust showed a positive effect on the repeated use of SSTs. Self-determined motivation had a positive association with the repeated use of SSTs, which was consistent with the prediction based on Techatassanasoontorn and Tanisuth (2008), Etgar (2006), Brennan and Turnbull (1999), Garbarino and Johnson (1999) and Hakansson and Snehota (1995). Ability was also positively associated with the repeated use of SSTs, which was consistent with Compeau and Higgins (1995), Yi and Hwang (2003), Rose and Fogarty (2006), Wang, Harris and Patterson (2013), Lusch, Brown and Brunswick (1992), Xue and Harker (2002), Auh et al. (2007), Crespin-Mazet and Ghauri (2007), Hitt et al. (2000), Lusch, Vargo and O'Brien (2007), Miles and Snow (2007) and Subramani and Venkatraman (2003). Contrary to Meuter et al. (2005) and Auh et al. (2007), role clarity did not influence the repeated use of SSTs, which suggests that SSTs in retailing might be simple enough for customers to use or that the availability of service staff might help clarify ambiguous instructions. Thus, role clarity was not a concern for customers. The mediating roles of trust, self-determined motivation, ability and role clarity will be discussed in the following section.

4.2.4 The mediating effect of consumer readiness on the relationships between hedonic, utilitarian and security factors and the repeated use of SSTs

The bootstrapping method was used to investigate the mediating effect of consumer readiness. The bootstrapping method replaces the original sample with a sample N of size the same as the original through selecting cases with replacement (Preacher and Hayes, 2008). These n cases serve as empirical, nonparametric approximations of the sampling distributions (Preacher and Hayes, 2008). Bootstrapping estimates the standard errors of mediating effects and reduces the impact of the non-normality of the data (Preacher and Hayes, 2008). In this

process, 1000 samples were bootstrapped using the PROCESS program with a 95% confidence interval (Hayes, 2012). The results are presented in the following section.

Based on proposition 1, the mediating effect of consumer readiness on the relationship between hedonic, utilitarian and security factors and the repeated use of SSTs was tested with the bootstrapping method. The following hypotheses emerged:

H9: Trust significantly mediates the relationships between (a) perceived control, (b) newness, (c) ease of use, (d) usefulness, (e) perceived anonymity, (f) security risk, (g) psychophysical risk and (h) performance risk and the repeated use of SSTs.

H10: Self-determined motivation significantly mediates the relationships between (a) perceived control, (b) newness, (c) ease of use, (d) usefulness, (e) perceived anonymity, (f) security risk, (g) psychophysical risk and (h) performance risk and the repeated use of SSTs.

H11: Ability significantly mediates the relationships between (a) perceived control, (b) newness, (c) ease of use, (d) usefulness, (e) perceived anonymity, (f) security risk, (g) psychophysical risk and (h) performance risk and the repeated use of SSTs.

H12: Role clarity significantly mediates the relationships between (a) perceived control, (b) newness, (c) ease of use, (d) usefulness, (e) perceived anonymity, (f) security risk, (g) psychophysical risk and (h) performance risk and the repeated use of SSTs.

Table 4.4 shows that trust mediated the relationships between the hedonic factors perceived control and newness and the repeated use of SSTs (H9a: b=.1062, CIs 95% .0545–.1601 and

H9b: b=.0450, CI95% .0008–.0879). Trust also mediated the relationships between the utilitarian factor usefulness and the repeated use of SSTs (b=.1555, CIs 95% .1012–.2142).

Table 4.4

The Mediating Effect of Trust on the Relationships between Hedonic, Utilitarian and Security Factors and the Repeated Use of SSTs

Dependent Variable						Repeated Use of SSTs		
Mediator			**Trust**					
						CI95%		
Independent Variable	H	**a.b**	S.E.	t-value		Lower	Upper	
Perceived Control	H9a	**.1062**	.0261	4.0690		.0545	.1601	**Supported**
Newness	H9b	**.0450**	.0223	2.0179		.0008	.0879	**Supported**
Ease of Use	H9c	**.0132**	.0226	.5841	-	.0325	.0576	**Not supported**
Usefulness	H9d	**.1555**	.0287	5.4181		.1012	.2142	**Supported**
Perceived Anonymity	H9e	**.0559**	.0206	2.7136		.0157	.0990	**Supported**
Security Risk	H9f	- **.0343**	.0183	- 1.8743	-	.0737	- .0002	**Supported**
Psychophysical Risk	H9g	- **.0287**	.0296	- .9696	-	.0891	.0293	**Not supported**
Performance Risk	H9h	- **.0324**	.0216	- 1.5000	-	.0789	.0085	**Not supported**

CI 95% - 95% Confidence Interval
a.b- Indirect effect, H- hypotheses

Table 4.4 shows that trust mediated the relationships between the hedonic factors perceived control and newness and the repeated use of SSTs (H9a: b=.1062, CIs 95% .0545–.1601 and H9b: b=.0450, CI95% .0008–.0879). Trust also mediated the relationships between the utilitarian factor usefulness and the repeated use of SSTs (b=.1555, CIs 95% .1012–.2142). The relationship between the security factor perceived anonymity and the repeated use of SSTs was also mediated by trust (b=.0559, CIs 95% .0157–.990). However, trust only marginally mediated the relationship between security risk and the repeated use of SSTs (b=-.0343, CIs 95% -.0737–.0002). Thus, H9a, H9b, H9d, H9e and H9f were supported. Contrary

to the hypotheses, trust did not significantly mediate the relationships between ease of use, psychophysical risk, performance risk and the repeated use of SSTs. Thus, H9c, H9f and H9h were not supported. Consistent with the prediction based on Kim, Kim and Hwang (2009), Harrison and Smith (2004), Wang (2002), Collier and Sherrell (2010), Geyskens, Steenkamp and Kumar (1998), Lusch, Brown and Brunswick (1992), Venkatraman and Subramaniam (2002), Auh et al. (2007) and Gruen et al. (2000), trust mediated the relationship between hedonic factors and the repeated use of SSTs. However, contrary to the prediction based on Wen, Prybutok and Xu (2011), Wang (2002), Collier and Sherrell (2010), Geyskens, Steenkamp and Kumar (1998), Lusch, Brown and Brunswick (1992), Venkatraman and Subramaniam (2002), Auh et al. (2007) and Gruen et al. (2000), trust mediated the relationship between usefulness (a utilitarian factor) and the repeated use of SSTs, but it did not mediate the relationship between ease of use and the repeated use of SSTs. Contrary to the prediction based on Morgan and Hunt (1994), Zinkhan and Karande (1991), Harrison and Smith (2004), Geyskens, Steenkamp, Kumar (1998), Lusch, Borwn and Brunswick (1992), Venkatraman and Subramaniam (2002), Auh et al. (2007) and Gruen et al. (2000), trust did not mediate the relationship between psychophysical, performance risk and the repeated use of SSTs. However, it mediated the relationships between the security factors perceived anonymity and security risk and the repeated use of SSTs. The results indicate that trust demonstrated differential mediating effects on the relationships between hedonic, utilitarian and security factors and the repeated use of SSTs, although it played a significant mediating role on most of the relationships between hedonic, utilitarian and security factors and the repeated use of SSTs.

Table 4.5

The Mediating Effect of Self-Determined Motivation on the Relationships between Hedonic, Utilitarian and Security Factors and the Repeated Use of SSTs

Dependent Variable						Repeated Use of SSTs		
Mediator			**Self-Determined Motivation**					
						CI95%		
Independent Variable	H	**a.b**	S.E.	t-value		Lower	Upper	
Perceived Control	H10a	**.0076**	.0060	1.2063	-	.0030	.0220	**Not supported**
Newness	H10b	**.0136**	.0080	1.7662		.0007	.0320	**Supported**
Ease of Use	H10c	**.0262**	.0120	2.1301		.0036	.0530	**Supported**
Usefulness	H10d	**.0162**	.0100	1.6701		.0011	.0384	**Supported**
Perceived Anonymity	H10e	- **.0082**	.0070	- 1.1081	-	.0273	.0030	**Not supported**
Security Risk	H10f	- **.0082**	.0060	- 1.3016	-	.0236	.0010	**Not supported**
Psychophysical Risk	H10g	- **.0174**	.0110	- 1.6415	-	.0429	- .0011	**Supported**
Performance Risk	H10h	- **.0033**	.0060	- 0.55	-	.0184	.0070	**Not supported**

CI 95% - 95% Confidence Interval
a.b- Indirect effect, H- hypotheses

As shown in Table 4.5, self-determined motivation significantly mediated the relationships between the hedonic factor newness and the repeated use of SSTs (b=.136, CIs 95% .0007–.0319). The relationships between the utilitarian factors ease of use and usefulness and the repeated use of SSTs were mediated by self-determined motivation (b=.262, CIs 95% .0036–.0530 and b=.0162, CIs 95% .0011–.384). Self-determined motivation also mediated the relationship between the security factor psychophysical risk and the repeated use of SSTs (b=-.0174, CIs 95% .0429–-.0011). The results provide support for H10b, H10c, H10d and H10g. The relationships between perceived control, anonymity, security risk, performance risk and the repeated use of SSTs were not significantly mediated by self-determined motivation. Thus, H10a, H10e, H10f and H10h were not supported. Consistent with the prediction based on Collier and Sherrell (2010), Dabholkar (1996), Risch, Rodie and Schultz-

Kleine (2000), Techatassanasoontorn and Tanvisuth (2008), Etgar (2006), Brennan and Turnbull (1999), Garbarino and Johnson (1999) and Hakansson and Snehota (1995), self-determined motivation mediated the relationships between hedonic factors and the repeated use of SSTs. Self-determined motivation mediated the relationship between usefulness and the repeated use of SSTs, which was consistent with the prediction based on Meuter et al. (2005), Techatassanasoontorn and Tanvisuth (2008), Etgar (2006), Brennan and Turnbull (1999), Garbarino and Johnson (1999) and Hakansson and Snehota (1995). Contrary to the prediction based on Jaasma and Koper (1999), Sargeant and Lee (2004), Techatassanasoontorn and Tanvisuth (2008), Etgar (2006), Brennan and Turnbull (1999), Garbarino and Johnson (1999) and Hakansson and Snehota (1995), self-determined motivation did not mediate the relationship between ease of use and the repeated use of SSTs. Consistent with the prediction based on Joinson (1999), Shore and Shannon (2007), Zakaria and Nordin (2008), Techatassanasoontorn and Tanvisuth (2008), Etgar (2006), Brennan and Turnbull (1999), Garbarino and Johnson (1999) and Hakansson and Snehota (1995), self-determined motivation mediated the relationships between perceived anonymity and the repeated use of SSTs. Self-determined motivation mediated the relationship between security risk and the repeated use of SSTs, but it did not mediate the relationships between psychophysical and performance risk and the repeated use of SSTs. This was contrary to the prediction based on Jaasma and Koper (1999), Sargeant and Lee (2004), Techatassanasoontorn and Tanvisuth (2008), Etgar (2006), Brennan and Turnbull (1999), Garbarino and Johnson (1999) and Hakansson and Snehota (1995). The results indicate that self-determined motivation demonstrated a differential mediating effect on the relationships between hedonic, utilitarian and security factors and the repeated use of SSTs.

Table 4.6

The Mediating Effect of Ability on the Relationships between Hedonic, Utilitarian and Security Factors and the Repeated Use of SST

Dependent Variable					Repeated Use of SSTs		
Mediator			**Ability**				
					CI95%		
Independent Variable	H	**a.b**	S.E.	t-value	Lower	Upper	
Perceived Control	H11a	**.0032**	.0181	1.206	-.0173	.0241	**Not supported**
Newness	H11b	**.0144**	.0125	1.766	-.0097	.0404	**Not supported**
Ease of Use	H11c	**.0765**	.0215	2.130	.0338	.1187	**Supported**
Usefulness	H11d	**.0169**	.0140	1.670	-.0083	.0471	**Not supported**
Perceived Anonymity	H11e	**.0197**	.0123	1.108	.0003	.0479	**Supported**
Security Risk	H11f	**-.0162**	.0116	-1.302	-.0446	.0002	**Not supported**
Psychophysical Risk	H11g	**-.0503**	.2380	-1.642	-.1037	-.0126	**Supported**
Performance Risk	H11h	**.0158**	.0097	-.550	-.0004	.0379	**Not supported**

CI 95% - 95% Confidence Interval
a.b- Indirect effect, H- hypotheses

As shown in Table 4.6, ability significantly mediated the relationships between the utilitarian factor ease of use and the repeated use of SSTs (b=.0765, CIs 95% .0338–.1187). Ability also significantly mediated the relationships between the security factors perceived anonymity and psychophysical risk and the repeated use of SSTs (H11e: b=.0197, CIs 95% .0003–.0479 and H11g: b=-.0503, CIs 95% -.1037–-.0126). Thus, H11c, H11e and H11g were supported. However, the relationships between perceived control, newness, usefulness, security risk, performance risk and the repeated use of SSTs were not significantly mediated by ability. Thus, H11a, H11b, H11d, H11f and H11h were not supported. Contrary to the prediction based on Hahn and Kim (2009), Lee and Lin (2009), Mayer, Davis and Schoorman (1995), Meuter et al. (2005), Compeau and Higgins (1995), Yi and Hwang (2003), Rose and Fogarty

(2006), Wang, Harris and Patterson (2013), Lusch, Brown and Brunswick (1992), Xue and Harker (2002), Auh et al. (2007), Crespin-Mazet and Ghauri (2007), Hitt et al. (2000), Lusch, Vargo and O'Brien (2007), Miles and Snow (2007) and Subramani and Venkatraman (2003), ability did not mediate the relationship between the hedonic factors perceived control and newness and the repeated use of SSTs. Ability did not mediate the relationship between utilitarian factor, usefulness and the repeated use of SSTs, which was also contrary to the prediction based on Igbaria and Ilvari (1995), Ramayah and Aafaqi (2004), Compeau and Higgins (1995), Yi and Hwang (2003), Rose and Fogarty (2006), Wang, Harris and Patterson (2013), Lusch, Brown and Brunswick (1992), Xue and Harker (2002), Auh et al. (2007), Crespin-Mazet and Ghauri (2007), Hitt et al. (2000), Lusch, Vargo and O'Brien (2007), Miles and Snow (2007) and Subramani and Venkatraman (2003). However, ability mediated the relationship between the utilitarian factor ease of use and the repeated use of SSTs, which was consistent with the prediction based on Abel and Larkin (1990), Bohlin and Hunt (1995) and Mamassis and Doganis (2004). Ability also mediated the relationship between the security factor perceived anonymity and the repeated use of SSTs, which was consistent with the prediction based on Joinson (1999), Abel and Larkin (1990), Bohlin and Hunt (1995), Mamassis and Doganis (2004), Compeau and Higgins (1995), Yi and Hwang (2003), Rose and Fogarty (2006), Wang, Harris and Patterson (2013), Lusch, Brown and Brunswick (1992), Xue and Harker (2002), Auh et al. (2007), Crespin-Mazet and Ghauri (2007), Hitt et al. (2000), Lusch, Vargo and O'Brien (2007), Miles and Snow (2007) and Subramani and Venkatraman (2003). Contrary to the prediction based on Hahn and Kim (2009), Lee and Lin (2009), Mayer, Davis and Schoorman (1995), Compeau and Higgins (1995), Yi and Hwang (2003), Rose and Fogarty (2006), Wang, Harris and Patterson (2013), Lusch, Brown and Brunswick (1992), Xue and Harker (2002), Auh et al. (2007), Crespin-Mazet and Ghauri (2007), Hitt et al. (2000), Lusch, Vargo and O'Brien (2007), Miles and Snow (2007) and

Subramani and Venkatraman (2003), ability mediated the relationship between the security factor psychophysical risk and the repeated use of SSTs. However, it did not mediate the relationship between the security factors security and performance risk and the repeated use of SSTs. The results indicate that ability showed differential mediating effects on the relationships between hedonic, utilitarian and security factors and the repeated use of SSTs.

Contrary to the hypotheses, role clarity did not mediate any relationships between hedonic, utilitarian and security factors and the repeated use of SSTs, as shown in Table 4.7. Therefore, H12a through H12h were not supported. Contrary to the prediction based on Meuter et al. (2005) and Auh et al. (2007), role clarity did not mediate the relationships between hedonic, utilitarian and security factors and the repeated use of SSTs. Thus, the results indicate that role clarity is not a mediator of the repeated use of SSTs.

Table 4.7

The Mediating Effect of Role Clarity on the Relationships between Hedonic, Utilitarian and Security Factors and the Repeated Use of SSTs

Dependent Variable										Repeated Use of SSTs		
Mediator				**Role Clarity**								
										CI95%		
Independent Variable	H		**a.b**	S.E.		t-value				Lower	Upper	
Perceived Control	H12a	-	**.0029**	.0057	-	1.206	-			.0175	.0048	**Not supported**
Newness	H12b		**.0012**	.0033		1.766	-			.0049	.0078	**Not supported**
Ease of Use	H12c	-	**.0158**	.0228	-	2.130	-			.0588	.0295	**Not supported**
Usefulness	H12d	-	**.0034**	.0059	-	1.670	-			.0173	.0078	**Not supported**
Perceived Anonymity	H12e	-	**.0019**	.0037	-	1.108	-			.0093	.0062	**Not supported**
Security Risk	H12f		**.0006**	.0029		1.302	-			.0044	.0082	**Not supported**
Psychophysical Risk	H12g		**.0041**	.0088		1.642	-			.0093	.0287	**Not supported**
Performance Risk	H12h	-	**.0051**	.0077	-	.550	-			.0219	.0100	**Not supported**

CI 95% - 95% Confidence Interval
a.b- Indirect effect, H- hypothesesik,

The results partially support the idea that consumer readiness mediates the relationships between hedonic, utilitarian and security factors and the repeated use of SSTs; they also suggest that dimensions of consumer readiness demonstrated differential mediating effects on the relationship between hedonic, utilitarian and security factors and the repeated use of SSTs. The impact of hedonic, utilitarian and security factors on the repeated use of SSTs were through trust, self-determined motivation and ability. However, role clarity was not an important mediator of the repeated use of SSTs. One plausible reason for such mixed results may be that customers may have different psychological responses to different hedonic, utilitarian and security factors of SSTs in different contexts or different stages of consumer decision making. In addition to enhancing customers' trust and self-determined motivation, managers should also find ways to enhance customers' ability to use SSTs in order to increase the use of SSTs in retailing.

Since the mediating effects of dimensions of consumer readiness have been tested, the mediating effects must be classified properly. Baron and Kenny (1986) suggest a classification scheme to classify mediation, namely full, partial and no mediation, based on the significance of direct effects (c') and indirect effects (a.b). When the direct effect (c') is not significant and the indirect effect (a.b) is significant and greater than zero, the mediation is full; when both the direct (c') and indirect effect (a.b) are significant and greater than zero, the mediation is partial (Baron & Kenny, 1986). When the indirect effect (a.b) is not significant, there is no mediation (Baron & Kenny, 1986). However, Zhao, Lynch and Chen (2010) argue that Baron and Kenny's mediation classification scheme is too simple and that some mediating effects not classified under this scheme may be overlooked. Thus, they suggest another mediation classification scheme to classify mediating effects into mediation and non-mediation. Three patterns of mediation (complementary, competitive and indirect-

only mediation) are classified under mediation. In complementary mediation, indirect effects (a.b) and direct effects (c') exist with the same positive or negative signs. In competitive mediation, indirect effects (a.b) and direct effects (c') exist with opposite signs. In indirect-only mediation, indirect effects (a.b) exist but no direct effects (c'). Two patterns are present in non-mediation: direct-only and no-effect non-mediation. In direct-only non-mediation, only direct effects (c') exist and no indirect effects (a.b). In no-effect non-mediation, neither direct effects (c') nor indirect effects (a.b) exists. To conform to state-of-the-art classification, this thesis adopts Zhao, Lynch and Chen's (2010) typology to classify the current mediating effects in this study.

As shown in Table 4.8, trust mediated the relationship between perceived control and the repeated use of SSTs. Thus, the indirect effect (a.b) exists and the direct effect (c') is significant (c'=.129, p<.001) with the same sign as the indirect effect; therefore, the mediation is classified as complementary mediation. Given that trust and self-determined motivation mediated the relationship between newness and the repeated use of SSTs, the indirect effect (a.b) exists and the direct effect (c') is significant (c'=.029, p<.05) with the same sign as the indirect effect. Thus, the mediation is classified as complementary mediation. Self-determined motivation and ability mediated the relationship between ease of use and the repeated use of SSTs, thus the indirect effect (a.b) exists, but the direct effect (c') is not significant. Thus, the mediation is classified as indirect-only mediation. Additionally, trust and self-determined motivation mediated the relationship between usefulness and the repeated use of SSTs, thus the indirect effect (a.b) exists and the direct effect (c') is significant

Table 4.8

Classification of Mediation of Dimensions of Consumer Readiness on the Relationships between Hedonic, Utilitarian and Security Factors and the Repeated Use of SSTs

Dependent Variable	**Repeated Use of SSTs**								
Independent Variable	**c**	**c'**	**t-value (c')**	**S.E. (c')**	**p-value (c')**	**a.b**	**Sign Direction**	**Mediation**	**Mediator**
Perceived Control	.243***	.129***	4.300	.03	.001	exist (+)	same	Complementary	Trust
Newness	.167***	.092*	3.067	.03	.001	exist (+)	same	Complementary	Trust, SDM
Ease of Use	.099*	- .001 [a]	- .0250	.04	.980	exist (-)	opposite	Indirect-only	SDM, Ability
Usefulness	.295***	.110*	2.750	.04	.001	exist (+)	same	Complementary	Trust, SDM
Perceived Anonymity	.192***	.126**	4.200	.03	.001	exist (+)	same	Complementary	Trust, Ability
Security Risk	- .012 [a]	.046 [a]	.1.533	.03	.100	exist (-)	opposite	Indirect-only	Trust
Psychophysical Risk	- .272***	- .180 [a]	- 3.600	.05	.001	exist (-)	same	Indirect-only	SDM, Ability
Performance Risk	- .075 [a]	- .050 [a]	- .1.667	.03	.130	not exist	Nil	No-effect	Nil
F-ratio	87.880***	110.212***							
R^2	.666	.792							
Adjusted R^2	.659	.785							

***p<.001 **p<.01 *p<.05 [a]p≤1.0

CI 95% - 95% Confidence Interval
c- Total effect, c' - Direct effect, a.b - Indirect effect,
SDM- Self-determined motivation

(c'=.110, p<.05) with the same sign as the indirect effect. Thus, the mediation is also classified as complementary mediation. Given that trust and ability mediated the relationship between perceived anonymity and the repeated use of SSTs, the indirect effect (a.b) exists and the direct effect (c') is significant (c'=.126, p<.01) with the same sign as the indirect effect. Thus, the mediation is also classified as complementary mediation. Trust mediated the relationship between security risk and the repeated use of SSTs, thus the indirect effect (a.b) exists, but the direct effect (c') is not significant. Thus,the mediation is classified as indirect-only mediation. In addition, self-determined motivation and ability mediated the relationship between psychophysical risk and the repeated use of SSTs, thus the indirect effect (a.b) exists but the direct effect (c') is not significant. Therefore, the mediation is also classified as indirect-only mediation. As both indirect effect (a.b) and direct effect (c') are not significant on the relationship between performance risk and the repeated use of SSTs, the mediation is classified as no-effect non-mediation. Thus, trust, self-determined motivation and ability played differential mediating roles on the relationships between hedonic, utilitarian, security factors and repeated use of SSTs. The results suggest that SST co-production is a complicated process. Customers had different responses to hedonic, utilitarian and security factors; such responses eventually influence the repeated use of SSTs. Therefore, by enhancing the repeated use of SSTs in retailing, managers should consider an integrated strategy (e.g. enhancing trust, self-determined motivation and ability simultaneously) rather than single strategies (e.g. enhancing trust only).

4.3 Chapter Summary

In this chapter, the mediating effect of consumer readiness on the relationship between hedonic, utilitarian and security factors and the repeated use of SSTs was investigated. The

results indicate that the hedonic factors perceived control and newness, the utilitarian factors ease of use and usefulness and the security factors perceived anonymity and psychophysical risk were associated with the repeated use of SSTs. Usefulness and psychophysical risk demonstrated the strongest relationships with the repeated use of SSTs.

Different hedonic, utilitarian and security factors had different effects on trust, self-determined motivation, ability and role clarity. Ease of use had the highest impact on self-determined motivation, ability and role clarity; usefulness had the strongest relationship with trust. The results led to the conclusion that enhancing ease of use and usefulness nurtures consumer readiness in retailing.

Moreover, trust and self-determined motivation demonstrated a positive impact on the repeated use of SSTs. Ability also demonstrated a positive effect on the repeated use of SSTs. However, role clarity did not show any effect on the repeated use of SSTs.

The results also indicate that dimensions of consumer readiness demonstrated differential mediating effects on the relationships between hedonic, utilitarian and security factors and the repeated use of SSTs. While trust mediated the relationships between perceived control, newness, usefulness, perceived anonymity, psychophysical risk and the repeated use of SSTs, self-determined motivation only mediated the relationships between newness, ease of use, usefulness, psychophysical risk and the repeated use of SSTs. Ability mediated the relationships between ease of use, perceived anonymity, psychophysical risk and the repeated use of SSTs. Unexpectedly, role clarity did not mediate any relationships between hedonic, utilitarian and security factors and the repeated use of SSTs.

The repeated use of SSTs is not only driven by hedonic, utilitarian and security factors. Attitudes towards SSTs are also drivers of the repeated use of SSTs. Thus, the mediating role of consumer readiness on the relationships between hedonic, utilitarian and security factors and attitudes towards SSTs are investigated in the next chapter.

CHAPTER 5

THE MEDIATING EFFECT OF CONSUMER READINESS ON THE RELATIONSHIPS BETWEEN HEDONIC, UTILITARIAN AND SECURITY FACTORS AND ATTITUDES TOWARDS SSTs

5.1 Introduction

In this chapter, the second part of the conceptual model in Chapter 3 is discussed. Proposition 2, which states that consumer readiness mediates relationships between hedonic, utilitarian and security factors and attitudes towards SSTs, is investigated. Based on this proposition, hedonic, utilitarian and security factors and consumer readiness were predicted to be associated with attitudes towards SSTs. The chapter investigates the impact of hedonic, utilitarian and security factors on attitudes towards SSTs and consumer readiness, the impact of consumer readiness on attitudes towards SSTs, and the mediating effect of consumer readiness on the relationships between hedonic, utilitarian and security factors and attitudes towards SSTs. Conclusions are made at the end of this chapter. Multiple regression analysis was used to analyse the data, as the effects being investigated were similar to those in Chapter 4.

5.2 Results and Discussions

5.2.1 The effects of hedonic, utilitarian and security factors on attitudes towards SSTs

In this section, the relationships between hedonic, utilitarian and security factors and attitudes towards SSTs are discussed. Based on proposition 2, the hedonic factors perceived control

and newness, the utilitarian factors ease of use and usefulness and the security factors perceived anonymity and perceived risk were predicted to influence attitudes towards SSTs. The following hypotheses emerged:

H13: There is a positive association between (a) perceived control, (b) newness and attitudes towards SSTs.

H14: There is a positive association between (a) ease of use, (b) usefulness and attitudes towards SSTs.

H15: There is a positive association between (a) perceived anonymity and attitudes towards SSTs, and a negative association between (b) security risk, (c) performance risk, (d) psychophysical risk and attitudes towards SSTs.

To further understand which factors nurture positive attitudes towards SSTs in customers, the impact of hedonic, utilitarian and security factors of SSTs on attitudes towards SSTs should be investigated. The results of regression equation shown in Table 5.1 indicate that perceived control, newness, ease of use, usefulness, perceived anonymity and psychophysical risk account for 66.6% of the variance in attitudes towards SSTs.

As hypothesized, the hedonic factors perceived control and newness were positively associated with attitudes towards SSTs (H1a: b=.207, p<.001) and (H1b: b=.209, p<.001), thus providing support for H13a and H13b. Consistent with Weiters et al.'s (2005) findings, the hedonic factors perceived control and newness form positive attitudes towards SSTs in customers.

Table 5.1

Effects of Hedonic, Utilitarian and Security Factors on Attitudes towards SSTs

Independent Variable		Attitudes towards SSTs			
	Hypotheses	B	S.E.	t-Value	
Perceived Control	H13a:	.207***	.042	4.92	Supported
Newness	H13b:	.209***	.040	5.27	Supported
Ease of Use	H14a:	.118**	.045	2.62	Supported
Usefulness	H14b:	.360***	.045	8.00	Supported
Perceived Anonymity	H15a:	.168***	.041	4.12	Supported
Security Risk	H15b:	- .010 [a]	.036	- .29	Not Supported
Performance Risk	H15c:	- .042 [a]	.058	- 4.08	Not Supported
Psychophysical Risk	H15d:	- .236***	.041	- 1.02	Supported
F-ratio		90.824***			
R^2		0.674			
Adjusted R^2		0.666			

***p<.001 **p<.01 *p<.05 [a]p≤1.0 B-Unstandardized loadings S.E.- Standard error

The results were also consistent with the prediction based on TPB (Ajzen, 1991) and Gollwitzer (1999), Ajzen (2002), Armitage and Conner (1999, 2001), Schifter and Ajzen (1985), Sheeran (2002), Mathieson (1991), Quelch and Klein (1996) and Mathieson (1991) that perceived control nurtured customers' positive attitudes towards SSTs.

As predicted, the utilitarian factors ease of use (b=.118, p<.01) and usefulness (b=.360, p<.001) were positively related to attitudes towards SSTs; this provided support for H14a and H14b. Among all the factors, usefulness had the strongest relationship with attitudes towards SSTs. Consistent with Weijters, Rangarajan and Falk (2005) and Weijters et al. (2007), ease

of use positively influenced attitudes towards SSTs. The results were consistent with the TAM and IDT's prediction that ease of use and usefulness are important drivers of positive attitudes in customers (Rogers, 2003; Chen, Gillenson, & Sherrell, 2001; Davis, 1999).

As hypothesized, a positive relationship emerged between the security factor perceived anonymity and attitudes towards SSTs (b=.168, p<.001). Psychophysical risk was negatively associated with attitudes towards SSTs (b=-.236, p<.001). Thus, H15a and H15d were supported. Contrary to the hypotheses, security risk and performance risk were not related to attitudes towards SSTs. Therefore, H15b and H15c were not supported. Consistent with the prediction based on Joinson (1999) and Kumar et al. (2007), perceived anonymity nurtured positive attitudes towards SSTs in customers. Psychophysical risk reduced positive attitudes towards SSTs, which was consistent with Bobbitt and Dabholkar (2001) and Dabholkar (1996). However, contrary to Bobbitt and Dabholkar (2001) and Dabholkar (1996), security and performance risk did not influence attitudes towards SSTs. These results suggest that customers were more concerned with psychological and physical damages rather than the performance and security risk of using SSTs in retailing. A possible reason may be that customers using SSTs could choose to use service counters staffed by personnel in retailing, thus they were not worried about the performance of the machines. In addition, they might be used to completing purchase using bank/credit cards, so they were not sensitive to the security issues associated with using SSTs.

To summarize, the hedonic factors perceived control and newness, the utilitarian factors ease of use and usefulness and the security factor perceived anonymity enhanced attitudes towards SSTs, whilst psychophysical risk reduced attitudes towards SSTs in customers. Further, the results indicate that usefulness and psychophysical risk have stronger impacts on attitudes

towards SSTs in customers. Thus, to form positive customer attitudes in retailing, managers should enhance machines' efficiency and reduce psychological and physical damages perceived by customers. The impact of consumer readiness on attitudes towards SSTs will be discussed in the following section.

5.2.2 The Effect of Consumer Readiness on Attitudes towards SSTs

Based on proposition 2, consumer readiness, which comprises trust, self-determined motivation, ability and role clarity, was predicted to be associated with attitudes towards SSTs. Therefore, the following hypotheses emerged:

H16: There is a positive association between (a) trust, (b) self-determined motivation, (c) ability, (d) role clarity and attitudes towards SSTs.

Table 5.2

The Effect of Consumer Readiness on Attitudes towards SSTs

Independent Variable		Attitudes towards SSTs			
	Hypotheses	B	S.E.	t-Value	
Trust	H16a	.750***	.039	19.321	**Supported**
Self-Determined Motivation	H16b	.071***	.012	6.031	**Supported**
Ability	H16c	.066 [a]	.052	1.259	**Not Supported**
Role Clarity	H16d	.040 [a]	.045	.880	**Not Supported**
F-ratio		266.579***			
R^2		.750			
Adjusted R^2		.747			

***p<.001 **p<.01 *p<.05 [a]p≤1.0 B-Unstandardized coefficients S.E.- Standard error

Given that attitudes towards SSTs are critical antecedents to the repeated use of SSTs based on TRA (Ajzen & Fishbein, 1980) and that consumer readiness was shown to affect the repeated use of SSTs in Chapter 4, it is reasonable to expect that consumer readiness also influences attitudes towards SSTs. As shown in Table 5.2, trust and self-determined motivation accounted for 74.7% of the variance in attitudes towards SSTs. As hypothesized, trust (b=.750, p<.001) and self-determined motivation (b=.071, p<.001) had a positive impact on attitudes towards SSTs, thus providing support for H16a and H16b. Contrary to the hypotheses, ability and role clarity did not positively influence attitudes towards SSTs. Thus, H16c and H16d were not supported. The results partially supported the idea that consumer readiness was associated with attitudes towards SSTs.

Consistent with the prediction based on TRA (Fishbein & Ajzen, 1975) and Dabholkar and Bagozzi (2002), Lee, Castellanos and Choi (2012), Wang and Namen (2004) and Xie, Shen and Zheng (2011), dimensions of consumer readiness such as trust and self-determined motivation affected the repeated use of SSTs (see Chapter 4) and positively influenced attitudes towards SSTs. However, contrary to the prediction, ability affected the repeated use of SSTs (see Chapter 4), but it did not affect attitudes towards SSTs. Thus, the prediction based on TRA was only partially supported. One possible reason is that ability had a relatively profound impact on consumer behaviour; it affected customer behaviour directly in retailing without the necessity of forming positive attitudes towards SSTs. Nevertheless, to form more positive attitudes towards SSTs in customers, managers should pay attention to enhancing trust and self-determined motivation in customers. The relationships between hedonic, utilitarian and security factors and consumer readiness were investigated in Chapter 4 and that the relationship between consumer readiness and attitudes towards SSTs was also tested in this chapter. However, it is also important to understand the mediating roles of

different dimensions of consumer readiness on the relationships between hedonic, utilitarian and security factors and attitudes towards SSTs.

5.2.3 The Mediating Effect of Consumer Readiness on the Relationships between Hedonic, Utilitarian and Security Factors and Attitudes towards SSTs

Based on proposition 2, consumer readiness, which comprises trust, self-determined motivation, ability and role clarity, mediates the relationships between hedonic, utilitarian and security factors and attitudes towards SSTs. The following hypotheses emerged:

H17: Trust significantly mediates the relationships between (a) perceived control, (b) newness, (c) ease of use, (d) usefulness, (e) perceived anonymity, (f) security risk, (g) psychophysical risk and (h) performance risk and attitudes towards SSTs.

H18: Self-determined motivation significantly mediates the relationships between (a) perceived control, (b) newness, (c) ease of use, (d) usefulness, (e) perceived anonymity, (f) security risk, (g) psychophysical risk and (h) performance risk and attitudes towards SSTs.

H19: Ability significantly mediates the relationships between (a) perceived control, (b) newness, (c) ease of use, (d) usefulness, (e) perceived anonymity, (f) security risk, (g) psychophysical risk and (h) performance risk and attitudes towards SSTs.

H20: Role clarity significantly mediates the relationships between (a) perceived control, (b) newness, (c) ease of use, (d) usefulness, (e) perceived anonymity, (f) security risk, (g) psychophysical risk and (h) performance risk and attitudes towards SSTs.

As customers are co-producers, the relationships between hedonic, utilitarian, and security factors and attitudes towards SSTs are predicted to be affected by consumer readiness. Thus, the mediating role of consumer readiness is investigated. As hypothesized, trust mediated the relationships between the hedonic factors perceived control and newness and attitudes towards SSTs (H9a: b=.1264, CIs 95% .0676–.1860 and H9b: b=.0535, CIs 95% .0005–.1081), as shown in Table 5.3. As expected, the relationship between the utilitarian factor usefulness and attitudes towards SSTs was also mediated by trust (b=.1850, CIs 95% .1255–.2493). Moreover, trust mediated the relationship between the security factor perceived anonymity and attitudes towards SSTs (b=.0668, CIs 95% .0185–.1136). Thus, support was provided for H17a, H17b, H17d and H17e. However, trust did not demonstrate mediating effects on the relationships between ease of use, security risk, psychophysical risk and performance risk and attitudes towards SSTs. Thus, H17c, H17f, H17g and H17h were not supported. Consistent with the prediction based on TRA (Fishbein & Ajzen, 1975), Dabholkar and Bagozzi (2002), Lee, Castellanos and Choi (2012), Wang and Namen (2004) and Xie, Shen and Zheng (2011), trust mediated the relationships between perceived control, newness, usefulness, perceived anonymity and the repeated use of SSTs (see Chapter 4). Trust also mediated the relationships between perceived control, newness, usefulness, perceived anonymity and attitudes towards SSTs. However, trust mediated the relationship between security risk and the repeated use of SSTs, but it did not mediate the relationship between security risk and attitudes towards SSTs, which was contrary to the prediction based on TRA. Thus, the results only partially supported TRA as applied to retailing.

Table 5.3

The Mediating Effect of Trust on the Relationships between Hedonic, Utilitarian and Security Factors and Attitudes towards SSTs

Dependent Variable						Attitudes Towards SSTs		
Mediator			**Trust**					
						CI95%		
Independent Variable	H	**a.b**	S.E.	t-value		Lower	Upper	
Perceived Control	H17a	**.1264**	.0299	4.227		.0676	.1860	**Supported**
Newness	H17b	**.0535**	.0275	1.945		.0005	.1081	**Supported**
Ease of Use	H17c	**.0158**	.0277	.570	-	.0378	.0725	**Not supported**
Usefulness	H17d	**.1850**	.0318	5.818		.1255	.2493	**Supported**
Perceived Anonymity	H17e	**.0668**	.0237	2.819		.0185	.1136	**Supported**
Security Risk	H17f	- **.0408**	.0224	- 1.821	-	.0841	.0048	**Not supported**
Psychophysical Risk	H17g	- **.0342**	.0350	- .977	-	.1072	.0341	**Not supported**
Performance Risk	H17h	- **.0386**	.0257	- 1.502	-	.0908	.0098	**Not supported**

CI 95% - 95% Confidence Interval

a.b- Indirect effect, H-Hypotheses

As shown in Table 5.4, self-determined motivation mediated the relationships between the hedonic factor newness and attitudes towards SSTs (b=.0240, CIs 95% .0048–.0477). The relationships between the utilitarian factors ease of use and usefulness and attitudes towards SSTs were also mediated by self-determined motivation (H18c: b=.0463, CI 95% .0206–.0764 and H18d: b=.0286, CI 95% .0074–.0563). Self-determined motivation also mediated the relationship between the security factor psychophysical risk and attitudes towards SSTs (b=-.0307, CI 95% -.0711–-.0028). Thus, H18b, H18c, H18d and H18g were supported. However, self-determined motivation did not significantly mediate the relationships between perceived control, anonymity, security risk, performance risk, and attitudes towards SSTs. Contrary to the prediction based on TRA (Fishbein & Ajzen, 1975), Dabholkar and Bagozzi (2002), Lee, Castellanos and Choi (2012), Wang and Namen (2004) and Xie, Shen and Zheng

(2011), self-determined motivation mediated the relationships between perceived control, newness, usefulness, perceived anonymity, security risk and the repeated use of SSTs (see Chapter 4), but it mediated the relationship between newness, ease of use, usefulness, psychophysical risk and attitudes towards SSTs. The results indicate that the impact of hedonic, utilitarian and security factors on the repeated use of SSTs were different from their effects on attitudes towards SSTs through self-determined motivation.

Table 5.4

The Mediating Effect of Self-Determined Motivation on the Relationships between Hedonic, Utilitarian and Security Factors and Attitudes towards SSTs

Dependent Variable						Attitudes Towards SSTs		
Mediator				**Self-Determined Motivation**				
						CI95%		
Independent Variable	H	**a.b**	S.E.	t-value		Lower	Upper	
Perceived Control	H18a	**.0135**	.0098	1.378	-	.0045	.0340	**Not supported**
Newness	H18b	**.0240**	.0110	2.182		.0048	.0477	**Supported**
Ease of Use	H18c	**.0463**	.1420	.326		.0206	.0764	**Supported**
Usefulness	H18d	**.0286**	.0126	2.270		.0074	.0563	**Supported**
Perceived Anonymity	H18e	- **.0145**	.0107	- 1.355	-	.0382	.0026	**Not supported**
Security Risk	H18f	- **.0144**	.0095	- 1.516	-	.0372	.0004	**Not supported**
Psychophysical Risk	H18g	- **.0307**	.0166	- 1.849	-	.0711	- .0028	**Supported**
Performance Risk	H18h	- **.0057**	.0094	- .606	-	.0246	.0130	**Not supported**

CI 95% - 95% Confidence Interval
a.b- Indirect effect, H-Hypotheses

Contrary to the hypotheses, ability and role clarity did not show any mediating effects on the relationships between hedonic, utilitarian and security factors and attitudes towards SSTs as shown in Tables 5.5 and 5.6. Thus, H19a through H19h and H20a through H20h were not supported. Contrary to the prediction based on TRA (Fishbein & Ajzen, 1975), Dabholkar

and Bagozzi (2002), Lee, Castellanos and Choi (2012), Wang and Namen (2004) and Xie, Shen and Zheng (2011), ability mediated the relationship between ease of use, perceived anonymity, psychophysical risk and the repeated use of SSTs (see Chapter 4), but it did not mediate the relationship between ease of use, perceived anonymity, psychophysical risk and attitudes towards SSTs. Thus, the current results may indicate that attitudes towards SSTs may not be an essential antecedent to the repeated use of SSTs as predicted by TRA.

Table 5.5

The Mediating Effect of Ability on the Relationships between Hedonic, Utilitarian and Security Factors and Attitudes towards SSTs

Dependent Variable						Attitudes Towards SSTs		
Mediator			**Ability**					
						CI95%		
Independent Variable	H	**a.b**	S.E.	t-value		Lower	Upper	
Perceived Control	H19a	**.0004**	.0032	.125	-	.0046	.0097	**Not supported**
Newness	H19b	**.0017**	.0049	.347	-	.0074	.0136	**Not supported**
Ease of Use	H19c	**.0093**	.0219	.425	-	.0280	.0588	**Not supported**
Usefulness	H19d	**.0021**	.0069	.304	-	.0083	.0198	**Not supported**
Perceived Anonymity	H19e	**.0024**	.0066	.364	-	.0078	.0183	**Not supported**
Security Risk	H19f	- **.0020**	.0057	- .351	-	.0170	.0062	**Not supported**
Psychophysical Risk	H19g	- **.0061**	.0154	- .396	-	.0432	.0179	**Not supported**
Performance Risk	H19h	**.0019**	.0054	.352	-	.0064	.0154	**Not supported**

CI 95% - 95% Confidence Interval
a.b- Indirect effect, H-Hypotheses

Table 5.6

The Mediating Effect of Role Clarity on the Relationships between Hedonic, Utilitarian and Security Factors and Attitudes towards SSTs

Dependent Variable										
							Attitudes Towards SSTs		
Mediator				**Role Clarity**					
Independent Variable	H		**a.b**	S.E.		t-value		CI95% Lower	Upper	
Perceived Control	H20a	-	**.0009**	.0053	-	.170	-	.0155	.0066	**Not supported**
Newness	H20b		**.0004**	.0030		.133	-	.0040	.0092	**Not supported**
Ease of Use	H20c	-	**.0049**	.0214	-	.229	-	.0513	.0340	**Not supported**
Usefulness	H20d	-	**.0011**	.0056	-	.196	-	.0154	.0093	**Not supported**
Perceived Anonymity	H20e	-	**.0006**	.0030	-	.200	-	.0069	.0067	**Not supported**
Security Risk	H20f		**.0002**	.0025		.080	-	.0039	.0061	**Not supported**
Psychophysical Risk	H20g		**.0013**	.0081		.160	-	.0130	.0219	**Not supported**
Performance Risk	H20h	-	**.0016**	.0072	-	.222	-	.0184	.0108	**Not supported**

CI 95% - 95% Confidence Interval
a.b- Indirect effect, H-Hypotheses

Further, the results indicate that hedonic, utilitarian and security factors affected attitudes towards SSTs and the repeated use of SSTs through different paths and in different ways. Such evidence suggests that customer attitudes towards SSTs may not be a necessary antecedent to the repeated use of SSTs in retailing. However, it can be concluded that most effects of hedonic, utilitarian and security factors on attitudes towards SSTs were through trust and self-determined motivation. Therefore, trust and self-determined motivation were important mediators of consumer attitudes towards SSTs. Thus, to enhance positive attitudes in customers towards SSTs, managers should enhance and facilitate customers' trust and self-determined motivation in retailing.

Table 5.7

Classification of Mediation of Dimensions of Consumer Readiness on the Relationships between Hedonic, Utilitarian, Security Factors and Attitudes towards SSTs

Dependent Variable	**Attitudes Towards SSTs**								
Independent Variable	**c**	**c'**	**t-value(c')**	**S.E. (c')**	**p value(c')**	**a.b**	**Sign Direction**	**Mediation**	**Mediator**
Perceived Control	.207***	.068*	1.98	.03	.050	Exist (+)	same	Complementary	Trust
Newness	.209***	.130***	4.12	.03	.001	Exist (+)	same	Complementary	Trust, SDM
Ease of Use	.118**	.052 [a]	1.30	.04	.200	Exist (+)	same	Indirect-Only	SDM
Usefulness	.360***	.146***	3.85	.04	.001	Exist (+)	same	Complementary	Trust, SDM
Perceived Anonymity	.168***	.114***	3.51	.03	.001	Exist (+)	same	Complementary	Trust
Security Risk	- .010 [a]	.047 [a]	1.67	.03	.100	not exist	Nil	No-effect	Nil
Psychophysical Risk	- .236***	- .167***	- 3.62	.05	.001	Exist (-)	same	Complementary	SDM
Performance Risk	- .042 [a]	.002 [a]	.07	.03	.950	not exist	Nil	No-effect	Nil
F-ratio	90.824***	120.756***							
R^2	.674	.806							
Adjusted R^2	.666	.800							

***p<.001 **p<.01 *p<.05 [a] p≤1.0

CI 95% - 95% Confidence Interval

c- Total effect, c' - Direct effect, a.b - Indirect effect, SDM- Self-determine motivation

As seen in Table 5.7, trust mediated the relationship between perceived control and attitudes towards SSTs, thus the indirect effect (a.b) exists and the direct effect (c') is significant (c'=.068, p<.05) with the same sign as the indirect effect. Thus, the mediation is classified as complementary mediation. Given that trust and self-determined motivation mediated the relationship between newness and attitudes towards SSTs, the indirect effect (a.b) exists and the direct effect (c') is significant (c'=.130, p<.001) with the same sign as the indirect effect, the mediation is also classified as complementary mediation. Self-determined motivation mediated the relationship between ease of use and attitudes towards SSTs; therefore, the indirect effect (a.b) exists, but the direct effect (c') is not significant with the same sign as the indirect effect. Thus, the mediation is classified as indirect-only mediation. Trust and self-determined motivation mediated the relationship between usefulness and attitudes towards SSTs. Thus, the indirect effect (a.b) exists and the direct effect (c') is significant (c'=.146, p<.001) with the same sign as the indirect effect. Therefore, the mediation is classified as complementary mediation. Trust mediated the relationship between perceived anonymity and attitudes towards SSTs, the indirect effect (a.b) exists and the direct effect (c') is significant (c'=.114, p<.001) with the same sign as the indirect effect. Thus, the mediation is classified as complementary mediation. As the direct effect (a.b) and indirect effect (c') between security risk and attitudes towards SSTs are not significant, the mediation is classified as no-effect non-mediation. However, self-determined motivation mediated the relationship between psychophysical risk and attitudes towards SSTs, thus the indirect effect (a.b) exists and the direct effect (c') is significant (c'=- .167, p<.001) with the same sign as the indirect effect. Thus, the mediation is classified as complementary mediation. Given that the direct effect (a.b) and indirect effect (c') between performance risk and attitudes towards SSTs are not significant, the mediation is classified as no-effect non-mediation. Thus, trust and self-determined motivation play differential mediating roles on the relationships between hedonic,

utilitarian, security factors, and attitudes towards SSTs. The results indicate that hedonic, utilitarian and security factors affect customers' attitudes towards SSTs in different ways. These results further suggest that managers should consider the complicity of the SST co-production process and use an integrated strategy (e.g. enhancing trust and self-determined motivation simultaneously) to nurture positive attitudes in customers.

5.2.4 Chapter Summary and Conclusion

The aim of this chapter is to test the mediating effect of consumer readiness. The results indicate that the hedonic factors perceived control and newness, the utilitarian factors ease of use and usefulness and the security factors perceived anonymity and psychophysical risk were associated with attitudes towards SSTs. Usefulness and psychophysical risk demonstrated the highest impact on attitudes towards SSTs, which led to the conclusion that enhancing the efficiency of SSTs in retailing and reducing the psychological and physical damages perceived by customers can form positive attitudes towards SSTs in customers.

The results also showed that trust and self-determined motivation were positively associated with attitudes towards SSTs. Unexpectedly, ability and role clarity did not show any relationships with attitudes towards SSTs. Thus, the results indicate that consumer trust and self-determined motivation are essential in enhancing customers' positive attitudes towards SSTs in retailing.

The results also indicate that ability and role clarity did not mediate the relationships between hedonic, utilitarian and security factors and attitudes towards SSTs. Only trust and self-determined motivation demonstrated differential mediating effects on the relationships

between hedonic, utilitarian and security factors and attitudes towards SSTs, thus providing support for the importance of the mediating roles of trust and self-determined motivation. However, the prediction based on TRA that attitudes towards SSTs were essential antecedents to the repeated use of SSTs could not be confirmed.

In addition to attitudes towards SSTs being considered as important antecedents to the repeated use of SSTs, satisfaction with SSTs is also found to drive the future use of SSTs. Thus, the mediating effect of consumer readiness on the relationships between hedonic, utilitarian and security factors and satisfaction with SSTs is investigated in the next chapter.

CHAPTER 6

THE MEDIATING EFFECT OF CONSUMER READINESS ON THE RELATIONSHIPS BETWEEN HEDONIC, UTILITARIAN AND SECURITY FACTORS AND SATISFACTION WITH SSTs

6.1 Introduction

In this chapter the third, fourth and fifth parts of the conceptual model discussed in Chapter 3 are discussed. Proposition 3, which states that consumer readiness mediates the relationships between hedonic, utilitarian and security factors and satisfaction with SSTs, is presented. Propositions 4 and 5, which state that (P4) attitudes towards SSTs and (P5) satisfaction with SSTs mediate the relationship between consumer readiness and repeated use of SSTs, are also presented. The chapter investigates the impact of hedonic, utilitarian and security factors on satisfaction with SSTs; the impact of consumer readiness on satisfaction with SSTs; and the mediating effect of consumer readiness on the relationships between hedonic, utilitarian and security factors and satisfaction with SSTs. The impact of attitudes towards SSTs and satisfaction with SSTs on the repeated use of SSTs and the mediating effect of attitudes towards and satisfaction with SSTs on the relationship between consumer readiness and the repeated use of SSTs are also discussed. Conclusions are made at the end of this chapter.

6.2 Results and Discussions

6.2.1 The effects of hedonic, utilitarian and security factors on satisfaction with SSTs

As based on proposition 3, hedonic, utilitarian and security factors were predicted to be

associated with satisfaction with SSTs. The following hypotheses emerged:

H21: There is a positive association between (a) perceived control, (b) newness and satisfaction with SSTs.

H22: There is a positive association between (a) ease of use, (b) usefulness and satisfaction with SSTs.

H23: There is a positive association between (a) perceived anonymity and satisfaction with SSTs, and a negative association between (b) security risk, (c) performance risk, (d) psychological risk and satisfaction with SSTs.

As shown in Table 6.1, the regression equation indicates that perceived control, newness, ease of use, usefulness, perceived anonymity, performance and psychophysical risk accounted for 62.8% of the variance in satisfaction with SSTs.

As hypothesized, the hedonic factors perceived control ($b=.093$, $p<.05$) and newness ($b=.177$, $p<.001$) demonstrated positive effects on satisfaction with SSTs, thus providing support for H21a and H21b. Consistent with the prediction based on Marzocchi and Zammit (2006), Wang (2012), Dabholkar and Bogazzi (2002), Chen and Chen (2009), Yen and Gwinner (2003), Wang (2012) and Dabholkar and Bogazzi (2002), hedonic factors such as perceived control and newness enhanced satisfaction with SSTs in customers. Thus, the results indicate that when customers feel they are in control and that SSTs are progressive, modern and innovative, they feel more satisfied with using them.

Table 6.1

Effects of Hedonic, Utilitarian and Security Factors on Satisfaction with SSTs

Independent Variable		Satisfaction with SSTs			
	Hypotheses	B	S.E.	t-Value	
Perceived Control	H21a:	.093*	.045	2.05	Supported
Newness	H21b:	.177***	.043	4.14	Supported
Ease of Use	H22a:	.212***	.048	4.38	Supported
Usefulness	H22b:	.317***	.048	6.54	Supported
Perceived Anonymity	H23a:	.117**	.044	2.67	Supported
Security Risk	H23b:	- . 012 [a]	.038	- .31	Not Supported
Performance Risk	H23c:	- .133*	.044	- 5.20	Supported
Psychophysical Risk	H23d:	- .230***	.062	- 2.13	Supported
F-ratio		76.994***			
R^2		.636			
Adjusted R^2		.628			

***p<.001 **p<.01 *p<.05 [a]p≤1.0 B-Unstandardized coefficients S.E.- Standard error

The utilitarian factors ease of use (b=.212, p<.001) and usefulness (b=.317, p<.001) were positively associated with satisfaction with SSTs, thus providing support for H22a and H22b. Amongst all factors, usefulness had the strongest relationship with satisfaction with SSTs. Consistent with Dabholkar and Bogazzi (2002) and Meuter et al. (2000), ease of use enhanced customer satisfaction with SSTs. Also consistent with the findings of Liu, Chen and Zhou (2006) and Meuter et al. (2000), usefulness positively influenced satisfaction with SSTs and was a strong predictor of customer satisfaction with SSTs.

Moreover, the security factor perceived anonymity (b=.117, p<.01) positively influenced

satisfaction with SSTs, and performance risk (b=-.133, p<.05) and psychophysical risk (b=-.230, p<.001) negatively influenced satisfaction with SSTs, thus providing support for H23a, H23b and H23d. However, security risk was not associated with satisfaction with SSTs. Thus, H23b was not supported. Contrary to the prediction based on Bhattacherjee (2001), Chen and Chen (2009) and Wang (2012), only psychophysical risk negatively affected the repeated use of SSTs (see Chapter 4), which also negatively influenced satisfaction with SSTs. Security risk negatively affected the repeated use of SSTs (see Chapter 4) but not satisfaction with SSTs. Performance risk negatively influenced satisfaction with SSTs but not repeated use of SSTs (see Chapter 4). Thus, the results only partially support the idea that security factors affect the repeated use of SSTs and influence satisfaction with SSTs.

Overall, the results supported the idea that hedonic and utilitarian factors were associated with satisfaction with SSTs but partially supported the idea that security factors were associated with satisfaction with SSTs. Security risk was not important in the current context. A possible reason may be that customers were used to paying for transactions using bankcards today. They are less aware that their personal details may be known when they use SSTs in retailing. However, psychophysical and performance risk negatively influenced satisfaction with SSTs. Further, usefulness and psychophysical risk demonstrated higher effects on satisfaction with SSTs. In addition to the efficiency of SSTs, the psychological and physical damages of SSTs should also be focused on in retailing; managers should aim to minimize the possibility that SSTs pose any psychological and physical risk to customers. However, only understanding the impact of hedonic, utilitarian and security factors on satisfaction with SSTs is not sufficient, as customers are actually co-producers. Thus, the impact of consumer readiness on satisfaction with SSTs should also be investigated.

6.2.2 The effects of consumer readiness on satisfaction with SSTs

Based on proposition 3, consumer readiness, which is comprised of trust, self-determined motivation, ability and role clarity, was predicted to be associated with satisfaction with SSTs. Thus, the following hypothesis emerged:

H24: There is a positive association between (a) Trust, (b) self-determined motivation, (c) ability,(d) role clarity and satisfaction with SSTs.

Table 6.2

The Effect of Consumer Readiness on Satisfaction with SSTs

Independent Variable					
		Satisfaction with SSTs			
	Hypotheses	B	S.E.	t-Value	
Trust	H24a	.533***	.040	15.45	**Supported**
Self-Determined Motivation	H24b	.221***	.012	5.86	**Supported**
Ability	H24c	.219 ***	.054	5.17	**Supported**
Role Clarity	H24d	.039 [a]	.047	1.02	**Not Supported**
F-ratio		260.880***			
R^2		.746			
Adjusted R^2		.743			

***p<.001 **p<.01 *p<.05 [a]p≤1.0 B-Unstandardized coefficients S.E.- Standard error

Given that satisfaction with SSTs is considered a critical antecedent to the repeated use of SSTs and the impact of consumer readiness on the repeated use of SSTs has been shown in Chapter 4, it is reasonable to expect that consumer readiness also affects satisfaction with SSTs. As shown in Table 6.2, the regression equation indicates that trust, self-determined motivation and ability accounted for 74.3% of the variance in satisfaction with SSTs.

As hypothesized, trust was positively associated with satisfaction with SSTs (b=.533, p<.001). Self-determined motivation (b=.221, p<.001) and ability (b=.219, p<.05) also positively influenced satisfaction with SSTs. Thus, H24a, H24b and H24c were supported. Among all the dimensions of consumer readiness, trust had the closest relationship with satisfaction with SSTs. Contrary to the hypothesis, role clarity did not show any impact on satisfaction with SSTs. Thus, H24d was not supported. The results partially supported the idea that consumer readiness was associated with satisfaction with SSTs.

Consistent with the prediction based on Bhattacherjee (2001), Chen and Chen (2009) and Wang (2012), trust, self-determined motivation and ability positively affected the repeated use of SSTs (see Chapter 4) and enhanced satisfaction with SSTs in retailing. Thus, the results indicate that satisfaction with SSTs may have a close link with the repeated use of SSTs. However, the effect of role clarity was not significant in the current context. A possible reason for this is that the availability of service staff may reduce customers' awareness of the clarity of instructions when they use SSTs. Thus, role clarity was not related to satisfaction with SSTs. In addition to hedonic, utilitarian and security factors, enhancing trust, ability and self-determined motivation is also important to customer satisfaction with SSTs. Given that the impact of hedonic, utilitarian and security factors on consumer readiness was tested in Chapter 4 and the effect of consumer readiness on satisfaction with SSTs is investigated in this chapter, the mediating role of consumer readiness on the relationships between hedonic, utilitarian and security factors and satisfaction with SSTs is further examined below.

6.2.3 The mediating effect of consumer readiness on the relationships between hedonic, utilitarian and security factors and satisfaction with SSTs

The bootstrapping method was used to test the mediating effect of consumer readiness on the relationship between hedonic, utilitarian and security factors and satisfaction with SSTs. The following hypotheses emerged:

H25: Trust significantly mediates the relationships between (a) perceived control, (b) newness, (c) ease of use, (d) usefulness, (e) perceived anonymity, (f) security risk, (g) psychophysical risk, (h) performance risk and satisfaction with SSTs.

H26: Self-determined motivation significantly mediates the relationships between (a) perceived control, (b) newness, (c) ease of use, (d) usefulness, (e) perceived anonymity, (f) security risk, (g) psychophysical risk, (h) performance risk and satisfaction with SSTs.

H27: Ability significantly mediates the relationships between (a) perceived control, (b) newness, (c) ease of use, (d) usefulness, (e) perceived anonymity, (f) security risk, (g) psychophysical risk, (h) performance risk and satisfaction with SSTs.

H28: Role clarity significantly mediates the relationships between (a) perceived control, (b) newness, (c) ease of use, (d) usefulness, (e) perceived anonymity, (f) security risk, (g) psychophysical risk, (h) performance risk and satisfaction with SSTs.

Given that satisfaction with SSTs is predicted to have a close link with the repeated use of SSTs and that the mediating role of consumer readiness on the relationship between hedonic,

utilitarian and security factors and the repeated use of SSTs was tested in Chapter 4, the mediating role of consumer readiness on the relationship between hedonic, utilitarian and security factors and satisfaction with SSTs should also be known. As shown in Table 6.3, trust mediated the relationships between the hedonic factors perceived control and newness and satisfaction with SSTs (H25a: b=.1132, CIs 95% .0566–.1732 and H25b: b=.0479, CIs 95% .0014–.0914). Thus, H25a and H25b were supported. The relationship between the utilitarian factor usefulness and satisfaction with SSTs was also mediated by trust (b=.1656, CIs 95% .1027–.2335), which provided support for H25d. Contrary to the hypotheses, the mediating effect of trust on the relationships between ease of use and satisfaction with SSTs was not significant. Thus, H25c was not supported. Moreover, trust mediated the relationship between the security factor perceived anonymity and satisfaction with SSTs (b=.0596, CIs 95% .0142–.1015), thus providing support for H25e. Contrary to the hypotheses, the mediating effect of trust on the relationships between security, psychophysical and performance risk and satisfaction with SSTs were not significant. Thus, H25f, H25g and H25h were not supported. Consistent with the prediction based on Bhattacherjee (2001), Chen and Chen (2009) and Wang (2012), trust mediated the relationships between the hedonic factors perceived control and newness, the utilitarian factor usefulness and the security factor perceived anonymity and the repeated use of SSTs (see Chapter 4). Trust also mediated the relationship between perceived control, newness, usefulness, perceived anonymity and satisfaction with SSTs. The only exception was that security risk marginally enhanced satisfaction with SSTs through trust, but it did not affect the repeated use of SSTs through the same path. Thus, the results only partially support the idea that trust mediated the relationship between hedonic, utilitarian and security factors and the repeated use of SSTs and satisfaction with SSTs. Nevertheless, the results indicate that trust demonstrated a significant mediating role on the relationship between hedonic, utilitarian and security factors

and satisfaction with SSTs.

Table 6.3

The Mediating Effect of Trust on the Relationships between Hedonic, Utilitarian and Security Factors and Satisfaction with SSTs

Dependent Variable						Satisfaction with SSTs		
Mediator			**Trust**					
Independent Variable	H	**a.b**	S.E.	t-value		CI95% Lower	Upper	
Perceived Control	H25a	**.1132**	.0296	3.824		.0566	.1732	**Supported**
Newness	H25b	**.0479**	.0227	2.110		.0014	.0914	**Supported**
Ease of Use	H25c	**.0141**	.0232	.608	-	.0328	.0621	**Not supported**
Usefulness	H25d	**.1656**	.0336	4.929		.1027	.2335	**Supported**
Perceived Anonymity	H25e	**.0596**	.0215	2.772		.0142	.1015	**Supported**
Security Risk	H25f	- **.0365**	.0202	- 1.807	-	.0800	.0013	**Not supported**
Psychophysical Risk	H25g	- **.0306**	.0312	- .981	-	.0914	.0309	**Not supported**
Performance Risk	H25h	- **.0346**	.0229	- 1.511	-	.0765	.0122	**Not supported**

CI 95% - 95% Confidence Interval
a.b- Indirect effect, H- hypotheses,

As shown in Table 6.4 and as hypothesized, self-determined motivation mediated the relationship between the hedonic factor newness and satisfaction with SSTs (b=.0227, CIs 95% .0058–.0448). Thus, H26a was not supported and H26b was supported. The relationships between the utilitarian factors ease of use and usefulness and satisfaction with SSTs were also mediated by self-determined motivation (H26c: b=.0438, CIs 95% .0197–.0746 and H26d: b=.0270, CIs 95% .0070–.0554), thus providing support for H26c and H26d. The mediating effect of self-determined motivation on the relationship between the security factor psychophysical risk and satisfaction with SSTs was also significant (b=-.0290, CIs 95% -.0660–-.0039). Thus, H26g was supported. However, contrary to the hypothesis, self-determined motivation did not mediate the relationship between the hedonic factor

perceived control and satisfaction with SSTs. The mediating effects of self-determined motivation on the relationships between the security factors perceived anonymity, security risk and performance risk and satisfaction with SSTs were also not significant. Thus, H26a, H26e, H26f and H26h were not supported.

Consistent with the prediction based on Bhattacherjee (2001), Chen and Chen (2009) and Wang (2012), the hedonic factor newness, the utilitarian factors ease of use and usefulness and the security factor psychophysical risk influenced the repeated use of SSTs (see Chapter 4) and affected satisfaction with SSTs through self-determined motivation. Thus, the results support the idea that satisfaction with SSTs may be an important determinant of the repeated use of SSTs.

Table 6.4

The Mediating Effect of Self-Determined Motivation on the Relationships between Hedonic, Utilitarian and Security Factors and Satisfaction with SSTs

Dependent Variable						Satisfaction with SSTs		
Mediator			**Self-Determined Motivation**					
						CI95%		
Independent Variable	H	**a.b**	S.E.	t-value		Lower	Upper	
Perceived Control	H26a	**.0127**	.0098	1.296	-	.0040	.0340	**Not supported**
Newness	H26b	**.0227**	.0104	2.183		.0058	.0448	**Supported**
Ease of Use	H26c	**.0438**	.0147	2.980		.0197	.0746	**Supported**
Usefulness	H26d	**.0270**	.0125	2.160		.0070	.0554	**Supported**
Perceived Anonymity	H26e	- **.0137**	.0097	- 1.412	-	.0358	.0042	**Not supported**
Security Risk	H26f	- **.0136**	.0085	- 1.600	-	.0318	.0020	**Not supported**
Psychophysical Risk	H26g	- **.0290**	.0161	- 1.801	-	.0660	- .0039	**Supported**
Performance Risk	H26h	- **.0054**	.0091	- .593	-	.0240	.0135	**Not supported**

CI 95% - 95% Confidence Interval
a.b- Indirect effect, H- hypotheses,

As shown in Table 6.5 and as hypothesized, ability mediated the relationship between the utilitarian factor ease of use and satisfaction with SSTs (b=.0914, CIs 95% .0449–.1529), which provided support for H27c. Ability also mediated the relationship between the security factor perceived anonymity and satisfaction with SSTs (b=.0236, CIs 95% .0017–.0509), thus providing support for H27e. The relationship between psychophysical risk and satisfaction with SSTs was also mediated by ability (b=-.0601, CIs 95% -.1190–-.0182), which provided support for H27g. However, contrary to the hypotheses, ability did not mediate the relationships between the hedonic factors perceived control and newness and satisfaction with SSTs. Thus, H27a and H27b were not supported. Also contrary to the hypothesis, the relationship between usefulness and satisfaction with SSTs was not mediated by ability. Thus, H27d was not supported. Ability also did not mediate the relationship between security risk, performance risk and satisfaction with SSTs. Thus, H27f and H27h were not supported.

Consistent with the prediction based on Bhattacherjee (2001), Chen and Chen (2009) and Wang (2012), ease of use, perceived anonymity and psychophysical risk affected the repeated use of SSTs through ability (see Chapter 4) and influenced satisfaction with SSTs through the same path. Thus, the results support the idea that satisfaction with SSTs may have a close link with the repeated use of SSTs.

Contrary to the hypotheses, the mediating effects of role clarity on the relationships between hedonic, utilitarian and security factors and satisfaction with SSTs were not significant (Table 6.6). The results further indicate that role clarity was not an important factor in the current context. It did not influence the repeated use of SSTs (see Chapter 4), attitudes towards SSTs (see Chapter 5) or satisfaction with SSTs.

Table 6.5

The Mediating Effect of Ability on the Relationships between Hedonic, Utilitarian and Security Factors and Satisfaction with SSTs

Dependent Variable						Satisfaction with SSTs		
Mediator			**Ability**					
Independent Variable	H	**a.b**	S.E.	t-value		CI95% Lower	Upper	
Perceived Control	H27a	**.0038**	.0124	.306	-	.0219	.0284	**Not supported**
Newness	H27b	**.0172**	.0150	1.147	-	.0095	.0506	**Not supported**
Ease of Use	H27c	**.0914**	.0268	3.410		.0449	.1529	**Supported**
Usefulness	H27d	**.0202**	.0166	1.217	-	.0103	.0550	**Not supported**
Perceived Anonymity	H27e	**.0236**	.0127	- 1.858		.0017	.0509	**Supported**
Security Risk	H27f	- **.0193**	.0123	- 1.569	-	.0463	.0028	**Not supported**
Psychophysical Risk	H27g	- **.0601**	.0253	- 2.375	-	.1190	- .0182	**Supported**
Performance Risk	H27h	**.0189**	.0117	- 1.615	-	.0015	.0454	**Not supported**

CI 95% - 95% Confidence Interval
a.b- Indirect effect, H- hypotheses,

Table 6.6

The Mediating Effect of Role Clarity on the Relationships between Hedonic, Utilitarian and Security Factors and Satisfaction with SSTs

Dependent Variable						Satisfaction with SSTs		
Mediator			**Role Clarity**					
Independent Variable	H	**a.b**	S.E.	t-value		CI95% Lower	Upper	
Perceived Control	H28a	**.0034**	.0050	.680	-	.0065	.0138	**Not supported**

(Table 6.6 continues)

(Table 6.6 continued)

Dependent Variable										Satisfaction with SSTs		
Mediator				**Role Clarity**								
Independent Variable	H		**a.b**	S.E.		t-value		CI95% Lower	Upper		
Newness	H28b	-	**.0013**	.0035	-	.371	-	.0096	.0048	**Not supported**
Ease of Use	H28c		**.0182**	.0218		.835	-	.0262	.0596	**Not supported**
Usefulness	H28d		**.0040**	.0060		.667	-	.0064	.0174	**Not supported**
Perceived Anonymity	H28e		**.0022**	.0041		.537	-	.0033	.0137	**Not supported**
Security Risk	H28f	-	**.0007**	.0029	-	.241	-	.0076	.0049	**Not supported**
Psychophysical Risk	H28g	-	**.0048**	.0085	-	.565	-	.0266	.0090	**Not supported**
Performance Risk	H28h		**.0060**	.0072		.833	-	.0099	.0201	**Not supported**

CI 95% - 95% Confidence Interval
a.b- Indirect effect, H- hypotheses,

Overall, the results only partially supported the idea that consumer readiness mediates the relationships between hedonic, utilitarian and security factors and satisfaction with SSTs, but trust, self-determined motivation and ability played mediating roles on the relationship between hedonic, utilitarian and security factors and satisfaction with SSTs. Thus, in addition to the hedonic, utilitarian and security factors of SSTs, managers should also focus on enhancing trust, ability and self-determined motivation of customers to increase the future use of SSTs.

The mediating effects of trust, self-determined motivation and ability were further classified. Table 6.7 shows that trust mediated the relationship between perceived control and satisfaction with SSTs, thus the indirect effect (a.b) exists and the direct effect (c') is not significant. Therefore, the mediation is classified as indirect-only mediation. Trust and self-determined motivation mediated the relationship between newness and satisfaction with

SSTs, thus the indirect effect (a.b) exists and the direct effect (c') is significant (c'=.091, p<.01) with the same sign as the indirect effect. Thus, the mediation is classified as complementary mediation. Given that self-determined motivation and ability mediated the relationship between ease of use, the indirect effect (a.b) exists and the direct effect (c') is not significant, the mediation is classified as indirect-only mediation. Trust and self-determined motivation mediated the relationship between usefulness and satisfaction with SSTs, thus the indirect effect (a.b) exists and the direct effect (c') is significant (c'=.100, p<.05) with the same sign as the indirect effect. Thus, the mediation is classified as complementary mediation. Since trust and ability mediated the relationship between perceived anonymity and satisfaction with SSTs, the indirect effect (a.b) exists but the direct effect (c') is not significant, the mediation is classified as indirect-only mediation. Given that the indirect effect (a.b) does not exist, and the direct effect (c') was significant (c'=.058, p<.05) on the relationship between security risk and satisfaction with SSTs, the mediation is classified as direct-only non-mediation. Self-determined motivation and ability mediated the relationship between psychophysical risk and satisfaction with SSTs, thus the indirect effect (a.b) exists and the direct effect (c') is not significant with the same sign as the indirect effect. Thus, the mediation is classified as indirect-only mediation. As the indirect effect (a.b) does not exist and direct effect (c') is not significant in the relationship between performance risk and satisfaction with SSTs, the mediation is classified as direct-only non-mediation. Thus, trust, self-determined motivation and ability played differential mediating roles on the relationships between hedonic, utilitarian, security factors, and satisfaction with SSTs. When the results in Tables 6.7 and 4.7 are compared, similar mediating roles of trust, self-determined motivation and ability are found between the hedonic, utilitarian and security factors and the repeated use of SSTs (see Table 4.7) as well as between the hedonic, utilitarian and security factors and satisfaction with SSTs (see Table 6.7). Therefore, the ways in which hedonic, utilitarian

Table 6.7

Classification of Mediation of Dimensions of Consumer Readiness on the Relationships between Hedonic, Utilitarian and Security Factors and Satisfaction with SSTs

Dependent Variable	**Satisfaction With SSTs**								
Independent Variable	**c**	**c'**	**t-value(c')**	**S.E.(c')**	**(c') p value**	**a.b**	**Sign Direction**	**Mediation**	**Mediator**
Perceived Control	.093*	- .040 [a]	- 1.12	.04	.260	Exist (+)	Opposite	Indirect-Only	Trust
Newness	.177***	.091**	2.77	.03	.010	Exist (+)	same	Complementary	Trust, SDM
Ease of Use	.212***	.044 [a]	1.30	.04	.290	Exist (+)	same	Indirect-Only	SDM, Ability
Usefulness	.317***	.100*	2.54	.04	.010	Exist (+)	same	Complementary	Trust, SDM
Perceived Anonymity	.117**	.045 [a]	1.34	.03	.180	Exist (+)	same	Indirect-Only	Trust, Ability
Security Risk	- .012 [a]	.058*	1.99	.03	.050	Not exist	opposite	Direct-Only	Nil
Psychophysical Risk	- .133*	- .008 [a]	- .17	.05	.870	Exist (-)	same	Indirect-Only	SDM, Ability
Performance Risk	- .230***	- .215***	- 6.33	.03	.001	Not exist	opposite	Direct-Only	Nil
F-ratio	76.994***	114.934***							
R^2	.636	.799							
Adjusted R^2	.628	.792							

***p<.001 **p<.01 *p<.05 [a]≤1.0

CI 95% - 95% Confidence Interval

c- Total effect, c' - Direct effect, a.b - Indirect effect, SDM- Self-determine motivation

and security factors influence customers' satisfaction with SSTs and the repeated use of SSTs are similar. Thus, when managers formulate integrated strategies to enhance the repeated use of SSTs, such strategies are likely to enhance satisfaction with SSTs in retailing. As the mediating roles of dimensions of consumer readiness are known, the importance of attitudes towards SSTs and satisfaction with SSTs on the repeated use of SSTs will be explored in the following section.

6.2.4 The relationships between attitudes towards SSTs, satisfaction with SSTs and the repeated use of SSTs

Based on propositions 4 and 5, which state that (P4) attitudes towards SSTs and (P5) satisfaction with SSTs mediate the relationship between consumer readiness and the repeated use of SSTs, the relationships between attitudes towards, satisfaction with, and the repeated use of SSTs were predicted. Thus, the following hypothesis emerged.

H29: There is an association between (a) attitudes towards SSTs, (b) satisfaction with SSTs and the repeated use of SSTs.

Attitudes towards and satisfaction with SSTs are predicted to be critical determinants of the repeated use of SSTs; thus, the effects of attitudes towards and satisfaction with SSTs are investigated. As shown in Table 6.2, the regression equation indicates that attitudes towards SSTs and satisfaction with SSTs accounted for 83.7% of the variance in the repeated use of SSTs.

Table 6.8

The Effect of Attitudes towards SSTs and Satisfaction with SSTs on the Repeated Use of SSTs

Independent Variable					
		Repeated use of SSTs			
	Hypotheses	B	S.E.	t-Value	
Attitudes Towards SSTs	H29a	.649***	.036	7.35	**Supported**
Satisfaction with SSTs	H29b	.263***	.036	17.80	**Supported**
F-ratio		922.47***			
R^2		.837			
Adjusted R^2		.837			

***p<.001 **p<.01 *p<.05 [a]p≤1.0 B-Unstandardized coefficients S.E.- Standard error

As hypothesized, attitudes towards SSTs and satisfaction with SSTs positively influenced the repeated use of SSTs (H29a: b=.649, p<.001 and H29b: b=.263, p<.001), thus providing support for H29a and H29b. However, attitudes towards SSTs had a stronger impact on the repeated use of SSTs than satisfaction with SSTs.

Consistent with the prediction based on TRA and the findings from Dabholkar and Bagozzi (2002) and Wang and Namen (2004), attitudes towards SSTs demonstrated positive effects on the repeated use of SSTs. Satisfaction with SSTs positively affected the repeated use of SSTs, which was consistent with the findings of Bhattacherjee (2001) and Chen and Chen (2009). Thus, when customer positive attitudes towards SSTs are formed and customers feel more satisfied, they are more likely to use SSTs in retailing in the future. Given that the effect of consumer readiness on attitudes towards and satisfaction with SSTs were tested in Chapters 5 and 6 and attitudes towards and satisfaction with SSTs both demonstrated positive effects on the repeated use of SSTs, their mediating roles on the relationship between consumer readiness and the repeated use of SSTs will be investigated and discussed below.

6.2.5 The mediating effects of attitudes towards SSTs and satisfaction with SSTs on the relationship between consumer readiness and the repeated use of SSTs

Based on propositions 4 and 5, which state that (P4) attitudes towards and (P5) satisfaction with SSTs mediate the relationship between consumer readiness and the repeated use of SSTs, the following hypotheses emerged.

H30: Attitudes towards SSTs significantly mediate the relationships between (a) trust, (b) self-determined motivation, (c) ability, (d) role clarity and the repeated use of SSTs.

H31: Satisfaction with SSTs significantly mediates the relationships between (a) trust, (b) self-determined motivation, (c) ability, (d) role clarity and the repeated use of SSTs.

As shown in Table 6.9, attitudes towards SSTs mediated the relationships between trust, self-determined motivation and the repeated use of SSTs (H30a: b=.4387, CI95% .3520–.5329 and H30b: b=.0416, CI95% .0252–.0601), thus providing support for H30a and H30b. However, contrary to the hypotheses, attitudes towards SSTs did not mediate the relationships between ability, role clarity and the repeated use of SSTs. Thus, H30c and H30d were not supported.

Consistent with the prediction based on TRA (Ajzen & Fishbein, 1980), trust and self-determined motivation influenced the repeated use of SSTs through attitudes towards SSTs. However, contrary to the prediction, ability positively influenced the repeated use of SSTs (see Chapter 4) but not through attitudes towards SSTs. Thus, the results only partially supported the idea that attitudes towards SSTs are critical antecedents of the repeated use of

SSTs. Such mixed results suggest that forming positive attitudes towards SSTs may not be an essential condition for the continued use of SSTs by customers in retailing. This may be the case especially when customers are confident enough to use SSTs.

Table 6.9

The Mediating Effect of Attitudes towards SSTs on the Relationships between Consumer Readiness and Repeated use of SSTs

Dependent Variable						Repeated Use of SSTs		
Mediator			**Attitudes Towards SSTs**					
						CI95%		
Independent Variable	H	**a.b**	S.E.	t-value		Lower	Upper	
Trust	H30a	**.4387**	.0441	9.948		.3520	.5329	**Supported**
Self-determined motivation	H30b	**.0416**	.0087	4.782		.0252	.0601	**Supported**
Ability	H30c	**.0385**	.0346	1.113	-	.0293	.1085	**Not supported**
Role Clarity	H30d	**.0234**	.0252	.929	-	.0252	.0733	**Not supported**

CI 95% - 95% Confidence Interval
a.b- Indirect effect, H- hypotheses,

As shown in Table 6.10, satisfaction with SSTs significantly mediated the relationships between trust (b=.1020, CI95% .0492–.1617), self-determined motivation, ability and the repeated use of SSTs (H31b: b=.0118, CI95% .0054–.0185 and H31c: b=.0460, CI95% .0198–.0805), thus providing support for H31a, H31b and H31c. However, it did not mediate the relationship between role clarity and the repeated use of SSTs. Thus, H31d was not supported. Consistent with the prediction based on Bhattacherjee (2001) and Chen and Chen (2009), dimensions of consumer readiness such as trust, self-determined motivation and ability positively affected the repeated use of SSTs through satisfaction with SSTs. Thus, the results indicate that satisfaction with SSTs was an important antecedent of the repeated use of SSTs, but role clarity was not an important factor in retailing.

Table 6.10

The Mediating Effect of Satisfaction with SSTs on the Relationships between Consumer Readiness and the Repeated Use of SSTs

Dependent Variable					Repeated Use of SSTs		
Mediator		**Satisfaction with SSTs**					
					CI95%		
Independent Variable	H	**a.b**	S.E.	t-value	Lower	Upper	
Trust	H31a	**.1020**	.0291	3.505	.0492	.1617	**Supported**
Self-determined motivation	H31b	**.0118**	.0034	3.471	.0054	.0185	**Supported**
Ability	H31c	**.0460**	.0160	2.875	.0198	.0805	**Supported**
Role Clarity	H31d	**.0079**	.0094	.840	- .0082	.0292	**Not supported**

CI 95% - 95% Confidence Interval
a.b- Indirect effect, H- hypotheses,

To further classify the mediation of attitudes towards and satisfaction with SSTs on the relationship between consumer readiness and the repeated use of SSTs, Zhao, Lynch and Chen's (2010) mediation classification scheme was used. As seen in Table 6.11, attitudes towards and satisfaction with SSTs mediated the relationship between trust and the repeated use of SSTs; thus, the indirect effect (a.b) exists and the direct effect (c') is significant (c'=.134, p<.01) with the same sign as the indirect effect. Therefore, the mediation is classified as complementary mediation. Given that attitudes towards and satisfaction with SSTs also mediated the relationship between self-determined motivation and the repeated use of SSTs, the indirect effect (a.b) exists and the direct effect (c') is not significant, the mediation is classified as indirect-only mediation. Satisfaction with SSTs mediated the relationship between ability and the repeated use of SSTs, thus the indirect effect (a.b) exists

Table 6.11

Classification of Mediation of Attitudes towards and Satisfaction with SSTs on the Relationships between Consumer Readiness and the Repeated Use of SSTs

Dependent Variable	**Repeated Use of SSTs**								
Independent Variable	**c**	**c'**	**(c') t-alue**	**(c') S.E.**	**(c') p value**	**a.b**	**Sign Direction**	**Mediation**	**Mediator**
Trust	.675***	.134**	3.04	.04	.001	Exist (+)	same	Complementary	Attitudes, Satisfaction
Self-determined motivation	.045*** -	.008 [a] -	.85	.01	.400	Exist (+)	opposite	Indirect-Only	Attitudes, Satisfaction
Ability	.244***	.160***	3.91	.04	.001	Exist (+)	same	Complementary	Satisfaction
Role Clarity	.010 [a] -	.021 [a] -	.63	.03	.530	Not Exist	Nil	No-effect	Nil
F-ratio	241.809***	332.181***							
R^2	.731	.849							
Adjusted R^2	.728	.847							

***p<.001 **p<.01 *p<.05 [a]p≤1.0

CI 95% - 95% Confidence Interval

c- Total effect, c' - Direct effect, a.b - Indirect effect

Attitudes- Attitudes Towards SSTs, Satisfaction - Satisfaction with SSTs

and the direct effect (c') is significant (c'=.160, p<.001) with the same sign as the indirect effect. Thus, the mediation is classified as complementary mediation. Neither the indirect effect (a.b) nor the direct effect (c') were significant in the relationship between role clarity and the repeated use of SSTs. Thus, the mediation is classified as no-effect non-mediation. Thus, attitudes towards and satisfaction with SSTs played differential mediating roles on the relationships between consumer readiness and repeated use of SSTs.

The results partially support propositions 3 and 4, which state that attitudes towards SSTs and satisfaction with SSTs mediate the relationship between consumer readiness and the repeated use of SSTs. Consistent with the findings shown in Chapters 5 and 6, role clarity was not an important factor in the current context since service personnel may be available to help customers clarify the steps and procedures for using SSTs in retailing. The results indicate that trust and self-determined motivation positively influenced the repeated use of SSTs through attitudes towards and satisfaction with SSTs, and ability positively affected the repeated use of SSTs through satisfaction with SSTs. Thus, attitudes towards and satisfaction with SSTs played differential mediating roles on the relationship between consumer readiness and the repeated use of SSTs and only partially supported the idea that attitudes towards and satisfaction with SSTs are essential antecedents to the repeated use of SSTs. However, in addition to enhancing consumer readiness, customer satisfaction with and attitudes towards SSTs should also be enhanced in order to increase the repeated use of SSTs in retailing.

6.2.6 Chapter Summary

In this chapter, the mediating effect of consumer readiness on the relationships between

hedonic, utilitarian and security factors and satisfaction with SSTs was investigated. The results indicate that perceived control, newness, ease of use, usefulness and perceived anonymity demonstrated positive effects on satisfaction with SSTs; performance risk and psychophysical risk were negatively associated with satisfaction with SSTs. Security risk was not related to satisfaction with SSTs. Usefulness and psychophysical risk had the strongest relationship with satisfaction with SSTs.

Trust, self-determined motivation and ability demonstrated positive effects on satisfaction with SSTs. Trust mediated the relationship between perceived control, newness, usefulness, perceived anonymity and satisfaction with SSTs. Self-determined motivation mediated the relationships between newness, ease of use, usefulness, perceived anonymity, psychophysical risk and satisfaction with SSTs; ability mediated the relationships between ease of use, perceived anonymity, psychophysical risk and satisfaction with SSTs. These results show that consumer readiness played a significant mediating role on the relationships between hedonic, utilitarian and security factors and satisfaction with SSTs.

The mediating effects of attitudes towards SSTs and satisfaction with SSTs on the relationship between consumer readiness and the repeated use of SSTs were also presented. Attitudes towards SSTs and satisfaction with SSTs were positively associated with satisfaction with SSTs. Attitudes towards SSTs mediated the relationships between trust, self-determined motivation and satisfaction with SSTs; satisfaction with SSTs mediated the relationships between trust, self-determined motivation, ability and satisfaction with SSTs. These results suggest that the relationship between consumer readiness and the repeated use of SSTs was mediated by attitudes towards SSTs and satisfaction with SSTs. Thus, enhancing attitudes towards SSTs and satisfaction with SSTs is important to enhancing the repeated use

of SSTs in retailing.

As the mediating roles of trust, self-determined motivation, ability and role clarity were examined in Chapters 4–6, the hierarchical relationships between hedonic, utilitarian and security factors; consumer readiness; attitudes towards, satisfaction with and the repeated use of SSTs should also be tested. Thus, an integrated co-production model will be presented and discussed in the next chapter.

CHAPTER 7

THE INTEGRATED CO-PRODUCTION MODEL

7.1 Introduction

To further understand the process of SST co-production at the stage of repeated use of SSTs, a holistic view using structural equation modelling (SEM) is adopted in this chapter. This allows for further investigation of the relationships between the independent variables: hedonic, utilitarian and security factors; the mediators: consumer readiness, attitude towards and satisfaction with SSTs; and the dependent variable: the repeated use of SSTs. Propositions 1 through 5 were further tested using SEM to understand the hierarchical relationships among these major study constructs.

SEM is used to estimate the causal relationships between variables. A structural model explains how well some variables predict other variables (Hoyle, 1995; Blunch, 2010). Structural equation models are a combination of regression and path models that predict the relationships between variables (Schumacher & Lomax, 1996; Blunch, 2010; Hair et al., 2010). In SEM, latent variables are variables that are not measured directly but are only estimated in the model and a single latent construct is allowed to be associated with multiple measures (Blunch, 2010; Hair et al., 2010). A structural equation model assesses the structure of the covariance matrix of the measures (Doncaster & Davey, 2007) and is considered a plausible explanation for the relationships between measures when two matrices are consistent with one another (Doncaster & Davey, 2007). Structural equation modelling is a confirmatory rather than an exploratory model and is suitable for theory testing rather than new theory development (Bray & Maxwell, 1985; Rigdon, 1998; Hair et al., 2010), and it is

used to model the relationship between latent variables (Bray & Maxwell, 1985; Blunch, 2010; Hair et al., 2010). Thus, SEM is appropriate for the current study to investigate the hierarchical relationships between hedonic, utilitarian and security factors; consumer readiness; attitudes towards and satisfaction with SSTs; and the repeated use of SSTs.

7.2 Results and Discussions

7.2.1 The integrated co-production model

Hedonic, utilitarian and security factors; consumer readiness; attitudes towards, satisfaction with and repeated use of SSTs formed a second-order model in this section. In a second-order model, first-order variables are related to second-order latent variables (Koufteros, Babbar, & Kaighobadi, 2009). Higher-order modelling is used when constructs are highly related and can be meaningfully conceptualized at a higher order of abstraction (Koufteros, Babbar, & Kaighobadi, 2009). Higher-order modeling can be used to reduce methodological problems in empirical studies. For example, if highly correlated constructs are not meaningfully conceptualized at a higher order of abstraction, these constructs may not produce a "clean" factor structure when entering into a model because the results may be subject to multicollinearity. Higher-order models not only retain the idiosyncratic nature of each first-order construct but also avoid multicollinearity from highly correlated constructs in a model (Koufteros, Babbar, & Kaighobadi, 2009)

According to Bagozzi & Heatherton (1994) and Goldstein (2011), four aggregation approaches can be taken in higher-order modelling: total and partial aggregation and total and partial disaggregation. Total aggregation is the summation of all items into single indicators

that are then related to the second-order variables. Total disaggregation is taking each individual item as an individual indicator that is then related to first-order latent variables, which are further related to second-order latent variables. Partial disaggregation is the random summation of multiple items into two indicators that are then related to first-order latent variables and then further related to second-order latent variables. Partial aggregation is the summation of items into subsets of indicators that are then related to first-order latent variables, which are further related to second-order latent variables. The drawback of total and partial aggregations is that information is lost and the distinctiveness of the components is obscured (Bagozzi & Foxall, 1996; Hox, 2010). The disadvantages of total and partial disaggregation are that the approaches are sensitive to measurement errors and it is difficult to obtain satisfactory model fits (Bagozzi & Foxall, 1996; Goldstein, 2011). Gerbing and Anderson (1993) also indicated that more indicators reduce model fit. As the sample size in the current study is not large (N=361), SEM requirements call for an optimal approach to be used to reduce the sensitivity of the structural model to the measurement errors.

Gerbing and Anderson (1984, 1988) and Hox (2010) suggested that partial aggregation should be used as it brings the benefits of total disaggregation and it minimizes the disadvantages of total and partial disaggregation. Chen, West and Sousa (2006) also suggested that choosing appropriate methods of second-order modelling is primarily based on the motivation and central scientific interest. Partial aggregation acknowledges the multidimensional nature of higher-order factors while maintaining the basic information of variance. Partial aggregation also produces more nearly continuous indicators that better approximate the continuous assumption of structural equation analysis (Joreskog & Sorbom, 1996; Goldstein, 2011). Moreover, summed indicators also reduce the size of the input covariance matrix and the asymptotic incorrectness of the input covariance matrix for a given

sample size. Thus, it facilitates the use of smaller sample sizes. Thus, after justifying different second-order approaches, partial aggregation was chosen as the appropriate technique for constructing higher-order models in the current study.

After adding and averaging the indicator items (Setton, Bennett, & Liden, 1996; Williams & Hazer, 1986; Williams, Malos, & Palmer, 2002), perceived control and newness were related to the latent construct of hedonic factors in the model. The indicators ease of use and usefulness were related to the latent construct of utilitarian factors. The indicators perceived anonymity, security risk, performance risk and psychophysical risk were also related to the latent construct of security factors, whereas the indicators trust, self-determined motivation, ability and role clarity were related to the latent construct of consumer readiness in the model. To form a structural equation model, the hedonic, utilitarian and security factors were then related to consumer readiness, whilst consumer readiness was then related to attitudes towards, satisfaction with and repeated use of SSTs. Attitudes towards and satisfaction with SSTs were then related to the repeated use of SSTs. The discriminant validity of the latent constructs were tested, most square roots of AVEs were higher than the correlations, but the square root of AVE of hedonic factors (.70) is lower than its correlation with consumer readiness (.83), the square root of AVE of consumer readiness (.82) is lower than its correlation with attitudes towards SSTs (.94) and the square root of AVE of consumer readiness (.83) is lower than its correlation with satisfaction with SSTs (.96). However, the chi-square difference test suggests that the differences between the unconstrained models and constrained models of latent constructs were not significant. For example, the chi-square difference between hedonic factors and consumer readiness was ($\chi 2$ =39.125, df = 1, p = .001), between consumer readiness and attitudes towards SSTs was ($\chi 2$ =29.498, df = 1, p = .001) and between consumer readiness and satisfaction was ($\chi 2$ =17.782, df = 1, p = .001),

suggesting that the discriminant validity of the latent constructs was sufficient.

Initially, the model was estimated to result in an unacceptable model fit ($\chi2$ (178)=928.21, p<.001), $\chi2$/df=5.12, RMSEA=.108, GFI=.78, AGFI=.71, NFI=.88, CFI=.90, IFI .90 and TLI=.88. According to the suggestions of MIs, correlations between error variances were added that resulted in performance risk being removed to improve model fit. This resulted in an acceptable model ($\chi2$ (149)=557.07, p<.001), $\chi2$/df=3.74, RMSEA=.087, GFI=.86, AGFI=.81, NFI=.92, CFI=.94, IFI .94 and TLI=.93 (Hu and Bentler, 1999; Koufteros & Marcoulides, 2006). The integrated co-production model indicates that hedonic, utilitarian and security factors accounted for 82% of the variance in consumer readiness. The results indicate that hedonic, utilitarian and security factors and consumer readiness accounted for 87% of the variance in attitudes towards SSTs and 85% of the variance in satisfaction with SSTs; hedonic, utilitarian and security factors, consumer readiness, attitudes towards and satisfaction with SSTs accounted for 99% of the variance in the repeated use of SSTs. The factor loadings for trust, self-determined motivation, ability and role clarity on consumer readiness were higher than .50, and the t-values were 10.69, 12.61, 13.01 and 12.31. The t-values were substantial and highly significant (p<.001). Thus, trust, self-determined motivation, ability and role clarity significantly loaded on a single latent variable, which was labelled consumer readiness. Figure 7.1 shows a diagrammed representation of the integrated co-production model. The direct, indirect and total effects of the constructs are shown in Table 7.1.

Figure 7.1 The Integrated Co-Production Model

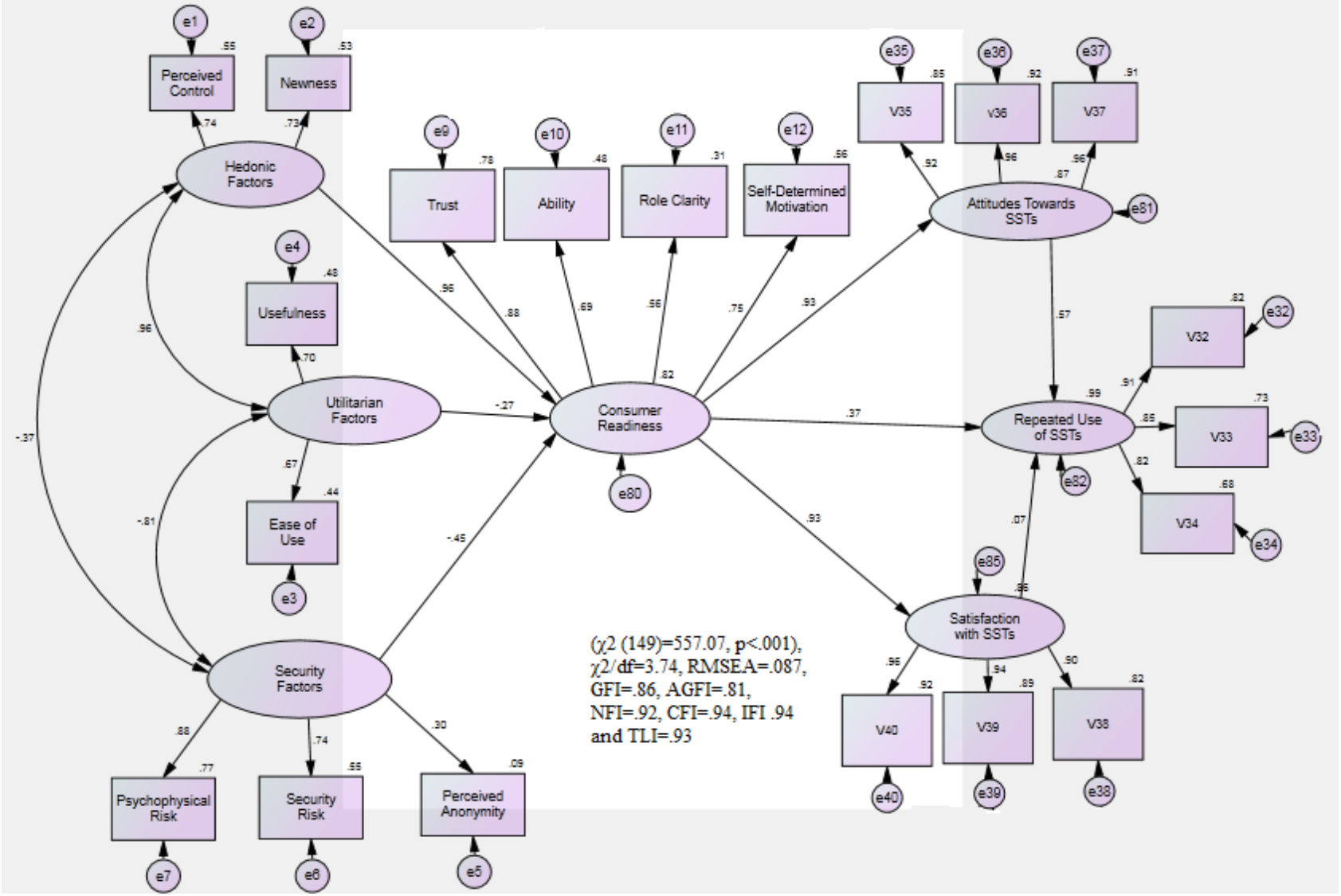


Table 7.1

Direct, Indirect and Total Effects of Constructs

Construct	Hypotheses	Direct Effects	t-Value		Hypotheses	Indirect Effects	t-Value		Total Effects	t-Value
Predicting Consumer Readiness										
Hedonic Factors	H32a	.959***	4.184	Supported		.000	.000		.959***	3.016
Utilitarian Factors	H32b	- .272 [a]	-.819	Not supported		.000	.000		- .272 [a]	-.579
Security Factors	H32c	- .449*	-2.164	Supported		.000	.000		- .449***	-1.682
Predicting Attitudes Toward SSTs										
Hedonic Factors		.000	.000		H35a	.896***	3.027	Supported	.896***	3.027
Utilitarian Factors		.000	.000		H35b	- .254 [a]	-.580	Not supported	- .254 [a]	-.580
Security Factors		.000	.000		H35c	- .419***	-1.690	Supported	- .419***	-1.690
Consumer Readiness	H33a	.934***	23.220	Supported		.000	.000		.934***	71.850
Predicting Satisfaction with SSTs										
Hedonic Factors		.000	.000		H36a	.890***	3.000	Supported	.890***	3.007
Utilitarian Factors		.000	.000		H36b	- .253 [a]	-.580	Not supported	- .253 [a]	-.580
Security Factors		.000	.000		H36c	- .419***	-1.690	Supported	- .417***	-1.682
Consumer Readiness	H33b	.928***	21.627	Supported		.000	.000		.928***	61.870
Predicting Repeated Use of SSTs										
Hedonic Factors		.000	.000		H34a	.932***	3.036	Supported	.932***	3.036
Utilitarian Factors		.000	.000		H34b	- .265 [a]	.581	Not supported	- .265 [a]	-.581
Security Factors		.000	.000		H34c	- .436***	1.690	Supported	- .436***	-1.690
Consumer Readiness	H33c	.374**	2.741	Supported	H38a	.597***	3.953	Supported	.972***	69.430
					H38b	.000	.000	Not supported		
Attitudes Toward SSTs	H37a	.573***	6.536	Supported		.000	.000		.573***	5.306
Satisfaction	H37b	.067 [a]	.822	Not supported		.000	.000		.067 [a]	.728

***p<.001 **p<.01 *p<.05 [a] p≤1.0

7.2.2 The mediating effect of consumer readiness on the relationships between hedonic, utilitarian and security factors and attitudes towards, satisfaction with and repeated use of SSTs

Propositions 1, 2 and 3 posit that consumer readiness mediates the relationships between hedonic, utilitarian and security factors and attitudes towards, satisfaction with and repeated use of SSTs. Thus, the following hypotheses emerged:

H32: There is an association between (a) hedonic, (b) utilitarian, (c) security factors and consumer readiness.

H33: There is an association between consumer readiness and (a) attitudes towards, (b) satisfaction with, and (c) repeated use of SSTs.

H34: Consumer readiness mediates the relationship between (a) hedonic, (b) utilitarian and (c) security factors and the repeated use of SSTs.

H35: Consumer readiness mediates the relationship between (a) hedonic, (b) utilitarian and (c) security factors and attitudes towards SSTs.

H36: Consumer readiness mediates the relationship between (a) hedonic, (b) utilitarian and (c) security factors and satisfaction with SSTs.

As shown in Table 7.1, hedonic factors positively and security factors negatively influenced consumer readiness (H32a: β=.959, $p<.001$ and H32c: β=-.449, $p<.05$), thus providing

support for H32a and H32c, respectively. However, utilitarian factors were not associated with consumer readiness. Thus, H32b was not supported. Consistent with the prediction based on Collier and Sherrell (2010), Meuter et al. (2005), Hahn and Kim (2009), Lee and Lin (2009), Mayer, Davis and Schoorman (1995), Oh et al. (2013), Lu, Wang and Hayes (2012), Kim, Kim and Hwang (2009), Dabholkar (1996), Rish, Rodie and Schultz-Kleine (2000) and Harrison and Smith (2004), hedonic factors were positively associated with consumer readiness. However, the results were contrary to the prediction that utilitarian factors did not influence consumer readiness, which was based on Wen, Prybutok and Xu (2011), Meuter et al. (2005), Hahn and Kim (2009), Lee and Lin (2009), Jaasma and Koper (1999), Sargeant and Lee (2004), Igbaria and Ilvari (1995), Ramayah and Aafaqi (2004), Meuter et al. (2005), Abel and Larkin (1990), Bohlin and Hung (1995), Mamassis and Doganis (2004) and Harrison and Smith (2004). Security factors negatively influenced consumer readiness, which was consistent with the prediction based on Morgan and Hunt (1994), Zinkhan and Karande (1991), Jaasma and Koper (1999), Sargeant and Lee (2004), Hahn and Kim (2009), Lee and Lin (2009), Mayer, Davis and Schoorman (1995), Harrison and Smith (2004), Joinson (1999), Abel and Larkin (1990), Bohlin and Hunt (1995), Mamassis and Doganis (2004), Shore and Shannon (2007) and Zakaria and Nordin (2008). The results indicate that hedonic factors enhanced consumer readiness while security factors decreased it. However, utilitarian factors did not influence consumer readiness in retailing.

Consumer readiness also demonstrated a positive effect on attitudes towards SSTs (H33a: β=.939, p<.001), satisfaction with SSTs (H33b: β=.928, p<.001) and the repeated use of SSTs (H33c: β=.374, p<.001), thus providing support for H33a, H33b and H33c. Consistent with the predication based on Wang (2012), Collier and Sherrell (2010), Techatassanasoontorn and Tanvisuth (2008), Compeau and Higgins (1995), Yi and Hwang (2003), Rose and Fogarty (2006), Wang, Harris and Patterson (2013), Meuter et al. (2005), Kim,

Christodoulidou and Choo (2013), consumer readiness enhanced the repeated use of SSTs. The results also suggested that consumer readiness is important to SST co-production, which was consistent with the prediction based on Geyskens, Steenkamp and Kumar (2000), Etgar (2006), Brennan and Turnbull (1999), Garbarino and Johnson (1999), Hakansson and Snehota (1995), Lusch, Brown and Brunswick (1992), Xue and Harker (2002), Auh et al. (2007), Crespin-Mazet and Ghauri (2007), Hitt et al. (2000), Lush et al. (2007), Miles and Snow (2007), Subramani and Venkatraman (2003) and Meuter et al. (2005). The results were also consistent with the prediction based on TRA (Fishbein and Ajzen, 1975), Dabholkar and Bagozzi (2002), Lee, Catellanos and Choi (2012), Wang and Naman (2004) and Xie, Shen and Zheng (2011) that attitudes towards SSTs are important to the repeated use of SSTs; thus, consumer readiness also positively influenced attitudes towards SSTs. Consistent with the prediction based on Bhattacherjee (2001), Chen and Chen (2009) and Wang (2012) that satisfaction is important to the repeated use of SSTs, consumer readiness also showed positive effects on satisfaction with SSTs. The results indicate that consumer readiness not only enhanced the repeated use of SSTs but also nurtured positive attitudes towards and satisfaction with SSTs.

As shown in Table 7.1, the indirect effects of hedonic and security factors on the repeated use of SSTs through consumer readiness were significant (H34a: β=.932, $p<.001$ and H34c: β=-.436, $p<.001$). Thus, consumer readiness mediated the relationships between hedonic and security factors and the repeated use of SSTs, which provided support for H34a and H34c. However, consumer readiness did not mediate the relationship between utilitarian factors and the repeated use of SSTs, which did not support H34b. The results show that consumer readiness mediated the relationship between hedonic factors and the repeated use of SSTs, which is consistent with the prediction based on Collier and Sherrell (2010), Meuter et al.

(2005), Hahn and Kim (2009), Lee and Lin (2009), Mayer, Davis and Schoorman (1995), Kim, Kim and Hwang (2009), Dabholkar (1996), Risch, Rodie and Schultz-Kleine (2000), Meuter et al. (2005) and Harrison and Smith (2004) that hedonic factors are positively related to consumer readiness. In addition, consumer readiness mediated the relationship between security factors and the repeated use of SSTs, which was consistent with the prediction based on Morgan and Hunt (1994), Zinkhan and Karande (1991), Jaasma and Koper (1999), Sargeant and Lee (2004), Hahn and Kim (2009), Lee and Lin (2009), Mayer, Davis and Schoorman (1995), Harrison and Smith (2004), Joinson (1999), Abel and Larkin (1990), Bohlin and Hunt (1995), Mamassis and Doganis (2004), Shore and Shannon (2010) and Zakaria and Nordin (2008) that security factors influenced consumer readiness. The results supported the prediction based on Wang (2012), Collier and Sherrell (2010), Compeau and Higgins (1995), Yi and Hwang (2003), Rose and Fogarty (2006), Wang, Harris and Patterson (2013), Meuter et al. (2005), Kim, Christodoulidou and Choo (2013), Geyskens, Steenkamp and Kumar (1998), Lusch, Brown and Brunswick (1992), Venkatraman and Subramaniam (2002), Auh et al. (2007), Gruen et al. (2000), Etgar (2006), Brennan and Turnbull (1999), Garbarino and Johnson (1999), Hakansson and Snehota (1995), Lusch, Brown and Brunswick (1992), Xue and Harker (2002), Auh et al. (2007), Subramani and Venkatraman (2003), Bendapudi and Leone (2003), Firat, Dabholkar and Venkatesh (2005), and Lengnick-Hall (1996) that consumer readiness positively influences the repeated use of SSTs. However, consumer readiness did not mediate the relationships between utilitarian factors and repeated use of SSTs as reflecting from the results. This is contrary to the prediction based on Wen, Prybhutok and Xu (2011), Meuter et al. (2005), Hahn and Kim (2009), Lee and Lin (2009), Jaasma and Koper (1999), Sargeant and Lee (2004), Igbaria and Ilvari (1995), Ramayah and Aafaqi (2004), Meuter et al. (2005), Abel and Larkin (1990), Bohlin and Hunt (1995), Mamassis and Doganis (2004) and Harrison and Smith (2004) that utilitarian factors

positively affect consumer readiness. The results indicate that the effects of hedonic and security factors on the repeated use of SSTs were achieved through consumer readiness and that utilitarian factors affected the repeated use of SSTs through more direct paths.

Moreover, the indirect effects of hedonic and security factors on attitudes towards SSTs through consumer readiness were significant (H35a: β=.896, $p<.001$ and H35c: β=-.419, $p<.001$). Thus, consumer readiness mediates the relationships between hedonic and security factors and attitudes towards SSTs, thus providing support for H35a and H35c. Contrary to the hypothesis, consumer readiness had no significant mediating effects on the relationship between utilitarian factors and attitudes towards SSTs since the indirect effect of utilitarian factors on attitudes towards SSTs through consumer readiness was not significant (H36b: β= -.253, $p>.05$). Consistent with the prediction based on TRA (Fishbein and Ajzen, 1975) and Dabholkar and Bagozzi (2002), Lee, Catellanos and Choi (2012), Wang and Namen (2004) and Xie, Shen and Zheng (2011), consumer readiness mediated the relationships between hedonic and security factors and the repeated use of SSTs and mediated the relationships between hedonic and security factors and attitudes towards SSTs. Thus, the results indicate that attitudes towards SSTs were an important antecedent for the repeated use of SSTs.

Additionally, the indirect effects of hedonic and security factors on satisfaction with SSTs through consumer readiness were also significant (H36a: β=.890, $p<.001$ and H36c: β=-.419, $p<.001$). Thus, the relationship between hedonic and security factors and satisfaction with SSTs was mediated by consumer readiness, thus providing support for H36a and H36c. However, the mediating effect of consumer readiness on the relationship between utilitarian factors and satisfaction with SSTs was not significant (H36b: β=-.253, $p<.001$); therefore, H36b was not supported. Consistent with the predication based on Bhattacherjee (2001),

Chen and Chen (2009) and Wang (2012), consumer readiness mediated the relationships between hedonic and security factors and the repeated use of SSTs and mediated the relationships between hedonic and security factors and satisfaction with SSTs, thus providing evidence that satisfaction with SSTs was an important determinant of the repeated use of SSTs.

The results indicate that consumer readiness plays a significant mediating role in the process. However, the impact of utilitarian factors on attitudes toward, satisfaction with and repeated use of SSTs were through different paths, which are different from the effects of hedonic and security factors on attitudes towards, satisfaction with and repeated use of SSTs. Hedonic and security factors, rather than utilitarian factors, affected consumer readiness, which in turn affects attitudes towards, satisfaction with and repeated use of SSTs. Utilitarian factors did not affect attitudes towards, satisfaction with and repeated use of SSTs indirectly as contrary to the results in Chapter 5,6,7 that utilitarian factors had strong impact (combined direct and indirect effects) on attitudes towards, satisfaction with and repeated use of SSTs. Nevertheless, the results partially supported proposition 1 (consumer readiness mediates the relationships between hedonic, utilitarian and security factors and repeated use of SSTs), proposition 2 (consumer readiness mediates the relationships between hedonic, utilitarian and security factors and the attitudes towards SSTs) and proposition 3 (consumer readiness mediates the relationships between hedonic, utilitarian and security factors and satisfaction with SSTs).

7.2.3 The mediating effects of attitudes towards and satisfaction with SSTs on the relationship between consumer readiness and the repeated use of SSTs

Based on propositions 4 and 5, which state that (P4) attitudes towards SSTs and (P5) satisfaction with SSTs mediate the relationships between consumer readiness and the repeated use of SSTs, the following hypotheses emerged:

H37: There is an association between (a) attitudes towards SSTs, (b) satisfaction with SSTs and the repeated use of SSTs.

H38: (a) Attitudes towards SSTs and (b) satisfaction with SSTs mediate the relationship between consumer readiness and the repeated use of SSTs.

As shown in Table 7.1, attitudes towards SSTs positively influenced the repeated use of SSTs (H37a: β=.573, $p<.001$), thus providing support for H37a. However, satisfaction with SSTs was not associated with the repeated use of SSTs (H37b: β=.067, $p>.05$), which did not support H37b. Contrary to the prediction based on Bhattacherjee (2001), Chen and Chen (2009) and the findings in Chapter 6, satisfaction with SSTs was not related to the repeated use of SSTs. Such inconsistent findings may be due to the influence of other factors in the model. Consistent with the prediction based on TRA (Ajzen & Fishbein, 1980), Dabholkar & Bagozzi (2002), Lee, Castellanos and Choi (2012), Wang & Namen (2004) and Xie, Shen and Zheng (2011), attitudes towards SSTs were positively associated with the repeated use of SSTs. The results indicate that satisfaction with SSTs may not be essential to the repeated use of SSTs as reflected in the model.

Furthermore, the indirect effect of consumer readiness on the repeated use of SSTs through attitudes towards and satisfaction with SSTs was significant (H38a: β=.597, p<.001). However, because satisfaction with SSTs was not associated with the repeated use of SSTs, the indirect effect was through attitudes towards rather than satisfaction with SSTs. Thus, it can be concluded that attitudes towards SSTs mediated the relationship between consumer readiness and the repeated use of SSTs, which provided support for H38a. Contrary to the hypothesis, (H38b) satisfaction with SSTs did not mediate the relationship between consumer readiness and the repeated use of SSTs. These results indicate that consumer readiness only affected the repeated use of SSTs indirectly through attitudes towards SSTs but not satisfaction with SSTs. However, the results provided support for proposition 4, which states that attitudes towards SSTs mediate the relationship between consumer readiness and the repeated use of SSTs. Proposition 5, which states that satisfaction with SSTs mediates the relationship between consumer readiness and the repeated use of SSTs, was not supported. Increasing customer satisfaction with SSTs may not increase the likelihood of customers using SSTs in retailing. According to Dabholkar and Thorpe (1994), the relationship between satisfaction with SSTs and post-purchase intentions can be specific to shopping situations. This may explain why the current findings were inconsistent. The findings also suggest that consumer readiness is an important factor in the future use of SSTs. Hedonic and security factors affect the use of self-checkout machines through consumer readiness. Consumer readiness can be considered important in enhancing customers' use of SSTs.

7.2.4 Chapter Summary

In this chapter, an integrated co-production model was built, and propositions 1 through 5 were tested using SEM. The results indicate that hedonic and security factors were positively

and negatively associated with consumer readiness, respectively, but utilitarian factors were not associated with consumer readiness. This finding leads to the conclusion that hedonic and security factors are important in nurturing consumer readiness.

Moreover, consumer readiness had a positive effect on satisfaction, attitudes towards SSTs and the repeated use of SSTs; this reconfirms the idea that consumer readiness has a positive impact on satisfaction with, attitudes towards and repeated use of SSTs. Attitudes towards SSTs also demonstrate a positive impact on the repeated use of SSTs, but satisfaction with SSTs was not associated with the repeated use of SSTs. Consumer readiness affected the repeated use of SSTs indirectly through attitudes towards SSTs but did not affect satisfaction with SSTs. The results indicate that enhancing satisfaction with SSTs may not increase the likelihood that customers will use SSTs in retailing.

The results also indicate that consumer readiness mediated the relationships between hedonic and security factors and attitudes towards, satisfaction with and repeated use of SSTs. However, it did not mediate the relationships between utilitarian factors and attitudes towards, satisfaction with and repeated use of SSTs. Moreover, attitudes towards SSTs mediated the relationships between consumer readiness and the repeated use of SSTs, but satisfaction with SSTs did not play any mediating role in such relationships. Thus, consumer readiness is important to the repeated use of SSTs in retailing.

A summary of findings from Chapters 4 through 7 will be presented in the next chapter. The managerial and theoretical implications of the findings, the limitations of the current study, and recommendations for future research will also be discussed.

CHAPTER 8

SUMMARY OF THE RESEARCH, IMPLICATIONS AND FUTURE RESEARCH

8.1 Introduction

The current research aims to understand the SST co-production process at the consumer decision stage and the repeated use of SSTs. Therefore, this study investigated relationships between hedonic, utilitarian and security factors; consumer readiness; attitudes towards, satisfaction with and repeated use of SSTs. Propositions 1–5 were tested, and the results were presented in Chapters 4–6. In Chapter 7, the integrated co-production model was assessed and the results were presented. In this chapter, a summary of the results is presented as well as research implications and the contributions and limitations of the current study. Finally, recommendations for future research are presented.

8.2 Summary of the study

Tables 8.1 to 8.6 summarize the results of the current study. The current results are also briefly summarized as below:

Table 8.1

Summary of the Effects of Hedonic, Utilitarian, and Security Factors on Attitudes Towards, Satisfaction with and Repeated Use of SSTs

	DV	**Repeated Use of SSTs**			**Attitudes Towards SSTs**			**Satisfaction with SSTs**	
Hypotheses	IV	Hypothesized Relationship		Hypotheses	Hypothesized Relationship		Hypotheses	Hypothesized Relationship	
H1a	Perceived control	(+ve)	Supported	H13a	(+ve)	Supported	H21a	(+ve)	Supported
H1b	Newness	(+ve)	Supported	H13b	(+ve)	Supported	H21b	(+ve)	Supported
H2a	Ease of Use	(+ve)	Supported	H14a	(+ve)	Supported	H22a	(+ve)	Supported
H2b	Usefulness	(+ve)	Supported	H14b	(+ve)	Supported	H22b	(+ve)	Supported
H3a	Perceived Anonymity	(+ve)	Supported	H15a	(+ve)	Supported	H23a	(+ve)	Supported
H3b	Security Risk	(-ve)	Not Supported	H15b	(-ve)	Not Supported	H23b	(-ve)	Not Supported
H3c	Performance Risk	(-ve)	Not Supported	H15c	(-ve)	Not Supported	H23c	(-ve)	Supported
H3d	Psychophysical risk	(-ve)	Supported	H15d	(-ve)	Supported	H23d	(-ve)	Supported
H8a	Trust	(+ve)	Supported	H16a	(+ve)	Supported	H24a	(+ve)	Supported
H8b	Self-Determined Motivation	(+ve)	Supported	H16b	(+ve)	Supported	H24b	(+ve)	Supported
H8c	Ability	(+ve)	Supported	H16c	(+ve)	Not Supported	H24c	(+ve)	Supported
H8d	Role Clarity	(+ve)	Not Supported	H16d	(+ve)	Not Supported	H24d	(+ve)	Not Supported
H29a	Attitudes Towards SSTs	(+ve)	Supported						
H29b	Satisfaction with SSTs	(+ve)	Supported						

DV- Dependent variables, IV- Independent variables, +ve- A positive relationship, -ve- A negative relationship

Table 8.2

Summary of the Effects of Hedonic, Utilitarian, and Security Factors on Consumer Readiness

Dependent Variable												
	Trust			**Self-Determined Motivation**			**Ability**			**Role Clarity**		
IV	H	Hypothesized Relationship		H	Hypothesized Relationship		H	Hypotheized Relationship		H	Hypothesized Relationship	
Perceived Control	H4a	(+ve)	Supported	H5a	(+ve)	Not Supported	H6a	(+ve)	Not Supported	H7a	(+ve)	Not Supported
Newness	H4b	(+ve)	Supported	H5b	(+ve)	Supported	H6b	(+ve)	Not Supported	H7b	(+ve)	Not Supported
Ease of Use	H4c	(+ve)	Not Supported	H5c	(+ve)	Supported	H6c	(+ve)	Supported	H7c	(+ve)	Supported
Usefulness	H4d	(+ve)	Supported	H5d	(+ve)	Supported	H6d	(+ve)	Not Supported	H7d	(+ve)	Supported
Perceived Anonymity	H4e	(+ve)	Supported	H5e	(+ve)	Not Supported	H6e	(+ve)	Supported	H7e	(+ve)	Not Supported
Security Risk	H4f	(-ve)	Supported	H5f	(-ve)	Supported	H6f	(-ve)	Supported	H7f	(-ve)	Not Supported
Performance Risk	H4g	(-ve)	Not Supported	H5g	(-ve)	Not Supported	H6g	(-ve)	Not Supported	H7g	(-ve)	Supported
Psychophysical Risk	H4h	(-ve)	Not Supported	H5h	(-ve)	Supported	H6h	(-ve)	Supported	H7h	(-ve)	Not Supported

H- Hypotheses, IV- Independent variables, +ve-A positive relationship, -ve- A negative relationship

Table 8.3

Summary of the Mediating Effect of Consumer Readiness on the Relationships between Hedonic, Utilitarian, Security Factors and Repeated Use of SSTs.

Independent Variable		Repeated Use of SSTs						
Mediators:								
	Trust		Self-Determined Motivation		Ability		Role Clarity	
	H		H		H		H	
Perceived Control	H9a	**Supported**	H10a	**Not supported**	H11a	**Not supported**	H12a	**Not supported**
Newness	H9b	**Supported**	H10b	**Supported**	H11b	**Not supported**	H12b	**Not supported**
Ease of Use	H9c	**Not supported**	H10c	**Supported**	H11c	**Supported**	H12c	**Not supported**
Usefulness	H9d	**Supported**	H10d	**Supported**	H11d	**Not supported**	H12d	**Not supported**
Perceived Anonymity	H9e	**Supported**	H10e	**Not supported**	H11e	**Supported**	H12e	**Not supported**
Security Risk	H9f	**Supported**	H10f	**Not supported**	H11f	**Not supported**	H12f	**Not supported**
Psychophysical Risk	H9g	**Not supported**	H10g	**Supported**	H11g	**Supported**	H12g	**Not supported**
Performance Risk	H9h	**Not supported**	H10h	**Not supported**	H11h	**Not supported**	H12h	**Not supported**

H-Hypotheses

Table 8.4

Summary of the Mediating Effect of Consumer Readiness on the Relationships between Hedonic, Utilitarian, Security Factors and Attitudes Towards SSTs.

Independent Variable		Attitudes Towards SSTs						
Mediators:	Trust		Self-Determined Motivation		Ability		Role Clarity	
	H		H		H		H	
Perceived Control	H17a	**Supported**	H18a	**Not supported**	H19a	**Not supported**	H20a	**Not supported**
Newness	H17b	**Supported**	H18b	**Supported**	H19b	**Not supported**	H20b	**Not supported**
Ease of Use	H17c	**Not supported**	H18c	**Supported**	H19c	**Not supported**	H20c	**Not supported**
Usefulness	H17d	**Supported**	H18d	**Supported**	H19d	**Not supported**	H20d	**Not supported**
Perceived Anonymity	H17e	**Supported**	H18e	**Not supported**	H19e	**Not supported**	H20e	**Not supported**
Security Risk	H17f	**Not supported**	H18f	**Not supported**	H19f	**Not supported**	H20f	**Not supported**
Psychophysical Risk	H17g	**Not supported**	H18g	**Supported**	H19g	**Not supported**	H20g	**Not supported**
Performance Risk	H17h	**Not supported**	H18h	**Not supported**	H19h	**Not supported**	H20h	**Not supported**

H-Hypotheses

Table 8.5

Summary of the Mediating Effect of Consumer Readiness on the Relationships between Hedonic, Utilitarian, Security Factors and Satisfaction with SSTs.

Independent Variable		Satisfaction With SSTs						
Mediators:	Trust		Self-Determined Motivation		Ability		Role Clarity	
	H		H		H			
Perceived Control	H25a	**Supported**	H26a	**Not supported**	H27a	**Not supported**	H28a	**Not supported**
Newness	H25b	**Supported**	H26b	**Supported**	H27b	**Not supported**	H28b	**Not supported**
Ease of Use	H25c	**Not supported**	H26c	**Supported**	H27c	**Supported**	H28c	**Not supported**
Usefulness	H25d	**Supported**	H26d	**Supported**	H27d	**Not supported**	H28d	**Not supported**
Perceived Anonymity	H25e	**Supported**	H26e	**Not supported**	H27e	**Supported**	H28e	**Not supported**
Security Risk	H25f	**Not supported**	H26f	**Not supported**	H27f	**Not supported**	H28f	**Not supported**
Psychophysical Risk	H25g	**Not supported**	H26g	**Supported**	H27g	**Supported**	H28g	**Not supported**
Performance Risk	H25h	**Not supported**	H26h	**Not supported**	H27h	**Not supported**	H28h	**Not supported**

H-Hypotheses

Table 8.6

Summary of the Mediating Effects of Attitudes Towards and Satisfaction with SSTs on the Relationships between Consumer Readiness and Repeated Use of SSTs

Dependent Variable		Repeated Use of SSTs		
Mediator	Satisfaction with SSTs		Attitudes Towards SSTs	
Independent Variable	Hypothesis		Hypotheses	
Trust	H31a	**Supported**	H30a	**Supported**
Self-determined motivation	H31b	**Supported**	H30b	**Supported**
Ability	H31c	**Supported**	H30c	**Not supported**
Role Clarity	H31d	**Not supported**	H30d	**Not supported**

The effects of hedonic, utilitarian and security factors on the repeated use of SSTs were examined. The results indicate that perceived control and newness (hedonic factors), ease of use and usefulness (utilitarian factors) and perceived anonymity (a security factor) had a positive impact on the repeated use of SSTs. The psychophysical risk (a security factor) negatively influenced the repeated use of SSTs. Usefulness and psychological risk had stronger relationships with the repeated use of SSTs, whereas security risk and performance risk (security factors) were not associated with the repeated use of SSTs.

The effects of hedonic, utilitarian and security factors on consumer readiness were also investigated. The results indicate that hedonic, utilitarian and security factors had differential effects on trust, self-determined motivation, ability and role clarity. However, usefulness had the strongest positive impact on trust, and ease of use had the strongest positive association with self-determined motivation, ability and role clarity.

The effects of different dimensions of consumer readiness on the repeated use of SSTs were also investigated. The results indicate that trust, self-determined motivation and ability

positively influenced the repeated use of SSTs. Trust had the highest positive relationship with the repeated use of SSTs.

This study also examined the mediating effects of consumer readiness on the relationships between hedonic, utilitarian and security factors and the repeated use of SSTs. The results indicate that trust mediated the relationships between perceived control and newness (hedonic factors), usefulness (a utilitarian factor), perceived anonymity and psychophysical risk (security factors) and the repeated use of SSTs. Self-determined motivation mediated the relationships between newness (a hedonic factor), ease of use and usefulness (utilitarian factors), psychophysical risk (a security factor) and the repeated use of SSTs. Ability mediated the relationships between ease of use (a utilitarian factor), perceived anonymity and psychophysical risk (security factors) and the repeated use of SSTs. Role clarity had no mediating effects on the relationships between hedonic, utilitarian and security factors and the repeated use of SSTs. Thus, trust, self-determined motivation and ability demonstrated differential mediating effects on the relationships between hedonic, utilitarian and security factors and the repeated use of SSTs.

Moreover, the effects of hedonic, utilitarian and security factors on attitudes towards SSTs were investigated. The results indicate that perceived control and newness (hedonic factors), ease of use and usefulness (utilitarian factors) and perceived anonymity (a security factor) positively affected attitudes towards SSTs. The psychophysical risk (a security factor) negatively affected attitudes towards SSTs. Usefulness and psychophysical risk had stronger relationships with attitudes towards SSTs, while security and performance risk were not associated with attitudes towards SSTs.

The effect of consumer readiness and attitudes towards SSTs was also investigated. Trust and self-determined motivation were positively associated with attitudes towards SSTs. Trust demonstrated the strongest relationship with attitudes towards SSTs.

The mediating effects of trust, self-determined motivation, ability and role clarity on the relationships between hedonic, utilitarian and security factors and attitudes towards SSTs were also investigated. The results indicate that trust mediated the relationships between perceived control and newness (hedonic factors), usefulness (a utilitarian factor), perceived anonymity (a security factor) and attitudes towards SSTs. However, ability and role clarity did not mediate any relationships between hedonic, utilitarian and security factors and attitudes towards SSTs. Trust and self-determined motivation demonstrated differential mediating effects on the relationship between hedonic, utilitarian and security factors and attitudes towards SSTs.

The effects of hedonic, utilitarian and security factors on satisfaction with SSTs were also investigated. The results indicate that perceived control and newness (hedonic factors), ease of use and usefulness (utilitarian factors) and perceived anonymity (a security factor) were positively associated with satisfaction with SSTs. Performance and psychophysical risk (security factors) were negatively associated with satisfaction with SSTs. However, security risk (a security factor) had no significant effect on satisfaction with SSTs. Usefulness and psychophysical risk demonstrated the strongest relationships with satisfaction with SSTs. The effects of consumer readiness on satisfaction with SSTs were also examined. Trust, self-determined motivation and ability were positively associated with satisfaction with SSTs. Trust demonstrated the strongest relationship with satisfaction with SSTs.

The mediating effect of consumer readiness on the relationships between hedonic, utilitarian and security factors and satisfaction with SSTs were also tested. The results indicate that trust mediated the relationships between perceived control and newness (hedonic factors), usefulness (a utilitarian factor), perceived anonymity (a security factor) and satisfaction with SSTs. Self-determined motivation mediated the relationships between newness (a hedonic factor), ease of use and usefulness (utilitarian factors), perceived anonymity and psychophysical risk (security factors) and satisfaction with SSTs. Ability mediated the relationships between ease of use (a utilitarian factor), perceived anonymity and psychophysical risk (security factors) and satisfaction with SSTs. Trust, self-determined motivation and ability demonstrated differential mediating effects on the relationships between hedonic, utilitarian and security factors and satisfaction with SSTs. The results were similar to the mediating effects of consumer readiness on the relationships between hedonic, utilitarian and security factors and the repeated use of SSTs. The only exception was that trust marginally mediated the relationship between security risk and the repeated use of SSTs, but it did not mediate the relationship between security risk and satisfaction with SSTs. The results suggest similar effects of hedonic, utilitarian and security factors on satisfaction with and repeated use of SSTs.

In this study, the relationships between attitudes towards, satisfaction with and repeated use of SSTs were also examined. The results indicate that attitudes towards and satisfaction with SSTs were positively associated with the repeated use of SSTs. Attitudes towards SSTs mediated the relationships between trust, self-determined motivation and the repeated use of SSTs. Satisfaction with SSTs mediated the relationships between trust, self-determined motivation, ability and the repeated use of SSTs. These findings suggest that attitudes

towards and satisfaction with SSTs played a significant mediating role between consumer readiness and the repeated use of SSTs.

In this study, an integrated co-production model was tested. The results indicate that hedonic and security factors were positively and negatively associated with consumer readiness, respectively, while utilitarian factors were not associated with consumer readiness. The results also indicate that consumer readiness demonstrated a positive effect on satisfaction with, attitudes towards and repeated use of SSTs. Attitudes towards SSTs also positively influenced the repeated use of SSTs, but satisfaction with SSTs was not related to the repeated use of SSTs.

The results also indicate that consumer readiness mediated the relationships between hedonic and security factors and attitudes towards, satisfaction with and repeated use of SSTs. However, consumer readiness did not mediate the relationships between utilitarian factors and attitudes towards, satisfaction with and repeated use of SSTs. These findings indicate that consumer readiness demonstrated a significant mediating role in the process. However, the impact of utilitarian factors on attitudes toward, satisfaction with and repeated use of SSTs is different from hedonic and security factors. Hedonic and security factors affected attitudes towards, satisfaction with and repeated use of SSTs through indirect routes, while utilitarian factors affected attitudes towards, satisfaction with and repeated use of SSTs through direct routes only.

Furthermore, the results indicate that attitudes towards SSTs mediated the relationships between consumer readiness and the repeated use of SSTs. Satisfaction with SSTs did not mediate the relationship between consumer readiness and the repeated use of SSTs. These

findings suggest that consumer readiness affected the repeated use of SSTs through attitudes towards SSTs but not through satisfaction with SSTs. Satisfaction with SSTs was not an important factor in the repeated use of SSTs as reflected in the model.

8.3 Study Implications

8.3.1 Theoretical Implications

The current study greatly enhances our theoretical knowledge and understanding of SST co-production processes in retailing. The adoption of SSTs has been influenced by many factors. The effects of perceived control, ease of use, usefulness, attitudes towards and satisfaction with SSTs on the repeated use of SSTs have been well documented. Theories such as the technology acceptance model (TAM), theory of reasoned action (TRA), theory of planned behaviour (TPB) and innovations of diffusion theory (IDT) have been in the previous literature to underpin these relationships. The current research has extended the application of these theories to our understanding of the use of SSTs.

The current research confirms the generalizability of TAM, TPB and IDT in that the theoretical framework links perceived control, ease of use and usefulness to attitudes towards, satisfaction with and repeated use of SSTs. Moreover, usefulness had the strongest relationship with attitudes towards, satisfaction with and repeated use of SSTs. These findings confirm that TAM and IDT are relatively robust theories in explaining consumer adoption and use of technology in various contexts.

Whilst the TRA explains most phenomena under the current research, it fails to provide a comprehensive explanation for why ability affects the repeated use of SSTs without necessarily forming positive attitudes towards SSTs. The current findings suggest that TRA may not be an appropriate theoretical framework under certain circumstances, especially when customers are confident in using technology. Thus, the use of TRA as a theoretical framework in SST contexts should be reviewed further.

Perceived anonymity also showed positive effects on attitudes towards, satisfaction with and repeated use of SSTs. In addition to TAM, TPB, TRA and IDT, the current research introduced the theory of de-individuation to explain the use of SSTs. This theory has been overlooked in previous SST literature, whereas de-individuation theory provides a sound theory to explain the use of SSTs in the current context. Thus, the current research expands our knowledge about the use of SSTs.

The concept of consumer readiness proposed by Meuter et al. (2005) was also adapted to explain the use of SSTs. The results suggest that consumer readiness as a multi-dimensional construct needs to be adjusted to explain different SST contexts and/or different consumer decision stages. Trust, self-determined motivation and ability demonstrated inconsistent and differential mediating effects on the relationships between hedonic, utilitarian and security factors and attitudes towards, satisfaction with and repeated use of SSTs, whereas role clarity did not mediate any relationships between hedonic, utilitarian and security factors and attitudes towards, satisfaction with and repeated use of SSTs. The findings imply that the key factors to effective co-production, as suggested by Bettencourt et al. (2002), Legnick-Hall (1996) and Auh et al. (2007) may not be limited to ability, motivation and role clarity and lead to the question of whether different SST settings need different theoretical frameworks

to effectively explain the SST co-production process. The current research points to the limitation of current theories and the need for future research to explore other possible theoretical frameworks.

For example, self-determined motivation is proposed by self-determination theory (SDT), which is an educational theory, as affecting attitudes towards, satisfaction with and repeated use of SSTs. This proposition suggests that SDT is an appropriate theoretical framework in the SST context. Thus, the introduction of SDT in SST settings offers an alternative explanation for consumer behaviour as it points to the importance of linking the degree of autonomy to different forms of motivation and the importance of the internalization process during consumers' use of SSTs.

Whilst self-determined motivation was thought to only be affected by autonomy, competence and ability when based on SDT (Deci & Ryan, 1991), the current findings suggest that it is also affected by newness, ease of use, usefulness, security risk and psychophysical risk. Therefore, the current research extends our knowledge by identifying more antecedents to self-determined motivation and the importance of SDT in SST contexts.

Trust positively affected attitudes towards, satisfaction with and repeated use of SSTs and demonstrated substantial mediating effects on the relationships between hedonic, utilitarian and security factors and attitudes towards, satisfaction with and repeated use of SSTs. This suggests the need to introduce trust theory when studying SST contexts. However, trust has mostly been studied in online contexts. This study provides another angle for understanding the role of trust in offline SST contexts, thereby addressing a contextual gap in previous literature.

Consumer satisfaction with SSTs is considered important for consumer behaviour (Bhattacherjee, 2001; Chen & Chen, 2009; Wang, 2012). However, the current study's findings suggest that satisfaction with SSTs is not associated with the repeated use of SSTs in retailing. These findings contradict the findings in previous SST literature such as Bhattacherjee (2001), Chen and Chen (2009), and Wang (2012) and imply that the relationship between satisfaction with and the repeated use of SSTs should be further evaluated.

The integrated co-production model explained 99% of the total variance in the repeated use of SSTs. This model greatly enhances our understanding of the use of SSTs. The current research successfully argues that consumer readiness is a multi-dimensional construct that should be placed as a mediator between hedonic, utilitarian and security factors and satisfaction with, attitudes towards and repeated use of SSTs. These findings contribute new, theoretical knowledge to the field of SST research.

Finally, the mixed results in the current study suggest that SST co-production is a complicated process. A single theory cannot fully explain such processes. We can conclude that a holistic theoretical approach is more appropriate and that different theories are needed to explain such complicated phenomena.

8.3.2 Managerial Implications

As indicated, usefulness and psychophysical risk were stronger predictors of customer attitudes towards, satisfaction with and repeated use of SSTs. Thus, managers should focus on enhancing machines' efficiency and reducing the psychological and physical risk

perceived by customers. The findings in the current study imply that unnecessary procedures using self-checkout machines should be avoided so SSTs can efficiently help customers complete transactions and enhance customers' perceptions of the SSTs' usefulness (Davis, 1996). By reducing the psychological and physical risks perceived by customers, managers may be able to provide more information about the safety and efficiency of using SSTs (Michell & Harris, 2005).

Perceived anonymity was found to enhance consumer trust as well as the attitudes towards, satisfaction with and repeated use of SSTs. These findings imply that the use of self-checkout machines is not only driven by the hedonic and utilitarian factors of SSTs but also by security factors such as perceived anonymity. In addition to enhancing the hedonic and utilitarian features of SSTs, managers can train supporting staff not to unnecessarily interact with the customer in purchasing so the customers' anonymity is preserved; therefore, the use of SSTs can be enhanced further.

Hedonic factors, such as perceived control and newness, and utilitarian factors, such as ease of use, were also positively related to attitudes towards, satisfaction with and repeated use of SSTs. Thus, managers should offer flexibility to customers in deciding to use SSTs (Lee & Allaway, 2002). In addition, managers should ensure that SSTs are perceived as innovative (Blythe, 1999) and that SST procedures are uncomplicated and are not confusing (Dbholkar & Bagozzi, 2002). By doing so, customer attitudes towards, satisfaction with and repeated use of SSTs can be further enhanced.

Contrary to Zhao et al. (2008), security risk and performance risk did not affect attitudes towards and repeated use of SSTs. In addition, security risk did not affect satisfaction with

SSTs, whereas, psychophysical risk negatively influenced satisfaction with, attitudes towards and the repeated use of SSTs. Thus, managers can put more emphasis on reducing psychophysical risk perceived by customers such as providing more safety information to customers (Michell & Harris, 2005).

The findings also suggest that managers can enhance consumer trust to further increase the use of SSTs. Trust is related to belief in the future actions of others (Gefen, 2000). Thus, managers can enhance customer trust by implementing control systems that include procedures and protocols to monitor and control successful transactions (Tan & Thoen, 2002).

The findings also indicate that enhancing customers' self-determination also enhances the use of SSTs. Based on SDT, autonomous contexts and optimal human contacts are essential to enhance self-determination or the internalization process (Deci & Ryan, 1991). Therefore, customers should not be forced to use SSTs, and optimal numbers of service counters should be provided. Trained support staff should also be available to provide customer service when problems arise.

Customers' ability also emerged as a predictor of the repeated use of SSTs. Thus, it is critical to train staff to assist customers so as to enhance their confidence in using SSTs. Additionally, staff could also provide training to older customers or those who seldom use SSTs. Based on SDT, enhancing ability can facilitate self-determined motivation or the internalization process as well. Therefore, coaching customers in the use of SSTs should be considered essential to enhancing the use of SSTs in retailing.

Because trust, self-determined motivation and ability positively influenced the repeated use of SSTs, in addition to modifying hedonic, utilitarian and security features of SSTs, managers can enhance consumer trust, self-determined motivation and ability. This reduces the time and resources necessary to enhance features and replace SSTs as such replacements may affect the operation and customers. Customers may not be able to adapt to the new features of SSTs and may give up on using them eventually.

By increasing the repeated use of SSTs in retailing, investments in SSTs can be more meaningful and worthwhile. Providing more options for customers to complete their purchases means that shoppers' experiences will be improved (Dabholkar, Bobbit, & Lee, 2003; Meuter et al., 2000). Therefore, firms can take advantage of the best benefits of deploying SSTs and improve their competitiveness.

When SSTs are properly deployed in organisations, personnel can be more easily managed because employees feel more satisfied with their jobs (Harter, Schmidt, & Hayes, 2002) when they are able to perform different tasks, such as training customers to use SSTs (Hsieh, 2005; Ho et al., 2009). When employees feel more satisfied with their jobs, absenteeism and turnover can be reduced (Koys, 2001; Avey, Patera, & West, 2006).

Finally, the current study also raises the question of whether it is ethical for organisations to lay off personnel and force customers to use SSTs in retailing since self-determined motivation has positive effects on attitudes towards, satisfaction with and the repeated use of SSTs and links to the degree of autonomy in customers choosing SSTs. This forced use of SSTs may affect the psychological well-being of customers (Ryan & Deci, 2000; Deci & Ryan, 2008) and be harmful to employees. This may especially harm those who do not have

the capability to use SSTs, e.g. the elderly or disabled, as ability has a close link with self-determined motivation (Deci & Ryan, 1991). The government or the union parties may consider establishing some industrial guidelines to govern such redundancy.

8.4 Limitations of the Research

Whilst the current study provides insights into the SST co-production process and relationships between hedonic, utilitarian and security factors, consumer readiness, attitudes towards, satisfaction with and repeated use of SSTs, it is subject to the following limitations.

The current study only investigates Australian supermarket customers, so the generalizability of the results is restricted. The current study could be expanded to other contexts or countries, as consumer behaviour may be different in different contexts (Arnould & Thompson, 2005; Mooij, 2010).

The current research used a cross-sectional research design; therefore, the internal validity is limited (Goodwin, 2009; Howitt & Cramer, 2010). The causal effects of the variables should be further investigated. Thus, longitudinal and/or experimental research could also be conducted to improve the internal validity of this research (Goodwin, 2009; Howitt & Cramer, 2010).

As the current study was mostly conducted in large supermarkets in Australia, the data may not represent the behaviour of consumers from small or medium retailers. To effectively reflect consumer use of SSTs, future research could focus on small and medium retailers.

As the current study investigated the use of SSTs in retailing using customers with the opportunity to use SSTs in retailing, customers who did not have the opportunity to use SSTs in retailing were not studied. Thus, the current findings did not sufficiently reflect the behaviour of different types of customers.

Furthermore, the sample size restricted the number of indicators in the integrated model. This limitation resulted in the use of second-order factors and the loss of some information in the model as a result of item aggregation. To enhance the explanatory power of the model advanced in the current study, a larger sample size could be used in the future.

8.5 Recommendation of Future Research

The current findings imply different avenues for further investigation.

First, consumer readiness is not limited to understanding the repeated use and first trial of SSTs. The effect of consumer readiness should be further investigated at other consumer decision stages, e.g. commitment to use SSTs (Bitner et al., 2002).

Second, given that the current study only studied customers who had the opportunity to use SSTs, comparing different structural equation models between SST adopters and non-adopters could further validate the model and contribute to the knowledge.

Third, as the current study only used trust, self-determined motivation, ability and role clarity as the dimensions of consumer readiness, future research could aim to modify and enhance the dimensions of consumer readiness (e.g. adding anxiety as a dimension (Dowling &

Staelin, 1994)) so this construct can be further investigated and the dimensions of the construct can be more complete.

Fourth, the current study did not investigate the effects of situational factors, such as waiting time and queue length, or other moderators, such as age, gender differences. Examining these factors in future research could provide additional insight into the possible moderating effects of situational factors and their effects on the model.

Finally, future research on shopping behaviour and technology use and adoption should also test the effects of self-determined motivation. Thus, the self-determined motivation scale can be investigated in relation to other aspects of consumer behaviour. For example, its relationship to purchase intentions is still unknown. Thus, it is worth investigating different properties of self-determined motivation scale in other settings.

8.6 Concluding Comments

This research aimed to use structural equation modelling to understand the SST co-production process and test the relationship between hedonic, utilitarian and security factors; consumer readiness; and attitudes towards, satisfaction with and repeated use of SSTs. The study also introduced new theories, such as the theory of de-individuation, the theory of trust, theory of co-production and SDT, to explain shopping behaviour and the use of SSTs and to highlight the importance of customers as co-producers participating in the process.

In conclusion, I hope this research will benefit the retailing industry as a whole and supermarket managers specifically. Given that self-checkout systems are being deployed more widely in Australia, I hope the current research can benefit SST manufacturers and help

them better understand SST features and factors that should be taken into consideration in the next generation of SSTs to facilitate their effective use in Australia.

Finally, I believe SSTs are wonderful innovations. Entering the 21st century, humans have more and more opportunities to work with technology. This leads to difficult questions for researchers. Are SSTs just like another invention? How can users and SSTs work harmoniously? I believe researchers have a responsibility to ensure this relationship is not acrimonious and that it continues to thrive; this was a major goal of the current study.

References

Aaker, D. (1996). *Building strong brands*. New York: The Free Press.

Abdullah, A., Bilau, A. A., Enegbuma, W. I., Ajagbe, A. M., Ali, K. N., & Bustani , S. A. (2012). Small and medium sized construction firms job satisfaction and evaluation in Nigeria. *Inernational Journal of Social Science and Humanity*, 2(1) , 35 40.

Abel, J. L., & Larkin, K. T. (1990). Anticipation of performance among musicians: Physiological arousal, confidence, and state-anxiety. *Psychology of Music*, 18(2), 171-182.

Abramovici, M., & Bancel-Charensol, L. (2004). How to take customers into consideration in service innovation projects. *The Service Industries Journal*, 24(1), 56-78.

Adams, D. A., Nelson, R. R., & Todd, P. A. (1992). Perceived usefulness, ease of use, and usage of information technology: A replication. *MIS Quarterly*. 16(2), 227-247.

Ahn, T., Ryu, S., & Han, I. (2007). The impact of Web quality and playfulness on user acceptance of online retailing. *Information & Management*. 44, 263-275.

Alam, I. (2006). Service innovation strategy and process: a cross-national comparative analysis. *International Marketing Review*, 23(3), 234-254.

Albesa, J. G. (2007). Interaction channel choice in a multichannel environment, an empirical study. *International Journal of Bank Marketing*, 25(7), 490-506.

Anitsal, I., & Schumann, D. W. (2007). Toward a conceptualization of customer productivity: the customer's perspective on transforming customer labor into

customer outcomes using technology-based self-service options. *The Journal of Marketing Theory and Practice*, 15(4), 349-363.

Ajzen, I., & Fishben, M. (1980). *Understanding attitudes and predicting social behavior*. Englewood Cliffs, NJ: Prentice - Hall.

Ajzen, I. (1991). The theory of planned behavior. *Organization Behavior and human Decision Processes*. 50, 179-211.

Ajzen, I. (2002). Perceived behavioral control, Self - efficacy, locus of control, and the theory of planned behavior1. *Journal of applied social psychology*, 32(4), 665-683.

Alam, S. S., & Sayuti, N. M. (2011). Applying the theory of planned behavior (TPB) in food purchasing. *International Journal of Commerce and Management*, 21(1), 8-20.

Albesa, J. G. (2007). Interaction channel choice in a multichannel environment, an empirical study. *International Journal of Bank Marketing*, 25(7), 490-506.

Alcock, T., & Millard, N. (2006). Self-service—but is it good to talk?. *BT Technology Journal*, 24(1), 70-78.

Aleassa, H., Pearson, J. M., & McClurg, S. (2011). Investigating software piracy in Jordan: an extension of the theory of reasoned action. *Journal of business ethics*, 98(4), 663-676.

Altarriba, J., & Heredia, R. R (2008). *An introduction to bilingualism: principles and processes.* Psychology Press.

Amott, N. (2007). *Cases from the Philippines in Innovative Philanthropy: An Overview of the Philippines*. In Innovation in Strategic Philanthropy (pp. 61-78). Springer US.

Anand, N., Gardner, H. K., & Morris, T. (2007). Knowledge-based innovation: emergence and embedding of new practice areas in management consulting firms. *Academy of Management Journal*, 50(2), 406-428.

Anderson, J.C., & David W. G. (1988). Structural equation modeling in practice: A review and recommended two-step approach. *Psychological bulletin*, 103(3), 411.

Anderson, J. C., & Gerbing, D. W. (1988). Structural equation modeling in practice: A review and recommended two-step approach. *Psychological bulletin*, 103(3), 411.

Andreassen, T. W., (2001). From disgust to delight: Do customers hold a grudge?.*Journal of Service Research*. 4(1), 39-49.

APCA. (2012). *Transaction statistics*. Retrieved November 10 2012, from http://www.apca.com.au/payment-statistics/transaction-statistics/cards

Armitage, C. J., & Conner, M. (1999). Predictive validity of the theory of planned behaviour: The role of questionnaire format and social desirability. *Journal of Community & Applied Social Psychology*, 9(4), 261-272.

Armitage, C. J., & Conner, M. (2001). Efficacy of the theory of planned behaviour: A meta - analytic review. *British journal of social psychology*, 40(4), 471-499.

Arnold, M. J., & Reynolds, K. E. (2003). Hedonic shopping motivations. *Journal of Retailing*, 79(2), 77-95.

Arnott, D. C. (2007). Trust–current thinking and future research. *European Journal of Marketing*, 41(9/10), 981-987.

Arnould, E. J., & Thompson, C. J. (2005). Consumer culture theory (CCT): Twenty years of research. *Journal of Consumer Research*, 31(4), 868-882.

Averill, J. R. (1973). Personal control over aversive stimuli and its relationship to stress. *Psychological Bulletin*, 80(4), 286.

ATM Marketplace. (2009). *Walk-in bill payment to total $80 billion by 2009*. Retrieved November 23 2012, from http://www.atmmarketplace.com/article/131957/Walk-in-bill-payments-to-total- 80-billion-by-2009

Auh, S., Bell, S. J., McLeod, C. S., & Shih, E. (2007). Co-production and customer loyalty in financial services. *Journal of retailing*, 83(3), 359-370.

Avey, J. B., Patera, J. L., & West, B. J. (2006). The implications of positive psychological capital on employee absenteeism. *Journal of Leadership & Organizational Studies*, 13(2), 42-60.

Babbie, E. R. (2005). *The basics of social research*. New York: Thomson Wadsworth.

Babbie, E., & Mouton, J. (2001). *The practice of business and social research*. Oxford University: Oxford University Press.

Bagozzi, R. P. (2011). Measurement and meaning in information systems and organizational research: methodological and philosophical foundations. *MIS Quarterly*, 35(2), 261-292.

Bagozzi, R. P., & Foxall, G. R. (1996). Construct validation of a measure of adaptive-innovative cognitive styles in consumption. *International Journal of Research in Marketing*, 13(3), 201-213.

Bagozzi, R. P., & Heatherton, T. F. (1994). A general approach to representing multifaceted personality constructs: Application to state self ‐ esteem. *Structural Equation Modeling: A Multidisciplinary Journal*, 1(1), 35-67.

Bagozzi, R. P., Wong, N., Abe, S., & Bergami, M. (2000). Cultural and situational contingencies and the theory of reasoned action: Application to fast food restaurant consumption. *Journal of Consumer Psychology*, 9(2), 97-106.

Balanda, K. P., & MacGillivray, H. L. (1988). Kurtosis: a critical review. *The American Statistician*, 42(2), 111-119.

Bandura, A. (1986). *Social foundations of thought and action*. Englewood Cliffs, NJ.

Bandura, A. (1994). *Self-efficacy*. John Wiley & Sons, Inc..

Bandura, A. (1997). *Self-efficacy: The exercise of control*. New York: Freeman.

Bandura, A. (2005). The primacy of self - regulation in health promotion. *Applied Psychology*, 54(2), 245-254.

Baron, R. M., & Kenny, D. A. (1986). The moderator–mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of personality and social psychology*, 51(6), 1173.

Bart, Y., Shankar, V., Sultan, F., & Urban, G. L. (2005). Are the drivers and role of online trust the same for all web sites and consumers? A large scale exploratory empirical study. *Journal of Marketing*, 69(4), 133-52.

Bashir, M. S., & Zakaria, M. Z. (2010). Hesitation on adoption Self-Service Technologies (SSTs): A case study on self-payment machine. *Umeå University*, Doctoral dissertation.

Batra, R., & Sinha, I. (2000). Consumer-level factors moderating the success of private label brands. *Journal of Retailing*, 76(2), 175-191.

Beadnell, B., Baker, S. A., Gillmore, M. R., Morrison, D. M., Huang, B., & Stielstra, S. (2008). The theory of reasoned action and the role of external factors on

heterosexual men's monogamy and condom use. *Journal of Applied Social Psychology*, 38(1), 97-134.

Beanland, C., Schneider, Z., LoBiondo-Wood, G., & Haber, J. (1999). *Nursing research methods. Critical appraisal and utilisation*. Sydney: Mosby.

Beatson, A., Coote, L. V., & Rudd, J. M. (2006). Determining consumer satisfaction and commitment through self-service technology and personal service usage. *Journal of Marketing Management*, 22(7-8), 853-882.

Beatson, A., Lee, N., & Coote, L. V. (2007). Self-service technology and the service encounter. *The Service Industries Journal*, 27(1), 75-89.

Berkman, H. W., Lindquist, J. D., & Sirgy, J. M. (1996). *Consumer Behavior*. Chicago: NTC Business Books.

Bendapudi, N., & Leone, R. P. (2003). Psychological implications of customer participation in co-production. *Journal of Marketing*, 67(1), 14-28.

Bentler, P. M. (1990). Comparative fit indexes in structural models. *Psychological Bulletin*, 107(2), 238.

Bentler, P. M., & Kano, Y. (1990). On the equivalence of factors and components. *Multivariate Behavioral Research*, 25(1), 67-74.

Bettencourt, L.A., Ostrom, A.L., Brown S.W., & Roundtree R.I. (2002). Client co-production in knowledge-intensive business services, *California Management Review*, 44 (Summer) 100–128.

Bhattacherjee, A. (2001). Understanding information systems continuance: an expectation-confirmation model. *MIS quarterly*, 25(3), 351-370.

Bitner, M. J. (2001). Self-service technologies: What do customers expect?. *Marketing Management*, Spring, 10-11.

Bitner, M. J., Brown, S. W., & Meuter, M. L. (2000). Technology infusion in service encounters. *Journal of the Academy of marketing Science*, 28(1), 138-149.

Bitner, M. J., Ostrom, A. L., & Meuter, M. L. (2002). Implementing successful self-service technologies. *The Academy of Management Executive*, 16(4), 96-108.

Black, N.J., Lockett, A., Winklhofer, H., & Ennew, C. (2001). The adoption of internet financial services: A qualitative study. *International Journal of Retail & Distribution Management*, 29(8), 390-398.

Blazevic, V., & Lievens, A. (2008). Managing innovation through customer coproduced knowledge in electronic services: An exploratory study. *Journal of the Academy of Marketing Science*, 36(1), 138-151.

Bliese, P. D., & Castro, C. A. (2000). Role clarity, work overload and organizational support: Multilevel evidence of the importance of support. *Work & Stress*, 14(1), 65-73.

Blunch, N. (2010). *Introduction to Structural Equation Modeling Using IBM SPSS Statistics and AMOS*. Sage.

Blythe, J. (1999). Innovativeness and newness in high-tech consumer durables. *Journal of Product & Brand Management*, 8(5), 415-429.

Bobbitt, L.M., & Dabholkar, P. A. (2001). Integrating attitudinal theories to understand and predict use of technology based self - service. *International Journal of Service Industry Management*, 12(5), 423.

Bohlin, R. M., & Hunt, N. P. (1995). Course structure effects on students' computer anxiety, confidence and attitudes. *Journal of Educational Computing Research*, 13(3), 263-270.

Bollen, K. A. (1989). A new incremental fit index for general structural equation models. *Sociological Methods & Research*, 17(3), 303-316.

Brace, N., Kemp, R., & Snelgar, R. (2006). *Multiple regression. SPSS for Psychologists*.

Brady, M. K., Knight, G. A., Cronin, J. J. Jr., Tomas, G., Hult, M., & Keillor, B. D. (2005). Remving the contextual lens:A multinational, multi - setting comparsion of service evaluation models. *Journal of Retailing*, 81(3), 215-230.

Brannick, M. T. (1995). Critical comments on applying covariance structure modeling. *Journal of Organizational Behavior*, 16(3), 201-213.

Bray, J. H., & Maxwell, S. E. (Eds.). (1985). *Multivariate analysis of variance (Vol. 54)*. Sage.

Brennan, R., & Turnbull, P. W. (1999). Adaptive behavior in buyer–supplier relationships. *Industrial Marketing Management*, 28(5), 481-495.

Briggs, A. R., Morrison, M., & Coleman, M. (Eds.). (2012). *Research methods in educational leadership and management*. Sage Publications.

Bruce, C. S. (2008). *Informed learning*. Association of College and Research Libraries/American Library Association.

Bruner, I. I. GC, & Kumar, A. (2005). Applying TAM to consumer usage of handheld Internet devices. *Journal of Business Research*, 58, 553-558.

Burns, R. P., & Burns. R. (2008). *Business research methods and statistics using SPSS*. United Kingdom: SAGE Publications.

Burns, A. C., & Bush, R. F. (2006). *Marketing Research (5th)*. Prentice Hall.

Burrows, P. (2001, August, 13). *IBM serves up some surprises: It's turning heads in the server market--and gaining ground*. Retrieved November 17 2008, from BusinessWeek Web Site: http://www.businessweek.com/magazine/content/01_33/b3745097.htm.

Busch, P., & Bush, R. F. (1978). Women contrasted to men in the industrial salesforce: Job satisfaction, values, role clarity, performance, and propensity to leave. *Journal of Marketing Research*, 438-448.

Calif, S. A. (2003, September, 20). *Supermarkets adding self-checkout lanes, digital shelf price tag*. Retrieved November 01 2008, from Access MyLibrary Web Site:http://www.accessmylibrary.com/coms2/summary_0286-8165283_ITM.

Campbell, S. J. (2008). Self-service drives contact center success. *ABI/INFORM Global*. 27(2), 33.

Canbase. (2009). *Self Service*. Retrieved December 11 2008, from http://www.canbase.com/Self_Service%20.htm.

Carpenter, J. R., & Kenward, M. G. (2007). *Missing data in randomised controlled trials–a practical guide*. Birmingham: National Coordinating Centre for Research Methodology.

Chang, M. K. (1998). Predicting unethical behavior: A comparison of the theory of reasoned action and the theory of planned behavior. *Journal of Business Ethics*, 17(16), 1825-1834.

Cheng, E. W. (2001). SEM being more effective than multiple regression in parsimonious model testing for management development research. *Journal of Management Development*, 20(7), 650-667.

Carbonell, P., Escudero, A. I. R., & Aleman, J. L. M. (2004). Technology newness and impact of go/no-go criteria on new product success. *Marketing Letters*, 15(2-3), 81-97.

Chen, K. J. (2005). Technology-based service and customers satisfaction in developing countries. *International Journal of Management*, 22(2), 307-318.

Chen, Y. H., & Barnes, S. (2007). Initial trust and online buyer behavior. *Industrial Management & Data Systems*, 107(1), 21-36.

Chang, H. C. (2010). A new perspective on twitter hashtag use: diffusion of innovation theory. *Proceedings of the American Society for Information Science and Technology*, 47(1), 1-4.

Chang, S. J., van Witteloostuijn, A., & Eden, L. (2010). From the editors: common method variance in international business research. *Journal of International Business Studies*, 41(2), 178-184.

Chaudhuri, A. (2000). A macro analysis of the relationship of product involvement and information search: the role of risk. *Journal of Marketing Theory and Practice*, 1-15.

Chau, P. Y., & Lung Hui, K. (1998). Identifying early adopters of new IT products: a case of Windows 95. *Information & Management*, 33(5), 225-230.

Chen S.C., & Chen H. H. (2009).The empirical study of customer satisfaction and continued behavioural intention towards self-service banking: technology readiness as an antecedent. *International Journal of Electronic Finance*, 3, 64-76.

Chen, S. C., Chen, H. H., & Chen, M. F. (2009). Determinants of satisfaction and continuance intention towards self-service technologies. *Industrial Management & Data Systems*, 109(9), 1248-1263.

Chen, L. D., Gillenson, M. L., & Sherrell, D. L. (2002). Enticing online consumers: an extended technology acceptance perspective. *Information & Management*, 39(8), 705-719.

Chen, J. S., Tsou, H. T., & Ching, R. K. (2011). Co-production and its effects on service innovation. *Industrial Marketing Management*, 40(8), 1331-1346.

Chen, F. F., West, S. G., & Sousa, K. H. (2006). A comparison of bifactor and second-order models of quality of life. *Multivariate Behavioral Research*, 41(2), 189-225.

Chieftech. (2013). *Self-Service Checkouts- Love Them or Hate them, Its All About the Customers*. Retrieved March 20 2013, from http://chieftech.com.au/post/self-service-checkouts-love-them-or-hate-them-its-all-about-the-customer.

Childers, T. L., Christopher, L. C., Carr, J. P., & Carson, S. (2001). Hedonic and utilitarian motivations for online retail shopping behavior. *Journal of Retailing*, 77, 511-35.

Cho, S. (2011). Self-service technology: An investigation of the potential for adoption in apparel retail setting. *University of North Carolina, Greensboro*, Phd thesis.

Cho, H., & LaRose, R. (1999). Privacy issues in Internet surveys. *Social Science Computer Review*, 17(4), 421-434.

Cho, N., & Park, S. (2001). Development of electronic commerce user-consumer satisfaction index (ECUSI) for Internet shopping. *Industrial Management & Data Systems*, 101(8), 400-406.

Chou, C. P., & Bentler, P. M. (1995). Estimates and tests in structural equation modeling.

Cunningham, L. F., Young, C. E., & Gerlach, J. H. (2008). Consumer views of self-service technologies. *The Service Industries Journal*, 28(6), 719-732.

Churchill Jr, G. A., Ford, N. M., Hartley, S. W., & Walker Jr, O. C. (1985). The determinants of salesperson performance: a meta-analysis. *Journal of Marketing Research*, 103-118.

Claycomb, C., Lengnick-Hall, C. A., & Inks L.W.I. (2001). The Customer as a productive resource: A pilot study and strategic implications. *Journal of Business Strategies*, 18(1), 47-69.

Coleman, J. S. (1990). *Foundations of social theory*. Cambridge: Harvard University Press.

Collier, J. E. (2006). Examining customers' intentions to use self-service technology through utilitarian and hedonic value judgments. *The University of Memphis*, PhD. (Thesis).

Collier, J. E., & Sherrell, D. L. (2010). Examining the influence of control and convenience in a self-service setting. *Journal of the Academy of Marketing Science*, 38 (4), 490–509.

Compeau, D. R., & Higgins, C. A. (1995). Computer self-efficacy: Development of a measure and initial test. *MIS quarterly*, 189-211.

Conchar, M. P., Zinkhan, G. M., Peters, C., & Olavarrieta, S. (2004). An integrated framework for the conceptualization of consumers' perceived-risk processing. *Journal of the Academy of Marketing Science*, 32(4), 418-436.

Cooper, R. G. (1984). New product strategies: what distinguishes the top performers?. *Journal of Product Innovation Management*, 1(3), 151-164.

Cosgrove-Mather, B. (2004, June, 8). *Self-checkouts ring up sales - Supermarkets shift to checkout lanes that don't need cashiers.* Retrieved February 27 2009, from CBS NEWS Web Site: http://www.cbsnews.com/stories/2004/06/08/tech/main621865.shtml.

Crespin-Mazet, F., & Ghauri, P. (2007). Co-development as a marketing strategy in the construction industry. *Industrial Marketing Management*, 36(2), 158-172.

Cronin, J. J., Brady, M. K., & Hult, G. T. M. (2000). Assessing the effects of quality, value, and customer satisfaction on consumer behavioral intentions in service environments. *Journal of Retailing* . 76(2), 193-217.

Cupchik, G. (2001). Constructivist realism: An ontology that encompasses positivist and constructivist approaches to the social sciences. *Forum: Qualitative Social Research Sozialforschung*, 2(1), Art. 7.

Curran, J. M., & Meuter, M. L. (2005). Self-service technology adoption: comparing three technologies. *Journal of Services Marketing*, 19 (2), 103-113.

Curran, J. M., & Meuter, M. L. (2007). Encouraging existing customers to switch to self-service technologies: put a little fun in their lives. *The Journal of Marketing Theory and Practice*, 15(4), 283-298.

Curran, J. M., Meuter, M. L., & Surprenant, C. F. (2003). Intentions to use self- service technologies: A confluence of multiple attitudes. *Journal of Service Research*, 5(3), 209.

Curtin, P. A., & Gaither, T. K. (2005). Privileging identity, difference, and power: The circuit of culture as a basis for public relations theory. *Journal of Public Relations Research*, 17(2), 91-115.

Cutcher, L. (2010). Local heroes: Co‐producing history,"community" and the self. Consumption, *Markets and Culture*, 13(1), 79-90.

Dabholkar, P. A. (1994). Incorporating choice into an attitudinal framework: analyzing models of mental comparison processes. *Journal of Consumer Research*, 100-118.

Dabholkar, P. A. (1995). A contingency framework for predicting causality between customer satisfaction and service quality. *Advances in Consumer Research*, 22, 101-108.

Dabholkar, P. A. (1996). Consumer evaluations of new technology-based self- service options: An investigation of alternative models of service quality. *International Journal of Research in Marketing*, 13, 29-51.

Dabholkar, P. A., & Bagozzi, R. P. (2002). An attitudinal model of technology- based self-service: moderating effects of consumer traits and situational factors. *Journal of the Academy of Marketing Science*, 30(3), 184-201.

Dabholkar, P. A., Bobbitt, L. M., & Lee, E. J. (2003). Understanding consumer motivation and behavior related to self-scanning in retailing: implications for strategy and research on technology-based self-service. *International Journal of Service Industry Management*, 14(1), 59-95.

Dabholkar, P. A., & Thorpe, D. I. (1994). Does customer satisfaction predict shopper intentions. *Journal of Consumer Satisfaction, Dissatisfaction and Complaining Behavior*, 7(1), 291.

Davidson, W. R., Sweeney, D. J., & Stampfl, R. W. (1988). *Retail Management.* New York: Wiley.

Davis, F. D. (1986). A technology acceptance model for empirically testing new end-user information systems: theory and results, *Massachusetts Institute of Technology, Sloan School of Management*, Thesis (Ph.D.).

Davis, F. D., Bagozzi, R. P., & Warshaw, P. R. (1989). User acceptance of computer technology: A comparison of two theoretical models. *Management Science*. 35(8), 982-1003.

Davis, F. D., Bagozzi, R. P., & Warshaw, P. R. (1992). Extrinsic and intrinsic motivation to use computers in the workplace. *Journal of Applied Social Psychology*, 22(14), 1109-1130.

Dean, D. H. (2008). Shopper age and the use of self-service technologies. *Managing Service Quality*, 18(3), 228-238.

Deci, E.L., Eghrari, H., Patrick, B.C., & Leone, D.R. (1994). Facilitating internalization: The self-determination theory perspective. *Journal of Personality*, 62, 119-142.

Deci, E. L., Koestelr, R., & Ryan, R. M. (1999). A meta-analytic review of experiments examining the effects of extrinsic rewards on intrinsic motivation. *Psychological Bulletin*, 125, 627-668.

Deci, E. L., & Ryan, R. M. (1985). *Self‐Determination*. John Wiley & Sons, Inc..

Deci, E. L., & Ryan, R. M. (1991). *A motivational approach to self: Integration in personality*. In R. Dienstbier (Ed.), Nebraska Symposium on Motivation: Vol. 38, Perspectives on motivation (pp. 237-288). Lincoln: University of Nebraska Press.

Deci, E.L., & Ryan, R.M. (2000a). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist*, 55(1), 68-78.

Deci, E.L., & Ryan, R.M. (2000b). Intrinsic and extrinsic motivations: Classic definitions and new directions. *Contemporary Educational Psychology*, 25(1), 54-67.

Deci, E. L., & Ryan, R. M. (Eds.). (2002). *Handbook of self-determination research*. University Rochester Press.

Deci, E. L., & Ryan, R. M. (2008). Facilitating optimal motivation and psychological well-being across life's domains. *Canadian Psychology*, 49, 14-23.

Deci, E. L., & Ryan, R. M. (2012). *Self-determination theory*. In P. A. M. Van Lange, A. W. Kruglanski, & E. T. Higgins (Eds.), Handbook of theories of social psychology: Vol. 1 (pp. 416-437). Thousand Oaks, CA: Sage.

De Mooij, M. (2010). *Consumer behavior and culture: Consequences for global marketing and advertising*. Sage.

Devaraj, S., Fan, M., & Kohli, R. (2002). Antecedents of B2C channel satisfaction and Preference: Validating e-commerce metrics. *Information System Research*, 13(3), 316-333.

Diener, E. (1980). *Deindividuation: The absence of self - awareness and self – regulation in group members*. Hillsdale, NJ: Erlbaum.

Dirk, Van den Poel., & Bart, L. (2004). Attrition analysis for financial services using proportional hazard models. *European Journal of Operational Research*, 157(1), 196-217.

Dolen, W. M., & de Ruyter, K. (2007). Moderated group chat: An empirical assessment of a new e-service encounter. *International Journal of Service Industry Management*.

Doncaster, C. P., & Davey, A. J. H. (2007). *Analysis of variance and covariance: How to choose and construct models for the life sciences*. Cambridge University Press.

Donner, M. B., VandeCreek, L., Gonsiorek, J. C., & Fisher, C. B. (2008). Balancing confidentiality: Protecting privacy and protecting the public. *Professional psychology: Research and Practice*, 39(3), 369a.13(5), 496-511.

Doney, P. M., Cannon, J. P., & Mullen, M. R. (1998). Understanding the influence of national culture on the development of trust. *Academy of management review*, 23(3), 601-620.

Doolin, B., & Troshani, I. (2007). Organizational adoption of XBRL. *Electronic Markets*,

Duronto, P. M., Nishida, T., & Nakayama, S. I. (2005). Uncertainty, anxiety, and

avoidance in communication with strangers. *International Journal of Intercultural Relations*, 29(5), 549-560.17(3), 199-209.

Doty, D. H., & Glick, W. H. (1998). Common methods bias: does common methods variance really bias results?. *Organizational Research Methods*, 1(4), 374-406.

Dowling, G. R., & Staelin, R. (1994). A model of perceived risk and intended risk-handling activity. *Journal of consumer research*, 119-134.

Dreyfuss, I. (2004, June, 8). *Self-checkouts ring Up Sales*. Retrieved October 30 2008, from http://www.cbsnews.com/stories/2004/06/08/tech/main621865.shtml.

Dusenbury, L., & William, B. H. (2004). Pursuing the course from research to practice. *Prevention Science*, 5 (1), 55-59.

Dwyer, F. R., & Tanner, J. F. (2002). *Business Marketing: Connecting Strategies, Relationship and Learning*. Boston, MA: McGraw-Hill.

Eagly, A. A., & Chalken, S. (1993). T*he Psychology of Attitudes*. Fort Worth, TX: Harcourt Brace.

Egger, F. N. (2000, April). Trust me, I'm an online vendor: towards a model of trust for e-commerce system design. In *CHI'00 extended abstracts on Human factors in computing systems* (pp. 101-102). ACM.

Eastlick, M. A., Ratto, C., Lotz, S. L., & Mishra, A. (2012). Exploring antecedents of attitude toward co-producing a retail checkout service utilizing a self-service

technology. *The International Review of Retail, Distribution and Consumer Research*, 22(4), 337-364.

Eighmey, J., & McCord, L. (1998). Adding value in the information age: Uses and gratifications of sites on the World Wide Web. *Journal of Business Research*, 41(3), 187-194.

Eisenhardt, K. M. (1989). Building theories from case study research. *Academy of Management Review*, 14(4), 532-550.

Elliott, M. A., Armitage, C. J., & Baughan, C. J. (2007). Using the theory of planned behaviour to predict observed driving behaviour. *British Journal of Social Psychology*, 46(1), 69-90.

Ergeneli, A., Camgoz, S. M., & Karapinar, P. B. (2010). The relationship between self-efficacy and conflict-handling styles in terms of relative authority positions of the two parties. *Social Behavior and Personality: An International Journal*, 38(1), 13-28.

Eriksson, K., Bagozzi, R. P., & Warshaw, P. R. (2001). Customer acceptance of internet banking in Estonia. *International Journal of Bank Marketing*, 23(20), 200-216.

Eriksson, K., & Nilsson, D. (2007). Determinants of the continued use of self- service technology: The case of internet banking. *Technovation*. 27, 159-167.

Etgar, M. (2006). Co-production of services. *The Service-Dominant Logic of Marketing*, 128-138.

Evans, G. (1982). *The varieties of reference (pp. 100-ff). J. H. McDowell (Ed.)*. Oxford: Clarendon Press.

Evans, J. R., & Mathur, A. (2005). The value of online surveys. *Internet Research*, 15(2), 195-219.

Evensen, G. (2009). *Data assimilation: the ensemble Kalman filter.* Springer.

Farrell, A. M., & Rudd, J. M. (2009). Factor analysis and discriminant validity: A brief review of some practical issues. *ANZMAC.*

Feder, G., Just, R. J., & Zilberman, D. (1985). Adoption of agricultural innovations in developing countries: A survey. *Economic Development and Cultural Change*, 33(2):255-298.

Ferguson, G. A., & Takane, Y. (2005). *Statistical analysis in psychology and education.* McGraw-Hill .

Fernet, C. (2011). Development and validation of the Work Role Motivation Scale foSchool Principals (WRMS-SP). *Educational Administration Quarterly*, 47, 307–331.

Field, A. (2000). *Discovering statistics using SPSS for windows.* Sage publications.

Field, A. (2009). *Discovering statistics using SPSS*. Sage publications.

Fielding, K. S., Terry, D. J., Masser, B. M., & Hogg, M. A. (2008). Integrating social identity theory and the theory of planned behaviour to explain decisions to engage in sustainable agricultural practices. *British Journal of Social Psychology*, 47(1), 23-48.

Firat, A. F., Dabholkar, N., & Venkatesh, A. (1995). Marketing in a postmodern world. *European Journal of Marketing*, 29(1), 40-56.

Fischhoff, B., Watson, S. R., & Hope, C (1990). *Defining Risk*. Washington, DC: Resources for the Future.

Fishbein, M., & Ajzen, I. (1975). *Belief, attitude, intention and behavior: An introduction to theory and research*.

FMI. (2010). *Supermarket anniversary fact*. Retrieved November 24 2012 from http://www.fmi.org/research-resources/fmi-research-resources/supermarket-anniversary-facts.

Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research*, 39-50.

Fortier, M. S., Vallerand, R. J., & Guay, F. (1995). Academic motivation and school performance: Toward a structural model. *Contemporary Educational Psychology*, 20, 257-274.

Frambach, R. T., Herk, H., & Agarwal, M. K. (2003). *Culture's Influence on Innovation Adoption: A Global Study of Managers' Adoption Intention of Telecom Innovations.* Vrije Universiteit.

Friman, M., Garling, T., Millett, B., Mattsson, J., & Johnston, R. (2002). An analysis of international business-to-business relationships based on the commitment- trust theory. *Industrial Marketing Management*, 31(5), 403-410.

Fujitsu. (2005, February, 11). *Fujitsu and store next bag new self-checkout customers; wins include national and independent grocery chains.* Retrieved October 20 2008, from http://www.fujitsu.com/us/news/pr/ftxs_20050211.html.

Gagne ́, M., & Deci, E. L. (2005). Self-determination theory and work motivation. *Journal of Organizational Behavior*, 26, 331–362.

Gallaugher, J. (2010). *Information Systems: A Manager's Guide to Harnessing Technology*. Flat World Knowledge.

Garbarino, E., & Johnson, M. S. (1999). The different roles of satisfaction, trust, and commitment in customer relationships. *Journal of Marketing*, 70-87.

Gardener, E., Howcroft, B., & Williams, J. (1999). The new retail ranking revolution. *The Service Industries Journal*, 19(2), 83-100.

Gefen, D. (2000). *E-commerce: the role of familiarity and trust*. Omega, 28(6), 725-737.

Gentry, L., & Calantone, R. (2002). A comparison of the three models to explain shop-bot use on the web. *Psychology & Marketing*, 19(11), 945-956.

Gerba, B. (2006, August, 02). *Self-checkout systems may reduce impulse purchases.* Retrieved November 28 2008, from The Digital Signage Insider Web Site: http://www.wirespring.com/dynamic_digital_signage_and_interactive_kiosks_journal/articles/Self_checkout_systems_may_reduce_impulse_purchases-286.html.

Gerbing, D. W., & Anderson, J. C. (1984). On the meaning of within-factor correlated measurement errors. *Journal of Consumer Research*, 572-580.

Gerbing, D. W., & Anderson, J. C. (1988). An updated paradigm for scale development incorporating unidimensionality and its assessment. *Journal of Marketing research*, 186-192.

Gerbing, D. W., & Anderson, J. C. (1993). Monte Carlo evaluations of goodness-of-fit indices for structural equation models. *Sage Focus Editions*, 154, 40-40.

Geyskens, I., Steenkamp, J.B., & Kumar, N. (1998). Generalizations about trust in marketing channel relationships using meta-analysis, *International Journal of Research in Marketing*, 15(3), pp.223-248.

Giannì, G., & Franceschini, F. (2003). A new model to support the personalised management of a quality e-commerce service. *International Journal of Service Industry Management*, 14(3), 331-346.

Giese, J. L., & Cote, J. A. (2000). *Defining customer satisfaction*. Retrieved November 20 2008, from http://www.amsreview.org/ amsrev/theory/giese00-01.html.

Gilbert, C. G. (2001, August). A dilemma in response: Examining the newspaper industry's response to the Internet. *In Academy of Management Proceedings (Vol. 2001, No. 1, pp. D1-D6)*. Academy of Management.

Glesen, C., & Peshkin, A. (1992). *Becoming qualitative researchers: An introduction*. New York: Longman.

Goldstein, H. (2011). *Multilevel statistical models (Vol. 922)*. Wiley. com.

Gollwitzer, P. M. (1999). Implementation intentions: strong effects of simple plans. *American Psychologist*, 54(7), 493.

Gomez, L. (2003). Effects of visual cues on public self-awareness and perceived anonymity of self. *Paper presented at the annual meeting of International Communication Association*.

Goodwin, C. J. (2009). *Research in psychology: Methods and design.* John Wiley & Sons.

Green, C. (2009, March, 23). *Grocery chain to deploy wincor nixdorf self-service checkout hardware in Northern Ireland trial*. Retrieved March 10 2009, from http://www.itpro.co.uk/98449/supermarket-retailer-spar-to-deploy-automated-checkout-system.

Griffy - Brown, C., Chun, M. W. S., & Machen, R. (2008). Hilton hotels corporation self-service technology. *Journal of Information Technology Case and Application Research*, 10(2), 37.

Gronroos, C. (1983). *Strategic Management and marketing in the service sector*. Report No. 83–104, Cambridge, Mass: Marketing Science Institute.

Grönroos, C. (1984). A service quality model and its marketing implications. *European Journal of Marketing*, 18(4), 36-44.

Gruen, T. W., Summers, J. O., & Acito, F. (2000). Relationship marketing activities, commitment, and membership behaviors in professional associations. *The Journal of Marketing*, 34-49.

Guay, F., Vallerand, R. J., & Blanchard, C. (2000). On the assessment of situational intrinsic and extrinsic motivation: The Situational Motivation Scale (SIMS). *Motivation and Emotion*, 24(3), 175-213.

Guido, G. (2006). Shopping motives and the hedonic/utilitarian shopping value: A preliminary study. *European Advances in Consumer Research*. 7, 168-169.

Guo, Q., Johnson, C. A., Unger, J. B., Lee, L., Xie, B., Chou, C. P., & Pentz, M. (2007). Utility of the theory of reasoned action and theory of planned behavior for predicting Chinese adolescent smoking. *Addictive behaviors*, 32(5), 1066-1081.

Guriting, P., & Ndubisi, N. O. (2006). Borne online banking: Evaluating customer perceptions and behavioral intention. *Management Research News*. 29(1/2), 6-15.

Guttman, L. (1954). *A new approach to factor analysis*: the Radex.

Gutterman, A. (2002). *International joint ventures: how to negotiate, establish and manage an international joint venture* (lst Ed.). Novato, California: World Trade Press.

Hays, M. (2003, March, 3). *Self-Checkout Systems Get More Hands-On*. Retrieved November 20 2008, from InformationWeek Web Site: http://www.information week.com/news/software/showArticle.jhtml?articleID=8700470.

Hahn, K. H., & Kim, J. (2009). The effect of offline brand trust and perceived internet confidence on online shopping intention in the integrated multi-channel context. *International Journal of Retail & Distribution Management*, 37(2), 126-141.

Hair, J. F., Bush, R. P., & Ortinau, D. J. (2000). *Marketing research: A practical approach for the new millennium*. Irwin Professional Publishing.

Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2006). *Multivaiate data analysis: A global perspective*. New Jersey: Prentice Hall.

Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2010). *Multivariate data analysis (7th ed.)*. Englewood Cliffs: Prentice Hall.

Hakansson, H., & Snehota, I. (Eds.). (1995). *Developing relationships in business networks*. Londres: Routledge.

Hall, M. J. (2003). The interpretation of non - homogeneous hydrometeorological time series: a case study. *Meteorological Applications*, 10(1), 61-67.

Hall, M. (2008). The effect of comprehensive performance measurement systems on role clarity, psychological empowerment and managerial performance. *Accounting, Organizations and Society*, 33(2), 141-163.

Haladyna, T. M. (1999). *A complete guide to student grading*. Allyn and Bacon.

Halvari, A. E. M., Halvari, H., Bjørnebekk, G., & Deci, E. L. (2010). Motivation and anxiety for dental treatment: Testing a self-determination theory model of oral self-care behaviour and dental clinic attendance. *Motivation and Emotion*, 34(1), 15-33.

Hansen, T., Jensen, J. M., & Solgaard, H. S. (2004), Predicting online grocery buying intention: a comparison of the theory of reasoned action and the theory of planned behaviour, *International Journal of Information Management*, 24(6), 539-50.

Harrison, D. A., Mykytyn, P. P., & Riemenschneider, C. K. (1997). Executive decisions about adoption of information technology in small business: Theory and empirical tests. *Information Systems Research*, 8(June), 171-195.

Harrison, S., & Smith, C. (2004). Trust and moral motivation: redundant resources in health and social care?. *Policy & politics*, 32(3), 371-386.

Harter, J. K., Schmidt, F. L., & Hayes, T. L. (2002). Business-unit-level relationship between employee satisfaction, employee engagement, and business outcomes: a meta-analysis. *Journal of Applied Psychology*, 87(2), 268.

Hattie, J. (1985). Methodology review: assessing unidimensionality of tests and items. *Applied Psychological Measurement*, 9(2), 139-164.

Hayes, A. F. (2012). PROCESS: A versatile computational tool for observed variable mediation, moderation, and conditional process modeling. *Manuscript submitted for publication*.

Healy, M., & Perry, C. (2000). Comprehensive criteria to judge validity and reliability of qualitative research within the realism paradigm. *Qualitative Market Research: An International Journal*, 3(3), 118-126.

Hegarty, N. (2010). Application of the Academic Motivation Scale to Graduate School Students. *The Journal of Human Resource and Adult Learning*, 6(2), 48-55.

Hegarty, M. (2010). Components of spatial intelligence. *Psychology of Learning and Motivation*, 52, 265-297.

Heijden, H. (2003). Factors influencing the usage of websites: the case of genericportal in the Netherlands. *Information & Management*, 40, 541-549.

Hendrickson, A. R., Massey, P. D., & Cronan, T. P. (1993). On the test-retest reliability of perceived usefulness and perceived ease of use scales. *MIS Quarterly*, 17, 227-230.

Hernan-dez, J. M. C., & Mazzon, J. A. (2007). Adoption of internet banking: proposition and implementation of an integrated methodology approach. *International Journal of Bank Marketing*, 25(2), 72-88.

Hiemstra, R. (2010). *Self-directed learning: A personal perspective*. In Derrick M.G. & Ponton, M.K. (Eds.), Emerging Directions in Self Directed Learning (pp.1- 18), Chicago, IL: Discovery Association Publishing House.

Hilton, T., & Hughes, T. (2012). Co-production and self-service: The application of Service-Dominant Logic. *Journal of Marketing Management*, (ahead-of-print), 1-21.

Hitt, M. A., Dacin, M. T., Levitas, E., Arregle, J.-L., & Borza, A. (2000). Partner selection in a merging and developed market context: Resource-based and organizational learning perspectives. *Academy of Management Journal*, 43: 449–467.

Hirst, C. (2004, August, 8). *TECHNOLOGY: Self-checkout - Supermarket Shake-up as the Bell Tolls*. Retrieved November 15 2008, from bBent Web Site: http://findarticles.com/p/articles/mi_qn4159/is_20040808/ai_n12758608.

HKTDC (2003, February, 6). *Checking IT Out: US Supermarkets Load Up with Self – Service Technology*. Retrieved November 9 2008, from International Market New Website: http://info.hktdc.com/imn/03020601/ecomm007.htm.

Hsieh, C.T. (2005). Implementing self-service technology. *Cumminications of the IIMA*, 5(1), 77-83.

Ho, W. H., Chang, C. S., Shih, Y. L., & Liang, R. D. (2009). Effects of job rotation and role stress among nurses on job satisfaction and organizational commitment. *BMC Health Services Research*, 9(1), 8.

Holbert, L. R., & Stephenson, M. T. (2003). The importance of indirect effects in media effects research: Testing for mediation in structural equation modeling. *Journal of Broadcasting & Electronic Media*, 47, 556-572.

Hooper, D., Coughlan, J., & Mullen, M. (2008). Structural equation modelling: guidelines for determining model fit. *Articles*, 2.

Howitt, D., & Cramer, D. (2010). Thematic analysis. *Introduction to qualitative methods in psychology*, 2, 163-186.

Hox, J. (2010). *Multilevel analysis: Techniques and applications.* Routledge.

Hoyle, R. H. (Ed.). (1995). *Structural equation modeling: Concepts, issues, and applications*. Sage Publications.

Hu, L. T., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. Structural Equation Modeling: *A Multidisciplinary Journal*, 6(1), 1-55.

Humphreys, A., & Grayson, K. (2008). The Intersecting Roles of Consumer and Producer: A Critical Perspective on Co‐production, *Co‐creation and Prosumption. Sociology Compass*, 2(3), 963-980.

Hunt, D. M., Geiger-Oneto, S., & Varca, P. E. (2012). Satisfaction in the context of customer co-production: A behavioral involvement perspective. *Journal of Consumer Behaviour*, 11(5), 347-356.

Hurley, A. E., Scandura, T. A., Schriesheim, C. A., Brannick, M. T., Seers, A., Vandenberg, R. J., & Williams, L. J. (1997). Exploratory and confirmatory factor analysis: Guidelines, issues, and alternatives. *Journal of Organizational Behavior*, 18(6), 667-683.

Hwang, Y., & Kim, D. J. (2007). Customer self-service systems: The effects of perceived Web quality with service contents on enjoyment, anxiety, and e-trust. *Decision Support Systems*, 43(3), 746-760.

Iarossi, G. (2006). *The power of survey design: A User's Guide for Managing Surveys, Interpreting Results, and Influencing Respondents*. World Bank-free PDF.

ICCHP. (2012). Accessibility and usability of self-service terminals and related devices. *13th International Conference On Computers Helping People with Special Needs*, July 2012.

Igbaria, M., & Iivari, J. (1995). The effects of self-efficacy on computer usage. *Omega*, 23(6), 587-605.

International Automated Systems. (2007). *Self-service supermarket check-out*. Retrieved March 20 2009, from: http://www.iaus.com/AutomatedSupermarket.aspx.

IHL Group (2007, July, 17). *Consumers on track to spend $1.3 Trillion a year at Self-Service Machines by 2011*. Retrieved February 1 2009, from http://www.ihlservices.com/ihl/press_detail.cfm?PressReleaseID=55.

Ivancevich, J. M., & Donnelly, J. H. (1974). A study of role clarity and need for clarity for three occupational groups. *Academy of Management Journal*, 17(1), 28-36.

Jaasma, M. A., & Koper, R. J. (1999). The relationship of student - faculty out - of - class communication to instructor immediacy and trust and to student motivation. *Communication Education*, 48(1), 41-47.

Jamal, A. (2004). Retail banking and customer behavior: a study of self-concept, satisfaction and technology usage. *The International Review of Retail, Distribution and Consumer Research*, 14(3), 357-379.

Janda, S., Trocchia, P. J., & Gwinner, K. P. (2002). Consumer perceptions of Internet retail service quality. *International Journal of Service Industry Management*, 13(5), 412-431.

Jaruwachirathanakul, B., & Fink, D. (2005). Internet banking adoption strategies for a developing country: The case of Thailand. *Internet Research*, 15(3), 295-311.

Jarvenpaa, S. L., & Tractinsky, N (1999). Consumer trust in an internet store: A cross-cultural validation. *Journal of Computer-Mediated Communication*, 5(2), 1-35.

Jarvis, D. (2002). The European Community Respiratory Health Survey II. *European Respiratory Journal*, 20(5), 1071-1079.

Jemmott III, J. B., Heeren, G. A., Ngwane, Z., Hewitt, N., Jemmott, L. S., Shell, R., & O'leary, A. (2007). Theory of planned behaviour predictors of intention to use condoms among Xhosa adolescents in South Africa. *AIDS care*, 19(5), 677-684.

Joët, G., Usher, E. L., & Bressoux, P. (2011). Sources of self-efficacy: An investigation of elementary school students in France. *Journal of Educational Psychology*, 103(3), 649.

Johnson, D. (2007). Achieving customer value from electronic channels through identity commitment, calculative commitment and trust in technology. *Journal of Interactive Marketing*, 21(4), 2-22.

Johnson-George, C., & Swap, W. (1982). Measurement of specific interpersonal trust: construction and validation of a scale to assess trust in a specific other. *Journal of Personality and Social Psychology*, 43, 1306-1317.

Joinson, A. (1999). Social desirability, anonymity, and Internet-based questionnaires. *Behavior Research Methods, Instruments, & Computers*, 31(3), 433-438.

Jones, G. R. (1986). Socialization tactics, self-efficacy, and newcomers' adjustments to organizations. *Academy of Management Journal*, 29(2), 262-279.

Joreskog, K. G., & Sorbom, D. (1996). *LISREL 8 User's Guide Chicago*, IL: Scientific Software International.

Judd, C. M., & Kenny, D. A. (2010). *Data analysis in social psychology: Recent and recurring issues*. John Wiley & Sons, Inc..

Jung, K., Heo, W., & Chen, W. (2012, December). IRIE: Scalable and robust influence maximization in social networks. In Data Mining (ICDM), 2012 *IEEE 12th International Conference* on (pp. 918-923). IEEE.

Kahai, S. S., Avolio, B. J., & Sosik, J. T. (1998). Effects of source and participant anonymity and difference in initial opinions in an EMS context. *Decision Sciences*, 29(2), 427-460.

Kelley, S. W., Donnelly, J. H., & Skinner, S. J. (1990). Customer participation in service production and delivery. *Journal of retailing*, 66(3), 315-35.

Kelly, J. P., & Hise, R. T. (1980). Role conflict, role clarity, job tension and job satisfaction in the brand manager position. *Journal of the Academy of Marketing Science*, 8(2), 120-137.

Kelly, P., Lawlor, J., & Mulvey, M. (2010). A Review of Key Factors Affecting the Adoption of Self-Service Technologies in Tourism.

Kenny, D. A., & Judd, C. M. (1986). Consequences of violating the independence assumption in analysis of variance. *Psychological Bulletin*, 99(3), 422-431.

Kim, J. S., Christodoulidou, N., & Choo, Y. C. (2013). Factors influencing customer acceptance of kiosks at quick service restaurants. *Journal of Hospitality and Tourism Technology*, 4(1), 40-63.

Kim, Y. J., Chun, J. U., & Song, J. (2009). Investigating the role of attitude in technology acceptance from an attitude strength perspective. *International Journal of Information Management*, 29(1), 67-77.

Kim, Y. H., Kim, M., & Goh, B. K. (2011). An examination of food tourist's behavior: Using the modified theory of reasoned action. *Tourism Management*, 32(5), 1159-1165.

Kim, Y. H., Kim, D. J., & Hwang, Y. (2009). Exploring online transaction self-efficacy in trust building in B2C e-commerce. *Journal of Organizational and End User Computing* (JOEUC), 21(1), 37-59.

King, L. A., & King, D. W. (1990). Role conflict and role ambiguity: A critical assessment of construct validity. *Psychological Bulletin*, 107(1), 48.

Kinney, L., & McDaniel, S. R. (1996). Strategic implications of attitude toward the Ad in leveraging event sponsorships. *Journal of Sport Management*, 10, 250-261.

Kinney, A.T., Smith, B.A., & Donzella, B. (2001). The influences of sex, gender, self discrepancies, and self awareness on anger and verbal aggressiveness among U.S. college students. *The Journal of Social psychology*, 141(2), 245-275.

Kinzie, M. B., Delcourt, M. A., & Powers, S. M. (1994). Computer technologies: Attitudes and self-efficacy across undergraduate disciplines. *Research in higher education*, 35(6), 745-768.

Klassen, R. M., Bong, M., Usher, E. L., Chong, W. H., Huan, V. S., Wong, I. Y., & Georgiou, T. (2009). Exploring the validity of a teachers' self-efficacy scale in five countries. *Contemporary Educational Psychology*, 34(1), 67-76.

Koestner, R., Ryan, R. M., Bernieri, F., & Holt, K. (1984). Setting limits on children's behavior: The differential effects of controlling vs. informational styles on intrinsic motivation and creativity. *Journal of Personality*, 52(3), 233-248.

Kohli, A. K. (1985). Some unexplored supervisory behaviors and their influence on salespeople's role clarity, specific self-esteem, job satisfaction, and motivation. *Journal of Marketing Research*, 424-433.

Kohli, A. K., Shervani, T. A., & Challagalla, G. N. (1998). Learning and performance orientation of salespeople: the role of supervisors. *Journal of Marketing Research*, 263-274.

Kotler, P. (2000). *Marketing Management*. Upper Saddle River, NJ: Prentice – Hall.

Kotler, P., Adam, S., Brown, L., & Armstrong, G. (2006). *Principles of Marketing (3rd)*. Prentice Hall.

Koufaris, M. (2002). Applying the technology acceptance model and flow theory to online consumer behavior. *Information Systems Research*, 13(2), 205-223.

Koufteros, X., Babbar, S., & Kaighobadi, M. (2009). A paradigm for examining second-order factor models employing structural equation modeling. *International Journal of Production Economics*, 120(2), 633-652.

Koys, D. J. (2001). The effects of employee satisfaction, organizational citizenship behavior, and turnover on organizational effectiveness: A unit-level, longitudinal study. *Personnel Psychology*, 54(1), 101-114.

Kristensson, P., Matthing, J., & Johansson, N. (2008). Key strategies for the successful involvement of customers in the co-creation of new technology-based services. *International Journal of Service Industry Management*, 19(4), 474-491.

Kuan, F. Y., Ho, Y. P., & Chang, T. F. (2011, May). A study on the influence of consumers' perceived control and perceived risk to new E-Commerce technology innovation resistance. In E-Business and E-Government (ICEE), 2011 *International Conference on* (pp. 1-4). IEEE.

Kumar, V., Mukerji, B., Butt, I., & Persaud, A. (2007). Factors for successful e-government adoption: a conceptual framework. *The electronic journal of e-Government*, 5(1), 63-76.

Laforet, S., & Li, X. (2005). Consumers' attitudes towards online and mobile banking in China. International *Journal of Bank Marketing*, 23(5), 362-380.

Lake, M. (2002, June, 6). *How it works; The self-checkout: Lots of swiping, no stealing*. Retrieved November 20 2008, from http://www.nytimes.com/2002/06/06/technology/how-it-works-the-self-checkout-lots-of-swiping-no-stealing. html

Lanseng, E. J., & Andreassen, T. W. (2007). Electronic healthcare: a study of people's readiness and attitude toward performing self-diagnosis. *International Journal of Service Industry Management*, 18(4), 394-417.

Larsson, R., & Bowen, D. E. (1989). Organization and customer: managing design and coordination of services. *Academy of Management Review*, 14(2), 213-233.

Lau, K. H., & Zhang, J. (2006). Drivers and obstacles of outsourcing practices in China. *International Journal of Physical Distribution & Logistics Management*, 36(10), 776-792.

Lea, M., Spears, R., & Rogers, P. (2003). *Social processes in electronic teamwork: The central issue of identity*. In S. A. Haslam, D. Van Knippenberg, M. J. Platow, & N. Ellemers (Eds.), Social identity at work: Developing theory for organizational practice (pp. 99–115). New York, NY: Psychology Press.

Lee, J., & Allaway, A. (2002). Effects of personal control on adoption of self-service technology innovation. *The journal of Services Marketing*, 16(6), 553.

Lee, W., Castellanos, C., & Choi, C.H. S. (2012). The effect of technology readiness on customers' attitudes toward self-service technology and its adoption; The empirical study of US airline self-service check-in kiosks. *Journal of Travel & Tourism Marketing*, 29(8), 731-743.

Lee, K., & Joshi, K. (2006, April). Development of an integrated model of customer satisfaction with online shopping. In *Proceedings of the 2006 ACM SIGMIS CPR*

conference on computer personnel research: Forty four years of computer personnel research: achievements, challenges & the future (pp. 53-56). ACM.

Lee, H. J., Cho, H. J., Xu, W., & Fairhurst, A. (2010). The influence of consumer traits and demographics on intention to use retail self-service checkouts. *Marketing Intelligence & Planning*, 28(1), 46-58.

Lee, Y. H., Hsieh, Y. C., & Hsu, C. N. (2011). Adding innovation diffusion theory to the technology acceptance model: supporting employees' intentions to use e-learning systems. *Educational Technology & Society*, 14(4), 124-137.

Lee, Y. Y., & Lin, J. L. (2009). The effects of trust in physician on self-efficacy, adherence and diabetes outcomes. *Social science & medicine*, 68(6), 1060-1068.

Lee, Y. I., & Trim, P. R. J. (2006). The role of marketing intelligence relationship marketing and trust. *Marketing Intelligence & Planning*, 24(7), 730-745.

Lee, M. K., & Turban, E. (2001). A trust model for consumer internet shopping. *International Journal of electronic commerce*, 6, 75-92.

Lee, M. K. O., & Turban, E. (2001). A trust model for consumer internet shopping. International *Journal of Electronic Commerce*, 6(4), 75-91.

Lengnick-Hall, C. A. (1996). Customer contributions to quality: a different view of the customer-oriented firm. *Academy of Management Review*, 21(3), 791-824.

Lengnick-Hall, C. A., Claycomb, V. C., & Inks, L. W. (2000). From recipient to contributor: examining customer roles and experienced outcomes. *European Journal of Marketing*, 34(3/4), 359-383.

Li, F., & Harmer, P. (1996). Testing the simplex assumption underlying the sport motivation scale: A structural equation modeling analysis. *Research Quarterly for Exercise and Sport*, 67(4), 396-405.

Liker, J. K., & Sindi, A. A. (1997). User acceptance of expert systems: a test of the theory of reasoned action. *Journal of Engineering and Technology management*, 14(2), 147-173.

Lin, H. F. (2011). An empirical investigation of mobile banking adoption: the effect of innovation attributes and knowledge-based trust. *International Journal of Information Management*, 31(3), 252-260.

Lin, J. S. C., & Chang, H. C. (2011). The role of technology readiness in self-service technology acceptance. *Managing Service Quality*, 21(4), 424-444.

Lin, J. S. C., & Hsieh, P. L. (2006). The role of technology readiness in customers' perception and adoption of self-service technologies. *International Journal of Service Industry Management*, 17(5), 497-517.

Lindell, M. K., & Whitney, D. J. (2001). Accounting for common method variance in cross-sectional research designs. *Journal of Applied Psychology*, 86(1), 114-121.

Liao, Z., & Cheung, M.T. (2002). Internet-based e-banking and consumer attitudes: An empirical study. *Information and Management archive*, 39(4), 283-295.

Liu, S. (2012). The impact of forced use on customer adoption of self-service technologies. *Computers in Human Behavior*, 28(4), 1194-1201.

Liu, Y., Chen, Y., & Zhou, C. (2006, April). Exploring success factors for web-based e-government services: behavioral perspective from end users. In *Information and Communication Technologies*, 2006. ICTTA'06. 2nd (Vol. 1, pp. 937-942). IEEE.

Locke, E. A. (1983). Job satisfaction and role clarity among university and college faculty. *Review of Higher Education*, 6(4), 343-65.

Lofshult, D. (2007). *Supermarket self-checkout survey*. retrieved Februray 1 2008, from IDEA Health & Fitness Association Web Site: http://www.ideafit.com/fitness-library/supermarket-self-checkout-survey.

Lomax, R. G. (2001). *Statistical concepts: A second course for education and the behavioral sciences*. Lawrence Erlbaum Associates.

Lu, J., Wang, L., & Hayes, L. A. (2012). How do technology readiness, platform functionality and trust influence C2C user satisfaction?. *Journal of Electronic Commerce Research*, 13(1), 50-69.

Lukas, B., Hair, J., Bush, R., & Ortinau, D. J. (2004). *Marketing Research*. McGraw - Hill.

Lukas, B.A., Hair, J.F., Bush, R.P., & Ortinau, D.J. (2005). *Marketing Research*. Sydney: McGraw- Hill.

Lusch, R. F., Brown, S., & Brunswick, G. J. (1992). A generic framework for explaining internal vs. external exchange. *Journal of the Academy of Marketing Science*, 20, 119–134.

Lusch, R. F., Vargo, S. L., & O'Brien, M. (2007). Competing through service: Insights from service-dominant logic. *Journal of retailing*, 83(1), 5-18.

MacGillivray, H. L., & Balanda, K. P. (1988). The relationships between skewness and kurtosis. *Australian Journal of Statistics*, 30(3), 319-337.

MacKinnon, D. P., & Luecken, L. J. (2008). How and for whom? Mediation and moderation in health psychology. *Health Psychology*, 27(2S), S99.

MacKinnon, D. P., Lockwood, C. M., Hoffman, J. M., West, S. G., & Sheets, V. (2002). A comparison of methods to test mediation and other intervening variable effects. *Psychological methods*, 7(1), 83.

MacMillan, K., Money, K., Money, A., & Downing, S. (2005). Relationship marketing in the not-for-profit sector: an extension and application of the commitment–trust theory. *Journal of Business Research*, 58(6), 806-818.

Makarem, S. C., Mudambi, S. M., & Podoshen, J. S. (2009). Satisfaction in technology-enabled service encounters. *Journal of Services Marketin*g, 23(3), 134-144.

Malaga, R.A. (2001). Web-based reputation management systems: problems and suggested solution. *Electronic Commerce Research*, 1(4), 403-17.

Malhotra, N. K. (2003). *Marketing Research - An Applied Orientation (4th ed.)*. Prentice Hall.

Malhotra, N. K. (2006). *Marketing Research - An Applied Orientation (5th ed.)*. Prentice Hall.

Malhotra, N. K., Kim, S. S., & Patil, A. (2003). Common method variance in IS research: A comparison of alternative approaches and a reanalysis of past research. *Management Science*, 52(12), 1865-1883.

Malhotra, N. K., Kim, S. S., & Patil, A. (2006). Common method variance in IS research: A comparison of alternative approaches and a reanalysis of past research. *Management Science*, 52(12), 1865-1883.

Mamassis, G., & Doganis, G. (2004). The effects of a mental training program on juniors pre-competitive anxiety, self-confidence, and tennis performance. *Journal of Applied Sport Psychology*, 16(2), 118-137.

Mano, H., & Oliver, R. L. (1993). Assessing the dimensionality and structure of the consumption experience: evaluation, feeling, and satisfaction. *Journal of Consumer research*, 451-466.

Maras, E. (2006, November, 08). *Supermarket Self Checkout Cuts Impulse Sales By Almost Half*. Retrieved November 21 2008, from VendingMarketWatch News Web Site:http://www.vendingmarketwatch.com/online/article.jsp?siteSection=1&id=16787&pageNum=2.

Martin, E. (2006). *Survey questionnaire construction*. Washington, D.C.: U.S. Census Bureau.

Marzocchi, G. L., & Zammit, A. (2006). Self - Scanning technologies in retail: Determinants of adoption. *The Service Industries Journal*, 26(6), 651-669.

Master Groces Australia (2008). *Submission by the Master Grocers Australia to the Australia Fair Pay Commission on the 2008 Minimum Wage Review.*

Master Groces Australia (2012). Submission by the Master Grocers Australia to the Australia Fair Pay Commission on the 2012 Minimum Wage Review .

Mathieson, K. (1991). Predicting user intentions: comparing the technology acceptance model with the theory of planned behavior. *Information systems research*, 2(3), 173-191.

Mathwick, C., & Rigdon, E., Malhotra, N. K. (2001). The effect of dynamic retail experiences on experiential perceptions of value: an Internet and catalog comparison. *Journal of Retailing*, 78(1), 51-60.

Mayer, R. C., Davis, J. H., & Schoorman, F. D. (1995). An integrative model of organizational trust. *Academy of Management*, 20(3), 709.

McAllister, D. J. (1995). Affect-and cognition-based trust as foundations for interpersonal cooperation in organizations. *Academy of management journal*, 38(1), 24-59.

McDaniel, S. W., Verille, P., & Madden, C. S. (1985). The threats to marketing research: An empirical reappraisal. *Journal of Marketing Research*, 74-80.

McDonald, R. P., & Ho, M. H. R. (2002). Principles and practice in reporting structural equation analyses. *Psychological Methods,* 7(1), 64.

McEachan, R. R. C., Conner, M., Taylor, N. J., & Lawton, R. J. (2011). Prospective prediction of health-related behaviours with the theory of planned behaviour: A meta-analysis. *Health Psychology Review*, 5(2), 97-144.

McQuitty, S. (2004). Statistical power and structural equation models in business research. *Journal of Business Research*, 57(2), 175-183.

Medlin, B. D. (2001). *The factors that may influence a faculty member's decision to adopt electronic technologies in instruction* (Doctoral dissertation, Virginia Polytechnic Institute and State University).

Mertler, C. A., & Vannatta, R. A. (2005). *Advanced and multivariate statistical methods.* Glendale. CA: Pyrczak.

Meuter, M. L., Bitner, M. J., Ostrom, A. L., & Brown, S. W. (2005). Choosing among alternative service delivery modes: an investigation of customer trial of self-service technologies. *Journal of Marketing*, 69(April), 61-83.

Meuter, M. L., Ostrom, A. L., Bitner, M. J., & Roundtree, R. (2003). The influence of technology anxiety on consumer use and experiences with self-service technologies. *Journal of Business Research*, 56(11), 899-906.

Meuter, M. L., Ostrom, A. L., Roundtree, R. I., & Bitner, M. J. (2000). Self- service technologies: understanding customer satisfaction with technology-based service encounters. *Journal of Marketing*, 64(3), 50-64.

Meyers, L. S., Guarino, A. J., & Gamst, G. C. (2005). *Applied multivariate research: Design and interpretation*. SAGE Publications.

Miles, J., & Shevlin, M. (2007). A time and a place for incremental fit indices. *Personality and Individual Differences*, 42(5), 869-874.

Miles, R. E., & Snow, C. C. (2007). Organization theory and supply chain management: An evolving research perspective. *Journal of Operations Management*, 25(2), 459−463.

Miletic, D. (2008, April, 22). *A new way to shop — check it out for yourself*. Retrieved February 15 2009, from The age Web Site: http://www.theage.com.au/news/national/a-new-way-to-shop-151-check-it-out-for-yourself/2008/04/21/1208742852723.html?page=fullpage.

Mitchell, V. W., & Harris, G. (2005). The importance of consumers' perceived risk in retail strategy. *European Journal of Marketing*, 39(7/8), 821-837.

Miyazaki, A. D. (2008). Online privacy and the disclosure of cookie use: Effects on consumer trust and anticipated patronage. *Journal of Public Policy & Marketing*, 27(1), 19-33.

Mahon, P. Y. (2013). Internet research and ethics: Transformative Issues in nursing education research. *Journal of Professional Nursing*.

Möller, K., & Svahn, S. (2006). Role of Knowledge in Value Creation in Business Nets*. *Journal of Management Studies*, 43(5), 985-1007.

Moorman, C. Deshpandé, R., & Zaltman, G. (1993). Factors affecting trust in market research relationships . *Journal of Marketing*, 57(1), 81-101.

Morio, H., & Buchholz, C. (2006). How anonymous are you online? Examining online social behaviors from a cross - cultural perspective. AI & Society. 23(2), 297-307.

Morris, M. G., & Venkatesh, V. (2000). Age differences in technology adoption decisions: Implications for a changing work force. *Personnel Psychology*, 53(2), 375-403.

Morgan, R.M., & Hunt, S.D. (1994). The commitment-trust theory of relationship marketing . *Journal of Marketing*, 58(3), 20-38.

Mouzas, S., Henneberg, S., & Naudé, P. (2008). Developing network insight. *Industrial Marketing Management*. 37(2), 167-180.

Mowen, J. C. (1992). The time and outcome valuation model: Implications for understanding reactance and risky choices in consumer decision making. *Advances in Consumer Research*, 19, 182-189.

Mukherjee, A., & Nath, P. (2007). Role of electronic trust in online retailing: a re-examination of the commitment-trust theory. *European Journal of Marketing*, 41(9/10), 1173-1202.

Mulaik, S. A., James, L. R., Van Alstine, J., Bennett, N., Lind, S., & Stilwell, C. D. (1989). Evaluation of goodness-of-fit indices for structural equation models.*Psychological Bulletin*, 105(3), 430.

Murphy, C. A., Coover, D., & Owen, S. V. (1989). Development and validation of the computer self-efficacy scale. *Educational and Psychological Measurement*, 49(4), 893-899.

Murray, K. B. (1991). A test of services marketing theory: Consumer information acquisition actives. *Journal of Marketing*, 5(January), 10-25.

Nambisan, S., & Baron, R. (2007). Interactions in virtual customer environments: Implications for product support and customer relationship management. *Journal of Interactive Marketing*. 21(2), 42-62.

Nakata, C., & Zhu, Z. (2003). *Self-Service Technology Failure: Understanding the Customer Perspective*. Power-point Presentation. February 14, 2012. As retrieved from http://www.uic.edu/cba/crim/CrimNewsFiles/Colloquia/

Newholm, T., McGoldrick, P., Keeling, K., Macaulay, L., & Doherty, J. (2004). Multi-story trust and online retailer strategies. *International Review of Retail, Distribution and Consumer Research*, 14(4), 437-56.

NCR. (2006, January, 26). *Ireland's superquinn deploys NCR self-checkout*. Retrieved October 28, 2008, from http://www.ncr.com/about_ncr/media_information/ news releases/2007/january/012607.jsp.

Nunnally, J.C., Bernstein, I.H. (1994). *Psychometric Theory (3rd ed.*). New York: WCB/McGraw-Hill.

O'cass, A., & Fenech, T. (2003). Web retailing adoption: exploring the nature of internet users web retailing behaviour. *Journal of Retailing and Consumer Services*, 10(2), 81-94.

Oh, H., Jeong, M., Lee, S. A., & Warnick, R. (2013). Attitudinal and Situational Determinants of Self-Service Technology Use. *Journal of Hospitality & Tourism Research*.

Oliver, R. L. (1997). *Satisfaction: A behavioral perspective on the consumer*. New York: McGraw - Hill.

Oliver, R. L., & Bearden, W. O. (1985). Crossover effects in the theory of reasoned action: A moderating Influence attempt. *Journal of Consumer Research*. 12(December), 324-340.

Olson, J. C., & Mitchell, A. A. (2000). Are product attribute beliefs the only mediator of advertising effects on brand attitude?. *Advertising & Society Review*, 1(1).

Oyedele, A., & Simpson, P. M. (2007). An empirical investigation of consumer control factors on intention to use selected self-service technology. *International Journal of Service Industry Management*, 18(3), 287-306.

Palmer, A. (2005). *Principles of service marketing*. London: McGraw- Hill.

Palmer, D. (2008, April, 21). *Woolworths trial self-checkout technology*. Retrieved November 26 2008, from http://www.ausfoodnews.com.au/2008/04/21/WooLworths-trial -self-checkout-technology.html.

Parafac, R. B. (1997). *Chapter 7 missing data*. Retrieved February 18, 2008, from Interactive introduction to multi-way analysis in MATLAB Web Site: http://www.modles.kyl.dk/courses/parafac/chap7missing.html

Parasuraman, A., Berry, L. L., & Zeithaml, V. A. (1994). Reassessment of expectation as a comparison standard in measuring service quality. *Journal of Marketing*. 58(January), 111-124.

Parasuraman, A. (2000). Technology readiness index (TRI): a multiple-item scale to measure readiness to embrace new technologies. *Journal of Service research*, 2(May), 307-20.

Parasuraman, P., Zeithaml, V., & Malhotra, A. (2005). E-SERVQUAL: A multiple-item scale for assessing electronic service quality. *Journal of Service Research*, 7(3), 213-233.

Paré, G., Lepanto, L., Aubry, D., & Sicotte, C. (2005). Toward a multidimensional assessment of picture archiving and communication system success. *International journal of technology assessment in health care*, 21(4), 471-479.

Parham, D., Roberts, P., & Sun, H. (2001). Information technology and Australia's productivity surge.

Parsian, N., & Dunning, T. (2009). Developing and validating a questionnaire to measure spirituality: A psychometric process. *Global Journal of Health Science*, 1(1), 2.11.

Peter, J. P., & Ryan, M. J. (1976). An investigation of perceived risk at the brand level. *Journal of Marketing Research*, 184-188.

Pett, M. A., Lackey, N. R., & Sullivan, J. J. (2003). *Making sense of factor analysis: The use of factor analysis for instrument development in health care research*. Sage.

Patterson, D. (2004, June, 8). *Next post previous post self-checkout goes mass market*. Retrieved October 30, 2008, from http://wmallbiztrends.com/2004/06/self-checkout-goes-mass-market.html.

Pelling, E. L., & White, K. M. (2009). The theory of planned behavior applied to young people's use of social networking web sites. *CyberPsychology & Behavior*, 12(6), 755-759.

Pikkarainen, T., Pikkarainen, K., Karjaluoto, H., & Pahnila, S. (2004). Consumer acceptance of internet banking: An extension of the technology acceptance model. *Internet Research*, 14(3).

Plotnikoff, R. C., Lippke, S., Courneya, K., Birkett, N., & Sigal, R. (2010). Physical activity and diabetes: An application of the theory of planned behaviour to explain physical activity for Type 1 and Type 2 diabetes in an adult population sample. *Psychology and Health*, 25(1), 7-23.

Podsakoff, P. M., MacKenzie, S. B., Lee, J. Y., & Podsakoff, N. P. (2003). Common method biases in behavioral research: a critical review of the literature and recommended remedies. *Journal of Applied Psychology*, 88(5), 879-903.

Podsakoff, P. M., MacKenzie, S. B., & Podsakoff, N. P. (2012). Sources of method bias in social science research and recommendations on how to control it. *Annual Review of Psychology*, 63, 539-569.

Polatoglu, V. N., & Ekin, S. (2001). An empirical investigation of the Turkish consumers' acceptance of internet banking services. *International Journal of Bank Marketing*, 19(4), 156-165.

Posonneault, A., & Heppel, N. (1998). Anonymity in group support systems research: A new conceptualization, measure, and contingency framework. *Journal of Management Information Systems*, 14(3), 89-108.

Postmes, T., & Spears, R. (1998). Deindividuation and antinormative behavior: A Meta - analysis. *Psychological Bulletin*, 123(3), 238-259.

Prahalad, C. K., & Ramaswamy, V. (2000). Co-opting customer competence. *Harvard business review*, 78(1), 79-90.

Prahalad, C. K., & Ramaswamy, V. (2004). *The future of competition: Co-creating unique value with customers*. Harvard Business Press.

Preacher, K. J., & MacCallum, R. C. (2002). Exploratory factor analysis in behavior genetics research: Factor recovery with small sample sizes. *Behavior Genetics*, 32(2), 153-161.

Preacher, K. J., & Hayes, A. F. (2004). SPSS and SAS procedures for estimating indirect effects in simple mediation models. *Behavior Research Methods, Instruments, & Computers*, 36(4), 717-731.

Preacher, K. J., & Hayes, A. F. (2008). Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. *Behavior research methods*, 40(3), 879-891.

Prentice-Dunn, S., & Rogers, R. W. (1982). Effects of public and private self – awareness on deindividuation and aggregation. *Journal of Personality and Social Psychology*, 43, 503-513.

Prentice-Dunn, S., & Rogers, R. W. (1989). *Deindividuation and the self-regulation of behavior*. In P. B. Paulus (Ed.), The psychology of group influence (2nd ed., pp. 86-109). Hillsdale, NJ: Lawrence Erlbaum.

Proença, J. F., & Rodrigues, M. A. (2011). A comparison of users and non-users of banking self-service technology in Portugal. *Managing Service Quality*, 21(2), 192-210.

Proença, J. F., & Rodrigues, M. A. (2011). A comparison of users and non-users of banking self-service technology in Portugal. *Managing Service Quality*, 21(2), 192-210.

Quelch, J. A., & Klein, L. R (1996). The internet and international marketing. *Sloan Management Review*, 37(3), 60-75.

Ramayah, T., Aafaqi, B., & Ignatius, J. (2004). Role of self-efficacy in e-library usage among students of a public university in Malaysia. *Malaysian Journal of Library and Information Science*, 9, 39-58.

Rangarajan, D., Falk, T., & Schillewaert, N. (2007). Determinants and outcomes of customers' use of self - service technology in a retail setting. *Journal of Service Research*, 10(1), 3-21.

Ratnasingam, P., & Pavlou, P. A. (2003). Technology trust in internet-based interorganizational electronic commerce. *Journal of Electronic Commerce in Organizations*, 1(1), 17-41.

Raykov, T., & Marcoulides, G. A. (2000). A method for comparing completely standardized solutions in multiple groups. *Structural equation modeling*, 7(2), 292-308.

Reicher, S., & Levine, M. (1994). On the consequences of deindividuation manipulations for the strategic communication of self: Identifiability and the presentation of social identity. *European Journal of Social Psychology*, 24(4), 511-524.

Reicher, S. Spears, R., & Postmes, T. (1995). A social identity model of deindividuation phenomena. *European Review of Social psychology*, 6, 161-198.

Reiter, J. P. (2012). Statistical Approaches to Protecting Confidentiality for Microdata and Their Effects on the Quality of Statistical Inferences. *Public Opinion Quarterly*, 76(1), 163-181.

Rencher, A. C., (2002). *Methods of multivariate analysis*. Wiley.

Ries, A., & Trout, J. (2000). *Positioning: The battle for your mind*. New York: Mc Graw-Hill.

Rigdon, E. E. (1998). Structural equation modeling.

Risch Rodie, A., Schultz Kleine, S. (2000). *Customer participation in services production and delivery*. In: T.A. Swartz, D. Iacobucci (eds.), Handbook of services marketing & management, 111-125. Thousand Oaks: Sage Publications.

Rise, J., Kovac, V., Kraft, P., & Moan, I. S. (2008). Predicting the intention to quit smoking and quitting behaviour: Extending the theory of planned behaviour. *British Journal of health psychology*, 13(2), 291-310.

Rietveld, T., & Van Hout, R. (1993). *Statistical techniques for the study of language behaviour*. Berlijn: Mouton de Gruyter.

Rizzo, J. R., House, R. J., & Lirtzman, S. I. (1970). Role conflict and ambiguity in complex organizations. *Administrative Science Quarterly*, 150-163.

Rodie, A. R., & Kleine, S. S. (2000). Customer participation in services production and delivery. *Handbook of services marketing and management*, 111-125.

Rogers, E. M. (1962). *Diffusion of Innovations*. New York: The Free Press.

Rogers, E. M. (1983). *Diffusion of Innovations*. New York: Free Press.

Rogers, E. M. (2003). *Diffusion of Innovations* (5th Ed). New York: The Free Press

Romero-Moreno, R., Losada, A., Mausbach, B. T., Marquez-Gonzalez, M., Patterson, T. L., & Lopez, J. (2011). Analysis of the moderating effect of self-efficacy domains in

different points of the dementia caregiving process. *Aging & Mental Health*, 15(2), 221-231.

Rose, J., & Fogarty, G. J. (2006). Determinants of perceived usefulness and perceived ease of use in the technology acceptance model: senior consumers' adoption of self-service banking technologies. In *Proceedings of the 2nd Biennial Conference of the Academy of World Business, Marketing and Management Development: Business Across Borders in the 21st Century* (Vol. 2, pp. 122-129). Academy of World Business, Marketing and Management Development.

Rosen, C. (2001, February 26). More retailers to tell customers 'do it yourself'. *Information Week*, 826, 29.

Rousseau, D. M., Sitkin, S. B., Burt, R. S., & Camerer, C. (1998). Not so different after all: A cross-discipline view of trust. *Academy of management review*, 23(3), 393-404.

Rud, O. P. (2000). *Data mining cookbook CD-Rom: Modeling data for marketing, risk and customer relationship management.* John Wiley & Sons, Inc..

Rudner, L. M., & Schafer, W. D. (2001). *Reliability*. ERIC Digest.

Ryan, R. M. (1995). Psychological needs and the facilitation of integrative processes. *Journal of Personality*, 63, 397–427.

Ryan, R. M., & Connell, J. P. (1989). Perceived locus of causality and internalization: examining reasons for acting in two domains. *Journal of personality and social psychology*, 57(5), 749.

Ryan, R. M., Mims, V., & Koestner, R. (1983). Relation of reward contingency and interpersonal context to intrinsic motivation: A review and test using cognitive evaluation theory. *Journal of Personality and Social Psychology*, 45(4), 736.

Ryu, K., & Han, H. (2010). Predicting tourists' intention to try local cuisine using a modified theory of reasoned action: The case of New Orleans. *Journal of Travel & Tourism Marketing*, 27(5), 491-506.

Salanova, M., Peiró, J. M., & Schaufeli, W. B. (2002). Self-efficacy specificity and burnout among information technology workers: An extension of the job demand-control model. *European Journal of Work and Organizational Psychology*, 11(1), 1-25.

Santos, J. (2003). E-service quality: a model of virtual service quality dimensions. *Managing Service Quality*, 13(3), 233-246.

Sargeant, A., & Lee, S. (2004). Trust and relationship commitment in the United Kingdom voluntary sector: Determinants of donor behavior. *Psychology & Marketing*, 21(8), 613-635.

Scannell, T. V., (1999). *Behavioral modles of advanced manufacturing technology selection*. Thesis, Michigan State University, East Lansing, MI.

Schenone, R. (2007, June, 28). *Self checkout grocery scanners - A shoplifter's delight*. Retrieved November 23 2008, from http://www.lockergnome.com/blade/ 2007/06 /28/self -checkout-grocery-scanners-a-shoplifters-delight/.

Schifter, D. E., & Ajzen, I. (1985). Intention, perceived control, and weight loss: an application of the theory of planned behavior. *Journal of Personality and Social Psychology*, 49(3), 843.

Schleifer, S. (1986). Trends in attitudes toward and participation in survey research. *Public Opinion Quarterly*, 50(1), 17-26.

Schreiber, G., Amin, A., Aroyo, L., van Assem, M., de Boer, V., Hardman, L., & Wielinga, B. (2008). Semantic annotation and search of cultural-heritage collections: The MultimediaN E-Culture demonstrator. *Web Semantics: Science, Services and Agents on the World Wide Web*, 6(4), 243-249.

Schreiber, J. B., Nora, A., Stage, F. K., Barlow, E. A., & King, J. (2006). Reporting structural equation modeling and confirmatory factor analysis results: A review. *The Journal of Educational Research*, 99(6), 323-338

Schumacher, R. E., & Lomax, R.G. (1996). *A beginner's guide to SEM*. Lawrence Erlbaum Associates, Manwah, New Jersey, USA.

Schutt, R. K. (2006). *Investigating the social world: The process and practice of research*. Thousands Oaks, Calif: Pine Forge Press.

Schwarzer, R., & Jerusalem, M. (2000). *General perceived self-efficacy scale*. Retrieved March, 30, 2006.

Scott, C. R., (1999). The impact of physical and discursive anonymity in group members' multiple identification during computer - supported decision making. *Western Journal of Communication*, 63, 456-487.

Sedgeman, J.A. (2009). *Conceptualization: the route to relevance and depth*. West Virginia University, Department of Community Medicine Journal.

Seiders, K., Voss, G. B., Grewal, D., & Godfrey, A. L. (2005). Do satisfied customers buy more? Examining moderating influences in a retailing context. *Journal of Marketing*, 26-43.

Selvan, N. T., Arasu, B. S., & Sivagnanasundaram, M. (2011). Behavioral Intention Towards Mobile Banking in India: The Case of State Bank of India (SBI). *International Journal of E-Services and Mobile Applications* (IJESMA), 3(4), 37-56.

Settoon, R. P., Bennett, N., & Liden, R. C. (1996). Social exchange in organizations: Perceived organizational support, leader–member exchange, and employee reciprocity. *Journal of Applied Psychology*, 81(3), 219.

Shamdasani, P., Mukherjee, A., & Malhotra, N. (2008). Antecedents and consequences of service quality in consumer evlaution of self-service internet technologies. *The service Industries Journal*, 28(1), 117-38.

Sharma, R., Yetton, P., & Crawford, J. (2010). A critique of the marker variable technique: the effect of alternative marker variable criteria. *ECIS 2010 Proceedings.*

Sheeran, P. (2002). Intention—behavior relations: A conceptual and empirical review. *European review of social psychology*, 12(1), 1-36

Sheppard, T. V., Hartwick, J., & Warshow, P.R. (1988). The theory of reasoned action: A meta-analysis of past research with recommendations for modifications and future research. *Journal of Consumer Research*, 15, 325-343.

Shih, Y., & Fang, K. (2004). The use of a decomposed theory of planned behavior to study internet banking in Taiwan. *Internet Research*, 14(3), 213-223.

Shoemaker, M. E. (1999). Leadership practices in sales managers associated with the self-efficacy, role clarity, and job satisfaction of individual industrial salespeople. *The Journal of Personal Selling and Sales Management*, 1-19.

Shores, M. L., & Shannon, D. M. (2007). The Effects of Self ‐ Regulation, Motivation, Anxiety, and Attributions on Mathematics Achievement for Fifth and Sixth Grade Students. *School Science and Mathematics*, 107(6), 225-236.

Shrout, P. E., & Bolger, N. (2002). Mediation in experimental and nonexperimental studies: new procedures and recommendations. *Psychological methods*, 7(4), 422.

Silmalis, L. (2013). *Shady Shoppers Stealing Millions Using Scanner Tricks at Coles and Woolworths Self-Serve Checkouts*. Retrived March 20 2013, from shttp://www. news.com.au/money/money-matters/shady-shoppers-stealing-millions-using-canner-trciks/story-e6frfmd 9 -226514344385.

Singh, J., & Rhoads, G. K. (1991). Boundary role ambiguity in marketing-oriented positions: a multidimensional, multifaceted operationalization. *Journal of Marketing Research*, 328-338.

Sitkin, S.B., & Roth, N.L. (1993). Explaining the limited effectiveness of legalistic "Remedies" for trust/distrust. *Organization Science*, 4(3), 367-392.

Skoglan, I., & Siguaw, J. A. (2004). *Understanding Switchers and Stayers in the Lodging*. Cornell University.

Smith, J. R., Terry, D. J., & Hogg, M. A. (2007). Social identity and the attitude–behaviour relationship: Effects of anonymity and accountability. *European Journal of Social Psychology*, 37(2), 239-257.

Snehota, I., & Hakansson, H. (Eds.). (1995). *Developing relationships in business networks*. Londres: Routledge.

Sparks, B. A., Bradly, G. L., & Callan, V. J. (1997). The impact of staff empowerment and communication style on customer evaluation: The special case of service failure. *Psychology & Marketing*, 14(5), 475-493.

Spears, R., & Lea, M (1992). *Social influence and the influence of the 'social' in computer - mediated communication.* Hemel Hempstead, England: Harvester Wheatsheaf.

Spreng , R. A., MacKenzie, S. B., & Olshavsky, R. W. (1996). A reexamination of the determinants of consumer satisfaction. *Journal of Marketing*, 60(July), 15-32.

Steenkamp, J. B. E., & Van Trijp, H. (1991). The use of LISREL in validating marketing constructs. *International Journal of Research in Marketing*, 8(4), 283-299.

Steffen, A. M., McKibbin, C., Zeiss, A. M., Gallagher-Thompson, D., & Bandura, A. (2002). The revised scale for caregiving self-efficacy reliability and validity studies. *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences*, 57(1), P74-P86.

Sterne, J. A., White, I. R., Carlin, J. B., Spratt, M., Royston, P., Kenward, M. G., ... & Carpenter, J. R. (2009). Multiple imputation for missing data in epidemiological and clinical research: potential and pitfalls. *BMJ: British Medical Journal*, 338.

Straub, E. T. (2009). Understanding technology adoption: Theory and future directions for informal learning. *Review of Educational Research*, 79(2), 625-649.

Sturdy, A. (2001). The global diffusion of customer service-a critique of cultural and institutional perspectives. *Asia Pacific business review*, 7(3), 75-89.

Subramani, M. R., & Venkatraman, N. (2003). Safeguarding investments in asymmetric interorganizational relationships: Theory and evidence. *Academy of Management Journal*, 46(1), 46-62.

Super Survey. (2008). Retrieved February 19, 2009, from http://www.supersurvey.com/.

Surendra, S. (2001). *Acceptance of Web technology based education by professors and administrators of a college of applied arts and technology in Ontario*. University of Toronto.

Szajna, B. (1994). Software evaluation and choice: Predictive evaluation the technology acceptance instrument. *MIS Quarterly*, 18(3), 319-324.

Tabachnick, B., & Fidell, L. (2007). *Survival/failure analysis.* Using multivariate statistics.

Tan, Y. H., & Thoen, W. (2002). Formal aspects of a generic model of trust for electronic commerce. *Decision Support Systems*, 33(3), 233-246.

Taylor, S.A., & Hunter, G.L. (2002). The impact of loyalty with e-CRM software and e-service. *International Journal of Service Industry Management*, 13(5), 452-74.

Taylor, S., & Todd, P. A. (1995). Understanding information technology usage: A test of competing models. *Information Systems Research*, 6(June), 144-176.

Techatassanasoontorn, A. A., & Tanvisuth, A. (2008, December). The integrated self-determination and self-efficacy theories of ICT training and use: the case of the socio-economically disadvantaged. *In G on Global Development Workshop*, Paris, France.

Teixeira, P. J., Carraça, E. V., Markland, D., Silva, M. N., & Ryan, R. M. (2012). Exercise, physical activity, and self-determination theory: A systematic review. International *Journal of Behavioral Nutrition and Physical Activity*, 9(1), 78.

Tenn, F. (2004, February, 4). *Supermarkets to spend big on self-checkout, POS hardware and mobile devices during next two*. Retrieved October 15 2008, from http://www.allbusiness.com/technology/software-services-applications-information/5228591-1.html.

Tenn, F. (2005, October, 1). *IHL Consulting Group. (Growth in self-checkout scanners usage in Supermarket)*. Retrieved October 15 2008, from http://www.highbeam. com/doc/1G1-138814207.html.

Tenn, F. (2006, October, 17). *Grocers on track to spend $9.8 billion on IT in 2006, according to new research report from IHL*. Retrieved November 10 2008, from http://www.allbusiness.com/human-resources/careers-career-path/3912529-1.html.

Thakur, M. G. R. (2012). A Study of Computer Self-efficacy Among D. Ed. Student Teachers.

The Online Survey Process. (2007). Retrieved February 20 2009, From StatPac Web Site: http://www.take-survey.com/process.htm.

Thomas, N., & Tow, W. T. (2002). The utility of human security: sovereignty and humanitarian intervention. *Security Dialogue*, 33(2), 177-192.

Thompson, G. (2003, November, 13). *IBM acquires retail self-checkout leader, PSI*. Retrieved October 01, 2008, from http://www- 03.ibm.com/press/us/en/pressrelease/ 6335.wss.

Thompson, B. (2004). *Exploratory and confirmatory factor analysis: Understanding concepts and applications*. American Psychological Association.

Tornatzky, L. G., & Klein, K. J. (1982). Innovation characteristics and innovation adoption-implementation: A meta-analysis of findings. *Engineering Management, IEEE Transactions on*, (1), 28-45.

Toth, G., Hornak, Z., & Vajda, F. (2004). Measuring anonymity revisited. *Nordsec 2004 Conference*.

Trochim, W. M. K. (2001). *The research methods knowledge base (2nd ed.)*. Cincinnati, OH: Atomic Dog Publishing.

Ulaga, W., & Eggert, A. (2006). Value-based differentiation in business relationships: gaining and sustaining key supplier status. *Journal of Marketing*, 119-136.

Vallerand, R. J., Pelletier, L. G., Blais, M. R., Briere, N. M., Senecal, C., & Vallieres, E. F. (1992). The Academic Motivation Scale: A measure of intrinsic, extrinsic and amotivation in education. *Educational and Psychological Measurement*, 52, 1003–1017.

Vallerand, R. J., Pelletier, L. G., Blais, M. R., Briere, N. M., Senecal, C., & Vallieres, E. F. (1993). On the assessment of intrinsic, extrinsic and amotivation in education: Evidence of concurrent and construct validity of the Academic Motivation Scale. *Educational and Psychological Measurement*, 53, 159–172.

Vargo, S. L., & Lusch, R. F. (2004). Evolving to a new dominant logic for marketing. *Journal of marketing*, 1-17.

Vargo, S. L., & Lusch, R. F. (2008). Why "service"?. *Journal of the Academy of marketing Science*, 36(1), 25-38.

Venkatesh, V. (2000). Determinants of perceived ease of use: integrating control, ntrinsic motivation, and emotion into the technology acceptance model. *Information Systems Research*, 11(4), 342-365.

Venkatesh, V., & Davis, F.D. (2000). A theoretical extension of the technology acceptance model: Four longitudinal field studies. *Management Science*，46（2）186-204.

Venkatraman, M. P. (1989). Involvement and risk. *Psychology & Marketing*, 6(3), 229-247.

Venkatraman, N., & Subramaniam, M. (2002). *Theorizing the future of strategy: Questions for shaping strategy research in the knowledge economy*. In Handbook of Strategy and Management. London: Sage Publications.

Völlink, T., Meertens, R. E. E., & Midden, C. J. (2002). Innovating 'diffusion of innovation'theory: Innovation characteristics and the intention of utility companies to adopt energy conservation interventions. *Journal of Environmental Psychology*, 22(4), 333-344.

Walker, R. H., Craig - Lees, M., Hecker, R., & Francis, H. (2002). Technology- Enabled Service Delivery: An Investigation of Reasons Affecting Customer Adoption and Rejection. *International Journal of Service Industry Management*, 13(1), 91-106.

Wang, Y. S. (2003). The adoption of electronic tax filing systems: an empirical study. *Government Information Quarterly*, 20(4), 333-352.

Wang, M. C. H. (2012). Determinants and consequences of consumer satisfaction with self-service technology in a retail setting. *Managing Service Quality*, 22(2), 128-144.

Wang, C., Harris, J., & Patterson, P. (2013). The Roles of Habit, Self-Efficacy, and Satisfaction in Driving Continued Use of Self-Service Technologies: A Longitudinal Study. *Journal of Service Research*.

Wang, J., & Namen, J. (2004). *Adoption of technology-based self-service: a case study on airport self check-in service*. University of Lulea, Lulea, Master's thesis.

Wang, Y. S., Wang, Y. M., Lin, H. H., & Tang, T. I. (2003). Determinants of user acceptance of Internet banking: an empirical study. International *Journal of Service Industry Management*, 14(5), 501-519.

Weber, E. U., Johnson, E. J., Milch, K. F., Chang, H., Brodscholl, J. C., & Goldstein, D. G. (2007). Asymmetric Discounting in Intertemporal Choice A Query-Theory Account. *Psychological Science*, 18(6), 516-523.

Weijters, B., Rangarajan, D, & Falk, T (2005). Customers' usage of self service technology a retail setting. *Vlerick Leuven Gent Worrking Paper*. 19.

Weijters, B., Rangarajan, D., Falk, T., & Schillewaert, N. (2007). Determinants and outcomes of customers' use of self-service technology in a retail setting . *Journal of Service Research*, 10(1), 3-21.

Wen, C., Prybutok, V. R., & Xu, C. (2011). An integrated model for customer online repurchase intention. *Journal of Computer Information Systems*, 52(1), 14-23.

Wicks, A. C., Berman, S. L., & Jones, T. M. (1999). The structure of optimal trust: Moral and strategic implications. *Academy of Management Review*, 24(1), 99-116.

Widaman, K. F. (1993). Common factor analysis versus principal component analysis: Differential bias in representing model parameters?. *Multivariate Behavioral Research*, 28(3), 263-311.

Widaman, K. F., & Thompson, J. S. (2003). On specifying the null model for incremental fit indices in structural equation modeling. *Psychological Methods*,8(1), 16.

Wikström, S. (1996). The customer as co-producer. *European Journal of Marketing*, 30(4), 6-19.

Williams, L. J. (1995). Covariance structure modeling in organizational research: Problems with the method versus applications of the method. *Journal of Organizational Behavior*, 16(3), 225-233.

Williams, E. (1998, March, 26). *Research and paradigms*. Retrieved February 28 2009, from http://www.umdnj.edu/idsweb/idst6000/williams_research+paradigms.htm.

Williams, G. C., Grow, V. M., Freedman, Z., Ryan, R. M., & Deci, E. L. (1996). Motivational predictors of weight loss and weight-loss maintenance. *Journal of Personality and Social Psychology*, 70, 115–126.

Williams, L. J., & Hazer, J. T. (1986). Antecedents and consequences of satisfaction and commitment in turnover models: A reanalysis using latent variable structural equation methods. *Journal of Applied Psychology*, 71(2), 219.

Williams, M. L., Malos, S. B., & Palmer, D. K. (2002). Benefit system and benefit level satisfaction: An expanded model of antecedents and consequences. *Journal of Management*, 28(2), 195-215.

Wolfinbarger, M., & Gilly, M. C. (2001). Shopping online for freedom, control and fun. *California Management Review*, 43(2), 34-55.

Wood, R., & Bandura, A. (1989). Impact of conceptions of ability on self-regulatory mechanisms and complex decision making. *Journal of Personality and Social Psychology*, 56(3), 407.

WRAL. (2006, May, 1). *Supermarket chain picks IBM self checkout system*. Retrieved October 28 2008, from http://localtechwire.com/business/local_tech_wire/wire/story/1166034/.

Xie, L., Shen, W., & Zheng, Y. (2011, June). Examining the effect of service experiences on the attitude towards and intention on using self-service technology. In *Computer Science and Service System (CSSS)*, 2011 International Conference on (pp. 2233-2240). IEEE.

Xue, M., & Harker, P. (2002), Customer efficiency: Concept and its impact on e-business management. *Journal of Service Research*, 4(4), 253–261.

ang, Z., & Peterson, R. T. (2004). Customer perceived value, satisfaction, and loyalty: The role of switching costs. *Psychology & Marketing*, 21(10), 799-822.

Yang, J., & Klassen, K. J. (2008). How financial markets reflect the benefits of self-service technologies. *Journal of Enterprise Information Management*, 21(5), 448-467.

Yang, Y.C., Liu, S.W., & Ding, M.C. (2012). Determinants of self-service technology adoption. *African Journal of Business Management*, 6(40), 10514-10523.

Yate, M. (2006). *The Art of the Interview Question*. Retrieved February 15, 2009, from http://dankoifman.com/?m=200606.

Yeh, Y. S., & Li, Y. M. (2009). Building trust in m-commerce: contributions from quality and satisfaction. *Online Information Review*, 33(6), 1066-1086.

Yen, R., & Gwinner, K.P. (2003). Internet retail customer loyalty: the mediating role of relational benefits. *International Journal of Service Industry Management*, 14(5), 483-500.

Yi, M. Y., & Hwang, Y. (2003). Predicting the use of web-based information systems: self-efficacy, enjoyment, learning goal orientation, and the technology acceptance model. *International journal of human-computer studies*, 59(4), 431-449.

Yoon, S. T. (2002). The antecedents and consequences of trust in online-purchase decisions. *Journal of Interactive Marketing*, 16(2), 47-63.

Yoon, C. (2011). Theory of planned behavior and ethics theory in digital piracy: An integrated model. *Journal of Business Ethics*, 100(3), 405-417.

Yousafzai, S. Y., Foxall, G. R., & Pallister, J. G. (2010). Explaining internet banking behavior: theory of reasoned action, theory of planned behavior, or technology acceptance model?. *Journal of Applied Social Psychology*, 40(5), 1172-1202.

Zakaria, E., & Nordin, N. M. (2008). The effects of mathematics anxiety on matriculation students as related to motivation and achievement. *Eurasia Journal of Mathematics, Science & Technology Education*, 4(1), 27-30.

Zikmund, W. G. (1994). *Business research methods (4th ed.).* United States of America: The Dryden Press.

Zeithaml, V., Parasuraman, A., & Malhotra, A. (2002). Service quality delivery through web sites: A critical review of extant knowledge. *Journal of the Academy of Marketing Science*, 30(4), 362-375.

Zhao, X., Lynch, J. G., & Chen, Q. (2010). Reconsidering Baron and Kenny: Myths and truths about mediation analysis. *Journal of Consumer Research*, 37(2), 197-206.

Zhao, X., Mattila, A. S., & Tao, L. S. E. (2008). The role of post-training self-efficacy in customers' use of self service technologies. *International Journal of Service Industry Management*, 19(4), 492-505.

Zhao, A. L. L., Stuart, H., Ward, P., & Goode, M. M. H. (2008). Perceived risk and Chinese consumers' internet banking service adoption. *International Journal of Bank Marketing*, 26(7), 505-525.

Zheng Z. K. (2006). Innovation, imitation, and new product performance: the case of China. *Industrial Marketing Management*, 35(3), 394-402.

Zhu, Z. (2002). Fix it or leave it: Antecedents and consequences of perceived control in technology - based self - service failure encounters. *Chicago: University of Illinois*, Doctoral Dissertation.

Zhu, K., Kraemer, K., & Xu, S. (2003). Electronic business adoption by European firms: a cross-country assessment of the facilitators and inhibitors. *European Journal of Information Systems*, 12(4), 251-268.

Zhu, Z., Nakata, C., Sivakumar, K., & Grewal, D. (2007). Self-service technology effectiveness: the role of design features and individual traits. *Journal of the Academy of Marketing Science*, 35(4), 492-506.

Zhu, Q., Song, Y., Hu, S., Li, X., Tian, M., Zhen, Z., & Liu, J. (2010). Heritability of the specific cognitive ability of face perception. *Current Biology*, 20(2), 137-142.

Zinkhan, G. M., & Karande, K.W. (1991). Cultural and gender differences in risk-taking behavior among American and Spanish decision makers. The Journal of social psychology . 131(5), 741-742.role of design features and individual traits. *J. of the Acad. Mark. Sci*, 35, 492-506.

Zwick, D., Bonsu, S. K., & Darmody, A. (2008). Putting Consumers to WorkCo-creationand new marketing govern-mentality. *Journal of Consumer Culture*, 8(2), 163-196.

Appendix I

The Questionnaire

MONASH University
Business and Economics

Department of Marketing

Self-Service Technologies (SSTs) Adoption and its Effect on Customer Shopping Experience in Retailing

An Phd Research project conducted by:
Larry Leung

Department of Marketing
Faculty of Business and Economics
Monash University

All information will be treated in the strictest of confidence

The survey asks about how customers perceive SSTs. This project should take approximately 10-15 minutes. For any enquiries regarding this research project, please contact:

Larry Leung
Department of Marketing
Faculty of Business and Economics
Monash University

Please circle the most appropriate response for each question.
(The scale is interpreted as 1=Strongly Disagree, 2=Disagree, 3=Slightly Disagree, 4=Neither Agree

nor Disagree, 5= Slightly Agree, 6=Agree, 7=Strongly Agree).

The survey asks about how customers perceive SSTs. This project should take approximately 10-15 minutes.

Please circle the most appropriate response for each question.

(The scale is interpreted as 1=Strongly Disagree, 2=Disagree, 3=Slightly Disagree, 4=Neither Agree nor Disagree, 5= Slightly Agree, 6=Agree, 7=Strongly Agree).

SECTION A: FEATURES OF SSTS

Part 1: The following statements **relate to how you use self-checkout systems.**								
Perceived Control (Dabholkar, 1996)(Yen & Gwinner, 2003)(Zhu, 2002)		Strongly Strongly disagree agree						
i.	I feel more in control when I use the self-checkout option to complete my purchase.	1	2	3	4	5	6	7
ii.	Self-checkout systems give me more control when purchasing in stores.	1	2	3	4	5	6	7
iii.	I have more flexibility when I use self-checkout systems.	1	2	3	4	5	6	7
iv.	I don't have to depend on service staff when I purchase something using self-checkout systems.	1	2	3	4	5	6	7
v.	Self-checkout systems offer me more options when purchasing in stores.	1	2	3	4	5	6	7

Part 2: The following statements **relate to how you feel when you use the self-checkout systems.**								
I am interested in using self-checkout systems because they are… **Newness** (Weijters, Rangarajan, & Falk, 2005)		Strongly Strongly disagree agree						
i.	Trendy.	1	2	3	4	5	6	7
ii.	Progressive.	1	2	3	4	5	6	7
iii.	Innovative.	1	2	3	4	5	6	7
iv.	New gadgets.	1	2	3	4	5	6	7
v.	Modern.	1	2	3	4	5	6	7

Part 3: The following statements **relate to what you believe about using self-checkout systems.**								
I believe … **Ease of Use** (Dabhokar & Bagozzi, 2002)(Zhao et al., 2008)		Strongly Strongly disagree agree						
i.	Using self-checkout systems is complicated.	1	2	3	4	5	6	7
ii.	Using self-checkout systems is confusing.	1	2	3	4	5	6	7
iii.	Using self-checkout systems takes a lot of effort.	1	2	3	4	5	6	7
iv.	Using self-checkout systems requires little work.	1	2	3	4	5	6	7
v.	Using self-checkout systems takes longer to complete my shopping.	1	2	3	4	5	6	7

Part 4: The following statements require you to indicate what you think are **the advantages of using self-checkout systems.**								
Usefulness (Weijters, Rangarajan, & Falk, 2005)		Strongly disagree					Strongly agree	
i.	Self-checkout systems are more efficient.	1	2	3	4	5	6	7
ii.	Self-checkout systems allow me to shop faster.	1	2	3	4	5	6	7
iii.	Self-checkout systems shorten queues.	1	2	3	4	5	6	7
iv.	Self-checkout systems reduce the waiting time at cash registers.	1	2	3	4	5	6	7

Please circle the most appropriate response for each question.

(The scale is interpreted as 1=Strongly Disagree, 2=Disagree, 3=Slightly Disagree, 4=Neither Agree nor Disagree, 5= Slightly Agree, 6=Agree, 7=Strongly Agree).

Part 5: The following statements ask you about what you think of self-checkout systems**.**								
Perceived Risk (Zhao et al., 2008)		Strongly disagree					Strongly agree	
i.	Self-checkout systems do not always work properly.	1	2	3	4	5	6	7
ii.	Self-checkout systems do not work as well as I expected.	1	2	3	4	5	6	7
iii.	Self-checkout systems have many technical problems.	1	2	3	4	5	6	7
iv.	I find I have to be careful when I use self-checkout systems to avoid making mistakes.	1	2	3	4	5	6	7
v.	Other people may gain access to my bank account if I use self-checkout systems.	1	2	3	4	5	6	7
vi.	I lose control of my bank account if I use self-checkout systems.	1	2	3	4	5	6	7
vii.	Others will know my personal details if I use self-checkout systems.	1	2	3	4	5	6	7
viii	Others may misuse my data if I use self-checkout systems.	1	2	3	4	5	6	7
ix.	I lose control of my personal data if I use self-checkout systems.	1	2	3	4	5	6	7
x.	I feel anxious when I use self-checkout systems.	1	2	3	4	5	6	7
xi.	I look foolish in front of others when I use self-checkout systems.	1	2	3	4	5	6	7
xii.	I feel depressed when I use self-checkout systems.	1	2	3	4	5	6	7
xiii	I feel frustrated when I use self-checkout systems.	1	2	3	4	5	6	7
xiv.	My usage of self-checkout systems is judged negatively by others.	1	2	3	4	5	6	7
xv.	My decision to use self-checkout systems is not socially accepted by others.	1	2	3	4	5	6	7
xvi.	I get a headache when I use self-checkout systems.	1	2	3	4	5	6	7
xvii	My eyesight is affected if I use self-checkout systems.	1	2	3	4	5	6	7
xvii	Using self-checkout systems is inconvenient because there are many service counters staff with personnel in stores.	1	2	3	4	5	6	7

xix.	I have to spend extra time completing my shopping as self-checkout systems cause delays.	1	2	3	4	5	6	7
xx.	I am not as efficient in shopping as usual if I do not use self-checkout systems.	1	2	3	4	5	6	7

Part 6: The following statements **relate to how you feel <u>when</u> you use self-checkout systems.**								
Perceived Anonymity (Gomez, 2003)		Strongly Strongly disagree agree						
i.	Self-checkout systems help me avoid being identified when I purchase certain things in stores.	1	2	3	4	5	6	7
ii.	I do not want people to remember me after I purchase things in stores.	1	2	3	4	5	6	7
iii.	My shopping is not affected by what people think of the things I buy.	1	2	3	4	5	6	7
iv.	Others will not be able to judge me on the basis of things I buy.	1	2	3	4	5	6	7
v.	I don't want to be recognized during the purchasing process.	1	2	3	4	5	6	7

Please circle the most appropriate response for each question.

(The scale is interpreted as 1=Strongly Disagree, 2=Disagree, 3=Slightly Disagree, 4=Neither Agree nor Disagree, 5= Slightly Agree, 6=Agree, 7=Strongly Agree).

SECTION B: CONSUMER'S VIEW OF SELF-CHECKOUT SYSTEMS

Part 1: The following statements ask about **your use of self-checkout systems.**								
Role Clarity (Meuter et al., 2005) (Kim, Christodoulidou, & Choo, 2013)		Strongly Strongly disagree agree						
i.	I am not sure how to use self-checkout systems properly.	1	2	3	4	5	6	7
ii.	I am certain about how to effectively use self-checkout systems.	1	2	3	4	5	6	7
iii.	I know what is expected of me when I use self-checkout systems.	1	2	3	4	5	6	7
iv.	The steps in the use of self-checkout systems are clear to me.	1	2	3	4	5	6	7
v.	I find the instructions on self-checkouts to be vague.	1	2	3	4	5	6	7

Part 2: The following statements **relate to your reasons for using the self-checkout.**								
Self-Determined Motivation (Halvari et al., 2010)		Strongly Strongly disagree agree						
I use self-checkout systems because…								
i.	I don't want store personnel to know what I buy when I shop.	1	2	3	4	5	6	7
ii.	When I go shopping, my family would like me to return home as soon as possible.	1	2	3	4	5	6	7
iii.	I don't want my children to feel too tired when I take them shopping.	1	2	3	4	5	6	7
iv.	I don't want older customers to stand in the shopping queue for too long.	1	2	3	4	5	6	7
v.	I want my friends to notice that I am up-to-date with the use of technology.	1	2	3	4	5	6	7

vi.	I want other shoppers to complete their shopping faster.	1	2	3	4	5	6	7
vii.	I don't want service staff to be irritated with me.	1	2	3	4	5	6	7
viii	I feel bad about myself if I don't use self-checkout systems.	1	2	3	4	5	6	7
ix.	I feel dissatisfied with myself if I don't use self-checkout systems.	1	2	3	4	5	6	7
x.	I feel pressure inside me that compels me to use self-checkout systems by others.	1	2	3	4	5	6	7
xi.	I feel proud of myself when I use self-checkout systems.	1	2	3	4	5	6	7
xii.	I feel uncomfortable if I don't use self-checkout systems.	1	2	3	4	5	6	7
xiii	I think using self-checkout systems is important to me personally.	1	2	3	4	5	6	7
xiv	It is of great personal significance for me to be able to use self-checkout systems when I go shopping.	1	2	3	4	5	6	7
xv.	I feel proud of myself when I use self-checkout systems.	1	2	3	4	5	6	7
xvi	I feel self-checkout systems are necessary in the shopping process.	1	2	3	4	5	6	7
xvi	Self-checkout systems are essential for me to effectively complete my shopping	1	2	3	4	5	6	7
xvi	Self-checkout systems enable me to complete my shopping as quickly as possible.	1	2	3	4	5	6	7
xix	Using self-checkout systems is a well-established habit of mine.	1	2	3	4	5	6	7
xx.	When I am shopping, it's now quite natural for me to use self-checkout systems	1	2	3	4	5	6	7
xxi	Using self-checkout systems is now a normal part of my shopping experience.	1	2	3	4	5	6	7
xxi	Using the self-checkout system is an important part of my shopping trips.	1	2	3	4	5	6	7
xxi	The use of self-checkout systems is now an entrenched habit of mine.	1	2	3	4	5	6	7
xxi	I use self-checkout systems because they are fun.	1	2	3	4	5	6	7
xxv	I enjoy using self-checkout systems.	1	2	3	4	5	6	7
xxv	I find that using self-checkout systems is a pleasurable experience.	1	2	3	4	5	6	7
xxv	I like the feeling of using self-checkout systems.	1	2	3	4	5	6	7
xxv	I enjoy not being helped when I make a purchase.	1	2	3	4	5	6	7

Part 3: The following statements **relate to how well you know yourself when you use self-checkout systems.**								
Ability (Meuter et al., 2005)		Strongly Strongly disagree agree						
i.	I am fully capable of using self-checkout systems.	1	2	3	4	5	6	7

ii.	I am confident of my ability to use self-checkout systems.	1	2	3	4	5	6	7
iii.	I do not feel I am qualified to complete my purchase using self-checkout systems.	1	2	3	4	5	6	7
iv.	My past experiences increase my confidence in successfully using self-checkout systems.	1	2	3	4	5	6	7
v.	Using self-checkout systems sometimes involves things that I am not capable of handling.	1	2	3	4	5	6	7

SECTION C: OUTCOME OF USING THE SELF-CHECKOUT

Part 1: The following statements ask you about **what you think of self-checkout systems.**								
Trust (Ratnasingam & Pavlou, 2003)		Strongly Strongly disagree agree						
i.	I trust self-checkout systems because they provide many benefits when I am shopping.	1	2	3	4	5	6	7
ii.	I am cautious about using self-checkout systems when I shop.	1	2	3	4	5	6	7
iii.	Self-checkout systems have more advantages than disadvantages if they deliver the service properly.	1	2	3	4	5	6	7
iv.	Self-checkout systems provide better services to customers when they shop.	1	2	3	4	5	6	7
v.	I can rely on self-checkout systems to complete my purchase.	1	2	3	4	5	6	7

Part 2: The following statements **relate to your feelings in regards to using self-checkout systems.**								
Satisfaction with SSTs (Zhao, Mattila, & Tao, 2008)		Strongly Strongly disagree agree						
i.	Self-checkout systems meet my expectation.	1	2	3	4	5	6	7
ii.	I am satisfied with the quality of service delivered by self-checkout systems relative to my expectation.	1	2	3	4	5	6	7
iii.	I am really satisfied with self-checkout systems.	1	2	3	4	5	6	7
iv.	In the past, self-checkout systems have provided worse services than I expected.	1	2	3	4	5	6	7
v.	In general, I am satisfied with the service I get from self-checkout systems.	1	2	3	4	5	6	7
vi.	Self-checkout systems provide better services than I expected.	1	2	3	4	5	6	7
vii.	In general, I am not satisfied with self-checkout systems.	1	2	3	4	5	6	7

Part 3: The following statements ask you about your feelings when using self-checkout systems.								
Attitudes Towards SSTs (Dabhokar, 1995)(Dabhokar & Bagozzi, 2002)		Strongly Strongly disagree agree						
i.	Using self-checkout systems during shopping is a good idea.	1	2	3	4	5	6	7
ii.	Using self-checkout systems is a wise idea when shopping.	1	2	3	4	5	6	7
iii.	I like the idea of using self-checkout systems when shopping.	1	2	3	4	5	6	7

iv.	Using self-checkout systems is beneficial when I shop.	1	2	3	4	5	6	7

Part 4: The following statements **relate to how likely you are to use self-checkout systems.**								
Repeated Use of SSTs (Dabhokar & Bagozzi, 2002)		Strongly disagree					Strongly agree	
i.	I expect I will continue to use self-checkout systems in future.	1	2	3	4	5	6	7
ii.	I plan to use more self-checkout systems when I go shopping.	1	2	3	4	5	6	7
iii.	I will strongly recommend others to use self-checkout systems during shopping.	1	2	3	4	5	6	7
iv.	I am certain I will use self-checkout systems again.	1	2	3	4	5	6	7

SECTION D: SHOPPING BEHAVIOUR

Please tick the box with the most appropriate response for each question.

This section asks for some information regarding your habits of using self-checkout systems.

i.	**Do you use self-checkout systems voluntarily even when service counters are available?**
☐ Yes	☐ No

ii.	**In the past 6 months, how many times have you used self-checkout systems because of queues at service counters? (Please only choose one option)**
	☐1 ☐2 ☐3 ☐4 ☐5 or above

iii.	**How often do you have problems with self-checkout systems?**	
☐ Rarely	☐ Sometimes	☐ Always

iv.	**How often do you need help from service staff when you use self-checkout systems?**	
☐ Not very often	☐ Less often	☐ Very Often

v.	**How would you describe the service staff when they help you solve the problem of self-checkout systems? (Please rate the following items.)**	
	Usefulness ☐0☐1☐2☐3☐4☐5	Friendliness ☐0☐1☐2☐3☐4☐5
	Politeness ☐0☐1☐2☐3☐4☐5	Indifference ☐0☐1☐2☐3☐4☐5

This section asks for some information regarding where you do your grocery shopping.

i.	**Where do you normally do your grocery shopping? (Only tick one option from below.)**	
☐ Woolworths	☐ Safeway	☐ Coles

☐ IGA	☐ ALDI	☐ NQR
☐ Ritchies	☐ Other, please specify…….....	

ii.	**How often do you do your grocery shopping? (Only tick one option from below.)**	
☐ Everyday	☐ 2-3 times per week	☐ Once a week
☐ Once a month	☐ Twice a month	☐ Once a year
☐ Twice a year	☐ Only when there are specials	

iii.	**What is the main reason for choosing this supermarket (From question i)? (Only tick one option from below.)**	
☐ Convenience	☐ Location	☐ Price
☐ Service quality	☐ Friendliness	☐ Others, specified_____

iv.	**Please tick which box best describes you as a shopper. (Only tick one option from below.)**	
☐ Impulse buyer	☐ Procrastinator (slow)	☐ In and out (quick)
☐ Conscious (Sticks to list)	☐ Budget Minded	☐ Social
☐ Convenience (Little planning)	Other, please specify……	

SECTION E: RESPONDENT PROFILE

Please tick the box with the most appropriate response for each question.

This section asks for some information regarding your demographic details

i.	**Your gender** ☐Female ☐Male

ii.	**Respondent's annual household income bracket** (Tick appropriate)		
☐ $20,000 and under	☐ $20,001-$40,000	☐ $40,001-$60,000	
☐ $60,001-$80,000	☐ $80,001-$100,000	☐ $100,001-$150,000	☐ $150,000

iii.	**Age group of respondent** (Tick appropriate)		
☐ Under 20	☐ 21-30	☐ 30-46	
☐ 47-46	☐ 47-55	☐ 55-65	☐Over 65

iv.	**Educational Level of respondent (**Tick appropriate**)**	
☐ Never attended school	☐ Primary (Year 1-6)	☐ Secondary (Year 7-10)
☐ High School (Year 11-12)	☐ TAFE/Commercial Institutes/Diplomas	☐ Bachelor Degree

☐ Post Graduate level	☐ PhDs level & above	☐ Others, Specify……

v.	**What is your ethnic background?** Please write your response in the blank space provided below. …… ……

vi.	**Please indicate your level of knowledge in completing this survey.**		
☐ Excellent	☐ Very Good	☐	Good
☐ Fair	☐ Poor		

Do you have any other comments you would like to make about the issues that have been discussed in this questionnaire? ……
……
……

Should you have any complaints about the manner in which this survey has been conducted, please do not hesitate to contact; The Standing Committee on Ethics in Research involving Humans at the following address: ***The Secretary, Standing Committee On Ethics In Research involving Humans****, Building 3D, Monash University, Clayton, Vic 3800, Australia; e-mail:* [redacted] *or telephone: 03 9905 2052*

THANK YOU VERY MUCH FOR YOUR TIME IN COMPLETING THIS QUESTIONNAIRE

Appendix II

The Consent Form

Consent Form : for Retailing Customers

Title : Self-Service Technologies (SSTs) Adoption and its Effect on Customer shopping Experience in Retailing.

Research into Phd Study – Questionnaire Survey

I agree to take part in the Monash University research project specified above. I have had the project explained to me, and I have read the Explanatory Statement, which I keep for my records. I understand that agreeing to take part means that:

I agree to participate in this survey ☐ Yes ☐ No

I understand that my participation is voluntary, that I can choose not to participate in part or all of the project, and that I can withdraw at any stage of the project without being penalised or disadvantaged in any way.

I understand that any data that the researcher extracts from this survey for use in reports or published findings will not, under any circumstances, contain names or identifying characteristics.

I understand that any information I provide is confidential, and that no information that could lead to the identification of any individual will be disclosed in any reports on the project, or to any other party.

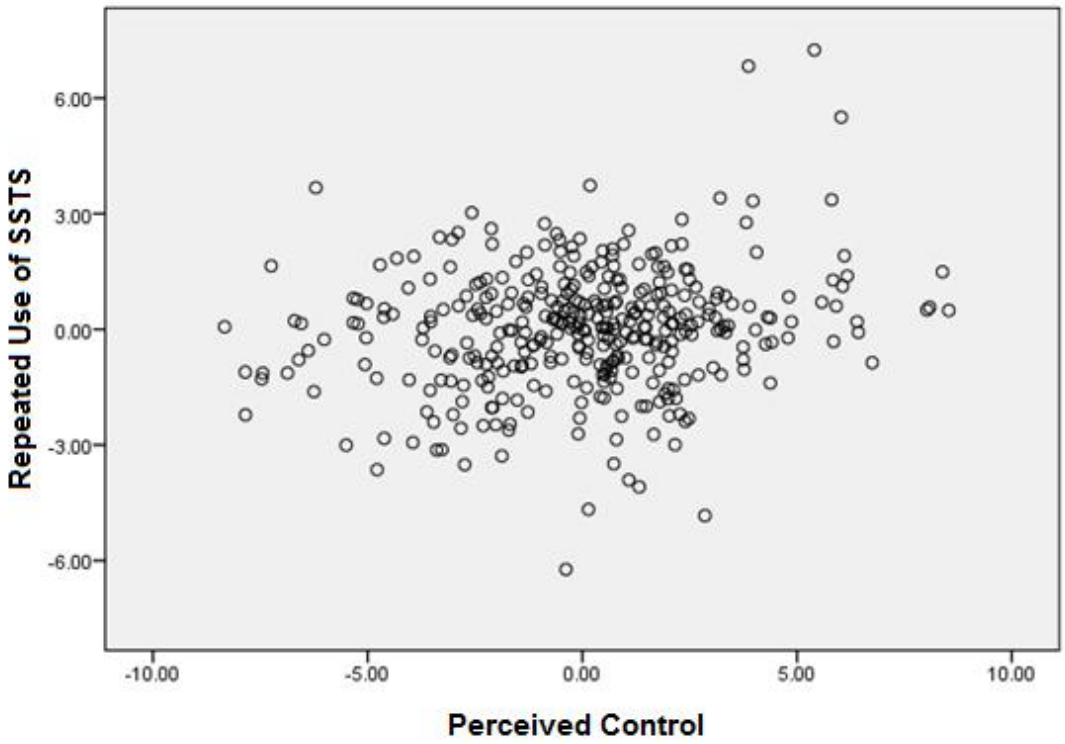
I understand that data from the interview audio tape will be kept in a secure storage and accessible to the research team. I also understand that the data will be destroyed after a 5 year period unless I consent to it being used in future research.

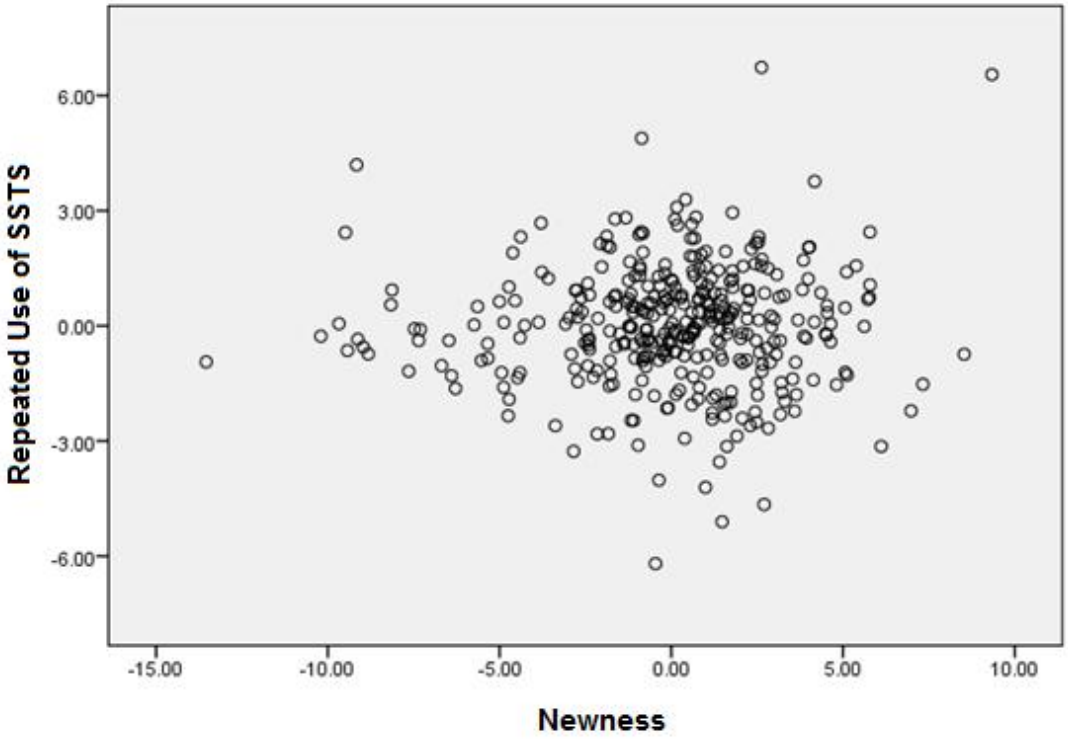
Date :

Signature of participant:

Appendix III

Partial Regression Plot Analysis




Repeated Use of SSTS
6.00
3.00
0.00
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-6.00
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-10.00
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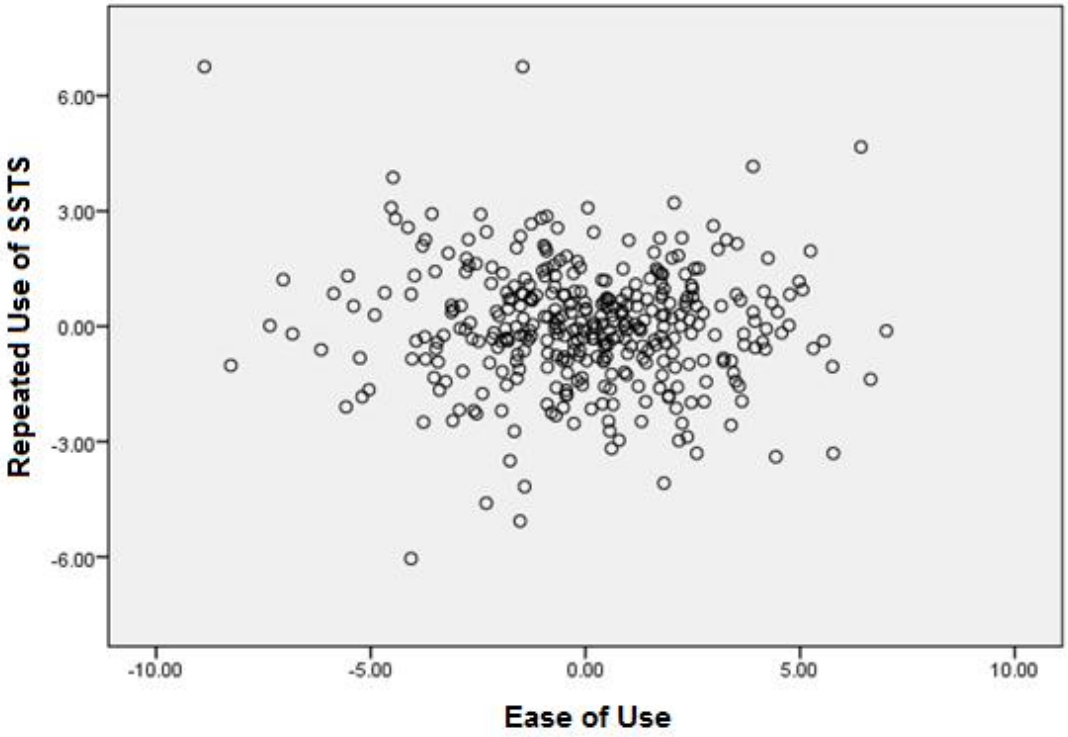
0.00
5.00
10.00
Newness


Repeated Use of SSTS
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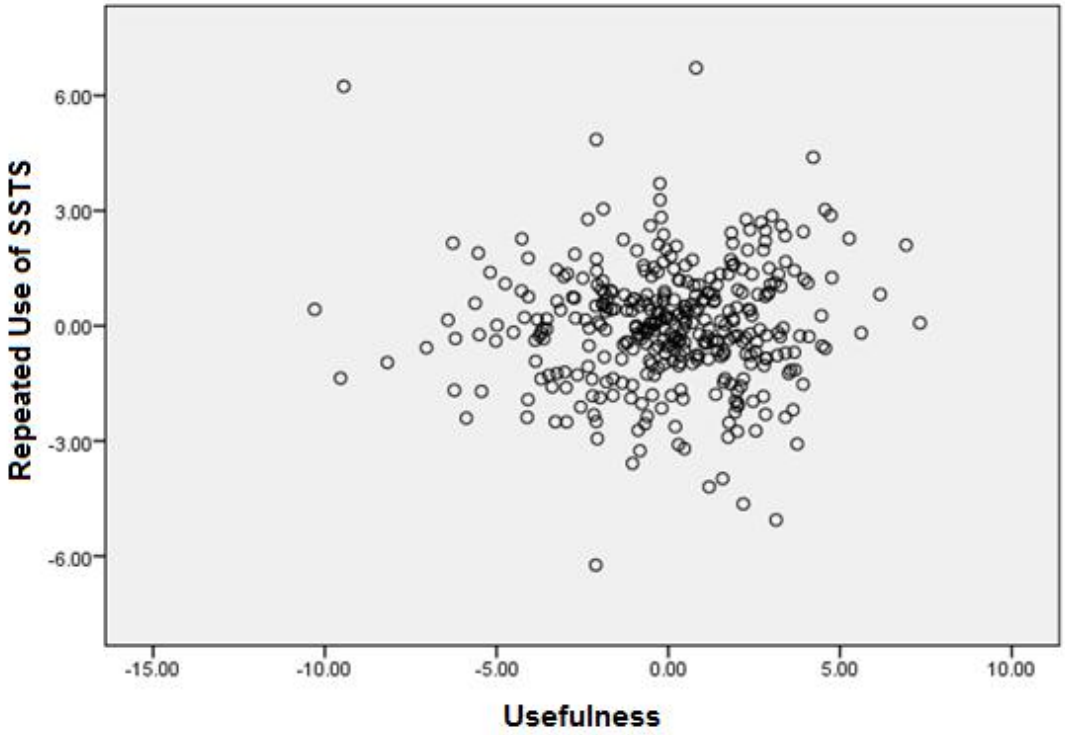
0.00
5.00
10.00
Ease of Use


Repeated Use of SSTS
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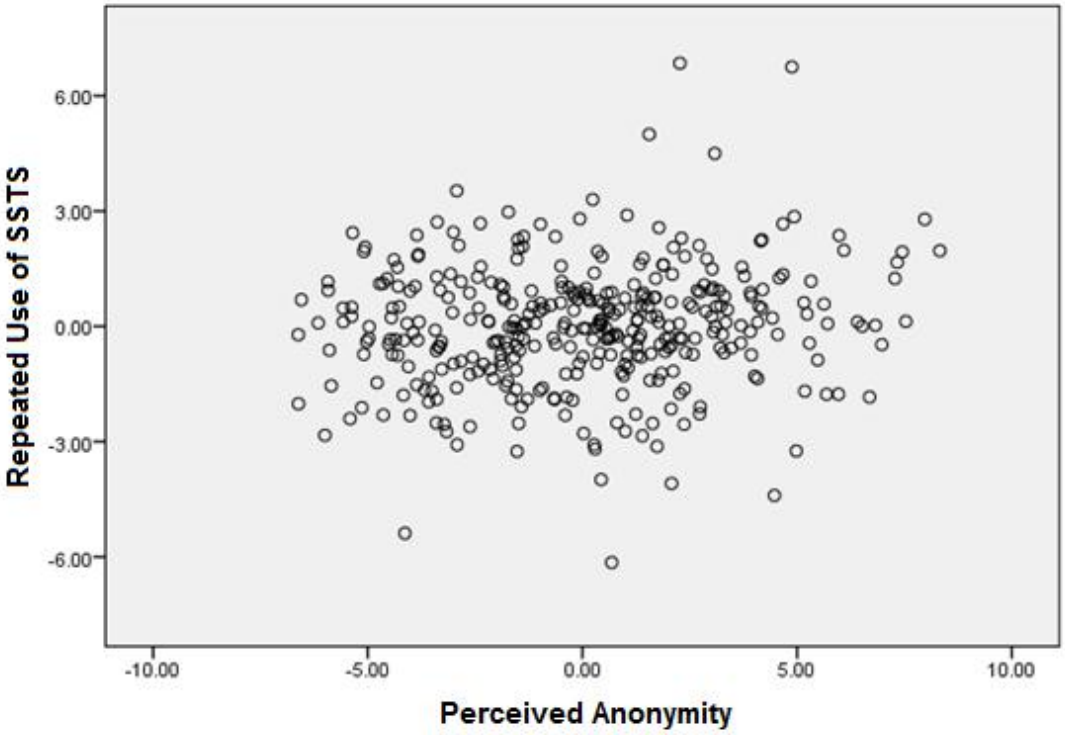
-6.00
-15.00
-10.00
-5.00
0.00
5.00
10.00
Usefulness


Repeated Use of SSTS
6.00
3.00
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-3.00
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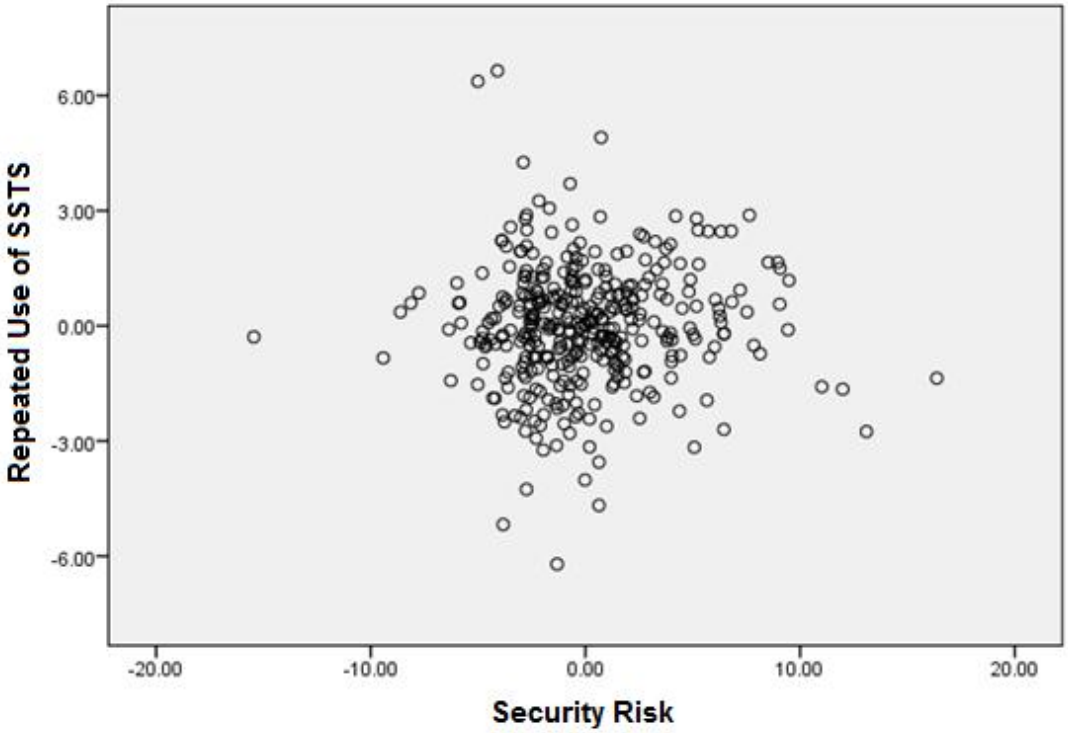
-10.00
-5.00
0.00
5.00
10.00
Perceived Anonymity


Repeated Use of SSTS
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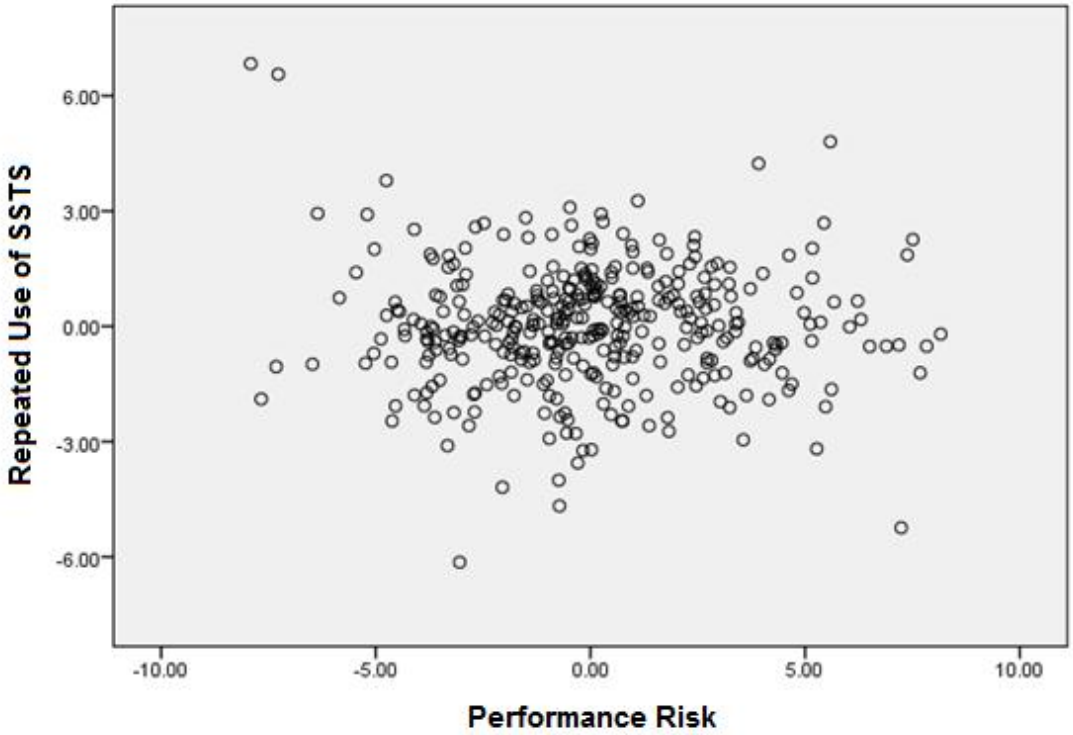
10.00
20.00
Security Risk


Repeated Use of SSTS
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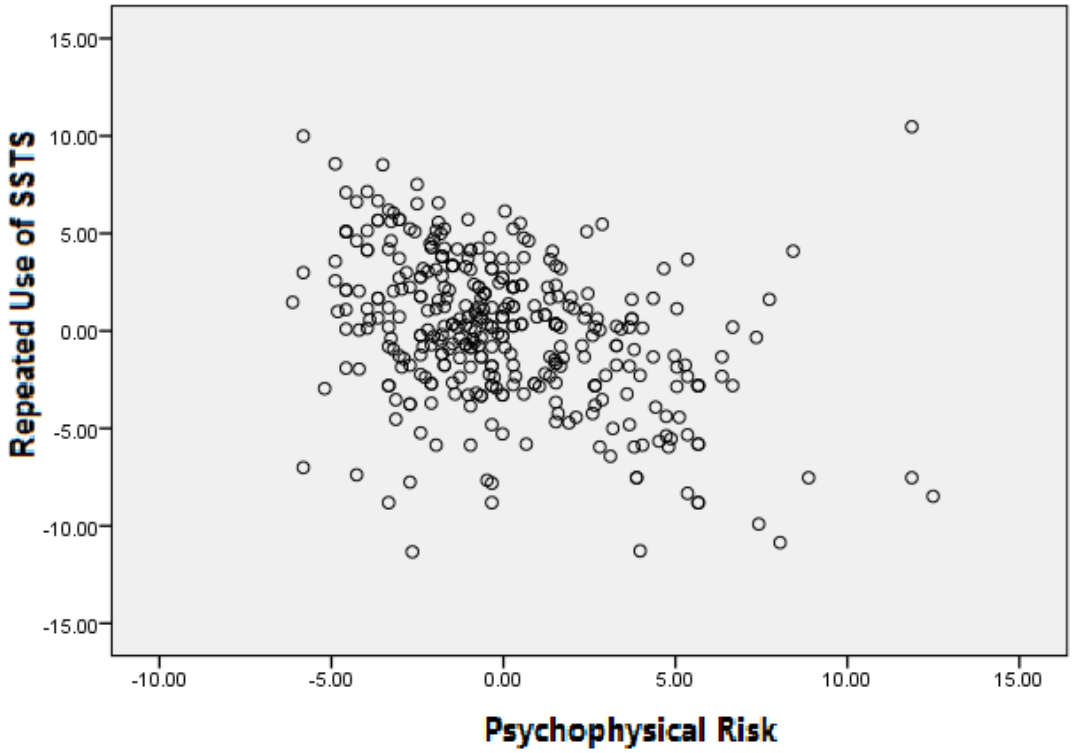
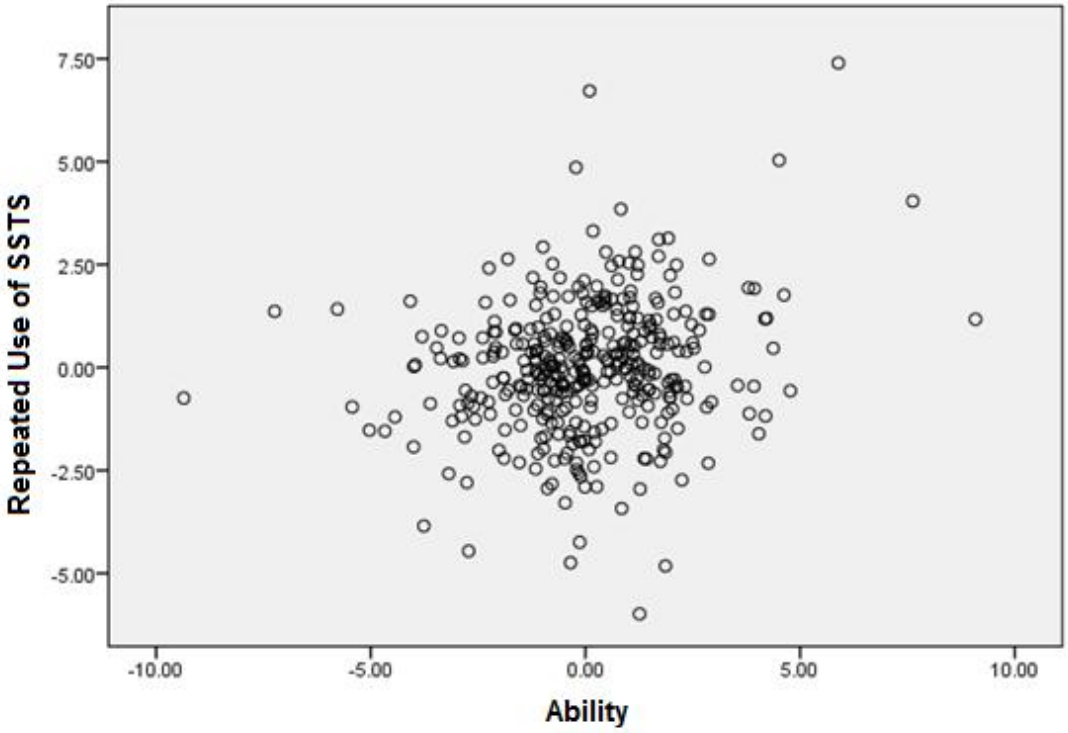
0.00
-3.00
-6.00
-10.00
-5.00
0.00
5.00
10.00
Performance Risk


Repeated Use of SSTS
15.00
10.00
5.00
0.00
-5.00
-10.00
-15.00
-10.00
-5.00
0.00
5.00
10.00
15.00
Psychophysical Risk


Repeated Use of SSTS
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2.50
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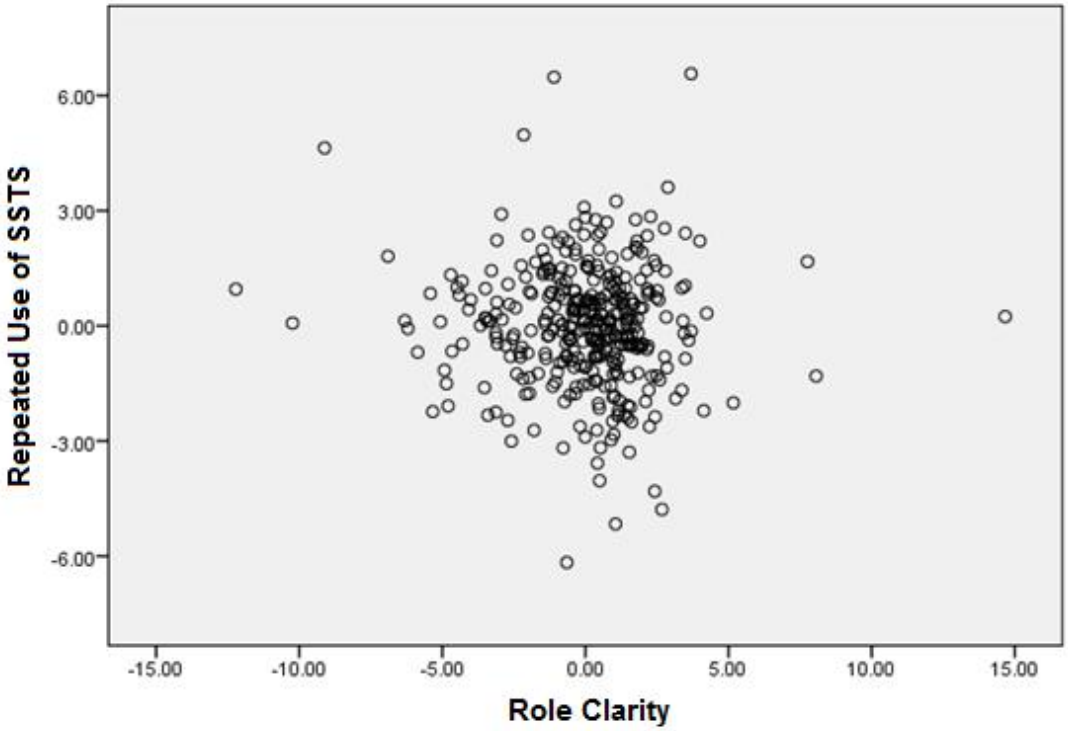
-5.00
-10.00
-5.00
0.00
5.00
10.00
Ability


Repeated Use of SSTS
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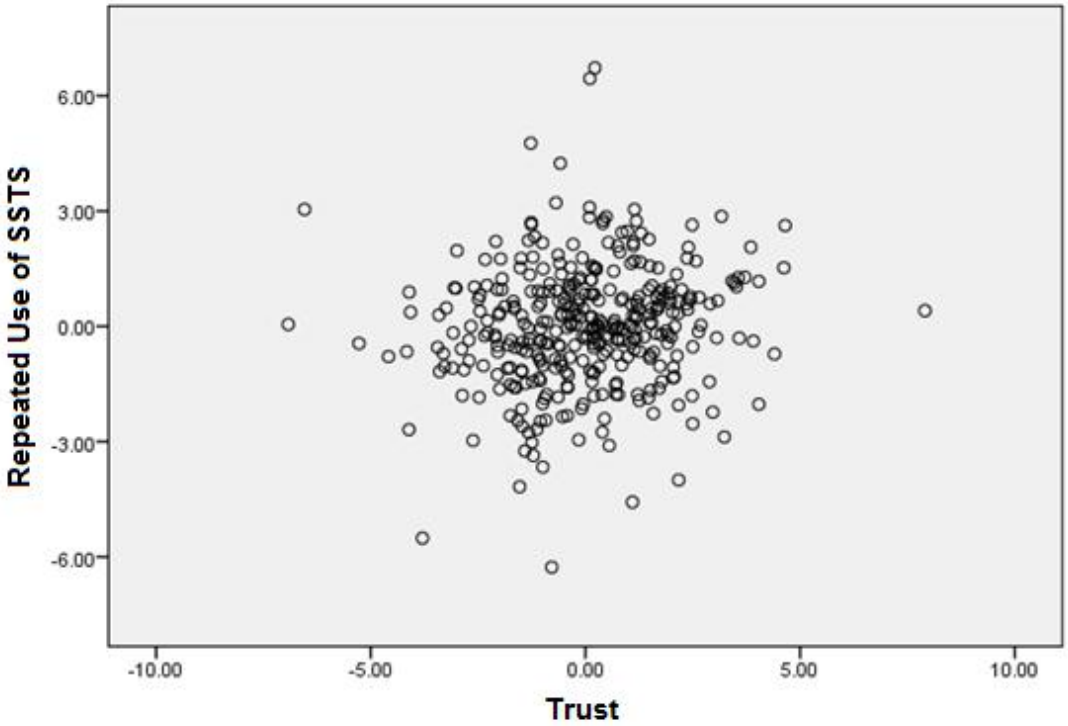
-10.00
-5.00
0.00
5.00
10.00
15.00
Role Clarity


Repeated Use of SSTS
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0.00
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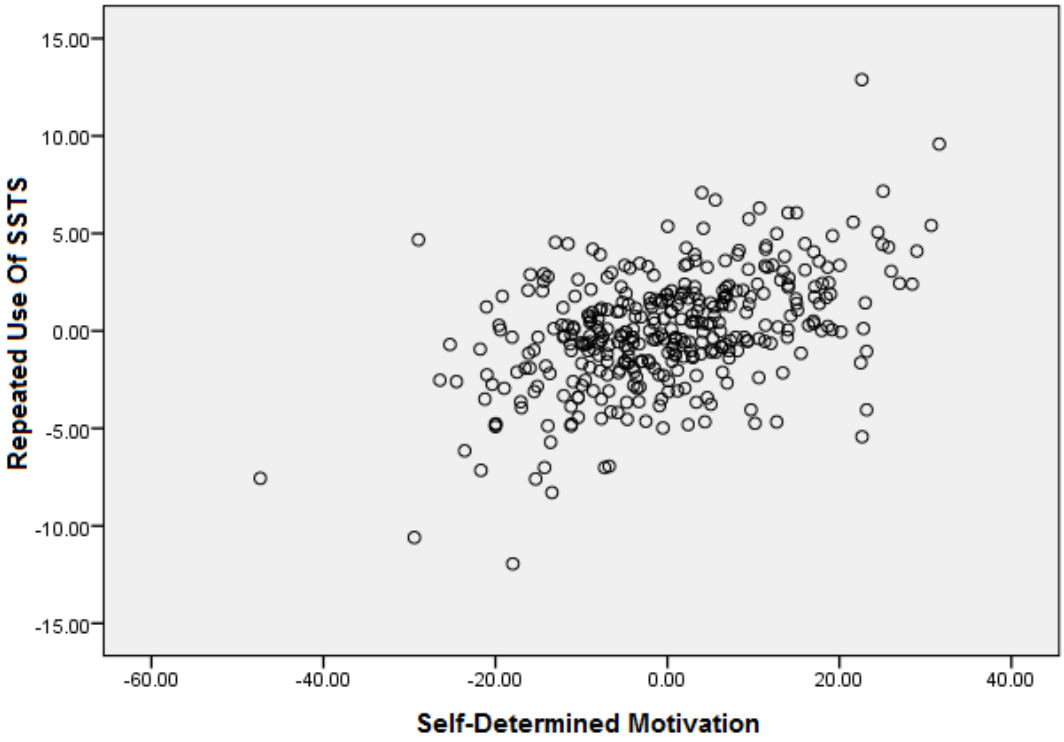
-6.00
-10.00
-5.00
0.00
5.00
10.00
Trust


Repeated Use Of SSTS
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5.00
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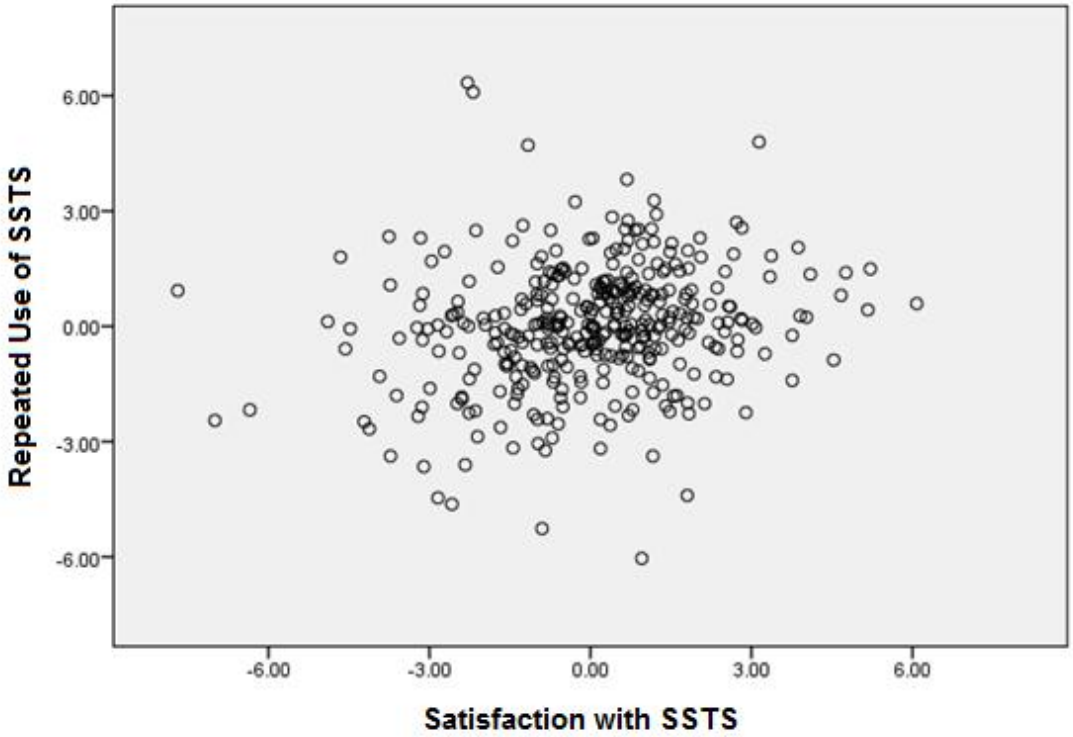
-20.00
0.00
20.00
40.00
Self-Determined Motivation


Repeated Use of SSTS
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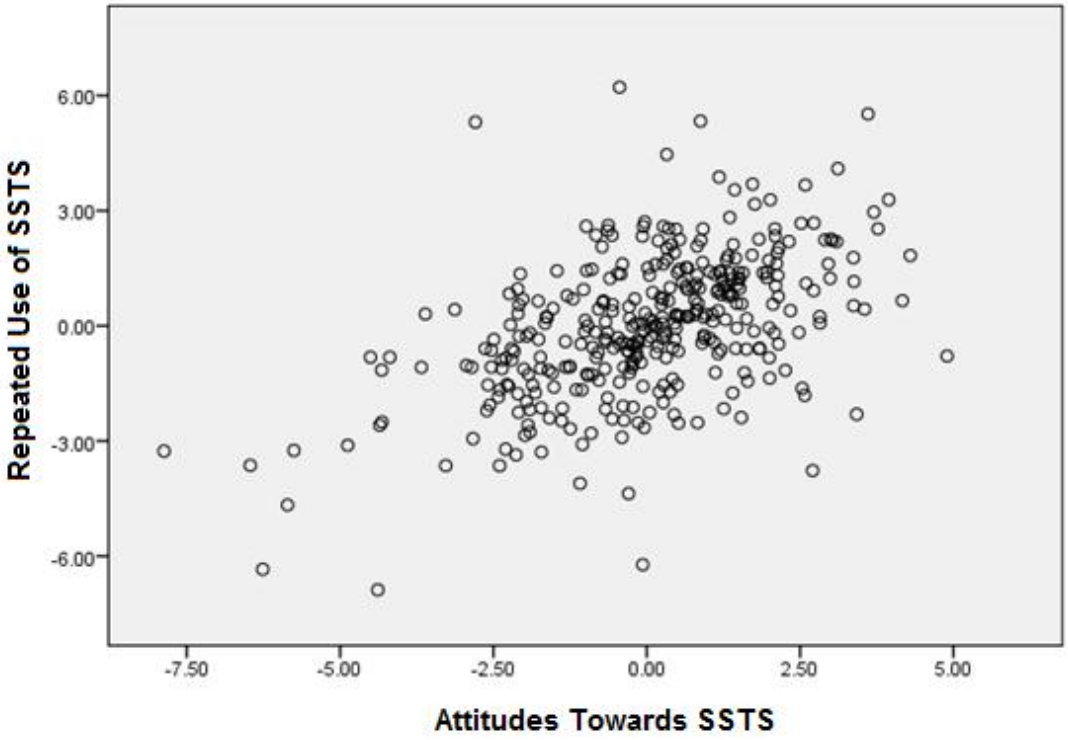
-3.00
0.00
3.00
6.00
Satisfaction with SSTS


Repeated Use of SSTS
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3.00
0.00
-3.00
-6.00
-7.50
-5.00
-2.50
0.00
2.50
5.00
Attitudes Towards SSTS