MEASURING CONSUMER INNOVATIVENESS TOWARDS SELF-SERVICE TECHNOLOGY IN SERVICE INDUSTRY

Ph. D. Thesis

by

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A THESIS

Submitted in partial fulfilment of the requirements for the award of the degree of

DOCTOR OF PHILOSPHY
in
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ROORKEE

CANDIDATE'S DECLARATION

I hereby certify that the work which is being presented in the thesis entitled "**MEASURING CONSUMER INNOVATIVENESS TOWARDS SELF-SERVICE TECHNOLOGY IN SERVICE INDUSTRY"** in partial fulfilment of the requirements for the award of the Degree of Doctor of Philosophy and submitted in the Department of Management Studies of the Indian Institute of Technology Roorkee, Roorkee, is an authentic record of my own work carried out during a period from January, 2013 to March, 2016 under the supervision of ***Dr. Zillur Rahman***, Associate Professor, Department of Management Studies, Indian Institute of Technology Roorkee, Roorkee.

The matter presented in this thesis has not been submitted by me for the award of any other degree of this or any other Institute.

(ARUN KUMAR KAUSHIK)

This is to certify that the above statement made by the candidate is correct to the best of my knowledge.

(ZILLUR RAHMAN)
Supervisor

Dated:

Abstract

Developing and implementing innovations has become a critical determinant of survival in today's competitive scenario. Over the past two decades, advances in technological and service innovations have allowed firms to offer technology-based self-service delivery options to their consumers. To this end, self-service technologies (SSTs) have become prevalent as service delivery options in almost all kinds of services such as banking, hospitality, and retail services. The development of such SSTs is significantly altering the nature of consumer-firm interactions. To date, majority of the service delivery research has concentrated on the interpersonal interactions with very little exploration investigating technology-based options. In fact, most of the research in recent years has focused on online-service delivery options. This research is intended to develop an understanding of the consumer innovation adoption process relating to self-service delivery options in offline service contexts. In order to ensure that such SSTs reach full potential, service firms need to understand the innovation and consumer characteristics, and situational factors that are related to the propensity to adopt these SST options.

This study is grounded in the literature from consumer innovativeness, information technology, and diffusion and adoption of innovations. Based on systematic study of extant literature on consumer innovativeness and TAM-based studies, followed by qualitative research, a theoretical conceptual model of consumer SST adoption was developed and proposed. The model highlights a five-stage innovation adoption process – Awareness, Investigation, Evaluation, Trial, and Adoption – along with the details of the variables to be found as determinants of SST adoption. All these crucial determinants are divided into two main categories – i) SST characteristics (perceived usefulness, perceived ease-of-use, complexity, and perceived risk); and ii) user characteristics (technology anxiety, need for interaction, subjective norm, previous experience, and demographics). Consumer innovativeness mediates the relationships between SST characteristics, user characteristics, and likelihood of adoption. Furthermore, two situational variables (wait time and crowding) were also incorporated as moderators between consumer innovativeness and likelihood of SST adoption.

A mixed research design was applied with a preliminary qualitative research exploring various determinants of SST adoption, followed by a quantitative investigation of determinants included in this study. Data were collected in different stages for different purposes such as scale development

and validation. For final analysis, data were collected via both online as well as offline survey methods from 380 service consumers who were already familiar with numerous SSTs available in distinct offline service contexts. The research instrument (questionnaire) was developed by adopting standard scales available for constructs acknowledged during literature review and qualitative research. Since there was no scale available for measuring consumer innovativeness towards SSTs, this research develops and validates a self-service innovativeness (SSI) scale applicable across a variety of SSTs. After developing this scale with a large sample, it has been validated in different contexts, allowing comparisons across distinct samples (i.e., student vs. non-student sample) and different industries (i.e., retail and hospitality industries).

There are 14 hypotheses in total, exploring three different kinds of effects – i) direct effects of various determinants on adoption intention; ii) mediating effects of consumer innovativeness variable between determinants and adoption intention; and finally iii) moderating effects of situational variables between consumer innovativeness and adoption intention. The results of hypotheses testing confirm the proposed mediating effects of the consumer innovativeness variable between determinants and adoption intention. Beside this, three of the four SST characteristics variables (perceived usefulness, perceived ease of use, and perceived risk) were found to have a significant direct effect on SST adoption that was mediated by the consumer innovativeness variable. Similarly, six of the eight user characteristics variables (technology anxiety, need for interaction, subjective norm, previous experience, age and income) have a significant direct effect on adoption intention. Of these, consumer innovativeness mediates the relationship between four determinants (technology anxiety, need for interaction, previous experience, and age) and SST adoption. In addition, preliminary support is found for the proposed five-stage innovation adoption process.

The research findings contribute to the understanding of consumer innovativeness towards SSTs for both practitioners and academicians. The theoretical conceptual model outlines various determinants of SST adoption, crucial stages of innovation adoption process, and more interestingly the mediating role of consumer innovativeness between these determinants and SST adoption intention. Additionally, the SSI scale developed, validated and proposed in this study is short, valid, reliable, and easy to administer across SSTs in different service domains. This study is intended to direct further academic research on SST adoption, and provides guidance to firms struggling with the development and implementation of SSTs.

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(Arun Kumar Kaushik)

Table of contents

List of Figures

List of Tables

Chapter 1
Introduction

The primary objective of the current chapter is to summarize the overall work done during this research under various sections. The chapter starts with the introduction of the research problem in hand. Next, the problem statement is given in order to specify the current research. The rationale of the study is provided, followed by various research objectives and questions. A proposed conceptual model is also given. Thereafter, the methodology adopted in this research is summarized. At the end of the chapter, the significance of this study, definitions of the key terms and the organization of thesis is reported.

1.1. Research Overview

In recent years, technological advances have combined with superior/advanced service-based products to significantly impact service delivery businesses (Bitner, Ostrom & Meuter, 2002; Lin & Hsieh, 2007; Parasuraman, 2000). As information, communication and technologies (ICT) have developed (Gupta & Gupta, 2008), the basic concept of self-service which began with vending machines, coin operated washer-dryers, and self-pumped gas, has expanded into a pervasive offering of self-service technology (SST) (Meuter, Ostrom, Roundtree, & Bitner, 2000) and tech-based self-services (Kaushik & Rahman, 2015c). Consumers now have the option of using ATMs, kiosks, scanners, touch screens, automated phone systems, and the Internet in a self-served mode for a variety of tasks, including booking flights and seat assignments, vending boarding passes, entering fast-food orders, preparing taxes, self-check-in/out, shopping, and account management (Meuter et al., 2000). These SST options, by removing the need for human interaction, and actively allowing the consumer to self-serve and control the service, have the potential of providing time savings, convenience, and service quality to the consumer while leveraging cost reduction and effective service delivery for firms (Bhappu & Schultze, 2006; Parasuraman, 2000).

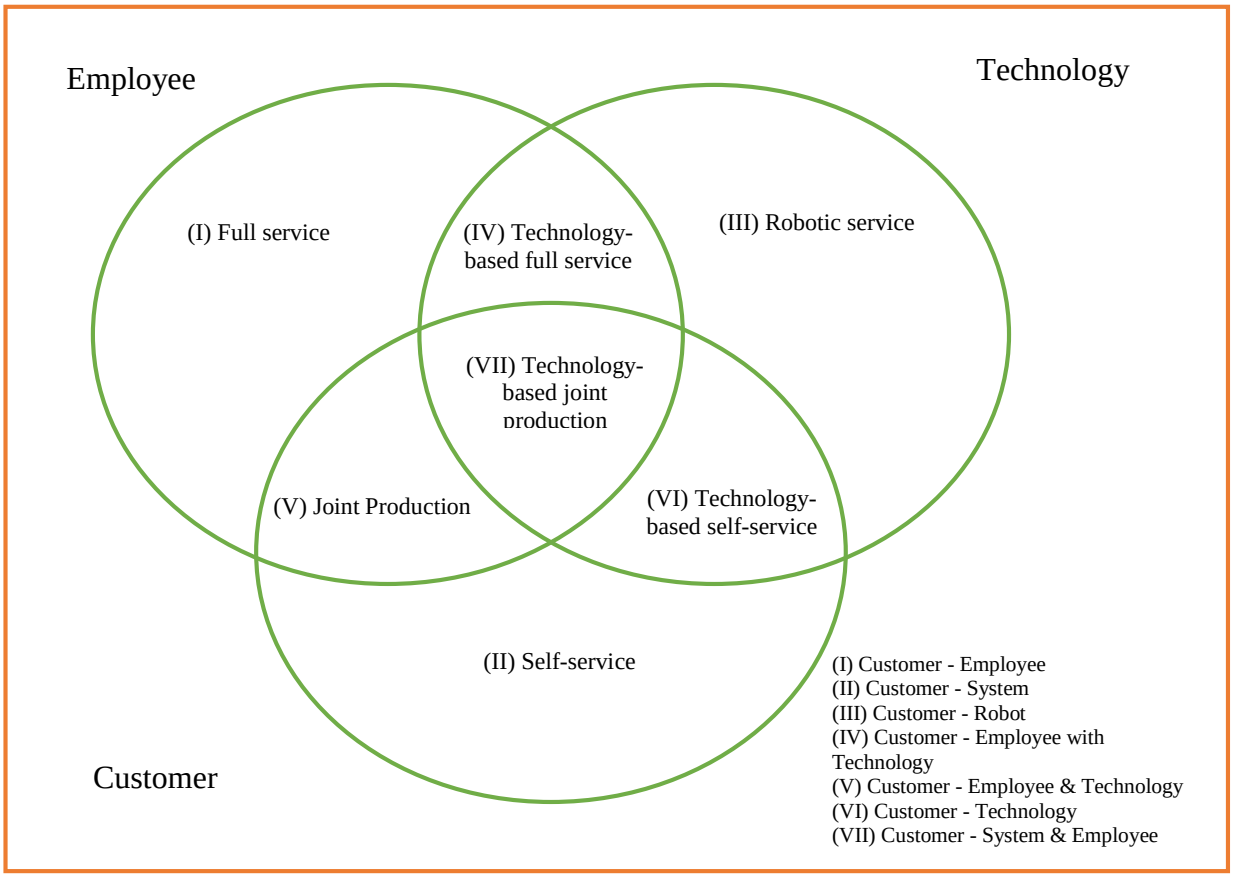
The whole transformation of service delivery options from full services (traditionally by employees) towards technology-based services (using technology instead of employees) can be clearly presented in the form of a diagram as shown in figure 1.1, presenting various relationships among all three essential components - employee, customer and technology. All interactions among these components are specified from a consumer's perspective, as this research mainly focuses on consumer perceptions regarding use of SSTs in offline service settings. Various service delivery options, illustrated in figure 1.1, include:

i. *Full-service option* - includes customer-to-employee interaction, where a service employee waits on the customer;
ii. *Self-service option* - indicates a customer responding to a service system in the absence of a service employee;
iii. *Robotics service option* - will likely include human-like robots, humanoid robots, fully serving customers;
iv. *Technology-based full-service option* - includes a service employee fully serving a customer by utilizing full-service technologies;
v. *Joint production* - includes both the service employee and the customer working together to produce and deliver the service within the service system, as defined by the service provider;

vi. *Technology-based self-service option* - includes customer to technology interaction without any contact with employees; and finally;

vii. *Technology-based joint production option* - includes the customer interacting with a service employee and technology.

Figure 1.1: Transformation of Service Delivery Options[1]



SSTs are increasingly being invested in, and form a part of service operations in most industries and companies today (Curran & Meuter, 2007). Further, SSTs exhibit a marked presence in the marketplace and represent considerable investment in money and strategy for many organizations (Bitner et al., 2002). In order for corporations to provide SSTs that are well accepted by the consumer, provide a good return-on-investment, and facilitate high service quality (Bitner, Brown & Meuter, 2000), firms need to understand which market-oriented factors or variables determine why and when customers use SSTs (Bitner et al., 2002; Curran & Meuter, 2007; Curran, Meuter & Surprenant, 2003). SST adoption has been investigated by various researchers through the application of numerous theories and models with behavioral constructs such as attitudes, beliefs, social norms, attributes and behaviors (Venkatesh, Morris, Davis &

[1] Source - Anitsal, Moon & Anitsal (2002b)

Davis, 2003). Of these existing models, eight models that have been widely applied in innovation adoption and diffusion research are given below (Venkatesh et al., 2003):

i. Theory of Reasoned Action (TRA) (Fishbein & Ajzen, 1975);
ii. Technology Acceptance Model (TAM) (Davis, 1989);
iii. Theory of Planned Behavior (TPB) (Ajzen, 1985, 1991);
iv. Combined TAM-TPB model (Taylor & Todd, 1995);
v. Model of Perceived Characteristics of the Utilization (Moore & Benbasat, 1991);
vi. Innovation Diffusion Theory (IDT) (Rogers, 1962);
vii. Social Cognitive Theory (Venkatesh et al., 2003); and
viii. Motivational Models.

From these, a related group of model variations has been used significantly in SST adoption research (see Table 1.1). This group consists of studies that have been recognized in SST adoption literature for base adoption models (e.g. TRA) and extended or adapted (e.g. TAM2), synthesized or combined (e.g. UTAUT), or compared model variations (TAM vs. TRA).

While many of these technology adoption models are relatively simple and straightforward, others are genuinely complex. Despite the fact that synthesized models such as Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh et al., 2003), and TAM 3 (Venkatesh & Davis, 2000) integrate predictive features of their predecessor models and offer ample and distinctive sets of constructs, they appear to be relatively complex for researchers and practitioners. Therefore, the current study intends to develop an understanding of the consumer adoption process relating to self-service delivery options in offline service contexts. To do so, the study selects a few crucial variables (SST characteristics and user characteristics) from the aforementioned models, and provides a comprehensive conceptual model of SST adoption. This model outlines a five-stage innovation adoption process and the factors proposed to influence the critical stage of adoption. The consumer innovativeness (CI) variable has been proposed to mediate the relationships between various SST characteristics and user characteristics, and the adoption intention.

The novelty of the study lies in its proposed model that can be applied to numerous SSTs available across different service industries. Besides this, the study develops and validates a self-service innovativeness (SSI) scale applicable across a variety of SSTs. This six-item scale has been used to measure consumer innovativeness - one of the crucial constructs of the proposed model, though other constructs have been measured by different standardized adopted scales. This study also proposes two crucial situational variables (waiting time and crowding) as moderators influencing the relationships between consumer innovativeness and SST adoption.

Table 1.1: Adoption Theories, Their Extensions, and Adaptations in SST Adoption Research

Base model	Extensions/adaptations	Synthesized/Combined	Comparisons
TRA (Fishbein & Ajzen, 1975)	TAM, TPB Foundation (Davis, 1989)	TRA-meta analysis (Sheppard et al., 1988) TR+SAT+BI (Lin & Hsieh, 2007) UTAUT (Venkatesh et al., 2003)	TAM Vs. TRA (Benbasat & Barki, 2007)
TPB (Ajzen, 1985, 1991)	DTPB (Taylor & Todd , 1995) TAM validation (Szajna, 1996) TAM augmented (Vijayasarathy, 2004)	C-TAM-TPB (Taylor & Todd, 1995) TR+TPB (Chen & Li, 2010) UTAUT (Venkatesh et al., 2003)	TAM vs. TPB (Mathieson, 1991) TAM vs. TPB vs. DTPB (Taylor & Todd, 1995)
TAM (Davis, 1989)	TAM 2 (Venkatesh & Davis, 2000) TAM as running example (Gefen, Straub & Boudreau, 2000) TAM extended (Kaushik & Rahman, 2015a, b) TAM meta-analysis (King & He, 2006) TAM3 (Venkatesh & Bala, 2008)	C-TAM-TPB (Taylor & Todd, 1995) SAT+TA (Wixom & Todd, 2005) TR+TAM=TRAM (Lin, Shih & Sher, 2007) TR+TA (Walczuch Lemmink & Streukens, 2007) TAM meta-analysis (Schepers & Wetzels, 2007) UTAUT (Venkatesh et al., 2003)	TAM vs. TPB (Mathieson, 1991) TAM vs. TRA (Benbasat & Barki, 2007)

1.2. Problem statement

Despite the availability of these existing SST adoption models (reported in Table 1.1), practitioners and academics need continuous development of SST adoption models so that these models:

i. Relatively simple in terms of constructs;
ii. Incorporate market-oriented SST variables and determinants requiring additional focus and that relate to the marketplace; and
iii. Provide additional empirical applications across numerous SST options and industries that have been rarely examined.

Although many adoption constructs and variable determinants have been examined in extant literature, several SST characteristics, user characteristics, and situational factors represent gaps that warrant further examination (Kaushik & Rahman, 2014, 2015a; Dabholkar & Bagozzi, 2002). The basic categories of SST industries and SST technologies exist (Bitner et al., 2002), confirmations and extensions of extant SST adoption research need to include a variety of industries and/or technologies. Many of the existing technology adoption models have examined a variety of behavioral, attitudinal, attributable, and belief variables that have been applied to various SSTs (Kaushik & Rahman, 2015a, b). However, the researcher, in his review of literature, found that neither was there a model with SST characteristics (perceived usefulness, perceived ease-of-use, complexity and perceived risk), user characteristics (technology anxiety, need for interaction, subjective norm, previous experience and demographics) and situational factors (waiting time and crowding) in combination, nor had such a model been tested empirically for different SSTs available in offline service contexts.

1.3. Rationale behind the study

Many marketing researchers found that consumers who "talk the talk" in marketing surveys do not always "walk the walk" at the time of actual innovation adoption (Arts, Ruud & Tammo, 2011). On certain occasions, majority of consumers shows high interest towards adoption of new technology, mainly in the early stages of the adoption process, but hardly a few consumers actually adopt or/and use it finally. The rationale for this study is predicated upon the following considerations:

i. The basic TAM along with its constructs (perceived usefulness and perceived ease of use) is a valid, simple, and recognized model of technology acceptance that is conducive to expansion in general applications for SST adoption research (Wixom & Todd, 2005; Faisal & Isaid, 2015);

ii. There is a need to examine various SST characteristics that can be applicable to numerous SSTs across different service industries (Wang et al, 2009);
iii. There is a need to examine various user characteristics (technology anxiety, need for interaction, subjective norm, previous experience and demographics) in SST adoption and diffusion literature (Simon & Usunier, 2007);
iv. There is a need to examine situational factors (waiting time and crowding) as adoption determinants (Wang, Harris & Patterson, 2009), especially in an offline service context (Kaushik & Rahman, 2015b);
v. Innovativeness is a valid measure in adoption literature that needs further measurement and examination in offline SST adoption research (Parasuraman, 2000);
vi. The proposed expanded TAM model is unique in its combined determinant variables and configuration.

Additionally, the inspirations behind conducting this research can be summarized under the following three sub-heads:

1.3.1. Why consumer innovativeness?

Measuring innovativeness of consumers is gaining significance by the day for several reasons. First, markets are becoming increasingly global. This fact highlights firms' needs to understand consumer similarities and differences across markets. Second, firms are introducing new SSTs with increasing frequency throughout the world. As such, they need to know consumers' propensity to adopt these SSTs and how this propensity varies across different SSTs (Curran & Meuter, 2005; Kaushik & Rahman, 2015a). Third, innovation has become one of the primary means for advancing consumer welfare by increasing the benefits of products while also reducing their costs (Golder & Tellis, 1997). Therefore, consumer innovativeness may be an important factor that drives a firm's economic progress and its position in global competition. Governments, society and public policy makers can also be benefited from an understanding of CI.

1.3.2. Why self-service technology?

Over the past few years, adoption theories have been successfully applied to the service context (Park & Kim, 2014). With an increase in the prominence of services, emphasis has shifted from product development towards service development. As a result, new technologies are being implemented in the service sector, and SSTs increasingly applied in the service delivery processes. SST is one of the most frequently used and widely accepted technological interfaces (Kaushik & Rahman, 2015c, d). This evolution of service delivery is somewhat comparable to

the time in the past when human labor was incessantly replaced with automatic machines, mainly in agricultural and manufacturing industries (Ong, 2010). It has been established in previous studies on hospitality technology adoption that a growing number of consumers are "*do-it-yourselfers*"— willing, and in some cases eager, to use SSTs in food service and lodging establishments. SSTs started out mainly as service delivery systems that brought more revenue for service providers instead of adding value to their service quality. For instance, SST was initially treated as only a replacement of labor to decrease overall labor cost. For example, an automatic teller machine (ATM) in the banking system that served as a cashier 24 hours a day and 7 days a week, saved labor costs, and allowed bank customers to perform self-services at their own convenience.

Thus SST plays a more crucial role as it decreases the need for interaction between a service provider and service consumers. Identification of the key antecedents predicting attitudes toward adoption of SSTs has become a significant area of academic research. The impact of these antecedents varies from one stage to another in the innovation adoption process across different SSTs (Curran & Meuter, 2005), and it should be clearly understood from the customer's perspective throughout distinct SSTs.

1.3.3. Why service industry?

At a time when the Indian economy is leaping forward with the vision of becoming a global force of the future, the present study focuses on the service sector for the investigation of customer innovativeness towards numerous offline SSTs. The services sector, with around 52 percent contribution to the Gross Domestic Product (GDP) in 2014-15, has made rapid strides in the past decade and a half to emerge as the largest and one of the fastest-growing sectors of the economy (http://indiabudget.nic.in). Although a rich body of research addresses factors affecting customer innovativeness in different marketing streams, only a few recent studies have concentrated on differentiating the key antecedents of adoption behavior (Arts et al. 2011), especially in the service industry (Kaushik & Rahman, 2015a).

Thus far, virtually all of service encounter literature has focused solely on the interpersonal dynamics of the service encounter. Despite the fact that these interpersonal dynamics are basically vital, the development of SSTs accessible to firms is leading us into a technological revolution that should be investigated in scholarly research. As many service encounters are currently encouraged without interpersonal interaction, it is necessary to comprehend the dynamics of these tech-based service encounters. This research addresses numerous calls for more scholarly attention to the dynamics and changes associated with the incorporation of new

technology (e.g., SST) into the service encounter. As such, the effect of technology (SST) on the whole service industry and associated firms demand further research.

1.4. Objectives and research questions

1.4.1. Objectives of the study

The primary objective of this study is to introduce and examine a comprehensive SST adoption model that:

- Is straightforward and practical in application.
- Includes key determinants or factors directly related to the marketplace.
- Applicable across multiple service industries and technologies that warrant additional focus on SST adoption research.

By developing a model that incorporates SST characteristics, user characteristics and situational factors in an offline service context, a viable and practical model that bridges the existing gaps may emerge (refer to Figure 1.2). Therefore, the overall objectives of this study are:

1. To develop and propose a basic conceptual model of consumer innovativeness.
2. To develop an innovativeness scale that can be validated across SSTs in different services.
3. To assess the key determinants of adoption (perceptions of SST characteristics, user characteristics variables and consumer innovativeness variable) in an offline service context.
   - 3.1. To determine whether consumer innovativeness mediates the relationship between SST characteristics and user characteristics variables, and intention of SST adoption.
   - 3.2. To determine whether situational variables (waiting time and crowding) moderate the relationship between consumer innovativeness and intention of SST adoption.

In order to explain how aforementioned research objectives would be achieved in this research, a detailed flow diagram is presented in figure 1.3.

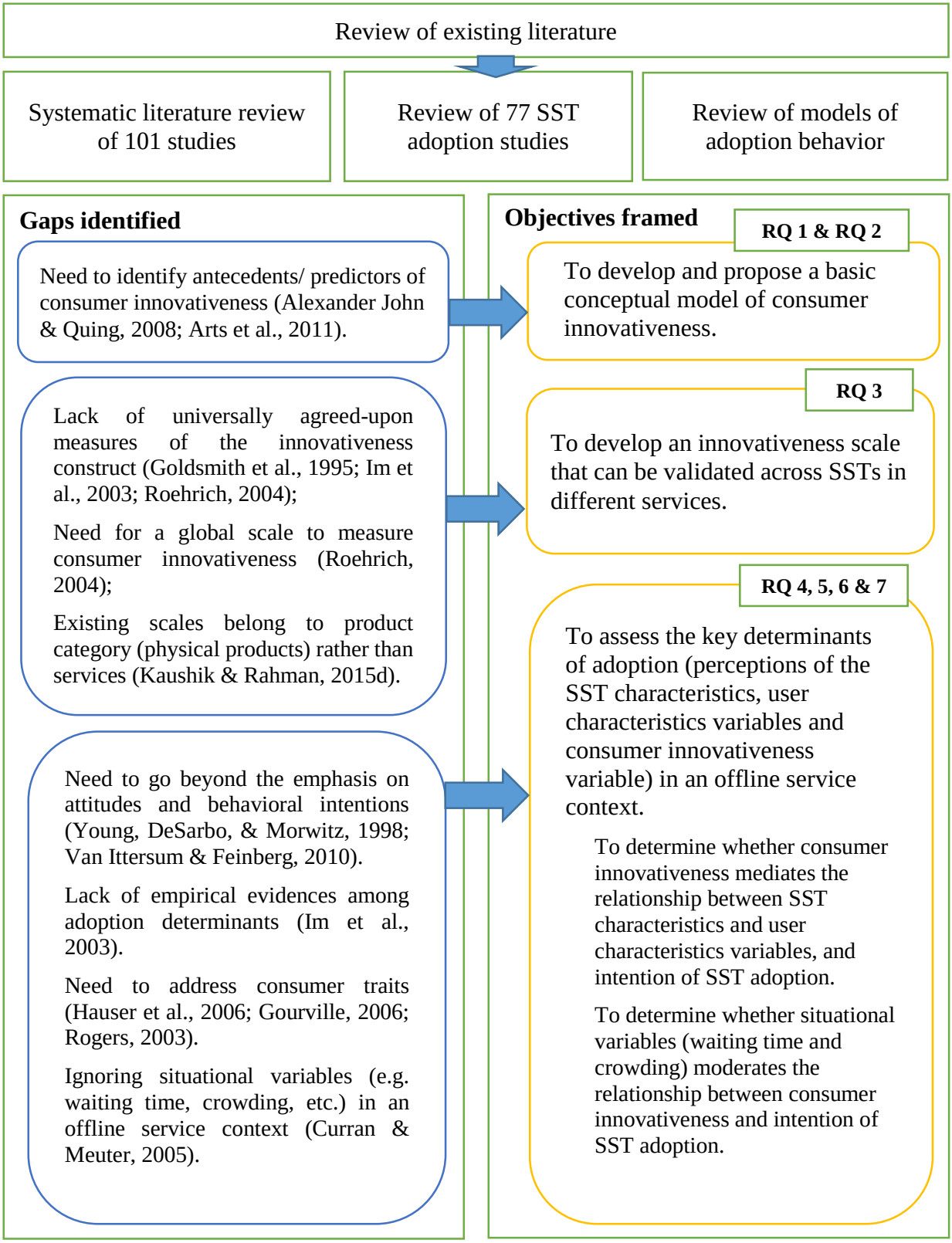
1.4.2. Research questions

The research questions provide step-by-step directions to solve the research problem in a defined manner. The general research question for this study is: How well does the proposed model explain consumer innovativeness towards SST adoption? However, to achieve the research objectives mentioned above, the following research questions have been formulated:

RQ 1: What are the different dimensions, perspectives and crucial factors of consumer innovativeness affecting customers' decision to adopt an SST?

RQ 2: What are the inter-relationships among these factors?

Figure 1.2: Transformation of Research Gaps into Research Objectives



[2] RQ – Research question. Objective 1 is based on RQ 1 and 2, objective 2 is based on RQ 3, while the third objective is based on RQ 4, 5, 6 and 7.

Figure 1.3: Flow Diagram of Research

Research Problem: Measuring Consumer Innovativeness towards Self-service Technology in Service Industry

Objective 1: Developing a Conceptual Model of CI

1. Systematic Review of CI Literature
   - Perspectives of CI
   - Dimensions of CI
   - Preposition development
   - Proposed CI Model
2. Review of SST adoption Literature
   - SST Technologies
   - SST Industries
3. Models of adoption behavior
   - Theory of Reasoned Action
   - Theory of Planned Behavior
   - Technology Acceptance Model
   - Innovation Adoption Model
4. Identify gaps in existing literature
5. Identify several constructs and their inter-relationships
6. Qualitative Research
   - Justifications
   - Methodology
   - Discussion of results
   - Identify final constructs
7. Conceptual model and hypotheses development
   - Mediating effects
   - Direct effects
   - Moderating effects
   - Sequential effects

Objective 2: Developing & validating SSI Scale

1. Consumer innovativeness and its measurement
2. Description of various scales of innovativeness
3. SSI scale development process

Phase I: Preliminary scale development
- Domain specification and Item Generation
- Purification of Scale

Phase II: Progressive evaluation of scale

Phase III: Validation in different industry (Retail)

Phase IV: Validation with a non-student sample in a different industry (Hospitality)

Phase V: Test-retest reliability and predictive validity

Phase VI: Convergent and discriminant validity

Discussion and implications

Objective 3: Assessing the key determinants of adoption

1. Research Methodology
   - **Research design**
     - Mixed
     - Cross-sectional survey
   - **Sampling design**
     - Sample, size and sampling technique
     - Consent, time duration
   - **Research instrument**
     - Survey development
     - Questionnaire structure
   - **Construct measures**
2. Data analysis and findings
   - Descriptive analysis
   - Measurement model analysis
   - Confirmatory factor analysis
   - Hypotheses testing
   - **Measurement model refinement and purification process**
     - SST characteristics
     - User characteristics
     - CI variable
     - Innovation adoption process variables
     - Full model
   - **Purification of Scale**
     - Mediating effect hypotheses
     - CI Hypothesis
     - Moderating effect hypotheses
     - SST characteristics hypotheses
     - User characteristics hypotheses
     - Adoption process hypotheses
3. Data analysis and findings
   - Discussion of results
   - Research contributions
   - Managerial implications
   - Limitations and future research directions

Outcomes: Identifying various determinants of likelihood of adoption; develop, proposed and validated a comprehensive SST adoption model; developing a self-service innovativeness scale; and empirically confirm the mediating role of CI along with various direct and sequential effects among constructs.

RQ 3: How can we measure consumer innovativeness towards SST adoption? Can we develop and validate a self-report scale to measure consumer innovativeness that can be applied to a variety of service domains?

RQ 4: How do these factors influence consumer innovativeness towards SST adoption?

RQ 5: How do these factors influence consumers' adoption of SSTs?

RQ 6: How does consumer innovativeness influence consumers' adoption of SSTs?

RQ7: Whether situational variables (waiting time and crowding) moderate the relationship between consumer innovativeness and SST adoption in an offline service context.

These questions directly determine the proposed conceptual model (see figure 1.4), and fourteen primary hypotheses (reported in Appendix A.1) that relate to the respective latent and measured variables included in the proposed model. The model and hypotheses will be developed in Chapter Four.

1.5. Theoretical Conceptual Framework

Although the numerous constructs, theories, and models available in extant literature are reviewed in chapter two, basic introductory comments on the proposed conceptual model (developed in Chapter Four) are appropriate. The proposed model (see Figure 1.4) of SST adoption in this research is based upon a systematic review of existing literature on consumer innovativeness and SST adoption along with TAM-based studies (refer to Appendices A.2 to A.4). Although the proposed model excludes attitude, behavioral intention and actual usage as constructs in the original TAM (Davis, 1989; Davis et al., 1989).

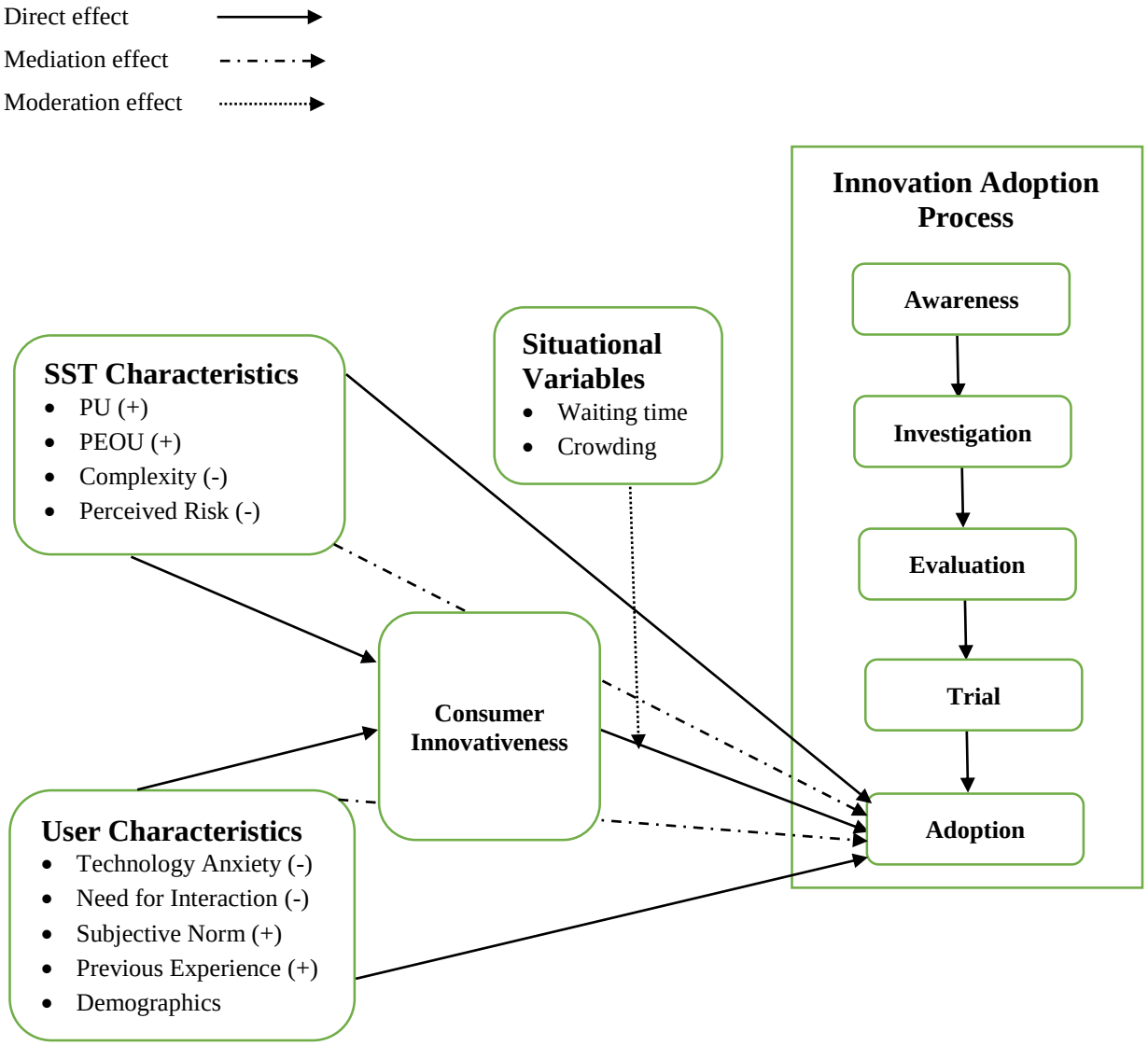
The review of CI studies (refer to Appendix A.2) is the foundation for the selection of the latent variable of 'consumer innovativeness' in this research (Kaushik & Rahman, 2014). The review of extant literature on SST adoption research that includes consumer demographic variables is the foundation for the addition of various demographics such as age, gender, income and education. (Meuter et al., 2003; Simon & Usunier, 2007; Venkatesh et al., 2003). Once again, the review of TAM and SST adoption literature forms the basis for the incorporation of the latent variables of SST characteristics, user characteristics and situational factors (Dabholkar, 1996; Dabholkar & Bagozzi, 2002; Wang, Harris & Patterson, 2009).

1.6. Methodology

In order to have support for, and empirically verify the above proposed model, primary responses were gathered in two distinct research phases – Qualitative phase and Quantitative phase. The qualitative research was intended to explore the research problem, followed by an intensive quantitative research. The first qualitative phase was meant to give an in-depth understanding of

the domain of interest so that useful insights into the proposed model were achieved. However, the second phase was more intensive, and included an empirical examination of the crucial variables included to influence the adoption behavior of consumers related to existing SSTs. This methodological triangulation gives a few advantages such as more accuracy and increased credibility of findings.

Figure 1.4: Theoretical conceptual model



1.6.1. Phase 1: Qualitative Research

Due to the limited literature on consumer innovativeness towards SST adoption, it seemed more suitable to start the research with an exploratory approach. An exploratory research mainly relies on secondary research based on literature reviewed and qualitative approaches such as informal discussions and/or in-depth interviews (a more formal approach) with consumers. Before conducting the quantitative research, it was important to ensure that the constructs included in

the current investigation were really crucial and related to the domain of interest, more specifically, SST adoption. Furthermore, not several qualitative studies exist within the adoption literature. Findings from this qualitative phase of the study develop an in-depth understanding of the consumer adoption behavior and also support the proposed model of SST adoption. The qualitative research approach was also useful in developing the questionnaire used for data collection in the quantitative phase of this study.

In-depth, open-ended interviews are considered an important approach to evaluate the crucial constructs influencing the adoption behavior of service consumers. Therefore, in-depth interviews were conducted in this qualitative phase of the research. The in-depth interviews primarily emphasized consumers' recent usage of distinct SSTs in numerous service contexts. A semi-structured format was used in order to explore consumers' awareness levels, usage, primary sources of information and reasons behind adoption or non-adoption of the SSTs. Respondents were also given a list of a few existing SSTs in order to make the discussions more intensive. Chapter three explains how and why qualitative research was conducted in this study.

1.6.2. Phase 2: Quantitative Research

In addition to the exploration of consumer adoption behavior by conducting exploratory qualitative research, a quantitative research was also conducted on distinct SSTs used across diverse services. The data collection in this quantitative phase of research emphasized those constructs that are presumed to be more effective in the adoption decision. In order to increase the generalizability of findings of this empirical examination, a wide variety of SSTs across different service industries were incorporated, rather than conducting a survey within a specific firm.

A cross-sectional survey approach was applied in order to completely explore the constructs that influence SST adoption. Based on these constructs, various crucial research hypotheses were developed and are proposed in Chapter Four. To empirically examine these hypotheses, numerous statistical tools and techniques were applied, using SPSS 20.0 and AMOS 20.0. The primary purpose of this quantitative phase of the research is to empirically verify the significance of each of the key constructs (or variables) reported in the proposed conceptual model (refer to Figure 1.4).

1.7. Significance of the Study

In this research, the proposed and validated conceptual model is formulated by systematically reviewing the technology diffusion and adoption literature. Initially, a basic yet robust and recognized base model (TAM) is identified. Thereafter, crucial determinants (SST characteristics and user characteristics) that have been promoted and emphasized for additional SST adoption research were finalized (Lee, Cho, Xu & Fairhurst, 2010; Simon & Usunier, 2007). The current study considers the basic TAM's constructs (perceived usefulness and perceived ease-of-use) as two crucial SST characteristics. As compared with other technology adoption/acceptance models, basic TAM is relatively straightforward; it possesses only two base variables (perceived usefulness and perceived ease-of-use) as the key latent determinants of behavioral intention (Gefen et al., 2000; Venkatesh & Davis, 2000). Consequently, basic TAM provides a simple yet viable model of adoption that is familiar in research (Gefen et al., 2000). It can be applied easily and practically by researchers and practitioners. The model also has strong relationships with, and provides comparisons for previous and future TAM-based adoption research. Comparing TAM with the "theory of reasoned action" (TRA) and the "theory of planned behavior" (TPB), Yousafzai, Foxall and Pallister (2010) confirmed that TAM was empirically superior. Previous studies that have used TAM to study innovation adoption behavior have mainly emphasized:

i. Model replication by empirically examining the relationships among PU, PEOU, attitude and intention towards adoption (Kaushik, Agrawal & Rahman, 2015).
ii. Conceptual support for central constructs (perceived usefulness and perceived ease-of-use) of TAM (Karahanna & Straub, 1999).
iii. Extension of TAM (Kaushik & Rahman, 2015a, b; Kaushik et al., 2015).
iv. Comparison of TAM with other adoption theories/models (Mathieson, 1991; Yousafzai et al., 2010).

Other additional SST characteristics (complexity and perceived risk) that are negatively related with innovativeness constructs were also finalized from other adoption models such as IDT (Rogers, 1962). Further, user characteristics (technology anxiety, need for interaction, subjective norm, previous experience and demographics) included in this study have been critically examined in technology adoption and diffusion literature. However, hardly any study that examined the negative effects of the two user characteristics mentioned earlier (technology anxiety and need for interaction) along with the positive effects of the other two user characteristics (subjective norm and previous experience) on consumer innovativeness in an offline service context, exists in SST adoption literature.

Several adoption studies have incorporated consumers' demographics (age, gender, education, and income) as external determinants of SST adoption (Lee et al., 2010; Meuter Ostrom, Bitner & Roundtree, 2003; Reinders, Dabholkar & Frambach, 2008; Simon & Usunier, 2007); an explicit emphasis on demographics as independent, direct determinants of consumer innovativeness has not been prevalent in existing SST adoption literature. Consumer demographic as one of the important user characteristics is an extensively assessed trait in SST adoption research.

Consumer innovativeness has been recognized as a crucial variable in technology adoption literature (Liljander, Gillberg, Gummerus & van Riel, 2006; Lin et al., 2007; Lin & Hsieh, 2006, 2007; Parasuraman, 2000). Technology readiness index (TRI) captures innovativeness as one of the crucial psychographic facets (optimism, innovativeness, discomfort and insecurity) of the consumer in technology adoption literature (Parasuraman, 2000). Innovativeness construct may have a decided and direct relationship with PU and PEOU (Lin et al., 2007) of SSTs. Past studies also confirm that customers with high innovativeness may adopt SSTs more easily and quickly than others (Parasuraman, 2000). Understanding and identifying 'innovativeness' construct in marketing research could allow firms to accordingly adjust the presentation and availability of SST options to optimize investments and maximize operational efficiency and consumer satisfaction. The researcher in this study explores innovativeness variable as a mediator between various determinants and intention of SST adoption.

Waiting time has been recognized as one of the crucial situational traits in SST adoption research. It has been indicated as an external variable that has a direct relationship with the PU of an SST, and also with consumers' intention to adopt the SST (Dabholkar & Bagozzi, 2002). Waiting time is a related situational variable that can be quantitatively measured in an offline service context. Further investigation of waiting time implications on consumers' perceived usefulness and perceived ease-of-use of SSTs is a reasonable thought in SST adoption literature. Similarly, the social implications of crowding has been perceived as a substantial situational variable in SST adoption research (Dabholkar & Bagozzi, 2002). Past studies have suggested a direct relationship of crowding with demographics and consumer innovativeness variables. However, the researcher in this study has examined the moderating role of the two aforementioned situational variables (waiting time and crowding) between innovativeness and intention of SST adoption. By understanding the effect of these situational variables (waiting time and crowding) on SST adoption, service firms can better anticipate whether adoption of new technology will be successful or unsuccessful.

1.8. Definitions of key terms

Beyond the various acronyms that are parenthetically identified in text throughout this study, it is appropriate to articulate and clarify the meaning and/or definition of specific terms and constructs that are associated with this research:

Adoption: Adoption (or technology adoption) is defined as the potential user's predisposition toward personally using a specific technology (Davis, 1989). In this research, adoption is the fifth and last stage of adoption process where the consumer, based on the trial stage and the resultant experience, decides to adopt the innovative offering (Rogers, 1962).

Attitude (-based) constructs: Constructs in technology adoption pertaining to the attitude beliefs of the customer or respondent that pertain to the customers' social setting (Ajzen & Fishbein, 1977; Davis et al., 1989). For example, technology anxiety, need for interaction, subjective norm, previous experience, etc.

Attribute (-based) constructs: Constructs in technology adoption pertaining to the attributes of the technology. These constructs are distinguished from attitude-based variables (Davis et al., 1989). For example, the central constructs of basic TAM - PEOU and PU, and the five basic innovation characteristics identified in IDT - relative advantage, compatibility, complexity, trialability, and observability are considered attributes of the SST.

Awareness: The first stage in the adoption process where the consumer is exposed to the new product/service offering, and gets to know of the product (Rogers, 1962).

Belief-based constructs: The variables and constructs in adoption models that are based upon the beliefs of the consumer or respondent; these include PEOU and PU in TAM and social norms and attitude-based perspectives in TRA (Wixom & Todd, 2005).

Basic/Base TAM: It is an information systems theory that models how users come to accept and use a technology. The original TAM was reduced to two primary antecedents (perceived usefulness and perceived ease of use) for technology adoption (Davis et al., 1989).

Behavioral intention: The degree to which a person has formulated conscious plans to perform or not perform some specified future behavior (Davis et al., 1989; Venkatesh et al., 2003; Lin, Lee, & Jen, 2008).

Complexity (COM): Complexity is defined as the measure of uncertainty in achieving the functional requirements (FRs) of any system (Suh, 2005).

Confirmatory factor analysis (CFA): CFA is a statistical technique used to verify the factor structure of a set of observed variables (Hair, Anderson, Tatham & Black, 1998).

Consumer innovativeness (CI): CI is generally defined as the propensity of consumers to adopt new and innovative products/services (Kaushik & Rahman, 2014).

Crowding: The situational factor of having potentially elevated numbers of people in the consumer's (respondent's) use-setting that can influence their perceptions or behaviors (Dabholkar & Bagozzi, 2002).

Demographics: Study of a population based on factors such as age, race, sex, economic status, level of education, income level and employment, among others (Malhotra & Dash, 2010).

Discriminant analysis: A discriminant (or multiple discriminant analysis) is the appropriate multivariate technique if the single dependent variable is dichotomous (e.g. high innovative vs. less innovative) or multi-chotomous (e.g., high-medium-low) and therefore nonmetric (Hair et al., 1998).

Exploratory factor analysis (EFA): In multivariate statistics, EFA is a statistical method used to uncover the underlying structure of a relatively large set of variables (Hair et al., 1998).

External variables: Variable attribute-based determinants in adoption models that are outside the basic belief, attitude, and behavioral constructs (Davis et al., 1989; Venkatesh et al., 2003; Wixom & Todd, 2005).

Evaluation: The third stage in the adoption process where the consumer who has acquired knowledge about the innovation, now begins to evaluate. He evaluates whether: i) more information search is necessary with respect to the innovation as well as the brand, or ii) he is satisfied with the product/service information that he possesses (Rogers, 1962).

Investigation: The second stage in the adoption process where the consumer begins to develop some interest in the innovative offering, and thereby puts in some effort to know more about it (Rogers, 1962).

Latent variables: Variables or constructs that cannot be measured directly in structured equation models and are, therefore, formulated or reflected from measured (i.e. objective or indicator) variables (Gefen et al., 2000).

Measured variables: Variables that are the observed or measured indicators of latent variables in the measured model (also known as observed or indicator variables) (Gefen et al., 2000).

Measurement model: A model defining latent constructs or variables with corresponding formative or reflective measured (i.e. observed or indicator) variables (Gefen et al., 2000).

Need for interaction: A need for interaction is defined as a desire to retain personal contact with others, in this case, with service employees during a service encounter (Curran et al., 2003).

Perceived usefulness (PU): It is defined as the degree to which a person believes that using a particular system would enhance his or her job performance (Davis, 1989)

Perceived ease of use (PEOU): It is defined as the degree to which a person believes that using a particular system would be free of effort (Davis, 1989).

Perceived risk (PR): Perceived risk is one of the important dimensions of the propensity to perform self-service. Weber and Bottom (1989) propose a definition using similar components. They perceived two dimensions of risk: i) the amount that would be lost as a consequence of an act and; ii) the individual's subjective feeling of uncertainty of the consequences.

Previous experience (PE): It can be defined as being familiar with and knowledgeable about the technology of interest, in this case, self-service technology (Sun & Zhang, 2006).

Psychographics: Subjective and unobservable customer traits that are based upon customers' psychology and personality (Meuter et al., 2003; Lin & Hsieh, 2007).

Self-service innovativeness (SSI) scale: A unidimensional multiple-items scale to measure consumers' propensity to adopt self-service technologies across distinct services (Kaushik & Rahman, 2015d).

Situational factors: Factors pertaining to the situation surrounding the trial or use of the SST by the customer or respondent (Dabholkar & Bagozzi, 2002; Simon & Usunier, 2007). For example, waiting time and crowding.

Structural model: A structural model provides a static view of a system, showing its key components and their relationships (Gefen et al., 2000).

Structural equation modelling (SEM): SEM is a collection of statistical techniques that allow a set of relationships between multiple independent and dependent variables to be examined (Hair et al., 1998).

Subjective norm (SN): The influence of social groups and peers upon the perspective, attitude, or inclination of the customer or respondent (Schepers & Wetzels, 2007).

Technology anxiety (TA): The degree of an individual's apprehension, or even fear, when she/he is faced with the possibility of using technology (Venkatesh & Bala, 2008).

Technology readiness (TR): The overall psychological state and perceived self-readiness of consumers or respondents to use technology, as formulated from measures of optimism, innovativeness, insecurity, and discomfort (Parasuraman, 2000).

Technology readiness index (TRI): A 36-item index developed by Parasuraman (2000) to measure and assesses TR.

Trial: In this fourth stage of the adoption process, the consumer goes and tries out the innovative offering, but there is not yet any further purchase (repurchase) commitment (Rogers, 1962).

Waiting time: The relative length of time perceived by customers in alternative processing comparisons (Bennington, Cummane & Conn, 2000; Dabholkar, 1996).

1.9. Organization of thesis

Chapter One has provided an overview of the research by reporting various objectives and questions to be explored in this thesis along with the rationale behind this study. Furthermore, the chapter introduced the proposed conceptual model, the methodology to be adopted and also defined various key constructs. In Chapter Two, an extensive review of extant literature is done to present research opportunities that need to be explored. Chapter Three reports the various findings of the qualitative research that support the proposed conceptual model. In Chapter Four, the proposed conceptual model and numerous hypotheses are developed and presented to provide a framework for measuring consumers' adoption of SSTs.

In Chapter Five, the methodology used in this study is defined along with a description of the data collection process and data analysis. Chapter Six describes the development and validation of SSI scale to be used for measuring consumer innovativeness variable. Chapter Seven describes the data analysis and testing of hypotheses. Chapter Eight concludes the thesis with a discussion of results, implications, assumptions and limitations, and provides directions for further study (see Figure 1.5). An activity-based flow diagram of the thesis is also shown in figure 1.6.

Figure 1.5: Structure of the thesis

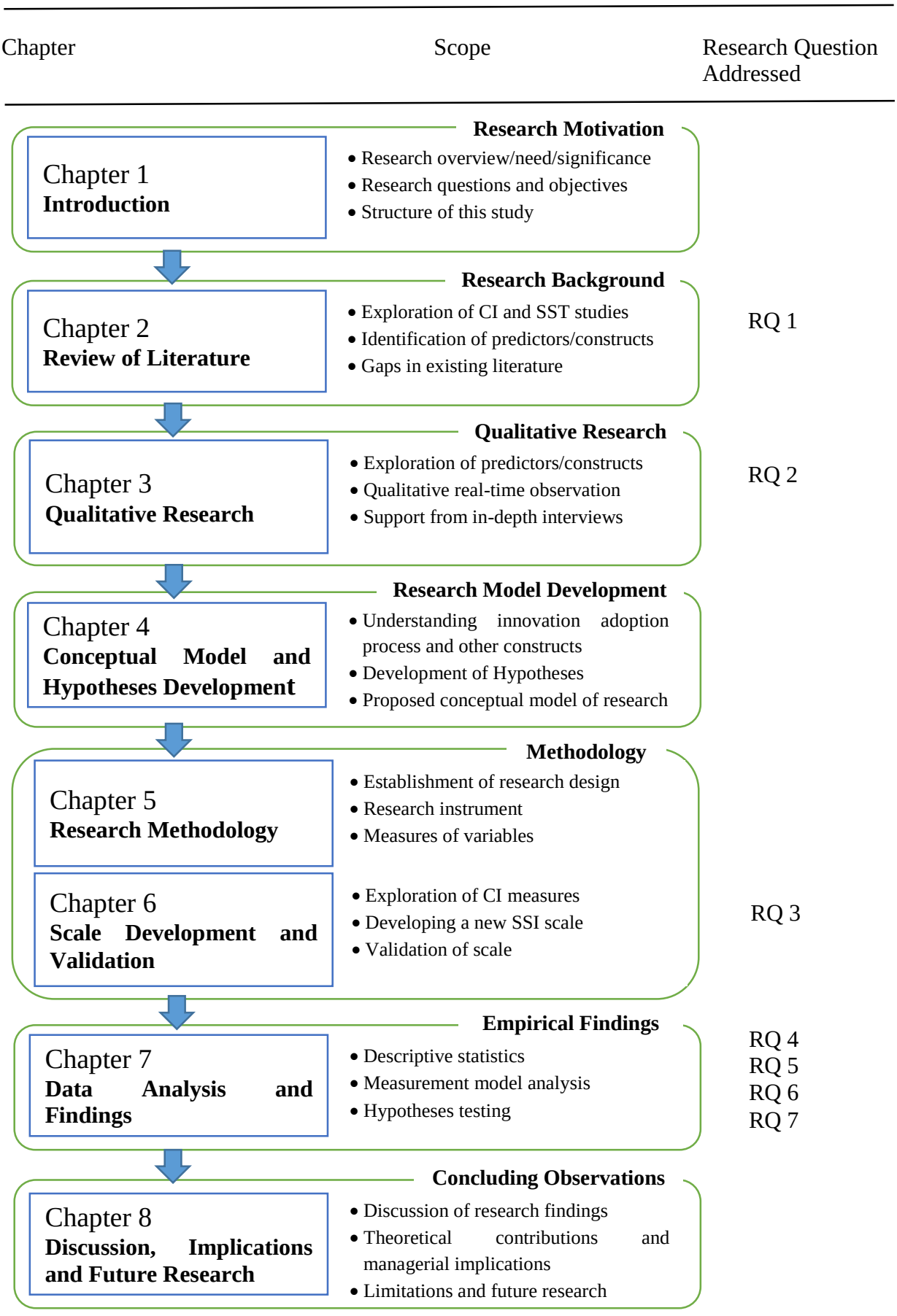
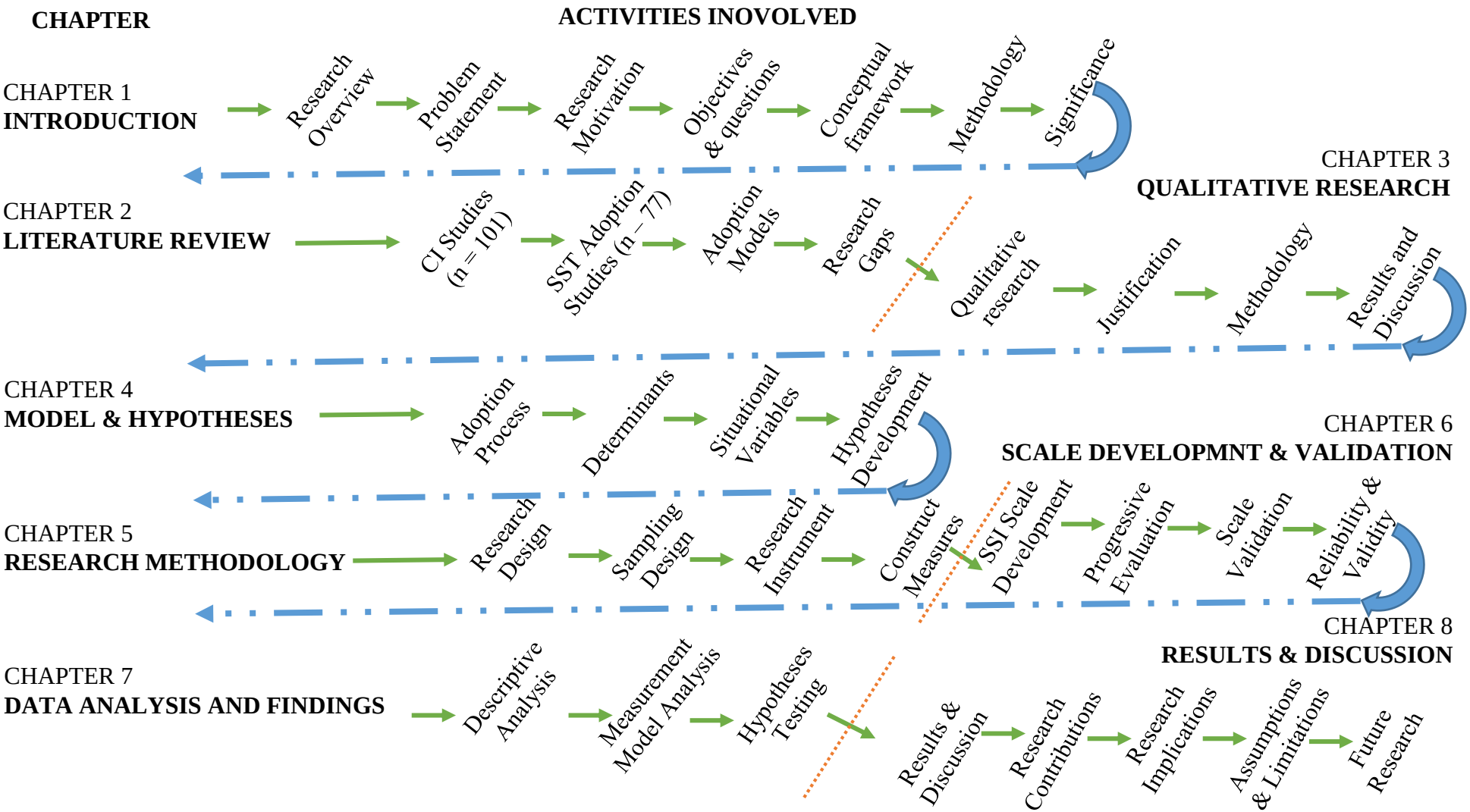


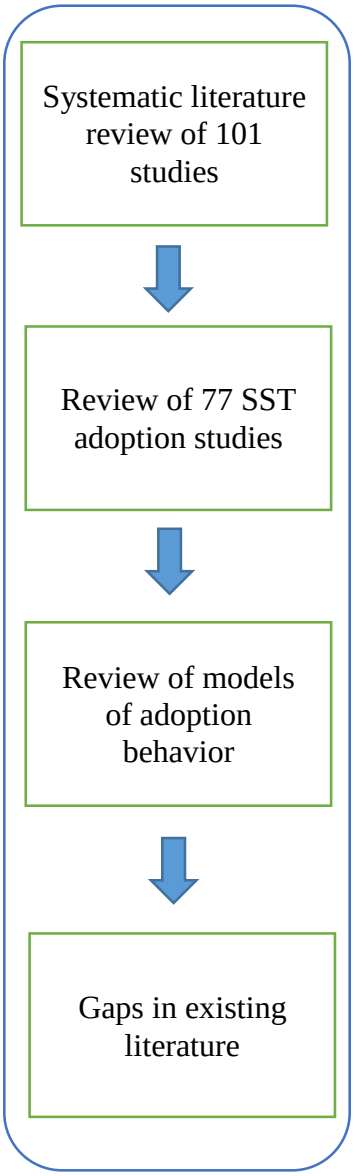
Figure 1.6: Activity-based Flow Diagram of the Thesis



Chapter 2

Review of Literature

The primary purpose of this study is to explore the consumer adoption of SSTs in offline service environment. To do so, the innovation adoption process and various key factors influencing SST adoption are examined. This chapter provides support for and theoretical background to the numerous constructs incorporated in the proposed conceptual model (developed in Chapter Four). The study is positioned within the existing adoption literature. Past adoption studies are reviewed in order to highlight important gaps in the existing literature. First, the role of consumer innovativeness in innovation adoption literature is widely reviewed, covering 101 articles (refer to Appendix A.2). This section is followed by a separate review of seventy seven self-service adoption studies (refer to Appendix A.4). Throughout the literature reviewed, the primary focus was on identifying the available gaps that could be addressed in this research. Thus, the chapter is mainly intended to illustrate how this research work fits within the existing literature. By highlighting gaps that have not been sufficiently addressed in past adoption studies, the significance of this research will become apparent. Three key areas - customer innovativeness, self-service adoption, and innovation adoption models - are thoroughly reviewed.



2.1. Consumer innovativeness (CI)

Innovation is one of the key issues in business and management research. It has been studied in many independent research traditions in different contexts and with different parameters (Hauser, Tellis & Griffin, 2006); the literature on innovation has mainly addressed innovation adoption and innovation diffusion (Summers, 1971; Foxall & Haskins, 1986; Rogers, 1995; Wejnert, 2002; Cheng & Huang, 2013). Innovation is actually treated as a key driver for the organizational success (Pauwels, Silva-Risso, Srinivasan & Hanssens, 2004). Despite constant and new developments in product design (technological innovation), marketing and supply chain (non-technological innovation), service delivery (process innovation), etc., most new products fail to survive in the market (Srinivasan et al., 2009). This failure of innovations has been most often due to a firm's lack of understanding of consumer needs and wants. In other words, their inability to conceptualize consumer innovativeness might be a strong reason.

As a marketing concept, innovativeness can at the very least be defined as imprecise. Firm innovativeness, or 'creation of newness,' depicts a firm's ability to develop and launch new products at a fast rate (Hurley & Hult, 1998). Product innovativeness, or 'possession of newness,' is the degree of newness of a product (Daneels & Kleinsmith, 2001). Consumer innovativeness, or 'consumption of newness,' is the tendency to buy new products more often and more quickly than other people (Midgley & Dowling, 1978). In this research, the word 'innovativeness' will be used solely with reference to consumer innovativeness. There is no real consensus on the meaning of innovativeness. It may be described as consumers' propensity to adopt new products (Tellis, Yin & Bell, 2009), and/or an early purchase of a new product (Kaushik & Rahman, 2014), as well as a tendency to be attracted by new products (Steenkamp, ter Hofstede & Wedel, 1999). Following the distinction made by Midgley & Dowling (1978) between actualized and innate innovativeness, most authors seem to consider innovativeness a trait, the nature of which is still under question.

The concept of consumer innovativeness emerged in the early 1970s. It has now become an important issue, particularly because of its prominent role in the adoption and diffusion of new and innovative products and services. It has not only been extensively researched by scholars in different fields, but the concept of consumer innovativeness is also important to the practitioners. It has been portrayed by the fact that many companies rely on the success of new products for their own profitability and survival in the competitive environment (Singh, 2006). To help minimize the risk of failure, firms need to address consumer factors that influence new product success, including understanding the role of consumer innovativeness and its influence on new product adoption behavior (Hauser et al., 2006; Rogers, 2003).

In this respect, a vast amount of literature on the acceptance of new products by consumers has focused on –

i. CI concept and measurement (e.g., Ostlund, 1972; Goldsmith & Hofacker, 1991; Midgley & Dowling, 1978; Roehrich, 2004; Venkatraman & Price, 1990);
ii. establishing the relation between innovation adoption behavior constructs and innovativeness (e.g., Foxall & Haskins, 1986; Venkatraman, 1991; Goldsmith, Freiden, & Eastman, 1995; Hirschman, 1980; Manning, Bearden & Madden, 1995; Citrin, Sprott, Silverman & Stem, 2000; Wood & Swait, 2002; Lassar, Manolis, & Lassar, 2005;);
iii. different antecedents of CI, including personal characteristics (demographic and psychographic) of consumers (e.g., Im, Bayus & Mason, 2003; Midgley & Dowling, 1993; Steenkamp et al., 1999).

There are various dimensions of consumer innovativeness such as innate innovativeness (II) (Midgley & Dowling, 1978), domain-specific innovativeness (DSI) (Goldsmith & Hofacker, 1991), innovative behavior (IB) (Summers, 1971) and vicarious innovativeness (VI) (Hirschman, 1980) that have been identified and examined. However, the findings lack a degree of clarity and consensus. Beside this, the strength of the relationship between scales of measuring consumer innovativeness and adoption behavior has been mixed (Roehrich, 2004). Innate innovativeness, for example, has been reported to have a positive but a weak impact on the new product adoption (Goldsmith et al., 1995; Im et al., 2003); while other forms of consumer innovativeness i.e., DSI and IB may have a more significant impact on it (Goldsmith et al., 1995; Im et al., 2007). Consumer researches, thus, have been hampered by the lack of a universally agreed-upon measure of the innovativeness construct, and the measures typically used have been criticized for their lack of reliability and validity (Goldsmith et al., 1995; Im et al., 2003; Roehrich, 2004).

2.2. Self-service technology (SST)

During the past two decades the converging of self-service and technology has changed the composition of service models. Traditional models based upon instructive human-based, up close and personal experiences are now being reexamined and adjusted to give new alternatives and challenges to consumers and firms (Bitner et al., 2000). The infusion of technological innovation (e.g. SST) into the service encounter and relationship has added a third dimension to Kotler's (1994) services marketing model by expanding the internal, external, and interactive relationships between company, employees, and customers (Parasuraman, 2000, p. 308).

The term ‘self-service technologies’ (SSTs) was first defined by Meuter et al., (2000) as ‘technological interfaces, enabling customers to use a service independent of direct service-employee involvement’. As a technology-oriented interaction now has the potential to determine the long-term success of a business (Meuter et al., 2005), the role of SST in the customer interaction has increased significantly. As SST is drastically changing the nature of service encounters and the structure of service delivery, it attracts considerable scholarly attention. To date, extensive research has been undertaken to understand the customer experience with SST service encounters in a range of contexts such as airlines (Liljander et al., 2006; Harris, Mohr & Bernhardt, 2006), retailing (Weijters, Rangarajan, Falk & Schillewaert, 2007; Forbes, Kelley & Hoffman, 2005), personal banking (Snellman & Vihtkari, 2003; Curran & Meuter, 2005), hotels (Beatson Coote & Rudd, 2006; Oyedele & Simpson, 2007), and libraries (Xinyuan, Mattila & Tao, 2008).

Nowadays, SST has turned into a far reaching services-marketing topic with its own developing domestic and global research and specialists. In Fisk, Brown and Bitner (1993) development -based literature review, self-service and technology-based trends are perceived and anticipated to experience development in parallel with the expanded enthusiasm in services marketing literature. The Walking-Erect phase (1985-1992) of their review captures the explosive increase that happened in service related publications, research, theory, and topics in this period. By 1992, 19 unique journals had overall published 397 service-focused scholarly articles from 72 different authors, and 56 authors distinguished as productive overall services marketing literature had published 613 articles; global exposure and contributions expanded as well and were incorporated in this development. The researcher has likewise included some of these articles in this literature review that will be described in next phases of this chapter.

Since 1983, services marketing and SSTs have kept on gaining importance, not just from an increased interest in service operations, additionally by shifting patterns in overall market environment; these patterns include: i) the continued shift to service and knowledge based products (Sheehan, 2005); ii) the continued realization of an emphasis on relationship marketing (Gronroos, 1997) and network marketing (Achrol, 1997); iii) technological advances shifting marketing emphasis from the aggregate market to the individual consumer (Tadajewski & Brownlie, 2008). These patterns encourage expanded self-service experiences with service providers and systems and reflect the requirement for firms to progressively use SST competitively to improve efficiencies and effectiveness in service delivery (Bitner et al., 2002).

2.3. Systematic literature review of consumer innovativeness studies

Different researchers have extensively studied the relationship between consumer innovativeness and adoption behavior since 1971, which was followed by studies on different antecedents of innovativeness and measurements of CI. The purpose of this study is to shed light on the various correlates of consumer innovativeness and its dimensions. It provides a propositional inventory and formulates an integrative conceptual model for further research. To encourage and facilitate more research on innovation adoption, the researcher in this study collected, explored, and analyzed the literature related to consumer innovativeness. This systematic literature review emphasizes the need to understand consumers' responses to innovation by presenting the findings of various studies on consumer innovativeness and adoption behavior. To do so, the authors identified 101 articles published in various international journals of high repute. The literature search was made through a search of an electronic database (Scopus) using particular keywords; a manual search of articles in various journals of marketing, innovation, and consumer behavior; and finally a cross-reference search.

Every piece of any ongoing research needs to be connected with the work already done in the past, to attain an overall relevance and purpose. This review of literature thus becomes an important link between the research proposed and the studies already done on CI. It informs the reader about aspects that have been already covered by other authors in their studies and also gives an opportunity to appreciate the evidence that has already been collected by previous research. At the end, it offers valuable inventory for further research by identifying key constructs and correlates of various dimensions of CI. It also proposes a basic conceptual model with a few propositions based on their relations concluded by other studies. The validity of the proposed model could be researched in further studies. Although this literature review consists of both the conceptual as well as empirical studies, a quantitative meta-analysis can also be applied to empirical papers included in this study.

2.3.1. Methodology and approach to the literature

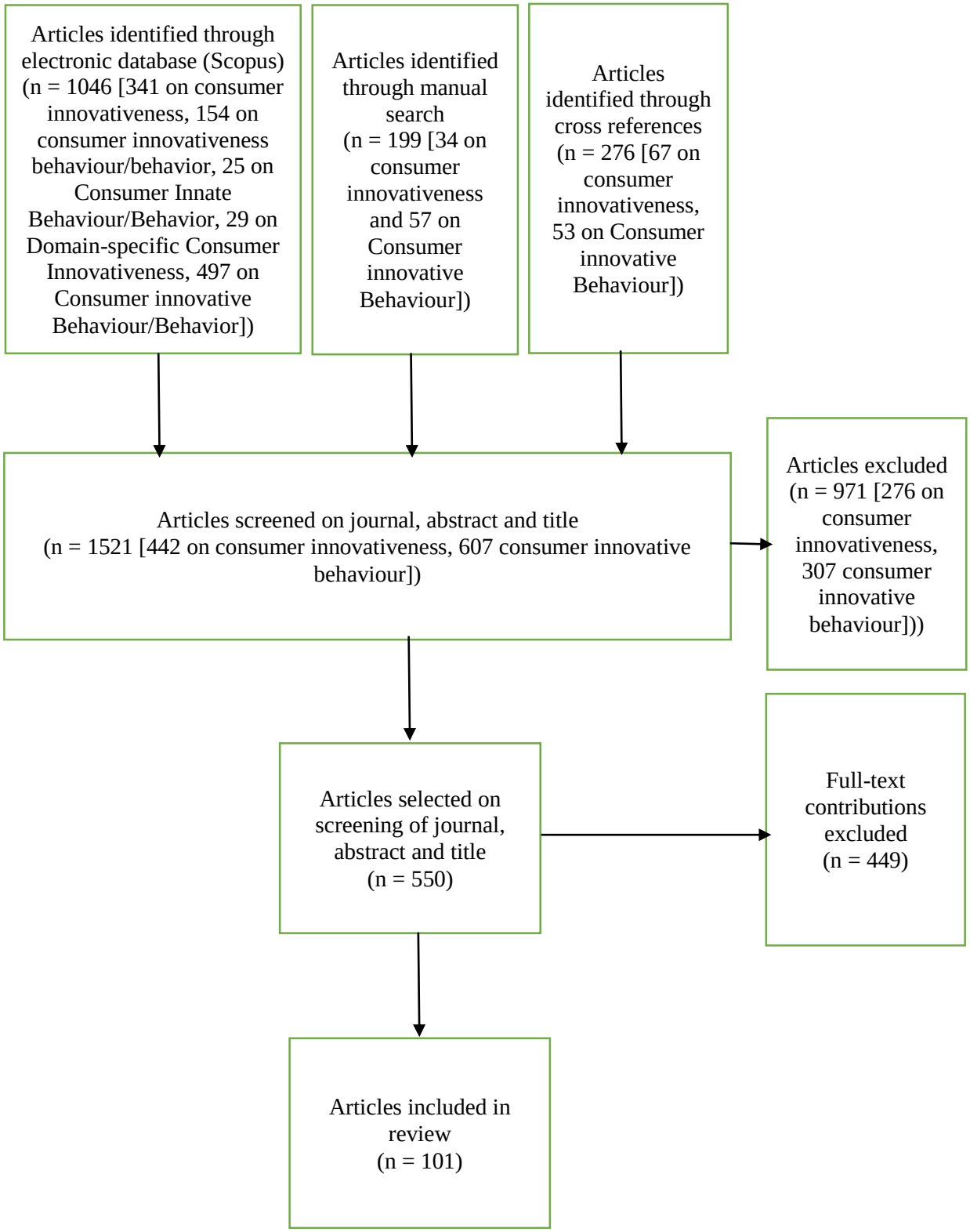
To explore and collect important articles on CI, the researcher first performed an electronic database search using one of the well-known electronic databases (Scopus). The search included articles available from 1971 to 2013 using keywords that occur in the article title, abstract, and keywords section of the database. The search also utilized both "consumer innovativeness behaviour" (spelling in British English) and "consumer innovativeness behavior" (spelling in American English). Unlike other databases, the results from the Scopus database were similar in number. More specifically, the initial search keywords were: consumer innovativeness,

consumer innovativeness behaviour, consumer innovativeness behavior, consumer innate behaviour, consumer innate behavior, domain-specific consumer innovativeness, consumer innovative behaviour, and consumer innovative behavior (see Table 2.1).

The second step in this review process was a manual search of articles published in various reputed international journals (e.g., Journal of Marketing, Journal of Product Innovation Management, Journal of Business Research, Journal of Consumer Psychology, Journal of the Academy of Marketing Science, Journal of Services Marketing, etc.). The next step of the review process was a cross-references search of articles collected through the Scopus and a manual search of different journals. The closing step of this process was sorting and selecting the final articles for this study. To do so, the researchers first applied the "AND" condition among the key search items, and they found a structural declining of the number of studies. This "AND" condition was taken as a cut-off point for abstract analysis of selected studies. Then all the duplicate articles mainly collected through the cross-reference search were removed. In fact, some of the studies that had similar results were also removed from the list of final selection of articles, resulting in 101 articles that were used for the study. The number of articles is limited because the major focus of this review was on consumer innovativeness and its different approaches and dimensions. The term "consumer innovativeness" had to be included primarily in the article title as a key search area. Later on, all the key terms had to be included in the article title, abstract, and keywords section of the database (see Figure 2.1).

There are two types of analysis of literature used in the present study, within-study literature analysis and between-study literature analysis. According to Onwuegbuzie, Leech and Collins, (2012), both these analyses are essential and should be used in all studies of literature reviews. A within-study literature analysis involves analyzing the contents of a specific work within that literature (Arora, Kalro & Sharma, 2015; Kalro, Bharadhwaj & Marathe, 2010). It involves analyzing each and every component of the work, including the work title, its literature review, conceptual/theoretical framework, methodology used, and a results, discussion, and future scope section. In its most rigorous and comprehensive form, it does not only involve analyzing the findings but also involves the major premises of a study. A between-study literature analysis, on the other side, involves comparing and contrasting key information from at least two or more literature sources. In such an analysis, the most common information to compare is the findings of the literature; however, every component or multiple components of an article should be compared with all components from other literature.

Figure 2.1: Flow Diagram of Search Strategy[3]



[3] Only select keywords are given within [ ], see Table 2.1 for total number of articles, and see Appendix A.2 for complete list of 101 articles included.

Table 2.1: Results Database: Research found in Electronic Database, Manual Search and Cross Reference Methods

Key terms	No. of Articles found in		
	Electronic Database	Manual Search	Cross Reference
Consumer Innovativeness	341	34	67
Consumer Innovativeness Behaviour	154	13	19
Consumer Innovativeness Behavior	154	19	29
Consumer Innate Behaviour	25	14	13
Consumer innate Behavior	25	17	19
Domain-specific Consumer Innovativeness	29	14	33
Consumer innovative Behavior	497	31	43
Consumer innovative Behaviour	497	57	53

2.3.2. Characteristics of the consumer innovativeness studies

The 101 studies finally selected for this review have general characteristics (see Appendix A.2). First, most of these studies are questionnaire based empirical studies conducted in developed nations like the United States (US), or in Europe and other Western contexts, and not in an Asian context like India and China. Second, these studies mainly address specific product categories like consumer durables, home products, electronics and new technologies (e.g., televisions, refrigerators, washing machines, VCRs, and later on computers, cell phones, Internet shopping, online buying adoption, etc.). In Appendix A.2, these 101 studies are arranged by year in ascending order (old to new) to show their contribution either in a single dimension or twice or in all three dimensions of CI.

2.3.3. Dimensions of consumer innovativeness and their correlates

After summarizing a systematic review of literature on consumer innovativeness, the authors found three basic dimensions of consumer innovativeness - II, DSI and IB. All these three dimensions along with their correlates will be described in upcoming sub-heads.

2.3.3.1. Generalist perspective - Innate Innovativeness and correlates

The first perspective of consumer innovativeness is a generalist perspective, which identifies consumer innovativeness based on their "innate innovativeness" (Hirschman, 1980) and is defined as "a generalized unobservable predisposition toward innovations application across product categories." This perspective treats consumer innovativeness as a personality trait or characteristic of any individuals that differentiates them from others in their society (Hilgard,

Atkinson & Atkinson, 1975). According to this perspective, consumer innovativeness simply refers to individual personality traits. For this reason consumer innovativeness is also referred to as global innovativeness (Goldsmith & Hofacker, 1991; Goldsmith et al., 1995). This perspective represents a highly generalized individual characteristic, and it is always free from a specific domain of consumer interests (Midgley & Dowling, 1978).

In the first column of Table 2.2, the authors describe various constructs and correlates of consumer innate innovativeness (CII), followed by direction of impact and significant result in the next two columns. In the last column, various studies (as numbered in Appendix A.2) are showing based on their contributing correlates. Table 2.2 describes various correlates of global or innate innovativeness found in respective empirical studies analyzed in this systematic literature review. It shows that new product adoption and IB are key constructs in studying CII. II is fundamentally a personality trait because it is defined as a propensity of a consumer to adopt new things. It was primarily treated as an important dimension of CI, extensively studied with DSI and IB.

Some of these studies (Mudd, 1990; Steenkamp & Baumgartner, 1992; Steenkamp & Burgess, 2002; Im et al., 2003; Steenkamp & Gielens, 2003; Cotte & Wood, 2004) denoted a positive significant relation, while other studies (Venkatraman, 1991; Bäckström, Pirttilä- Beckman & Tuorila, 2004; Hirunyawipada & Paswan, 2006; Im, Mason & Houston, 2007) showed somewhat of a relation between II and these two constructs, but a few studies (e.g., Manning et al., 1995) denied this fact and showed that no significant relation at all exists between them. Thus II shows an ambiguous relation with new product adoption and IB. However, it has been extensively studied, especially in the global and cross-culture studies.

Additionally, another two key constructs, number of purchased/owned products (Foxall, 1988; Steenkamp & Baumgartner, 1992) and purchase/usage intention (Limayem, Khalifa & Frini, 2000; Hui & Wan, 2004; Jin & Suh, 2005; Okazaki, 2007; Pallister, Wang & Foxall, 2007) were considered phenomenal to describe CII. Limayem and colleagues (2000) found that consumers' attitude and intention mediate the relationship of consumer innovation with Internet shopping behavior. Foxall and Bhate (1991) suggested that II is significantly related with frequency of use of personal computers. Foxall (1995) also found that product involvement moderates the relationship between II and new product adoption. In sum, II does not directly affect the product adoption, it actually affects it with the help of some mediating variables. In fact, II has a stronger effect on adoption intention than actual adoption.

Table 2.2: Correlates of Innate Innovativeness

Construct	Direction	Significant	Studies
Dependent variables			
New Product Adoption/ Innovative Behavior	+ve	Yes	7, 13, 29, 38, 42, 44, 48, 49, 85, 101
	+ve	Partly	10, 47, 59, 70, 100
	+ve	No	6, 20, 31, 39, 55, 90, 98
Number of Purchased/Owned Products	+ve	No	5, 13, 15, 16, 87
Purchase/Usage intention	+ve	Yes	17, 34, 49, 54, 71, 77, 101
Brand/Product Attitude	+ve	Yes	34, 54, 99
Perceived Category Fit on Extension	-ve	Yes	89
Attitude	Moderator		
Market Mavenism	+ve	Yes	58
Evaluation of Brand Extension	+ve	Partly	41
Consumers' lead userness	+ve	Yes	84
Risk	-ve	Yes	85, 101
Usefulness	+ve	No	88, 101
Ease of use	+ve	Yes	88, 101
Brand/Product Awareness	+ve	Yes	89
Correlates			
Domain-specific innovativeness (DSI)	+ve	Yes	19, 59
	+ve	Partly	51
Opinion Leadership	+ve	Yes	2, 52
Susceptibility to Interpersonal Influence	-ve	Yes	57
Social Comparison Information	-ve	Yes	57
Role Relaxed Consumers	+ve	Yes	57
Attitudes towards Product/Service	+ve	Yes	74
Usage of Multi-channel	+ve	Yes	82
Culture	+ve	Yes	100
Personal Characteristics			
Age	-ve	No	42, 57, 58
	+ve	Yes	38, 91
Income	+ve	Yes	38, 91
		No	42, 74
Education	+ve	Yes	38, 74, 91
		No	42
Gender [1= male; 2 = female]		Yes	91
		No	57, 58
		Partly	89
Sexual orientation		Partly	89
Religion		Yes	3
Family size		Yes	91

2.3.3.2. Particularist perspective - Domain-specific Innovativeness and correlates

Innovativeness was traditionally assumed to remain constant over a person's lifetime because it was treated as an individual personality trait. This generalist approach was not successful enough in explaining consumer innovativeness by using a general model because consumer innovativeness might be related to a consumer's interest in a specific product category, and be less of a personality characteristic of the individual (Citrin et al., 2000). However innovativeness is socially influenced (Hirschman, 1980); therefore it should not be a constant, as believed in the case of the generalist perspective (Hynes & Lo, 2006). Therefore, in addition to a generalist perspective of CI, another crucial perspective came into the picture, called the "particularist perspective". This perspective of consumer innovativeness treated innovativeness in a specific domain of a consumer's interest and renamed innovativeness as "domain-specific innovativeness".

Hirunyawipada and Paswan (2006) found that cognitive and DSI increases the new product's actual adoption; while sensory innovativeness and perceived risks increase consumers' propensity to acquire novel information regarding new products (see Appendix A.3). Therefore, DSI has emphasized "actualized innovativeness" in a specific domain of a consumer's interest. The actualized innovativeness or product adoption behavior refers to actual acquisition of ideas and information about new products by consumers (Hirschman, 1980; Midgley & Dowling, 1978). Most of the studies in such a vein have used number of products owned (McCarthy, O'Reilly & Cronin, 2000; Blake, Neuendorf & Valdiserri, 2003), the relative time of adoption for a particular product, and purchase intentions as a way to measure innovativeness (Rogers & Shoemaker, 1971; Midgley & Downling, 1993; Foxall, 1995; Agarwal & Prasad, 1998; Agarwal & Karahanna, 2000; Goldsmith, 2001; Park & Jun, 2003; Lafferty & Goldsmith, 2004; Reisenwitz, Iyer, Kuhlmeier & Eastman, 2007; Lu, Liu, Yu & Wang, 2008; Huang, Hsieh & Chang, 2011). However, Midgley (1977) differentiated II as a trait possessed by every human being, and actualized innovativeness as an actual innovative behavior.

According to Rogers (2003), "actualized adoption is the extent to which consumers are relatively early in adopting new products than other members of their societies." Several other researchers have used this perspective to measure the time of adoption by the consumer for a specific category of products (Midgley & Dowling, 1978). These studies based on the time of adoption clearly distinguished between early adopters and late adopters. Actualized innovativeness also covers individual behavior that deals with acquiring new information and ideas about new products (Midgley & Dowling, 1978; Hirschman, 1980) from the different sources of information, like product trials.

Table 2.3 describes various constructs and correlates of DSI along with the direction of impact, results of significance, and various studies (as numbered in Appendix A.2) as per their correlates. As shown in Table 2.3, new product adoption and IB are two key constructs to describe DSI, as in case of II. Some studies (Goldsmith et al., 1995; Roehrich, 2004; Girardi, Soutar & Ward, 2005) suggested a significant positive relationship between DSI and II. DSI is also positively and significantly linked with product adoption behavior (IB). However, results show that II ambiguously relates to IB, and the relationship between DSI and IB seems to be more positive and straightforward (Grewal, Mehta & Kardes, 2000; Vishwanath, 2005; Huotilainen, Pirttilä-Backman & Tuorila, 2006) than II.

Other important studies suggest that purchase/usage intention and opinion leadership are important key correlates of DSI. Many studies (Goldsmith, Flynn & Goldsmith, 2003; Agarwal & Prasad, 1998; Agarwal & Karahanna, 2000; McCarthy et al., 2000; Goldsmith, 2001; Park & Jun, 2003; Lafferty & Goldsmith, 2004; Reisenwitz et al., 2007; Lu et al., 2008) suggested a positive significant relationship with DSI and purchase/usage intention, with the exception of one study (Munnukka, 2007) that showed an insignificant relation between these two constructs.

In addition, Citrin and colleagues, (2000) mentioned that DSI and Internet usage affect consumers' online shopping adoption (Pandya, Vallabhaneni & Seow, 2012). This implies product usage as key variable for specific domains of interest. With the exception of single study (Grewal et al., 2000), many studies (Goldsmith & Hofacker, 1991; Flynn & Goldsmith, 1993; Goldsmith, d'Hauteville & Flynn, 1998; Roehrich, 2004; Jordaan & Simpson, 2006; Sun, Youn, Wu & Kuntaraporn, 2006) suggested a significantly positive relationship between DSI and product involvement. Manning and colleagues (1995) provided evidence that consumer independent judgment depends upon the number of trials of new products in the context of clothing and electronic products. Product knowledge can also be identified as a positive significant variable of DSI, as suggested by many studies (Goldsmith & Hofacker, 1991; Flynn & Goldsmith, 1993; Grewal et al., 2000; Pagani, 2007). Moreover, many studies (Goldsmith & Flynn, 1992; Goldsmith et al., 2005; Jordaan & Simpson, 2006; Ruvio & Shoham, 2007; Shoham & Ruvio, 2008) have found a significant positive relationship between DSI and opinion leadership. In sum, these four can be considered as key domain-specific variables in studying DSI.

Table 2.3: Correlates of Domain-specific Innovativeness

Construct	Direction	Significant	Studies
Dependent variables			
New Product Adoption/Innovative Behavior (IB)	+ve	Yes	31, 32, 49, 55, 56, 59, 60,
	Partly	Yes	96, 98
	+ve	No	92, 47
Number of Purchased/Owned Products	+ve	Yes	33, 45
Consumer Purchase/Usage Intention	+ve	Yes	25, 30, 36, 43, 49, 50, 79, 83, 87, 97
		No	75
Attitude towards Product/Brand	+ve	Yes	78, 79
		No	50
Opinion Leadership	+ve	Yes	12, 32, 63, 72, 86, 95
Market Mavenism	+ve	Yes	12, 72
Evaluation of Brand Extension	+ve	Yes	37
Social Identity Function	+ve	Yes	32
Awareness of Product/Service	+ve	Yes	8
Ease of Use	+ve	Yes	83
Usefulness	+ve	No	83
Opinion Seeking	-ve	Yes	86
Correlates			
Innate Innovativeness (II)	+ve	Yes	19, 51, 52
Innovative Behavior	+ve	Yes	19, 26, 36, 52
Product Usage	+ve	Yes	8, 11, 24, 26, 33, 36, 40, 60
Opinion Leadership	+ve	Yes	8, 14, 40, 52, 53, 61, 63, 81, 93
Opinion Seeking	-ve	No	24, 52, 63
Market Mavenism	+ve	Yes	40
Consumers' Leading Edge Status	+ve	Yes	80
Need for Uniqueness	+ve	Yes	51, 61
Product Involvement	+ve	Yes	8, 14, 24, 51, 61, 63, 66
	+ve	No	32
Product Knowledge	+ve	Yes	8, 14, 24, 32, 76, 97
Price Sensitivity	-ve	Yes	40, 76
Network Prevalence			45
Personal Characteristics			
Age	-ve	Yes	40, 53
	-ve	No	26
	Partly	Yes	45, 65
Education	+ve	Yes	45
		No	26
Gender	-ve	Yes	53
Income	+ve	Yes	45
Marital status		No	45
Race		No	45

2.3.3.3. Integrator perspective - Innovative Behavior and correlates

The third and final perspective of consumer innovativeness is the "integrator perspective", which proposes an intermediary level of the first two perspectives - the generalist and particularist perspectives. It supports both the perspectives and considers consumer innovativeness to be a constant and global in nature, but only to some extent and not exactly in all domains of consumers' interest. According to this perspective, individuals might show a uniform attitude toward adopting an innovation in a specific or few domains, but not for all the domains of their interest. It actually depends upon the situation and need of that particular change for the consumer at the same time. There has always been a debate in determining the relationship between II and "actualized innovativeness" (IB).

Once again, the columns in Table 2.4 denote various correlates of the third dimension (IB) of consumer innovativeness, directional impact either positive or negative, significant results, and various studies with their respective correlates. IB was also studied separately and not in combinations with II and DSI. Summers (1971) mentioned that product adoption is a function of different situational variables and behavioral considerations of consumers. It treats product adoption as a function of actualized adoption behavior in the context of food, apparel, household, and cosmetic products. Moreover, other studies (e.g., Feick & Price, 1987; Medina & Machaels, 1991; McBride & Gillespie, 2000; McDonald & Alpert, 2007) also mentioned IB as actualized adoption behavior of consumers.

On the contrary, some studies (Foxall & Bhate, 1991; Girardi et al., 2005; Vishwanath, 2005; Chao, Reid & Mavondo, 2012; Lim & Park, 2013) examined the combined effect of II and DSI on IB and concluded two fundamental consequences: first, how DSI has a positive and straightforward effect on IB and, second, how DSI mediates the direct impact of II on IB. Im and colleagues (2003) mentioned personal characteristics as stronger predictors of product adoption behavior (IB) than II in the context of electronic products. Moreover, other studies (Steenkamp et al., 1999; Im et al., 2003, 2007; Hirunyawipada & Paswan, 2006; Gielens & Steenkamp 2007; Schreier & Prügl, 2008) also examined the consumer's personal characteristics (e.g., age, income, marital status, education, and family size) and found that age and income are the two key correlates that reveal the IB of consumers. Also, a few studies (e.g., Summers, 1971; Girardi et al., 2005; Ruvio & Shoham, 2007) found a positive significant correlation between IB and opinion leadership. Thus, personal characteristics and opinion leadership are two key correlates of IB.

Table 2.4: Correlates of Innovative Behavior

Construct Correlates	Direction	Significant	Studies
Domain-specific innovativeness (DSI)	+ve	Yes	12, 19, 52, 56, 59, 72, 73, 96
		No	75
Innate innovativeness (II)	+ve	Yes	8, 13, 17, 22, 29, 30, 38, 42, 44, 48, 49, 52
	+ve	Partly	10, 47, 59, 70
	+ve	No	6, 20, 31, 39, 55, 74
Opinion Leadership	+ve	Yes	1, 52, 72
Market Mavenism	+ve	Yes	4, 72
Susceptibility to Interpersonal Influence	-ve	Yes	44
Brand Reputation and Power	+ve	Yes	73
Manufacturing Power	+ve	Yes	73
Price Promotion Intensity	-ve	Yes	73
Perceived Risk	-ve	Partly	59
Consumers' Lead Userness	+ve	Yes	84
Personal Characteristics			
Age	-ve	Yes	28, 42, 59, 70, 73
		Partly	75
		No	84
Income	+ve	Yes	42, 59, 70
		Partly	35, 75
		No	84
Marital status	+ve	Partly	75
Education	+ve	Yes	42
		No	35, 75
Household size	+ve	Yes	73

2.3.4. General discussion

2.3.4.1. Consumer innovativeness and adoption behavior

This section first clarifies the difference between new product adoption and actual adoption behavior (also known as IB), which have been taken in combination in most of the studies. In many studies, the concept of adoption has been used in a limited way to refer to a single decision point (Anderson & Ortinau, 1988; Antil, 1988; Black, 1982; Gatignon & Robertson, 1985; Mascarenhas, 1991). However, according to Antil (1988), adoption is an acceptance and continued use of a product and should be considered as a whole process experienced by every user of an innovation individually (Hall, Loucks, Rutherford & Newlove, 1975). Antil (1988)

also suggests a sequence of initial adoption, use experience, evaluation, and continued use. The continued use based on satisfaction and experience in the post adoption process will be accompanied with high quality of use. Such high quality of use leads to innovative behavior. Therefore, usage experience and its evaluation are indispensable in understanding IB after an initial adoption of new products. The early adoption tends to positively affect post adoption variables such as use frequency, use variety, and satisfaction. Such post adoption variables also tend to be positively related to IB. The relationships among adoption, post adoption variables, and IB need to be examined.

To examine the relationship between consumer innovativeness and adoption behavior, the authors present various findings of different studies on consumer innovativeness and adoption behavior in different contexts (see Appendix A.3). Adoption behavior and consumer innovativeness are closely associated because consumer innovativeness is generally defined as the propensity of consumers to adopt new and innovative products/services. All three dimensions of consumer innovativeness discussed up to now consider new product adoption as their key construct, which is again a function of behavioral considerations (Summers, 1971). Therefore, it becomes necessary to discuss various studies on consumer innovativeness and adoption behavior. In appendix A.3, the author presents the outcomes of the various studies and try to develop an understanding of the relationship between consumers' adoption behavior and their innovativeness. Based on the general discussion on various findings given in appendix A.3, the authors would like to present model-based relationships among all three dimensions of CI. The model (see Figure 2.2) also shows the impact of personal characteristics, individual psychological characteristics, vicarious innovativeness, and domain-specific variables on different dimensions of CI.

2.3.4.2. Three perspectives of consumer innovativeness

After a systematic review of literature, the authors found three basic perspectives of consumer innovativeness - generalist, particularist, and integrator perspectives. As discussed earlier, these three perspectives divide consumer innovativeness into three basic dimensions based on various studies. As a sum, the generalist perspective defines consumer innovativeness as a generalized unobservable predisposition toward innovation across all product categories. This perspective treats consumer innovativeness as a personality trait, which differentiates people from others having a permanent and specific characteristic (Hilgard et al., 1975). Here, the consumer innovativeness is known as innate innovativeness (Hirschman, 1980). Another group of studies from the particularist perspective defines consumer innovativeness with a specific domain of

consumers' interest called domain-specific innovativeness. Finally, the last perspective, i.e., integrator perspective, examined consumer innovativeness as actualized innovativeness and called it innovative behavior.

2.3.4.3. Development of prepositions and conceptual model of consumer innovativeness

The literature review suggests three basic dimensions of consumer innovativeness each from one perspective. Primarily, in the general perspective, consumer innovativeness was treated as general or innate innovativeness based on individual personality traits. Foxall and Bhate (1991) found a significant positive relationship between II and frequency of use of personal computers. However, they (Foxell & Bhate, 1993) again found a weak correlation between II and purchase and consumption in the context of food products (see Appendix A.3). In contrast, Foxall (1988) found no significant relationship of product adoption with II in the food product industry. In fact, Lassar and colleagues (2005) found a negative relationship between global innovativeness and online banking adoption. Thus, the researcher can support his finding from the literature review, suggesting that the impact of II on product adoption behavior is ambiguous. At the same time, the researcher offers an opportunity to others to explore and clarify this relationship in future studies. Although Im and colleagues (2007) also suggested that II does not directly affect adoption behavior, it indirectly affects some of the components of "vicarious innovativeness".

According to Hirschman (1980, 285) vicarious innovativeness is defined as "the acquisition of information regarding a new product. Through vicarious innovativeness the individual can, in essence, adopt the product concept without adopting the product itself." Vicarious innovativeness, which includes advertising, modelling, and word of mouth, is suggested to play a mediating role between CII, DSI, and actual adoption behavior (Im et al., 2007). As the researcher has only a few related-studies, there is still a need for sufficient evidences on how VI mediates this relationship. The impact of different VI variables (e.g., advertising, modelling, and word of mouth) must also be analyzed separately. Thus, the researcher proposes the following preposition:

> **P_1:** Vicarious innovativeness mediates the relationship between consumer innate innovativeness, domain-specific innovativeness, and actual adoption behavior.

Limayem and colleagues (2000) suggested a strong and positive effect of II on online shopping intention. Additionally, II directly and positively influences the purchase intention (Jin & Suh, 2005) to use wireless services (Okazaki, 2007). One recent study (Chao et al., 2012) also found a lack of direct association between CII and the actual adoption of brand-new products.

There is still a lack of evidence on how strongly II affects adoption intention but not actual adoption. It becomes important for practitioners to investigate carefully how innovativeness changes from one stage to another in the innovation adoption process (i.e., intention stage to actual adoption stage). Therefore, in the absence of sufficient evidence, the researcher proposes the following preposition for further research:

> **P_2:** Innate innovativeness has a stronger effect on adoption intention than on actual adoption behavior.

When the first generalist perspective failed in explaining CI, then many studies changed their emphasis from general to domain-specific innovativeness. Goldsmith and colleagues (2005) found a high correlation between DSI and number of new products adopted, as compared to II in the context of clothing and electronic products (see Appendix A.3). Once again, Goldsmith and d'Hauteville (1998) found a positive correlation between DSI and consumers' product knowledge and involvement in the wine industry. Citrin and colleagues (2000) also found that DSI and Internet usage affects consumers' online shopping adoption. As discussed in the last section, II ambiguously relates to IB; but in contrast, the literature review suggested a more positive and straightforward relationship between DSI and IB. This shows that DSI can be used more effectively to measure product adoption behavior. In other words, DSI is a better predictor of innovative behavioral criteria. As mentioned by Goldsmith (2001), the DSI scale can be treated as a reliable and valid scale to study Internet consumer innovativeness because it has good psychometric characteristics. The literature review also suggested that the DSI scale is believed to be a good and strong predictor of behavioral criteria, as compared to the market maven scale (Goldsmith et al., 2003). Although Goldsmith (2003, 2005), Goldsmith and d'Hauteville (1998) and Citrin and colleagues (2000) conducted many studies to explain this relationship between DSI and IB in various contexts, there is still a lack of studies on the nature of this relationship in cross-culture global contexts. Thus, the researcher proposes the following preposition to be taken into consideration for further research:

> **P_3:** Domain-specific innovativeness has a positive and straightforward effect on innovative behavior.

Foxall (1995) also found that product involvement moderates the relationship between new product adoption and II in food products and a computer software context. Lassar and colleagues (2005) found a negative relationship between II and online banking adoption, while there is a positive relationship between Internet-related innovativeness and online banking adoption. In

addition, as the researcher has already discussed, DSI has emphasized more the "actualized innovativeness" in the banking industry (Hirunyawipada & Paswan, 2006) and a clearer predictor of actual adoption behavior than II, while II showed positive correlations with DSI. Thus various studies (e.g., Foxall, 1995; Goldsmith et al., 1995, 2005; Citrin et al., 2000) found that DSI mediates the relationship between II and IB. However, the majority of these studies were empirical in nature and conducted in specific contexts (e.g., U.S. and European), which limits generalizing their findings in different contexts (like Asian emerging economies). Therefore, the researcher again proposes this relationship to be further explored:

> **P_4:** Domain-specific innovativeness mediates the direct impact of innate innovativeness on innovative behavior.

Goldsmith and Flynn (1992) suggested that DSI categorizes consumers according to their higher number of shopping trips and greater spending. It shows that two important domain specific variables, i.e., product involvement and product knowledge, have strong correlations with DSI. Similarly, Citrin and colleagues (2000) found that DSI and Internet usage affects consumers' online shopping adoption. This evidences a strong correlation between the third domain-specific variable (product usage) and DSI. Once again, Goldsmith and colleagues (1998) found a positive correlation between DSI and consumers' product knowledge and involvement. Moreover, there are many studies describing a strong correlation among these domain-specific variables such as product usage (Goldsmith & Hofacker, 1991; Foxall & Bhate, 1991; Goldsmith et al., 1998, 1999, 2003; McCarthy et al., 2000; Huotilainen et al., 2006), product involvement (Flynn & Goldsmith, 1993; Goldsmith et al., 1998; Roehrich, 2004; Jordaan & Simpson, 2006; Sun et al., 2006; Hynes & Lo, 2006), and product knowledge (Grewal et al., 2000; Pagani, 2007; Huang et al., 2011) - and DSI, while the relationship of these variables with II is still ambiguous.

This seems logical, as the literature defined DSI in a specific domain of interest and II as a general personality trait. It can be noticed that one of the key domain-specific variables, i.e., opinion leadership, has a direct positive correlation with both DSI (Girardi et al., 2005; Goldsmith et al., 2005; McDonald & Alpert, 2007; Chakrabarti, 2010) and IB (Summers, 1971; Girardi et al., 2005; Ruvio & Shoham, 2007). In brief, the researcher found a direct and positive impact of a few domain-specific variables on DSI that may vary in different contexts. It will be more crucial to see the effects of all variables separately as well as in combination on innovativeness. They could also be ranked on the basis of their degree of correlation with the innovativeness construct. Therefore, the researcher proposes:

P_5: Domain-specific variables (product usage, product knowledge, and product involvement) have a stronger effect on domain-specific innovativeness than innovative behavior.

Limayem and colleagues (2000) found that consumers' attitudes and intention toward purchase of products or brands mediate the relationship of consumer innovativeness with Internet shopping behavior. Moreover these two variables, i.e., product/brand attitude (Ridgway & Price, 1994; Limayem et al., 2000; Hui & Wan, 2004; Jin & Suh, 2005; Okazaki, 2007; Pallister et al., 2007; Cheng & Huang, 2013) and purchase usage/intention (Limayem et al., 2000; Jin & Suh, 2005; Lam, Ahearne, Mullins, Hayati & Schillewaert, 2013) showed significant relationships with II. However, the same variables, product/brand attitude (Agarwal & Prasad, 1998; Agarwal & Karahanna, 2000; Goldsmith, 2001; Park & Jun, 2003; Lafferty & Goldsmith, 2004; Reisenwitz et al., 2007; Lu et al., 2008; Marcati, Guido & Peluso, 2008), and purchase usage/intention (Park, Burns & Rabolt, 2007; Reisenwitz et al., 2007) also have significant correlations with DSI.

Thus, these individual psychological characteristics (attitude and intention) have a strong influence on different dimensions of consumer innovativeness. However, attitude and intention are individual personality traits and therefore seem to be conceptually more similar to II than to DSI and IB. In short, the individual psychological characteristics influence II and DSI but have no direct influence on IB. These psychological constructs, namely attitude toward adoption and intention to adopt have frequently been studied in recent research on innovation adoption. Although this is quite clear in previous studies, the researcher again recommends analyzing the effects of these two constructs on all three dimensions of consumer innovativeness before generalizing the findings of previous studies. To do this the researcher proposes:

P_6: Individual psychological characteristics (attitude and intention) have a direct and stronger effect on innate innovativeness than on domain-specific innovativeness and innovative behavior.

Im and colleagues (2003) found that personal characteristics (age and income) are stronger predictors of new product adoption than global innovativeness in the context of consumer electronic products. In addition, various studies (Steenkamp et al., 1999; Im et al., 2003, 2007; Hirunyawipada & Paswan, 2006) reveal that socio-demographic variables correlate significantly with IB but surprisingly show ambiguous correlations with DSI (Goldsmith et al., 1999, 2003, 2005; Blake et al., 2003; Li & Buhalis, 2006) and also with II (Steenkamp & Burgess, 2002; Im

et al., 2003; Clark & Goldsmith, 2006; Goldsmith, Clark & Goldsmith, 2006). In fact, most of the studies show lower significance of personal characteristic variables with II and DSI than with IB. It must be noticed that a majority of the studies reported age and income as significant predictors of new product adoption. Their findings surprisingly differ for other variables like education, marital status, family size, and so on. Socio-demographics are extensively studied in all consumer-based research. It must also be analyzed while conducting any research on the adoption behavior of consumers. Therefore, the researcher proposes the following preposition relating to personal characteristics with all three basic dimensions of CI:

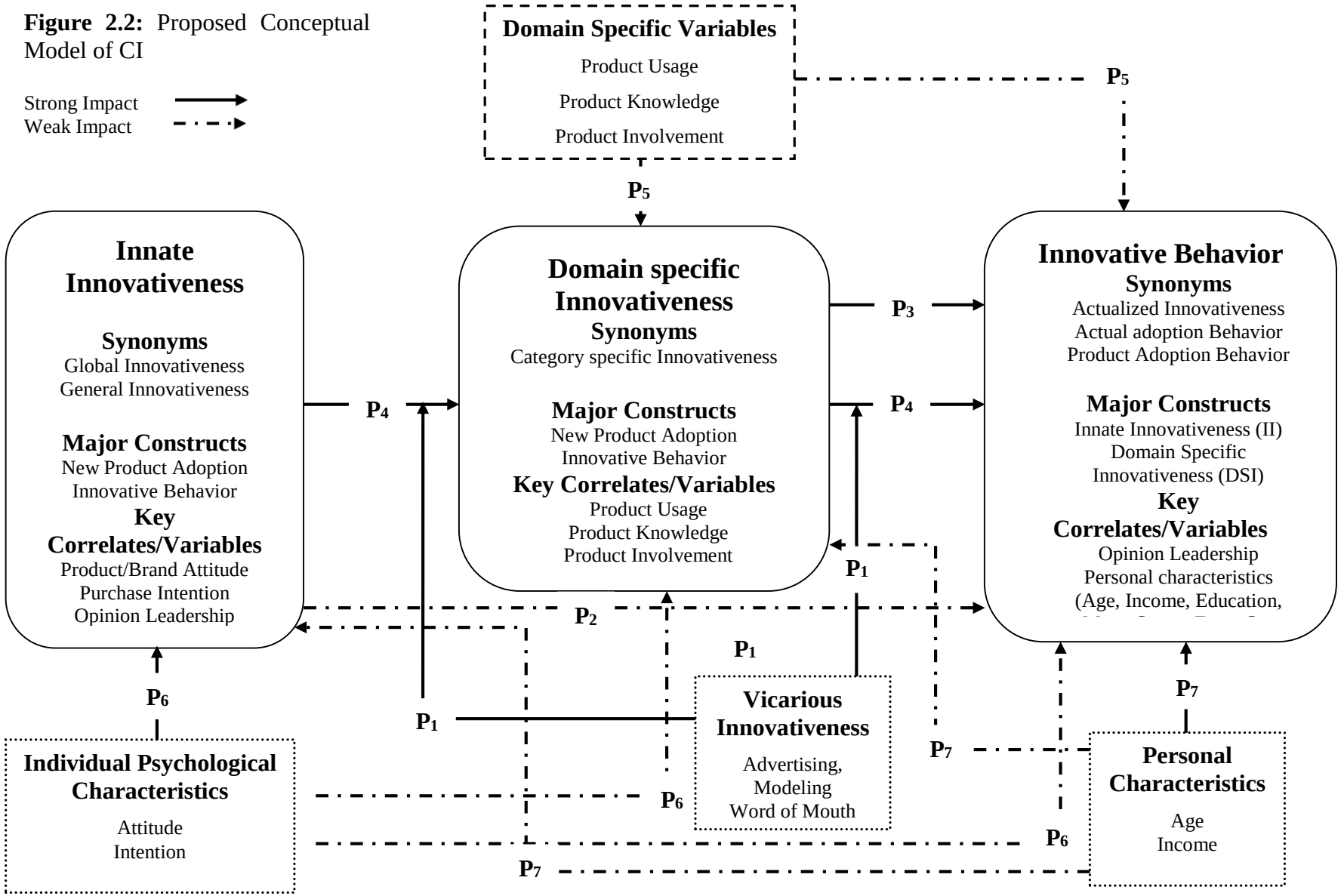
> **P_7:** Personal characteristic variables (age and income) have a direct and stronger impact on innovative behavior than on innate and domain-specific innovativeness.

Thus, after this systematic review of the literature, the researcher proposes a basic conceptual model of consumer innovativeness based on the aforementioned prepositions (see Figure 2.2). The model includes all three basic dimensions and their interrelationships. In addition, the moderating effects of VI and direct and/or indirect effects of domain-specific variables, personal characteristics, and other individual psychological characteristics on various dimensions of consumer innovativeness are also being shown in the CI model. This model presents a combined picture of results and findings of various empirical as well as conceptual studies. It shows crucial relations among all three basic dimensions of consumer innovativeness. It also provides major constructs and correlates of each dimension that has been extensively studied in the past.

2.3.4.4. Generalizability

In this literature review, the researcher found a lack of studies within the consumer innovativeness domain in an Asian context, as a majority of the studies were conducted in a Western context (Steenkamp et al., 1999; Stremersch and Tellis, 2004; Tellis, Stremersch, and Yin, 2003), with the exception of a few studies emphasizing consumer innovativeness in emerging markets (e.g., Steenkamp and Burgess, 2002). Further research must emphasize the development of new scales with key constructs that have been suggested by this study for different dimensions of consumer innovativeness. New studies could also emphasize validation of Western constructs of consumer innovativeness in Asian emerging markets. With the help of these directions, new global scales of consumer innovativeness could be developed, or even available scales could be validated in different global contexts.

Figure 2.2: Proposed Conceptual Model of CI



2.4. Reviewed SST adoption literature

To comprehend the general establishment of, and contributions to SST adoption literature, 77 different articles have been reexamined in this second phase of literature review (see Appendix A.4). From the review, following patterns in literature related to technology (SST) adoption and diffusion were noted:

i. Several authors associated with Arizona State (Bitner, Brown, Fisk, Ostrom, Meuter, and Curran) are common in majority of SST adoption and service marketing literature. A lot of their publications included convenience sampling (where student as target sample) and repeat sampling (where samples drawn from a specific population at different time intervals) across numerous technologies and industries (Bitner et al., 2000; Bitner et al., 2002; Meuter et al., 2000; Meuter et al., 2003). All these research have helped define essential SST and industry typology in this study.

ii. While literature reviewed in this phase represents paucity of domestic research, there have been large number of studies from European (Liljander; Reinders; Simon; Schepers; Tsikriktsis; Verhoef; Walczuch; Wang; Weijters; and y Monsuwe) and Australasian (Bennington; Chen; Hsieh; Lin; and Shih) authors and publications.

iii. A few SST categories (e.g. kiosk) have had common individual attention from the Arizona State camp (Meuter et al., 2000, Meuter et al., 2003); this is because of the predominance of these SSTs (kiosks) in public transports (e.g., airlines service) (Reinders et al., 2008, Reinders et al., 2007).

iv. Finally, numerous SSTs (e.g., ATMs, phone/IVR/AVR, vending kiosks, touch screens and monitors, scanners and swiping, and video/CD/software media) and industry categories (e.g., traditional retail and hospitality/personal services) reported in table 2.5 and table 2.6 have received considerable attention in existing literature and give important future research directions.

2.4.1. Typology of SST Technologies

To recognize innovation-based and industry-based gaps in literature that warrant further examination, it is important to separate SST (see Table 2.5) and industry typology (Table 2.6). The most comprehensive categorization of SSTs has probably been done by Meuter and associates (2000, p. 52). In their study, four categories of SST-interfaces are distinguished based on different purposes such as customer service, transactions, and self-assistance: (a) Telephone/Interactive Voice Response; (b) Online/Internet; (c) Interactive Kiosks; and (d) Video/CD. According to Meuter et al. (2000), this classification combines SSTs into four general groups; each has noteworthy differing qualities. The assortment inside of expansive technology classifications is further exhibited by Meuter et al. (2003)

in their study where they explore usage rates for 14 distinctive SST categories such as: car rental; airline ticketing; hotel checkout; package tracking; investment transactions; tax self-preparation; phone banking; ATMs; phone services; pay-at-pump; Internet information; Internet shopping; blood pressure machines; gambling machines (p. 903).

SST literature perceives the unique nature of SSTs and the related constraints of construct validity and generalization with respect to technology and industry typologies (Curran & Meuter, 2005; Curran & Meuter, 2007; Gutek, Cherry, Bhappu, Schneider & Woolf, 2000; Liao, Chen & Yen, 2007; Lin et al., 2007; Phongkusolchit, 2003; Reinders et al., 2007; Szajna, 1996; Venkatesh & Davis, 2000; Walczuch et al., 2007; Wang et al., 2009). The utilization of expansive technology categories and diverse industry combinations as proposed by Meuter et al. (2000, 2003), may warrant thought of augmented subcategories. To this end, the diverse range of SSTs and industries are considered and casually segmented across the research literature sample. Perreault, Cannon, and McCarthy (2011) mentioned that such segmentation needs identifying various dimensions or divisions that give a robust heterogeneity between categories and good homogeneity within categories (p. 95).

Considering this, a review of the 77 SST adoption articles (see Appendix A.4) uncovers trends that support sub-categorization within two of the four primary categories suggested by Meuter et al. (2000). Review and thought of their Online/Internet category proposes a consistent two-segment typology of:

a) Internet-passive interactions such as browsing and information seeking.
b) Internet-active interactions such as online shopping and account management.

Review also suggests further segmentation of the Interactive Kiosk category into three sub-categories:

i. Vending kiosks, (e.g., ATMs, ticket vending, and various vending apparatus.
ii. Touch screens/Monitors for interactive transactions (e.g., check-in/out, seat assignment, and ordering).
iii. Scanning/swiping which includes self-check-out and card swiping or scanning for financial transactions.

Articles, reviewed in this phase, which had more than three technologies and which had no particular SST are (sub-) categorized as combined and general/not specified respectively. While this expanded typology does not give an impeccable outline (e.g., ATMs and gas pumps have vending, scanning/reading, and touch screen technologies), it does give a sub typology of SST technologies that further identifies the distinct nature, utilization, and use of innovation in self-services.

Table 2.5: Typology of SSTs included in Previous Studies

Meuter et al.'s category	Review-driven sub-categories	Uses or Nature	Number	Percentage
Online/Internet	Online/IT Active	Shopping, transactions	29	28.43
Multiple	Combined/varied	Combined	22	21.57
Telephone/IVR	Phone/Mobile/IVR/AVR	Phone- or mobile-based	12	11.76
Interactive Kiosks	Scanning/Swiping	Transactions, information	12	11.76
Interactive Kiosks	Vending Kiosks	Physical vending	10	9.80
Interactive Kiosks	Touch screens/Monitors	Transactions, selections	10	9.80
Not Included	General/Not specified	Not SST specific	6	5.88
Video/CD	Video/CD/software	Information, utilization	1	0.98
Total			102	100.00

Note. ATMs are counted thrice as vending, scanning, and touch screen; 'Multiple' is used to denote more than three (e.g., Liu, 2013); 'Not included' is used to denote those studies which didn't report any specific SST; Total is from collective occurrences across all 77 articles.

2.4.2. Typology of SST Industries

Meuter et al.'s categories of SSTs identify various industries/sectors such as banking, airlines, shipping, hotels, retail gas, car rental, health monitoring, Internet-based, pharmaceutical, online education, tourism, tax preparation, and general training industries (2000, p. 52). Bitner et al. (2000, p. 142) also highlighted telecommunications, banking, shipping, hotels, personal services, news and information, and Internet-based companies in their Technology Infusion Matrix. In 2003, Meuter et al. implicitly included Internet-based, banking, retail gasoline, tax preparation, medical monitoring, shipping, hotels, gambling, investment, car rental and airline industries in their research generalization.

While all these industries together form a long list, various industries have received repetitive emphasis and consideration in existing literature (see Table 2.6). Such industries, along with this review of 77 SST adoption studies (refer to Appendix A.4), give the following eight SST industry categories: i) Internet/IT-based (23.16%); ii) Multiple/Varied/Miscellaneous (21.05%); iii) Banking/Financial (16.84%); iv) Transit (9.47%); v) Business/Office Services; vi) Traditional Retail; vii) General/Not specified; viii) Hospitality/Personal Services. Of these, the first three categories together have been the recipients of majority (nearly 61%) of industry focus in the reviewed SST adoption studies.

E-commerce interactions comprise scanning, communication, data recovery, sharing and exchange, on-line learning, shopping and comparing, consumer sales, business-to-business collaborations, and account recovery and support. Web-based SSTs and industries have their own IT accentuation and sub-groups. While numerous general services-oriented journals perceive and address the Internet as a key

technology in self-service option, 50 percent (approx) of information system (IS) journals are available in this review (refer to Appendix A.4).

Table 2.6: Typology of Industries included in Previous Studies

Industry	Incidences	Percentage
Internet/IT based (including retail, banking, etc.)	22	23.16
Multiple/Varied/Miscellaneous	20	21.05
Banking/Financial	16	16.84
Transit	9	9.47
Business/Office Services	8	8.42
Retail	8	8.42
Hospitality/Personal Services	8	8.42
General/Not specified	4	4.21
Total	95	100.00

E-commerce interactions comprise scanning, communication, data recovery, sharing, and exchange, on-line learning, shopping and comparing, consumer sales, business-to-business collaborations, and account recovery and support. Web-based SSTs and industries have their own IT accentuation and sub-groups. While numerous general services-oriented journals perceive and address the Internet as a key technology in self-service option, a decided presence (approximately 50%) of information system (IS) journals are available in this review (Appendix A.4).

Banking has been one of the most studied industries in SST adoption research because of its constant implementation of new SST-based services (Internet, phone, and kiosk such as ATMs, Passbook printing kiosks, etc.), and their high degree of adoption and usage by customers (Curran & Meuter, 2005). Thus, banking industry provides crucial research opportunities for different SST type comparisons (Curran & Meuter, 2005) and offers an extensive number of consumers as SST users (Curran et al., 2003). Banks have traditionally invested a lot of time and overhead on face-to-face transactions; their ability to attract clients and deliver banking services using SSTs has impressive influence on costs, efficiency, and profitability (Curran et al., 2003).

Airlines and train systems that have traditionally depended on face-to-face and personal exchanges for reservations, ticketing, and information have likewise been chosen for much global SST adoption research (Liljander et al., 2006; Lin & Hsieh, 2007; Lin & Hsieh, 2006; Reinders et al., 2008, Reinders et al., 2007; Simon & Usunier, 2007). Providing check-in facilities, seat assignment, and baggage check-in experiences bring about critical expenses in overhead and time (Reinders et al., 2008). Besides the vending and information related SSTs in travel, the hospitality industry has also provided much

touch screen check-in/out and ordering opportunities for SST adoption research (Dabholkar, 1996; Dabholkar & Bagozzi, 2002; Oyedele & Simpson, 2007).

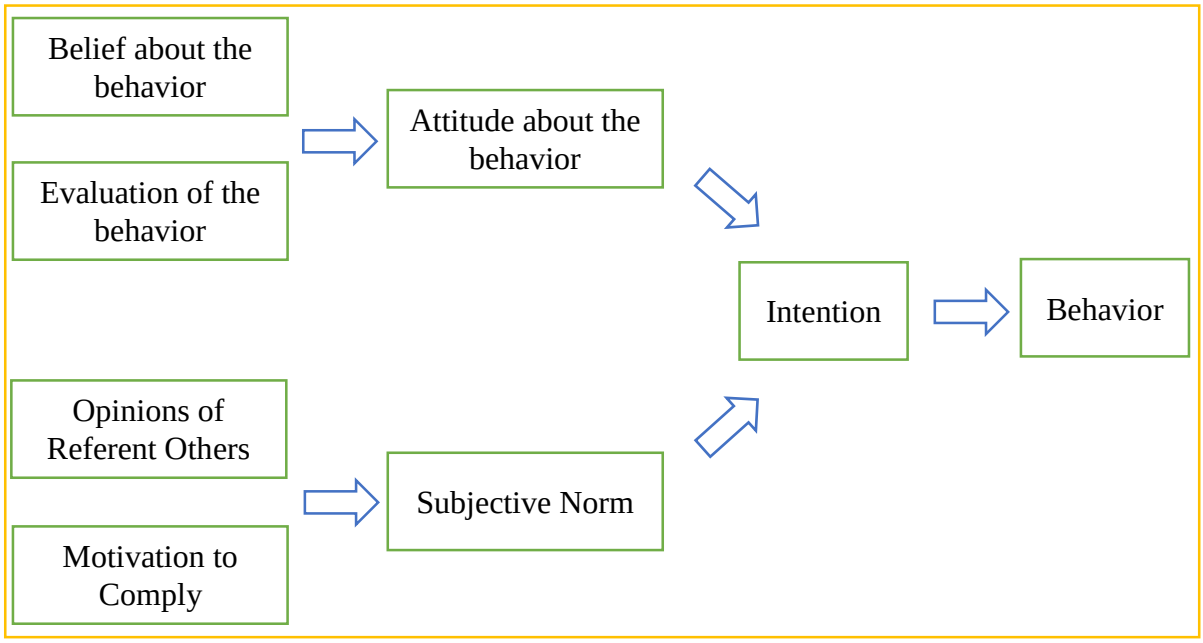
Relatively few adoption studies have concentrated on offline service contexts. Wang et al., (2009) proposed a model that concentrated on the situational effects in multi-channel retail settings, Oyedele and Simpson (2007) observed few consumer control factors in retail shopping and check-out, and Phongkusolchit (2003) investigated technology anxiety (TA) for self-checkout in retail stores. Though, no study has been distinguished that applies TAM or an extended TAM across numerous SSTs in offline service contexts.

2.5. Various models of adoption behavior

2.5.1. Theory of Reasoned Action

Theory of Reasoned Action (TRA), presented by Ajzen and Fishbein in 1977, is the foundation of both Theory of Planned Behavior and Technology Acceptance Model. In TRA, actual behavior or action is mediated by two crucial behavioral constructs (attitudes and behavioral intentions) that are associated with beliefs and evaluations which are, in turn, related to subjective norm (SN)/normative belief (Davis et al., 1989). This model of acceptance behavior concentrates fundamentally on users' subjective norms (or normative beliefs), perceived desires of reference groups and individuals, and their inspirations to follow these desires (see Figure 2.3).

Figure 2.3: Theory of Reasoned Action (Ajzen & Fishbein, 1977)



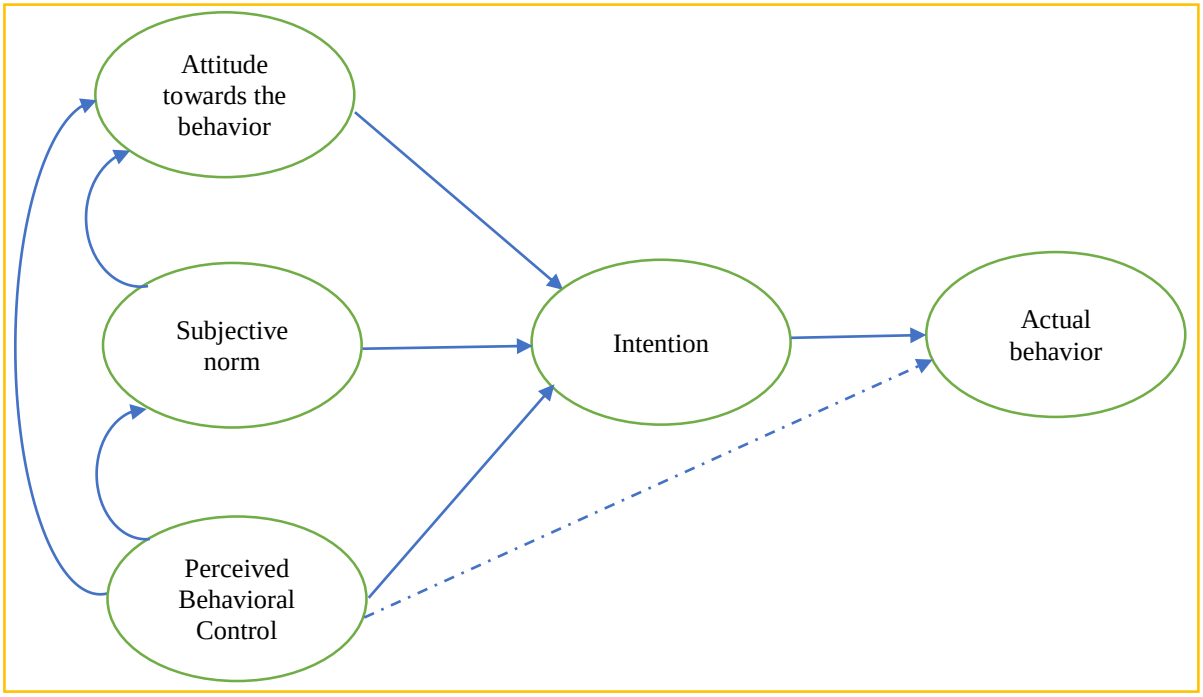
According to Davis et al. (1989), social relationship and its effect is viewed as the primary determinant of adoption behavior in case of SST adoption or use. However, Ajzen and Fishbein

contend that four distinct components exist in a behavioral entity - action, target, context, and time (1977, p. 889). Thus, the model has limited scope of being generalized; if target, action, context, and time fluctuate, then the behavioral index is eventually defined solely by the action itself. When the target market data incorporate different customers, crowding/queuing and waiting time situations that are usually found in offline service contexts, then the ability of TRA to predict and confirm attitude as a mediator becomes weakened in the model.

2.5.2. Theory of Planned Behavior

TPB was proposed by Ajzen in 1985; it mainly emphasizes the independent latent variables - attitude, subjective norm, and control, and their individual associations with actual behavior as mediated by behavioral intentions (see Figure 2.4). While both TPB and TAM derive from TRA, TPB is a belief-based model whereas TAM is attribute-based. Ajzen framed TPB by adding perceived behavioral control to TRA as a third interactive, belief-based latent variable besides attitude and subjective norm (Ajzen, 1991). He proposed this model because of the controversial perception that TRA failed to explain the behavior where individuals had incomplete volitional control; adding perceived behavioral control as a variable provides for the distinction between voluntary and involuntary situations in explaining behavior. Control and voluntarism can be key considerations in SST adoption where firms make SST a dictated mode of service delivery instead of a mere option (Reinders et al., 2008, Reinders et al., 2007; Venkatesh & Bala, 2008; Venkatesh et al., 2003; Wixom & Todd, 2005).

Figure 2.4: Theory of Planned Behavior (Ajzen, 1991)



Like TRA, TPB has following generalization issues in relation to TAM:

i) TPB needs clear identification of beliefs prior to application while TAM does not. TAM is more generalizable, but also more risky because it excludes key TRA variables.
ii) TPB is more difficult to apply across diverse applications whereas TAM's basic constructs are measured identically in every situation.
iii) Some TPB items need explicit behavioral alternatives and comparatives while TAM does not (Mathieson, 1991).

2.5.3. Technology Acceptance Model

Of the basic technology adoption/acceptance models reported in Table 2.7, TAM is probably the most perceived and widely accepted model (Gefen et al., 2000). TAM, as introduced by Davis in 1989, is rooted in TRA, but clearly differs from its predecessor in terms of constructs and specificity (Davis et al., 1989). TAM is an attribute-based model and mainly emphasizes the perceived characteristics of the technological system (PU and PEOU) as primary latent variables. Basic TAM incorporates PU and PEOU as antecedents to attitude which is a mediating variable, and does not focus on subjective norm (or normative beliefs) and perceived behavioral control constructs included in TPB (Davis et al., 1989; Wang, Harris & Patterson, 2007). TAM was initially intended for general characteristic in technology (Davis et al., 1989), whereas TRA was intended for behavioral applications with a particular targets, contexts, time and technologies (Ajzen & Fishbein, 1977, p. 889). It can be said that the generalizability of TAM is more than TRA; it better addresses the diversity and variety in respondents, situational context, and time.

2.5.4. TAM2 and TAM3

TAM2, as shown in Figure 2.5, signifies an extension of basic TAM by Venkatesh and Davis (2000) and mainly emphasizes the antecedents to PU. TAM2 incorporates the essential constructs of basic TAM (PU, PEOU, intention, and usage behavior), but also adds a few external antecedents to PU (subjective norm, image, job relevance, output quality, and result demonstrability). It also includes experience and voluntariness constructs as moderators in the relationship of subjective norm with PU, and also, intention. TAM2 offers a significant explanation of PU variance by incorporating two social influence variables (social norm and image) and three cognitive instrumental variables (job relevance, output quality, and result demonstrability). Similarly, in TAM3 (see Figure 2.6), Venkatesh and Bala (2008) expanded TAM2 by incorporating a variety of four anchor antecedents (computer self-efficacy, external control, computer anxiety, and computer playfulness) and two adjustment antecedents (enjoyment and usability) for PEOU. Thus, TAM3 contains five antecedents of PU and six antecedents

of PEOU, along with two moderators (experience and voluntariness) influencing nine model path relationships (see Figure 2.7).

Figure 2.5: Technology Acceptance Model (Davis, 1989)

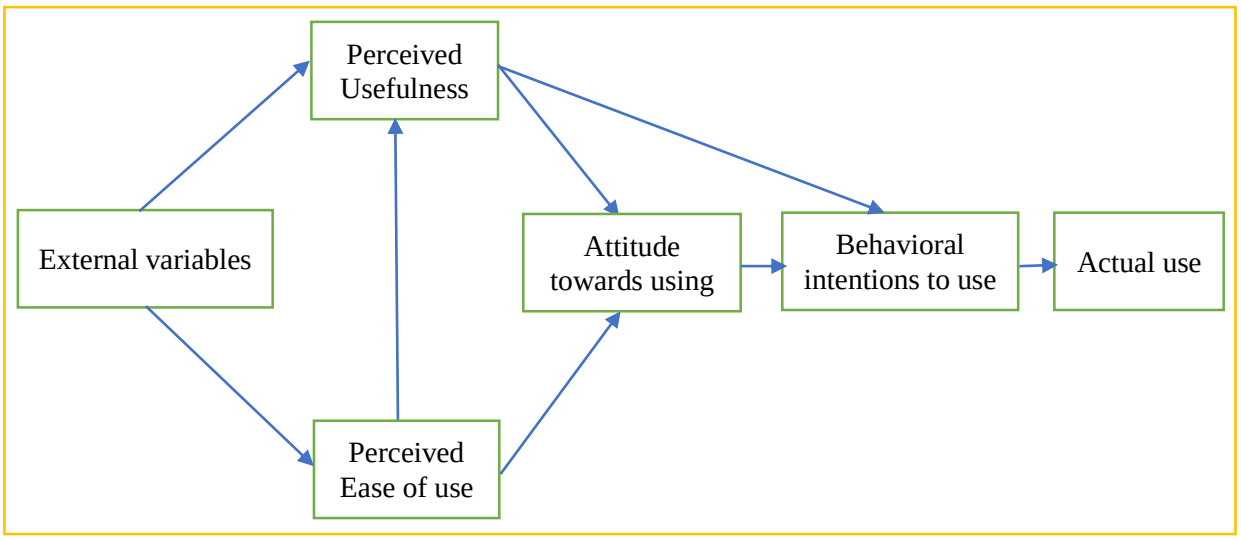
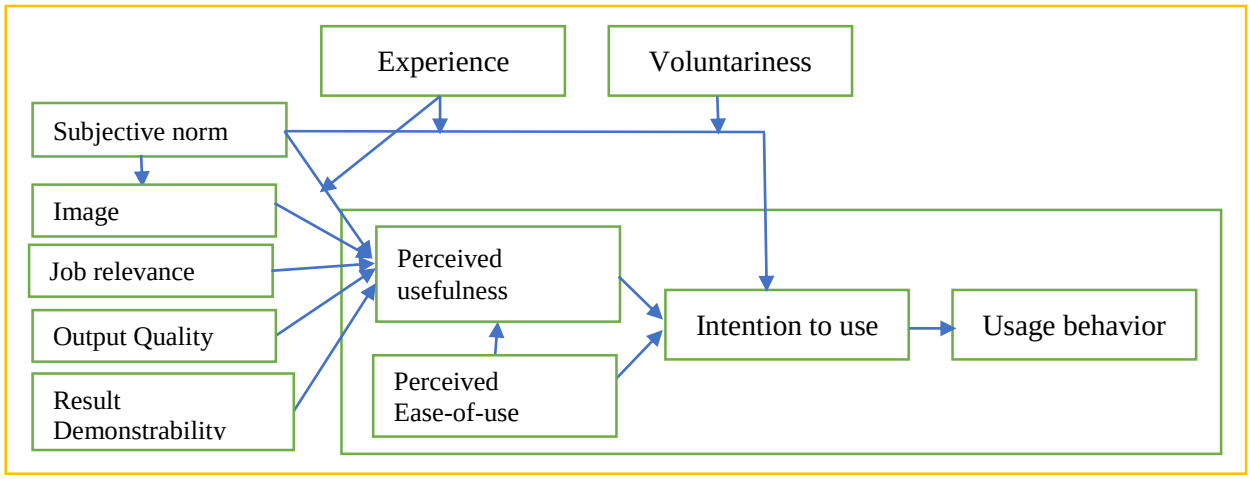
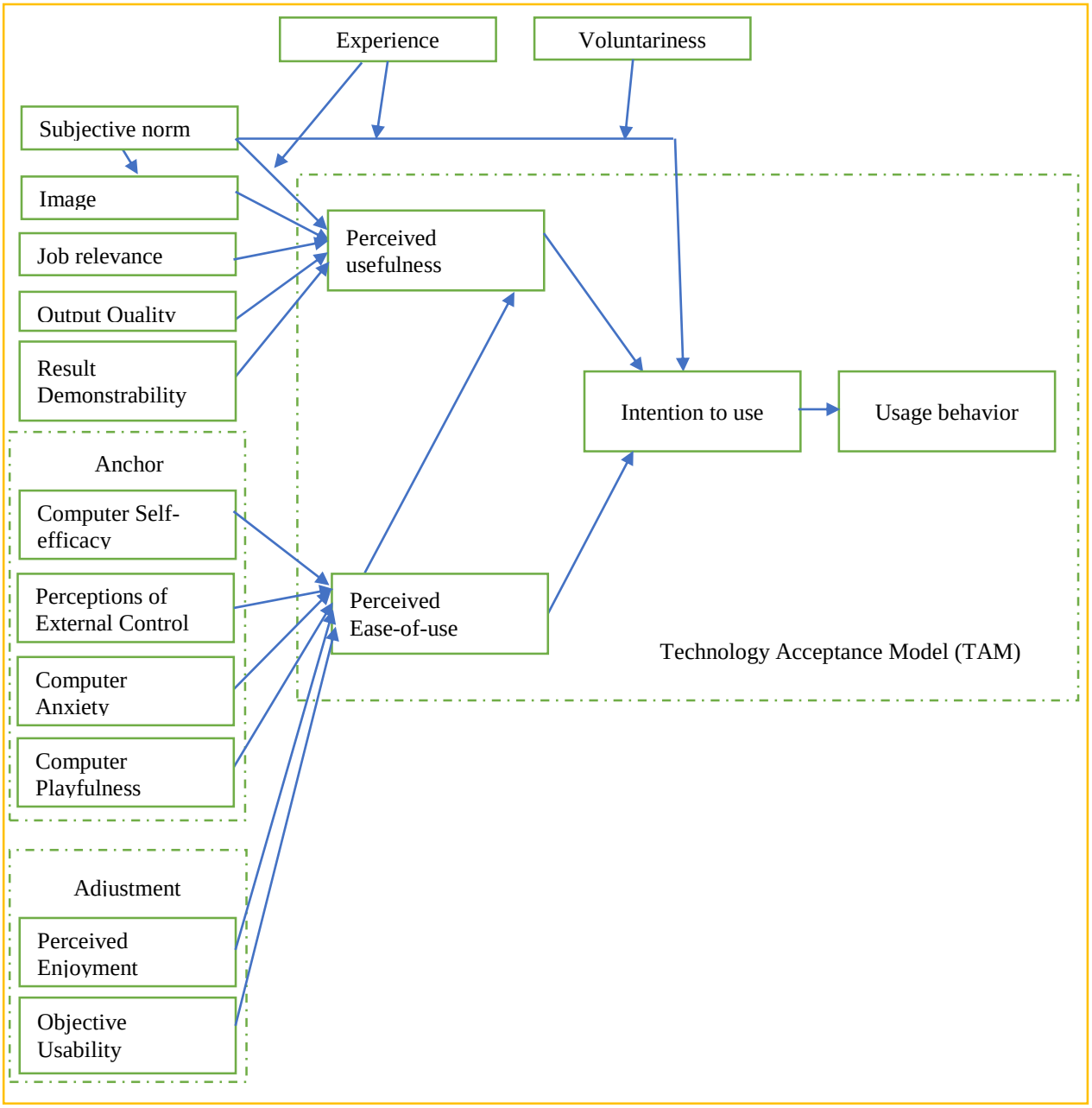


Figure 2.6: TAM2 (Venkatesh & Davis, 2000)



These additional determinants in TAM 2 and TAM 3 have implications for the use of social influence considerations and instrumental considerations regarding SST design, output quality, and ease-of-use in different situations, but these are not easily or directly measurable for offline service environments. The complexity of TAM2 and TAM3, as well as their emphasis on control and required settings makes them inappropriate to be taken as base models for the present study. Some other extended forms of aforementioned based models (TRA, TPB, and TAM) are given in table 2.7.

Figure 2.7: TAM3 (Venkatesh & Bala, 2008)



2.6. Gaps in existing literature

From a systematic review of literature on consumer innovativeness and SST adoption, certain gaps have been identified. These gaps prove that there is significant scope of CI research, specifically in the field of SST adoption in offline service contexts. Major gaps identified from the literature review are:

i. There is a lack of studies emphasizing differentiating antecedents/predictors of consumer innovativeness in different stages of the adoption process (Alexander John & Quing, 2008; Arts et al., 2011).

Table 2.7: Various Adoption Models found in Literature

Theory/Model	Proposed by	Key Constructs / Variables
Innovation Diffusion Theory (IDT)	Everett Rogers, 1962	Relative Advantage, Compatibility, Complexity, Trialability, and Observability
Theory of Reasoned Action (TRA)	Martin Fishbein and Icek Ajzen, 1975, 1980	Attitude, Behavior Intention, and Subjective norm
Theory of Planned Behavior (TPB)	Icek Ajzen, 1985	Attitude, Behavior Intention, and Subjective norm, Perceived Behavioral Control (PBC)
Technology Acceptance Model (TAM)	Fred Davis, 1989; Richard P. Bagozzi, Fred D. Davis and Paul R. Warshaw, 1992	PU, PEOU, Attitude, Intention, Actual Behavior
Perceived Characteristics of the Innovation (PCI)	Gary C. Moore & Izak Benbasat, 1991	Usability: Relative Advantage, PEOU and Compatibility; Social: Result demonstrability, visibility and Image; Psychological: Voluntariness and Trialability
Decomposed Theory of Planned Behavior (DTPB)	Shirley Taylor and Peter A. Todd, 1995	Subjective norm (SN): Peer and superior influence; PBC: Self-efficacy, Resources Facilitating Condition and Technology Facilitating Condition; Attitude: Relative Advantage, Compatibility, Complexity (from IDT)
Unified Theory of Acceptance and Use of Technology (UTAUT)	Viswanath Venkatesh, Michael G. Morris, Gordon B. Davis and Fred D. Davis., 2003	Performance Expectancy; Effort expectancy; Social influence (SN from DTPB and Image from PCI); Facilitating conditions (PBC from TPB, Facilitating Condition from DTPB and Complexity from IDT).
Theory of Innovation Resistance	S. Ram, 1987	Functional Level Barriers: Usage, Value and Risk Barriers; Psychological Level Barriers: Tradition and Image barriers
Theory of Perceived Risk (TPR)	R. Bauer, 1960	Perceived Risk: Security, Privacy, Financial, Social, Time / Convenience and Performance risk

ii. The majority of studies is based on IDT (Rogers, 1995), TRA (Fishbein & Ajzen, 1975), TPB, (Ajzen, 1985), and TAM (Davis et al., 1989), and address only a few key constructs while ignoring others such as situational variables (e.g. waiting time, crowding, etc.) in an offline service context (Curran & Meuter, 2005).

iii. There is still a need to go beyond the emphasis on attitudes and behavioral intentions in services technology literature (Young, DeSarbo, & Morwitz, 1998; Van Ittersum & Feinberg, 2010).

iv. There is a lack of empirical evidence to support the relationships among variables included in innovation adoption and diffusion literature (Im et al., 2003).

v. There is a need to address consumer traits (both demographic and psychographic traits) influencing new product (e.g. SST) adoption to help minimize the risk of failure (Hauser et al., 2006; Gourville, 2006; Rogers, 2003).

vi. There are numerous forms of consumer innovativeness such as II (Midgley & Dowling, 1978), DSI (Goldsmith & Hofacker, 1991), IB (Summers, 1971) and VI (Hirschman, 1980) that have been identified and examined. However, the findings still lack a degree of clarity and consensus (Kaushik & Rahman, 2014).

vii. CI studies have been hampered by the lack of universally agreed-upon measures of the innovativeness construct, and the measures typically used have been criticized for their lack of reliability and validity (Goldsmith et al., 1995; Im et al., 2003; Roehrich, 2004).

viii. Existing scales have been unable to accurately measure consumer innovativeness. Hence, there is a need for a global scale to measure it (Roehrich, 2004).

ix. Majority of existing scales belong to the product category (physical products) rather than services, therefore it becomes crucial to develop an innovativeness scale that can be directly applied in different service industries (Kaushik & Rahman, 2015d).

x. Different adoption models still need extensions, for instance, TPB overlooks emotional variables such as threat, fear, mood and negative or positive feeling, and assesses them in a limited fashion (Dutta-Bergman, 2005).

xi. More studies are required to overcome various criticisms of TAM as a theory, such as its questionable heuristic value, limited explanatory and predictive power, triviality, and lack of any practical value (Chuttur, 2009).

xii. The mediating effects of ‘attitude’ and/or ‘need for interaction’ constructs between various antecedents (e.g. ease of use) and behavioral intention towards SST adoption need to be further examined (Venkatesh & Davis, 2000; Venkatesh et al., 2003).

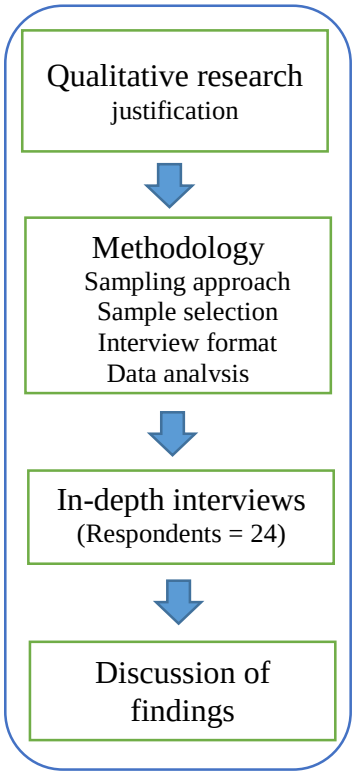
Summary

Chapter Two describes how this research fits well with existing literature and highlights specific gaps that have been addressed. Comprehensively, this chapter details the literature reviewed to set the foundation for the proposed conceptual model and relevant hypotheses developed in Chapter Four. The qualitative research conducted and reported in Chapter Three will provide sufficient support to the numerous variables and their hypothesized inter-relationships.

Chapter 3

Qualitative Research

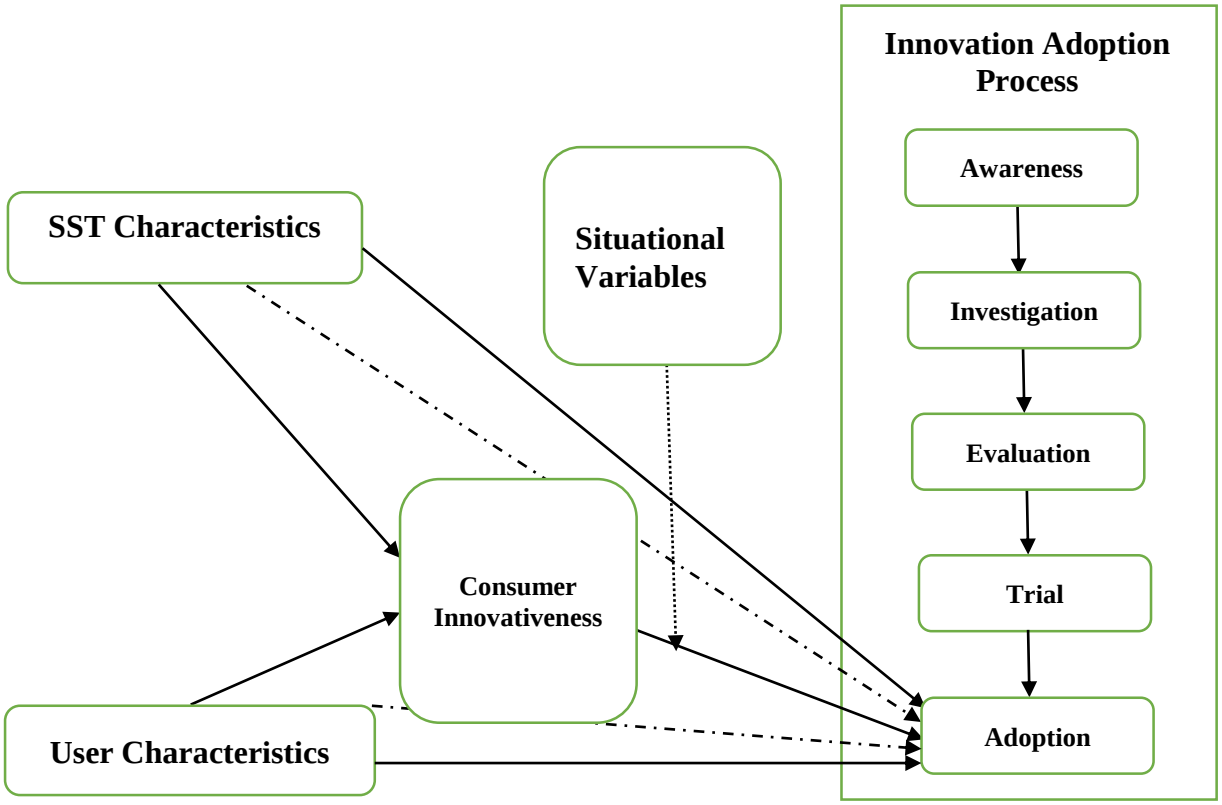
This chapter portrays how qualitative in-depth interviews were conducted to investigate the under-scrutinized territory of SST adoption by service consumers and the variables reported to be significant in the SST adoption process. After a brief description into the qualitative methodology, various justifications behind conducting qualitative in-depth interviews are provided. The general technique is depicted, including a discussion of the sampling strategy, interview format, and data analysis strategy. The final section of this chapter describes the various findings from the qualitative research. At this point key subjects are discussed and upheld with few descriptive quotes. These findings from the qualitative research and the literature reviewed in Chapter Two give assistance in developing the proposed conceptual model in Chapter Four.



3.1. Qualitative research

To complement the systematic literature review given in Chapter Two, it was deemed necessary to have face-to-face interactions with few real service consumers to develop and propose a comprehensive conceptual model. For this, qualitative in-depth interviews can be an effective method of finding hidden facts and related variables not previously considered in SST adoption research.

Figure 3.1: Preliminary Model: Consumer Adoption of Self-Service Technologies



A qualitative research usually applies an inductive methodology that starts with particular perceptions and moves toward the advancement of general developing patterns. This methodology does not impose an inflexible structure or make assumptions about the interrelationships before making real observations. In this study, an advanced research framework was made through a review of existing literature to direct the qualitative research. This advance framework comprises a new technology (SST) adoption process and collection of distinct variables (SST characteristics, user characteristics and situational variables) proposed to affect the intention of SST adoption (see Figure 3.1). Despite the fact that a general adoption model was outlined, the framework stayed flexible and adaptable to understanding collected from the qualitative in-depth interviews. Findings from the qualitative research led to the inclusion of two additional variables that were not initially incorporated in the conceptual model. Having such an advanced framework to direct the qualitative research is really important so as to avoid a lack of focus in the qualitative study (Miles, 1979).

3.1.1. Qualitative research justification

There might be a number of reasons behind conducting a qualitative research. Some of the important ones are:

i. There has been insufficient research examining consumer adoption of service innovations. Majority of the adoption literature has focused on the adoption of new products rather than services. Qualitative research has been demonstrated to be effective in developing new theory or under-explored areas of interest.

ii. Qualitative studies have only occasionally been integrated into SST adoption literature. However, qualitative research may suggest essential variables that might have been overlooked in this adoption research domain.

iii. There are considerable advantages related with methodological triangulation. Therefore, this qualitative research will be supplemented with a quantitative study, providing a more comprehensive mixed research design approach.

The rest of this section will briefly discuss each of the three justifications mentioned above for conducting a qualitative research and explain why qualitative in-depth interviews were incorporated as way of investigation.

3.1.1.1. Adoption of Service Innovations

Because of the limited research exploring consumer innovativeness towards adoption of new service innovations such as SSTs, a qualitative research approach seems appropriate for exploring the phenomenon further. Without an established theoretical background and empirical back up, it seems important to apply a qualitative approach to get a better understanding of the whole adoption process and relevant variables regarding SST adoption. Qualitative research is needed when existing literature on a subject is limited (Bonoma, 1985), as is the case here with SST adoption. On the other hand, quantitative methodology is more suitable for testing an existing theory and/or conceptual model, while the qualitative research is preferably suited for theoretical generation and development (Bonoma, 1985; Deshpande, 1983; Jorgenson, 1989; Miles & Huberman 1994).

The utilization of qualitative research to achieve a deeper understanding of an under-explored research area has been termed exploratory research (Calder, 1977) or grounded theory (Glaser & Strauss, 1967). Grounded theory refers to a theory systematically developed or discovered from data rather than depending exclusively on the inward rationale of an existing theory. This research approach emphasizes that all theories and conceptual models be based upon real perceptions. According to Calder (1977), "There must be an external origin at some point in theory development, and this origin is the world of everyday thought and experience" (p. 354). Integrating qualitative in-depth interviews

with empirical research is a successful way of applying grounded approach for the advancement of an adoption theory.

Qualitative research has widely been applied in services marketing literature across an extensive variety of topics including service experience (Amould & Price, 1993; Bitner, Booms & Tetreault, 1990; Bitner, Booms & Mohr, 1994; Grove & Fisk, 1997; Meuter, Ostrom, Roundtree & Bitner, 2000), service switching (Keaveney, 1995), service quality (Parasuraman, Zeithaml & Berry, 1985) and customer loyalty (Gremler, 1995). A comparative approach has also been applied to investigate the process of new service development (NSD) (Easingwood, 1986; Martin & Horne, 1993).

3.1.1.2. Qualitative Studies in Adoption Literature

To the best of researchers' knowledge, qualitative research has hardly been integrated into SST adoption literature. Customer perspective is an indispensable part of the consumer adoption decision. So as to better understand the consumer adoption process, it is crucial to develop a clear and in-depth understanding of the phenomenon from the user's or adopter's viewpoint. Furthermore, customers are the kings and their way of thinking should be researched qualitatively. The qualitative/exploratory research approach is particularly intended to produce a rich behavioral understanding of consumer behavior (Calder, 1977; Hudson & Ozanne, 1988).

Previously, adoption research has largely been carried out through cross-sectional surveys (Cowles and Crosby, 1990; Dickerson & Gentry, 1983; Gilly & Zeithaml, 1985;Mahajan, Muller & Srivastava, 1990; Midgley & Dowling, 1993; Zeithaml &Gilly, 1987), experimentation (Ellen, Bearden & Sharma, 1991; Olshavsky & Spreng, 1996) or some combination of the two (Ostlund, 1974). The consumer adoption process and research inquiries investigating reasons and intentions, which are crucial for this research, are preferably suited for a qualitative research (McQuarrie & McIntyre, 1988).

3.1.1.3. Methodological Triangulation

Applying a qualitative approach along with a quantitative approach considerably strengthens any research. Combining these two methodologies has been termed convergent methodology, multi-method/multi-trait (Campbell & Fiske, 1959), convergent validation or triangulation (Jick, 1979). Each of these research approaches advocates that qualitative and quantitative methodologies can, and should be applied together instead of being seen as contradictory approaches to research. According to Jick (1979), triangulation is defined as "the combination of methodologies in the study of the same phenomenon" (p. 602). This utilization of various approaches together has a rich history in social science research and provides several key advantages. First, there is higher accuracy and increased credibility in the research findings (Brewer & Hunter, 1989; Jick, 1979; Sherry, 1991). Second, it

allows for a more precise conceptualization and assessment of theory by confirming various findings in more than one way. When multiple or mixed research approaches are applied and comparative outcomes achieved, the findings are likely to more closely characterize the actual nature of the problem (Grove & Fisk, 1992). "The use of complementary methods is generally thought to lead to more valid results" (Jick, 1979, p. 603). Furthermore, using a mixed research design limits the effects of biases in specific examinations (Brewer & Hunter, 1989).

As every method has some inherent weaknesses, a research may be strengthened by applying mixed research approach (Bonoma, 1985; Miles & Huberman, 1994). Indeed, with methodological triangulation, the strengths of one method may compensate for the weaknesses of other method(s) (Brewer & Hunter, 1989; Brinberg& Hirschman, 1986). However, it is essential to ensure that methods have complementary strengths instead of overlapping weaknesses. In this adoption research, the strengths and weaknesses of both qualitative and quantitative research designs are clearly complementary.

Although the key limitations of qualitative research have been widely explored by past researchers (McQuarrie & McIntyre, 1988; Miles, 1979), it is considerably significant and used in recent studies (Kaushik & Rahman, 2015c). A qualitative approach offers a deep understanding of the research problem. Furthermore, qualitative approaches preserve the sequential movement of events and their face validity appears unquestionable (Miles, 1979). According to Miles and Huberman (1994), qualitative data additionally "focus on naturally occurring, ordinary events in natural settings, so that we have a strong handle on what 'real life' is like" (p. 10).

While the effectiveness and significance of qualitative research has been established, there do exist some weaknesses therein (e.g., small, non-representative samples and interpretational subjectivity) that may be overcome by integrating it with a quantitative approach. In the absence of quantitative support, findings cannot be generalized because they are entirely based on a relatively small sample. Also, in the light of the findings of qualitative research, quantitative examination becomes all the more appropriate as it focuses only on the crucial variables recognized in the literature review, or supported in qualitative research. In this research, methodological triangulation will be developed by integrating the strengths of qualitative and quantitative methodologies. In the first phase, the qualitative study will explore the problem in hand, presenting and supporting relevant adoption determinants and other key variables. Once the model is appropriately developed and proposed based on the various corresponding hypotheses, the quantitative methodology will examine the relationship among identified variables.

3.1.1.4. Qualitative In-depth Interviews

Due to the availability of various methods for conducting a qualitative research (e.g., ethnography, critical incident technique, participant observation, in-depth interviews, etc.), it becomes important to choose the most appropriate method for the study to be carried out. For the present study, qualitative in-depth interviews was deemed the best method to explore consumer innovativeness towards SST adoption in an offline service context. This specific methodology takes into consideration testing, point by point investigation and a reasonable emphasis in order to explore and support the proposed conceptual model (see Figure 3.1).

Maybe the most grounded support of using qualitative in-depth interviews comes from Kerlinger (1986, p. 446) who concludes that "the best instrument available for sounding people's behavior, future intentions, feelings, attitudes and reasons for behavior would seem to be the structured interview." Such in-depth interviews allow a definite investigation of the innovation adoption process from the respondents' viewpoint in their own words (Hudson & Ozanne, 1988). This methodological approach gives a comprehensive conceptualization of consumer innovativeness towards SST adoption. Also, in-depth interviews have been observed to be an effective approach in previous consumer research (Amould & Price, 1993; Belk, Sherry & Wallendorf, 1988; Celsi, Rose & Leigh, 1993; Gremler, 1995; Parasuraman, Zeithaml & Berry, 1985; Schouten, 1991; Sirsi, Ward & Reingen, 1996).

3.2. Methodology

3.2.1. Sampling Approach

Unlike sampling for quantitative research, qualitative research does not necessitate that a sample be representative of the population as a whole (Gilly & Wolfinbarger, 1998; Holstein & Gubrium, 1995). "For the exploratory approach, sample generalizability is not even particularly meaningful" (Calder, 1977, p. 361). For this research, the desired sample was chosen to give variability in usage, knowledge and experience with SSTs in offline service context only, rather than online context. The definitive purpose of the sample is to evaluate the relevance of the proposed conceptual model and produce an extensive variety of variables that may influence the overall adoption process.

Purposive sampling was applied for the present qualitative research (Lincoln & Guba, 1985). Purposive sampling, also known as judgmental, selective or subjective sampling, is a type of non-probability sampling technique, where the sample is chosen based on the interviewer's judgement and previous experience (Pandey & Wali, 2010; Belk et al., 1988; Jorgenson, 1989). This sampling approach is also known as 'conceptually-driven sequential sampling' (Miles & Huberman, 1994) or 'theoretical sampling' (Glaser & Strauss, 1967). Additional respondents can simply be included as new interests or needs dictate. "Sampling for an active interview is an ongoing process; designating a group

of respondents is tentative, provisional and sometimes even spontaneous" (Holstein & Gubrium, 1995, p. 74).

3.2.2. Sample Selection

The principle criterion for the sample to be included in this study was to choose a sample with wide SST usage, knowledge and previous experience with SSTs. To accomplish this, co-scholars with adoption research backgrounds from a major Indian university were invited to participate. An adjusted snowball sampling technique was applied where many key informants recommended potential respondents who fit the basic requirements of this research.

Initial in-depth interviews were conducted in distinct stages to determine distinguishing respondent characteristics that were required in future interviews. Subjects for in-depth interviews were enlisted from different backgrounds. All respondents were chosen in light of their varying demographic and psychographic characteristics, mainly SST usage, knowledge and past experience. As the in-depth interviews progressed, variability in respondents' demographics and SST usage, knowledge, and experience was considered and further respondents were deliberately enlisted to produce a diverse sample (see Table 3.1). Of the 28 individuals approached, two declined to take part in the interview, one didn't complete it and one was not able to meet for the interview at the stipulated time. This resulted in a sample of 24 respondents. All respondents, at the end of their respective interviews, were given a surprise gift for their participation. The average time taken for an interview was 35 minutes. It took around half of the month to complete all these interviews.

In-depth interviews were continued until saturation or redundancy was accomplished in responses (Gummesson, 1988; Lincoln & Guba, 1985). The reiteration was realized after twenty four successful in-depth interviews. While 24 may appear to be a small number of respondents, McCracken (1988) suggests that eight respondents are enough for creating themes in a qualitative research. Miles and Huberman (1994) mention, "qualitative researchers usually work with small samples of people" (p. 27). This is also supported by Barczak, Ellen, and Pilling (1997, p. 132), who state "by the 13th interview, common themes were emerging and responses were becoming redundant." There are studies in the past that have considered around twenty respondents (Gremler, 1995; O' Guinn & Belk, 1989), and there are a few others that have included even less than fifteen (Barczak et al., 1997).

3.2.3. Interview Format

Each of the interviews started with a brief clarification of the purpose of the study. The interviews investigated current use of SSTs, researched why a respondent utilized some technologies and not

others, explored what variables affect SST adoption, and also the general technology adoption process identifying with different SSTs in offline service contexts.

Table 3.1: Qualitative in-depth Interview Respondents

Initials	Age	Gender	Marital Status	Education	Occupation
AK	32	M	Single	PG	Service
RS	54	M	Married	UG	Service
APS	62	M	Married	UG	Retired
MS	43	F	Married	Some college	Service
SKK	56	M	Married	Higher secondary	Service
BK	23	F	Single	PG	Student
RKS	31	M	Married	PG	Service
AKK	32	M	Married	Ph.D.	Student
RC	35	F	Married	PG	Service
AM	25	F	Single	UG	Preparation
RK	27	F	Single	PG	Service
PS	31	M	Married	Diploma	Service
MR	47	M	Married	Some college	Business
MK	52	F	Married	Diploma	Service
AT	30	F	Single	Ph.D.	Service
DJ	26	F	Single	PG	Student
NJ	26	M	Single	PG	Student
YJ	29	M	Single	Ph.D.	Student
AKA	32	M	Single	Ph.D.	Student
DS	27	F	Single	PG	Business
JKN	38	M	Married	Ph.D.	Service
IK	28	M	Married	PG	Service
BA	23	F	Single	UG	Preparation
VK	58	M	Married	Senior secondary	Business

Sample size = 24

In order to confirm that each of the interviews was in view of the same set of SSTs, sample respondents were given a list of specific SSTs presently accessible in banks, retail stores, hotels, airports, etc. Table 3.2 demonstrates a list of these SSTs utilized for the interview process alongside their details given to respondents. These SSTs were picked in view of their differed level of consumer use (Meuter & Bitner, 1997). All respondents primarily sorted these SSTs into two categories: SSTs

they had used earlier and those they had never used. Such sorting of SSTs benefited in two ways: first, identification of widely and poorly adopted SSTs could be done, and second, it allowed for more focused interviews in terms of questions to be asked.

An attempt was made to examine as many of the total SSTs as possible in every interview, with most interviews covering 8-10 of the SSTs. During the interviews, both categories of SSTs (previously used and not used by the respondents) were talked about. The same series of questions were asked for each SST. Respondents were initially asked about their present utilization of a particular SST. Thereafter, they were inquired about their adoption decision process for each SST. The interview questions also centered on what factors affected their adoption of a given SST. Despite the fact that prompts were given, the intent of these qualitative in-depth interviews was to get responses in respondents' own words about their SST adoption process. By emphasizing numerous SSTs in every interview, the extent of the information gathered during each interview was expanded. Each interview lasted about 35 minutes.

An interview guide was prepared and used to direct the overall interview process (see Table 3.3). This interview guide was flexible enough to investigate interesting knowledge all through the interview. Using an active interview methodology (Holstein & Gubrium, 1995), new questions and directions were included and investigated as the interviews progressed.

An active interview provides general structure while avoiding the inflexibility of a pre-determined series of questions. Holstein and Gubrium (1995) stated, "the active interview is a conversation, but not without a guiding purpose or plan" (p. 76). An interview guide gives an arrangement of questions that might be completely used in every interview. The common rule of thumb in an active interview methodology is to let the respondents' answers decide how nearly the interview parallels the interview guide. After evaluating every response, the interviewer decides what to ask next and whether specific questions are essential.

At the end of every interview, respondents provided important information on their demographics (e.g. age, gender, education level, marital status and occupation). As a final step in the interview process, all respondents were once again informed about the overall purpose of the study. During the same time, questions and concerns raised by respondents were also addressed. All in-depth interviews were initially tape recorded and later interpreted into text format. Tape recording the interviews permitted the interviewer to enhance the quality of communication by maintaining eye contact and taking notes of points of interest and non-verbal cues. Interpretation to text format allowed for a more definite investigation of the remarks made amid the interviews.

Table 3.2: SSTs used amid the in-depth Interviews

SSTs	Description
Automated airline check in	Allows customers to check themselves in for a flight and generates a seating assignment; available in airport terminals and are used instead of checking in with a ticket agent at the main counter or gate.
ATMs	Allows customers to access bank accounts through free-standing machines which require a bank card and access code or PIN.
Cash deposit kiosk	An ATM-like machine that allows customers to deposit cash directly into their accounts with/without using an ATM-debit card.
Cheque deposit kiosk	A self-service terminal that enables a customer to deposit cheques without any manual intervention of the branch officer.
Pass book printing kiosk	Allows customers to update their passbooks with information regarding transactions in their savings accounts, recurring deposits and PPF accounts through the facility round the clock, even after branch timings.
Automated hotel check-in and check-out system	Allows hotel guests to check-in and check-out from the hotel using the television set and remote control in their room.
Touch screen ordering	Allows customers to place orders with a modified cash register by touching a screen that displays possible selection options.
Self-scanning of purchases	Allows customers to scan barcodes on their own merchandise at an organized grocery or retail store and pay with a debit/credit card.
Bill payment kiosk	Allows customers to pay utility bills and resolve service problems via cash, check, or credit card.
Automatic vending machines	Touch screen based kiosks, providing various products by making a payment either with cash, credit/debit card or smartcard.
Self-dispensing system	Customers are provided the option of refuelling their vehicle either through pre-loaded automation tags or manual option by feeding the quantity to be dispensed by the dispensing unit.
Interactive kiosk at railway station	Provides required information, and helps passengers/travellers to get familiar with all the facilities available.
Automatic prescription service	Allows customers to order medical prescription refills, place orders or request medical information by following computerized prompts and using a touch tone telephone.
Automatic queue management system	Allows customers to choose from various services and based on his/her selection, generates a token with details such as counter number, waiting number, etc.

Table 3.3: Interview Guide for Qualitative in-depth Interviews

	Open-ended questions
For SSTs the respondent has used before	Describe in your own words how often you have used this SST? Are you aware of any of these SSTs? When you first became aware? What were the primary sources of information? Tell me about the first time you used the SST. Have you ever used it since then? Why? How did you decide whether or not to adopt the SST? Was there anything that encouraged you or prevented you from adopting it? If you were confronted with the need for this service, which service delivery option would you like to choose? Will you choice influence in case of (i) high waiting time, and (ii) overcrowding situations?
For SSTs the respondent has not used before	Tell me about when you first became aware of any of these SSTs? What happened after you became aware of this SST? How and why did you decide to avoid it or not to use it? What are the main reasons prevented you from adopting it? Is there anything the service provider could have done to encourage you to use the SST? Tell me about the intention of you ever using this or any other SST, not mentioned here. Why?

3.2.4. Data Analysis

Examination of qualitative responses is challenging. "The most serious and central difficulty in the use of qualitative data is that methods of analysis are not well formulated. For quantitative data, there are clear conventions the researcher can use. But the analyst faced with a bank of qualitative data has very few guidelines" (Miles, 1979, p. 590). Miles (1979) even defines it as "a mysterious, half-formulated art" (p. 593). Generally, the examination procedure is intended to take raw data in order to create a few common themes, and produce conclusions or create meaning in light of these themes.

Although there are different ways to examine qualitative responses, yet most of these methods incorporate a few common crucial activities. According to Holstein and Gubrium (1995), "Analysis amounts to systematically grouping and summarizing the descriptions, and providing a coherent organizing framework that encapsulates and explains aspects of the social world that respondents portray" (p. 79). Spiggle (1994) provided four inferential processes of: (i) categorization; (ii)

abstraction; (iii) comparison; and (iv) refutation that link the final result of research to its data. The aforementioned four processes have been used to direct the data analysis for this study. Using each of these processes, the researcher organizes data, extracts meaning, arrives at conclusions and supports or disputes conceptual frameworks (Spiggle, 1994).

Although each of the above mentioned processes will be discussed independently, they are really interdependent in the investigation procedure. Beginning with the gathering of responses from the first respondent, each of these steps is intertwined with the other. The whole gathering of information and coding procedure is accomplished through a repetition of these processes. An examination of early responses highlighted the need for further questions to be included in upcoming interviews (Schouten, 1991). Furthermore, examining responses amid the collection process makes information collection very convincing and strengthens the definitive conclusions drawn from the qualitative research.

As mentioned earlier, the initial phase in qualitative data analysis is categorization. This has been characterized as the procedure of grouping or labeling units of responses (or data) and is ordinarily referred to as coding (Spiggle, 1994). For this, the researcher verifies that units of data belong to, or represent, a certain category of interest. These units of data were organized into categories on the basis of their similitude (Lincoln & Guba, 1985). Generally, the unit of investigation may fluctuate between couple of words to a whole passage. This is practically equivalent to a cluster analysis or a factor analysis of grouping various items together. This procedure has also been termed 'unitizing' (Lincoln & Guba, 1985; Miles & Huberman, 1994). "When you're working with text or less well organized displays, you often note recurring patterns, themes, or 'gestalts,' which pull together many separate pieces of data" (Miles & Huberman, 1994, p. 246).

The second phase in this qualitative data analysis is abstraction based on the preceding categorization process (Spiggle, 1994). In this phase, empirically grounded categories are collapsed into higher-order theoretical variables which goes beyond the simple identification of patterns. Already recognized categories are grouped into broader, applied classes. It might be a variable from the primary model, or a new variable may develop and be perceived as conceptually relevant. "Essentially, the method involves sorting units into provisional categories on the basis of 'look-alike' characteristics" (Lincoln & Guba, 1985, p. 203).

The third phase in this analysis is a comparison across distinct categories. The objective is to build up homogeneity within categories and heterogeneity between categories. Similarities are noted across units of data that seem to belong to the same category to confirm they do actually belong together. This attempt is an essential part of the constant comparative method (Glaser & Strauss, 1967).

The final step in this qualitative analysis process is refutation. This comprises intentionally challenging evolving implications to confirm their importance. This last step includes integrating a varied sample or intentionally looking for particular cases that may disconfirm the growing examination. It becomes critical to have the capacity to see additional evidence after a theme has been recognized and yet stay open to disconfirming evidence when it appears. This translates into maintaining suspicion all through the data gathering and analysis procedure, constantly looking for an optional clarification.

Thus, each of the above-mentioned processes (categorization, abstraction, comparison and refutation) were carefully included in this qualitative data analysis. Amid the response collection, initial categories were developed. Once all in-depth interviews were completed, the translated responses were read many times. After becoming familiar with all responses, repetitive themes and thoughts were recognized. While every respondent conveyed ideas differently, the examination included recognizing the similarities between responses. Key expressions were chosen to recognize repeating ideas and thoughts identified with the selection of innovative SSTs. These recurring ideas and themes were applied in order to support the proposed adoption process model and the various proposed determinants of adoption.

3.3. Discussion of qualitative results

The current section summarizes the results of the qualitative in-depth interviews. Each of the significant themes and constructs observed to be essential in the SST adoption process is discussed and supported with related quotes. Although every possible effort was made to examine the responses collected through in-depth interviews, such investigation of qualitative data is a subjective practice. All guidelines related with this type of qualitative analysis were followed carefully to deal with this subjectivity issue. The quotes indicated in the accompanying sub-sections were chosen in light of their capacity to support or represent a crucial issue that arose from the in-depth interviews. Results of the in-depth interviews are separated into two distinct sections. First, important quotes and a related discussion concentrating on the overall SST adoption process are provided. This examination of distinct adoption stages is followed by an intensive examination of the adoption stage at the end. Second, specific factors affecting the adoption of an innovative SST are detailed and supported with relevant quotes.

3.3.1. SST Innovation Adoption Process

The first fundamental aspect of these qualitative in-depth interviews was to investigate consumer innovativeness towards SST adoption. To this end, an innovation adoption process related to SSTs

available in offline service contexts is described. Respondents spoke in-depth about their use and knowledge of, and experiences with the adoption of innovative SSTs (see Table 3.3). Important quotes from the in-depth interviews for supporting each of the adoption stages are provided in upcoming sub-heads. Moreover, the discussion and accompanying quotes demonstrate crucial aspects of every adoption stage, and consumer perceptions regarding these stages of the SST adoption process. Each of the five stages in the innovation adoption process is discussed in following sub-sections.

3.3.1.1. Awareness

Confirming whether service consumers actually know about the availability of SST-based options in offline service contexts is a crucial first step, without which SST adoption is quite impossible. Unexpectedly, several consumers who consistently used various services within their service firms were not even aware of the various SST options that provided the same services. This fact is demonstrated by the following quote:

> "No, they have never at any point let me know about it when I purchase goods at any organized retail store and pay with my card. In fact, they have never informed about whether I can use it by myself or not. I thought it is only for their use. I think, if you really want to offer it for our use, you must put it in front rather than somewhere in back areas. Thanks for letting me know, otherwise I never knew about it."[4] (Self-scanning of purchases; MR, 47, M, Married, Business)[5]

> "They never let me know about it. In fact they never told me when I was experiencing the problems with the procedure of checking out a few days back. Their employees should have at least presented it once in front of me. Yes, I have heard about the automated hotel check-in and check-out system, but unfortunately, I don't know whether it is available in those hotels where I stayed for number of times." (Automated hotel check-in and check-out system; RS, 54, M, Married, Service)

It suddenly creates an impression that some organizations fail to even inform their consumers about the availability of various SST options. In fact, when told about them, many respondents were excited to use the various SSTs, but were not aware of them earlier. Although, for some of the other consumers, these SST options may not be seen without a clear marketing communication, as confirmed by the accompanying quote:

> I usually get information on services and facilities available in hotels either online through hotel websites or offline through outside boards in marketplaces. I don't think I ever heard about any self-service kind of options in hotels. In fact, during my stay at any hotel, I never heard about anything that allows consumers to

[4]To make this chapter ease to read, various quotes are shown in smaller typeface (Times roman, 11) as compared to text matter (Times roman, 12).
[5]Following every quote, the SST asked is given, along with the respondent's details as shown in Table 3.1

> place orders just by touching a screen that displays possible selection options. We usually place our order manually or telephonically. (Touch screen ordering; RC, 35, F, Married, Service)

Besides the significance of awareness, it is also interesting to note how service consumers become aware of the presence of SST options. For those consumers who were aware of the SST options, in-depth interviews demonstrated that most of them were aware because of their own personal sources such as family and friends. Hardly any respondent mentioned a company's promotional efforts as their main source of information. These in-depth interviews revealed many ways in which service providers could inform consumers about the accessibility of an SST. One appropriate way to inform them is during interpersonal experiences, as evidenced by the following quote:

> The cashier told me how to deal with the machine. Initially, I felt bad because I thought that cashier wanted to shift his responsibilities to kiosk, but when I reached there, I found all required information while interacting with kiosk. That was a good initial experience with that SST. (Cash deposit kiosk; AK, 32, M, Single, Service)

> One day, I was totally frustrated with the long queue in my bank. I was watching here and there, then an uncle standing just behind me said that I can use a kiosk to deposit the cheque. It was quite easy, and I immediately got a receipt as well. Actually, that kiosk returns a copy of cheque along with other details like data and time of submission. (Cheque deposit kiosk; BA, 23, F, Single)

Service providers are also capable of informing consumers regarding the accessibility and use of SSTs through signage within their firms. This can be confirmed by following:

> In banks, we usually got sufficient information about how to use an automated machine. In my bank, I found distinct signage for using different SSTs. For example, when we needed our passbook to be printed, it was very easy to follow the signs regarding how to place the passbook on the kiosk along with other activities to perform. It hardly took a few minutes to print many pages. (Passbook printing kiosk; NJ, 26, M, Single, Student)

Another way through which service providers may inform their consumers is link necessary information with promotional resources such as leaflets, monthly or quarterly newsletters, or send them text messages containing relevant information. These methods are supported by the following responses:

> I first time received a SMS regarding the payment of my bill by machine. Although. It was not quite impressive way, as I generally make my bill payments via online. But then I realized that firms are now providing many technology based services in addition with providing traditional service delivery options. (Bill Payment Kiosk; AKK, 32, M, Married, Student)

> They initially mailed me an online leaflet about their facilities and new services. After a few weeks, when I was booking my stay over there, I found quite similar information on their website. It was quite interesting to find many technology-based services available during my stay. (Multiple SSTs used in hotels, e.g. automated check-in and check-out kiosks, MS, 43, F, Married, Service)

It seems that in addition to firm marketing resources, a majority of consumers acquire information regarding various SST options from personal sources including family, friends and colleagues:

> I first time heard about it from my younger brother. His college is very close to our bank, and he generally goes there for such activities. (Passbook printing kiosk, AKA, 32, M, Single, Student)

> My son told me how to use it, as I thought it was difficult to handle for me. Today, I believe, my son-in-law can make a quicker transaction using it. (ATMs, APS, 62, M, Married, Retired)

Thus, ensuring consumer awareness regarding SST options is undoubtedly a crucial first step in the SST adoption process. The in-depth interviews highlighted the significance of the awareness stage and also revealed several ways to make consumers aware.

3.3.1.2. Investigation

Once consumers become aware that a specific SST is accessible, they can use it. The in-depth interview process established that service consumers, in most situations including the offline state, prefer to gather more information on the SST before using it. There is a strong connection between the first stage of awareness and second stage of investigation that can be demonstrated through the following quote:

> When I heard about the use of it, I found it quite interesting and easy to use. In fact, I saw many simple instructions given on signage regarding how to use it independently. But, once I started using it, it became difficult for me, therefore I immediately decide to call service employees rather than wasting my time. (Touch screen ordering; SKK, 56, M, Married, Service)

Consumers may gather information regarding the use of SSTs either through personal sources or firms' promotional efforts. However, it appears that potential users rely more on their personal networks (e.g., family, friends and colleagues) during the investigation stage than firms' promotional resources.

> Once I discussed about it with one of my friends who travels a lot. One day, I planned to visit one of the areas he had already visited, and I was to reach there late at night. So, I asked him about any good hotels at that place. He recommended to me a hotel which opened at night also, and maintained many useful kiosks 24*7. (Multiple SSTs used in hotels, e.g. automated check-in, check-out kiosks, Touch screen ordering, etc.; JKN, 38, M, Married, Service)

> I discussed with my senior regarding this because he usually travels two-three times a year. He told me that it was quite a simple and safe option to use. It saves time and is mostly preferred by people who have already experienced it. (Automated airline check-in; RK, 27, F, Single, Service)

A few consumers also preferred service employees as a source for collecting required information regarding SST usage.

> In case I was stuck somewhere, I would prefer to call service employees rather than wasting my valuable time. (Multiple Banking Kiosks; MK, 52, F, Married, Service)

> I would interact with a service employee directly if I found him free to deal with my problem. (Multiple Banking Kiosks; VK, 58, M, Married, Business)

In addition to consumers' personal sources and firm controlled sources, information regarding SST usage can also be found in many virtual social communities.

> I got more information about these SSTs through online social communities. One day, I discussed this matter in one of our virtual social group. I got many comments on the use or not use of technology based services. I found that youngsters with high social class and even students highly prefer SST usage (ATMs; AT, 30, F, Single, Service)

A passive way of investigation was also frequently mentioned during in-depth interviews. For several service consumers, aggressively looking for SST-related information was not much appealing. However, listening to individuals discuss SST usage emerged as an effective way of information gathering that encouraged them towards SST usage.

> I am not an innovator, as I usually wait for others to adopt a specific technology. My friends in general encourage me to use an innovative technology like it. (Automatic Ticket Vending Machines; IK, 28, M, Married, Service)

> I feel hesitant while using any innovative technology, mainly in front of others. I prefer to use it after others have. I like to observe what kind of responses other people had. (Bill Payment Kiosk; AM, 25, F, Single)

Thus, it is important for service providers that along with basic SST awareness, they offer necessary information regarding SST usage. It seems that potential users required more information to investigate how to accurately use an SST option. It can then be said that consumers require more information in the investigation stage as compared to the awareness stage. This information benefits to develop consumer opinions regarding the SST which are discussed in the following section.

3.3.1.3. Evaluation

In light of the revelations from in-depth interviews, it seems that service consumers develop a few evaluative judgements regarding the SST before deciding whether or not to adopt it. On the basis of their investigating efforts to acquire more knowledge about SST usage, they evaluate the SST options more comprehensively before using for the first time. In several quotes, the significant association between SST evaluation and trial is clearly evident.

> Initially, I thought a self-service type of thing is not necessarily required. Yes, I was aware of the several self-service options in different sectors. I saw that people really preferred these services either just for a change, or in some specific situations like trying to avoid waiting time. I then realized that I should also try some of them. I asked my friends and colleagues, and based on their opinions, I decided to use it next time. (Self-dispensing system at the pump; RKS, 31, Mal, Married, Service)

It is during the evaluation stage that potential users seem to decide for the first time whether to use an SST. In previous stages, a lack of awareness, or even lack of interest may have prevented SST usage, but, the choice to use an SST or otherwise was not made; the choice was only avoided. However, in the evaluation stage, numerous service consumers clarified why they deliberately chose not to use an SST:

> I once looked at it and read all instructions about how to use it. But, I was not sure if it would work. At the festival time, it's really not easy to try new things about which you don't have sufficient information so I decided it wasn't for me at least this time. (Automated airline check-in; PS, 31, M, Married, Service)

> On the basis of my past experiences and evaluation, I can say that it usually does not work and creates a lot of frustration. So it's better to know about things in advance instead of waiting to use them at the last hour. According to me, such things irritate me and therefore I don't want to use it. (Interactive kiosk; BK, 23, F, Single, Student)

On the basis of the in-depth interviews, it can be said that a negative evaluation of the SST ends the SST adoption process immediately. On the other hand, a positive evaluation drives potential users towards the final two behavioral stages of the adoption process. These two behavioral stages of trial and adoption are closely associated and will be discussed collectively in the next section.

3.3.1.4. Trial and adoption

In these two behavioral stages (trial and adoption), potential users adjust their ways to deal with the self-service options. Here, change in consumer behavior is important for SST use and firms need to aim towards inducing such behavioral changes for successful SST implementation. It is clear from the

evaluation stage that a positive evaluation will ultimately lead to trial of an SST, where trial is characterized as first time use of the SST.

> After getting good response from others, I decided to try it. Although I knew it can be easily used for withdrawing cash, but when they (my friends) said it is even good for quick money transfer, I thought I should try it at least once. (ATMs; YJ, 29, M, Single, Student)

> I heard a lot about it and realized that it is a really simple and nice way to deal with a large number of customers. So I used it for the first time. Sometimes, we move here and there, and when we finally get a long queue, after some time we realize that we are at the wrong place. So it's better to use it in those situations. (Automatic queue management system; DJ, 26, F, Single, Student)

> Yes, of course it's better to conduct some personalized training programmes, if required. At least for first time users and even for those who usually complain about using SSTs. (Automatic queue management system; DJ, 26, F, Single, Student)

The trial stage plays a significant role in the overall adoption process. Previous experience has a basic and important association with further SST adoption. After experiencing any SST for the first time, potential users are able to build their perception towards real SST usage which helps them decide whether the SST is appropriate for adoption.

> When I tried it first time, I felt really good. I'll definitely try it again whenever I have a chance. But as you know, it is available only in select organizations, so we can use it only where it is available. (Automatic queue management system; DS, 27, F, Single, Business)

> I remember when I actually used it for the first time, I noticed that the money transfer was done instantly. I immediately got a text message to confirm the service completion as well. I was really happy because we can't get such immediate response from a service employee. He/she will definitely require more time to execute such activities. (ATMs; YJ, 29, M, Single, Student)

> It was almost frustrating for me when I used it first time. It was not even showing the instructions clearly on its screen, and I ultimately had to call the next person available. That person was a guard, and he also didn't know how to use it. Then I decided to pay my bill online as usual. (Bill Payment Kiosk; AKK, 32, M, Married, Student)

Thus, to ensure that a specific SST is used again and again after the initial trial, it is really important that the SST trial provides a good positive experience.

> Yes, obviously it must have been a good trial for continued using it. (Automated hotel check-in and check-out system; RS, 54, M, Married, Service)

On the other hand, a good first trial experience can also be contrasted with following quotes from those respondents who did not enjoy their first time SST usage.

> It was festival time when I first used it. Due to two consecutive holidays, I didn't have another option, so I tried it. Unfortunately, I was completely stuck when I saw a long queue in front of it. I immediately wanted to avoid it, but as I said it was the only alternative at that time. After waiting for around half an hour, I found it out of order. (ATMs; BK, 23, F, Single, Student)

> I had a bad first experience with it. So the next time, I will try to catch someone (service employees) to serve my purpose instead of using it again. (Bill Payment Kiosk; AKK, 32, M, Married, Student)

However, a good trial experience leads to continued use of a specific SST, a few interview quotes represent adoption is far away from it. Whereas, majority of respondents showed that they would like to adopt a SST based on their initial trial, but initial trial does not mean using it only first time. Instead initial trial refers to using a SST a few times. It seems that multiple positive trials are required before consumers adopt an SST.

Even then, it is not easy to understand adoption in terms of number of trials or number of times SST is used by the consumer. Therefore, instead of incorporating 'repeated use' and 'commitment' stages in the SST adoption process, respondents in the current study were directly asked whether they had adopted a given SST. Based on their responses in 'yes' or 'no', they were classified into one of two groups - those who adopted the SST and those who did not.

In summary, the examination of the in-depth interview quotes identifying with the SST adoption process demonstrates that service consumer's advance through five distinct adoption stages (see Figure 3.1). Every stage seems to be a crucial one to be focused before progressing to the next. Anytime during the SST adoption process, consumers may choose to reject the SST-based service delivery option. Here, in-depth interview confirms the continuity among all these adoption stages:

> My son once told me about the benefits of using it (awareness). At that time, I didn't have a clue about the multiple services offered by it. It was to some extent unbelievable for me as my son mentioned that all these services were accessible at the same time in one single attempt. To confirm it, I asked my branch managers about the same and I in fact asked a few additional things such as security issues, any hidden cost, etc. (investigation). Based on his information, I realized that it might be useful to me as well (evaluation). I immediately decided to try it at least once (trial). Yes, I have thereafter been using it for the last few years (adoption). (ATMs; SKK, 56, M, Married, Service)

3.3.2. Predictors of adoption

Along with the SST adoption process, the in-depth interviews also explored which crucial variables affected the adoption of SSTs in an offline service context. The proposed determinants of adoption are once again supported with several quotes presented in this section. Three key determinants (SST characteristics, user characteristics and consumer innovativeness variable) are examined in the next sub-sections.

3.3.2.1. Perceptions of the SST characteristics

The comprehensive examination of variables affecting the adoption of various SSTs offers support for the proposed conceptual model of this study. Various quotes confirm the effect of all four variables - perceived usefulness, perceived ease-of-use, complexity and perceived risk on intention of adoption. Of these four variables, PU and PEOU positively affect SST adoption (Davis, 1989, Davis et al., 1989), whereas complexity and perceived risk have a negative effect on intention of adoption (Kaushik & Rahman, 2015a, b). The effects of each variable included in this study will be broadly discussed in Chapter 4.

- Perceived usefulness

A majority of respondents clearly mentioned that for a specific SST to be voluntarily chosen, it must offer strong benefits over employee-based services option. Thus, SSTs will be highly adopted when they are perceived to deliver additional advantages over other service delivery options.

> I would be happy to choose it, as it is really useful, handling many services independently. Almost, all services provided by it make it valuable and most widely adopted. I am not surprised with its wider acceptance by individuals. As for me, I will definitely adopt any technology that is useful to me. (ATMs; AT, 30, F, Single, Service)

> Yes, anything that is useful to us will be highly adopted. I have used it hundreds of times just because it is really useful and can be accessed any time, any place nowadays. ATMs; SKK, 56, M, Married, Service)

On the other hand, a few respondents specify that if any SST does not deliver benefits to them, they will hardly be encouraged to adopt it. In fact, they would either reject, or avoid it.

> I'm actually not scared of any specific SST. I just believe that sometimes a specific SST provides several benefits and becomes highly adopted like ATMs. Contrarily, some SSTs fail just because they do not serve the intended purposes and are not perceived as useful as highly adopted ones. (Multiple banking SSTs; BK, 23, F, Single, Student)

- Perceived ease-of-use

In consistency with past adoption research (Curran & Meuter, 2005), majority of respondents perceived 'ease-of-use' as one of the crucial SST characteristics. As evidenced by several quotes, any SST, if brings along perceived ease-of-use with usefulness, will be highly adopted.

> If we compare highly adopted SSTs with poorly adopted ones, we will see highly adopted ones (e.g., ATMs) are perceived easy to use as well as useful by majority of individuals. (ATMs; YJ, 29, M, Single, Student)

Several interesting facts emerged from in-depth interviews with a few highly experienced respondents. For instance, the SST adoption decision becomes more complex if any SST is perceived useful, but not ease of use or vice-versa, as stated in following quote:

> For me, it was easy to use as I had good trial experience, but I am not using it because it's really not useful for me as I hardly travel. One of my friends having his own business doesn't find it ease-of-use, although that option is really useful for him for domestic travelling at least. In the end, we both do not use it. (Automated airline check-in; RK, 27, F, Single, Service)

- Complexity

In-depth interviews suggest that an individual's perception regarding the complexity of an innovative SST negatively affects the intention of SST adoption. In fact, for many respondents, the complex nature of a specific SST discourages them from its adoption.

> Anything with complexity in use will be avoided by anyone. For me, if something is hard to handle, even in front of others, I will definitely not touch it. (Multiple SSTs; MS, 43, F, Married, Service)

> Everyone will laugh at me, if I am not able to complete a task on a complex machine or SST. I will be happier to prefer a service employee over an SST in such a situation. (Multiple SSTs; AM, 25, F, Single)

Sometimes, a specific SST is perceived as easy to use by some consumers while being perceived as difficult to use by others. This is clear from the following quote:

> Using it just by following instructions given on screen is really easy. In fact, I like it most when its voice system properly works. (ATMs; YJ, 29, M, Single, Student)

> It wasn't really easy to follow commands given by the system until the commands were displayed on screen. (ATMs; BK, 23, F, Single, Student)

These altered evaluative judgements about the same SST reveal differences in perception across users or possible difference in the quality of SSTs available in different banks.

- Perceived risk

The perceived risk is another SST characteristic integrated into the proposed model on the basis of literature reviewed in Chapter Two and qualitative in-depth interviews in this chapter. Numerous kinds of risks related with SST adoption were deeply discussed with all the interviewees. Few important quotes are presented here which reveal the crucial role of this construct in the study.

> For me, providing debit/credit card details to any machine is potentially dangerous, and so I feel hesitant in doing so. (Bill Payment Kiosk; AKK, 32, M, Married, Student)

> It has become a critical issue recently because of several news pieces, or rumors of frauds on several occasions. So I have serious concerns about it. (ATMs, APS, 62, M, Married, Retired)

On the other hand, other respondents do not show the same concerns regarding the risks associated with using an SST.

> I don't think it's a big issue nowadays. I guess almost all service providers, especially those dealing with financial transactions, are using several safeguards in order to avoid these frauds. (ATMs; YJ, 29, M, Single, Student)

> I'm really not worried about the security concerns, at least in case of offline services. I may have some minor issues when dealing with someone online, you know, using a credit card and submitting details over a website. But providing similar details offline doesn't bother me. (Multiple SSTs used for financial transactions, e.g. bill payment kiosk; AT, 30, F, Single, Service)

In addition, another risk perceived with the use of an innovative SST is the uncertainty whether the SST would work timely and accurately.

> I was quite suspicious about it. I thought, is this really working? Should I use the same or call someone? (Automated hotel check out; RC, 35, F, Married, Service)

On the basis of various quotes discussed here, it is quite clear that service consumers definitely consider various SST characteristics when choosing SSTs over a service employee. While several of these perceptions might not be based on respondents' own experiences, the findings can't be ignored in today's competitive scenario.

3.3.2.2. Perceptions of the user characteristics

Besides consumer perceptions of above-mentioned SST characteristics, various characteristics of potential users were also expected to affect SST adoption. Qualitative in-depth interview provide sufficient support for the four select user characteristics which include: i) technology anxiety; ii) previous experience; iii) subjective norm; and iv) need for interaction. All the four user characteristic

variables were explored through a systematic literature review in Chapter Two and in-depth interviews. All four variables are discussed and supported with some important quotes in the upcoming sub-sections.

- Technology Anxiety

Not surprisingly, a majority of respondents specified that feeling relaxed with an innovative SST is a significant aspect of SST adoption. Some respondents who were slightly scared of using an innovative SST were found to be less interested in adopting it. In fact, with widely accepted SST options, a few respondents showed anxiety when asked to use them.

> OK, I agree, I was a little scared as my card was stuck in it. (ATMs; BK, 23, F, Single, Student)

> There might be an incident when you are stuck with the situation, but yes, it definitely discourages you towards adopting an innovative SST, especially when you have other options as well. I would not like to use it again and again, once I lose my confidence in it. (Bill Payment Kiosk; AKK, 32, M, Married, Student)

Contrarily, a few respondents who found an SST useful and ease-of-use, mainly amid trial, were much more comfortable with various self-service delivery options.

> I personally know a lot of my friends and colleague who really enjoy with machines, and prefer technology over employee-based service options. They find a technology-based option time saving and much easier to use. (Multiple SSTs; AKK, 32, M, Married, Student)

Some respondents also specified that service providers or designers must design an innovative SST in order to reduce user feelings of anxiety.

> As I have already mentioned earlier, highly adopted SSTs are those which are perceived useful and ease-to-use by majority of potential users. Actually, a user-friendly SST will be more preferred by most of us, as it increases comfort level, and simultaneously reduces one's feelings of technology anxiety. (ATMs; YJ, 29, M, Single, Student)

- Previous Experience

Past literature shows that previous experience of using existing technologies will affect the adoption of new technologies (Curran & Meuter, 2005). In fact, experiencing a highly adopted technology (e.g., ATMs) will also create a favorable impression towards poorly adopted ones (e.g., phone banking). These findings were supported by many respondents during qualitative in-depth interviews.

> I always somewhat thought it was easy to understand because it's very much like an ATM (pay at the pump; SKK, 56, M, Married, Service)

I am confident to use it, since I've already used similar things like a cash deposit kiosk. (Bill payment kiosk; AK, 32, M, Single, Service)

On the other hand, people with less experience associated with existing technologies found new technologies difficult to use.

I never used it, in fact, not even similar technologies. For me, it's better to avoid it, until I use a simple technology that is already adopted by others. At this age, I found I have missed the opportunities to use several SSTs as I always preferred service employees over a machine. (Bill payment kiosk; APS, 62, M, Married, Retired)

- Need for interaction

Need for interaction variable was found in literature, but not included in our proposed model prior to in-depth interviews as a key determinant of SST adoption. From the in-depth interviews, it is found that interactions with service employees are really important to some respondents, especially in an offline service context where both service delivery options (SSTs and employees) are available. Here, a need for interacting with service employees seems to be an important aspect as stated in the following quote.

If I have both service delivery options, I mean SSTs and employees, I would definitely like to interact with employees, even if I have a chance to use a machine (SST). Interaction with service employees will also improve my confidence to deal with an innovative SST. (Bill Payment Kiosk; AKK, 32, M, Married, Student)

Employees are perceived to be more capable of providing superior consumer services in distinct situations. It usually happens when a consumer needs additional usage information, any assistance from experts or better understanding of the system. In such situations, consumers perceive employees to be a much better option over an innovative SST.

I would be happier talking to someone with me just to ensure that it's going to work or not. In case you're making any financial transaction with your card, it's better to have someone authorized with you. Don't know, but I'll feel hesitation, if I am using it alone. (Self-dispensing system; RS, 54, M, Married, Service)

I maybe wouldn't use it. It's different type of transaction where I would definitely require an expert, at least for the first few times. I wouldn't feel that I could have an expert's opinion from a machine. I'd prefer human interaction only (Multiple SSTs involving financial transaction; RC, 35, F, Married, Service)

On the other hand, several respondents with low levels of need for interaction prefer SST options as an alternate to avoid employees amid a service transaction. This is an interesting and significant finding for many service providers who have invested a lot in implementing various SST options.

> Even in well-organized retail stores, most of the checkers are not consumer friendly. They're talking to others sitting on another counter, and usually creating delays in service transactions. It just appears I could do the same thing. (Self-scanning of purchases; YJ, 29, M, Single, Student)

> I really don't like waiting for my turn, especially when a service employee is talking to somebody else, or says there is a problem in our system. I simply wish I could handle the same system. (Cash deposit kiosk; AK, 32, M, Single, Service)

- Subjective norm

In addition to a need for interacting with service employees, there is another kind of need for interaction with other members of society. In light of in-depth interviews and also according to the rational behavioral theory, this need for social interaction appears to be a powerful force capable of affecting the adoption decision. The need for social interaction, also called as subjective norm, is an individual's understanding of what behavior would be approved or disapproved by those important to the individual, thus influencing his or her decision to perform or not perform the behavior in a given situation. Since social contact enables greater exchange of information with a personal touch in an offline service context, this study included the variable as a key determinant of adoption. This is also supported by many respondents as evident by the following quotes.

> I am that kind of person who can't seat quiet, you know without talking to someone sitting next to me. (Automated airline check in; RK, 27, F, Single, Service)

> I would prefer talking to someone who had already used it several times. I like talking to others, especially to get new insights about new things like a new technology. (Bill Payment Kiosk; AM, 25, F, Single)

Many respondents believed that there is no need to talk with anyone including service employees. They even preferred using an SST independently.

> Using it with the help of others seems quite strange, I really don't think we need someone to help or to get knowledge about how to use it. It's really simple to use, in fact, technology developers nowadays provide user-friendly machines, and all instructions are usually written on, or given by the machine itself. We just need to follow those instructions. It's quite simple, you know! (ATMs; MS, 43, F, Married, Service)

Based on the above discussion, it appears that all the four user characteristic variables incorporated in this research affect SST adoption in an offline service context. However, they might have different effects on SST adoption as reported in past research.

3.3.2.3. Consumer innovativeness variable

The last variable affecting the adoption decision which was supported by qualitative in-depth interviews was the consumer innovativeness variable. Although this variable has been widely explored

in innovation adoption and diffusion research (Kaushik & Rahman, 2014), the researcher in this study explores its distinct role as a mediating variable which is discussed in Chapter Four. Respondents were not directly questioned about this innovativeness; various quotes supporting the critical role of this variable clearly specified its significance in the SST adoption process.

> I know some of my friends who are really innovative, you know they easily start using any kind of machine, like once we all friends went on a trip. During our stay at one of the most prestigious hotels, I noticed my friends were much more familiar with many of the SSTs you are talking about. I think they have a high level of innovativeness than me. (Multiple SSTs used in hotels; AKK, 32, M, Married, Student)

For several of the respondents, their innovativeness towards SST adoption encouraged them to use different SSTs.

> I found out it was like simply put your card in and select 'yes', and start pumping your gas. It's really fine, I enjoy such kind of machines. In fact, I feel even better when I use innovative things rather than following a traditional way of delivering services. (Self-dispensing system; YJ, 29, M, Single, Student)

> It is quite simple as it was a matter of couple of clicks on the screen and you easily got to review your bill. It brought up your bill on that screen and then encouraged you to go further. It is very simple, direct and not a complex process. Whenever I find such technologies, I feel excited to use them. (Automated hotel check out; PS, 31, M, Married, Service)

Consumer innovativeness is considered as a propensity or tendency to adopt an innovation (Kaushik & Rahman, 2014). On the basis of qualitative in-depth interviews, it can be said that respondents' tendency to be attracted towards distinct SSTs is considered their innovativeness.

3.3.2.4. Situational variables

In addition to all three kinds of determinants (SST characteristics, user characteristics and consumer innovativeness variables), the in-depth interviews also support a few crucial situational variables to be included in this research as moderating variables.

- Waiting time

Most of the respondents believed that their adoption decision may vary depending upon the situation. Past adoption studies as well as this in-depth interview analysis support that waiting time variable is one of the most crucial, especially in an offline service context.

> I would obviously like to use it (SST), if there is a long queue in front of service employees, and I will have to wait for so long for their (employee) services. (Multiple Banking Kiosks; VK, 58, M, Married, Business)

Although, I prefer employee-based services because he/she is already available, but yes, in case he/she is really busy, or not responding to my request timely, I would definitely choose another option. (Multiple SSTs; BA, 23, F, Single)

I know, at least for me, it's never easy to deal with an innovative kind of technologies as you mentioned a list of numerous SSTs. I am usually visiting my bank, in fact, now I know almost everyone working over there. Due to this, I hardly wait there. But, if the situation is different, you know, if somebody takes more time to serve, and we have another quick service delivery option available, then what's wrong with using that option? (Multiple SSTs; MK, 52, F, Married, Service)

- Crowding

In addition to waiting time, the in-depth interviews support crowding as another crucial situational variable to be included in this research. According to many respondents, crowding creates frustration in the mind which in turn influences their selection of a service-delivery option in the presence of several alternative options.

I was once again stuck in a complicated situation when I visited my bank after a two-day bank holiday. The banks were like a 'mandi' (local crowded market) where hundreds of people were in queue. I for the first time saw so many people together in a bank. It was very frustrating for me as I wanted to deposit some cash to my brother's account. I waited for an hour yet it was looking like service employees were not even capable of serving all of us. Although I took a little bit of time, but then I decided to use it. (Cash deposit kiosk; BK, 23, F, Single, Student)

I may wait for my turn, it's natural. But I need proper queue management. Due to overcrowding, sometimes we may even get confused regarding the right service counter. It is important that the right person serves us. (Passbook printing kiosk; NJ, 26, M, Single, Student)

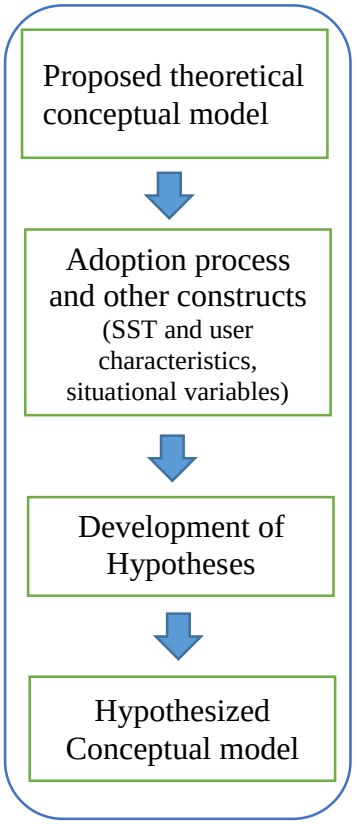
Summary

This chapter explains the qualitative research approach applied in the present study. To begin with, qualitative research was introduced and justified as an appropriate approach for this research. The in-depth interview methodology was also established as an appropriate methodology for this qualitative research. Subsequent sections described the sampling and data analysis plans along with the interview format used. Findings of this qualitative research were broadly discussed and key variables of the proposed conceptual model supported with illustrative quotes. All variables included in this study were based on the literature reviewed in Chapter Two and also supported by qualitative in-depth interviews reported in this chapter. Chapter Four will describe the proposed conceptual model and hypotheses development among the select variables.

Chapter 4

Conceptual Model and Hypotheses Development

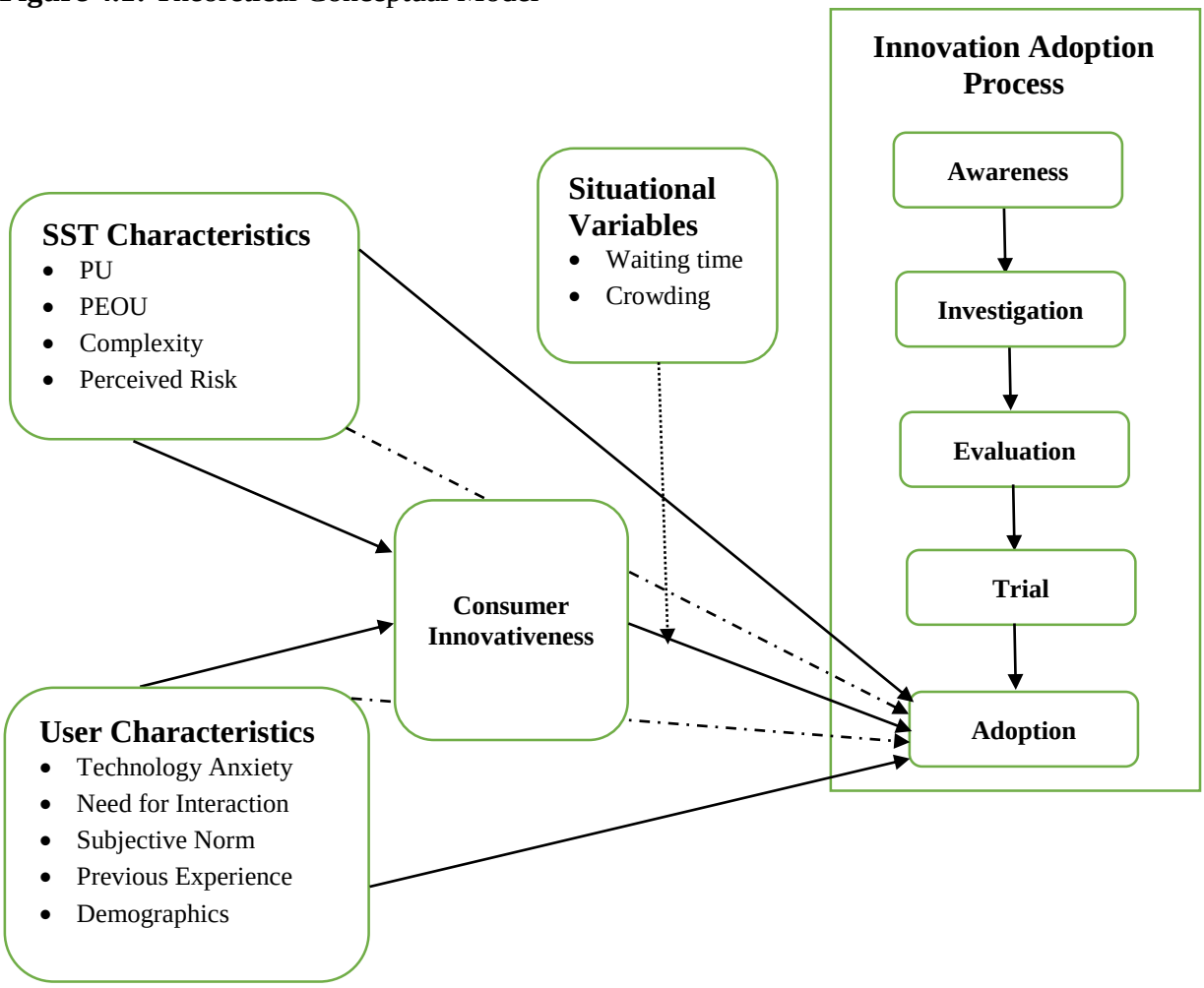
The primary objective of this research is to examine the crucial variables that influence the SST adoption by consumers in an offline service context. The initial section of this chapter is intended to develop and propose a theoretical conceptual model of consumer innovativeness towards SST adoption, comprising the basic technology adoption process, and important determinants of SST adoption. The proposed model was developed on the basis of systematic literature reviewed in Chapter Two and the qualitative research presented in Chapter Three. Another section of the chapter details the development of various hypotheses.



4.1. The conceptual model

The theoretical conceptual model, as shown in Figure 4.1, outlines consumer innovativeness towards SST adoption in an offline context. Key determinants of SST adoption are also demonstrated. The proposed model shows various associations among the variables included in this study. All these associations were hypothesized based on the systematic literature review in Chapter Two and the qualitative research presented in Chapter Three. The overall model is a comprehensive form of diverse literature related to consumer innovativeness and SST adoption. The model consists of two different portions, each of which will be described here.

Figure 4.1: Theoretical Conceptual Model



The first part, which falls on the right side of the model, consists of the five general stages of the innovation adoption process - Awareness, Investigation, Evaluation, Trial and Adoption. The left side of the model lists variables considered as determinants of SST adoption. All these crucial adoption determinants are further divided into three sets: i) consumer innovativeness; ii) SST characteristics (perceived usefulness, perceived ease-of-use, complexity and perceived risk); and iii) user

characteristics (technology anxiety, need for interaction, subjective norm, previous experience and demographics). Two situational variables (waiting time and crowding) have also been included as moderators between consumer innovativeness and intention of SST adoption. This study explores 'consumer innovativeness' as a mediator between various determinants (SST characteristics and user characteristics) and intention of SST adoption. Each of these elements of the proposed conceptual model will be discussed below.

4.1.1. The Adoption Process

The innovation (e.g. SST) adoption process is conceptualized as a progression of five distinct stages a consumer will progress through when choosing whether or not to normally utilize the SST. This adoption process starts with the awareness of the accessibility of the SST, and ends with commitment to adopting (or using) the SST. This SST adoption process involves three distinct phases: i) cognitive phase - awareness and investigation; ii) affective phase – evaluation; and iii) behavioral phase – trial and adoption. The initial stage - awareness - is when the consumer first comes to know about the SST's accessibility in the market. This awareness can be created through an organization's promotional/communication efforts (e.g., advertising, promotions, and consumer education), or individual sources (e.g., word-of-mouth publicity) (Sadh & Agnihotri, 2010). The awareness stage is followed by the investigation stage where the potential adopter gathers primary information and develops knowledge regarding the use of the SST along with its benefits and limitations.

The third stage - evaluation - signifies another crucial step towards SST adoption and comprises a preliminary evaluation of the information collected in the previous stage. Once essential information has been gathered and analyzed, a potential adopter makes an evaluative decision resulting either in favorable or unfavorable attitude towards adoption. It is on the basis of this evaluation that the customer decides whether to try the SST for the first time.

The last two stages - trial and adoption - are behavioral phases. Trial basically refers to performing the activities related with delivering a service providing an SST option for the first time. At this stage, a consumer may decide to try the SST or otherwise. Trial mainly involves first time use of any SST that assists users to estimate the value of the self-service delivery option. In this stage, the consumer really experiences how services can be delivered through SST instead of a service employee.

The final behavioral phase is adoption. Once a consumer has tried an SST, he/she now has some real experience of evaluating the SST option. Based on this evaluation and alternate determinants of adoption to be discussed later in this chapter, the SST may or may not be repetitively used. Thus, this adoption stage is conceptualized as one involving repetitive SST use after a successful trial.

This study assumes that SST adoption is accomplished once a first time user decides to keep on utilizing the SST whenever the service is required. Previous studies have mentioned that adoption is not an after effect of the initial trial, rather, there are a few additional stages involved such as 'repeated use' and 'commitment'. SST adoption is also related with repeated and selective utilization of the SST. In fact, commitment is accomplished when the SST option totally replaces utilization of the employee-based service delivery option (Rogers, 1995). The current study is organized in an offline service context where both service delivery options (SSTs and employees) are available. Therefore, the study conceptualizes SST adoption as a choice to utilize an SST over service employees after a successful trial. To this end, innovativeness is measured as a direct determinant of adoption rather than trial. Based on this conceptualization and other determinants (SST characteristics and user characteristics), the study considers adoption as the final stage of the SST adoption process.

Several other remarks in association with the proposed adoption process should also be reported. To begin with, the SST adoption process reveals the general progression from awareness to adoption only in order to describe the most common technology adoption process described in literature. Second, despite the fact that the model is proposed to depict the adoption of SSTs, it is recognized that separating individual experience of using an SST from overall experience is exceptionally difficult. In general, assessments of, and views towards the SST will incorporate other aspects of the overall service consumed. For example, while using a touch screen information kiosks at the hotel, it may be hard to differentiate one's experience of using this kiosk from his/her overall experience with the hotel.

Furthermore, services have been demonstrated to be assessed on both process and outcome dimensions (Grove & Fisk, 1992; Parasuraman et al., 1985), further complicating differentiation between SST-related experience and overall service experience. Finally, the proposed SST adoption process reveals all five stages from awareness to adoption. It is recognized that not every single potential adopter will progress through all these stages. Consumers may also, at any stage, reject the SST-based service option, especially when they have the traditional employee-based service option. The study incorporates two situational variables (waiting time and crowding) which are crucial in an offline service context as both these variables may influence consumer decision to adopt an SST.

4.1.2. Determinants of adoption

Besides investigating the SST adoption process, the quantitative phase of this research explores the key determinants of SST adoption. While all stages in the SST adoption process are equally important, this research revolves around the variables affecting the adoption of an SST. SST adoption was chosen as the center of attention of this study because of the difficulties organizations face in enhancing consumer utilization of SSTs. Creating awareness and encouraging positive investigation of SST-

related information in order to evaluate an SST is of little use to an organization if they are not followed by desired consumer behavioral change in terms of adoption of the SST. Although SST adoption is impractical without first accomplishing trial, adoption is the more important stage in the overall adoption process.

Adoption of an SST is exceptionally difficult due to the intangibility and inseparability in the nature of services. In case of a new physical product, demonstrations and free samples can be utilized to increase its trial and adoption. On the other hand, services can't be as effortlessly showed because services are activities performed by the provider, unlike physical products they cannot be seen, tasted, felt, heard or smelt before they are consumed. Also, the intangible nature of services presents challenges in corresponding with potential users. Moreover, the adoption of an SST may require significant behavioral changes from consumers such as frequently performing activities they had not done in the trial stage. Due to these challenges, it is critical to identify and examine the variables affecting SST adoption.

The proposed conceptual model presented in Figure 4-1 outlines the three distinct determinants of adoption. In the first place, and the major contribution of this study, is the key mediating variable - consumer innovativeness - proposed to impact SST adoption. The other two sets of variables (SST characteristics and user characteristics) have been recognized in existing literature as crucial constructs of consumer adoption behavior. All three sets of variables will be briefly presented in the next three sub-sections. Literature reviewed in Chapter Two and qualitative research in Chapter Three support the incorporation of these constructs in the proposed model.

4.1.2.1. Consumer innovativeness

Consumer innovativeness has been considered as the mediating variable in the proposed conceptual model. . The positioning of this innovativeness variable highlights its importance in determining the intention of adoption. This construct has never been explored as a separate mediator in adoption literature (Kaushik & Rahman, 2014). In the present study, this innovativeness construct has been proposed to mediate between SST characteristics, user characteristics, and adoption (see Figure 4.1). In addition to having an expected mediating effect, this variable is anticipated to have a significant direct impact on intention of adoption. The mediating effect of innovativeness is intended to explain a few inconsistent and questionable conclusions from the past adoption research. In this research, it is proposed that the innovativeness variable will influence the intention of a consumer adopting an SST in an offline service context. Innovativeness of consumers will also affect consumer adoption behavior in distinct stages of the adoption process. This research mainly focuses on examining the consumer

innovativeness variable as a determinant of adoption. This study also develops and validates an SSI scale to measure consumer innovativeness towards SST adoption in Chapter Six.

4.1.2.2. SST Characteristics

The second set of variables SST characteristics - has also been indicated to be an important determinant of adoption. This set of SST characteristics includes: individual perceptions of SST usefulness, ease-of-use, complexity and perceived risk. These constructs are expected to have a direct and indirect (through the consumer innovativeness variable) impact on trial. . A superior understanding of consumer perceptions of these SST characteristics would be helpful in designing a user-friendly SST interface, and communicating and promoting SSTs to increase the SST adoption rate.

4.1.2.3. User Characteristics

The third set of variables - user characteristics - has been widely explored in past consumer innovativeness and SST adoption research. These user characteristics identify with the characteristics of potential adopters and have been demonstrated to be significant in the advancement of adopter class profiles. Here, the study assumes that these variables would influence the intention of SST adoption. The variables are also anticipated to have an indirect effect on adoption through the consumer innovativeness variable. While not easily controllable by organizations, it would be worthwhile to observe how these user characteristics impact intention of adoption. The user characteristics to be investigated in this study include: technological anxiety, need for interaction, subjective norm, previous experience, and a few demographic variables. Understanding these user characteristics may prove useful in segmenting markets and focusing on specific marketing strategies to encourage SST adoption.

Thus, the current study proposes a conceptual model that can be applied to better understand the SST adoption process. Recognized SST characteristics and user characteristics are intended to influence SST adoption. Furthermore, the consumer innovativeness variable demonstrated as a key mediating variable highlighting its importance in the adoption decision. Both SST and user characteristics variables are also expected to have an indirect effect on adoption through the consumer innovativeness variable. All these variables will be examined in more detail with the development of specific hypotheses in the following sections. All hypotheses will be briefly explained and supported based on the existing literature.

4.1.3. Situational variables

In addition to the determinants of SST adoption mentioned earlier, the current study also incorporates two situational variables - waiting time and crowding - as moderators between consumer innovativeness and intention of adoption. Situational variables include context-specific variables that

may either directly influence or moderate PU or PEOU beliefs of consumers about SST adoption (Dabholkar & Bagozzi, 2002). Wang et al. (2009) asserted that considerable research on SST adoption has focused on SST characteristics (e.g., PU and PEOU) and user characteristics (both demographics and psychographics), and yet ignored the role of situational variables (e.g., waiting time and crowding) in an offline service context. They hypothesized a model that placed situational variables - perceived waiting time, task complexity, and group influence - as moderators between SST attitudes and SST behaviors. Verhoef et al., (2009) also recognized situational moderators - type of store, location, culture, economic climate, season, and competition entrance - as distinct considerations from consumer moderators like socio-demographics for customer experiences.

4.1.3.1. Waiting time

Waiting time is a variable that has been predominantly measured in SST adoption research (Bennington et al., 2000; Dabholkar, 1996; Dabholkar & Bagozzi, 2002; Gutek et al., 2000; Lin & Hsieh, 2006; Reinders et al., 2007; Rose, Meuter & Curran, 2005; Simon & Usunier, 2007; Verhoef et al., 2009). Dabholkar (1996) showed that waiting time not only had an immediate positive association with behavioral intention towards SST adoption, but also influenced its expected service quality (i.e., PU and PEOU) (pp. 37, 43). Dabholkar & Bagozzi (2002) also determined that waiting time can reinforce the relationship between PEOU and SST attitude. Similarly, Simon and Usunier (2007) examined the relationship between technology preference and waiting time, and found that consumers have a greater situational preference for technology when the waiting time for traditional employee-based service is comparatively longer.

4.1.3.2. Crowding

Crowding is another situational variable that has been included in this research. Past studies have showed that crowds in retail stores can create delays resulting in frustration among consumers (Bobbitt & Dabholkar, 2001). High density of consumers in the use environment not only influences queue time and delays, but also affects SST adoption (Dabholkar & Bagozzi, 2002). The social anxiety and waiting time effects of crowding make it an applicable and crucial situational variable to be examined in SST adoption research. Crowding has the potential to psychologically and socially affect consumer innovativeness along with other facets of technology readiness (Optimism, insecurity and discomfort), and reinforce the relationship between PEOU and SST attitude (Dabholkar & Bagozzi, 2002).

Dabholkar & Bagozzi (2002) determined that, as with waiting time, the social anxiety that follows crowding reinforces the positive relationship between PEOU and attitude, and also between attitude and intention towards SST adoption. While researchers have assumed that both perceived waiting time

and crowding anxiety could influence consumers' PEOU, they have not concluded whether these situational variables also affect consumer innovativeness towards SST adoption. It is quite reasonable to assume that the adoption of an SST could increase if waiting times for traditional employee-based service options are long, or social anxiety occurs due to crowding. This research has already assumed that consumer innovativeness could mediate this effects of SST characteristics and user characteristics on adoption, a more extensive investigation on whether both the situational variables (waiting time and crowding) moderate the effect of consumer innovativeness on adoption will be presented here.

4.2. Hypothesis Development

As mentioned earlier, the literature reviewed in Chapter 2 and the qualitative research discussed in Chapter 3 provide support for the various hypotheses developed in this section. Figure 4-2 represents the various path relationships among the variables included in this research. In the following sub-sections, these path relationships will be briefly discussed and proposed as hypotheses to be examined in this research. The complete set of all hypotheses is also reported in Appendix A.1.

4.2.1. Mediating Effect Hypotheses

As theoretically conceptualized in Figure 4-2, the proposed model represents the consumer innovativeness variable mediating the relationship between SST characteristics, user characteristics and intention of adoption. The mediation analysis in this research is based on a 4-step process suggested by Baron and Kenny (1986). To confirm a mediating effect here, the following associations must be found: First, the consumer innovativeness variable is expected to have a positive significant effect on the intention of adoption. Second, the SST characteristics and user characteristics variables are anticipated to have a direct significant effect on the intention of adoption. Third, the SST characteristics and user characteristics variables are anticipated to have a significant effect on the consumer innovativeness variable.

The fourth and last expected condition to be explored is - when the effect of consumer innovativeness, SST characteristics and user characteristics variables is measured together, the significance of SST characteristics and user characteristics variables decreases. When each of the four estimated path relationships are supported, then the mediating effect can be acknowledged (Baron & Kenny, 1986).Each of the path relationships essential to examine the proposed mediating effect is created and supported in the rest of the section. Taking into account the conceptualization of the general model, the researcher proposes the following two mediating effect hypotheses:

H_1: Consumer innovativeness mediates the relationship between SST characteristics (perceived usefulness, perceived ease of use, complexity and perceived risk) and intention of adoption.

H_2: Consumer innovativeness mediates the relationship between user characteristics (technology anxiety, need for interaction, subjective norm, previous experience and demographics) and intention of adoption.

4.2.2. Consumer Innovativeness Hypothesis

Since the central focus of this research is to predict the intention of adoption of SSTs in an offline service context, the development of the next hypothesis requires investigating the consumer innovativeness variable. Consumer innovativeness, as shown in Figure 4-2, is positioned as key variable in determining SST adoption. Of the specific personality dimensions of technology readiness index (TRI), innovativeness - a positive enabler of technology readiness - identifies with a constructive perspective of innovation and a conviction that innovation offers individuals expanded control, flexibility, and efficiency (Parasuraman, 2000). Thus, people with high innovativeness perceive a given innovation as more useful because they don't give much emphasis to conceivable contrary outcomes (Scheier & Carver, 1992; Walczuch et al., 2007). Past studies have found that early adopters (people with high innovativeness) have less unpredictable conviction sets about new innovation (Karahanna, Straub & Chervany, 1999). In other words, innovative individuals are generally thought to hold favorable attitude and intention towards innovation adoption and use (Kaushik & Rahman, 2014). In light of the above, the researcher assumes that consumer innovativeness is a crucial variable that positively influences tourists' selection of service delivery by SSTs over service employees in an offline service context (Parasuraman & Colby, 2001; Tsikriktsis, 2004). It is therefore hypothesized:

H_3: Consumer innovativeness is positively related to the intention of adoption.

4.2.3. Moderating Effect Hypothesis

Wang et al. (2009) mentioned that majority of SST adoption research is static in nature and does not incorporate situational variables while situational variables have been identified as desired determinants of SST adoption (Bobbitt & Dabholkar, 2001; Dabholkar, 1996; Gutek et al., 2000; Rose et al., 2005; Simon & Usunier, 2007; Verhoef et al., 2009; Wang et al., 2009; y Monsuwe, Dellaert & de Ryyter, 2004), or also as moderators (Bhappu & Schultze, 2006; Dabholkar & Bagozzi, 2002; Venkatesh et al., 2003; Verhoef et al., 2009). Many other researchers have suggested that these situational variables be included in future adoption research (King & He, 2006; Lee et al., 2010; Verhoef, 2009; Lin & Hsieh, 2007; Lin & Hsieh, 2006; Verhoef et al., 2009). Since this study primarily focuses on SST adoption in an offline service context, incorporation of situational variables (waiting time and crowding) becomes compulsory. Therefore, the researcher proposes the following moderating effect hypotheses:

H_4: Situational variables (Waiting time and crowding) moderate the relationship between consumer innovativeness and the intention of adoption.

H_{4a}: Tolerance for wait moderates the relationship between consumer innovativeness and the intention of adoption.

H_{4b}: Tolerance for crowding moderates the relationship between consumer innovativeness and the intention of adoption.

4.2.4. SST Characteristics Hypotheses

In addition to the consumer innovativeness variable, consumer perceptions regarding select SST characteristics are also proposed to have a direct significant effect on the intention of adoption. These SST characteristics variables are also expected to significantly influence consumer innovativeness, demonstrating the existence of an indirect influence on adoption. SST characteristics variables, for example PU, PEOU, complexity and perceived risk are also investigated. Both direct and indirect influences of these SST characteristics variables are presented in this study.

Existing literature on SST adoption has demonstrated the importance of SST characteristics affecting the adoption and diffusion of numerous SSTs (Gatignon & Robertson 1991; Rogers, 1995). While distinct SST characteristics have been investigated, themost widely recognized model is suggested by Rogers (1995). According to Rogers (1995), the key innovation characteristics include - relative advantage, complexity, compatibility, observability and trialability - that considerably affect innovation adoption and diffusion.

The aforementioned innovation characteristics have been found significant in product adoption research, but because of the distinct nature of services and the behavioral changes needed for the utilization of SSTs, these innovation characteristics are anticipated to be less persuasive in SST adoption. Thus, the experiential nature with distinctly different features (e.g., intangibility and inseparability) of SSTs may result in an assessment of same innovation characteristics to be fundamentally problematic and only moderately linked with intention of adoption. This is consistent with results of Gatignon and Robertson (1991) who concluded that "these characteristics might not be the most appropriate for understanding the adoption of consumer innovations, or for explaining the adoption decision making process" (p. 318). In view of the above, this research proposes an entirely new set of SST characteristics (PU, PEOU, COM and PR) that may have a direct as well as an indirect effect (through consumer innovativeness) on the intention of adoption.

In this new set of SST characteristics, PU and PEOU have been adopted from TAM-based adoption research (Davis, 1989; Davis et al., 1989). These two innovation characteristics (PU and PEOU) have been widely explored in SST adoption research as well (Kaushik & Rahman, 2015 a, b). In addition to these two characteristics, complexity (Rogers, 1995) and perceived risk (Kaushik & Rahman, 2015a) are the other two crucial SST characteristics which have been incorporated in the present research to examine SST adoption behavior. It is presumed that PU and PEOU will have positive significant effects on adoption, while complexity and perceived risk will have negative significant effects on the intention of SST adoption. Extensive literature supports the significant roles of these innovation characteristics in SST adoption (Davis, 1989; Davis et al., 1989; Rogers, 1995; Kaushik & Rahman, 2014, 2015a, b). The researcher also hypothesizes the similar associations between adoption behavior and SST characteristics that have been proposed in previous studies, but in different contexts. Thus, the researcher proposes the following hypotheses relating SST characteristics and the intention of adoption of SSTs:

H_{5a}: Perceptions of usefulness of SSTs are positively related to the intention of adoption.

H_{5b}: Perceived usefulness of SSTs are positively related to consumer innovativeness.

H_{6a}: Perceptions of ease-of-use of SSTs are positively related to the intention of adoption.

H_{6b}: Perceived ease-of-use of SSTs are positively related to consumer innovativeness.

H_{7a}: Perceptions of complexity is negatively related to the intention of adoption.

H_{7b}: Perceptions of complexity is negatively related to consumer innovativeness.

H_{8a}: Perceptions of risk are negatively related to the intention of adoption.

H_{8b}: Perceived risk is negatively related to consumer innovativeness.

4.2.5. User Characteristics Hypotheses

In addition to consumer innovativeness and SST characteristics variables having a direct effect on the intention of adoption, the user characteristics variables are also proposed to have a direct significant effect on the intention of adoption. Consistent with SST characteristics, these user characteristics variables are also expected to significantly influence consumer innovativeness, demonstrating the existence of an indirect influence on adoption. User characteristics variables such as technological anxiety, need for interaction, subjective norm, previous experience with related SSTs and demographic

characteristics are also investigated. Both direct and indirect influences of the user characteristics variables are presented in this study. Each of the user characteristics will be discussed here in order to develop user characteristics related hypotheses.

4.2.5.1. Technology anxiety

Due to the technological nature of SSTs, it is assumed that comfort level with an innovative SST in the trial stage may play a significant role in the decision to adopt that specific SST. While some potential adopters eagerly accept the use of an innovative SST, others may experience discomfort in using the same SST. The inclusion of this technological anxiety variable in adoption research is mainly based upon previous works investigating computer anxiety (Igbaria and Parasuraman 1989; Raub, 1981; Ray & Minch, 1990). Computer anxiety has been characterized as the fear of an impending interaction with a computer that is disproportionate to the actual threat presented by the computer (Ray & Minch, 1990). Here, technological anxiety extends this concept of computer anxiety and measures a respondent's level of comfort with an innovative SST. An important study confirmed that technological anxiety is a valuable construct in dividing the heavy and light adopters of SSTs (Meuter & Bitner, 1997). Therefore, it is hypothesized that technological anxiety will have a direct effect on the intention of SST adoption.

H_{9a}: Technological anxiety is negatively related to the intention of adoption.

Along with the direct influence on adoption, it is also assumed that technological anxiety will indirectly influence adoption through its influence on consumer innovativeness. Feelings of anxiety regarding the adoption of SST will enhance the confusion related to the role and activities to be performed by potential user or innovators. It is assumed that a high degree of technology anxiety will create problems in understanding the role of the independent producer of the service. Past adoption studies mention that feelings of anxiety will also decrease the confidence of innovators to adopt an SST (Rogers, 1995). Furthermore, feelings of ability to use an SST will also be hampered by technological anxiety. Therefore, it is assumed that individuals with high levels of technological anxiety will have a corresponding low perception of ability to use. Thus, the researcher hypothesizes:

H_{9b}: Technological anxiety is negatively related to consumer innovativeness.

4.2.5.2. Need for interaction

A need for interaction between service providers and consumers is a pre-requisite to delivering quality services (Seth, Deshmukh & Vrat, 2005). Usually, mutual interactions foster interpersonal relationships between customers and service employees providing valued experiences during the

service delivery process (Bitner, Booms & Mohr, 1994; Kaushik & Rahman, 2015a). Service consumers often try to maximize these experiences. Such interactions are quite necessary in order to give consumers a better understanding of the functioning of service delivery through SSTs, at least in the initial stages (Seth et al., 2005). However, such interactions and interpersonal relationships are usually absent during SST usage. In such situations, consumers might ignore the usefulness of SSTs and perceive the overall quality of services differently. It is hypothesized that need for interaction with service employees will have a direct negative effect on adoption of an innovative SST. Thus, we posit:

H_{10a}: Need for interaction is negatively related to the intention of adoption.

Relationship building is a valued aspect to a specific customer base that consumes employee-based services rather than SST-based services (Dabholkar, 1996). Customers with low levels of innovativeness examine particular SSTs based on their interaction with employees, therefore, interaction must be infused into the service transaction process (Cunningham, Young, and Gerlach, 2009). Past literature shows both direct and indirect effects of need for interaction on consumer innovativeness towards SST adoption (Dabholkar, 1996; Meuter et al., 2005). A customer base with high innovativeness may opt to adopt SSTs over interacting with service personnel to show their independence (Meuter et al., 2000; Ojiako, 2012). At the same time, other customers having a desire for interactive relationships are more likely to ignore SST use (Forman & Sriram, 1991). It is assumed that a greater desire for interaction and interpersonal relationships leads to a decrease in innovativeness towards SST adoption, therefore it is hypothesized:

H_{10b}: Need for interaction is negatively related to consumer innovativeness.

4.2.5.3. Subjective norm

Fishbein and Ajzen (1975) introduced the concept of subjective norm from the rational behavioral theory. In the theory of planned behavior (TPB), Ajzen (1991) defined SN as "the perceived social pressure to perform or not to perform the behavior" (Ajzen, 1991, p. 188). Subjective norm can be defined more precisely as "an individual perception or opinion of what important others believe the individual should do" (Finlay et al., 1999, p. 2015). This individual perception or opinion is termed normative belief. Subjective norms, represented by normative beliefs, are a part of the extensive social norms construct. In TPB, Ajzen (1991) mentioned that subjective norm explains the behavioral intention to perform a specific behavior (Casalò, Flaviàn & Guinalìu, 2010). Several studies also confirm that attitude and subjective norms together are more effective predictors of adoption behavior (Trafimow & Fishbein, 1994). Since consumers in offline service contexts are more dependent on

social interactions, it is assumed that subjective norm will have a direct effect on adoption of an innovative SST. It is therefore proposed:

H_{11a}: Subjective norm is positively related to the intention of adoption.

Subjective norm as a construct has been extensively studied to extend the TAM for different services (Hsu & Lu, 2004; Venkatesh & Davis, 2000). In a majority of studies, subjective norm has had a positive impact on consumer intentions (Schepers & Wetzels, 2007), however, there is a need to study the effects of subjective norm on the consumer innovativeness variable (Riemenschneider, Harrison & Mykytn, 2003). The researcher did not find any study examining the direct effect of social norm on consumer innovativeness in an offline service context while such context (e.g., bank, retail store or hotel) serves as a point of social contact for service consumers. Social contact enables greater exchange of information with a personal touch in an offline service context. Therefore, the researcher includes subjective norm as a crucial construct in this research and proposes:

H_{11b}: Subjective norm is positively related to consumer innovativeness.

4.2.5.4. Previous experience

Previous experience, or being a user of related products, has been indicated to be significantly effective when discriminating between adopters and non-adopters of technology (Danko & MacLachlan, 1983; Dickerson & Gentry, 1983; Rogers, 1995). Furthermore, innovation diffusion theory has demonstrated that previous experience, knowledge or exposure to related technologies lead to a more prominent intention of adopting similar technologies (Rogers, 1995). "Innovations often are not viewed singularly by individuals. They may be perceived as an interrelated bundle of new ideas. The adoption of one new idea may trigger the adoption of several others" (Rogers, 1995, p. 235). Therefore, previous experience of using an innovative SST ought to improve the intention of SST adoption. This suggests a direct influence of previous experience on intention of adoption as hypothesized below:

H_{12a}: Previous experience is positively related to the intention of adoption.

In proposed model, previous experience is expected to have an indirect effect on adoption through its effect on consumer innovativeness. An experienced potential adopter, or a user of related SSTs will be more likely to have greater positive perceptions towards innovativeness. In other words, the innovativeness of a potential adopter can be improved by the knowledge and experience of using related products (Mahajan et al., 1990). Past studies demonstrate that as technology (e.g., computers) usage increases, self-confidence regarding computers also increases (Gardner, Dukes & Discenza,

1993). In a study by Wang, Harris, and Patterson (2012), it was clearly mentioned that past positive experiences with one SST might inspire a user to use another SST in case both have similar technologies. Thus, experience with a similar SST provides training and confidence that is proposed to increase feelings of ability in relation to using innovative SSTs. Therefore it is proposed:

H_{12b}: Previous experience is positively related to consumer innovativeness.

4.2.5.5. Demographic variables

Here, consumer demographics represent user characteristics determinants of SST adoption that are comparatively identifiable and perceivable in target marketing (Perreault et al., 2011). There are a number of researchers who have used demographics in their adoption models (Venkatesh et al., 2003; Simon & Usunier, 2007), or suggested their consideration in further SST research (Meuter et al., 2003). In SST adoption literature, widely acknowledged and investigated demographic variables are: i) age (Bennington, Cummane & Conn, 2000; Meuter et al., 2003; Venkatesh et al., 2003; Oyedele & Simpson, 2007; Simon & Usunier, 2007; Reinders et al., 2008; Lee et al., 2010); ii) income (Meuter et al., 2003; Lee et al., 2010); iii) education (Lee et al., 2010); and iv) gender (Burgers, de Ruyter, Keen & Streukens, 2000; Meuter et al., 2003;Venkatesh et al., 2003; Reinders et al., 2008; Lee et al., 2010).

Simon and Usunier (2007) showed that age had a negative influence on preference towards SST over employee-based service option. Even though not widely studied in the SST adoption literature, gender has been empirically revealed to determine adoption of personal computers (Venkatraman, 1991) and usage of self-service alternatives (Langeard, Bateson, Lovelock & Eiglier, 1981). Many studies have confirmed that potential adopters tend to be more educated (Venkatesh et al., 2003; Greco & Fields, 1991), are younger (Simon & Usunier, 2007; Venkatraman, 1991), and have higher income levels (Kaushik & Rahman, 2014; Zeithaml & Gilly, 1987). Being consistent with past findings, the researcher hypothesizes that demographic variables (age, gender, education and income) will have the significant influence on the intention of adoption, and therefore:

H_{13a}: Customers who are younger, male, have higher education and income levels are more likely to try an innovative SST than those customers who are older, female, and have lower education and income levels.

In addition to direct effect on adoption, the above-mentioned demographic variables might also have a direct influence on consumer innovativeness. For instance, consumers with higher education levels might perceive an innovative SST as more understandable. Higher levels of education might lead to greater self-confidence in an individual which would, in turn, increase the propensity to adopt an

innovation. According to Kaushik and Rahman (2014), "consumer innovativeness is generally defined as the propensity of consumers to adopt new and innovative products/services" (p. 250).

It is usually assumed that younger consumers enjoy more while using technology, which results in increased levels of innovativeness in them. Income is also proposed to lead to higher level of innovativeness as consumers with higher income levels will generally prefer using an innovative SST (e.g., ATMs) more frequently. The researcher proposes the following hypothesis related with consumer innovativeness and demographic variables:

H_{13b}: Customers who are younger, male, have higher education and income levels are more likely to have higher level of consumer innovativeness than those customers who are older, female, have lower education and income levels.

4.2.6. Adoption Process Hypotheses

Because of the hierarchical conceptualization of the innovation adoption process, it is assumed that every stage is an important antecedent for the subsequent phase. Without effectively satisfying an initial stage, it is unlikely that a potential user will advance to the subsequent phase in the adoption process. Thus, a high involvement adoption model is anticipated in this research that suggests the importance of consumer choice of SSTs over employees in an offline service contexts. An innovative SST has typically been modeled as having high involvement decision processes, rather than low involvement by consumers. In light of the high consumer involvement conceptualization of the adoption process, the following hypotheses related with every stage involved in the innovation adoption process are proposed:

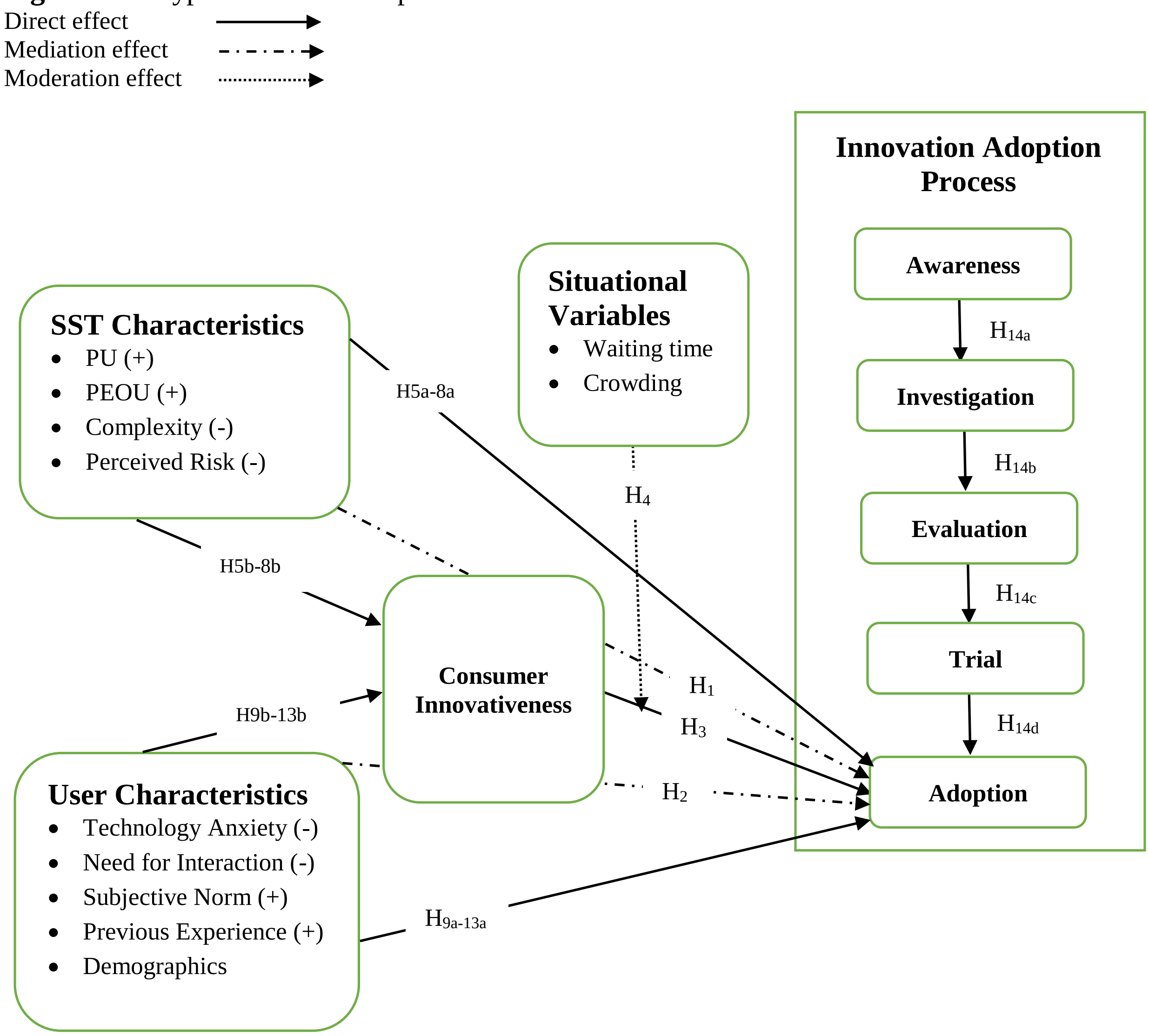
H_{14a}: Customers with higher awareness are more likely to investigate and collect information than customers with lower awareness.

H_{14b}: Customers who collect more information through investigation are more likely to evaluate the SST favorably than those customers who collect less information through investigation.

H_{14c}: Customers with a more favorable evaluation are more likely to try the SST than those customers with a less favorable evaluation of the SST.

H_{14d}: Customers with a more positive trial experience are more likely to adopt the SST than those customers with a less positive trial experience.

Figure 4.2: Hypothesized Conceptual model



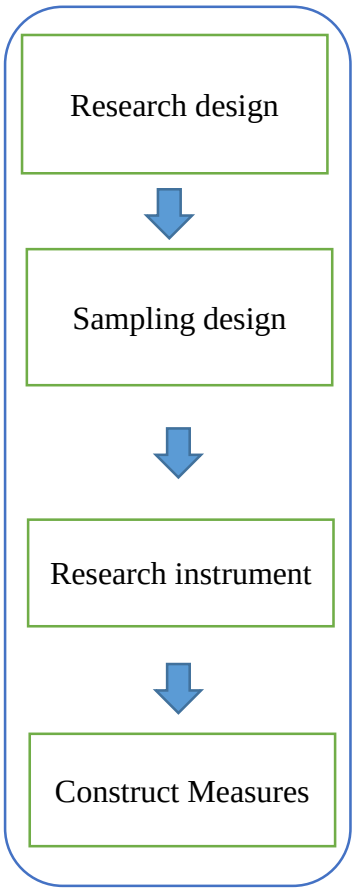
Summary

This chapter presents the conceptual outline of this research with a brief discussion and support for the various research hypotheses. The innovation adoption process, as it identifies with the adoption of SSTs, is hierarchically conceptualized as a five-stage process. Various determinants of adoption are also investigated. Overall, the proposed model examines the mediating effects of consumer innovativeness in the adoption decision of SSTs in an offline service context. This innovation (SST) adoption process and key determinants of adoption (SST characteristics and user characteristics) were established from a systematic literature reviewed in Chapter Two and the qualitative research presented in Chapter Three. The next chapter depicts the methodological issues identified with testing the hypotheses and other data analysis requirements.

Chapter 5

Research Methodology

Based on the literature reviewed in Chapter Two and a qualitative research in Chapter Three, the researcher developed and proposed a conceptual adoption model and corresponding hypotheses in Chapter Four. This Chapter Five describes the various methodological issues related to the quantitative phase of this study. The chapter primarily incorporates a clarification of the mixed research design, research context, and sampling approach applied in this study. It essentially gives estimation about how this mixed research design has been implemented in the present research setting. In short, the chapter sets a foundation to reach empirical objectives of the research by providing detailed methodological approaches. The Chapter also provides useful information around the methodology and intent of the study. Furthermore, the development of the research instrument, measures of various constructs, and the data analysis plans are described.



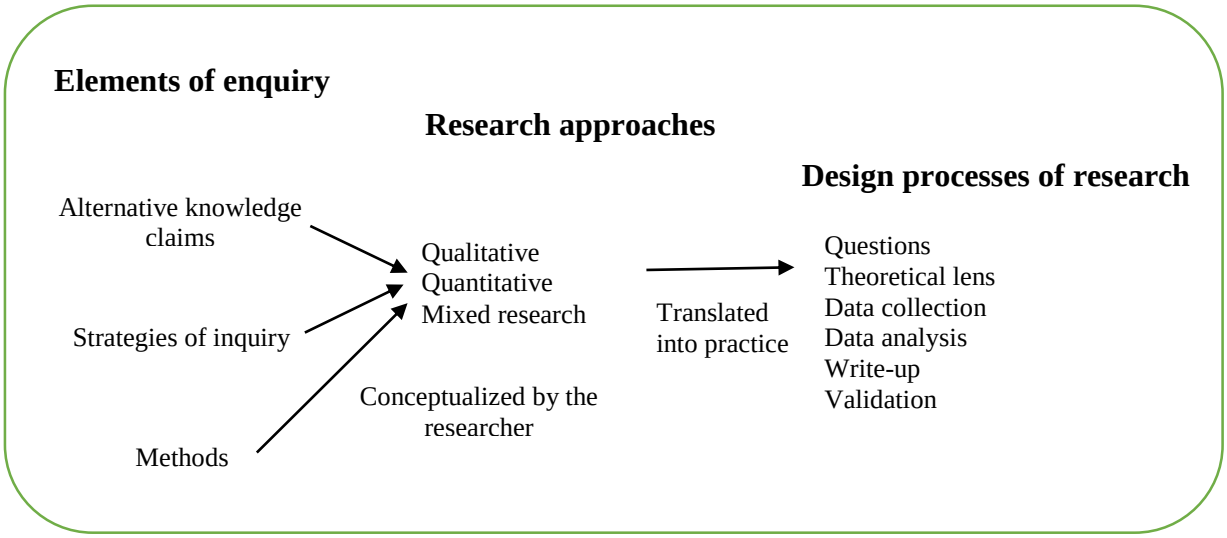
5.1. Research Design and context

"A research design is the logical sequence that connects the empirical data to the study's initial research questions and ultimately its conclusions"

- Yin, 1994.

The research design in this study is mixed and multivariate in nature. Both quantitative and qualitative research designs individually fall short of the major approaches being used today in social sciences research. Thus, a mixed research design is preferred by scholars today. It has come to be generally accepted that it is not a question of 'quantitative approach vs. qualitative approach', rather, research practices lie somewhere on a continuum between the two (Newman & Benz, 1998). The best that can be said is that majority of the studies tend to be both quantitative as well as qualitative in nature. According to Creswell (2003), there are three key elements of enquiry (i.e., knowledge claims, strategies, and methods) which are combined to form different research approaches. These approaches, in turn, are translated into processes in the design of research (See Figure 5.1). Preliminary steps involved in designing a research proposal thus include: assessing the knowledge claims brought to the study; considering the strategy of inquiry to be used; and identifying specific methods. Using these three elements, a researcher can identify whether to use quantitative, qualitative, or mixed method approach to inquiry.

Figure 5.1: Elements of enquiry leading to various research approaches and the design process



Both qualitative and quantitative research approaches have distinct yet crucial roles. According to Malhotra and Dash (2010), the required sample size for a research depends on many qualitative issues such as: importance of decision, nature of research, number of variables, and nature of analysis, sample size considered in similar studies, completion rates, incidence rates, and resource constraints. These

qualitative issues are addressed in qualitative research that involves collection, combination and integration of non–numerical descriptive data. In qualitative research, the data are expressed in words which leads to the identification of factors/antecedents representing major constructs measuring and analyzing key dependent variables such as consumer innovativeness (in this study). On the other hand, in quantitative research, data are expressed in terms of numbers. The major variables and factors acknowledged during qualitative research are used as scale items and constructs to develop a research instrument/questionnaire. This research applies a mixed research design with two separate phases – qualitative (Chapter Four) and quantitative (Chapter 6). For the quantitative phase of the study, a self-administered cross-sectional survey design was used. To test the hypotheses proposed in this chapter, data were collected via both online and offline survey methods from service customers. The following sections detail the rationale for a cross-sectional survey design, the context used, and the sampling process (see Figure 5.2).

5.1.1. Rationale for a cross-sectional survey design

There are various design options available, each with theoretical and methodological strengths and weaknesses; no one design can be said to be the best. This study applies a cross-sectional survey design to collect consumer responses for hypotheses testing. The cross-sectional survey approach gives many advantages over other design options. First, surveys are a viable approach to gathering data from a wide variety of respondents (Babbie, 1989). Large samples consistent with the survey design help in increasing generalizability of research outcomes (Kerlinger, 1986). Second, survey design has been found successful in measuring and exploring a large number of variables (Churchill, 1991; Kerlinger, 1986; Vivek, Beatty, Dalela, & Morgan, 2014).

Third, the survey approach takes into consideration the capacity to examine natural phenomena. While adoption of a particular SST could be replicated in a non-natural setting, examining the innovation adoption process associated with a given SST option in an offline service context would provide a better understanding of the phenomenon. Additionally, the survey approach allows for examination of actual behaviors instead of measures of behavioral intentions. There are also some economic advantages of using survey approach in research. In spite of the fact that surveys can be expensive, they are sometimes extremely economical regarding the quantity as well as quality of information provided (Kerlinger, 1986).

While several benefits of the survey approach have been mentioned above, there are also a few limitations associated with it. First, causal relations can't be built completely, rather conclusions drawn are in view of correlational relationships. With survey design, there is a chance that uncontrolled extraneous variables might affect an association. Second, the survey design uses standardized scales

for data collection, which may cause the researcher to miss crucial information when surveying respondents (Babbie, 1989). To overcome this problem, pretesting of questionnaire was done and qualitative in-depth interviews conducted during the course of the present study to ensure that the study concentrated on key factors related with SST adoption in an offline service context. Third, the survey design mainly uses self-report information via a paper-pencil based research instrument. Generally, some issues are inherent to self-report information, such as social desirability bias. To remove these biases, standardized existing scales with recognized reliability and validity were utilized for most constructs except 'consumer innovativeness'. The researcher, during literature review, didn't find a consumer innovativeness scale measuring consumer innovativeness towards SST adoption. Therefore, this study develops and validates an SSI scale applicable across a variety of SSTs (See Chapter 5). Both negatively and positively phrased questions were asked to prevent and detect respondent agreement. Privacy was additionally kept up in order to confine the influences of social desirability bias.

Another key issue related with research design is the selection of either cross-sectional or longitudinal research design. While cross-sectional research design examines one phenomenon at a time, longitudinal research design attempts to gather responses from the same respondents over a period of time. In spite of the fact that consumer decision regarding SST adoption is a multi-stage process that progresses over time, the primary emphasis of this study is on adoption - a particular stage in the technology adoption process. The emphasis on adoption constrains the need of reviewing adoption studies over a long period of time. Also, the survey intended to test the transient measures of adoption by asking respondents to reflect upon their past experience and consider upcoming opportunities. Further, time and expense limitations restricted the capacity of leading an expanded longitudinal study.

Considering the advantages and limitations mentioned above, a cross-sectional survey design was finalized to fulfill the study objectives. A cross-sectional survey permits economical gathering of a huge amount of information from a nationwide sample of service consumers. In addition, it allows the investigation of a substantial number of variables in a natural setting.

5.1.2. Context

Selection of a suitable context for investigation of SST adoption was a major concern in this study. In order to effectively test the various hypotheses developed in Chapter Four, a context with a few key criteria was required. First, it was essential that SST innovation be an existing and accessible option to potential adopters. Second, it was desired that the SST innovation have an established group of adopters

along with another group of non-adopters. Third, few newly applied SSTs are required to maintain novelty in the consumer adoption process.

On the basis of the aforementioned criteria, appropriate organizational settings were chosen from a few service organizations (e.g. bank, retail store and hotel) interested in participating in the current research. The research was offered to and acknowledged by these organizations which have implemented SST options to their customers. The exact context was customer use of several SSTs (e.g., ATMs, pass-book printing kiosk, queue management solution kiosk, and cash deposit kiosk) available in banking services. Each of the respondents or service customers was identified as a separate element of analysis. Each of them have had the chance to use the SST-based option of service delivery along with employee-based option.

5.2. Sampling Design

5.2.1. Target Population

Neuman (2006) defines population as a larger group of individuals from which the sample is taken, while the target population is simply defined as the collection of elements or objects that possess the information sought by the researcher and about which inferences are made. Most populations are so large that their measurement can be done only through representative sample surveys. Since it is difficult to approach the overall population, the researcher in this research carefully identifies the target population. Responses were gathered from service consumers who had used SSTs in order to perform various activities within service firms. One of the key drivers of this study was to investigate and compare behavior of customers who had used SST options with behavior of those who had not. To this end, an effort was made to distinguish consumers as users and non-users of SSTs. SST users were recognized based on their recent activities such as passbook printings, depositing cash, etc. via distinct kiosks. However, non-users of SSTs were not as easily identified. The bankers did not maintain any record for non-adopters of self-service delivery options. Therefore, service consumers were randomly asked whether they had used an SST at least once, or they were non-users.

5.2.2. Sample

Salkind (2003) defines a sample as a subset of the population. The sample should represent the larger population, and the results of the research should be generalizable to the population. One of the stated assumptions of this study is that the sample adequately represents the population, and assumes that the results are generalizable. The purpose of the research dictates that a respondent, to be part of the sample, should: be an offline service user rather than on-line; preferably have some knowledge of self-

service or technology-based systems, whether or not having used such a system; must be more than 18 years old and an Indian national; and be interested and voluntarily participate in the survey.

5.2.3. Sample Size

In most of marketing research, the overall population to be studied is either infinite or hard to define. Therefore, determining the right sample size is of utmost importance in quantitative research. There are several ways to determine the size of a sample, and sample size depends on a number of qualitative factors such as importance of the problem and its solution, the nature and type of the research, sample size in similar studies and their sampling strategies, response rate, methodology to be used, resource constraints, etc. (Malhotra & Dash, 2010).

According to Hair et al. (1998, 2006), minimum 10-15 participants should be selected for each variable and its corresponding items included in the study. In other words, a sample size could be finalized on the basis of proportion of items and respondents. For instance, a research with20 items would require a sample of at least 200 to 300 respondents for applying distinct multivariate statistical techniques. Thus, this ratio would also depend on the type of statistical technique a researcher intends to apply in his/her research. For example, structural equation modelling (SEM) requires that the responses be at least 10-15 times of the item being measured; on the other hand, , 5-10 responses per item are acceptable while measuring regression weights. Similarly, internal consistency though Cronbach's alpha of any established scale should be measured with minimum 100 to 200 respondents (Spector, 1992).

According to some researchers, 300 respondents appear as an appropriate sample size, 100 look poor and 1000 seem excellent (Comrey & Lee, 1992). A few others recommend the following sample size formula to measure multiple correlations (Green, 1991):

$$n \geq 50 + 8\ m$$

Where,

n = minimum sample size required, and

m = number of predictors included.

In this research, the researcher considers nearly 45 variables for thirteen distinct constructs which are measured on a 7-point Likert scale. Following Hair et al. (1998) and Nunnally (1978) who suggested that the number of respondents should be 5-10 times more than the total items included to measure distinct constructs, the researcher contacted nearly 600 service consumers with varying demographic characteristics. Initially, of the total 380sample respondents who were first contacted online, only 176 returned the mail survey, with 161 responses being usable. Thus, the response rate for those identified as SST users came out to be 46.31% (176/380). This online response rate is quite high as compared to

other studies. The primary reason behind this was the personal attention of the researcher and regular reminders sent through mail seeking responses. Since the study required nearly 400 responses to fulfill the minimum requirement of 5-10 times the number of variables used, the researcher conducted a field survey where nearly 300 respondents were contacted personally. Of these 300 respondents approached, 267 responded to the questionnaire while many of them (n = 48) did not provide complete information; this was particularly true for female respondents who provided incomplete information in the demographic section. It can be said that the offline usable response rate of 89% (267/300) was quite high due to the personal involvement of the researcher. This way, the sample size of 380 was finalized for quantitative analysis. Table 7.1 (in Chapter 7) summarizes the basic demographic characteristics of these 380 participants of the research survey.

5.2.4. Sampling technique

There are different sampling techniques through which samples are chosen for research. These may be categorized mainly into two parts – (i) Probability and (ii) Non-probability sampling techniques. For final data collection, one of the probability sampling techniques - a multi-stage cluster sampling - has been applied in this research. As indicated by Neuman (2006), cluster sampling is applied by conducting surveys on clusters of individuals, rather than selecting the people themselves. Cluster sampling might be the best sampling technique for this quantitative phase of research because service users experiencing offline self-service technologies are huge in number, and spread all over the world. The participants were targeted cluster-wise once the geographical regions involved in the study were identified. Cluster sampling is widely preferred for such geographically dispersed populations (Neuman, 2006).

5.2.5. Informed consent

It is obligatory to gain consent from subjects when conducting any academic research, recruiting participants and collecting information from respondents. In fact, it is the responsibility of the researcher to make sure this information is collected and maintained (Creswell, 2005). The responsibility of the researcher also includes making sure that the information collected is used for its intended purpose only. It is assumed that the researcher will ensure the rights of the subjects and see that no harm will come to them by participating in the research. To this end, the researcher maintains that the responses will be kept confidential, names will not be stored with the responses, and identities of participants will not be revealed to anyone. An informed consent provides complete contact information of the researcher, the name of the university, benefits and risks related with participation, the purpose of the study and criteria for participation (Creswell, 2005).

As an essential component of an informed consent, participants were given information on how to withdraw from the study if they wished. This choice was maintained throughout the research. Even after completion of the surveys, respondents could alter their opinion, and their names and responses could be removed. Participants were clearly informed that: their participation was voluntary and not a condition of continued use of SSTs; their service providers were not associated with the research; and that the research was independently conducted.

5.2.6. Time Duration

The time required to carefully identify and approach the target population was around three to four months (August to November, 2015). The target region included the northern part of India and mainly included New Delhi, Uttar Pradesh, Haryana, Punjab, Chandigarh and Uttarakhand. This study primarily focuses on offline service contexts where both SST-based as well as employee-based service delivery option are accessible. Numerous kinds of services (e.g. banking, retail, hospitality, etc.) offer similar service settings, therefore, the researcher decided to reach the target sample offline as well as online in the autumn semester of 2015.

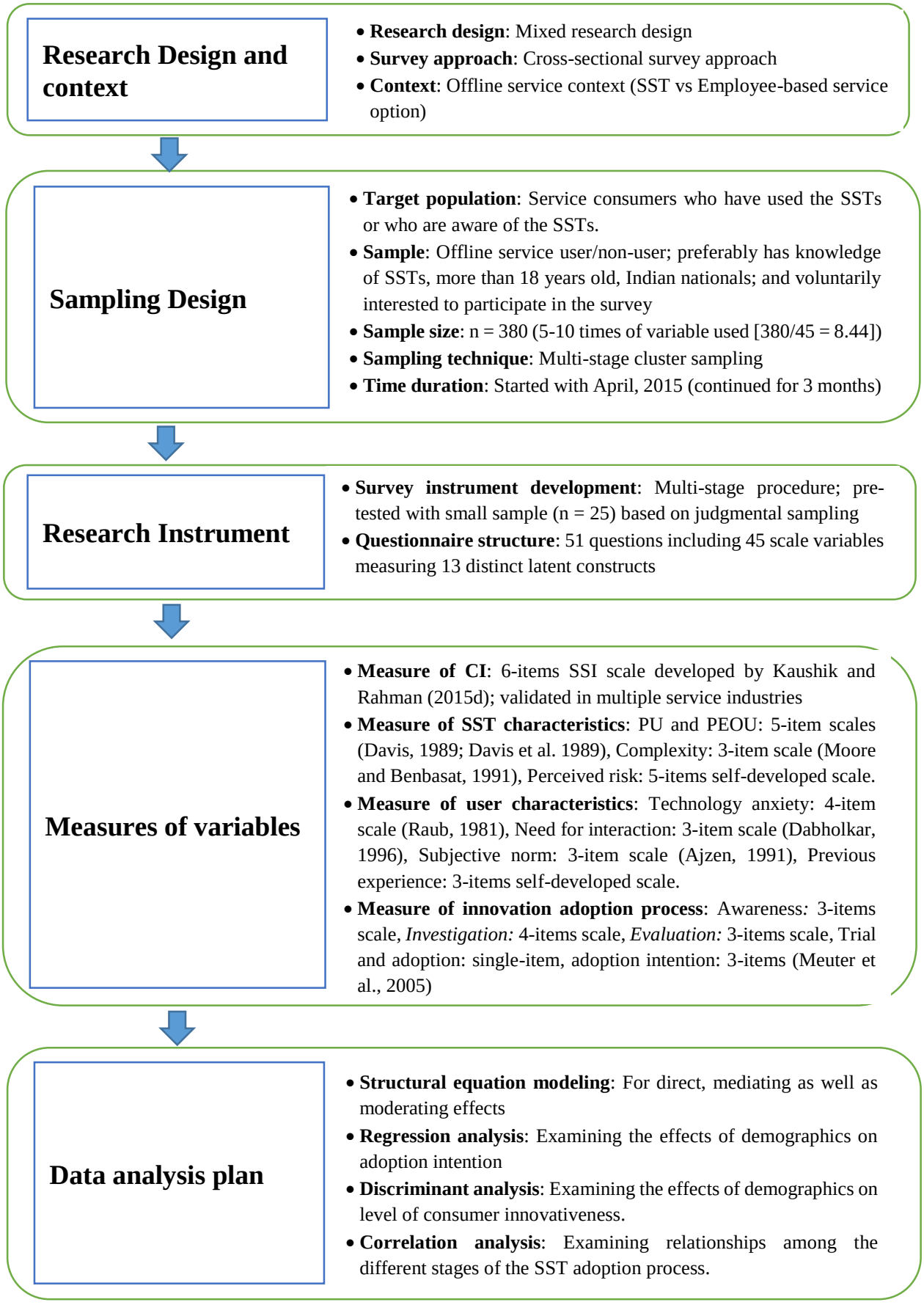
5.3. Research instrument

The intent of the research instrument used in this study was to gather primary data for testing the various hypotheses developed in Chapter Four. The current section describes the overall structure of the research questionnaire, and how the survey instrument (i.e., questionnaire) was developed. This comprises a discussion on the survey instrument development, its pretesting and finally a brief on the overall structure of questionnaire. Various measures used to assess the distinct constructs included in the study will be described later in the chapter.

5.3.1. Survey instrument development

A multi-stage procedure was used to develop the research instrument that was finally sent to sample respondents. A systematic literature review was conducted to develop a conceptual adoption model that provides directions and guides the data collection process. Next, qualitative in-depth interviews described in Chapter Three were used to support the variables to be included in the final research instrument. In light of the qualitative in-depth interviews, a few additional variables (need for interaction, subjective norm and perceived risk) were also incorporated in the proposed conceptual model.

Figure 5.2: Flow Diagram of Research Methodology



Initially, the survey instrument was pretested with a small sample based on judgmental sampling technique to evaluate the readability, length and clarity of questions. All key participants were asked to complete the survey and report problems (if any) regarding the questions, their wordings, instructions, or any other issues. This judgmental sample comprised experienced users of technology-based services, therefore, they all were capable to support in the refinement of the research instrument. Twenty-five participants were finally involved in this judgmental sampling technique.

Next, the research instrument was distributed to another small sample of service consumers. Ten service consumers were contacted at a time when they were actually using the SSTs (e.g., ATMs). Eight such consumers agreed to participate in this pretest of the research instrument in exchange for a surprise gift, while two consumers rejected the offer due to some kind of personal urgency. The research instrument was distributed to them at convenient places followed by nearly 15-20 minutes of discussions related to their perceptions on distinct variables and their statements.

In the pretesting stage, wordings were improved and ambiguous questions removed. Initial evaluations of reliability for each of the measures were completed and items with insignificantly low item-to-total correlations were dropped to improve overall reliability of the measures. During the pretesting stage, three items were deleted resulting in a final research instrument with 51 questions including 45 scale variables measuring 13 distinct latent constructs as shown in Table 7.7 (in Chapter 7).

5.3.2. Questionnaire structure

The research instrument (questionnaire) comprised structured questions to measure all variables related to SST adoption in an offline service context. The instrument incorporates measures of SST characteristics, user characteristics, and consumer innovativeness variables along with measures for distinct stages of the innovation adoption process. Although the majority of variables involved in the research questionnaire were measured through adapted multi-item scales, at the point when no suitable measures could be found, scales were developed following standard scale development processes (Churchill, 1979; Netemeyer et al., 2003) (see Chapter 6).

In such situations, the systematic literature review helped to identify various existing scales for adaptation, while the qualitative in-depth interviews were used to support the scale development process. Most of the scale items (except single item dichotomous variables and demographics) consisted of 7-pointLikert scale questions. The final research questionnaire based on different constructs and their corresponding items is shown in Appendix A.5.

5.4. Measures of variables

This section describes various measures either adopted or developed in order to operationalize corresponding variables incorporated in the proposed conceptual model (see Chapter Four). First of all, measures of the consumer innovativeness variable are presented. This is followed by a discussion on distinct measures for SST characteristics, user characteristics and situational variables. In the end, measures related with different stages of the innovation adoption process are discussed.

5.4.1. Measures of consumer innovativeness

Consumer innovativeness was conceptualized in Chapter Four as "the propensity of consumers to adopt new and innovative products/services" (Kaushik & Rahman, 2014, p. 250). Here, consumer propensity to adopt an innovative SST is measured by a six-item SSI scale developed by Kaushik and Rahman (2015d). This specific measure of consumer innovativeness has been developed for the present study. The measure is developed in one specific service industry (banking), and validated in two distinct industries (retail and hospitality). All six-items are measured by a 7-point Likert scale. Further details regarding the development of this measure are discussed in Chapter Six.

5.4.2. Measures of SST characteristics

Consumer perceptions regarding four SST characteristics (PU, PEOU, COM and PR) are anticipated to affect intention of SST adoption. These four SST characteristics variables incorporated in the proposed conceptual model are identified from existing adoption literature reviewed in Chapter Two, and supported by qualitative research in Chapter Three. For the first two variables (PU and PEOU), 5-item scales were adopted from Davis (1989) and Davis et al. (1989). Similarly, perception regarding complexity is assessed through another 3-item scale developed by Moore and Benbasat (1991). Finally, the role of perceived risk was explored in the qualitative phase of the study. To develop a measure for perceived risk, five context specific risk factors related with performance, privacy, and confidentiality issues were established based on perceptions of respondents who participated in the qualitative in-depth interviews. Each of the SST characteristics variables was assessed with 7-point Likert scales.

5.4.3. Measures of user characteristics

Four user characteristics variables (technology anxiety, need for interaction, subjective norm and previous experience) and basic demographic variables were also measured through the research instrument. All these variables are expected to show significant effects on the intention of adoption (see Chapter Four). All user characteristics variables are measured with 7-point Likert scales. Further details related with the various sources of these measures are discussed here.

First, the measure for technology anxiety was adapted from a scale which was specifically developed for computer anxiety (Raub, 1981). This 4-item scale has been applied in earlier adoption research and presented as an effective adaptation from the original scale (Meuter & Bitner, 1997). Second, need for interaction is conceptualized as the consumer's desire to interact with service employees during a service transaction. This variables measured with a 3-item scale developed by Dabholkar (1996). Third, subjective norm, conceptualized as the perceived social pressure to perform or not perform a behavior, is also measured with a 3-item scale developed by Ajzen (1991). Fourth, previous experience that refers to the extent of usage of related technological products and services, is also measured by the three context specific items developed for this study. Furthermore, basic demographic variables (age, gender, education and income) were also asked.

5.4.4. Measures of the innovation adoption process

While the determinants of adoption discussed above (consumer innovativeness, SST characteristics and user characteristics) have been widely studied in existing literature, the innovation adoption process with distinct stages has not been frequently explored. Due to this, various measures for distinct stages involved in the SST adoption process were initially adopted from Meuter et al., (2005). For trial and adoption stages, single item measures were developed for this study.

The first stage in the innovation adoption process - awareness - is conceptualized as the level of consciousness regarding the existence of an innovative SST and its general availability (Meuter et al., 2005). A 3-item scale is adopted to measure the level of awareness of respondents. The second stage - investigation - relates to the level of efforts a customer applies in order to learn about an innovative SST. Here, a 4-item scale is adopted to measure the investigation level. The third stage in the SST adoption process - evaluation - is conceptualized as an overall assessment of the SST, and whether it is an appropriate option for each respondent, is determined. Evaluation is also measured with a 3-item scale developed by Meuter et al., (2005).

Initially, both trial and adoption behavioral stages are assessed with single item scales. Trial is conceptualized as the first time a respondent uses an innovative SST. Thus, trial was measured with only one question examining whether or not a respondent had used an innovative SST. Since, it is a dichotomous question having 'yes' and 'no' as possible answers, all the respondents, based on their responses, were categorized into two sets - those who had tried the SST ('yes' response), and those who had not tried the SST ('no' response). The final stage in the SST adoption process - adoption- is conceptualized as repeated use and commitment towards continued SST usage. Adoption was also measured with a single question determining whether or not the respondent had used one or several SSTs a few times earlier, and whether the participant had committed towards continued SST use when

ever needed. This way, all the respondents were once again categorized as adopters and non-adopters. After a discussion with a panel of experts consisting of subject experts and researchers from related areas, adoption intention was also measured with a 3-item adopted scale suggested by Davis (1989) and Venkatesh and Bala (2008). It has been incorporated mainly to examine the impact of various adoption determinants on respondents' adoption intention towards innovative SSTs. This step will also be useful when examining the adoption behavior of non-adopters of existing SSTs.

5.5. Data Analysis Plan

In this research, numerous primary data analysis procedures are applied to test the various hypotheses developed in Chapter Four. These analyses and their findings are more deeply discussed and reported in Chapter Seven. To examine the significant determinants of adoption and their inter-relationships, a series of regression analyses was incorporated. As shown in the proposed conceptual model (see Figure 4.2), the consumer innovativeness variable is proposed as a crucial mediator between various determinants and intention of adoption. To examine the mediating effect, a four-step procedure is also followed (Baron & Kenny, 1986) according to which, if all four steps are significantly fulfilled, mediation can be confirmed.

Structural equation modeling was intended to test the direct, mediating as well as moderating effects because the main dependent variable - adoption intention - is a continuous (or metric) variable. If adoption is measured as a non-metric variable, discriminant analysis assuming multivariate normality in the dependent variable would be an effective way to examine the various metric independent variables shown in the proposed conceptual model (See Figure 4.2). Next, the relationships among the different stages of the SST innovation process will be empirically examined through a series of correlation analyses.

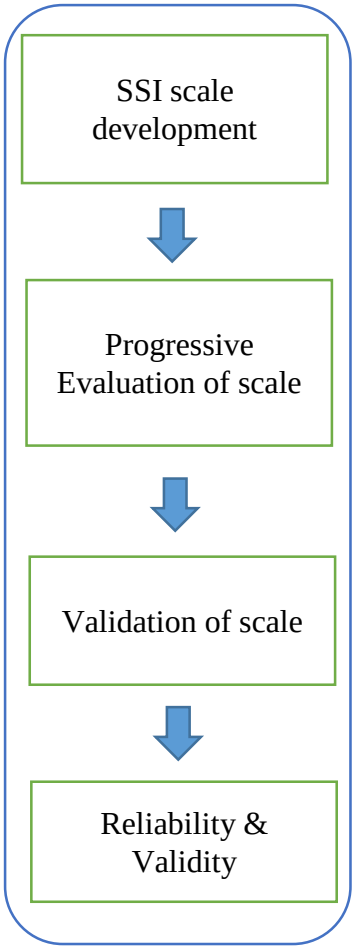
Summary

Chapter Five has described the overall study design to be used in testing the hypotheses and conceptual model detailed in Chapter Four. The design, rationale for its selection, the context and the sampling plan were all described in detail. Background information on the development of the research instrument and the origin of each of the scales used was also provided. The analysis and results of the study will be discussed in the next chapter.

Chapter 6

Scale Development and Validation

Consumer innovativeness is a central variable in innovation diffusion and adoption literature. The foremost challenge confronted by investigators involved in innovation diffusion and adoption research is the problem of measuring the innovativeness construct. Furthermore, a scale measuring innovativeness towards self-service technologies (SSTs) adoption is required as SSTs have grown considerably in the last few decades. To this end, researcher in this Chapter Six develops and validates SSI scale applicable across a variety of SSTs. The chapter presents a series of six distinct phases describing the development and validation of a six-item self-report scale. The innovativeness scale has been validated in different contexts, allowing comparisons across distinct samples (i.e., student vs. non-student sample) and different industries (i.e., retail and hospitality industries). The SSI scale presented in this chapter is short, valid, reliable, and easy to administer in service domains. The SSI scale will further be used in data analysis in Chapter Seven.



6.1. Introduction

Despite continuous developments in product design, marketing activities and supply chain, most new products fail to survive in the market (Srinivasan, Pauwels, Silva-Risso & Hanssens, 2009). This failure of innovations has most often been due to a firm's limited understanding of consumer needs and wants (Liu, 2013). To minimize the risk of failure, firms need to focus on consumer characteristics influencing the success of new products. Such characteristics include consumer innovativeness and its influence on new product adoption behavior (Hauser et al., 2006; Rogers, 2003). A number of previous studies researching new product adoption have emphasized on the personal characteristics of consumers (e.g., Hirschman, 1980; Lassar et al., 2005; Füller, Matzler & Hoppe, 2008). Innovativeness and its measurement have since become crucial concepts to be addressed (Parasuraman & Colby, 2015; Schultz, Salomo & Talke, 2013).

Emergence of the internet has provided a dynamic medium for carrying out transactions between firms and customers in the virtual marketplace (Rahman, 2003). As a result, many innovative financial solutions, especially for transaction processing services (e.g., banking and insurance) arose in the past few decades (Nejad & Estelami, 2012; Collier & Kimes, 2012). These developments led to the introduction and advancement of many self-service technologies (SSTs) in the services arena (Weijters et al., 2007; Wang, Harris & Patterson, 2013). In fact, traditional services are increasingly replaced with technology-based self-services (Beuningen, Ruyter, Wetzels & Streukens, 2009), mainly in the absence of any other options for service delivery (Reinders et al., 2008). The term 'self-service technology' was first defined by Meuter et al., (2000) as "technological interfaces, enabling customers to use a service independent of direct service-employee involvement." In recent times, a number of distinct SSTs have become available in retail banking services significantly affecting the traditional service delivery process of the banking industry (Kaushik & Rahman, 2015a). For instance, automatic teller machines (ATMs) emerged in the late 1970s; electronic fund transfer at the point of sale (EFTPOS) started in the early 1980s; telephone/mobile banking was introduced in the mid-1990s; internet banking emerged in the late 1990s and self-service kiosks (SSKs) were introduced in the early 21st century (Kaushik & Rahman, 2015a; Meuter et al., 2000).

Consumer innovativeness is defined as a consumer's propensity to adopt new products. Parasuraman and Colby (2015) also defined innovativeness as a tendency to be a technology pioneer and thought leader. However, there is no real consensus on the meaning of innovativeness, and it can be presented as the early purchase of a new product as well as the human tendency to be attracted towards new products (Steenkamp et al., 1999). There exist three key dimensions of consumer innovativeness that have emerged from three different perspectives: *innate innovativeness* has emerged

from the generalist perspective, *domain specific innovativeness* from particularist, and *innovative behavior* from the integrator perspective (Kaushik & Rahman, 2014). A firm's innovativeness or 'creation of newness' refers to a firm's ability to develop and launch new products (Hurley & Hult, 1998) while product innovativeness, also known as 'possession of newness', measures the extent to which a product carries the element of novelty (Daneels & Kleinsmith, 2001). Thus, Consumer innovativeness, also termed 'consumption of newness', is a consumer's tendency to adopt new products more often and more frequently as compared to other consumers (Midgley & Dowling, 1978). This study uses the word 'innovativeness' only with reference to CI.

Numerous scales have been developed to measure consumer innovativeness in different contexts. These scales can be categorized as: Life innovativeness scales (i.e., the ability to introduce newness in one's life) (Roehrich, 2004) and Adoptive innovativeness/Consumer Innovativeness Scale (as shown in Table 6.1). Studies on innovation adoption and diffusion have been hindered by the absence of a universally accepted measure of innovativeness, and the measures conventionally used have drawn criticism for their unreliability and invalidity (Goldsmith et al., 1995; Roehrich, 2004). In earlier decades, majority of the innovations and related theories primarily focused on development of products rather than services (Khan & Khan, 2009; Kaushik & Rahman, 2015a, b); the major emphasis was on product development because of its economic impact. Also, majority of existing scales belongs to product category only. With an increase in the prominence of services, emphasis has shifted from product development towards service development (Dotzel, Shankar & Berry, 2013; Kaushik & Rahman, 2015a, b). As a result, SSTs are increasing being applied in the service delivery processes. Therefore, to measure CI, a global scale that is valid, reliable, and easy to use in service domains is required. This is a credible gap in diffusion and adoption literature. Thus, the primary purpose of this research is to develop and validate a self-report scale of consumer innovativeness that meets the above mentioned criteria in context of SSTs. This study develops a short, balanced and valid scale based on the standard scale development procedure suggested by Churchill (1979). The novelty of this study lies in the fact that this scale was developed in the banking industry and has been further validated in different contexts, allowing comparisons across distinct samples (i.e., student vs. non-student sample) and different industries (i.e., retail and hospitality industry).

6.2. Consumer innovativeness and its measurement

The concept of consumer innovativeness and its measurement have become important in the present context for several reasons: First, markets have become globalized, therefore, marketers need to understand the similarities and differences in consumers' characteristics. Second, many firms are introducing numerous SSTs and need to know about consumers' propensity to adopt these SSTs and

how consumer propensity varies across SSTs (Curran & Meuter, 2005). Innovation nowadays advances consumer welfare by increasing the benefits of products while also reducing their costs (Golder & Tellis, 1997). For example, by introducing self-service options, firms are constantly reducing their labor cost. Understanding consumer innovativeness drives a firm's economic progress, and provides benefits to governments and public policy makers.

Previous research conducted to measure consumer innovativeness mainly used one of the following three methods - time-of-adoption method (Rogers, 1962; Rogers & Shoemaker, 1971), a cross-sectional method (Midgley & Dowling, 1978), and a self-report method (Goldsmith & Hofacker, 1991). Each has its own benefits and criticisms and none of them can be treated as universally acceptable. Based on the theory of innovation diffusion (Rogers, 1962), innovativeness is defined as "degree to which an individual is relatively earlier in adopting an innovation than other members of his system" (Rogers & Shoemaker, 1971, p. 27). In this context, many researchers have used time of adoption as an initial measure of CI, but, this approach has also been criticized (Hurt, Joseph & Cook, 1977; Midgley & Dowling, 1978). According to Midgley and Dowling (1978), time-of-adoption scale simply equates time-of-adoption and the 'innovativeness' construct, and does not bear any isomorphic relationship between them. Also, the invalidity and unreliability of existing scales led to innovativeness being measured in different ways in different studies which made comparison and generalization of the findings of these studies difficult (Goldsmith & Hofacker, 1991). Further, time-of-adoption scales cannot be used to accurately predict future adoption behavior of consumers and rely on faulty memory of respondents. Hurt et al., (1977) also mentioned that the sample size may be restricted by time and cost constraints in time-of-adoption based studies.

Midgley and Dowling (1978) offer a more comprehensive way to measure consumer innovativeness - by using a cross-sectional approach in which the researcher investigates how many new products in a given list of products an individual has already purchased at the time of the field survey. They consider this approach as a better measure of II. They further mentioned that II is a personality trait possessed by more or less every individual in a society. This approach however, drew criticism due to its use of time-of-adoption scale. There were many questions raised such as, which products or their categories would be selected, and which products would be considered new? Also, this approach was meant to measure II as a general personality trait, and was found to be of little use in a specific domain of interest. A majority of innovation adoption studies found that if consumer innovativeness overlapped across different product domains, measuring II would be of little value to those interested in DSI (Gatignon & Robertson, 1985). Hirschman (1980) used a domain specific scale to measure fashion innovativeness, and many others have also used similar domain specific measures of consumer

innovativeness (Price & Ridgway, 1983). However, a majority of these scales were neither consistent across studies, nor did they offer enough evidence for their validity (Goldsmith & Hofacker, 1991).

Innovativeness scales, as shown in table 6.1, touch diverse dimensions, the foremost in innovation diffusion literature are: newness attraction/repulsion scales (Leavitt & Walton, 1975; Hurt et al., 1977; Raju, 1980; Baumgartner & Steenkamp, 1996; Goldsmith & Hofacker, 1991; Roehrich, 1995; Louarn, 1997), creativity/originality scales (Kirton, 1976; Hurt et al., 1977), risk attraction/aversion scales (Leavitt & Walton, 1975; Louarn, 1997), attention to others' opinion scales (Leavitt & Walton, 1975; Louarn, 1997). Most of these scales are multidimensional, albeit with a few exceptions such as Raju's, Goldsmith and Hofacker's and Baumgartner and Steenkamp's unidimensional scales, and require further validation in different contexts. Thus, there should be a unidimensional, reliable and valid self-report scale with multiple items to measure consumer innovativeness that could be applied to a specific domain of interest. Multiple items would ensure that a construct is analyzed from different perspectives which would increase the scale's overall reliability (Ekrem & Fazil, 2007; Chahal & Kumari, 2012). Thus, the researcher in this study, developed and validated a unidimensional SSI scale that is applicable in different service industries offering SSTs. To develop such a scale, the researcher also used an opinion leadership scale (King & Summers, 1970) as it is conceptually associated with consumer innovativeness in marketing literature.

6.3. Structure of this study

To develop a SSI scale and evaluate its psychometric characteristics, this study was performed in six different phases as described by Goldsmith and Hofacker (1991). The first phase comprises the process of developing a balanced and unidimensional scale. The second phase evaluates its reliability, dimensionality, and criterion-related validity on a different sample of respondents (Churchill, 1979, Netemeyer et al., 2003; Jain, Sinha & De, 2010; Prakash, 2011, 2015). The third phase reflects the flexibility of the scale by showing its adaptability in a service arena other than the one considered in its initial development. The fourth phase includes a sample of 'real customers' instead of only a 'student sample' to prove its validity and reliability in the field. The fifth phase examines its test-retest reliability, predictive validity and the possible effects of social desirability and yea-saying. In the sixth and last phase, the researcher examines the convergent and discriminant validity of the scale using multitrait-multimethod (MM) procedure (Campbell & Fiske, 1959).

Table 6.1. List and Brief Description of Various Scales of Innovativeness

	Author(s) (Year)	Scale	Brief Description & Validation
Life Innovativeness Scale	Leavitt and Walton (1975)	Innovativeness	Multidimensional (seven dimensions), 24-item scale, highly reliable, but only scores on female respondents are included, further validated by Goldsmith and Nugent (1984); Goldsmith (1990); Bearden, Netemeyer, and Mobley (1993)
	Kirton's (1976)	Kirton's innovators–adaptators inventory (KAI)	Multidimensional (three dimensions), 32-item inventory, further validated by Goldsmith and Nugent (1984); Goldsmith (1990); Mudd (1995)
	Hurt et al., (1977)	Hurt–Joseph–Cook's scale	Multidimensional (four or five dimensions), 20-item scale with good psychometric properties such as internal consistency and validity, further validated by Goldsmith and Nugent (1984); Goldsmith (1990); Pallister and Foxall (1995)
Adoptive innovativeness / Consumer Innovativeness Scale	Raju (1980)	Innovativeness as category within Exploratory Tendencies	Unidimensional, 10-item reliable measure, mainly criticized for its structure, further validated by Joachimsthaler and Lastovicka (1984); Wahlers, Dunn, and Etzel (1986).
	Price and Ridgway (1983)	Use innovativeness (UI)	Multidimensional (five dimensions), 44-item UI scale with sufficient internal reliability, further validated by Ram and Jung (1989); Girardi et al., (2005).
	Goldsmith and Hofacker (1991)	Domain-specific Innovativeness (DSI)	Unidimensional, 6-item highly reliable scale, further validated by Goldsmith et al., (1995).

Roehrich (1995)	Innovativeness as Hedonic Innovativeness and Social Innovativeness	Multidimensional (two dimensions) 6-item scale (3 items for each dimension), internally consistence, further validated by Roehrich (1987).
Baumgartner and Steenkamp (1996)	Exploratory Acquisition of Product (EAP) as dimension of Exploratory Buying Behavior	Unidimensional 10-item EAP scale, further validated by Steenkamp and van Trijp (1996).
Louarn (1997)	Attraction to Newness, Autonomy in innovative decision, and Ability to take risks in trying newness as dimensions of Predisposition to innovate	Multidimensional (three dimensions), 6-item scale (2 items for each dimension) with good psychometric properties (i.e., internal consistency and validity), only 'newness attractiveness' is correlated with innovative behavior, further validated by Yang, Tu, and Yang (2009).
Hartman, Gehrt, and Watchrevringskan (2004)	Teen Innovativeness Scale consists of Vicarious-innovative, Use-innovative and Adoptive-innovative dimensions	Multidimensional (three dimensions), 20-item scale with good content, construct and face validity, and sufficient reliabilities, mainly appropriate for younger consumer segments, further validated by Hartman and Samra (2008).
Vandecasteele and Geuens (2010)	Motivated Consumer Innovativeness (MCI)	Multidimensional (four dimensional), 20-item scale, reliable and internally valid and does not seem to suffer from social desirability bias, only one Western European country was surveyed, further validated by Li, Zhang, and Wang (2014).

6.3.1. Phase I: Preliminary Scale Development

The researcher has considered a widely accepted scale development process proposed by Churchill (1979) and Netemeyer et al., (2003), further augmented by many researchers (e.g., Walsh & Beatty, 2007; Vivek et al., 2014). The scale development procedure comprises following main steps:

6.3.1.1. Step 1: Domain specification and Item Generation

The foremost step of the scale development process is to conceptualize the key construct of interest. In this study it is 'consumer innovativeness' that consists of three different dimensions - II, DSI and IB (Kaushik & Rahman, 2014). II is more of an abstract concept and is defined as a generalized personality trait that reflects "…a degree to which an individual makes innovative decisions independently of the communicated experience of others" (Midgley & Dowling, 1978, p. 235). However, DSI is distinguished from II and defined as "a tendency to learn about and adopt innovations (new products) within a specific domain of interest" (Goldsmith & Hofacker, 1991, p. 211). They (Midgley & Dowling, 1978; Kaushik & Rahman, 2014) also suggest that DSI conceptually and empirically mediates the relationship between II and IB.

Gatignon and Robertson (1985) concluded that innovators must be identified and characterized on a product category basis and that there was no generalized innovator across product categories. There is also a lack of consistency in the findings of previous adoption studies as researchers failed to specify the level of abstraction at which they measured innovativeness, thus comparing findings at different levels (Goldsmith & Hofacker, 1991). This study focuses on consumer adoption behavior towards SSTs while considering the different types of SST options available in different service arenas. The researcher chose SSTs as their domain of study due to the fact that the development of a SSI scale called for a specific area of study within the services arena (Gatignon & Robertson, 1985). The information necessary to develop such a scale would have to be obtained from a sample of respondents that were familiar with technology and used SSTs fairly regularly. The researcher found that students would make an ideal sample due to their constant interaction with and regularly updated knowledge of SSTs. SSTs met these criteria because the younger generation is more technology-friendly, and new and advanced technology is always an area of interest (Arts et al., 2011); many of them have used different SSTs in different contexts, therefore, possess significant knowledge about them.

A systematic review of previous diffusion studies provides the following description of innovators' behavior while discussing consumer behavior: innovators are the first to buy/adopt a new product/service; they have more interest in, and more knowledge of the product/service than

other members of society; they are exposed to more information about the product/service, and are more likely to share this information with others. The researcher in this phase of study, has identified 13 items reflecting the above-mentioned characteristics of consumers. All these items were first carefully written in simple language, and then rewritten to reflect opposite polarity wording as given in Table 6.2.

Table 6.2: Preliminary Grouping of Items with Opposite Polarity Wording

Item No.	Description of item
1 and 14	I am generally the first (last) in my society to use a new SST.
2 and 15	If I heard that a new way of self-service is introduced, I would (not) be interested to use it.
3 and 16	If I found a new SST while visiting bank, I would (not) prefer to use it.
4 and 17	I (do not) like to use any new SST.
5 and 18	I have personally experienced a few (many) SSTs.
6 and 19	As compared to all, I have used a specific SST a few (many) times.
7 and 20	I am generally the first (last) in my friend circle to know about availability and usage of any new SST.
8 and 21	I (do not) prefer using SSTs over a traditional way of service delivery with human interaction.
9 and 22	I (do not) use a SST, if I haven't heard about its usage and benefits.
10 and 23	I (do not) want to use a SST, if it is not for my present use.
11 and 24	I (do not) use any new SST before other people use it.
12 and 25	I (do not) like to use any new SST that has similar functions as in others.
13 and 26	I would (not) like to use more new ways of self-service delivery that saves time and efforts.

- *The scale is initially developed in the context of banking industry, therefore the term 'SSTs' was used to denote the ATMs, Phone banking and/or SSKs.*
- *All 13 Scales items were developed based on innovators' characteristics such as innovators are the first to adopt a SST; they have more interest in, and more knowledge of the SSTs; they are exposed to more information about the SSTs, and they are more likely to share this information with others (Engel, Blackwell & Miniard, 1986; Gatignon & Robertson, 1985; Midgley & Dowling, 1978; Wilkie, 1986).*
- *All 13 items were first carefully written in simple language, and then rewritten to reflect opposite polarity wording.*

6.3.1.2. Step 2: Scale Purification

Two different and opposite sets of questionnaires (Set A and Set B) were initially developed, and each set contained either 13 positive or 13 negative items. In other words, a specific item in Set A reflected just the opposite of the corresponding item in Set B. A seven-point Likert scale was

used with end-points 1 (Strongly agree) and 7 (Strongly disagree). These items were also preceded by a few criterion measures assessing the respondent's level of interest in SSTs. First of all, 'a list of a few SSTs available in the banking industry' (i.e., Automatic Teller Machines, Phone/mobile banking, and Self-service kiosks) was presented. The respondents were asked whether they were aware that a particular SST existed (awareness), and whether they had, at some point, used that SST (usage). The respondents had to choose one of three options - Yes, no, and don't know. Summing up the number of Yes responses provided crucial information about the level of awareness of consumers (regarding SSTs) and their usage of the SSTs available in the banking industry. The next criterion item was, 'whether they read any information source like magazines, newspapers, etc. regarding the implementation of SSTs in banks'. Here, the respondent was free to choose any one of the following responses: always, sometimes, rarely and never. Thereafter, they were asked, 'how often do they visit their banks' and the response format included options such as: never, once a week and twice or more a week. Thus, the four criterion items - consumer awareness, experience, readership and visit, were included in both sets of questionnaires. All the scale items showed positive correlations with these criterion measures reflecting enough item validity.

The questionnaire was first tested with 34 students, aged 20-30 years in order to confirm the accuracy and relevancy of the research questionnaire. Reliability was measured using Cronbach's alpha coefficients for each of the items, and all values exceeded 0.70 (Nunnally, 1978; Bahl & Wali, 2014,). This ensured that all the scale items were understandable. For final data collection, every one of 30 doctoral/marketing students was given 12 copies of the questionnaire (six copies of each set). They were instructed to distribute the questionnaires in the following way: 3 copies from set A were to be distributed to 3 male respondents and the remaining 3 copies from set were to be distributed among 3 female respondents. Similarly, 3 copies from set B were to be distributed to 3 male respondents, and the remaining 3 copies from set to 3 female respondents. Finally, 312 usable responses from 167 males and 145 females were received, with an average respondent age of 21.3 years. Out of these 312 responses, the responses received for set A questionnaires were 157, while those for set B questionnaires were 155. This arrangement enabled the researcher to compare both sets of questionnaires.

To purify the scale, the researcher applied item analysis as suggested by Churchill (1979). For both sets of thirteen items, the inter-item and item-to-total correlations were analyzed along with calculating Cronbach's alpha values (Jain, Sahney & Sinha, 2013). Items having the lowest values of item-to-total correlation were deleted in cases where deletion increased alpha values; in cases where deletion did not increase alpha values, items were not deleted. This procedure was

repeated until the minimum acceptable value of Cronbach's alpha of 0.70 was achieved (Nunnally, 1978), and item deletion started decreasing alpha values. This resulted in two distinct sets of sixteen variables each with Cronbach's alpha values of 0.77 and 0.73.

The next step of the purification stage was to analyze correlations between each of the sixteen items with four criterion measures (SST awareness, SST usage, readership and visit). All these variables were found positively correlated as the correlation ranged from .19 to .67 for Set A, and .21 to .57 for Set B (see Table 6.3). The average value of correlations, as reported in table 6.3, for individual items while considering all four criterion variables, is taken as basis for selection of each item (Messick, 1981). Another method of item selection was to apply exploratory factor analysis (EFA) to all the items and select those that loaded on only one factor without any cross loading (Churchill, 1979; Rudawska, 2011). Although all the items were found inter-correlated, but it does not mean that they were also related to criterion measures in ways the scale was supposed to measure.

Table 6.3: Correlations between Scale Items and Criterion Variables in Phase I

Item Number	Correlations with Criterion Measures				
	Awareness	**Usage**	**Readership**	**Visit**	**Average**
1	.11	.23	.31	.17	0.21
2*	.34	.47	.42	.39	**0.41**
3	.13	.18	.11	.53	0.24
4	.19	.42	.08	.13	0.21
7	.17	.23	.07	.13	0.15
8*	.29	.34	.41	.34	**0.35**
9	.06	.19	.13	.12	0.13
11*	.31	.37	.33	.42	**0.36**
15	.13	.12	.21	.09	0.14
16*	.33	.28	.21	.49	**0.33**
17	.07	.27	.21	.09	0.16
19	.17	.23	.09	.21	0.18
22*	.26	.31	.43	.39	**0.35**
23*	.23	.42	.38	.47	**0.38**
24	.12	.21	.13	.07	0.13
25	.07	.11	.19	.08	0.11

*Items selected based on the highest average criterion validity.

The researcher finally selected six individual items (shown in Table 6.3) that contributed most to the internal consistency of the scale, and had highest average criterion validity as suggested by Messick (1981). Each of the scale items had a positive as well as a negative statement as shown in Table 6.2. To ensure balance in scale, the researcher selected three positive (2, 8 and 11) and three negative items (16, 22 and 23). All selected items were uni-modal because if a positive version of any item was selected, its negative version was not selected, and vice versa.

Furthermore, a new data set was collected in order to assess the internal consistency of scale along with its dimensionality and validity. The scale was developed from positive as well as negative sets of items from two distinct samples. Therefore, it became necessary to check the scale characteristics before combining the scale items.

6.3.2. Phase II: Progressive Evaluation of Scale

In this phase, the researcher used their six-item SSI scale with a five-point Likert scale instead of the seven-point Likert scale because many other similar studies recommended the use of this response format (Goldsmith & Hofacker, 1991). Further, several experts and respondents also suggested the use of five-point Likert scale.

Subjects

The questionnaire was distributed to 24 doctoral/PG students from marketing specialization. Each student was given 10 questionnaires to be distributed among 5 male and 5 female respondents. These students further distributed the questionnaire to 240 respondents. Finally, out of the 240 questionnaires circulated, 221 usable responses were received from 114 male and 107 female respondents, with an average respondent age of 23.2 years.

Criterion Measures

The respondents were again asked about the level of their awareness and their usage of SSTs. This time they were provided an extended list of SSTs like Passbook printing kiosk, Cash deposition kiosks, Token machines and Cheque deposition machine along with the names of other SSTs used in the first phase. Once again, the researcher assessed their awareness and usage of SSTs by summing the number of Yes answers. They were again asked whether they had read any information source such as newspapers/magazines related to the banking industry, and also, how frequently they visited banks. In addition to these four criterion measures, three new questions were added to assess the respondent's level of interest in self-service banking technologies (SSBTs): First, they were asked, 'How many times do you use any SST such as

ATMs, Phone/Mobile banking, etc. in an average week?' They could answer on a four-point response scale, and the options available were, never, 1-2 times in a week, 3-4 times in a week, and almost daily. The second additional question was, 'How much do you like use SSTs in banking services?' The response format included not at all, not very much, to same extent and a lot. Finally, the respondents were asked about their opinion leadership by adding the seven-items of opinion leadership scale (King & Summers, 1970). The scores on the scale were expected to be positively correlated with all criterion items - awareness, usage, readership, visit, frequency of use, likeness, and opinion leadership as shown in Table 6.4.

Results

The next section describes the analysis of various psychographic characteristics of the scale.

Reliability

The overall mean score of the above- mentioned six-item scale was 17.2 (SD = 3.7) with a mean inter-item correlation of 0.43 and coefficient alpha value of 0.82 for the summed scale. A comparison between the mean score of 18.4 for male students and 16.1 for female students [t (219) = 4.73, p = .013] suggests that college males have more innovativeness towards SSBTs than females. The coefficient alpha values were 0.81 and 0.83 for men and women respectively.

Dimensionality

One critical issue of the study was analyzing the impact of direction-of-item wording on the dimensionality of the multi-item scale. For this, both sets of scale items (i.e., positive and negative) were included in order to improve agreeing responses. It resulted in high internal consistency and unidimensionality of the overall scale. Here, the researcher also applied item validity tests to ensure high inter-item correlations and item-to-total correlations (see Table 6.4). The scale in this second phase was evaluated for dimensionality. A principal component factor analysis was applied, resulting in a single factor solution. All the six items were loading on a single factor (factor loading ≥ 0.50) with Eigen value of 2.8, and total variance explained was 53.7%. Besides this, a confirmatory factor analysis (CFA) was also applied to test the scale scores. The calculated significant value of chi square ($\chi 2$) was 34.731 (degree of freedom = 9) with goodness of fit index of 0.913 that was greater than the threshold value 0.9. This shows that CFA is consistent with the results of EFA in relation with the dimensionality of scale items.

Validity

Table 6.4 reports the correlation coefficients among innovativeness and seven distinct criterion measures included in phase II. All these values confirm the convergent validity for all the

criterion items as innovativeness was found positively correlated with all these variables. The correlation coefficient varies from 0.27 with consumers' readership to 0.67 with opinion leadership. The results also confirm the validity of opinion leadership as it significantly correlated with all other variables. The results were similar in case of male and female respondents and overall values are reported in Table 6.4. Thus, the results in phase II, confirm the internal consistency, unidimensionality, and validity of the six-item SSI scale.

Table 6.4: Correlations between Innovativeness and Criterion Variables in Phase II

Variable	X_2	X_3	X_4	X_5	X_6	X_7	X_8
Innovativeness ($X_{1)}$	.46	.53	.27	.38	.32	.43	.67
Awareness ($X_{2)}$		.43	.29	.31	.20	.22	.41
Usage ($X_{3)}$			.18	.29	.26	.19*	.39
Readership ($X_{4)}$				.08*	.23	.31	.43
Visit ($X_{5)}$					.17*	.23	.39
Frequency ($X_{6)}$						.28	.33
Likeness ($X_{7)}$							.27
Opinion Leadership ($X_{8)}$							1.00

Here: n = 221, *p > 0.001

6.3.3. Phase III: Validation in Different Industry (Retail)

To validate the SSI scale in a different industry, the researcher selected the retail industry because of its history of introducing distinct SSTs in organized retail firms. Current technological advances in retail firms has enhanced consumers' shopping activities as well as retailers' jobs (Pandey & Wali, 2010; Pantano & Di Pietro, 2012; Zhu, Nakata, Sivakumar & Grewal, 2013). Many researchers have focused on distinct SSTs such as self-scanning devices or checkout systems in supermarkets (Liljander et al., 2006) and examined the impact of implementing these SSTs on consumer commitment towards firms. Leung and Matanda (2013) described the impact of basic human needs on the adoption of self-service retailing technologies (SSRTs). Another reason behind the selection of retail industry was the inclusion of a student sample while developing the scale. The researcher wanted to choose an industry relevant to their buying behavior and young students are the primary customers of organized retail stores. Thus, all the six items in SSI scale were rewritten in the context of SSRTs.

Subjects

For data collection, the researcher targeted 107 retail customers visiting organized retail stores in different, convenient locations in the northern region of India. Finally, 102 usable responses comprising 45 male and 57 female responses with an average age of 23.6 years, were received.

Criterion Measures

The questionnaire started with the names of some common SSRTs such as self-scanning devices, checkout systems, electronic fund transfer at the point of sale (EFTPOS), etc. All the respondents were asked about their awareness and usage of these SSRTs with a Yes, No, and Don't know response format. Similarly, all the criterion measures used in case of the banking industry were rephrased for the retail industry to measure readership of newspaper/magazines to seek information about SSRTs, visiting a retail store, frequency of use of SSRTs, their likeness of using SSRTs, and opinion leadership items. The researcher expected positive correlations of innovativeness constructs with all the criterion variables.

Results

Reliability

The mean score of this six-item scale was 18.9 (SD = 3.48) with a mean inter-item correlation of 0.39 and coefficient alpha value of 0.87 for the summed scale. A comparison between the positive and negative scores of the scale ($r = -0.53$, $p < 0.001$) confirmed the findings of phase II, that an agreeing response style hardly affected responses to these items. Additionally, a Kolmogorov-Smirnov (K-S) sample test confirmed that the scores were normally distributed about their mean.

Dimensionality

The dimensionality of scale was once again checked by EFA, providing a single factor solution. All the six items were loading on a single factor (factor loading ≥ 0.50) with Eigen value of 3.1, and total variance explained was 56.3%. Furthermore, CFA confirmed an excellent fit of the unidimensional model with a calculated value of chi square ($\chi 2$) of 14.894 (degree of freedom = 9), and Bentler- Bonett fit index of 0.913 (Bentler, 1984).

Validity

Table 6.5 reports the correlation coefficients among innovativeness and distinct criterion measures included in phase III. The results provide support to convergent validity for all criterion measures. For instance, the results support the validity of opinion leadership scales as opinion leadership was significantly correlated with all other scale items. The results also support the

validity of innovativeness scale. Innovativeness is also positively correlated (p = 0.01) with all seven criterion items, with correlation coefficients ranging from 0.46 with consumers' likeness of using SSRTs to 0.77 for SSRTs opinion leadership. Thus, the results in phase III confirm that other than the banking industry, the SSI scale can successfully be used in the retail industry for self-service technological adoption. The researcher agrees that a few additional studies in other service industries such as airlines, hospitality, entertainment, etc. can establish the degree to which this scale can be freely adopted.

Table 6.5: Correlations between Innovativeness and Criterion Variables in Phase III

Variable	X_2	X_3	X_4	X_5	X_6	X_7	X_8
Innovativeness (X_1)	.57	.49	.51	.63	.55	.46	.77
Awareness (X_2)		.56	.43	.61	.21	.37	.59
Usage (X_3)			.31	.57	.19*	.68	.65
Readership (X_4)				.37	.13*	.32	.56
Visit (X_5)					.56	.67	.43
Frequency (X_6)						.52	.68
Likeness (X_7)							.51
Opinion Leadership (X_8)							1.00

Here, n = 102, *p > 0.001

6.3.4. Phase IV: Validation with a Non-Student Sample in a Different Industry (Hospitality)

In the preceding two phases, the researcher used a sample comprising mainly students. However, to evaluate the scale robustness with the presence of 'true customers', they extended their study by analyzing tourists' innovativeness towards SSTs available in hospitality industry (e.g. self-service hotel technologies, i.e. SSHTs). Information Communication Technology (ICT) plays a big role in the service industry as communication with customers is more in this sector. Customer participation and involvement are factors critical to the success of any service provider. The hospitality industry is also a part of the service industry, and hotels are constantly investing in ICT to improve their service quality, and reduce overall cost (Kim & Qu, 2014). Expansion of ICT in the hospitality industry is the reason behind the introduction of a number of SSTs (self-check-in kiosks, electronic tourist guides, tourism information kiosks, self-service systems in dining facilities, hotel self-check-in, and automated hotel check-out) in this sector (Kim, Christodoulidou & Brewer, 2012; Riebeck, Stark, Modsching & Kawalek, 2008). Therefore, the

researcher conducted personal interviews with tourists that lasted around six to ten minutes to learn about the tourists' adoption behavior of SSTs available in hotels located at different places in the northern region of India. A list of distinct SSHTs was included (e.g., digital signage, self-service kiosks, self-check-in and checkout system, EFTPOS and so on) as criterion variables in order to compare how the factors affecting adoption behavior varied across distinct SSTs.

The SSI scale has already been validated for the retail industry once in the present study. In phase IV, the researcher attempted to validate their scale with a non-student sample in the hospitality industry. This would allow a comparison between student and non-student samples as well as between different industries (retail vs. hospitality industry). To this end, around 450 personal interviews were conducted, resulting in 432 usable responses from 219 male and 213 female respondents with an average age of 36.2 years. A majority of the respondents reported themselves well-educated (74% reported having a UG/PG degree from a recognized institute/university), and adults (42.7% were under 30 years of age). Around 39% were unmarried, and 28.4% earned more than INR 5, 00,000 per annum. Assuming similar experiences of self-service options in hospitality industry by domestic tourists across the country, they are selected as the target respondents.

The mean score of this six-item scale was 15.7 (SD = 4.13) with a mean inter-item correlation of 0.43 and coefficient alpha value of 0.84 for the summed scale. The dimensionality analysis, using EFA once again provided a single factor solution which accounted for 53.7% of total variance. A comparison between the positive and negative scores of the scale ($r = - 0.39$, $p < 0.001$) confirmed that an agreeing response style hardly affected responses to scale items. Results showed that the use of student samples in the initial phases of this study to develop and refine the scale had no adverse effects on the scale's psychometric characteristics when the scale was used on adults or 'real consumers' in a different industry. Thus, this innovativeness scale can reliably be used with both student and adult service consumers. In addition, the scale was found to be robust across different industries as it was originally developed for banking services, but it has been validated in retail and hospitality industries under similar conditions. Thus, the scale has genuine utility in measuring domain-specific innovativeness across distinct SSTs in different industries.

6.3.5. Phase V: Test-Retest Reliability and Predictive Validity

In this phase, the researcher analyzed two additional psychometric characteristics of the scale - test-retest reliability and predictive validity. Test-retest reliability is a measure of the consistency of an assessment or a test across time. According to Brown (1976), it is basically the correlation

of any measure taken twice at two different points in time and indicates the stability of the measure. It mainly believes that the quality or construct being measured will not be changed. It means trait will be steady over time, and is not affected by practice or learning. It also assumes that over a period of time, subjects would not recall how they responded previously. The researcher, in this phase of the study, confirms these assumptions by correlating the scale scores obtained from the same student sample at two different points of time – first, at the beginning of their semester, and then after sixteen weeks (at the end of the semester).

According to Brown (1976), predictive validity is the extent to which a score on a scale or test predicts scores on some criterion measures. It is also measured by correlating the scale's scores collected at two different points in time over a period of sixteen weeks. The scale scores obtained here were also correlated in order to examine the effects of yea-saying and social desirability.

Subjects and Design

To analyze the above-mentioned characteristics, the researcher collected responses of 86 students from the marketing discipline (53 male and 33 female) at the beginning of their spring semester with the help of the SSI scale about SSBTs adoption. Over a period of sixteen weeks, 77 of these students once again responded to the SSBTs version of the research questionnaire.

Instruments

In the first questionnaire, respondents were asked about their demographics and their innovativeness towards SSBTs. The next version of the questionnaire, filled sixteen weeks later at the end of spring semester, listed a few more SSBTs. The students answered which of these they were aware of and had used (at least once). To determine yea-saying, the researcher used the YN-2 scale that comprises 20 items chosen to assess the propensity to 'stimulus acceptance' believed to cause a part of the propensity to concur with the questionnaire items irrespective of their content (Wells, 1961, 1963). The alpha value arrived at by the researcher for the YN-2 scale was .72. To measure social desirability, the researcher used the Strahan and Gerbasi (1972) X1 scale as it was found to be the most reliable shorter version of Crowne–Marlowe social desirability scale (1960), at least among student samples (Thompson & Phua, 2005). Loo and Thorpe (2000) also confirmed the reliability of X1 version of this scale over X2 version, again using student samples. The Strahan–Gerbasi X1 scale, using a 'True/False' format with total score ranges between 0 and 10, where higher scores indicated a higher degree of socially desirable responses, has been widely used in social science literature (Thompson & Phua, 2005;

Faranda, 2001; Flynn & Goldsmith, 1999). The alpha value arrived at by the researcher for this scale was .76.

Reliability

The mean scores of the scale were 15.7 and 14.3 with standard deviations of SD1 = 4.78 and SD2 = 5.23 for the first and second circulations of the scale, respectively. The Cronbach's alpha coefficients was 0.83 when used the first time, and 0.87 when used the next time. A comparison between the scores of positive and negative halves of the scale ($r = - 0.67$, $p < 0.001$) confirms previous findings. In both the cases, the scores were uni-modal, and were found normally distributed about their corresponding means, using K-S sample test. The correlations of the measures used in Phase V were reported in Table 6.6, and provided good evidence for the test-retest reliability as the researcher found a large enough correlation (0.81) between the two circulations of the scale.

Dimensionality

The dimensionality for both versions of scale was once again examined by factor analysis, extracting a single factor each time. It once again confirmed the previous findings. The CFA confirmed once again an excellent fit of the unidimensional model with a calculated value of chi square ($\chi 2$) of 24.667 for the first circulation of the SSI scale ($n = 86$). It also provided the Bentler- Bonett fit index of 0.921, indicating that the model accounts for a majority of the total variance and co-variance among the scale items (Bentler, 1984).

Validity

Table 6.6 reports the correlations among innovativeness and distinct criterion measures included in phase V and provides large correlations between: the first SSBT version of the innovativeness scale (SSBT1) and awareness (0.67); SSBT1 and usage (0.53); SSBT1 and readership (0.39), and SSBT1 and visit (0.47), thus giving evidence for predictive validity. Furthermore, large correlations of the second SSBT version of the innovativeness scale (SSBT2) with all four criterion measures (0.69, 0.61, 0.45, and 0.57) once again supported the evidence for criterion-related (concurrent) validity. Thus, an absence of significant correlations between either SSBT scale version and any of the four criterion measures, supports the fact that replies from respondents were free of yea-saying and social desirability response bias.

Table 6.6: Inter-correlations of SSBTs Innovativeness and Criterion Measures in Phase V

	SSBTs 2	Awareness	Experience	Readership	Visits	YN-2	SGX_1
SSBTs 1	0.81	0.67	0.53	0.39	0.47	.13*	.07*
SSBTs 2		0.69	0.61	0.45	0.57	.11*	.03*
Awareness			0.69	0.59	0.43	.09*	- .17*
Usage				0.45	0.71	.07*	-.19*
Readership					0.27	.00*	.01*
Visit						.06*	.05*
YN-2							.27

(n = 86), *p > .10

6.3.6. Phase VI: Convergent and Discriminant Validity

According to Campbell and Fiske (1959), "convergent validity assesses the extent to which a measure correlates highly with other measures of the same construct, and discriminant validity is the extent to which a measure is not correlated with measures of other, different constructs." Both are generally examined using a multitrait-multimethod (MM) matrix, denoting the inter-correlations among several measures of more than one trait. It is anticipated that altered measures of the same trait will be extremely correlated, while measures of different traits will be poorly correlated. In the present research, the three innovativeness traits (i.e., SSBTs innovativeness, SSRTs innovativeness, and SSHTs innovativeness) were operationalized by three approaches - the SSI scale, a rating scale, and a question for each trait regarding innovative behavior.

Subjects

Once again, a few marketing students were given ten questionnaires and each of them was requested to gather replies from male and female subjects from similar age groups. This process gathered 292 usable responses from 134 male and 158 female respondents. The average age of respondents was 22.7 years.

Instrument

To examine convergent and discriminant validity, the questionnaire included the six-item SSBT scale similar to the one used in phase II. This scale has been used twice before in this study - first in the retail industry to measure innovativeness towards SSRTs (Phase III), and again to measure innovativeness towards SSHTs in the hospitality industry (Phase IV). To provide the second operationalization of all three traits, three related explanations termed 'self-reports' of the 'SSBTs Innovator', 'SSRTs Innovator' and 'SSHTs Innovator,' are presented. A SSRTs innovator was presented as 'a retail customer who is interested in using/adopting a SST available

in his/her current retail settings; such individuals have good knowledge regarding new SSTs and are willing to use/adopt them; they also like to talk with others about these SSTs'. This statement was followed by a 25-point rating scale with end points - I like this, I don't like this at all, and neutral. Thereafter, the third and last operationalization of the traits was related with a single item enquiring about the number of visits for each kind of SSTs. The query was how frequently respondents visited banks/retail stores/hotels for SSBTs, SSRTs, and SSHTs, and responses were measured on a 5-point Likert scale: *never*, *almost never*, *less than once a week*, *about once a week*, and *twice a week or more*.

Results

Reliability

The reliability analysis was done by calculating Cronbach's alpha coefficient for each case. The calculated alpha values were 0.81, 0.84 and 0.85, for SSBTs, SSRTs and SSHTs, respectively.

Dimensionality

To examine dimensionality, factor analysis was applied separately on total scores for each of the three cases. The results confirmed a single factor solution representing the unidimensionality of scale in all three cases.

Convergent and Discriminant Validity

To examine convergent and discriminant validity of overall scale, the MM Matrix was applied by comparing the values of correlation coefficients for all three traits. Each of these traits was operationalized by three different ways - using innovativeness scale, single item self-description, and number of visits reported. In this way, the researcher got nine different variables which must be related to one another as per the requirements of convergent and discriminant validity.

In Table 6.7, the values of correlations meet the above qualifying criteria. All the three measures of each trait come together, and the diagonal correlations were considerably greater than the off-diagonal correlations. As per the basic rules of MM matrix, all the correlations follow a similar pattern in all three heterotrait-heteromethod blocks. The similarity of correlation patterns can also be confirmed by a confirmatory factor model, where there must be a single factor for each trait, and a single factor for each method. Additionally, both the trait factors and method factors must be mutually orthogonal, and strongly correlated.

Table 6.7: Multitrait-multimethod matrix from phase VI

	Scale			***Report***			***Visit***		
	SSBTs	SSRTs	SSHTs	SSBTs	SSRTs	SSHTs	SSBTs	SSRTs	SSHTs
Scale									
SSBTs	0.81*								
SSRTs	0.53	0.84*							
SSHTs	0.29	0.37	0.85*						
Report									
SSBTs	0.49	0.55	0.14	---					
SSRTs	0.61	0.69	0.23	0.41	---				
SSHTs	0.13	0.27	0.67	0.19	0.11	---			
Visit									
SSBTs	0.65	0.09	0.15	0.63	0.06	0.23	---		
SSRTs	0.17	0.58	0.27	0.11	0.52	0.31	0.14	---	
SSHTs	0.03	0.21	0.55	0.08	0.38	0.60	0.06	0.31	---

n = 292, At this sample size, r's ≥ .095 are significant at $p < 0.05$, one-tailed. *Internal consistency (Cronbach's alpha) coefficient values.

Table 6.8: Factor loadings for MM factor analysis

	Traits			***Methods***		
	SSBTs	SSRTs	SSHTs	SSBTs	SSRTs	SSHTs
Scale						
SSBTs	0.338			0.651		
SSRTs		0.651		1.062		
SSHTs			0.523	1.413		
Report						
SSBTs	4.719				5.761	
SSRTs		5.681			1.113	
SSHTs			6.031		0.962	
Visit						
SSBTs	0.643					1.018
SSRTs		0.706				0.961
SSHTs			0.378			0.253

The researcher examined the model with asymptotic distribution free methods, and the parameter estimates were reported in Table 6.8 and Table 6.9, where the SSI scale is titled 'Scale,' and the self-report measure is titled 'Self-report.' All the non-negative unique factor variances for each variable were not reported. The calculated significant value of chi square ($\chi 2$) was 23.681 (degree of freedom = 12, p = 0.376) with Bentler-Bonett fit index of 0.954 that is greater than the threshold value 0.9. Thus, the researcher in this study, found enough evidence for discriminant and convergent validity (Bentler, 1984).

Table 6.9: Factor correlations for MM factor analysis

	Traits			***Methods***		
	SSBTs	SSRTs	SSHTs	Scale	Self-report	Visits
SSBTs	1*					
SSRTs	-.026	1*				
SSHTs	-.041	.398	1*			
Scale	0*	0*	0*	1*		
Self-report	0*	0*	0*	.261	1*	
Visits	0*	0*	0*	.321	-.058	1*

*Parameters fixed a priori.

In Table 6.8, all the factor loadings for the MM factor analysis were reported. Each row denotes one of the nine observed variables that is a function of one trait factor and one method factor. Thus, each row represents two distinct regression slopes for each variable. Further, Table 6.9 reports all correlation coefficients among factors. The result shows that innovativeness towards SSRTs and SSHTs are correlated mainly when compared to innovativeness towards SSBTs. Thus, consumer innovativeness varies across SSTs in different contexts. Similarly, the lack of correlation across methods shows that the methods are independent and consistent with the original justification of the MM.

6.4. Discussion

The researcher in this study, has developed a self-report scale measuring consumer innovativeness towards self-service options available in the banking industry, and validated this innovativeness scale across different SSTs in two other service industries. A self-report measure avoids the theoretical and operational problems related with the time of adoption measure and the cross-sectional approach, and complements these techniques. Furthermore, by conceptualizing the nature of innovativeness construct, the researcher developed this self-report innovativeness scale that directly measures the latent construct itself, instead of other related

variables. Many researchers have already developed such self-report scales of DSI in previous studies. The researcher in the present study, offers a more comprehensive SSI scale that can be used in multiple service industries to examine consumers' adoption of SSTs. This six-item scale can be used along with other related standard multidimensional scales like Technology Readiness Index (Parasuraman's TRI) and TRI 2.0 (Parasuraman & Colby, 2015). This will be helpful in measuring innovativeness construct, especially in the context of self-service technology adoption. Applying a standardized scale development procedure (Churchill, 1979) is generally preferred because scale's reliability and validity can easily be established, and it also offers possible comparisons with similar studies.

The first step in a standardized scale development procedure is finalizing an initial pool of items which would be taken to the next stage for purification. EFA confirmed the unidimensionality of the scale. Reliability analysis indicated that the scale was internally consistent and stable across samples. Correlation analysis with other constructs established different criterion-related (concurrent and predictive) convergent and discriminant validity.

The scale appears not to be affected either by yea-saying or social desirability response bias. The self-report measure, developed in the present study, is mainly appropriate for service domains where consumers adopt self-service options more frequently and report their actual or intended adoption behavior. Rarely adopted self-service options may not be predicted well in case consumers do not report favorable attitude and behavioral intentions (Curran et al., 2003).

This limits the generalizability of the scale, and suggests that the scale should be validated in further studies requiring such innovativeness scales to prove a useful tool. Practitioners and managers can use this SSI scale to categorize potential consumers as adopters, innovators, early adopters, early majority, late majority and laggards for introducing new self-service technologies. With this, their demographics or psychographics may also be profiled. This will also provide answers to a variety of questions such as what is the overall level of innovativeness to interact effectively with existing SSTs? Are there diverse customer segments that differ in terms of innovativeness? If yes, what are their relative sizes, and how do they differ in terms of their demographic and psychographic characteristics? Answer to these questions will provide insights to practitioners and policymakers regarding the adoption behavior of their existing customers. They can then use this information to revisit existing strategies and formulate new ones to extend the reach of their SSTs to target new customer segments.

For conceptual studies, the scale can also be applied to measure the innovativeness across samples in case researchers wish to analyze the relationships between innovativeness and other theoretically related variables. Researchers, in further studies, may use this short, valid and

reliable scale to measure innovativeness across numerous SSTs. This study explores widely the concept of innovativeness, and the scale will be useful to examine the relationships among different dimensions of innovativeness (II, DSI, and IB), as suggested by Kaushik and Rahman (2014).

The researcher in this study, has developed a balanced scale, and suggest that a balanced, and unidimensional scale be developed by carefully examining the effects of direction-of-item wording. The foremost limitation of this study was its dependence on student samples while developing the scale in phase II However, the findings of phase IV with an adult sample validate this innovativeness scale with respect to other populations. The researcher encourages more empirical studies in order to validate the scale. Additional examinations are required to evaluate the psychometric characteristics of the scale.

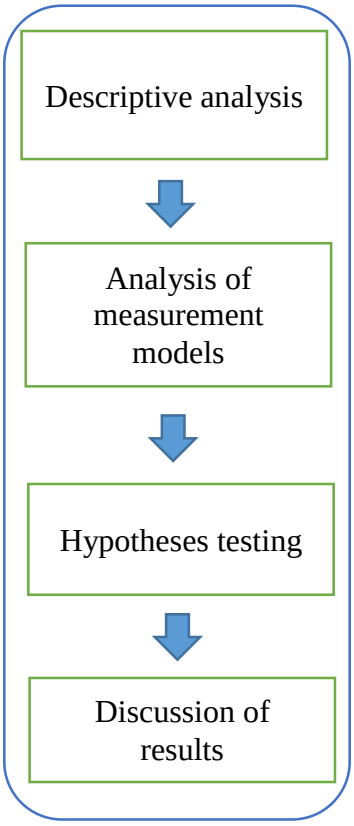
Summary

As mentioned in Chapter Five, there was a need to develop a measure for consumer innovativeness variable to be used in this study. To this end, Chapter Six has described the overall scale development process applied by the researcher in order to develop and validate a SSI scale. This SSI scale will be used as an essential component of research questionnaire for collecting the primary responses. The scale will be applied to measure the respondent's innovativeness towards SST adoption in offline service contexts. Chapter Seven will be based on the analysis of these primary responses in order to confirm various hypotheses developed in Chapter Four.

Chapter 7

Data Analysis and Results

In this chapter various results and findings of the primary data analysis are discussed. Numerous statistical techniques were applied in order to examine the various hypotheses developed in Chapter Four. The statistical techniques applied includes descriptive statistics, confirmatory factor analysis, structural equation modeling, multiple regression analysis, discriminant analysis, and correlation analysis. This chapter starts with describing the participants in terms of their demographics. This description is followed by a comprehensive discussion on refinement and purification of the measurement models by confirmatory factor analysis using AMOS 20.0. Finally, the results of the structural equation modeling, multiple regression and discriminant analyses, and correlation analysis are discussed in order to support the proposed conceptual model and research hypotheses.



7.1. Descriptive statistics

As mentioned in Chapter Five, more than 400 service consumers who had recently used an SST (e.g., ATMs, cash deposit kiosks, etc.) were contacted online as well as offline. The 400 respondents gave 380 usable responses which were finalized for final analysis. Table 7.1 shows basic demographic characteristics of respondents. All these demographic variables were incorporated in order to examine SST adoption and innovativeness levels among sample respondents.

Table 7.1: Demographic characteristics of participants

	Category	Respondents (n)	Respondents (%)
Gender	Male	257	67.6
	Female	123	32.4
Age (Years)	18 - up to 25	44	11.6
	More than 25 - up to 35	65	17.1
	More than 35 - up to 45	73	19.2
	More than 45 - up to 55	113	29.7
	More than 55	85	22.4
Education	Higher secondary or Less	5	1.3
	Senior secondary/Diploma	15	3.9
	UG	119	31.3
	PG	213	56.1
	Ph.D. or more	28	7.4
Income (☐)	2,50,000 - below	55	14.5
	2,50,001 - 5,00,000	100	26.3
	5,00,001 - 7,50,000	129	33.9
	7,50,001 - 10,00,000	71	18.7
	10,00,001 - Above	25	6.6
Employment	Service	153	40.3
	Business	111	29.2
	Student	92	24.2
	Unemployed	15	3.9
	Agriculture (Others)	9	2.4
	Total	**380**	**100.0**

Of these 380 final respondents, majority of responses were collected from male participants. Although both male as well as female consumers were contacted almost equally, it seemed hard

to get exact responses from female respondents. Nearly 40 female respondents didn't mention either their age or income level, or both. Since demographics in this study are used to examine one crucial research hypothesis, therefore it was hard to ignore these responses. No identification such as name and contact information was asked during the survey, therefore, the researcher couldn't contact them for the missing information. Ultimately all such responses were excluded from the final set of questionnaires. Age of respondents ranged from 18 to 76 years with nearly 30% respondents falling in the age group of 'more than 45 up to 55'. If the total respondents be divided in two groups - below 45 years and above of 45 years - the two groups would be almost equal in size. Most of the sample respondents (87.4%) were either under graduates or post graduates. Income figures were found to be distributed relatively well. Nearly 70 percent of the total sample respondents were either employed or businessmen.

7.2. Non-response biasness

Following Armstrong and Overton (1977), the researcher examined non-response bias by comparing "early" and "late" responses with the help of one-way ANOVA test. To do so, fifty early responses were compared with fifty late responses. The ANOVA (using the F-distribution) was applied to compare means of all 45 observed variables. Results revealed that there was no significant difference between these two groups (see Table 7.2). Thus, the results preclude the possibility of non-response biasness with respect to response time.

7.3. Measurement Model Analysis Overview

The proposed conceptual model developed in Chapter Four was made-up of different measurement models. Before final analysis, refinement and purification of these models is essential. Therefore, confirmatory factor analysis (CFA) and reliability analysis were applied in order to purify the measurement models. This procedure is proposed to retain a cleaned set of items that effectively measure every construct. These purified measurement scales are further utilized to test various hypotheses developed in Chapter Four.

7.3.1. Confirmatory Factor Analysis

CFA is a multivariate statistical method used to specify the relationships between observed measures and their proposed fundamental constructs (Anderson & Gerbing, 1988). Confirmatory models additionally allow the researcher to check the convergent and discriminant validity of constructs in the models (Campbell & Fiske, 1959).

Table 7.2: Non-response Bias Test

Variable		Sum of Squares	df	Mean Square	F	Sig.
CI1	Between Groups	.640	1	.640	.802	.373
	Within Groups	78.200	98	.798		
	Total	78.840	99			
CI2	Between Groups	.090	1	.090	.121	.728
	Within Groups	72.660	98	.741		
	Total	72.750	99			
CI3	Between Groups	1.960	1	1.960	2.313	.132
	Within Groups	83.040	98	.847		
	Total	85.000	99			
CI4	Between Groups	1.960	1	1.960	2.505	.117
	Within Groups	76.680	98	.782		
	Total	78.640	99			
CI5	Between Groups	.360	1	.360	.444	.507
	Within Groups	79.400	98	.810		
	Total	79.760	99			
PR1	Between Groups	1.000	1	1.000	.961	.329
	Within Groups	102.000	98	1.041		
	Total	103.000	99			
PR2	Between Groups	.010	1	.010	.009	.925
	Within Groups	108.740	98	1.110		
	Total	108.750	99			
PR3	Between Groups	.010	1	.010	.012	.912
	Within Groups	80.580	98	.822		
	Total	80.590	99			
PR4	Between Groups	.010	1	.010	.009	.923
	Within Groups	104.740	98	1.069		
	Total	104.750	99			
PR5	Between Groups	.160	1	.160	.187	.667
	Within Groups	84.000	98	.857		
	Total	84.160	99			
PU1	Between Groups	.090	1	.090	.230	.633
	Within Groups	38.420	98	.392		
	Total	38.510	99			
PU2	Between Groups	.010	1	.010	.023	.879
	Within Groups	42.180	98	.430		
	Total	42.190	99			
PU3	Between Groups	.640	1	.640	1.217	.273
	Within Groups	51.520	98	.526		
	Total	52.160	99			
PEOU1	Between Groups	.640	1	.640	1.329	.252
	Within Groups	47.200	98	.482		
	Total	47.840	99			
PEOU2	Between Groups	.160	1	.160	.342	.560
	Within Groups	45.800	98	.467		
	Total	45.960	99			
PEOU3	Between Groups	.250	1	.250	.580	.448

	Within Groups	42.260	98	.431		
	Total	42.510	99			
COM1	Between Groups	.640	1	.640	.655	.420
	Within Groups	95.800	98	.978		
	Total	96.440	99			
COM2	Between Groups	.090	1	.090	.093	.762
	Within Groups	95.300	98	.972		
	Total	95.390	99			
COM3	Between Groups	.160	1	.160	.153	.697
	Within Groups	102.680	98	1.048		
	Total	102.840	99			
SN1	Between Groups	5.760	1	5.760	3.246	.275
	Within Groups	173.880	98	1.774		
	Total	179.640	99			
SN2	Between Groups	5.290	1	5.290	3.500	.264
	Within Groups	148.100	98	1.511		
	Total	153.390	99			
SN3	Between Groups	8.410	1	8.410	3.845	.353
	Within Groups	214.340	98	2.187		
	Total	222.750	99			
PE1	Between Groups	6.760	1	6.760	4.581	.353
	Within Groups	144.600	98	1.476		
	Total	151.360	99			
PE2	Between Groups	1.210	1	1.210	1.100	.297
	Within Groups	107.780	98	1.100		
	Total	108.990	99			
PE3	Between Groups	5.290	1	5.290	3.997	.384
	Within Groups	129.700	98	1.323		
	Total	134.990	99			
NI1	Between Groups	5.760	1	5.760	4.579	.453
	Within Groups	123.280	98	1.258		
	Total	129.040	99			
NI2	Between Groups	9.610	1	9.610	8.084	.455
	Within Groups	116.500	98	1.189		
	Total	126.110	99			
NI3	Between Groups	14.440	1	14.440	14.358	.125
	Within Groups	98.560	98	1.006		
	Total	113.000	99			
TA1	Between Groups	27.040	1	27.040	21.488	.213
	Within Groups	123.320	98	1.258		
	Total	150.360	99			
TA2	Between Groups	16.000	1	16.000	10.993	.581
	Within Groups	142.640	98	1.456		
	Total	158.640	99			
TA3	Between Groups	10.240	1	10.240	8.294	.465
	Within Groups	121.000	98	1.235		
	Total	131.240	99			
TA4	Between Groups	10.240	1	10.240	6.963	.413

	Within Groups	144.120	98	1.471		
	Total	154.360	99			
AW1	Between Groups	2.560	1	2.560	1.527	.219
	Within Groups	164.280	98	1.676		
	Total	166.840	99			
AW2	Between Groups	4.410	1	4.410	2.783	.398
	Within Groups	155.300	98	1.585		
	Total	159.710	99			
AW3	Between Groups	1.000	1	1.000	.662	.418
	Within Groups	148.000	98	1.510		
	Total	149.000	99			
INV1	Between Groups	.490	1	.490	.249	.619
	Within Groups	192.820	98	1.968		
	Total	193.310	99			
INV2	Between Groups	.360	1	.360	.183	.670
	Within Groups	193.280	98	1.972		
	Total	193.640	99			
INV3	Between Groups	1.000	1	1.000	.525	.471
	Within Groups	186.840	98	1.907		
	Total	187.840	99			
INV4	Between Groups	1.690	1	1.690	.867	.354
	Within Groups	191.060	98	1.950		
	Total	192.750	99			
EVL1	Between Groups	3.610	1	3.610	1.219	.272
	Within Groups	290.180	98	2.961		
	Total	293.790	99			
EVL2	Between Groups	5.760	1	5.760	1.616	.207
	Within Groups	349.240	98	3.564		
	Total	355.000	99			
EVL3	Between Groups	10.890	1	10.890	2.773	.199
	Within Groups	384.820	98	3.927		
	Total	395.710	99			
BI1	Between Groups	2.560	1	2.560	1.113	.294
	Within Groups	225.440	98	2.300		
	Total	228.000	99			
BI2	Between Groups	4.840	1	4.840	2.168	.144
	Within Groups	218.800	98	2.233		
	Total	223.640	99			
BI3	Between Groups	4.000	1	4.000	1.984	.162
	Within Groups	197.560	98	2.016		
	Total	201.560	99			

Several criteria exist to evaluate the overall fit between the proposed measurement model and the primary data. Of these criteria, the chi-square test is possibly the most common indicator of fit adequacy. On the other hand, the chi-square test is exceptionally sensitive to sample size and generally indicates an unacceptable fit for large samples, even when the fit is really acceptable

(Anderson & Gerbing, 1988; Bagozzi & Yi, 1988; Bentler & Bonett, 1980). Although the chi-square test will be incorporated in the measurement model, yet other fit indices that are relatively less sensitive to large sample size biases will also be incorporated to overcome the limitations of the chi-square test.

According to Bentler (1990) and Bentler and Bonett (1980), both Bentler's Comparative Fit Index (CFI) and Bentler and Bonett's Non-normed Fit Index (NNFI) (also known as Tucker-Lewis coefficient – TLI) are less likely to create biased estimates with large sample sizes, thus are relatively less sensitive to large sample sizes than the chi-square test. Hence, both these fit indices (CFI and NNFI) will be incorporated in addition to the chi-square test to evaluate the overall model fit in this quantitative phase of the study.

Although no specific rules direct acceptable fit with these tests, general rule of thumb has usually been followed by marketing researchers. It is generally accepted that an acceptable fit for the fit indices used in this research (CFI and NNFI) will be accomplished when scores are greater than .90 (Hair et al., 1998). The acceptable fit is also evidenced with the same score (>.90), even if chi-square test is not found significant enough due to sample size limitations. Furthermore, a chi-square to degree of freedom ratio of 2:3 will also demonstrate an acceptable fit. Here again, the chi-square to degree of freedom ratio is extremely sensitive to large sample size biases.

In addition to the overall fit of the measurement model evaluated by the aforementioned criteria, examinations of various kinds of validity (convergent and discriminant validity) and reliability have also been done with the help of confirmatory model. As a general rule of thumb, convergent validity is supported when an expected pattern of significant factor loadings are observed where all the items with significant loadings will reach the fundamental construct (Anderson & Gerbing, 1988; Steenkamp & Trijp, 1991). Next, discriminant validity between two constructs is supported when the correlation is less than 1.0 by an amount greater than twice the standardized error (Bagozzi & Warshaw, 1990). The reliability for each construct is evaluated using Cronbach's alpha coefficient and is supported with scores of .70 or higher.

In order to evaluate the overall model fit, convergent and discriminant validity, the reliability of all measures as described in Chapter Five, and five different confirmatory factor models were examined. The first of four confirmatory factor models relates to the set of four variables – the SST characteristics variables, the user characteristics variables, the consumer innovativeness variable, and the innovation adoption process variables. The fifth and final confirmatory measurement model included all these variables within one model. No single item measures will be included in the CFA. Since the CFA is intended to refine the measures for the aforementioned set of variables, insignificant items will be dropped based on an analysis of the standardized

residual matrix, standardized factor loading and item-to-total correlations.

7.4. Confirmatory Factor Analysis Results

As mentioned earlier, the five distinct measurement models were evaluated through CFAs using AMOS 20.0. This section discusses the results of CFAs. Tables 7.3to 7.7 provide factor loadings, t-values and various fit statistics for each of the measurement models.

7.4.1. SST Characteristics Variables

In the first measurement model, the SST characteristics variables are evaluated. The first two constructs (PU and PEOU) are measured with 4-item adopted scales and complexity is measured with a 3-item adopted scale, while perceived risk is measured with a 5-itemadopted scale as described in Chapter Five. In the purification procedure, one item was dropped from PU and PEOU measures. Results of the first CFA with all 14 items remaining in the model are shown in Table 7.3.

Table 7.3: Confirmatory Factor Analysis: SST Characteristics Variables

Covariance Structure Analysis Standardized Factor Loadings (t-values)				
Item	Perceived usefulness	Perceived ease-of-use	Complexity	Perceived risk
PU1	.890 (22.8)	-	-	-
PU2	.917 (***)	-	-	-
PU3	.735 (17.3)	-	-	-
PEOU1	-	.848 (19.2)	-	-
PEOU2	-	.865 (***)	-	-
PEOU3	-	.806 (18.1)	-	-
COM1	-	-	.764 (11.5)	-
COM2	-	-	.770 (11.5)	-
COM3	-	-	.691 (***)	-
PR1	-	-	-	.812 (21.2)
PR2	-	-	-	.856 (23.6)
PR3	-	-	-	.898 (***)
PR4	-	-	-	.876 (24.8)
PR5	-	-	-	.862 (24.0)
Fit statistics				
Chi-square (χ^2) = 81.135, degree of freedom (d.f.) = 71, p < .001			CFI = .997	
χ^2 / d.f. ratio = 1.143			NNFI (or TLI) = .996	
Cronbach α coefficient (PU) = .882			Cronbach α coefficient (COM) = .785	
Cronbach α coefficient (PEOU) = .877			Cronbach α coefficient (PR) = .933	

*** = denotes a constrained relationship to 1.00 in order for identification.

All the scale-items, as shown in Table 7.3, load significantly on their expected fundamental constructs. The smallest standardized loading is .691 that is extremely significant at .001 level. The observed pattern of all these factor loadings provides sufficient evidence of convergent validity (Anderson & Gerbing, 1988). Discriminant validity is supported based on an examination of all potential correlations which were found to be significantly less than 1.0 by an amount greater than twice the standard error in all cases (Bagozzi & Warshaw, 1990).

Additionally, the chi-square test and the chi-square to degree of freedom ratio both indicate an excellent fitting model; however, these tests are extremely sensitive to sample size (see Table 7.3). Other goodness of fit indices (CFI and NNFI) that are not much sensitive to sample size limitations also confirm an excellent measurement model fit. Both CFI and NNFI are more than the acceptable level (>.90) with scores of .997 and .996 respectively. In order to confirm the internal consistency of the measures for each of these constructs, reliability analysis using Cronbach's alpha was also conducted. All four Cronbach alpha coefficients were more than the minimum acceptable values of .70 (Cronbach, 1951) as shown in Table 7.3, providing support for the inclusion of all these measures in this study. The value of Cronbach alpha coefficients ranges from .785 to .993.

7.4.2. User characteristics Variables

The second measurement model examines the user characteristics variables (TA, NI, SN and PE). Demographic variables also included as user characteristics were not involved in this measurement model because they are all measured with single indicators. Subjective norm, need for interaction and previous experience were measured with 3-item adopted scales, whereas technology anxiety was assessed with a4-item adopted scale as discussed in Chapter Five. Results of this CFA with all 13items in the model are shown in Table 7.4.

Table 7.4 shows that all the scale-items load significantly on their expected fundamental constructs, providing evidence of convergent validity (Anderson & Gerbing, 1988). The smallest standardized loading is .616 (t-value = 12.2) which is highly significant. Discriminant validity is once again supported by examining all potential correlations which are found to be significantly less than 1.0 by an amount greater than twice the standard error in all cases (Bagozzi & Warshaw, 1990).

While the chi-square test indicates an excellent model fit, other indices support the adequacy of fit. The chi-square to degree of freedom ratio of 1.392 is just below the recommended ratio of 2:3, which is a standard used to assess the fit of a measurement model. Furthermore, other goodness of fit indices (CFI and NNFI) confirm a good measurement model fit. Both CFI and

NNFI are above the acceptable level of .90 with scores of .991 and .987 respectively. The Cronbach alpha coefficients are also calculated in order to confirm the internal consistency for each of the measures and the values range from .789 to .903.

Table 7.4: Confirmatory Factor Analysis: User Characteristics Variables

Covariance Structure Analysis				
Standardized Factor Loadings (t-values)				
Item	Technology anxiety	Need for interaction	Subjective norm	Previous experience
TA1	.773 (17.6)	-	-	-
TA2	.847 (20.2)	-	-	-
TA3	.876 (21.2)	-	-	-
TA4	.855 (***)	-	-	-
NI1	-	.781 (16.4)	-	-
NI2	-	.869 (***)	-	-
NI3	-	.810 (16.9)	-	-
SN1	-	-	.891 (16.2)	-
SN2	-	-	.834 (***)	-
SN3	-	-	.616 (12.2)	-
PE1	-	-	-	.732 (11.9)
PE2	-	-	-	.710 (***)
PE3	-	-	-	.797 (12.4)
Fit statistics				
Chi-square (χ^2) = 82.130, degree of freedom (d.f.) = 59, p < .001			CFI = .991	
χ^2 / d.f. ratio = 1.392			NNFI = .987	
Cronbach α coefficient (TA) = .903			Cronbach α coefficient (NI) = .860	
Cronbach α coefficient (SN) = .815			Cronbach α coefficient (PE) = .789	

*** = denotes a constrained relationship to 1.00 in order for identification.

7.4.3. Consumer innovativeness variable

The third measurement model examines the consumer innovativeness variable that is measured by a6-item scale (developed in Chapter Six). One item was dropped in purification procedure from this measure for analysis. Consumer innovativeness, characterized as consumer's propensity to adopt innovation, is considered a unidimensional construct in this study. The CI variable is the most crucial variable, positioned as a mediator between determinants of adoption and intention of adoption. Results of the confirmatory measurement model for this CI variable with all six items in the model are shown in Table 7.5.

As shown in Table 7.5, all the five items load significantly on their expected fundamental construct, confirming the unidimensionality of the innovativeness construct. The smallest

standardized loading is .744 with a t-value of 18.1 that is highly significant. Once again the observed pattern of all factor loadings provides enough evidence of convergent validity (Anderson & Gerbing, 1988).

The chi-square test again indicates a good model fit along with other indices supporting the adequacy of fit. The chi-square to degree of freedom ratio of 3.189 is very close to the standard ratio of 2:3 used to assess the fit of a measurement model. Furthermore, other goodness of fit indices (CFI and NNFI) confirm a good measurement model fit. Both CFI and NNFI were above the acceptable level of .90 with scores of .994 and .985 respectively. The Cronbach alpha coefficients are also calculated in order to confirm the internal consistency for CI measure, resulting in a value of .923.

Table 7.5: Confirmatory Factor Analysis: Consumer Innovativeness Variable

Covariance Structure Analysis Standardized Factor Loadings (t-values)	
Item	Consumer innovativeness
CI1	.744 (18.1)
CI2	.787 (20.0)
CI3	.836 (22.5)
CI4	.877 (24.7)
CI5	.911 (***)
Fit statistics	
Chi-square (χ^2) = 12.755, degree of freedom (d.f.) = 4, p < .001	CFI = .994
χ^2 / df ratio = 3.189	NNFI = .985
Cronbach α coefficient (CI) = .923	

*** = denotes a constrained relationship to 1.00 in order for identification.

7.4.4. Innovation Adoption Process Variables

The fourth measurement model examines the various constructs of the innovation adoption process. Since trial and adoption are measured with a single item, they are not included in this measurement model. Of the remaining constructs, awareness, evaluation and behavioral intention are measured with 3-item scales and investigation is measured with a 4-item scale. Results of this CFA with all 13 items in the model are shown in Table 7.6.

All scale-items, as shown in Table 7.6, load significantly on their expected fundamental constructs providing evidence of convergent validity (Anderson and Gerbing 1988). The smallest standardized loading is .690that is highly significant. However, discriminant validity is confirmed by examining all potential correlations which were found to be significantly less than

1.0 by an amount greater than twice the standard error in all cases (Bagozzi & Warshaw, 1990).

Table 7.6: Confirmatory Factor Analysis: Adoption Process Variables

Covariance Structure Analysis Standardized Factor Loadings (t-values)				
Item	Awareness	Evaluation	Investigation	Behavioral intention
AW1	.876 (***)	-	-	-
AW2	.959 (29.1)	-	-	-
AW3	.935 (27.9)	-	-	-
EVL1	-	.933 (***)	-	-
EVL2	-	.965 (39.9)	-	-
EVL3	-	.970 (40.8)	-	-
INV1	-	-	.690 (***)	-
INV2	-	-	.927 (16.6)	-
INV3	-	-	.872 (15.7)	-
INV4	-	-	.924 (16.5)	-
BI1	-	-	-	.776 (***)
BI2	-	-	-	.909 (16.9)
BI3	-	-	-	.808 (16.2)

Fit statistics

Chi-square (χ^2) = 95.120, degree of freedom (d.f.) = 59, $p < .001$	CFI = .992
χ^2 / d.f. ratio = 1.612	NNFI = .989
Cronbach α coefficient (AW) = .945	Cronbach α coefficient (EVL) = .969
Cronbach α coefficient (INV) = .914	Cronbach α coefficient (BI) = .869

*** = denotes a constrained relationship to 1.00 in order for identification.

The chi-square test and the chi-square to degree of freedom ratio both indicate a good model fit. Other goodness of fit indices (CFI and NNFI) also confirm a good model fit. Both CFI and NNFI are greater than acceptable level (>.90) with scores of .992 and .989 respectively. Cronbach alpha coefficient, for each of the measures, is greater than the standard value of .70 as it ranges from .869 to .969, providing support to the use of these measures for hypotheses testing.

7.4.5. Full Model

Once each of the four measures were refined and purified using four distinct CFAs discussed above, a single CFA was additionally performed for an overall model comprising all four constructs. As would be expected with individual models demonstrating acceptable fit, the fit for the overall model is also acceptable. All indicators and their loadings on the expected fundamental constructs are shown in Table 7.7, indicating an expected pattern of these significant

loadings and confirming convergent validity (Anderson & Gerbing, 1988).

The smallest standardized loading is .614 with a t-value of 12.2 which is once again highly significant. It is crucial to closely look at the discriminant validity issue, especially in the case of an overall model because all constructs are allowed to correlate with every other single construct incorporated in the model. In previous measurement models, discriminant validity could only be examined between constructs included in a single measurement model. A series of correlation analysis indicates that all possible correlations were significantly less than 1.0 based on the confidence interval test confirming discriminant validity (Bagozzi & Warshaw, 1990).

In consistence with previous measurement models, the chi-square test and the chi-square to degree of freedom ratio both indicate a good model fit. The chi-square to degree of freedom ratio is 2.98while other fit indices of CFI and NNFI with scores of .989 and .987 respectively confirm the overall model fit.

7.5. Common method variance

Because all the constructs were measured using multi-item, self-reporting scales from the same subjects, there was a possibility of common method bias/variance which could result if the constructs shared common measurement methods (Podsakoff, MacKenzie, Lee & Podsakoff, 2003). To evaluate this possibility, we applied in the present research procedural and statistical remedies as suggested by Podsakoff et al., (2003). First of all, we informed all our respondents that there are no right or wrong answers, only perceptions that are either favorable or unfavorable, and all the answers will be kept anonymous and confidential.

We used the well-known Harman's single-factor test proposed by Harman (1960) and Podsakoff and Organ (1986) which suggests that if there is a common method variance (CMV) in the data, it is unlikely to influence the results or conclusions. To do so, all the 45 final items were included into an un-rotated principal-component exploratory factor analysis (extracting only one factor). Results of this analysis revealed the presence of single factor that did not account for a majority of the total variance (14.186 percent). According to rule of thumb, this total variance explained by a single factor should not be more than 50 percent (Hair et al., 1998). Thus the results preclude the possibility of CMV, and suggest that CMV is not of great concern and will not affect the results and their interpretation. Podsakoff et al., (2003) characterized the Harman single-factor test as a diagnostic technique that "actually does nothing to statistically control for (or partial out) method effects" (p. 889). Further, they argued that the emergence of multiple factors did not indicate the absence of CMV and recommend against the use of this test.

Therefore, the researcher also applied common latent factor (CLF) method in order to confirm

the common method variance among all observed variables in the proposed model. For this, a CLF was added to the structural model, and then connected to all 45 observed variables. On comparing the standardized regression weights from this model to the standardized regression weights of a model without the CLF, it was found that there were no large differences (> 0.2). Therefore, no need was felt to retain CLF in the structural model, as there was no possibility of CMV.

7.6. Hypotheses testing

The measures refined and purified through CFA were used to collect primary responses as inputs for structural equation modeling. Structural equation modeling was used to test various research hypotheses developed in Chapter Four.

7.6.1. Overall Mediating Effects Hypotheses (HI - H2)

The major emphasis of the proposed conceptual model and hypotheses developed in Chapter Four is on the mediating effects of the consumer innovativeness variable. The central positioning of the consumer innovativeness variable, as shown in Figure 4.1 and Figure 4.2 (in chapter Four), demonstrates the proposed mediating effects between determinants of adoption and intention of SST adoption. Findings of the mediation analysis will be discussed in this section. Figure 4.2 (in chapter Four) depicts the rest of the hypotheses. Interestingly, a majority of research hypotheses are indirectly investigated through this mediation analysis. Findings related to the other sets of hypotheses will also be described later in this chapter.

As mentioned earlier in Chapter Five, a four-step mediation analysis suggested by Baron and Kenny (1986) will be applied in this examination. To confirm that mediation exists, each of the four steps must be fulfilled. If any of the four steps fails at any time, the test for mediation is immediately stopped and the mediating hypothesis rejected. A general four-step procedure adopted during mediation analysis is demonstrated in Figure 7.1. Here, variable Y is projected as a mediator between the set of variables X_1 through X_4 and variable Z. As mentioned earlier, there are four crucial steps involved:

i) Step 1 examines the direct effect of variable Y on Z;

ii) Step 2 examines the direct effect of the set of X variables (X_1 to X_4) on variable Z. If any of the variables X_1 through X_4 do not have a significant direct effect on Z, they will be dropped from any further analysis;

iii) Step 3 examines the direct effects of the remaining X variables on Y. Once again, if any of the remaining X variables don't affect Y, they are dropped from further analysis;

Table 7.7: Confirmatory Factor Analysis: Full Model

Covariance Structure Analysis Standardized Factor Loadings (t-values)					
Item	**Perceived usefulness**	**Perceived ease-of-use**	**Complexity**	**Perceived risk**	**Technology anxiety**
PU1	.892 (***)	-	-	-	-
PU2	.915 (23.0)	-	-	-	-
PU3	.735 (17.1)	-	-	-	-
PEOU1	-	.855 (***)	-	-	-
PEOU2	-	.858 (19.5)	-	-	-
PEOU3	-	.806 (18.1)	-	-	-
COM1	-	-	.767 (***)	-	-
COM2	-	-	.767 (12.1)	-	-
COM3	-	-	.689 (11.5)	-	-
PR1	-	-	-	.811 (***)	-
PR2	-	-	-	.855 (19.8)	-
PR3	-	-	-	.899 (21.3)	-
PR4	-	-	-	.877 (20.5)	-
PR5	-	-	-	.861 (19.9)	-
TA1	-	-	-	-	.774 (***)
TA2	-	-	-	-	.847 (17.5)
TA3	-	-	-	-	.875 (18.1)
TA4	-	-	-	-	.855 (17.7)

Table 7.7: (Continued)

Covariance Structure Analysis Standardized Factor Loadings (t-values)					
Item	**Need for interaction**	**Subjective norm**	**Previous experience**	**Consumer innovativeness**	**Awareness**
NI1	.780 (***)	-	-	-	-
NI2	.870 (16.4)	-	-	-	-
NI3	.809 (15.8)	-	-	-	-
SN1	-	.896 (***)	-	-	-
SN2	-	.830 (16.3)	-	-	-
SN3	-	.614 (12.2)	-	-	-
PE1	-	-	.733 (***)	-	-
PE2	-	-	.706 (11.9)	-	-
PE3	-	-	.799 (12.8)	-	-
CI1	-	-	-	.792 (***)	-
CI2	-	-	-	.829 (18.1)	-
CI3	-	-	-	.835 (18.3)	-
CI4	-	-	-	.859 (18.9)	-
CI5	-	-	-	.893 (19.9)	-
AWR1	-	-	-	-	.876 (***)
AWR2	-	-	-	-	.958 (29.1)
AWR3	-	-	-	-	.935 (27.9)

Table 7.7: (Continued)

Covariance Structure Analysis Standardized Factor Loadings (t-values)			
Item	**Evaluation**	**Investigation**	**Behavioral intention**
EVL1	.933 (***)	-	-
EVL2	.965 (39.9)	-	-
EVL3	.970 (40.8)	-	-
INV1	-	.689 (***)	-
INV2	-	.927 (16.6)	-
INV3	-	.871 (15.7)	-
INV4	-	.924 (16.5)	-
BI1	-		.777 (***)
BI2	-		.907 (17.0)
BI3	-		.810 (16.3)

Fit statistics

Chi-square (χ^2) = 997.004, degree of freedom (d.f.) = 867, $p < .001$

χ^2 / d.f. ratio = 1.150

CFI = .989

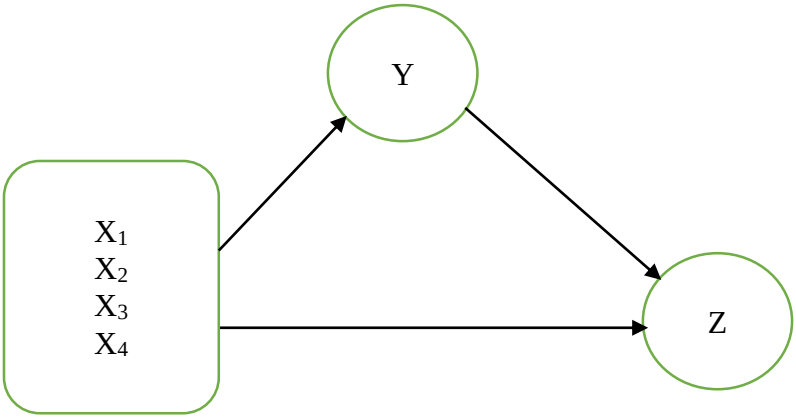
NNFI = .987

***denotes a constrained relationship to 1.00 in order for identification.

iv) The last and final Step 4 included regressing all of the remaining X variables along with variable Y on variable Z. This step is fulfilled if including variable Y in the model decreases the direct effects of X variables on variable Z.

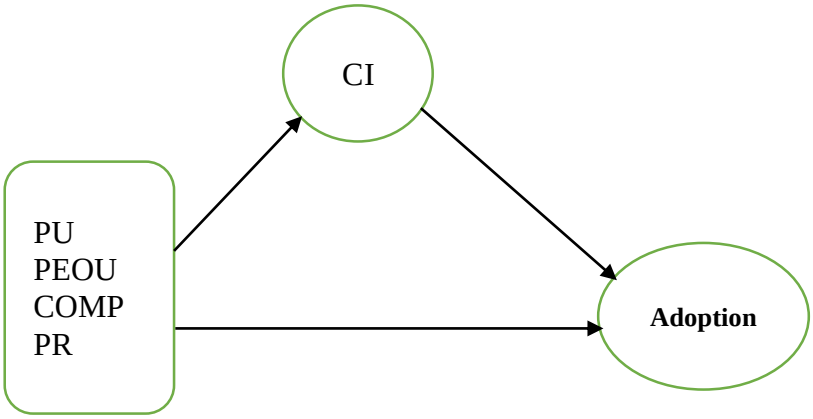
When all four steps are fulfilled, mediation can be established. Complete mediation is hardly found. It happens if the inclusion of variable Y (in step 4) reduces the direct effect of variables X_1 through X_4 to zero which is quite uncommon with behavioral data, therefore, partial mediation is a more realistic result. Partial mediation can be established when the inclusion of variable Y (in step4) reduces the direct effects of variables X_1 through X_4. This reduction in the direct effects of variables X_1 through X_4 demonstrates the mediating effect of variable Y (Baron & Kenny, 1986).

Figure 7.1: General four-step procedure of mediation analysis



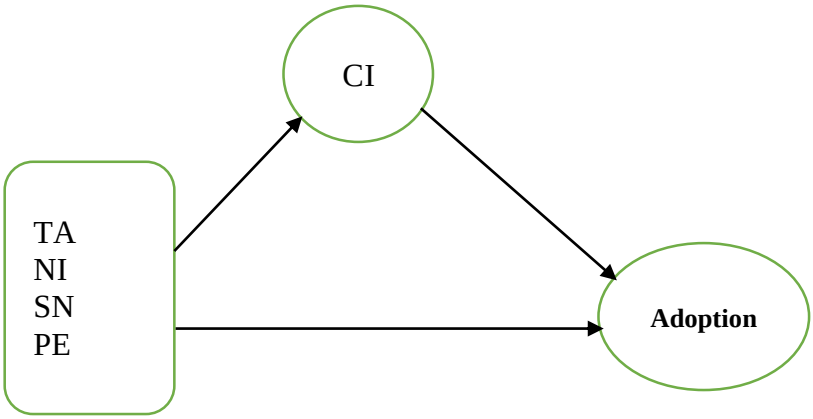
Thus, the conceptual framework used in this study can be adapted from the general mediating procedure as shown in Figure 7.1. Adoption, the crucial dependent variable of this study can be indicated by variable Z (see Figure 7.2a, b). The consumer innovativeness variable can be indicated by the mediating variable Y. Finally, the variables X_1 through X_4 represent the SST characteristics (see Figure 7.2a) and user characteristics variables (see Figure 7.2b).

Figure 7.2a: Consumer innovativeness as mediator between SST characteristics and adoption



The above mentioned four-step procedure is applied two distinct times in order to test both the mediating effect hypotheses. Consumer innovativeness variable was independently tested as mediator between the SST characteristics variables and intention of adoption (see Figure 7.2a).This was followed by an examination of consumer innovativeness variable as mediator between the user characteristics variables and intention of adoption (see Figure 7.2b). Findings of these two separate mediation analyses are discussed in this section.

Figure 7.2b: Consumer innovativeness as mediator between user characteristics and adoption



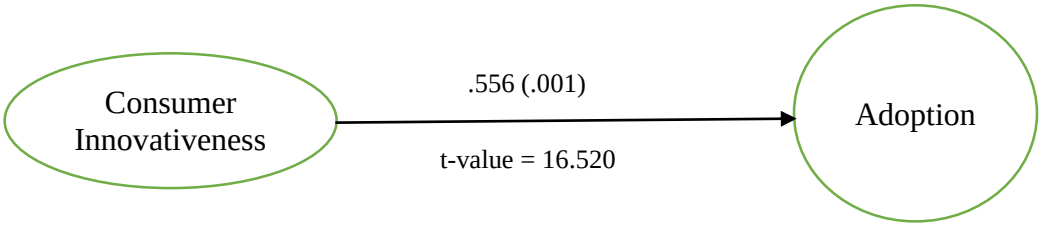
7.6.1.1. Consumer innovativeness: Mediator between SST characteristics and adoption

First, the mediating role of consumer innovativeness variable in the relationship between the SST characteristics variables and the intention of adoption is explored. Findings of the mediation analysis are presented in this section.

As discussed earlier, the first step in the mediation analysis is to examine the direct effect of consumer innovativeness on intention of adoption. Figure 7.3a illustrates the relationship of the consumer innovativeness variable with adoption, and its direct effect on adoption, confirming that consumer innovativeness does have a significant, direct impact on adoption. Results confirm the significant overall fit of the model (χ^2 = 90.768, d.f. = 19, p <.001).

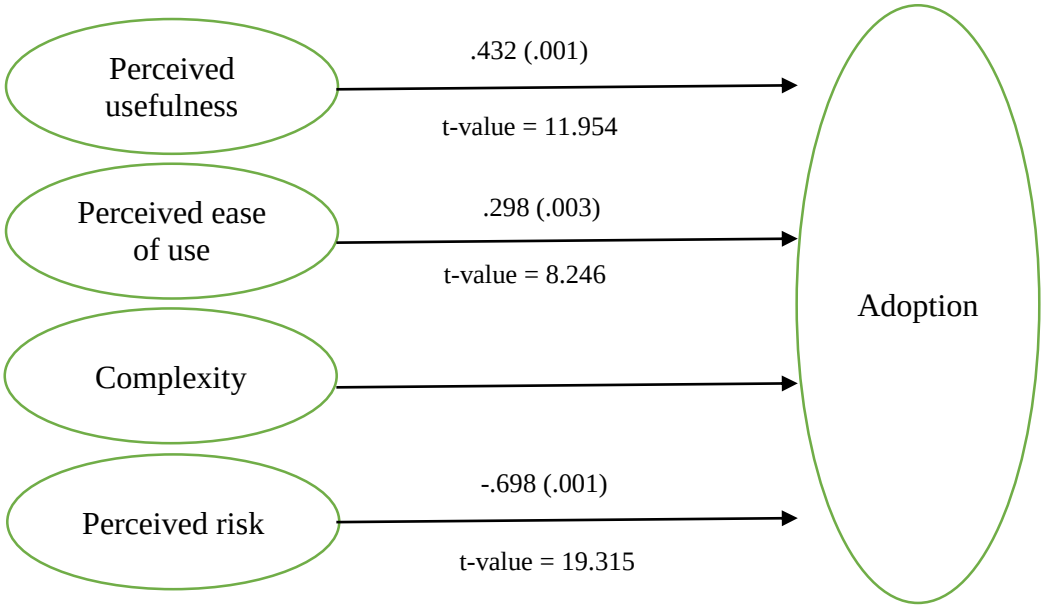
The chi-square test indicates a close model fit along with other indices supporting the adequacy of fit. The chi-square to degree of freedom ratio of 4.777 is close to the range of 2-3. Here, the chi-square test, due to its sensitivity to sample size, indicates an unacceptable fit, even when the fit is actually acceptable (Anderson & Gerbing, 1988; Bagozzi & Yi, 1988; Bentler & Bonett, 1980). Other goodness of fit indices confirm a good structural model fit (RMSEA = .073; GFI = .942; CFI = .965; NFI = .956; NNFI = .948).

Figure 7.3a: Step 1 - Direct effect of consumer innovativeness variable on adoption[6]



In relation to consumer innovativeness, Figure 7.3a demonstrates that consumer innovativeness is a strong determinant of adoption as confirmed by structural equation modeling with a standardized estimate of .556 (p value < .001). Consumer innovativeness shows a positive, significant effect on the intention of adoption.

Figure 7.3b: Step 2 - Effects of SST characteristics variables on adoption



The second step in the mediation analysis examines the direct effects of SST characteristics variables on adoption. The four SST characteristics (PU, PEOU, COM and PR) variables and their effects on adoption are shown in 7.3b. Three of the four determinants (PU, PEOU and PR) were found to have a direct, significant effect on intention of adoption. PU and PEOU were positively associated with adoption though perceived risk was negatively associated with adoption.

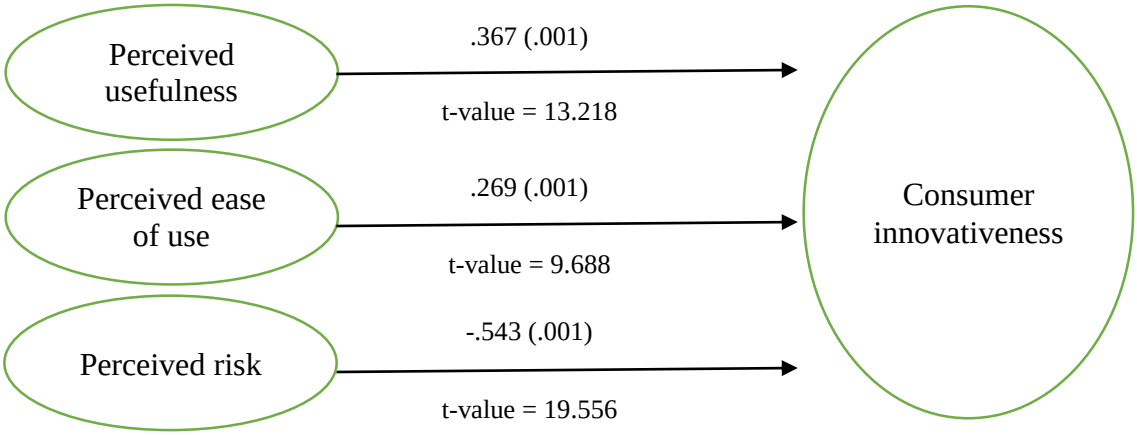
Here, the standardized estimates can be used to compare the relative strength of these determinants in the model, with higher standardized estimates representing a more powerful determinant of adoption. Based on these estimates, it seems that perceived risk and perceived

[6]Numbers on the top of the arrows indicate standardized estimates and p-values (shown in parentheses) for SEM.

usefulness are the two most effective determinants, while perceived ease of use is the weakest but statistically significant determinant of adoption. The odds ratios corresponding to every determinant are also given in Figure 7.3b. Complexity was not found to have a direct, significant effect on adoption. The overall fit of this model is significant (χ^2 = 325.656, d.f. = 115, p <.001) with χ^2 / d.f. = 2.832; RMSEA = .051 (> .1) and other model fit indices - GFI = .972; CFI = .946; NFI = .919; NNFI = .936 – are more than the threshold value (p > .9).

With three of the four SST characteristics variables significantly affecting adoption, the second step in the mediation analysis was fulfilled. Since complexity did not significantly affect adoption, consumer innovativeness cannot mediate the relationship between complexity and intention of adoption. Therefore, complexity was dropped from further mediation analysis.

Figure 7.3c: Step 3 - Effects of SST characteristics variables on consumer innovativeness

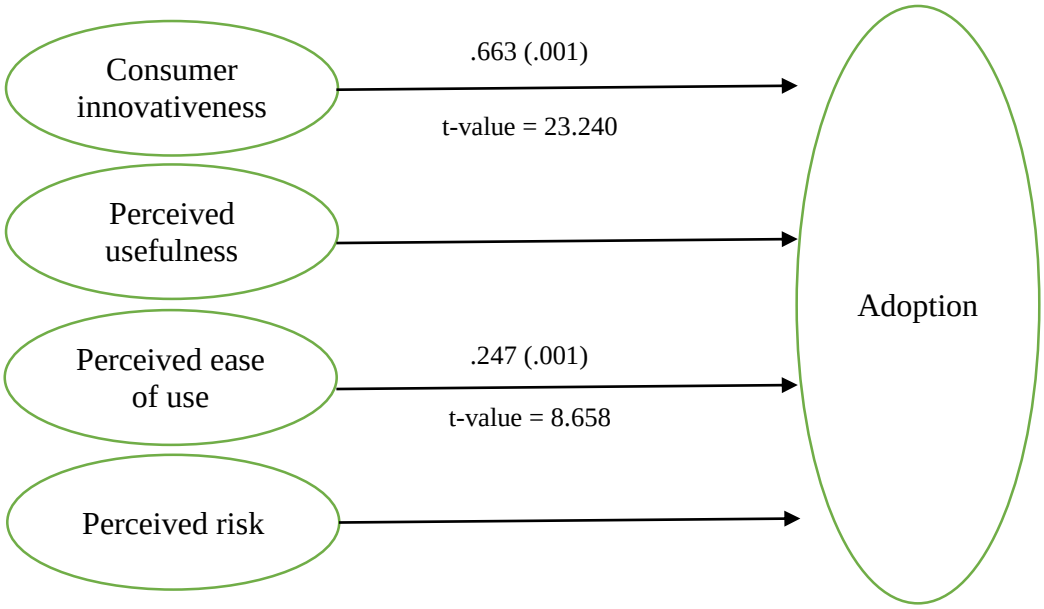


Step 3 examines the effect of the remaining SST characteristics variables on consumer innovativeness. To confirm required mediation, these determinants must also affect the level of consumer innovativeness. Figure 7.3c illustrates the remaining three SST characteristics variables (PU, PEOU and PR) and their effects on consumer innovativeness. All these three variables have a significant direct effect on consumer innovativeness. PU and PEOU were positively associated with consumer innovativeness though perceived risk was negatively associated with consumer innovativeness. The overall fit of the model is significant (χ^2 = 456.407, d.f. = 148, p <.001) with χ^2/d.f. = 3.084; RMSEA = .064 and other model fit indices - GFI = .972; CFI = .946; NFI = .919; NNFI = .936 – are more than the threshold value (> .9).

The fourth and final step in this mediation analysis was to examine the effects of consumer innovativeness and rest of the SST characteristics variables on intention of adoption. As mentioned earlier, PU, PEOU and PR were the three SST characteristics variables to successfully pass through all previous steps of the mediation analysis, complexity did not.

Figure 7.3d shows the effects of consumer innovativeness, PU, PEOU and PR on adoption intention. Results clearly support the expected mediating role of consumer innovativeness by showing it as a significant determinant of adoption in the model. As shown in Figure 7.3b, PU, PEOU and PR have demonstrated a significant effect on the intention of adoption in step 2, however, when consumer innovativeness was incorporated along with these determinants, their individual effect significantly decreased (see Figure 7.3d). In fact, PU and PR failed to show a significant effect on intention of adoption when modeled with consumer innovativeness, illustrating a strong partial mediation by consumer innovativeness. Although PEOU still maintains a significant effect on adoption, its significance is somewhat decreased. Therefore, it can be concluded that consumer innovativeness mediates the relationship between SST characteristics (PU, PEOU and perceived risk) and the intention of adoption, partially supporting hypothesis 1.

Figure 7.3d: Step 4 - Effects of consumer innovativeness and SST characteristics variables on adoption



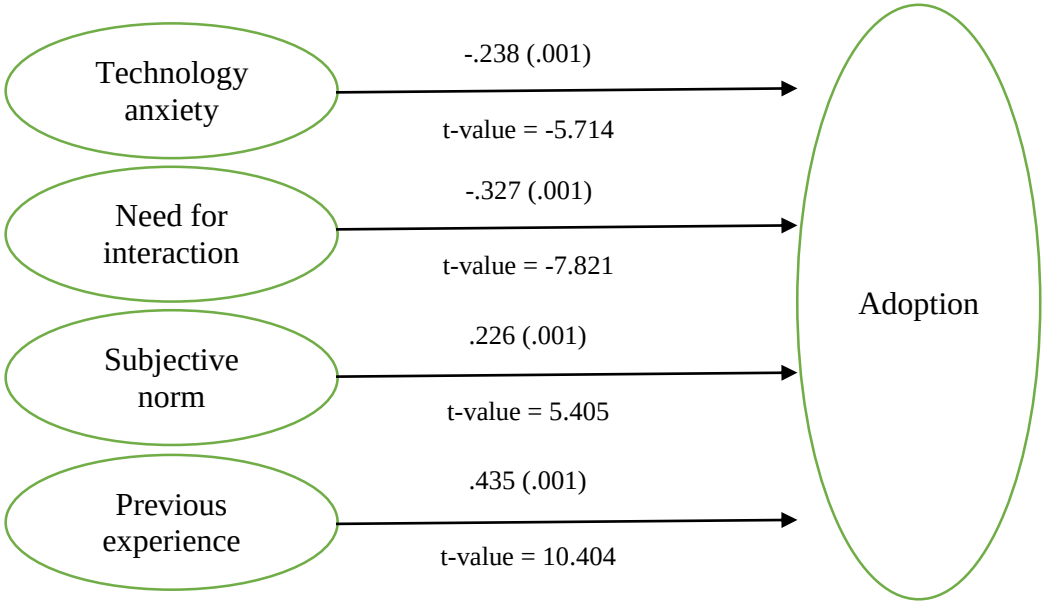
7.6.1.2. Consumer innovativeness: Mediator between user characteristics and adoption

After the procedure described above, the mediating role of consumer innovativeness variable in the relationship between the user characteristics variables and the intention of adoption was explored. Findings of the mediation analysis are presented in this section.

Once again, the first step in the mediation analysis was to examine the direct effect of consumer innovativeness variable on intention of adoption. It was already examined during testing of the consumer innovativeness variable's mediating effect between SST characteristics and adoption (see Figure 7.3a).

After satisfying the first step, the second essential step in the mediation analysis examines the direct effects of user characteristics variables (TA, NI, SN and PE) on the intention of adoption. Each of these four user characteristics variables and their effects on adoption are illustrated in Figure 7.4b. All the four predictors have a significant effect on intention of adoption. Technology anxiety and need for interaction were found to be negatively associated with adoption intention while subjective norm and previous experience were positively associated with adoption. In view of the standardized estimates, it seems that subjective norm, previous experience and need for interaction are the three most powerful determinants of adoption while technology is the weakest.

Figure 7.4b: Step 2 - Direct effects of user characteristics variables on adoption

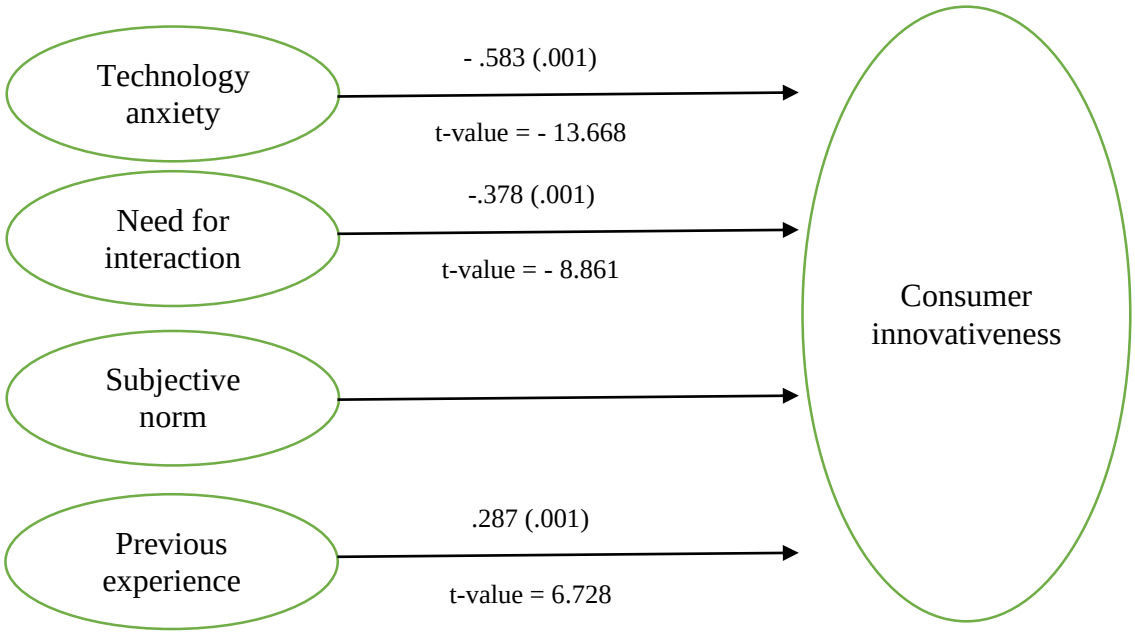


The overall fit of the model is significant (χ^2 = 259.007, d.f. = 100, p <.001) with a χ^2 / d.f. value of 2.59 and RMSEA = .065. This structural model fit is further confirmed by significant goodness of fit-indices (GFI = .921; CFI = .947; NFI = .917; NNFI = .936), while based on a comparison with structural model of SST characteristics, this model has all significant determinants.

With all four user characteristics variables significantly affecting SST adoption, the second step in this mediation analysis was satisfied. Step 3 examines the direct effects of the user characteristics variables on consumer innovativeness. For complete mediation analysis, these determinants must also affect consumer innovativeness. Figure 7.4c illustrates the four user characteristics variables and their effects on consumer innovativeness. Technology anxiety, need for interaction and previous experience all have a significant effects on consumer innovativeness. Previous experience was found to be positively related to consumer innovativeness while both technology anxiety and need for interaction were negatively related to consumer innovativeness.

However, subjective norm did not have a significant effect on consumer innovativeness. The overall fit of the model was found to be significant again (χ^2 = 362.068, d.f. = 131, p <.001) with a χ^2/d.f. value of 2.76 and RMSEA = .068. Other goodness of fit-indices are - GFI = .924; CFI = .940; NFI = .910; NNFI = .930)

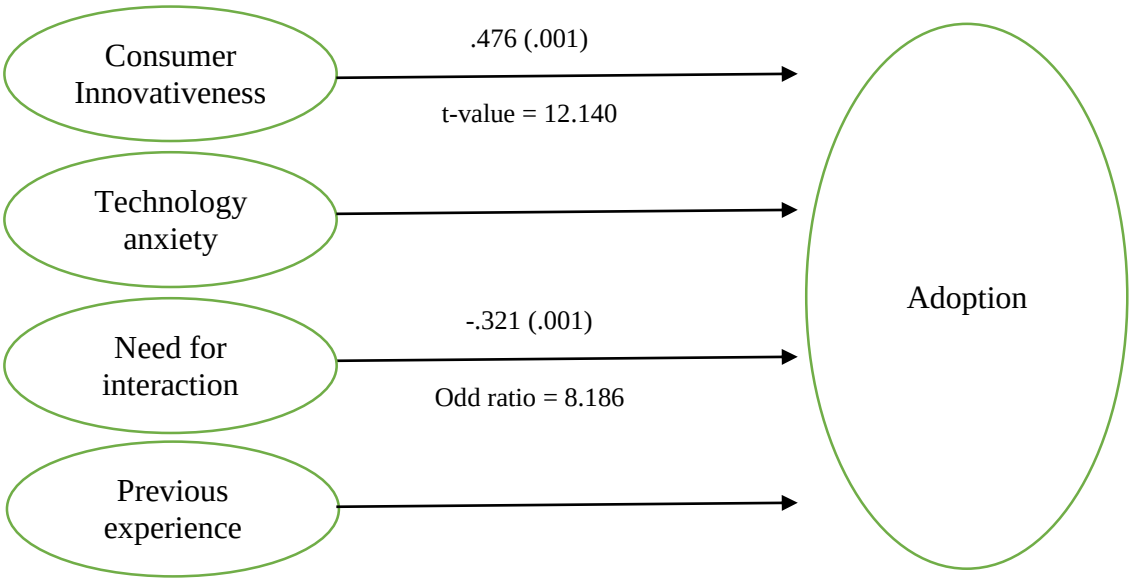
Figure 7.4c: Step 3 - Effects of user characteristics variables on consumer innovativeness



The fourth and final step in this mediation analysis involved examining the effects of consumer innovativeness and rest of the user characteristics variables (technology anxiety, need for interaction and previous experience) which successfully passed through all the previous steps, on intention of adoption. However, subjective norm did not successfully pass the previous step and was therefore dropped from further mediation analysis.

Figure 7.4d illustrates the effect of consumer innovativeness, need for interaction, previous experience and technology anxiety on the intention of adoption. Results support the expected mediating role of consumer innovativeness by showing it as a significant determinant of adoption in this structural model. In step 2 (see Figure 7.4b), need for interaction, previous experience, and technology anxiety all demonstrated a significant effect on adoption. However, as consumer innovativeness was incorporated along with the rest of the determinants from step 3, the effect of these variables is significantly decreased, demonstrating partial mediation by consumer innovativeness. Further, both previous experience and technology anxiety failed to demonstrate a significant effect on intention adoption when incorporated into the model with consumer innovativeness.

Figure 7.4d: Step 4: Effects of consumer innovativeness and user characteristics variables on adoption



Need for interaction had a significant effect on adoption, although its significance decreased when incorporated into the model with consumer innovativeness. This establishes that consumer innovativeness mediates the relationship between need for interaction, previous experience, technology anxiety and the intention of adoption. Thus, hypothesis 2 is also partially supported.

Based on the first two mediating effect hypotheses, it can be concluded that consumer innovativeness has a strong partial mediating effect between SST characteristics variables (PU, PEOU and perceived risk) and user characteristics variables (technology anxiety, need for interaction and previous experience), and intention of adoption. In addition to the above two mediating effect hypotheses, various other hypotheses were also developed in Chapter Four and several of them have been tested in the mediation analysis as discussed in the following sections.

7.6.2. Consumer innovativeness Hypothesis (H_3)

Hypotheses 3 examines the direct impact of the consumer innovativeness variable on the intention of adoption. This hypothesis (H_3) was measured in the first step of the mediation analysis (see Figure 7.3a). Consumer innovativeness variable was found to have significant, direct effect on the intention of adoption at .001 level, providing support for hypothesis 3. Thus, it can be concluded that if consumer innovativeness goes up, the intention of adoption also increases.

7.6.3. Moderating Effects Hypotheses (H_4)

In addition to the direct effect of the consumer innovativeness variable on adoption, a few other

crucial relationships have also been explored. Hypothesis 4 predicted that a few situational variables (e.g. waiting time, crowding) would moderate the relationship between consumer innovativeness and adoption. It was expected that for respondents with a low tolerance for wait, consumer innovativeness would have more effect on adoption than for respondents with a high tolerance for wait. Possessing high tolerance for wait and/or crowding indicates feeling comfortable with ambiguous situations. In order to test for these moderating effects, two separate analyses are performed.

7.6.3.1. Moderating effect of waiting time

First, respondents were split into three groups – (i) those with a high tolerance for wait; (ii) those with a low tolerance for wait, and (iii) a group with impartial tolerance level. The first 45.5% of the respondents (n = 173) scored 7 or less (based on the percentiles for dividing the total respondents into three groups) on the 7-point two-item tolerance for wait scale, and were classified as having low tolerance for wait. Next 35% of the respondents (n = 133) who scored 9 or more on the same scale, were classified as having high tolerance for wait. Remaining respondents were categorized as a group with an impartial tolerance level.

Structural equation modeling was run to determine if consumer innovativeness to adoption relationship was stronger for the low tolerance for wait group as expected. Results confirmed the significant relationship between consumer innovativeness and the intention of adoption (χ^2 = 120.403, d.f. = 38, $p < .001$) with a χ^2/d.f. value of 3.168 and other fit indices - RMSEA = .084, GFI = .907; CFI = .949; NFI = .928; NNFI = .924). In high tolerance for wait group, the standardized estimate for consumer innovativeness was found to be .32 ($p < .001$, t-value = 8.765). With the low tolerance for wait group, this relationship was expected to be much stronger. In the low tolerance for wait group, the standardized estimate for consumer innovativeness was .37 ($p < .001$, t-value = 10.134).

Although the relationship was stronger in the low tolerance for wait group as expected, the difference in the consumer innovativeness estimate was not significantly different. To test the significant difference between the two standardized estimates, the researcher conducted moderation analysis with 'critical ratios for differences' option available in AMOS 20.0 and after examining group differences, found that the standardized estimates are not significantly different, thus hypothesis 4a is rejected.

7.6.3.2. Moderating effect of crowding

Next, respondents were again split into three groups – (i) those with a high tolerance for crowding; (ii) those with a low tolerance for crowding; and (iii) a group with impartial tolerance

level. The first38.2% of the respondents (n = 145) scored 10 or less (based on the percentiles for dividing the total respondents into three groups) on the 7-point three-item tolerance for crowding scale, and were classified as having low tolerance for crowding. Next, 40.8% of the respondents (n = 155) who scored a more than 13 on the same scale, were classified as having high tolerance for crowding. Remaining respondents were categorized as a group with impartial tolerance level.

Once again, structural equation modeling was run in order to determine if consumer innovativeness to adoption relationship was stronger for the low tolerance for crowding group. Results confirmed the significant relationship between consumer innovativeness and intention of adoption (χ^2 = 128.094, d.f. = 38, p < .001) with a χ^2/d.f. value of 3.371 and other fit indices - RMSEA = .079, GFI = .922; CFI = .956; NFI = .939; NNFI = .935). In high tolerance for wait group, the standardized estimate for consumer innovativeness was.23 (p < .001, t-value = 6.299). With the low tolerance for wait group, this relationship was expected to be much stronger. In the low tolerance for wait group, the standardized estimate for consumer innovativeness was.49 (p < .001, t-value = 13.421).

It was revealed that the relationship was stronger in the low tolerance for wait group as expected, and the difference in the consumer innovativeness estimate was also significantly different. To test the significant difference between the two standardized estimates, the researcher once again carried out moderation analysis with 'critical ratios for differences' option and after examining group differences, the researcher found that the standardized estimates were significantly different. Thus, tolerance for crowding significantly moderated the relationship between consumer innovativeness and the intention of adoption, supporting hypothesis 4b.

Overall, the moderation analyses provide partial support for hypothesis H_4 as one of two situational variables (waiting time and crowding) was found to be an effective moderating variable. In the offline service context, it seems natural that people would adopt the alternative service delivery option, if they find a crowded service environment.

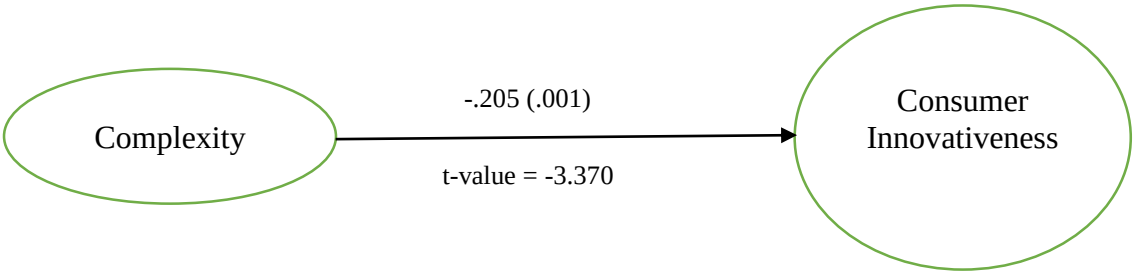
7.6.4. SST Characteristics Hypotheses (H5a, b – H8a, b)

Several SST characteristics hypotheses were also examined during mediation analysis. Results are presented in this section. The direct effect of the SST characteristics variables on adoption (hypotheses H_{5a} – H_{8a}) are illustrated in Figure 7.3b. Findings confirmed that PU, PEOU and perceived risk have a direct, significant effect on intention of adoption, supporting hypotheses H_{5a}, $H_{6a}$and H_{8a}. However, complexity was not found to significantly affect adoption, therefore, hypothesis H_{7a} is not supported.

In addition to the direct effects on adoption, the SST characteristics variables were also

hypothesized to affect the consumer innovativeness variable (hypotheses H_{5b} – H_{8b}). Once again, several of these hypothesized relationships were already examined amid the mediating analysis of the CI variable between SST characteristics variables and adoption (see Figure 7.3c). Results showed that PU and PEOU both had a positive, significant effect on adoption, while perceived risk negatively affected adoption intention. However, since complexity didn't clear the second step of mediation analysis, it was dropped from further mediation analysis. Therefore, the effect of complexity on consumer innovativeness was examined at this stage. Figure 7.5 illustrates the finding from this examination, where complexity has a negative significant effect on consumer innovativeness. Thus, based on this as well as previous findings from mediating analysis, hypotheses H_{5b}, H_{6b}, H_{7b} and H_{8b} are supported.

Figure 7.5: Direct effect of complexity on consumer innovativeness



7.6.5. User Characteristics Hypotheses (H9a, b – H12a, b)

Several user characteristics hypotheses were also examined amid the mediation analysis of the CI variable between user characteristics variables and adoption. Results are provided in this section. The direct effect of the user characteristics variables on intention of adoption (hypotheses 9a, 10a, 11a, and 12a) are demonstrated in Figure 7.4b. The effect of technology anxiety (hypothesis 9a), need for interaction (hypotheses 10a), subjective norm (hypotheses 11a) and previous experience (hypothesis 12a) on intention of adoption were all found significant enough, where technology anxiety (-.238, $p < .001$; t-value = -5.714) and need for interaction (-.327, $p < .001$; t-value = -7.821) were negatively associated with adoption while subjective norm (.226, $p < .001$; t-value = 5.405) and previous experience (.435, $p < .001$; t-value = 10.404) were positively associated with adoption.

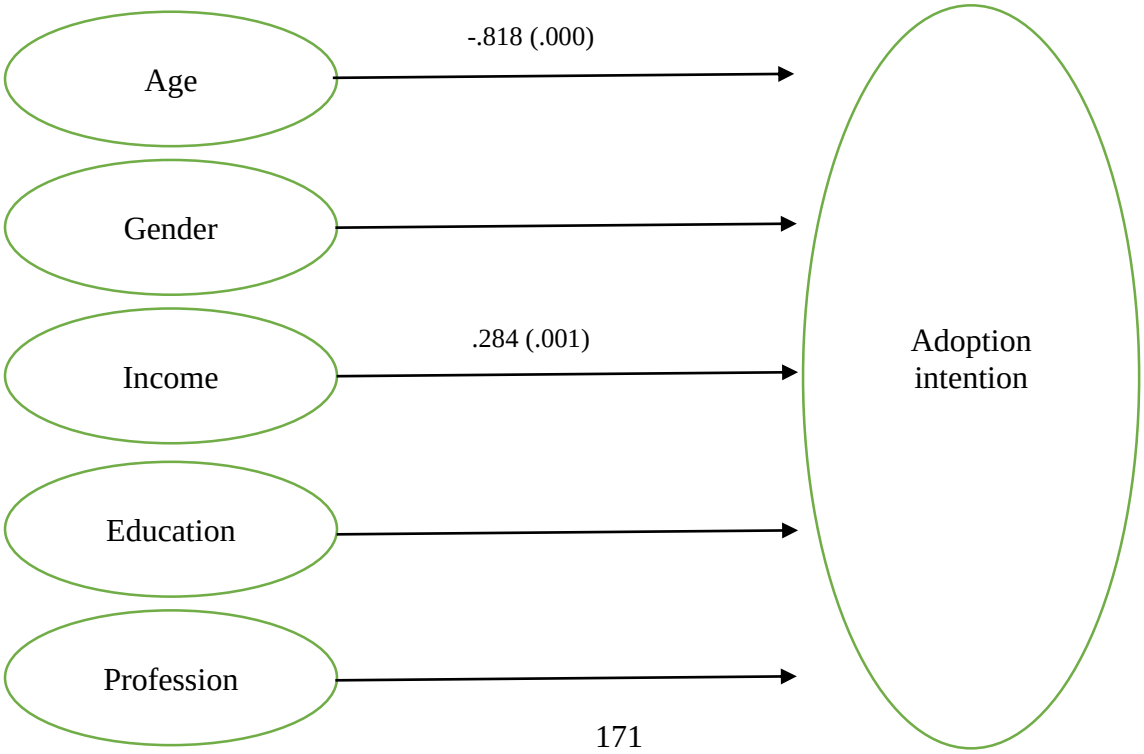
In addition to the direct effects on intention of adoption, these user characteristics variables were expected to affect the consumer innovativeness variable. These proposed relationships are given in hypotheses 9b, 10b, 11b and 12b. The effect of technology anxiety (hypothesis H_{9b}), need for interaction (hypotheses H_{10b})and previous experience (hypothesis H_{12b}) on consumer innovativeness were all significant enough, supporting their corresponding hypotheses, while subjective norm (hypotheses H_{11b}) didn't significantly affect consumer innovativeness, thus

hypothesis H_{11b} was rejected (see Figure 7.4c). Here, technology anxiety (-.583, $p < .001$; t-value = - 13.668) and need for interaction (-.378, $p < .001$; t-value = -8.861) were both negatively associated with adoption, while previous experience (.287, $p < .001$; t-value = 6.728) was positively associated with adoption.

Following Kaushik and Rahman (2015c), two separate analyses were run to test Hypothesis 13a and Hypothesis 13b. In order to examine the effects of demographic variables (age, gender, income, education and profession) on adoption intention, first of all, these demographic variables were included as separate independent variables while adoption intention was considered dependent variable. Simple linear regression analysis confirmed that age and income were two significant determinants of adoption intention towards SSTs. As expected, age was negatively related to adoption intention while income was positively related to adoption intention. Gender, education and profession didn't show a direct significant effect on adoption intention.

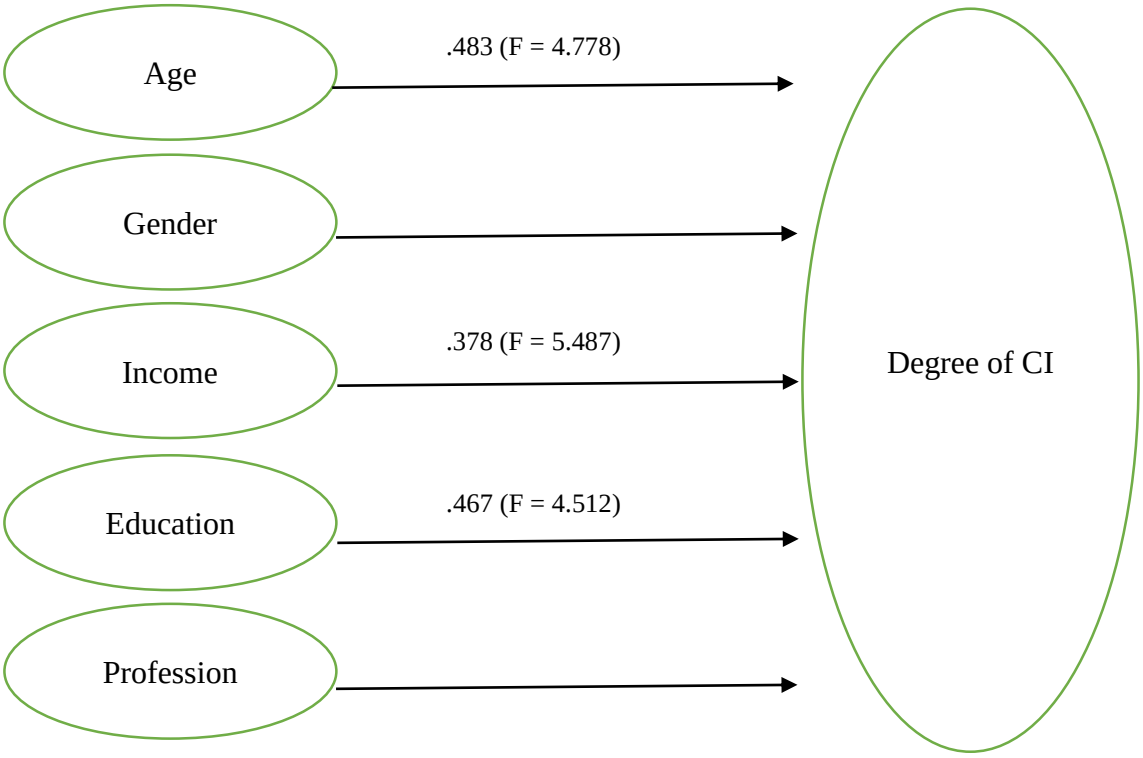
The overall fit of the regression model was highly significant (F-value = 199.221, $p < .0001$) with an adjusted R^2 of 72.3%. Although the R^2 value was relatively high, but even if it were low, it would not have mattered as the intent of the model was not to predict the variance in adoption intention. Rather, the purpose of this step was to develop crucial relationships among demographic variables and adoption intention. The standardized regression estimates are given in Figure 7.6a, partially supporting hypothesis H13a. Thus, sample respondents who were younger and had higher income levels were more likely to adopt an innovative SST.

Figure 7.6a: Direct effects of demographic variables on adoption intention



In order to examine the effects of demographic variables (age, gender, income, education and profession) on level of consumer innovativeness, the respondents were first divided into three separate groups – respondents with a high degree of innovativeness; those with a low degree of innovativeness; and a third group of respondents with an impartial tolerance level. The first39.2% of the respondents (n = 149) who scored 21 or less (based on the percentiles for dividing the total respondents into three groups) on the 7-point five-item innovativeness scale, were classified as having low degree of innovativeness. Next, 35% of the respondents (n = 133) who scored 30 or more on the same scale, were classified as having high degree of innovativeness. Remaining respondents were categorized as a group with impartial innovativeness level.

Figure 7.6b: Direct effects of demographic variables on consumer innovativeness



Following Kaushik and Rahman (2015c), a multiple discriminant analysis was applied for identifying the most significant demographic variables which discriminated between adopters (those with high innovativeness) and non-adopters (those with low innovativeness) as categorized above. The results of this analysis are shown in Figure 7.6b. Results reveal that age, income and education were significant determinants of SST adoption. The standardized discriminant coefficients of age, income and education were .483 ($F = 4.778$, $p = .024 < .05$, d.f. = 2, 377), .378 ($F = 5.487$, $p = .018 < .05$, d.f. = 2, 377) and .467 ($F = 4.512$, $p = .036 < .05$, d.f. = 2, 377) respectively with classification accuracy of 70.4%. The classification accuracy is a

measure of fit for a discriminant model. The above statistics show that based on respondent scores on measures of consumer innovativeness, a respondent's status as an adopter or non-adopter of the SST was accurately predicted for nearly 70.4% of the total sample respondents.

Thus, hypothesis H_{13b} is also partially supported as age, income and education (see Figure 7.6b) were found to affect the consumer innovativeness variable. This confirms that the sample respondents who were younger, or/and respondents with higher education levels were more likely to be innovative than those who did not possess these demographic characteristics.

7.6.6. Adoption Process Hypotheses (H14a - H14d)

The final set of hypotheses examined in this research is based on the association among five distinct stages (or constructs) of the innovation adoption process - awareness, investigation, evaluation, trial and adoption. In this section, all these constructs and their hypothesized relationships (as developed in Chapter Four) are qualitatively examined. In order to examine these relationships quantitatively, correlations between every stage (construct) and the consequent stage (construct) were examined.

The initial association was found between the first two stages of awareness and investigation. Hypothesis H_{14a} states a higher level of consumer awareness would lead to increased level of investigation and information collection. This was confirmed by a significant correlation between these two stages (.632, $p < .001$), supporting hypothesis H_{14a}. Similarly, the relationship between the second and third stages (investigation and evaluation) in hypothesis H_{14b} showed that higher level of consumer efforts related to investigation would lead to more favorable evaluations of an innovative SST by consumers. This relationship was also statistically significant (.433, $p < .001$), supporting hypothesis H_{14b}. It was found that more favorable evaluations of an innovative SST would lead more frequent trial behavior, as Hypothesized in H_{14c}. This is also evidenced by a significant correlation between these two stages (.557, $p < .001$), confirming hypothesis H_{14c}. Hypothesis H_{14d}states that respondents with a more positive trial experience are more likely to adopt an innovative SST than those consumers with a less positive trial experience. In order to confirm this, the respondents were asked whether they successfully completed the task using an SST for the first time. Their level of satisfaction with their usage experience was compared with their adoption intentions. As expected, this hypothesis was also supported with a significant correlation of .247 ($p<.003$). However, this also raises a question on its practical significance as a low correlation of under .30 shows little practical significance.

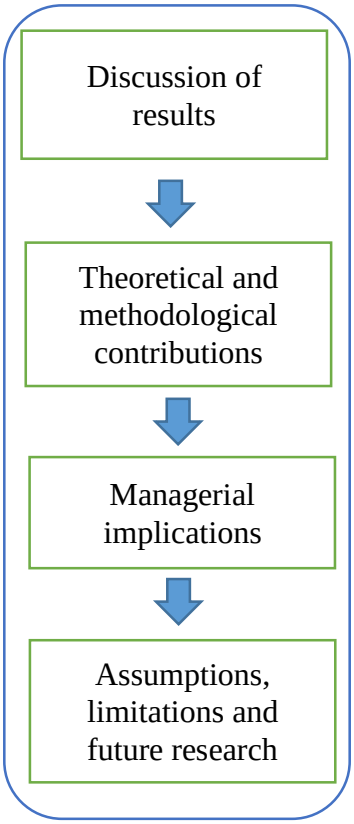
Summary

This chapter describes the data analysis procedure and provides a summary of findings from the quantitative methodology adopted in this research. Demographic statistics of the sample respondents were initially provided followed by a summary of the refinement and purification procedures of all measures used to collect primary responses. The foremost intent was to provide findings from the empirical examination of various hypotheses developed in Chapter Four. In the next and last chapter, various findings and implications for both academics and managers are reported along with research limitations and directions for future research.

Chapter 8

Discussion, Implications and Future Research

This research primarily explores consumer innovativeness towards SSTs in numerous service industries. To this end, the study examines the general innovation adoption process in addition to various determinants (SST characteristics and user characteristics) of SST adoption. This chapter includes - discussion on the results of the quantitative research, research contributions (theoretical and methodological contributions), implications of the research (theoretical as well as managerial implications), and finally limitations and future research directions.



8.1. Discussion of Results

Various research hypotheses related with consumers' adoption of SSTs were developed and proposed in Chapter Four. Majority of the hypotheses related to the associations among numerous determinants of SST adoption, and their effects on consumers' intention of adoption. Furthermore, many research hypotheses examined the association between various stages (awareness, investigation, evaluation, trial and adoption) in the general innovation adoption process. In sum, all hypotheses intended to examine consumer innovativeness towards SSTs in offline service contexts. Table 8.1 summarizes the results of hypotheses testing. The discussion on each set of research hypotheses is given in the following sections.

8.1.1. Overall mediating effects

The primary emphasis of the proposed theoretical conceptual model (refer to Figure 4.1 in Chapter Four) is on consumer innovativeness and its role as a mediating variable. SST characteristics and user characteristics variables have been explored in existing literature as determinants of SST adoption with diverse findings and interpretations (Venkatraman, 1991). By introducing consumer innovativeness as a key mediating variable, a more comprehensive and practically significant set of determinants can be used to explore consumers' adoption of SSTs in offline services contexts.

A four-step mediation analysis (suggested by Baron & Kenny, 1986) was applied twice -once for consumer innovativeness as mediator between SST characteristics variables and adoption, and the second time for consumer innovativeness as mediator between user characteristics and adoption. Both these examinations confirmed the role of consumer innovativeness as a significant mediating variable in the relationships among majority of aforementioned determinants, providing partial support for hypotheses 1 and 2.

With respect to hypothesis 1, consumer innovativeness, out of total four SST characteristics, mediated the relationship between PU, PEOU and PR, and adoption intention. Similarly, partial support was found for hypothesis 2 as consumer innovativeness mediated the relationship between TA, PE and NI, and the intention of adoption. Overall, consumer innovativeness was found to mediate the relationship between:

- three of the SST characteristics variables (perceived usefulness, perceived ease of use and perceived risk) and intention of adoption, and;
- three user characteristics (technology anxiety, previous experience and need for interaction) and the intention of adoption (refer to Table 8.1).

Table 8.1: Summary of Hypotheses Results

Hypothesis number	Hypothesis Statement	Result
	Mediating Effects Hypotheses	
H_1	Consumer innovativeness mediates the relationship between SST characteristics (perceived usefulness, perceived ease of use, complexity and perceived risk) and the intention of adoption.	Partially supported • Strong partial mediation for PU and PR • Weak partial mediation for PEOU • No mediation for complexity
H_2	Consumer innovativeness mediates the relationship between user characteristics (technology anxiety, need for interaction, subjective norm, previous experience and demographics) and the intention of adoption.	Partially supported • Strong partial mediation for TA and PE • Weak partial mediation for NI • No mediation for subjective norm
	Consumer Innovativeness Hypothesis	
H_3	Consumer innovativeness is positively related to the intention of adoption.	Supported
	Moderating Effects Hypotheses	
H_4	Situational variables (Waiting time and crowding) moderates the relationship between consumer innovativeness and the intention of adoption. H_{4a}: Tolerance for wait moderates the relationship between consumer innovativeness and the intention of adoption. H_{4b}: Tolerance for crowding moderates the relationship between consumer innovativeness and the intention of adoption.	Partially supported • Tolerance for wait doesn't moderate the relationship between consumer innovativeness and the intention of adoption • Tolerance for crowding significantly moderates the relationship between consumer innovativeness and the intention of adoption

	SST Characteristics Hypotheses	
H_{5a}	Perceptions of usefulness of SSTs are positively related to the intention of adoption.	Supported
H_{5b}	Perceived usefulness of SSTs are positively related to consumer innovativeness.	Supported
H_{6a}	Perceptions of ease-of-use of SSTs are positively related to the intention of adoption.	Supported
H_{6b}	Perceived ease-of-use of SSTs are positively related to consumer innovativeness.	Supported
H_{7a}	Perceptions of complexity is negatively related to the intention of adoption.	Not supported
H_{7b}	Perceptions of complexity is negatively related to consumer innovativeness.	Supported
H_{8a}	Perceptions of risk are negatively related to the intention of adoption.	Supported
H_{8b}	Perceived risk is negatively related to consumer innovativeness.	Supported
	User Characteristics Hypotheses	
H_{9a}	Technological anxiety is negatively related to the intention of adoption.	Supported
H_{9b}	Technological anxiety is negatively related to consumer innovativeness.	Supported
H_{10a}	Need for interaction is negatively related to the intention of adoption.	Supported
H_{10b}	Need for interaction is negatively related to consumer innovativeness.	Supported
H_{11a}	Subjective norm is positively related to the intention of adoption.	Supported
H_{11b}	Subjective norm is positively related to consumer innovativeness.	Not supported

H_{12a}	Previous experience is positively related to the intention of adoption.	Supported
H_{12b}	Previous experience is positively related to consumer innovativeness.	Supported
H_{13a}	Consumers who are younger, male, have higher education and income levels are more likely to adopt an innovative SST than those customers who are older, female, and have lower education and income levels.	Partially supported • Age negatively affects adoption • Income positively affects adoption • Gender, education and profession didn't show any significant effect on adoption
H_{13b}	Consumers who are younger, male, have higher education and income levels are more likely to have higher level of consumer innovativeness than those customers who are older, female, have lower education and income levels.	Partially supported • Age, income and education are the significant determinants of SST adoption
	Adoption Process Hypotheses	
H_{14a}	Consumers with higher awareness are more likely to investigate and collect information than consumers with lower awareness.	Supported
H_{14b}	Consumers who collect more information through investigation are more likely to evaluate the SST favorably than those consumers who collect less information through investigation.	Supported
H_{14c}	Consumers with a more favorable evaluation are more likely to try the SST than those consumers with a less favorable evaluation of the SST.	Supported
H_{14d}	Consumers with a more positive trial experience are more likely to adopt the SST than those consumers with a less positive trial experience.	Supported

The aforementioned mediating effects indicate the significance of the consumer innovativeness variable in examining consumers' adoption of SSTs. The proposed framework can be utilized by both practitioners and academics to clearly understand the various adoption theories and models available in existing literature. Besides, more useful insights related to the mediating effects can be gained by examining each hypothesis used to establish mediation. Each of the other sets of hypotheses is discussed in the following sections.

8.1.2. Consumer innovativeness variable

Consumer innovativeness variable is expected to have a direct significant effect on intention of adoption. As expected, consumer innovativeness was found positively related to intention of adoption. As the degree of innovativeness in consumer increases, the intention of adoption also increases. Thus, hypothesis $H_3$is supported. Consumer innovativeness is defined as the propensity of consumers to adopt new and innovative products/services (Kaushik & Rahman, 2014). Thus, it can be concluded that consumers having high innovativeness would be more likely to adopt new and innovative products/services.

8.1.3. Moderating variables

In addition to the direct and moderating effects of the consumer innovativeness variable on SST adoption, numerous other research hypotheses were also developed and proposed (refer to Chapter Four). For instance, hypothesis H_4 stated that situational variables (waiting time and crowding) would moderate the relationship between consumer innovativeness and intention of adoption. To examine this, tolerance for wait and tolerance for crowding were divided into three different groups: (i) those with a high tolerance for wait/crowding; (ii) those with a low tolerance for wait/crowding, and (iii) a group with impartial tolerance levels for wait/crowding. Two separate analyses were run in order to examine the moderating role of the two situational variables (waiting time and crowding).

First, SEM was run to examine whether the consumer innovativeness to adoption relationship was stronger for the low tolerance for wait group as expected. Results confirmed that this relationship was slightly stronger as compared to high tolerance for wait group, but the difference between the groups was not found statistically significant, therefore hypothesis H_{4a} was not supported. SEM was run again to examine whether the consumer innovativeness to adoption relationship was stronger for the low tolerance for crowding group. Results this time confirmed that this relationship was stronger in the low tolerance for wait group as expected. Also, the difference in the consumer innovativeness estimate between the groups was found statistically significant, supporting hypothesis H_{4b}.

8.1.4. SST characteristics variables

The SST characteristics variables (PU, PEOU, COM and PR) were also proposed to have a direct effect on both intention of adoption and the consumer innovativeness variable. Hypotheses H_{5a} through H_{8a} intended to examine their direct effects on intention of adoption, whereas hypotheses H_{5b} through H_{8b} sought to examine their direct effects on the consumer innovativeness variable.

As discussed in mediating analysis, majority of the SST characteristics variables did influence the intention of adoption. Three of the four SST characteristics variables (perceived usefulness, perceived ease of use and perceived risk) were found to significantly affect the intention of adoption, supporting hypotheses H_{5a}, H_{6a} and H_{8a}. As expected, PU and PEOU were both found positively related to adoption, while PR was negatively related to adoption. Thus, consumers who perceived a new and innovative SST to be more useful and possessing ease of use were more likely to adopt it. Similarly, consumers who perceived more risk associated with a new and innovative SST, were less likely to adopt it.

Complexity was not found to be a statistically significant determinant of intention of adoption, rejecting H_{7a}; however, the effect was in the expected (negative) direction. Consumers who perceived an SST to be less complex were more likely to adopt it. An effective explanation for this unexpected non-significant result is that the SSTs (e.g. ATM) under study may not be characteristically complex enough to allow complexity to be a significant determinant of adoption. In fact, the mean complexity score (3.1on a 7-point scale) also indicates a relatively low value, supporting this argument.

Mediating analysis showed that all the SST characteristics variables influenced the consumer innovativeness variable in the expected directions, providing evidence in support of hypotheses H_{5b}, H_{6b}, H_{7b} and H_{8a}. Results were quite similar to those pertaining to the effects of the SST characteristics variables on intention of adoption. This time however, all four SST characteristics variables were found significantly related to consumer innovativeness. Interestingly, complexity was also found to be a significant determinant of consumer innovativeness, although it was not significant enough in case of intention of adoption. A potential explanation for this contradictory result is that various SSTs under study may differ in their level of complexity due to which the complexity variable proves to be a significant determinant of consumer innovativeness, but not of intention of adoption. In fact, the standardized coefficient (-.205) for complexity was the weakest among four SST characteristics, providing support to this argument.

8.1.5. User characteristics variables

The user characteristics variables consisted of four individual personality traits (TA, NI, SN and PE), and five demographic variables (age, gender, education, profession and income). Collectively, this set of variables was also expected to have a direct significant effect on both intention of adoption as well as consumer innovativeness variable. Hypotheses H_{9a} through H_{13a} intended to examine their direct effects on intention of adoption, whereas hypotheses H_{9b} through H_{13b} intended to examine their direct effects on the consumer innovativeness variable.

As discussed in mediating analysis, the user characteristics variables did influence intention of adoption. All the aforementioned personality traits (technology anxiety, need for interaction, subjective norm and previous experience) were found to have significant influence on intention of adoption, supporting hypotheses H_{9a}, $H_{10a,}$ H_{11a} and H_{12a}. Two of the demographic variables (age and income) were also found to have significant influence on adoption, partially supporting hypothesis H_{14a}.

Interestingly, demographics that have generally been explored in academic research and business decision making emerged as relatively weak determinants of adoption. Only two (age and income) of the five demographic variables were found to have significant effect on adoption, while the remaining three variables (gender, education and profession) failed to show any significant influence. Thus, it can be concluded that variables other than consumer demographics are required to clearly understand consumers' adoption behavior.

Both 'technology anxiety' and 'need for interaction' were negatively related to adoption. Thus, consumers who were more anxious about using SSTs and those who liked interacting with service employees were less likely to adopt an SST. On the other hand, 'subjective norm' and 'previous experience' were found positively related to adoption. It can be said that higher level of subjective norm and previous experience with an SST increases the intention of adoption for other SSTs (Curran & Meuter, 2005; Kaushik & Rahman, 2015a).

Three user characteristics variables (TA, NI and PE) influenced the consumer innovativeness variable in the same direction as in case of intention of adoption, supporting hypotheses H_{9b}, H_{10b} and H_{12a}. In addition, three of the demographic variables (age, income and education) were also found to have significant influence on consumer innovativeness, partially supporting hypothesis H_{14b}. Surprisingly, subjective norm showing significant influence on intention of adoption was not found a significant determinant of consumer innovativeness. This shows that consumers' adoption of SSTs might be influenced by others; however, their innovativeness does not seem to be influenced by others' opinion.

8.1.6. Innovation adoption process

In addition to examining various determinants of adoption, a general innovation adoption process (consisting of five stages - awareness, investigation, evaluation, trial and adoption) was also examined in this study. This five-stage adoption process was widely explored through qualitative research (refer to Chapter Three) followed by an empirical examination of associations between different stages in chapter seven. To examine the association between the different stages in the above mentioned process, simple correlations were investigated. Significant values of correlation coefficients confirmed that each stage was a crucial antecedent to the next. Since simple correlation examination can't provide causality, direction of causality conclusions are subject to fundamental theoretical and conceptual supports.

Results of correlation analysis provide support for hypothesis H_{14a} which suggests that higher awareness leads to higher investigation. The value of correlation coefficient between 'awareness' and 'investigation' stages is .632 ($p < .001$). Awareness is the first and one of the most crucial steps in a general innovation adoption process. It clearly shows that without consumers' awareness regarding availability of a SST, other stages of the process cannot exist In simple words, without awareness, there will not be any kind of investigation or evaluation before any trial or adoption.

Hypothesis H_{14b}states that higher investigation leads to more evaluation. This hypothesis is based upon existing adoption literature and conceptual biases that indicate that all innovation is beneficial and that if consumers simply learn more about an innovation, it will be adopted. This bias is mainly based on a general perception that lack of adoption is a result of certain limitations on the part of the individual. Hypothesis H_{14b} is also supported with a significant correlation coefficient (.433, $p < .001$) between investigation and evaluation.

Hypothesis H_{14c}relates evaluation to trial by proposing that favorable evaluation leads to higher chances of trial. As anticipated, a significant positive relationship (.557, $p < .001$) was found between evaluation and trial stage of the innovation adoption process. Thus, consumers with favorable SST evaluation are more likely to try an SST as compared to those consumers with an unfavorable evaluation, supporting H_{14c}.

Hypothesis H_{14d} proposes that consumers having a satisfactory SST trial would be more likely to adopt the SST as compared to those consumers who are less or not satisfied. This hypothesis (H_{14d}) is also supported with a significant correlation coefficient of .247 ($p<.003$), but simultaneously, a question arises on its practical significance. While the value of this correlation coefficient (.247, $p<.003$) is statistically significant, a very low correlation of under .30 indicates

little practical significance. Rather interestingly, it appears that a favorable initial trial does not automatically lead to adoption of an SST.

A close examination of customers' behavioral intention shows that nearly 62% respondents indicated a strong intention to adopt an SST in the near future (score of 6 or 7 on the 7-point Likert scale). Almost 9.3% of the total sample respondents scored very less (score of 1 or 2 on the same scale), showing that they would not adopt SSTs even in near future, and that they are entirely happy with traditional ways of service delivery. Being consistent with others, findings provide sufficient statistical support for all stages of the adoption process. All correlation coefficients were statistically significant, supporting past adoption research and adding more evidences to support findings of the qualitative research carried out this study (refer to Chapter Three).

8.2. Research Contributions

The overall research was planned, designed and conducted to make several contributions to existing literature.

8.2.1. Theoretical contributions to the innovation adoption literature

Even though innovation adoption literature has an immensely rich history, the current research make several contributions to it. First, the study explores the concept of consumer innovativeness and proposes a distinct and significant role of the consumer innovativeness variable. This study in the first phase reviews a wide range of literature on consumer innovativeness from 1971 to 2013 in order to understand the basic perspectives and dimensions of consumer innovativeness (refer to Appendix A.2). As a result, three basic dimensions of CI (II, DSI, and IB) were identified (Kaushik & Rahman, 2014). Furthermore, major constructs and correlates were also discussed and reported for each of these dimensions. This might help in the conceptualization of consumer innovativeness in future studies.

In addition, a basic conceptual model of CI (refer to Figure 2.2) is proposed based on the results and findings of various studies indifferent contexts and traditions; therefore, the relevance of this model should be checked in future studies. For this, seven crucial propositions were developed and it is proposed that these be examined in future studies. Existing adoption research has depended to a great extent on individual perceptions of innovation characteristics (Venkatraman, 1991) or user characteristics (Rogers, 1995); this research demonstrates the significance of measuring consumer innovativeness towards innovation (e.g. SST) adoption.

The consumer innovativeness variable was demonstrated as a central construct and one of the crucial determinants of SST adoption (refer to Figure 4.1). Of the 13 SST characteristics and user

characteristics variables, only two variables (complexity and subjective norm) were found not mediated by the consumer innovativeness variable. The proposed conceptual model (Figure 4.1) and the mediating effect of the consumer innovativeness variable would definitely help in better understanding consumers' adoption behavior towards SSTs.

Second, this research emphasizes an entirely new service delivery option - SSTs. Services are unique in nature (Grove & Fisk, 1992; Parasuraman et al., 1985) and the consumers' sharing role shows that a clear identification of the factors/variables that initiate the adoption of such service delivery options (SSTs) is needed. Findings support that SST adoption requires significant change in customers' consumption and behavior patterns. Previous adoption literature has mostly concentrated on product innovations; this study indicates the significance of the consumer innovativeness variable towards SSTs in an offline service context. Service firms, unlike manufacturing firms, tend to focus on the adoption of service innovation over product innovation (Verma & Jayasimha, 2014). Therefore, the study focuses on service innovation rather than product innovation.

Third, this research contributes to existing theory by concentrating on consumer adoption behavior. Majority of adoption research has explored innovation diffusion without focusing on how customers make adoption decisions (Gatignon & Robertson, 1991; Olshavsky & Spreng, 1996). This thesis develops and proposes research hypotheses associated with specific factors (SST and user characteristics) affecting an individual potential user. Identifying critical factors would be helpful in understanding the overall adoption behavior of an individual potential adopter.

Finally, this research avoids two common biases: (i) pro-innovation bias, and (ii) individual blame bias. These two kinds of biases are usually associated with the study of innovation adoption. Pro-innovation bias refers to 'a perception that all innovation is positive and should be utilized by all potential adopters' (Rogers, 1995). Hence, since all innovation is supposed to be beneficial, a failure to adopt an innovation is perceived as an irrational response. This specific bias has prevented significant factors associated with failure to adopt an innovation from being effectively explored during literature review. This study demonstrates that several consumers make knowledgeable, rational decisions to reject an innovation due to various genuine reasons.

It is thus worth mentioning that not all innovations would be voluntarily adopted by potential adopters. However, while a few consumers enjoy tech-based self-service options (SSTs), others may wish to continue with the traditional way of service delivery (employee-based services). To overcome this pro-innovation bias, the initial section of the questionnaire used in this study clearly asked respondents about the various SSTs they had used in the past. In this way, many

SSTs that have not yet completely diffused throughout the consumer base were explored (Rogers, 1995). Furthermore, responses were collected from both users and non-users of SSTs. Findings also reveal crucial factors that lead to the rejection of SSTs. This approach is hardly present in existing adoption literature.

Individual blame bias believes that 'it is a fault of an individual adopter, if the innovation is not used' (Rogers, 1995). This study assumes that an innovation rejection may be due to either the individual adopter or the firm offering the innovation. Therefore, the proposed conceptual model in this research mainly examines two different kinds of variables - SST characteristics (from firm's perspective) and user characteristics (from individual adopter's perspective) that prevent innovation (SST) adoption. SST characteristics variables can and should be managed by service firms for effective SST implementation. Incorporating both adopters and non-adopters of SSTs in the research design also limits the effects of the individual blame bias. Thus, this study avoids both of the aforementioned biases and contributes to adoption literature by examining SST adoption with a distinctive perspective.

8.2.2. Theoretical contributions to the services literature

The present study also contributes to services marketing literature. First, the thesis increases the existing body of knowledge by examining modern service delivery options (SSTs). With technological advancement in the service delivery processes, 'high-touch and low-tech' method has been replaced with 'high-tech and low-touch' method (Kaushik et al., 2015). Proliferation of SSTs has led to an overall improvement in the traditional service delivery process. Increased technological adoption in the service industry (Kim et al., 2012) is the reason behind the introduction of a number of SSTs such as airport self-check-in kiosks, electronic tourist guides, tourism information kiosks, self-service systems in dining facilities, hotel self-check-in, and automated hotel check-out (Riebeck et al., 2008).

Second, this research explores the 'customer production' aspect (customer as a sole producer of the service), whereas majority of adoption studies have only focused on the 'customer participation' aspect (Bitner, Faranda, Hubbert, & Zeithaml, 1997; Hubbert, 1995). For instance, in the current SST-based context, no service providers are present amid the service production process. This situation produces a unique dynamic between the service user and the service firm. This expansion to service literature from the customer production view would help in developing the customer participation literature.

Third, this study explores the crucial area of consumer decisions associated with adopting modern service delivery options (SSTs). Majority of past studies in service literature has

primarily dealt with existing customer bases and their post-purchase behaviors, for example customer satisfaction, loyalty, re-purchase, etc. (Sheng & Zolfagharian, 2014; Billore, Billore & Sadh, 2007; Gremler, 1995; Keaveney, 1995). However, the current tech-oriented service environment needs a clear understanding of how to encourage existing customer bases and attract potential users of new and innovative SSTs. This study addresses such issues by exploring consumer's adoption behavior towards numerous SSTs.

Finally, the current study extends the utility of existing adoption models (refer to Table 1.1) through analysis of various determinants of adoption in order to examine consumer innovativeness towards SSTs in the offline service context. Although majority of adoption studies have focused on innovation adoption in the online service context (Kaushik & Rahman, 2015b, c). Thus, there is a lack of empirical studies that examine the influence of distinct determinants of adoption (e.g., SST and user characteristics) and situational variables (e.g., waiting time and crowding) on customers' adoption behavior towards SSTs in offline service contexts.

8.2.3. Methodological contributions

The study also offers two crucial methodological contributions to self-service adoption literature. First, applying qualitative research leading to quantitative analysis is a unique attempt in adoption literature, strengthening the findings of study. As mentioned in chapter three, there are considerable advantages related with this methodological triangulation. A qualitative investigation explores the problem of interest, helping in identifying relevant constructs (e.g., determinants of adoption). Quantitative investigation, on the other hand, examines the proposed relationships among variables and provides useful insights through empirical findings and results.

Second, the study offers a methodological advancement in self-service adoption literature by examining various methods such as non-response bias and common method variance, and reporting favorable findings. According to Fiske (1982, pp. 81-84), method variance refers to a variance that is attributable to the measurement method rather than the construct of interest. The term method refers to the form of measurement at different levels of abstraction, such as content of specific items, scale type, response format and the general context. Following Armstrong and Overton (1977), the researcher in this study diagnosed non-response bias by comparing "early" and "late" participants, using one way ANOVA (F-test) and confirmed that there was no problem of unit non-response bias with the data. Similarly, for common method variance in the data, the researcher first applied procedural and statistical remedies (Podsakoff, MacKenzie, Lee &

Podsakoff, 2003), and then applied Harman's single-factor test and CLF method (Podsakoff & Organ, 1986). The results preclude the possibility of common method variance, and suggest that method biases do not affect the results of this study.

8.3. Managerial Implications

The significance of any academic research is not limited to its theoretical contributions, the managerial implications are equally important. First of all, this study developed and proposed an effective framework in order to understand the adoption behavior of potential adopters of SSTs. The growth of SSTs has revolutionized interactions between consumers and service providers. The advent of the Internet and electronic communication has enabled companies to be more responsive to customers through SSTs (Rahman, 2003). Almost every decade after the 1970s witnessed the introduction of a new SST, for example, in the late 1970s, automated teller machines (ATMs) were introduced; in the early1980s, electronic fund transfer at the point of sale (EFTPOS) was effected; in the mid-1990s telephone/mobile banking made its entry; in the late 1990s, internet banking emerged; at the turn of the twenty-first century, self-service kiosks (SSKs) came into existence (Curran & Meuter, 2005; Curran, Meuter & Surprenant, 2003; Kaushik & Rahman, 2015a), with mixed success. However, academic researchers have little understanding of how to develop and implement the best designed SSTs. For this, understanding the adoption behavior of potential users and how to attract them towards these self-service delivery options is required.

Secondly, this study suggests a few pre-acquisition and consumption avoidance practices usually employed by customers along with corresponding confrontative strategies in order to overcome such practices. To encourage SST adoption, service firms need to formulate effective strategies to reduce consumers' resistance to adopt. There are three pre-acquisition avoidance practices that customers follow to resist SST adoption - ignore, diffuse and delay. Thus, consumers may:

(i) *Ignore* information regarding new technologies;

(ii) *Refuse* to adopt them;

(iii) *Postpone* adopting them as their way of resisting technological adoption.

To win over this consumer resistance, practitioners and policymakers need to formulate the following pre-acquisition confrontative strategies:

(i) *Pretest* - Providing people an opportunity to use SSTs temporarily.

(ii) *Heuristics* - Providing customers an opportunity to learn and discover for themselves the new SSTs introduced.

(iii) *Extended decision-making* - Educating customers about alternative uses of a given SST.

Consumer resistance to change is not limited only to the pre-adoption stage. They might become resistant to a given SST even after initial adoption. Regular use of a given SST after initial adoption may be considered consumption of the SST. Resistance might manifest during the consumption stage which follows the adoption stage. There might be three consumption avoidance practices employed by customers:

(i) *Neglect:* When consumers limit their use of SSTs to specific occasions.

(ii) *Abandonment:* When consumers altogether give up their use of SSTs.

(iii) *Distancing:* When consumers start maintaining a physical distance with a given SST to avoid using it.

To counter these practices, the following consumption confrontative strategies may be used.

(i) *Accommodation*: Changing customer tendencies, preferences, routines, etc. according to the salient features of a given SST, thus encouraging adoption.

(ii) *Partnering:* Establishing a connection (e.g. through a user-friendly interface) between customers and SSTs.

(iii) *Mastering:* Encouraging customers to thoroughly learn the operations, strengths and weaknesses of SSTs.

8.3.1. Adoption Process

Two other crucial implications arise from the empirical investigation of the innovation adoption process included in this study. Findings from the hypothesis testing (H_{14a} to H_{14d}) highlight the significance of two key stages (awareness and trial) of the innovation adoption process. The first stage - awareness - is one of the most critical stages in the innovation adoption process. Most of the service consumers not adopting the SSTs were not aware of their existence while the service firms claimed that they had made all possible efforts to advertise them. It is clear that without awareness, moving through the remaining stages of the adoption process is not possible.

It is important that consumers are well informed of the accessibility of SSTs. The best possible time to inform consumers is amid interpersonal interactions with service employees, particularly when service delivery could be done through SSTs. Different techniques for expanding consumers' awareness include informing them through mails, direct communication with them when they physically visit firm, boards showing facilities available, etc. All such efforts should be directed at developing initial awareness and providing outlets to potential users wanting to know more about SST options.

Besides the importance of the awareness stage in the adoption process, the significant but critical relationship between the trial and the adoption stages also provides crucial implications to managers/service providers. Findings show that consumers who tried the SST for first time and got satisfied, typically adopt the SSTs (correlation coefficient = .247 < .3). Getting consumers to try any specific SST for the first time led to favorable outcomes such as continued use, positive behavioral intention, etc.

First time trial of any innovative SST is not as easy as trying a new product for the first time. Further, an initial trial of the SST can't be simply provided for free. There is always an investment with respect to the consumers in terms of time and energy spent to try the SST for the first time. Therefore, marketing efforts such as special incentives and time-to-time training programs can be conducted to encourage initial trial of SSTs.

A close observation and examination of behavioral intention scale reveals that a few sample respondents (nearly 9.3%) have shown unfavorable intentions towards SST adoption. It thus becomes crucial to identify the various reasons behind their choice to not adopt the SSTs. Introducing an SST option to consumers would allow them to select one of the two service delivery options - SSTs or employee-based services - based on their comfort and preference. Their selection of one particular option would be based on the investigation and evaluation stages of the innovation adoption process. An SST is a modern way of self-service which doesn't require any assistance of service employees, whereas employee-based services are the traditional way of service delivery. Consumer innovativeness plays an important role in deciding whether they (consumers) try to investigate and evaluate the SST options, or continue with the traditional option (employee-based services).

8.3.2. Determinants of adoption

In addition to the exploration of the consumer innovativeness variable and the innovation adoption process, numerous other variables (SST and user characteristics) that affect SST adoption were empirically examined. Findings from these examinations provide useful insights to service providers regarding the overall adoption behavior of consumers. The consumer innovativeness variable was primarily shown to be a central construct (mediating variable) in the proposed conceptual model (refer to Figure 4.1), but it has also emerged as the most effective determinant of intention of adoption.

When a new and innovative technology (e.g., computers) is implemented for employees within a firm, learning and using the technology could be stipulated as a necessary condition for employment. However, consumers can't be forced to adopt a new technology(e.g., SST) because

they (consumers) usually have two options - either switch to new service providers or continue with the traditional mode of service delivery (e.g., employee-based services). Due to this, service providers mainly implement SSTs as an alternative for the traditional service delivery option, and not a replacement of these services. Therefore, service providers need to critically examine the various determinants of adoption and accordingly direct their efforts to attract potential users, and encourage existing consumers to adopt the SSTs.

Use of new and innovative SSTs requires change in consumer behavior which would involve performing tasks for the first time. This could be facilitated through effective training programs that could make potential adopters more comfortable and efficient with use of new and innovative SSTs. Here, the role of consumer demographics is very important. For instance, the nature of the training programs and other promotional efforts made by the service providers depends on consumer demographic characteristics such as their age, education, profession, etc. Thus, user demographics is another critical determinant of consumers' adoption of SSTs.

The nature of training programs also depends on the nature of the SSTs (e.g., complexity and uniqueness). For instance, a training program may range from being as easy as giving simple instructions on SST usage to as complicated as providing personalized training sessions. Most of existing SSTs (e.g. ATMs, cash-deposit kiosks, etc.) could be introduced adequately through detailed guidelines on how to use them. But this may not be true in all cases. For instance, in one of the qualitative in-depth interviews conducted in this study (refer to Chapter Three), one respondent (DJ, 26, F, Single, Student) asserted that personalized training programs should be conducted for initial users and complainers who find SSTs difficult to use. Such personalized training sessions will not only increase the number of initial trials, but also attract other customers towards these SSTs.

Most of the previous discussion has emphasized how to encourage potential users to use SSTs. However, some consumers have clearly mentioned that they don't want to be encouraged to use the SSTs. To explore this situation, a close examination of various adoption determinants is required. Findings from the various hypotheses tests confirm significant roles of numerous variables - SST characteristics variables (PU, PEOU and PR) and user characteristics variables (TA, NI, SN, PE, age and income). In addition to direct significant effects on intention of adoption, most of these variables have also shown direct effects on consumer innovativeness variable and indirect effects on adoption through the consumer innovativeness variable. Managers and other practitioners will also have to understand how each variable influences the consumer adoption decision.

Findings showed that 'need for interaction with service employees' is a significant characteristic to decide which delivery option to choose (SSTs vs. employee-based services). Results revealed that consumers who perceived need for interaction as a basic requirement in the service delivery process would likely not adopt an SST option. Therefore service providers will have to plan accordingly, for example, they may try to demonstrate the advantages of using SSTs over an employee-based service. Allowing consumers to choose an option they feel more comfortable with would increase consumers' overall satisfaction, which would in turn affect consumer loyalty towards the firm.

8.4. Assumptions and Limitations

8.4.1. Assumptions

All research is based on a set of assumptions that influences the overall research including participant responses and researchers' interpretation of those responses (Cooper & Schindler, 2008). Researchers must therefore identify and discuss those assumptions at the outset of the study. Researcher makes assumptions on the following aspects of their research:

i. the predictive abilities of basic TAM's constructs (PU and PEOU) have been demonstrated through extant research (Davis, Bagozzi& Warshaw, 1989; Taylor & Todd, 1995a, b; Szajna, 1996; Wixom & Todd, 2005; Lin et al., 2007; Schepers & Wetzels, 2007; Walczuch et al., 2007);

ii. extant literature has repeatedly shown consumer innovativeness to be a strong predictor of technology adoption (Kaushik & Rahman, 2014; Parasuraman, 2000);

iii. studies of demographics are widespread in adoption literature, they have generally constructed demographics as either moderators or control factors (Venkatesh et al., 2003; Brown & Venkatesh, 2005), examining them as independent variables in offline service contexts has been inadequately demonstrated in extant literature (Kaushik & Rahman, 2015c);

iv. demographic traits warrant continued investigation in SST adoption research (Lee et al., 2010; Verhoefet al., 2009);

v. while extant literature on consumer innovativeness has yielded varied results (Liljander et al., 2006; Lin & Hsieh, 2006; Walczuch et al., 2007), innovativeness variable separately represents a significant psychographic factor which warrants continued investigation as a SST adoption determinant (Lin & Hsieh, 2007; Lin & Hsieh, 2006; Meuter, Bitner, Ostrom &Brown, 2005; Parasuraman, 2000; Tsikriktsis, 2004; Walczuch et al., 2007);

vi. adoption research in varied, specific SST industries and technologies is pertinent and warranted (Curran & Meuter, 2005; Lin et al., 2007; Reinders, van Hagen & Frambach, 2007; Szajna, 1996; Venkatesh & Davis, 2000; Walczuch et al., 2007).

Other theoretical and conceptual assumptions for this research include:

- *Issue of interest being investigated* - the first assumption arose from the belief that the issue of interest can be researched and evaluated in current scenario. In the present study for example, the researcher has investigated consumers' adoption of SST options with an assumption that the 'innovativeness' construct is a crucial issue to be studied.
- *Chosen research methodology* - the second assumption is that mixed research is a valid method for exploring the issue of interest. The goal of generic qualitative research is to build a chain of evidence that captures the essence of the issue studied, while quantitative research confirms the issue by empirically examining it.
- *Data collection method* - the third assumption is that use of open-ended questions for qualitative research and self-developed adopted standardized scales for empirical investigations would be efficient and effective methods for collecting data from participants.
- *Data analysis procedures* – the fourth assumption is that the statistical techniques applied in this research would provide appropriate output that could be interpreted easily.
- *Participants* - there are many other assumptions with regard to the participants of the study such as: each participant will be appropriate to be surveyed, participants will have sufficient knowledge and willingness to participate in the research survey, there will not be any problem in approaching these participants, they shall be available on time and when required, etc.

8.4.2. Limitations

As with any research, this study too has a few crucial limitations. The cross-sectional nature of data collection in the quantitative phase is the first limitation of this study. Innovation adoption is actually a dynamic process that happens over a period of time, while the data, in quantitative phases of this study, were collected through a cross-sectional survey. In such situations, a longitudinal study might be superior, though time and cost constraints limit the practicality of the longitudinal approach. Furthermore, longitudinal studies are usually inadequate in cases of large sample sizes (Weiss &Heide, 1993). To overcome this limitation, this research concentrates essentially on one particular stage (adoption) of the innovation adoption process, thus reducing the requirement of a longitudinal approach by constricting the whole time dimension of adoption.

Also, a cross-sectional study does not allow for causal implications to be drawn. For instance, with a cross-sectional survey, simple correlational implications can be drawn while the proposed

conceptual model (refer to Figure 4.1) indicates a directional association among the various constructs as well. However, the study provides theoretical support for these directions of the effects (refer to Chapter Four) in addition to support from the qualitative in-depth interviews (refer to Chapter Three). Furthermore, the empirical examinations and favorable results also provide sufficient support to strengthen the overall findings of the study.

The second crucial limitation of this research is related with the generalizability of findings to a specific context. This research is actually not conducted within one particular context or organization. It is indeed a multiple-context study. For instance, the proposed innovativeness scale has been validated in different contexts allowing comparisons across distinct samples (i.e., student vs. non-student sample) and different industries (i.e., banking, retail and hospitality industries). A study within a single context is sometimes more beneficial because it avoids several difficulties arising due to intrinsic differences among different settings. However, caution is advised when generalizing its findings to other contexts.

Third, the previous experience-based SST context may not have been exceptional to effectively examine all of the proposed research hypotheses. Instead of any specific SST, This study first asks whether the respondents used any SST(s), and based on respondents' memory, further questions were asked. Thus, the primary responses collected for final empirical examination (in Chapter Seven) might be based on faulty memory of respondents. Adoption does vary widely between SSTs used to deliver comparable services (Curran & Meuter, 2005; Kaushik & Rahman, 2015a). Also, since SSTs used by consumers may vary from service to service, it becomes essential to study how consumers feel about diverse SSTs.

Various additional potential limitations associated with the study warrant mentioning. These include:

i. To begin with, while robust and unique in design, the proposed conceptual model is not, nor is intended to be, an exceptional model of SST adoption. The model is an alternative adoption model that is relatively straightforward. However, it comprises market-oriented determinants of SST adoption with crucial SST-related, user-related and situational variables.
ii. This model, using situational factors as moderators between consumer innovativeness and intention of SST adoption, and not as independent variables with basic TAM constructs (PU and PEOU) (Venkatesh et al., 2003; Verhoef et al., 2009), could differentiate the findings of the study.
iii. While the proposed model is a robust, attribute-based and attitude-based model, yet other adoption models (e.g., TRA, TPB, etc.) might contain additional essential determinants that

are not covered in the proposed model (Venkatesh & Bala, 2008; Venkatesh & Davis, 2000; Venkatesh et al., 2003).

iv. TAM and its TRA foundations were established for general technology and have been applied most predominantly in on-line/IT-based research. The application of the proposed model in this SST adoption research is an extended application into an offline service context that could alter the generalized findings and research for SST adoption. (Davis et al., 1989; Venkatesh & Bala, 2008; Venkatesh & Davis, 2000; Venkatesh et al., 2003).

v. The SSTs in distinct offline contexts are particular and novel applications; therefore, these findings may or may not be generalizable to all offline SSTs.

8.5. Suggestions for Future Research

Since this study incorporates an empirical examination of a less-explored research area, the possibilities for further studies are many. First, the literature reviewed based on 101 CI studies showed neither studies on consumer non-innovativeness nor studies examining rejection of new products by consumers. It is an important but surprisingly untouched area, though Woodside (1996) did mention that consumers can reject offers of new products with advanced technologies in an industrial innovation context. Thus, this study can provide marketers with insights on what drives CI. From this understanding, marketers can tailor their product offerings and marketing communication strategies. Segmentation is another practical implication - by understanding what might drive CI, marketers can distinguish between innovativeness and non-innovativeness seekers, etc.

Although a few studies emphasizing negative attitudes towards adoption could provide a few initial ideas regarding consumers' non-innovativeness (Bäckström et al., 2004; Huotilainen et al., 2006), this specific domain requires further and deep research. For instance, further research could study why consumers refuse to adopt an innovative product/service. This area of research is really crucial for marketing managers to gain knowledge of consumer behavior. Studies focusing on resistance to change (Piderit, 2000) might also be helpful in formulating various marketing strategies. A wide range of literature indicates that a large number of consumers shop on a routine basis (Aarts and Dijksterhuis, 2000; Bargh, Chen, and Burrows, 1996); therefore future research could consider habitual behavior.

Further, the said limitations of this study suggest important directions for further studies. To establish generalizability, upcoming research could investigate more contexts across services. Selecting a specific service context or a new and innovative SST within a given context would also help to decide the significance of consumer innovativeness variable. In order to determine

causality, experimental research investigating the innovation diffusion and adoption could also be conducted (Kalro, Sivakumaran & Marathe, 2013). Finally, a longitudinal research design could also be included in order to examine different stages of SST diffusion and adoption process such as from its implementation stage to the diffusion in the whole market.

Next, the proposed conceptual model (refer to Figure 4.1) can be adjusted to answer other research questions. While the adoption stage was particularly investigated in this research, any of the alternate stages of the adoption process could be investigated in future research. For instance, the basic variables affecting awareness or trial could be identified or created and examined. Additional determinants of adoption might also be significant and should be investigated in future. To this end, the differential effect of the consumer innovativeness variable could also be examined across these stages. For instance, consumer innovativeness variable is found a crucial mediating variable between most of SST characteristics and user characteristics and intention of adoption. Complexity and subjective norm didn't show any significant influence on adoption and innovativeness respectively, resulting in no mediating effect of consumer innovativeness. Future researchers may determine whether similar findings could be established for other stages too.

In association with various other related studies, an entirely new stream of SST research may also be proposed. For example, a couple of such possibilities could be investigated as: how does SST adoption affect (i) service quality; and (ii) consumer satisfaction or loyalty? The selection of SSTs over employee-based services infers a distancing between consumers and service providers. Most interpersonal experiences during service delivery favor consumer-employee relationships and consumer loyalty towards the firm (Gupta & Sharma, 2009). Therefore, it is imperative to clearly comprehend the broader implications of shifting consumers away from employee-based services towards SSTs, and the resulting effect on their loyalty.

8.6. Conclusion

The theoretical conceptual adoption model developed, proposed and validated in this study was primarily based on adoption literature (reviewed in Chapter Two), and followed by a qualitative research regarding SST adoption. The consumer innovativeness variable was intended and revealed as a crucial mediating variable between various determinants of adoption (SST and user characteristics) and the intention of adoption. The hypotheses (developed in Chapter Four) were empirically examined in offline service contexts. A SSI scale was also developed and used in order to measure the consumer innovativeness variable. Overall, the interpretation of various results and findings strengthen the understanding of consumer's innovativeness towards SSTs.

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Appendix A.1
Research Hypotheses

Mediating Effects Hypotheses

H_1: Consumer innovativeness mediates the relationship between SST characteristics (Perceived usefulness, perceived ease of use, complexity and perceived risk) and the intention of adoption.

H_2: Consumer innovativeness mediates the relationship between user characteristics (technology anxiety, need for interaction, subjective norm, previous experience and demographics) and the intention of adoption.

Consumer Innovativeness Hypothesis

H_3: Consumer innovativeness is positively related to the intention of adoption.

Moderating Effects Hypotheses

H_4: Situational variables (Waiting time and crowding) moderates the relationship between consumer innovativeness and the intention of adoption.

H_{4a}: Tolerance for waiting time moderates the relationship between consumer innovativeness and the intention of adoption.

H_{4b}: Tolerance for crowding moderates the relationship between consumer innovativeness and the intention of adoption.

SST Characteristics Hypotheses

H_{5a}: Perceptions of usefulness of SSTs are positively related to the intention of adoption.

H_{5b}: Perceived usefulness of SSTs are positively related to consumer innovativeness.

H_{6a}: Perceptions of ease-of-use of SSTs are positively related to the intention of adoption.

H_{6b}: Perceived ease-of-use of SSTs are positively related to consumer innovativeness.

H_{7a}: Perceptions of complexity is negatively related to the intention of adoption.

H_{7b}: Perceptions of complexity is negatively related to consumer innovativeness.

H_{8a}: Perceptions of risk are negatively related to the intention of adoption.

H_{8b}: Perceived risk is negatively related to consumer innovativeness.

User Characteristics Hypotheses

H_{9a}: Technological anxiety is negatively related to the intention of adoption.

H_{9b}: Technological anxiety is negatively related to consumer innovativeness.

H_{10a}: Need for interaction is negatively related to the intention of adoption.

H_{10b}: Need for interaction is negatively related to consumer innovativeness.

H_{11a}: Subjective norm is positively related to the intention of adoption.

H_{11b}: Subjective norm is positively related to consumer innovativeness.

H_{12a}: Previous experience is positively related to the intention of adoption.

H_{12b}: Previous experience is positively related to consumer innovativeness.

H_{13a}: Consumers who are younger, male, have higher education and income levels are more likely to adopt an innovative SST than those customers who are older, female, and have lower education and income levels.

H_{13b}: Consumers who are younger, male, have higher education and income levels are more likely to have higher level of consumer innovativeness than those customers who are older, female, have lower education and income levels.

Adoption Process Hypotheses

H_{14a}: Consumers with higher awareness are more likely to investigate and collect information than consumers with lower awareness.

H_{14b}: Consumers who collect more information through investigation are more likely to evaluate the SST favorably than those consumers who collect less information through investigation.

H_{14c}: Consumers with a more favorable evaluation are more likely to try the SST than those consumers with a less favorable evaluation of the SST.

H_{14d}: Consumers with a more positive trial experience are more likely to adopt the SST than those consumers with a less positive trial experience.

Appendix A.2
Consumer Innovativeness Studies

No.	Year	Authors	Journal	II	DSI	IB
1	1971	Summers	Journal of Marketing Research			√
2	1977	Hurt, Joseph & Cook	Human Communication Research	√		
3	1982	Hirschman	Advances in Consumer Research	√		
4	1987	Feick & Price	Journal of Marketing			√
5	1988	Foxall	Research in Consumer Behaviour	√		
6	1990	Venkatraman & Price	Journal of Business Research	√		
7	1990	Mudd	Technovation	√		√
8	1991	Goldsmith & Hofacker	J of the Academy of Marketing Science		√	
9	1991	Medina & Michaels	J of International Consumer Marketing			√
10	1991	Venkatraman	Journal of Retailing	√		
11	1991	Foxall & Bhate	Technovation	√	√	√
12	1992	Goldsmith & Flynn	European Journal of Marketing		√	
13	1992	Steenkamp & Baumgartner	Journal of Consumer Research	√		√
14	1993	Flynn & Goldsmith	Educational and Psycho. Measurement		√	
15	1993	Foxall & Bhate	Journal of Economic Psychology	√		
16	1994	Foxall	British Journal of Management	√		√
17	1994	Ridgway & Price	Psychology and Marketing	√		√
18	1995	Foxall	Technovation	√		
19	1995	Goldsmith, Freiden & Eastman	Technovation	√	√	√
20	1995	Manning, Bearden & Madden	Journal of Consumer Psychology	√		√
21	1995	Steenkamp & Baumgartner	Int J of Research in Marketing	√		√
22	1996	Baumgartner & Steenkamp	Int J of Research in Marketing	√		√
23	1998	Goldsmith & d'Hauteville	British Food Journal		√	
24	1998	Goldsmith, d'Hauteville & Flynn.	European Journal of Marketing		√	
25	1998	Agarwal & Prasad	Information Systems Research		√	
26	1999	Goldsmith, Moore & Beaudoin.	J of Product and Brand Management		√	√
27	1999	McCarthy, O'Reilly & O'Sullivan	British Food Journal		√	
28	1999	Steenkamp, Hofstede & Wedel.	Journal of Marketing	√		
29	1999	Donthu & Garcia	Journal of Advertising Research	√		
30	2000	Agarwal & Karahanna	MIS Quarterly		√	
31	2000	Citrin, Sprott, Silverman & Stem	Industrial Management and Data Systems	√	√	
32	2000	Grewal, Mehta & Kardes	Journal of Economic Psychology		√	
33	2000	McCarthy, O'Reilly & Cronin	Agribusiness Discussion Paper		√	
34	2000	Limayem, Khalifa & Frini	IEEE Transactions	√		
35	2000	McBride & Gillespie	Latin American Business Review			√
36	2001	Goldsmith	Internet Research		√	√
37	2001	Klink & Smith	Journal of Marketing Research		√	
38	2002	Steenkamp & Burgess	Int. Journal of Research in Marketing	√		√

39	2002	Sin & Tse	J of International Consumer Marketing	√		
40	2003	Goldsmith, Flynn & Goldsmith.	Journal of Marketing Theory & Practice		√	
41	2003	Hem, Chernatony & Iversen	Journal of Marketing Management	√		
42	2003	Im, Bayus & Mason.	J of the Academy of Marketing Science	√		√
43	2003	Park & Jun	International Marketing Review		√	
44	2003	Steenkamp and Gielens	Journal of Consumer Research	√		√
45	2003	Blake, Neuendorf & Valdiserri	Internet Research		√	
46	2003	Muzinich, Pecotich & Putrevu	J of Retailing and Consumer Services		√	
47	2004	Bäckström, Pirttilä-Backman & Tuorila	Appetite	√	√	
48	2004	Cotte & Wood	Journal of Consumer Research	√		√
49	2004	Hui & Wan	The Internet Business Review	√	√	
50	2004	Lafferty & Goldsmith	Corporate Reputation Review		√	
51	2004	Roehrich	Journal of Business Research	√	√	
52	2005	Girardi, Soutar & Ward	European J of Innovation Management	√	√	√
53	2005	Goldsmith, Kim, Flynn & Kimm	Journal of Social Psychology		√	
54	2005	Jin & Suh	Journal of Consumer Marketing	√		
55	2005	Lassar, Manolis & Lassar	Int Journal of Bank Marketing	√	√	
56	2005	Vishwanath	Journal of the American Society for IST	√	√	√
57	2006	Clark & Goldsmith	International J of Consumer Studies	√		
58	2006	Goldsmith, Clark & Goldsmith	Journal of Consumer Behaviour	√		
59	2006	Hirunyawipada & Paswan	Journal of Consumer Marketing	√	√	√
60	2006	Huotilainen Pirttilä-Backman & Tuorila	Food Quality and Preference		√	√
61	2006	Jordaan & Simpson	J of Family Ecology and Cons. Sciences		√	
62	2006	Singh	International Marketing Review	√		
63	2006	Sun, Youn, Wu & Kuntaraporn	J of Computer-Mediated Comm		√	
64	2006	Hauser, Tellis & Griffin	Marketing Science	√	√	√
65	2006	Li & Buhalis	Int. J of Information Management		√	
66	2006	Hynes & Lo	Singapore Management Review		√	
67	2006a	Wang, Pallister & Foxall	Technovation		√	
68	2006b	Wang, Pallister & Foxall	Technovation		√	
69	2006c	Wang, Pallister & Foxall	Technovation		√	
70	2007	Im, Mason & Houston	J of the Academy of Marketing Science	√		√
71	2007	Okazaki	Computers in Human Behavior	√		
72	2007	Ruvio & Shoham	Psychology & Marketing		√	√
73	2007	Gielens & Steenkamp	Int. Journal of Research in Marketing	√		√
74	2007	Lennon et al.	Psychology & Marketing	√		√
75	2007	Munnukka	Marketing Intelligence & Planning		√	√
76	2007	Pagani	Tech. Analysis & Strategic Manag.		√	
77	2007	Pallister, Wang & Foxall	Technovation	√		

78	2007	Park, Burns & Rabolt	J of Fashion Marketing and Manag.		√	
79	2007	Reisenwitz, Iyer, Kuhlmeier & Eastman	Journal of Consumer Marketing		√	
80	2007	Schreier, Oberhauser & Prügl	Marketing Letters		√	
81	2007	McDonald & Alpert	Marketing Intelligence & Planning			√
82	2008	Konus, Verhoef & Neslin	Journal of Retailing	√		
83	2008	Lu, Liu, Yu & Wang	Information & Management		√	
84	2008	Schreier & Prügl	J of Product Innovation Management	√		√
85	2008	Shannon & Mandhachitara	Journal of Product & Brand Management	√		
86	2008	Shoham & Ruvio	Psychology & Marketing		√	
87	2008	Marcati et al.	Research Policy	√	√	
88	2009	Kuo & Yen	Computers in Human Behaviour	√		
89	2009	Salinas & Pérez	Journal of Business Research	√		
90	2009	Vandecasteele & Geuens	Journal of Business Research	√		
91	2009	Tellis, Yin & Bell	Journal of International Marketing	√		
92	2009	Barcellos, Aguiar, Ferreira & Vieira	Brazilian Administration Review		√	√
93	2010	Chakrabarti	British Food Journal		√	
94	2010	Park, Yu & Zhou	Journal of Consumer Marketing	√		
95	2010	Hoffmann & Soyez	Journal of Business Research		√	
96	2011	Karande, Merchant & Sivakumar	Academy of Marketing Science			√
97	2011	Huang, Hsieh & Chang	Rev of Global Manag. & Service Science		√	
98	2012	Chao, Reid & Mavondo	Australasian Marketing Journal	√	√	√
99	2013	Lam et al.	J of the Academy of Marketing Science	√		
100	2013	Lim & Park	J of International Consumer Marketing	√	√	√
101	2013	Cheng & Huang	Transportation Research	√		√

Appendix A.3

Consumer Innovativeness and Adoption Behavior

Sl. No.	Author(s)/Year	Findings	Context
1	Summers (1971)	Product adoption is a function of different situational variables and behavioral considerations of consumers	Food, Apparel, Household and Cosmetic Products
2	Foxall (1988)	There is no significant relation of product adoption with global or innate innovativeness	Food product
3	Venkatraman & Price (1990)	There is always a difference in proneness towards innovations between cognitive and sensory innovators	PC, VCR & Food processor
4	Venkatraman (1991)	Global innovativeness always dominates different innovation types while determining importance of innovation characteristics	Personal computer and VCR
5	Foxall & Bhate (1991)	There is a significant relation between Global innovativeness and frequency of use	Personal computer
6	Goldsmith & Flynn (1992)	DSI categories consumers according to their higher number of shopping trip and greater spending	Fashion
7	Foxall & Bhate (1993)	There is a weak correlation between Global innovativeness and purchase & consumption	Food product
8	Foxall (1994)	Global innovativeness doesn't show evidence where notion of an innovation-prone personality is based	Food product
9	Foxall (1995)	Product involvement moderates the relationship between new product adoption and global or innate innovativeness	Food products and computer software
10	Manning et al., (1995)	There is a correlation between Inherent consumer novelty seeking and actualized novelty seeking & awareness, and consumer independent judgment making depends upon the number of trials of new products	Food product, electronics product, etc.
11	Goldsmith et al., (1995)	There is a high correlation between DSI and number of new products adopted as compared to Global innovativeness	Clothing and electronics products
12	Goldsmith et al., (1998)	There is a positive correlation between DSI and consumers' product knowledge & involvement	Wine
13	Citrin et al., (2000)	DSI and internet usage affects consumers' online shopping adoption	Online shopping

14	Limayem et al., (2000)	Attitude and Intention of consumer mediate the relationship of CI with internet shopping behavior	Online shopping
15	Goldsmith (2001)	DSI scale can be treated as reliable and valid scale to study Internet CI, since it has good psychometric characteristics	Snacks, Compact Disks, and Skin care Products
16	Goldsmith et al., (2003)	DSI Scale is a good and stronger predictor of behavioral criteria as compared to market maven scale	NA
17	Im et al., (2003)	Personal characteristics (age and income) are stronger predictors of new product adoption than global innovativeness	Consumer electronics products
18	Lassar et al., (2005)	There is a negative relation between Global innovativeness and online banking adoption, while there is a positive relationship between internet related innovativeness and online banking adoption	Banking industry
20	Hirunyawipada & Paswan (2006)	Cognitive and DSI increase the new products actual adoption; while sensory innovativeness and perceived risks increase consumers' propensity to acquire novel information regarding new products	Consumer Electronic Products
21	Im et al., (2007)	Innate Innovativeness does not directly affect adoption behavior while affects indirectly with some of the components of vicarious innovativeness.	Household products
22	Tellis et al., (2009)	Negatively valence construct of reluctance is relatively better predictor of new products adoption in different countries	Household Products
23	Park, Yu & Zhou (2010)	Cognitive innovators are more quality & price consciousness, but sensory innovators are brand and fashion consciousness etc.	NA
24	Chao et al., (2012)	There is lack of direct association between CII, a generalized predisposition, and adoption of really new product	Electronic Products
25	Hur, Yoo & Chung (2012)	Three important factors affecting consumer's intentions to purchase convergence products are functional, epistemic, and emotional values.	Convergence products
26	Cheng & Huang (2013)	personal innovativeness has a positive effect on the both mobile access adoption and QR code adoption	Mobile Ticketing Services

Appendix A.4
SST adoption literature

Sl. No.	Author(s)/Year	Nature of study and methodology	Industry	Technology
1	Ajzen (1991)	Theoretical/Conceptual	General/Not specified	General/Not specified
2	Ajzen and Fishbein (1977)	Theoretical/Conceptual	General/Not specified	General/Not specified
3	Benbasat and Barki (2007)	Theoretical/Conceptual	Internet/IT-based	Online/IT-active and passive
4	Bennington et al., (2000)	Mixed research design	Bus/Office Services	Phone/IVR/AVR
5	Bhappu and Schultze (2006)	Empirical	Bus/Office Services	Online/IT - active
6	Bitner et al., (2000)	Theoretical/Conceptual	Multiple/Varied Misc.	Multiple/varied
7	Bitner et al., (2002)	Literature review	Multiple/Varied Misc.	Multiple/varied
8	Bobbitt and Dabholkar (2001)	Theoretical/Conceptual	Internet/IT-based	Internet - active and passive
9	Burgers et al (2000)	Mixed research design	Call Centres	Phone/IVR/AVR
10	Chen and Li (2010)	Empirical	Internet/IT-based	Online/IT - active
11	Cheng & Huang (2013)	Empirical	Travel	Mobile ticketing/QR codes
12	Collier & Kimes (2012)	Empirical	Hospitality/Restaurant	Online/IT-active and passive
13	Curran and Meuter (2005)	Empirical	Bank/Finance	ATM; Phone/IVR/AVR; Online/IT - active
14	Curran and Meuter (2007)	Empirical	Bank/Finance	ATM; Phone/IVR/AVR; Online/IT - active
15	Curran et al., (2003)	Empirical	Bank/Finance	ATM; Phone/IVR/AVR; Online/IT - active
16	Dabholkar (1996)	Empirical	Hospitality	Touch screens/Monitors
17	Dabholkar and Bagozzi (2002)	Empirical	Hospitality	Touch screens/Monitors
18	Fisk et al., (1993)	Literature review	General/Not specified	General/Not specified
19	Gefen et al., (2000)	Empirical	General/Not specified	General/Not specified
20	Gutek et al., (2000)	Empirical	Personal Services	General/Not specified
21	Im et al., (2010)	Empirical	Bank	Internet Banking

22	Kaushik & Rahman (2015a)	Empirical	Bank	ATM; Phone/Mobile; SSKs
23	Kaushik & Rahman (2015b)	Empirical	Organized Retail	Point-of-sale system, self-scanning devices and a self-checkout system
24	Kaushik & Rahman (2015c)	Empirical	Bank	ATM; Phone/Mobile; SSKs
25	Kaushik, Agrawal & Rahman (2015)	Empirical	Hospitality/Hotel	Self-service check-in and check-out kiosks, and self-service payment kiosk
26	Kim, Christodoulidou & Brewer (2012)	Empirical	Multiple/Varied Misc.	Multiple/varied
27	Kim & Qu (2014)	Empirical	Hospitality/Hotel	General/Not specified
28	King and He (2006)	Empirical	Internet/IT-based	Computer vs. non computer
29	Lee et al., (2010)	Empirical	Trade Retail	Scanners/Readers
30	Lee & Allaway (2002)	Empirical	Internet/IT-based	Online/IT - passive
31	Leung & Matanda (2013)	Empirical	Trade Retail	Self-checkout systems
32	Liao et al., (2007)	Empirical	Internet/IT-based	Online/IT - active
33	Liljander et al., (2006)	Empirical	Transit	Touch screens/Monitors; Online/IT
34	Lin et al., (2007)	Empirical	Bank/Fin; Transport; Bus/Office Services	Online/Internet-active
35	Lin and Hsieh (2006)	Empirical	Bank/Fin; Transport	Multiple/varied
36	Lin and Hsieh (2007)	Empirical	Bank/Fin; Transport; Bus/Office Services	Multiple/varied
37	Liu (2013)	Empirical	Multiple/Varied Misc.	Multiple/varied
38	Liu and Arnett (2000)	Empirical	Internet/IT-based; Multiple/Varied/Misc.	Online/Internet-active and passive
39	Massey et al., (2007)	Empirical	Internet/IT-based	Online/Internet-active and passive
40	Mathieson (1991)	Empirical	Internet/IT-based	Online/Internet-active and passive
41	McCartan-Quinn et al., (2004)	Qualitative	Bank/Fin	Phone/IVR/AVR
42	McCloskey (2003)	Empirical	Internet/IT-based	Online/Internet-active

43	Meuter et al., (2000)	Mixed research design	Multiple/Varied/Misc.	ATM; Phone/IVR/AVR; Internet - active
44	Meuter et al., (2003)	Empirical	Multiple/Varied/Misc.	Multiple/Varied/General
45	Meuter et al., (2005)	Empirical	Multiple/Varied/Misc.	Phone/IVR/AVR
46	Michel and Meuter (2008)	Empirical	Bank/Finance	Multiple/Varied/General
47	Mick and Fournier (1998)	Theoretical/Conceptual	Internet/IT-based	Multiple/Varied/General
48	Ong, 2010	Theoretical/Conceptual	Hospitality/Hotel	Multiple/Varied/General
49	Oyedele and Simpson (2007)	Empirical	Trade Retail; Multiple/Varied/Misc.	Multiple/Varied/General
50	Parasuraman (2000)	Empirical	Multiple/Varied/Misc.	Multiple/Varied/General
51	Peterson et al., (1997)	Theoretical/Conceptual	Trade Retail; Internet/IT-based	Online/Internet - active and passive
52	Phongkusolchit (2003)	Empirical	Trade Retail	Scanners/Readers
53	Reinders et al., (2007)	Empirical	Transit	Vending Kiosks; Phone IVR; Online/IT - active
54	Reinders et al., (2008)	Empirical	Transit	Vending Kiosks; Online/IT - active
55	Rose et al., (2005)	Empirical	Internet/IT-based	Online/IT - active
56	Schepers and Wetzels (2007)	Empirical	Internet/IT-based; Multiple/Varied/Misc.	Multiple/Varied/General
57	Sheppard et al., (1988)	Empirical	Multiple/Varied/Misc.	Multiple/Varied/General
58	Shih (2004)	Empirical	Internet/IT-based	Online/IT - active and passive
59	Shultze and Orlikowski (2004)	Qualitative	Bank/Fin; Internet/IT-based	Online/IT - passive
60	Simon and Usunier (2007)	Empirical	Bank/Fin; Transit; Bus./Office Services	Vending Kiosks
61	Szajna (1996)	Empirical	Internet/IT-based	Online/IT - active
62	Tarafdar et al., (2007)	Empirical	Bus/Office Services; Internet/IT-based	Online/IT - passive
63	Taylor and Todd (1995)	Empirical	Internet/IT-based; Multiple/Varied/Misc.	Online/IT - active and passive
64	Tsikriktsis (2004)	Empirical	Multiple/Varied/Misc.	Multiple/Varied/General

65	Venkatesh and Bala (2008)	Empirical	Internet/IT-based	Online/IT - active and passive
66	Venkatesh et al., (2003)	Empirical	Internet/IT-based; Multiple/Varied/Misc.	Online/IT - active and passive
67	Venkatesh and Davis (2000)	Theoretical/Model	Multiple/Varied/Misc.	Multiple/Varied/General
68	Verhoef et al., (2009)	Theoretical/Conceptual	Multiple/Varied/Misc.	Multiple/Varied/General
69	Vijaryasarathy (2004)	Empirical	Internet/IT-based	Online/IT - active
70	Walczuch et al., (2007)	Empirical	Bank/Finance	Video/CD/Software/Media
71	Walker and Johnson (2003)	Theoretical/Model	Internet/IT-based	Online/IT - active
72	Wang et al., (2007)	Theoretical/Model	Multiple/Varied/Misc.	Multiple/Varied/General
73	Wang et al., (2009)	Qualitative	Traditional Retail	Scanners/Readers
74	Wang et al., (2012)	Empirical	Trade Retail	Self-checkout systems
75	Wixom and Todd (2005)	Empirical	Multiple/Varied/Misc.	Multiple/Varied/General
76	y Monsuwe (2004)	Theoretical/Literature review	Internet/IT-based	Online/IT - active
77	Zhu et al., (2013)	Empirical	Multiple/Varied Misc.	Multiple/Varied/General

Appendix A.5
Research Questionnaire

RESEARCH QUESTIONNAIRE

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Research Problem: Why people do adopt Self-service Technologies?

This survey asks questions about using self-service technologies (SSTs) in offline service context. SSTs simply refer to those technological devices that are used by you to serve yourself. For example, ATMs, Cash deposit kiosk and pass-book printing kiosk in banking, bill payment kiosks (at a Vodaphone store), touch screen information kiosks (at hotels, bus stands and railway stations, etc.).

These automated systems allow you to serve yourself without any assistance from service employees. When you use such SSTs, you do not talk with a live customer service employee. Thus, you adopt a modern service delivery option (SST-based services) and avoid a traditional service delivery system (employee-based services).

We are very interested in your opinions about such self-service technologies **whether you use these technologies-based service delivery options or not**. There are no right or wrong answers. When completing this survey, some of the questions may seem quite similar. However, we would appreciate your answering all of the questions, even if you feel that you have already responded to a similar question. The survey should take approximately 15-20 minutes to complete.

1. Have you ever used any kind of self-service technologies? ( ) Yes ( ) No

2. Kindly mark all those SSTs, you have ever used.

ATMs ( ), Automated cheque deposit kiosk ( ), Cash deposit kiosk ( ),
Pass book printing kiosk ( ), Bill payment kiosk ( ), Interactive information kiosk ( ), Automatic queue management system ( ), Automatic vending machine ( ),
Self-scanning purchase system ( ), Automated airline check in ( ),
Automated hotel check-in system ( ), Automated hotel check-out system ( ),
Touch screen ordering ( ), Automated-fuel refilling system ( ),
Any other……

When answering the following questions, please keep in mind that the term 'Self-service technology (SST)' refers to any technological device/system you have already used as mentioned in last step.

1. Were you already aware of the SST, when you used it for first time? ( ) Yes ( ) No

2. Have you ever attempted to use the SST but were unsuccessful, and had to talk to a service employee? ( ) Yes ( ) No

3. Have you successfully completed the task using a SST for the first time? ( ) Yes ( ) No

4. If yes, how satisfied were you with the SST?

Very dissatisfied						Very satisfied
1	2	3	4	5	6	7

Please indicate the extent to which you agree with the statement; by circling the most appropriate number (i.e., circling "1" indicates you strongly disagree with the statement and circling "7" indicates you strongly agree with the statement. Numbers in the middle indicate varying levels of agreement).

1. I consider myself to be well informed about the existence of the self-service technology.

1 2 3 4 5 6 7

2. I have exerted some efforts to learn about the self-service technology system.

1 2 3 4 5 6 7

3. I read the information provided to me about the self-service technology system.

1 2 3 4 5 6 7

4. For me, the self-service technology system is NOT a good way to serve myself.

1 2 3 4 5 6 7

5. I consider myself to be knowledgeable about the self-service technology system.

1 2 3 4 5 6 7

6. I have asked questions about the self-service technology system.

1 2 3 4 5 6 7

7. I feel I have spent some time acquiring information about the self-service technology system.

1 2 3 4 5 6 7

8. Overall, I feel that the self-service technology system is an effective way to deliver self-services.

1 2 3 4 5 6 7

9. Using the self-service technology system would NOT be valuable for me.

1 2 3 4 5 6 7

10. It is very likely I will use the self-service technology systems in the future.

1 2 3 4 5 6 7

11. I plan to use a self-service technology in the future.

1 2 3 4 5 6 7

12. The likelihood (chances) that I would recommend the use of self-service technology to a friend is high.

1 2 3 4 5 6 7

The following section asks questions in order to determine your innovativeness, how innovative are you? Please indicate the extent to which you agree with each statement whether you have used the automated phone system or not.

1. If I heard that a new way of self-service is introduced, I would be interested to use it.

1 2 3 4 5 6 7

2. I prefer using self-service technology over a traditional way of service delivery with human interaction.

1 2 3 4 5 6 7

3. I use any new self-service technology before other people use it.

1 2 3 4 5 6 7

4. If I found a new self-service technology while visiting service firm, I would NOT prefer to use it.

1 2 3 4 5 6 7

5. I do NOT use an SST, if I have not heard about its usage and benefits.

1 2 3 4 5 6 7

6. I do NOT want to use an SST, if it is not for my present use.

1 2 3 4 5 6 7

This section asks questions regarding your preference of SSTs over service employees. Please circle the most appropriate number for each statement below. Please circle the most appropriate number for each statement below.

1. People who influence my behavior think that I should use the self-service technology system.

1 2 3 4 5 6 7

2. People who are important to me think that I should use the self-service technology system.

1 2 3 4 5 6 7

3. Using a self-service technology system enhances (improves) my position within my surroundings (societies).

1 2 3 4 5 6 7

4. I commonly use lots of self-service technologies for different services.

1 2 3 4 5 6 7

5. I do NOT have much experience with self-service technology system.

1 2 3 4 5 6 7

6. I use a lot of technologically based products and services.

1 2 3 4 5 6 7

This section asks questions regarding your preference of service employees over an innovative SST. Please respond to all these questions even if you have never used any specific kind of SST.

1. I feel apprehensive (nervous) about using self-service technology.

   1 2 3 4 5 6 7

2. Technical terms sound like confusing jargon (difficult to understand) to me.

   1 2 3 4 5 6 7

3. I have avoided self-service technology because it is unfamiliar to me.

   1 2 3 4 5 6 7

4. I hesitate to use most forms of self-service technology for fear of making mistakes I cannot correct.

   1 2 3 4 5 6 7

5. Personal contact with a service employee makes delivering services enjoyable for me.

   1 2 3 4 5 6 7

6. Personal attention by a service employee is important to me.

   1 2 3 4 5 6 7

7. It bothers (troubles) me to use a machine when I could talk to a live person instead.

   1 2 3 4 5 6 7

8. The waiting time for SST-based services was generally longer than for employee-based services.

   1 2 3 4 5 6 7

9. If there is a line of people waiting to use the self-service technology, the likelihood (chances) that I will wait and use the self-service is high.

   1 2 3 4 5 6 7

10. In case of delay, I will **NOT** wait for my turn, and choose any other option.

    1 2 3 4 5 6 7

11. The number of consumers lining up behind me would make me nervous about using the self-service technology.

    1 2 3 4 5 6 7

12. The number of consumers affects whether I will choose self-service technology.

    1 2 3 4 5 6 7

The following section asks your opinion about SST. Please respond to all the questions, even if you feel that I have already answered a similar question before. We really appreciate you answering all the questions included in this survey.

1. Using the self-service technology improves my performance.

   1 2 3 4 5 6 7

2. Using the self-service technology increases my productivity.

   1 2 3 4 5 6 7

3. Using the self-service technology enhances (improves) my effectiveness.

   1 2 3 4 5 6 7

4. I find the self-service technology to be useful.

   1 2 3 4 5 6 7

5. My interaction with the self-service technology is clear and understandable.

   1 2 3 4 5 6 7

6. Interacting with self-service technology does not require a lot of my mental effort.

   1 2 3 4 5 6 7

7. Find the self-service technology to be easy to use.

   1 2 3 4 5 6 7

8. I find it easy to get the self-service technology to do what I want it to do.

   1 2 3 4 5 6 7

9. I believe that the self-service technology system is hard to use.

   1 2 3 4 5 6 7

10. It is difficult to use the self-service technology system.

    1 2 3 4 5 6 7

11. I believe that the self-service technology system is easy to use.

    1 2 3 4 5 6 7

12. I fear using the self-service technology system reduces the confidentiality of personal information.

    1 2 3 4 5 6 7

13. I am unsure (unconfident) whether the automated self-service technology system performs satisfactorily.

    1 2 3 4 5 6 7

14. Using the self-service technology system infringes (disregards) on my privacy.

    1 2 3 4 5 6 7

15. I am sure the automated self-service technology system performs as well as the other service delivery options.

    1 2 3 4 5 6 7

16. Overall, using the automated self-service technology system is risky.

1 2 3 4 5 6 7

Finally, so that we may categorize your responses with other participants, please answer the following questions. We ensure you that your complete information will remain confidential.

Age group (Years): ( ) 18 – 25, ( ) More than 25 – up to 35,

( ) More than 35 – up to 45 ( ) More than 45 – up to 55,

( ) More than 55

Gender: ( ) Male ( ) Female

Annual household income (INR): ( ) 2, 50, 000 or less ( ) 2, 50, 001 - 5, 00, 000

( ) 5, 00, 001 – 7, 50, 000 ( ) 7, 50, 001 – 10, 00, 000 ( ) 10, 00, 001 or above

Highest education level: ( ) Higher secondary or less ( ) Senior secondary/ diploma

( ) Under graduate ( ) Post graduate ( ) Ph.D. or above

Current employment: ( ) Service ( ) Business

( ) Student ( ) Unemployed ( ) Agriculture, any other.

Finally, if you have any suggestion regarding how any specific self-service technology can be improved.

_____

_____

_____

Is there anything that can be done to encourage you to use these technology-based service options?

_____

_____

_____

Thank you very much for your time, we appreciate your assistance.

List of Publications

IN JOURNALS:

- Kaushik, A.K., and Rahman, Z. (2014). Perspectives & Dimensions of Consumer Innovativeness: a Literature Review & Future Agenda. *Journal of International Consumer Marketing*, 26(3), 239-263.
- Kaushik, A.K., and Rahman, Z. (2015). Self-service Innovativeness Scale: Introduction, Development and Validation of scale. Service Business, DOI: 10.1007/s11628-015-0291-0.
- Kaushik, A.K., and Rahman, Z. (2015). Are Street Vendors really Innovative towards Self-service Technology? *Information Technology for Development*, DOI: 10.1080/02681102.2015.1052359.
- Kaushik, A.K., and Rahman, Z. (2015). An alternative model of self-service retail technology adoption. *Journal of Services Marketing*, 29(5), 406-420.
- Kaushik, A.K., and Rahman, Z. (2015). Innovation Adoption across Self-service Banking Technologies in India. *International Journal of Bank Marketing*, 33(2), 96-121.
- Kaushik, A. K., Agrawal, A.K., and Rahman, Z. (2015). Tourist behaviour towards self–service hotel technology adoption: Trust and subjective norm as key antecedents. *Tourism Management Perspectives*, 16, 278-289.

IN PROCEEDINGS:

- Agrawal, A.K., Kaushik, A. K., and Rahman, Z. (2015). Co-creation of Social Value through Integration of Stakeholders. *Procedia – Social and Behavioral Sciences*, 189, 142-48.
- Agrawal, A.K., Kaushik, A. K., and Rahman, Z. (2015). An exploratory study of organizational factors required to facilitate customer learning in co-creation. *Proceeding of International Conference on Evidence Based Management 2015 (ICEBM2015)*. Organized by BITS, Pilani, Rajasthan, India on 20-21 Mar, 2015.
- Kaushik, A. K., Kumar, D., and Rahman, Z. (2014). An Empirical Study of SSTs Adoption in Organized Retail Stores. *Proceeding of International Conference on Research and Sustainable Business (ICRSB14)*. Organized by IIT Roorkee, India on 6-8 Mar, 2014.

List of Conferences/Workshops

INTERNATIONAL/NATIONAL CONFERENCES

1 Paper Title	*Tourist behaviors and experiences: Adoption of SSTs in hospitality industry*
Conference Title	Global Conference on "Managing in Recovering Markets" (GCMRM2015)
Organized by and Date	MDI, Gurgaon, India on 10-12 Mar, 2015
2 Paper Title	*Self-service Innovation Adoption among Street Vendors: A Study of Emerging Markets*
Conference Title	MARCON 2014: International Marketing Conference
Organized by and Date	IIM Calcutta, India on 19-21 Dec, 2014
3 Paper Title	*An Empirical Study of SSTs Adoption in Organized Retail Stores*
Conference Title	International Conference on Research and Sustainable Business (ICRSB14)
Organized by and Date	IIT Roorkee, India on 6-8 Mar, 2014
4 Paper Title	*Co-creation of social value through integration of stakeholders*
Conference Title	XVIIIth Annual Inter. Conf. of the Society of Operations Management
Organized by and Date	IIT Roorkee, India on 12-14 Dec, 2014
5 Paper Title	*An exploratory study of organizational factors required to facilitate customer learning in co-creation*
Conference Title	International Conference on Evidence Based Management 2015
Organized by and Date	BITS, Pilani, Rajasthan, India on 20-21 Mar, 2015

WORKSHOPS ATTENDED

1. Management Development Programme/Faculty Development Programme on "Data Analysis using SPSS", organized by Faculty of Management Studies, Gurukul Kangri University Haridwar on March 23-24, 2013.
2. One Day QIP workshop on "Qualitative Research Methods in Social Sciences and Humanities", organized by Department of Humanities and Social Sciences, IIT Roorkee on October 12, 2013.
3. One Day QIP workshop on "Challenges to Professionalism", organized by Department of Humanities and Social Sciences, IIT Roorkee on March 22, 2014.
4. Three days' workshop on "Excel/Lead in Sankalp 2015" organized by Indian Institute of Technology, Roorkee on February 6-8, 2015.