Chapter 1

Introduction

1.1 INTRODUCTION

Technology is a linchpin for succeeding in the new world, where consumers seek more efficiency and demand quality performance from their service providers. Traditionally the service encounters has been portrayed as a “high-touch, low-tech” interaction, but have changed tremendously over the years as technology has taken up a prominent place in a consumer’s daily life. The growing importance of technology has led to Parasuraman (1996) integrating the services marketing triangle with this new dimension and developing the services marketing pyramid, which discusses company–technology, technology–employee and technology–customer interactions.

Ostrom et al (2010) identified leveraging technology to advance service as one of the ten interdisciplinary research priorities focused on the science of service. Thus adoption of products or services based on technology is becoming increasingly relevant and an understanding of the factors affecting consumer’s adoption of technologies is of prime significance to both academicians and practitioners.

With advancement in communication and information technologies, the extent and scope of customers performing services themselves have significantly increased. Self-service technology (hereafter SST) has been widely employed, either as a means to enhance an organization’s efficiency or for catering to the changing needs of customer segments. SSTs enable customers to use technology to produce and consume services without direct personal contact with the representative from the firm, and the only human involved in the service delivery process is the consumer himself. Thus self-service as a model and a market trend has gained significant impetus in the last decade across a variety of service industries, as consumers increasingly accept and often prefer self-service to assisted service.

While there is extensive research done on SSTs with respect to the retail, banking and financial services, there is a dearth of studies in the health care context from the service marketing point of view. The concentration has been on studies on SSTs used for transaction (ATM and online banking), customer service (kiosks) and self-service
interfaces (internet self-service interface, ISST). The works by Dabholkar 1996; Shih and Venkatesh 2004; Leung and Wei 1999; Bobbitt and Dabholkar 2001; Lee and Allayway 2002; Curran and Meuter 2005; Dabholkar and Bagozzi 2002 and Walker et al 2002 are some of the major works carried out in this field. Further, majority of the existing theoretical models (TAM and its extended models, UTUAT, Theory of Trying, Decomposed TPB model) examined individual adoption and usage behaviour in the context of organizational setting. It has been pointed out by information systems (IS) researchers that context is an important aspect of understanding the technology and its use, as technology is embedded in a context. The criticality of contextual factors, the target users and the technology under consideration in individual assessment of technological products or services have been pointed out by various researchers, thereby demonstrating the need for taking into account different contexts in the study of the consumer – SST relationship (Curran and Meuter 2005; Walker and Johnson 2006; Shih and Venkatesh 2004 and Moon and Kim 2001).

It has also been noted by Kotler (1973) that healthcare services are fundamentally poles apart from other services, and it is characterized by a negative demand from the consumer’s side. One motive for the selection of this context is the dearth of research in services literature with regard to services customers need, but may not want. Customers avail these services with a lot of unwillingness and anxiety (Berry et al 2004). As stated by Berry and Bendapudi (2007) coproduction in a healthcare context “involves directly confronting fears, considerable inconvenience and cost, and making lifestyle changes.”

However in recent years, the technological advances have ushered in an age of consumerism into the healthcare industry (Sharf 1988). Internationally there is a visible shift towards preventive health care and encouraging self-care among patients, which lays great emphasis on customer empowerment (Feste and Anderson 1995; Grandinetti 1999 and Michie et al 2003). Adoption of health care technology promoting self-help is gaining momentum as a viable solution among health care stakeholders in sustaining health care systems globally. It is perceived that active participation of a person in managing one’s health, have the prospective to not only sustain current care delivery, but to fundamentally change the model to a more efficient and more patient-centered one.
1.2 HEALTH SCENARIO- GLOBAL AND INDIAN PERSPECTIVE

Globalization is placing the social framework of a majority of nations under pressure, and the performance of health systems apparently leave a lot to be desired. Citizens are increasingly becoming more intolerant with the malfunctioning of health service delivery systems. The need of the hour is very clear - a health system which needs to be proactive to the challenges of a dynamic world.

There is a major rise in non-communicable diseases (NCD) the world over and it accounted for sixty per cent of the fifty eight million deaths estimated worldwide in 2005. This accounts for nearly forty six per cent of the global burden of diseases. According to WHO projection for year 2015, nearly forty one million people will die of chronic disease, calling for urgent action. Diabetes, cancer, cardiovascular diseases and chronic respiratory diseases are the major NCDs affecting human life. Epidemics of NCDs are presently emerging or accelerating in most developing countries (Murray and Lopez 1996). Since the impact of NCDs on the quality of life and a country’s socioeconomic structure is drastic, WHO estimates that the loss of national income of different countries will be dramatic. Therefore globally, the spotlight is mainly on health endorsement and primary preventive actions that are targeted at both the high risk groups and the general population. It also needs to be noted that the loss of life due to NCD complications is more prevalent among the 35-69 years age group in Indian context when compared to developed nations - where NCD complications arise in people greater than 70 years (Murray and Lopez 1996 and Reddy and Yusuf 1998).

Type 2 diabetes, is a growing, worldwide epidemic with significant clinical, social and financial costs as it is associated with the devastating micro vascular and macro vascular complications if not controlled (Scavini et al 2013). Raleigh et al (1997) and Greenhalgh (1997) in their study carried out in a UK context reported that South Asians develop the disease ten years in advance than their white counterparts, have a higher risk of diabetic complications, a forty per cent higher mortality rate and observed that there is a high influence of socio cultural backgrounds. According to the International Diabetes Federation (IDF), India has 62 million people with diabetes and this will increase to 101 million by the year 2030 (IDF, Diabetes Atlas, 2011). This is based on a recent national survey, the ICMR INDIAB Study which showed that India had 62.4 million people with diabetes in the year 2011(Anjana et al 2011). Further, 'India is the largest contributor to South-east Asia regional mortality, with 1.1 million
deaths attributable to diabetes in 2013’ (IDF Diabetes Atlas, 2013).

Consequently, there is a definite need to prevent and improve diabetes care for the Indian population.

The mounting economic pressures on hospitals, coupled with advances in diagnostic technologies, intensifying competition among suppliers and physicians and changing consumer demands are shifting diagnostic testing from hospitals and commercial laboratories closer to the patient. In the specific context of NCDs, the growing demand for acute and chronic care as well as the continuous nature of preventive interventions, required over many years, highlights the need for encouraging consumer participation in terms of self-monitoring and self-care in healthcare management.

1.3 SIGNIFICANCE OF THE STUDY

The American Association of Diabetic Educators’ (AADE) position statement stresses that ‘among the self-care behaviours (healthy eating, taking medications, healthy coping, being active, monitoring, reducing risk, and problem solving), self-monitoring of blood glucose (hereafter, SMBG) is a key component of the treatment regimen’ (Tomky et al 2008). Monitoring is the only way to know whether the patient is achieving his or her treatment goals and performance of self-care behaviours is frequently contingent on the results of SMBG (Poolsup et al 2009). In the context of diabetes, the SMBG provides patients with important information about the effects of exercise, meals and therapeutic interventions on their metabolic control. Despite the many documented benefits of SMBG among patients suffering from diabetes in managing the disease, technology adoption rates are relatively low (Vincze et al 2004) signifying the importance of identifying the determinants of technology adoption.

A good understanding of factors affecting and/or facilitating the decision making, evaluations and behavioural aspect of healthcare related technology adoption behaviour is expected to help the development of healthcare related marketing theory. A greater understanding of the attitudes and apprehension of consumers will be needed in order to assist, and encourage them to adopt the technology. It is expected that it will help both researchers and practitioners to develop various interventions to
maximize technology adoption. Researchers have stated that “an adopter’s experience with one innovation obviously influences that individual’s perception of the next innovation to diffuse through the individual’s system.” Therefore this study is also expected to provide an understanding of other similar set of innovations.

1.4 STATEMENT OF THE PROBLEM

Based on the discussion thus far, it is clear that in a scenario of rapid health transition, policy makers and service providers are faced with critical issues of reforming health care system, which has been focusing mainly on curative care to one that addresses the complexities of preventive health care management. Healthcare providers have both a challenge and an opportunity to collaborate with healthcare consumers who have increasingly become “tech-savvy” over the past decade. The benefits in successfully doing so are many, from increased customer satisfaction, to improved efficiency and reduced costs. Therefore, it is very crucial to have an understanding and appreciation of how consumers view usage of technologies for healthcare management.

Although there have been several studies investigating the self-service technology (SST) acceptance behaviour from a variety of theoretical perspectives, those studies have not provided a unified understanding. The attempt to build a collective body of knowledge has been hindered by lack of a sound theoretical foundation, which is needed to help assimilate the diverse research findings as well as to provide a framework for the prediction and explanation of SST adoption. A lot of work has either tried to replicate the existing models or modify the existing theoretical models of technology adoption in IS by addition of extraneous variables. Similarly there is a dearth of models explaining healthcare technology adoption as well as studies from the perception of consumers or patients.

For the present study, it is intended to test the Theory of Planned Behaviour (hereafter TPB) model and its extensions in predicting consumer’s technology adoption intention of self-help technology in a healthcare context, as it has been applied to forecast consumer behaviour, technology adoption behaviour, and health related behaviours (Ajzen 1985; Godin and Kok 1996 and Hung and Chang 2005). Rhodes and Courneya (2003) have pointed out that only a small number of studies have been carried out to examine the measurement precision of existing TPB concepts. There is
a need for more research to refine and elaborate the TPB variables (Armitage and Conner 2001; Trafimow et al 2004; Sheeran 2002; Webb and Sheeran 2006 and Yoo and Robbins 2008).

Further Dabholkar and Bagozzi (2002) has observed that the significance of studying direct effects has declined significantly and attempt to understand what bridges the causal relationship and what alters the magnitude or direction of the causal relationship (Frazier et al 2004 and Rose et al 2004) is gaining more importance. Raykov and Marcoulides (2000) have observed that ‘if an indirect effect does not receive proper attention, the relationship between two variables of interest may not be fully considered’. Mediation analysis can help to identify the critical components of interventions (MacKinnon et al 1995). The introduction of these variables may thus help in deciding interventions for eliciting behaviour change, which possibly will aid in overcoming one of the disadvantages of TPB of not providing specific strategies for bringing in behavioural change (Taylor et al 2006).

Therefore, this study addresses the following questions:

1. What are the factors influencing intention of consumers in adopting self-service technologies in a healthcare context?
2. Which theoretical model is more effective in predicting intention of consumers in adopting self-service technologies in a healthcare context- the core TPB model, two component TPB model, or extensions of the traditional TPB model and two component TPB model with extraneous variables (personal norm and facilitating conditions)?
3. Does illness acceptance, long term orientation (LTO) and quality of life (QOL) have a mediating effect on adoption intention of consumers in adopting self-service technologies in a healthcare context?
4. Does demographic variables like age and gender have a moderating effect on intention of consumers in adopting self-service technologies in a healthcare context?
1.5 RESEARCH OBJECTIVES

One of the main objectives of the study is to identify the beliefs held by patients regarding adoption of self-help technology in a healthcare context. In addition, the predictive validity of the various TPB models and the moderating and mediating effects of selected variables are tested in a sample of adults clinically diagnosed with Type 2 diabetes.

Sarstedt et al (2009) has observed that the ‘assumption of homogeneity is unrealistic’ in consumer behaviour studies and ‘ignoring population heterogeneity on an aggregate data level can seriously bias the results and thereby, yield inaccurate management conclusions’. Therefore, in the present research, the aggregate sample was classified into ‘Adopters Users’- sub sample who are owners of SMBG device and uses it for monitoring; ‘Adopters Rejecters’- sub sample who are owners of SMBG device but do not use it for monitoring and ‘Non Adopters’- sub sample who do not own SMBG. These sub samples were tested across the models under study to confirm the optimum measurement structure for TPB predictors.

Accordingly, the research considers the following objectives:

1. To elicit salient beliefs regarding diabetes and motives for adoption of SMBG for self-monitoring of blood glucose in a sample of adults clinically diagnosed with Type 2 diabetes;

2. To identify specific behavioural, normative and control beliefs as well as illness beliefs that is related to adoption intention of SMBG for self-monitoring of blood glucose in a sample of adults clinically diagnosed with Type 2 diabetes;

3. To test the fit of the core TPB model, two component TPB model and their extensions for the prediction of adoption intention of SMBG for self-monitoring of blood glucose in a sample of adults clinically diagnosed with Type 2 diabetes;

4. To compare the strength of the association of TPB constructs in predicting adoption intention to use SMBG regularly for self-monitoring in a sample of adults clinically diagnosed with Type 2 diabetes in a sample of adults clinically diagnosed with Type 2 diabetes;
5. To test and compare the mediating effect of illness acceptance, long term orientation (LTO) and quality of life (QOL) towards intention to use SMBG regularly for self-monitoring in a sample of adults clinically diagnosed with Type 2 diabetes; and

6. To test and compare the moderating effects of age and gender towards intention to use SMBG regularly for self-monitoring in a sample of adults clinically diagnosed with Type 2 diabetes.

1.6 HYPOTHESES OF THE STUDY AND CONCEPTUAL MODEL

The determinants of an individual’s decision to perform a particular behaviour can be explained with the help of the Theory of Planned Behaviour, TPB (Conner and Armitage 1998). The TPB theory explains behavioural choice through an individual’s behavioural intention (BI), attitude toward behaviour (AB), subjective norm (SN) beliefs and perceived behavioural control (PBC). Ajzen (1991) has stated that the comparative significance of attitude, SN and PBC will vary across behaviours and situations and the magnitude of PBC- BI relationship is dependent upon the type of behaviour and the nature of the situation. The above mentioned three variables make independent contributions toward predicting BI (Ajzen 1991).

‘Generally, the more favourable the attitude and subjective norm, and the greater the perceived behaviour al control, the stronger should be the individual’s intention to perform a particular behaviour’ (Ajzen 1991). The derived hypotheses for the study are based on the thorough and critical analysis earlier studies and detailed discussion is presented in later chapters.

*Therefore, the following hypotheses are considered with respect to the core TPB model;*

H1a: Attitude will have an influence on behavioural intention.

H1b: Subjective norm will have an influence on behavioural intention.

H1c: Perceived behavioural control will have an influence on behavioural intention.
Meta-analytic reviews support the construct and predictive validity of the TPB constructs across a variety of behaviours (Hagger et al 2002; Armitage and Conner 2001; Sheppard et al 1988; and Sheeran and Orbell 1999). A meta-analysis of the studies utilizing the TPB revealed that the TPB accounted for 39 per cent and 27 per cent of the variance in behavioural intention and behaviour, respectively (Armitage and Conner 2001). However, such meta-analyses indicate that a substantial proportion of the variance in intentions remains unexplained by the TPB variables of AB, SN and PBC. Addressing this issue, Ajzen (2001) has put forth a two component model of TPB, where the original TPB constructs are split into two components.

Ajzen and Fishbein (2005) have indicated that appropriate attitude measures for use in the TPB should contain items representing the instrumental and affective or experiential components of attitudes. Although usually pooled together, current research (Blanchard et al 2003 and Rhodes and Courneya 2003) suggests that these two dimensions should be treated as different variables. Conner and Armitage (1998) argue that the failure to consider all of the significant social factors has resulted in mixed result with respect to the role of normative factors in attitude–behaviour relations. Therefore, taking cue from the two component TPB model, SN are posited to comprise both injunctive (perceived pressure from important others to perform a behaviour) and descriptive (perceived observation of important others performing a behaviour) beliefs (Ajzen 2002a, 2006). ‘PBC along with attitude and SN is a co-determinant of intention and PBC with intention is a co-determinant of behaviour’ (Pavlou and Fygerson 2006). Notani (1998) pointed out that the nature, formulation and adequacy of PBC employed in a study is very significant in providing support for the TPB model, as this dimension differentiates TPB from TRA. Ajzen (2002) proposed that the TPB can be modified by separating the construct of PBC into two separate constructs: self-efficacy (an individual's situation-specific self-confidence for engaging in the behaviour) and controllability (the extent that an individual has access to means to exert control over the target behaviour.

Thus the two component TPB model is tested with the following hypotheses;

H2a: Instrumental Attitude will have an influence on behavioural intention.
H2b: Affective Attitude will have an influence on behavioural intention.
H2c: Injunctive norm will have an influence on behavioural intention.
H2d: Descriptive norm will have an influence on behavioural intention.
H2e: Self- efficacy will have an influence on behavioural intention.
H2f: Perceived control will have an influence on behavioural intention.

Ajzen (1991) also indicated that after the existing variables of the theory have been taken into account, the TPB is basically open to extension by the integration of additional variables or modification by the alteration of existing paths. Thus personal norm which takes into account an individual’s own values involved with a certain behaviour (Cialdini et al 1990 and Conner and Armitage 1998) and facilitating conditions which reflects the availability of resources needed to engage in a behaviour (Taylor and Todd 1995) are included in the TPB framework, as it is expected that these are likely to add to the prediction of intention. Therefore, the extensions of both the core and two component TPB model are examined in the context of self-help technology adoption in a healthcare situation.

*The following hypotheses are considered with respect to the extended core TPB model (H3a-H3e) and the extended two component TPB model (H4a-H4h).*

H3a: Attitude will have an influence on behavioural intention.
H3b: Subjective norm will have an influence on behavioural intention.
H3c: Perceived behavioural control will have an influence on behavioural intention.
H3d: Personal norm will have an influence on behavioural intention.
H3e: Facilitating conditions will have an influence on behavioural intention.
H4a: Instrumental Attitude will have an influence on behavioural intention.
H4b: Affective Attitude will have an influence on behavioural intention.
H4c: Injunctive norm will have an influence on behavioural intention.
H4d: Descriptive norm will have an influence on behavioural intention.
H4e: Self- efficacy will have an influence on behavioural intention.
H4f: Perceived control will have an influence on behavioural intention.
H4g: Personal norm will have an influence on behavioural intention.
H4h: Facilitating conditions will have an influence on behavioural intention.
The aim of comparing alternative models is to test and confirm the optimum measurement structure for TPB predictors. This presupposition can be ascertained through the following hypothesis.

**H5: Across the models, the core TPB model will have the lowest explanatory power in predicting behavioural intention in a healthcare technology context, which will be enhanced in the two component TPB model, followed by extended core TPB model and the highest explanatory power for the extended two component TPB model.**

Raykov and Marcoulides (2000) have observed that ‘if an indirect effect does not receive proper attention, the relationship between two variables of interest may not be fully considered.’ Mediation analysis can help to identify the critical components of interventions (MacKinnon and Dwyer 1993). Further, interventions can be ‘designed to change the outcome of interest by targeting mediating variables that are hypothesized to be causally related to the outcome’ (Magill 2011).

Laugesen et al (2011) and Scammon et al (2011) observed that since health technology acceptance behaviour is an activity to promote, protect or maintain health, it should be considered as health behaviour. Therefore, a better understanding of the health technology acceptance behaviour should be seen not only from a technology acceptance perspective but also from a health behaviour outlook. Therefore, illness acceptance is considered as a mediating variable in the present study of adoption intention of self-help technology in a healthcare context.

These presumptions are being tested through the following hypotheses:

**H6a: Illness acceptance will have a significant mediating effect on the eight paths considered in the study, namely; attitude (instrumental and affective)–intention, subjective norm (injunctive and descriptive)–intention, PBC (self-efficacy and perceived control)–intention, personal norm–intention and facilitating conditions–intention.**

**H6b: Long term orientation will have a significant mediating effect on the eight paths considered in the study, namely; attitude (instrumental and affective) – intention, subjective norm (injunctive and descriptive)–intention, PBC (self-efficacy
and perceived control)-intention, personal norm-intention and facilitating conditions-intention.

**H6c: QOL will have a significant mediating effect on the eight paths considered in the study, namely; attitude (instrumental and affective)-intention, subjective norm (injunctive and descriptive)-intention, PBC (self-efficacy and perceived control) -intention, personal norm-intention and facilitating conditions-intention.**

According to Hall and Rosenthal (1991); Judd et al (1995) and Aguinis et al (2001), the recognition of significant moderators of relations between predictors and outcomes shows the maturity and complexity of a field of inquiry and is at the heart of theory in social science (Hall and Rosenthal 1991 and Cohen et al 2003). Considering situational factors, consumer traits and demographic variables (Dabholkar and Bagozzi 2002 and Venkatesh et al 2003) as moderator variables that change the strength of the attitude–intention and intention-behaviour relationships is of more interest because understanding when the TPB variables are most predictive of intentions and behaviour provides some insight into when changes in those variables are likely to affect intentions.

**H7: Gender will have a significant moderating effect on the eight paths considered in the study, namely; attitude (instrumental and affective)-intention, subjective norm (injunctive and descriptive)-intention, PBC (self-efficacy and perceived control)-intention, personal norm-intention and facilitating conditions-intention.**

**H8: Age will have a significant moderating effect on the eight paths considered in the study, namely; attitude (instrumental and affective)-intention, subjective norm (injunctive and descriptive)-intention, PBC (self-efficacy and perceived control) -intention, personal norm-intention and facilitating conditions-intention.**

The following conceptual frameworks were tested with the above discussed hypotheses.
Figure 1: Conceptual Framework-Core TPB Model and its Extended Model

Note: The 3 constructs within the box and their link to BI represents the Core TPB Model and the entire figure represents the extended Core TPB Model.
Figure 1: Conceptual Framework-Two Component TPB Model and its Extended Model

Note: The 6 constructs within the box and their link to BI represents the Two Component TPB Model and the entire figure represents the extended Two Component TPB Model.
1.7 CHAPTER SCHEME

Chapter – 1 provides an introduction to the research work and an overview about the research problems. Chapter – 2 review a selection of relevant literature covering self-service technology, technology adoption models, health behaviour models, technology adoption studies discussed in different contexts and discussion of Theory of Planned Behaviour in detail. Chapter – 3 outlines the methodology used for the study which covers both the qualitative and quantitative phases of the study. Chapter – 4 comprise the analysis of the primary data collected, followed by discussion of the findings taking into account both the formative and reflective analysis. Chapter – 5 is an assessment of the major findings from the study, its theoretical and managerial implications, limitations and derived conclusions.