THE ROLE OF SATISFACTION AND PARTICIPATION IN TECHNOLOGY ACCEPTANCE

By

Harpreet Singh
Bachelor of Commerce, Delhi University, 1999

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Name: **Harpreet Singh**

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Supervisory Committee:

Dr. Michael Parent
Senior Supervisor
Associate Professor & Academic Director, M.B.A. Programs
Faculty of Business Administration
Simon Fraser University

Dr. Andrew Gemino
Supervisor
Assistant Professor
Faculty of Business Administration
Simon Fraser University

Date Approved: July 27, 2005

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ABSTRACT

The Technology Acceptance Model (TAM) suggests that two factors predict computer acceptance behaviour: perceived ease of use, and perceived usefulness. User participation is also believed to positively affect these two determinants. Researchers have suggested that user acceptance is best measured by measuring the satisfaction level of users with IS. This study not only measures acceptance through satisfaction with the new IS but also explores whether or not users' current satisfaction with the existing IS have any significant affect on the users' perception of ease of use, and usefulness of a new IS. A model was established with measures of perceived ease of use, perceived usefulness, current level of satisfaction with existing IS, user participation in developing new IS and perceived satisfaction. The results of this study indicate that user participation and current satisfaction positively affect perceived ease of use. The results also validate the TAM.

DEDICATION

to my parents, without whose unconditional support, understanding and most of all love, the completion of this work would not have been possible.

with all my love.

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INTRODUCTION

Introduction:

The exponential growth of information system technology in today's world has led to the development of both larger and more sophisticated information systems (IS). IS has become an integral part of the business environment. Applications range from supporting day-to-day business operations to providing a competitive advantage to companies. Organizations are exerting increasing demands on these systems, many of which are integrated database and network systems that support a wide variety of users with different demands for information. Many systems are used to facilitate global as well as vertically integrated operations. The proliferation of IS has had a substantial impact on managers in all functional areas and at all managerial levels. A considerable interest surrounds the factors that predict whether users will accept or reject IS.

An IS is a combination of software, hardware, people, and procedures assigned to receive, store, manipulate, summarize, and present data to a given organization. Once started, computer-based information systems (CBIS) are often critical to the ongoing existence of the sponsoring organization since they are completely embedded in day-to-day operations (Fox, undated). Business managers now recognize IS as powerful business tools for personal use and for organizations to gain competitive advantage (Guimaraes et al., 1992). Nevertheless, investment in IS has an inherent riskiness due to the high IS failure rates (Markus and Keil, 1994). To make effective use of technology, managers, professionals, and operating employees must accept the application, learn how to interact directly with aspects of the hardware and

software, and adapt the technology to their task requirements (Doll, Hendrickson, and Deng, 1998). Understanding why people accept or reject computers has proven to be one of the most challenging issues in IS research (Swanson, 1988).

The central focus of management information system (MIS) implementation research is directed to the factors explaining success or failure of CBIS (Cheney et al., 1986; Ein-Dor and Segev, 1978). Prior research views CBIS success from a variety of perspectives and uses varying definitions and measures of success, including users' overall satisfaction and decision-making satisfaction, level of CBIS usage, perceived benefits of CBIS, improved decision quality and performance, and business profitability (Baroudi and Orlikowski, 1988, Davis et al. 1989, Venkatest, 2000). Among these, user satisfaction and perceived benefits are widely regarded as the prime criteria of CBIS success. System usage is also considered a good surrogate measure of CBIS success. It has been argued, however, that system usage is often not voluntary; i.e., management may mandate its usage. Further, system usage is considered by many; a behaviour, determined to a great extent by user attitudes (user satisfaction) toward a new system. Thus, measuring CBIS success through users' perceived benefits is suggested to be more appropriate (Guimaraes et al., 1992).

This research reviews prior work on user acceptance of technology, specifically the Technology Acceptance Model (TAM) (Davis et al., 1989) and its variances/extensions as scholars propose. For the purpose of this paper, user participation and users' current level of satisfaction with the existing technology are studied in relation to TAM. This study also focuses on the behavioural intention to use the system rather than actual system usage. Davis et al. (1989) found that the behavioural intention to use the system is significantly correlated with usage. This paper begins with a review of the current literature, to provide a contextual background and research framework. The second section of this paper outlines the research method used to

address the research questions. The third section explains the hypotheses, which is followed by the results section and then a discussion of the results and limitations of the study. Finally, implications for management and areas for further research are presented in the conclusion.

Rationale for the Paper

Why Study the User Acceptance of Technology?

IS do not provide any benefits to an organization if they are not used. Unfortunately, resistance to end-user systems by managers and professionals is a widespread problem. To better predict, explain, and increase user acceptance, it is crucial to understand what people accept or reject CBIS. End-users are often unwilling to use available computer systems that, if used, would generate significant performance gains (Swanson, 1988). Practitioners and researchers require a better understanding of why people resist using computers to devise practical methods for evaluating systems, predicting how users will respond to them, and altering the nature of systems to improve them and their processes of implementation (Davis et al., 1989)

CHAPTER TWO:
THEORETICAL BACKGROUND

Introduction

Scholars have defined information system (IS) failure in a variety of ways. Wilson and Howcroft (2002) took a close look at the statistics-revealing causes of IS failure and concluded that failures can be attributed to varied phenomena such as cost over-runs, schedule over-runs, cancellations, operating at a loss, and so on. In the IS literature, the suggested measures of success or failure of an IS are plentiful (Davis & Venkatesh, 2004; Ginzberg, 1981; Hartwick & Barki, 1994, Dalcher & Genus, 2003). In some cases, a project is considered a failure if it does not meet the standards, or if it is an "operating failure," where a failure may occur in another system, when the first system fails to work properly. In other cases, a failed system may not perform as expected, may not be fully operational, or may not be useable as it was intended. From a user's perspective, a system may be considered a failure if it is not used (Wilson & Howcroft, 2002). Given the wide variety of measures of failure, a consensus for its definition seems implausible. The variety in definitions of IS failure also expose a more general problem of technology evaluation (i.e., how do we measure success?) (DeLone & McLean, 1992; Wilson & Howcroft, 2002).

Despite the differing theoretical explanations, failures continue to surface within the practitioners' literature and IT management continue to face difficulties in achieving the intended implementation. While firms have multiple objectives in installing a system, the ultimate, shared objective is for individual users to accept and faithfully use the system (Chin, Gopal & Salisbury, 1997), thus, realizing the benefits for the organization that were anticipated from the introduction of the technology.

'Failure' does not mean that a system needs to be abandoned altogether, or that it is even falling apart, but simply implies that a system is not being used as it was intended. Markus and Keil (1994) suggest that the prevention of an unused/underused system is critical to any IS success. Systems typically remain unused or underused if the end-users do not perceive them to be useful (Markus & Keil, 1994; Davis et al., 1989; Venkatesh, 2000). Any failure to meet expectations is another key theme in the literature (e.g., Lyytinen & Hirschheim, 1987). Hence, failure does not hinge on the technical functioning of the system, and can occur even when the technical system has performed as its designers intended (Dutton et al., 1995).

The lack of success of approximately 30 percent of new IS, by either failing to improve organizational processes or by being underutilized, continues to be a major concern for organizations (Markus & Keil, 1994; Johansen & Swigart, 1996; Moore, 1991). To lessen the risk of a failure of an IS, organizations must be able to accurately predict the outcome of their IS development efforts (Davis & Venkatesh, 2004). The earlier a prediction can be made in the development stages of an IS project, the more likely can changes be made to facilitate a successful system. Several researchers have advocated the early evaluation of an IS in its developmental stages (Alavi, 1984; Davis & Venkatesh, 2004), while others have suggested approaches for this evaluation (Davis, et al., 1989).

One path of research that has sought to understand success measures focuses on technology acceptance and subsequent use. One of the dominant research perspectives within the technology acceptance literature relies on the Technology Acceptance Model (TAM). The TAM, first presented by Davis (1989) argues that, during use of a system, the users make assessments about its ease of use and usefulness. If the system is easy to use and useful, then the user is more likely to have a positive attitude toward the system, which will result in an intention to use, and greater use of the system. While other researchers have investigated other outcomes (including

satisfaction) and external variables that affect perceptions of the system, fundamentally, the TAM is focused on ascertaining whether or not the system delivers with respect to ease of use and usefulness.

In the following section, the factors that indicate the users' intention to use/adopt a new IS (early detection) are demonstrated by briefly describing current challenges faced by organizations. Second, Davis's TAM is presented. Finally, user-participation and user-satisfaction are explored.

User-Acceptance of Information Systems (IS)

Issues and Challenges

Organizations allocate large resources to the IS development process with an intention to gain greater efficiencies and a reasonable return on investment. Unfortunately, many of the development efforts are unsuccessful, resulting in inferior systems that are less than effective. Conversely, potentially effective systems may not be embraced by the intended system users (Jiang et al., 1998; Markus & Keil, 1994).

Earlier research has suggested that a behavioural intention to use the system is a reasonable indicator of future system usage (Davis et al. 1989; Jackson et al., 1997; Venkatesh, 1999). The literature also suggests that the determination of the factors that affect behavioural intention to use a system is important to understand their role in the successful implementation of an information system (Jackson et al. 1997). IS researchers recognize that the user's acceptance of a system as a major objective of system implementation and the organizational change it entails. Thus, a variety of perspectives have been adopted to explain user-resistance and different strategies have been suggested to promote system acceptance (Jiang et al., 2000).

As discussed above, non-acceptance by the users may render even a technically sound system unused or underused. A company that has paid for an unused IS loses on the opportunity cost in terms of time and money. Despite significant technological advances and increasing organizational investment in these technologies, the problem of underutilized systems plagues businesses (Johansen & Swigart 1996; Moore, 1991). In an example used by Venkatesh (2002), the Internal Revenue Service (IRS) invested about $4B on a system aimed at simplifying the processing of tax returns for 1996 by computerizing the process. In early-1997, however, the reports indicated that the IRS was forced to revert to the manual method of processing returns. In this case, and in others, users found the system to be too difficult to use and were unable to clear the hurdle to begin user-acceptance and usage of the new system (Venkatesh, 1999). Markus and Keil (1994) suggested three factors: 1) ease of use, 2) implementation efforts by line staff to ensure the system is used, and 3) bad system design which is tied into usefulness of the system, to lead to unused or under-utilized systems. To further demonstrate the importance of user-acceptance, Lee et al. (1995) suggested that user-acceptance not only leads to utilization of the system, but also creates higher end-user job satisfaction.

In summary, earlier research has studied the impact of users' internal beliefs and attitudes on usage behaviour (Ives, Olson, & Baroudi, 1983; Swanson, 1974), and how these internal beliefs and attitudes are, in turn, influenced by various external factors, including user-participation (Kenneth, et al., 2002; Swanson, 1974); the type of system development process used (Alavi, 1984); the nature of the implementation process (Ginzberg, 1978); and past experience (Martins & Kambil, 1999).

Technology Acceptance Model (TAM)

Several theoretical models have been employed to study user-acceptance and usage behaviour of emerging information technologies (Davis et al. 1989; Delone & McLean, 1992;

Venkatesh et al., 2003). While many of the models incorporate perceived ease of use as a determinant of acceptance, the TAM (Davis, 1989) is the most widely-applied model of user-acceptance and usage. TAM is adapted from the Theory of Reasoned Action (TRA) (Ajzen & Fishbein, 1980; Fishbein & Ajzen, 1975), which is a widely accepted model from social psychology, concerned with the determinants of consciously-intended behaviour intention to perform a behaviour. Behaviour intention is jointly determined by the person's attitude and subjective norm concerning the behaviour in question. TRA is a general model and, as such, does not specify the beliefs that are operative for a particular behaviour. TRA further asserts that any other factors that influence behaviour do so only indirectly by influencing attitudes, social norms, or their relative weights. Thus, variables such as system design characteristics, user characteristics (including cognitive style and other personality variables), task characteristics, nature of the development or implementation process, political influences, organizational structure and so on, fall into this category. Fishbein and Ajzen (1975) refer to these as external variables. Thus, TRA is implied to mediate the impact of uncontrollable environmental variables and controllable interventions on user behaviour. TRA captures the *internal* psychological variables through which numerous *external* variables studied in IS research influence user acceptance.

A key purpose of TAM is to provide a basis for tracing the impact of external factors on internal beliefs, attitudes, and intentions. TAM does not include TRA's subjective norm as a determinant of behaviour intention, as Fishbein and Ajzen acknowledge, which is one of the least understood aspects of TRA. To understand behaviour intentions with respect to technology, TAM posits that two specific beliefs: perceived ease of use, and perceived usefulness, determine one's behavioural intention to use technology, which is linked to subsequent behaviour (Taylor & Todd, 1995). Attitude towards using a technology was omitted by Davis et al. (1989) in their final model because of the partial mediation of impact of beliefs on intention by attitude, a weak but

direct link between perceived usefulness and intention. This is explained as originating from people who intend to use a technology because it is useful even though they do not have a positive attitude, which provides a better understanding of the influence of perceived ease of use and perceived usefulness on the key dependent variable of interest – intention. Further, TAM proposes that perceived ease of use is a determinant of usefulness since the easier technology is to use, the more useful it can be.

Perceived usefulness and ease of use measures are meant to be fairly general determinants of user-acceptance. Davis et al. (1989) described these measures in a general way so that they could be readily applied to different CBIS and user populations. Usefulness and ease of use are also distinct but related constructs (Davis et al., 1989). Usefulness can be affected by various external variables over and above ease of use. For example, consider choosing between two graphics software programs that are equally easy to use. If one produces higher quality graphics, it would likely be seen to be a more useful system despite the ease of use parity. The crucial point is to understand the factors that drive users to accept systems and, more importantly, to understand how managers can manipulate the environment to affect the determinants and consequently achieve higher user-acceptance results.

1) Perceived Ease of Use

Perceived ease of use refers to the degree to which the prospective user expects the target system to be free of effort (Davis, 1989). The easier a system is to interact with, the greater should be the users' sense of efficacy (Bandura, 1982) and personal control (Lepper, 1985) regarding their ability to carry out the sequences of behaviour needed to operate the system. Efficacy is thought to operate autonomously from instrumental determinants of behaviour (Bandura, 1982), and influences affect, effort persistence, and motivation due to inborn drives for competence and self-determination (Bandura, 1982). The key paradigm upon which the ease of

use construct is based is self-efficacy theory (Bandura, 1982). Bandura defines self-efficacy as "...judgments of how well one can execute courses of action..." which provides a basis for the definition of perceived ease of use (Davis, 1989). Bandura argues that the primary source of information used to form self-efficacy judgments is direct experience performing the target behaviour, which he refers to as "enactive attainments." Gist and Mitchell (1992) similarly emphasize the importance of exposure to a task via direct behavioural experience for forming strongly-held, stable, and accurate self-efficacy beliefs. In the context of computer use, Gist et al. (1992) explicitly define software self-efficacy as being based upon direct hands-on experience. Unlike perceived usefulness, perceived ease of use is expected to require direct experience to become well-formed and thus, will not be stable over time if non-interactive mock-ups are used. Conventional wisdom suggests that actually performing (or attempting to perform) a behaviour is a prerequisite for accurately judging how easy or difficult it is, and theory and research bear this out (Venkatesh, 2000). Theoretical and empirical evidence suggests that before hands-on experience, user perceptions about ease of use would be anchored to various general computer beliefs about computer use, and that after direct experience, ease of use perceptions would be adjusted to reflect various aspects of the experience (Venkatesh, 2000). External variables are theorized to be sole contributors affecting the perception of ease of use (Davis et al, 1989).

2) Perceived Usefulness

Perceived usefulness is defined as the prospective users' subjective probability that using a specific application system will increase their job performance within an organizational context (Davis, 1989). Kieras and Polson (1985) suggest that users possess distinct knowledge about their job situation, which they use as a basis for determining what tasks can be performed with a given system. Robey (1979) theorized that *"A system that does not help people perform their jobs is not likely to be received favourably in spite of careful implementation efforts."* This was also demonstrated by Markus and Keil (1994) in a case study where a system failed to solve the

company's problem, despite its technical soundness and attention to the "human factor". In their analysis, the authors found that sales reps were not motivated to do what the system enabled them to do. To make matters worse, using the system made it harder for sales reps to do what they were motivated to do. Therefore, due to the lack of perceived usefulness of the system, the system was rendered unused. Within an organizational context, people are generally reinforced for good performance by raises, promotions, bonuses, and other rewards (Vroom, 1964). A system high in perceived usefulness, in turn, is one in which users believe in the positive user/performance relationship (Davis, 1989). Goodhue and Thompson's (1995) technology-to-performance chain model combined insights from research on user attitudes as predictors of utilization with insights from research on task-technology fit as a predictor of performance. Task-technology fit theory suggests that information systems affect performance depending on the fit or correspondence between the task requirements of the users and the functionality of the system. Task-technology fit theory also suggests that the impact on performance depends on the fit between individual characteristics of users and the functionality of the system. The basic argument of the model is that, for an information technology to have a positive impact on individual performance, the technology must fit with the tasks it is supposed to support, and it has to be used (Goodhue & Thompson, 1995). Thus, those systems that have a good technology-task fit will be perceived to be more useful than others. From this perspective, Davis (1989) used a questionnaire to measure perceived usefulness and perceived ease of use. The survey contained two measures of technology-task fit: 1) a facets-of-fit measure, and 2) a predicted-outcomes measure. Specifically, the six ease-of-use questions, for example: *"I would find <application> easy to use*" ask about one aspect of facets-of-fit, namely ease of use. In contrast, the six perceived-usefulness questions, for example: *"Using <application> in my job would increase my productivity"* ask respondents to assess technology-task fit based on predicted outcomes.

User-Participation

User-involvement has been used interchangeably with user-participation in virtually all prior research. Barki and Hartwick (1989), based on research in psychology, marketing, and organizational behaviour, argue for creating a distinction between user-participation and user-involvement. User-participation refers to "the behaviour and activities that the target users or their representatives perform in the systems development process." User-involvement is "a subjective psychological state of the individual," that depends on the importance and personal relevance that users attach to a particular system or to IS in general. Based on this distinction, Lin and Shao (2000) suggest that user-participation directly leads to acceptance. Research has shown a positive relationship between user-participation and user-acceptance (Lin & Shao, 2000; Davis & Venkatesh, 2004).

User-participation in IS development has long been considered as a critical factor in achieving system success, dating to the initial work of Swanson (1974). Traditional theories of participative decision-making and planned organizational change suggest that user-participation may lead to an increase in perceived usefulness. In contrast, some of the process literature (Newman & Noble, 1990) suggests the opposite; that is, that increased user-participation during application development may actually result in conflict and lead to a reduction in perceived usefulness. In general, user-participation is believed to increase user-acceptance by improving communication, facilitating the development of realistic expectations, creating a sense of ownership, and engendering user-support and commitment to change (Ives & Olson, 1984).

In the organizational behaviour literature, little consensus has been reached concerning a definition of participation (Locke & Schweiger, 1979; Vroom & Jago, 1988). Vroom and Jago (1988) note that, in everyday terms, participation refers to "taking part". They go on to suggest that, typically, one participates when one has contributed to something. Such participation can

take a variety of forms: direct (participation through personal action) or indirect (participation through representation by others); formal (using formal groups, teams, meetings, and mechanisms) or informal (through informal relationships, discussions, and tasks); performed alone (activities done by oneself) or shared (activities performed with others) (Locke & Schweiger, 1979; Vroom & Jago, 1988).

Barki and Hartwick (1994) identified and validated three statistically distinct dimensions of user-participation: overall responsibility, the user-IS relationship, and hands-on activity. Overall responsibility refers to user activities and assignments reflecting overall leadership or accountability for the system development project. Examples include being the leader of the project team, having responsibility for the overall success of the system, and being responsible for selecting hardware or software, estimating costs, requesting funds, etc. The user-IS relationship refers to development activities reflecting user-IS communication and influence. Examples include the initial evaluation and approval of a formal agreement of work to be done by the IS staff, being kept informed by the IS staff during various stages of IS development, and the evaluation and approval of work done by the IS staff. Hands-on activities refer to specific physical design and implementation tasks performed by users. Examples include defining screen layouts and report formats, creating user procedure manuals, and designing a user training program (Hartwick & Barki, 1994). While these three constructs may be viewed as conceptually distinct, they are likely to be empirically related. Users who engage in one set of participative behaviours are also likely to engage in the other two sets of behaviour. Individuals who are active in the system development process are likely to develop a belief that the system is both important and personally relevant, and the feeling that the system is good (Hartwick & Barki, 1994). In other words, user-participation influences user-involvement. Users who participate will likely influence system attributes in accordance with their personal needs and desires (Robey & Farrow, 1982), resulting in a system they perceive as being important, personally relevant, and good.

End-User Satisfaction

End-user satisfaction is the extent to which users believe the system meets their information requirements (Ives et al., 1983). End-user computing satisfaction is conceptualized as the affective attitude towards a specific computer application by someone who interacts with the application directly. It can be evaluated in terms of both the primary and secondary user roles. User information satisfaction, especially of the information product, focuses on the primary role and is independent of the source of information (i.e. application). Secondary user satisfaction varies by application and depends on an application's ease of use (Doll & Torkzadeh, 1988).

Satisfaction has been on the IS research agenda for decades. It appeals to both scholars and practitioners with its theoretical and practical significance. Early IS researchers, e.g. Ives, Olson, and Baroudi (1983), examined user satisfaction as a function of system characteristics. Satisfaction is frequently used as a surrogate for IS success as it is linked to the success construct in a number of conceptual and empirical aspects (Bailey & Pearson, 1983). It also enjoys a higher degree of face and convergent validity, compared to other common success proxies such as usage and perceived usefulness (Khalifa & Liu, 2004). As discussed earlier, usage is not an appropriate measure when it is mandatory. End-user satisfaction is significantly related and relevant to performance (Gelderman, 1998), and therefore, it has gained its place as a reliable tool for evaluating IS (Baroudi & Orlikowski, 1988). The increased use of end-user satisfaction measurement in companies, as an indicator of system effectiveness, is a move away from earlier measurements of efficiency indicators (Gatain, 1994).

Much research has been done on the relationship between the success of an IS and the satisfaction of the people who use them. Nevertheless, many studies report inconsistent or contradictory results. Despite inconclusive findings, the relationship between user-satisfaction and IS success has great appeal (Woodroof & Kasper, 1998). Mahmood et al. (2000) proposed an

integrative theoretical framework for the instrument development of end-user satisfaction. They compiled results from studies conducted in 1986 to 1998 and reconciled their differences in conceptualization, methodology, analysis techniques, and sample characteristics. Results of the meta-analysis indicated that end-user satisfaction is mainly affected by perceived benefits, and user background, among other factors. Perceived benefits was measured by ease of use and perceived usefulness. User background was determined by user-experience, user-skills and user-involvement/participation.

TAM, End-User-Satisfaction, and User-Participation

The TAM has been supported by a number of studies replicating and modifying the instrument (Doll et al., 1998; Jackson et al. 1997; Taylor & Todd, 1995), and continues to be adapted to a variety of settings. The constructs of ease of use and usefulness are depicted as having a direct effect on intentions concerning the technology. In other words, individuals would rely on their perceptions of usefulness, as well as ease of use to form their intentions. These intentions are fair predictors of acceptance behaviour (Davis et al. 1989). Although a consensus seems to exist on the internal measure of TAM (i.e., ease of use and usefulness) in determining intention to use, a division is seen in the determinants of success. End-user acceptance of the IS is considered as a determinant of its success or failure by many researchers (Davis et al. 1989; Dalcher & Genus, 2003; Hartswick & Barki, 1994). End-user IS acceptance is the willingness of an individual or a group to utilize IS. Acceptance is a subjective attitude, and therefore, is not easily measured (Lee et al., 1995). To operationalize user-acceptance, researchers in the field have identified several indicators including system usage and end-user satisfaction. Many scholars agree that users' intention to use the system is significantly correlated with the actual usage, which, in turn, is a good indicator of acceptance of an IS (Davis et al., 1989; Jackson et al. 1997). System usage, however, which has been regarded as a measure to predict the success of an IS, is not considered as a reliable measure since, in most organizations, usage of IS is mandated

(Adamson & Shine, 2003; DeLone & McLean, 1994). Consequently, users' initial intention to use the system may not be correlated to users' actual usage because of the mandated environment. User-satisfaction is one of the most frequently used measures of the success of an IS system. End-user satisfaction is likely to lead to acceptance, and subsequently, to increased usage, thus justifying the systems' costs by improving productivity (Dalcher & Genus, 2003; Doll & Torkzadeh, 1988). IS satisfaction is assumed to be a good substitute for objective determinants of information success. Lee, Kim and Lee (1995) found that system utilization is positively related to end-user IS satisfaction. These authors also found a positive and significant relationship between end-user acceptance and end-user IS satisfaction. Therefore, users' initial perception of satisfaction with an IS should reflect their future usage of the IS.

Traditional theories of participative decision-making and planned organizational change suggest that user-involvement may lead to an increase in perceived usefulness. Jackson, Chow, and Leitch (1997) proposed that user-participation is positively related to perceived usefulness, since those who participate may be better able to influence system attributes to serve their needs. This proposition is supported by Robey and Farrow (1982) and Swanson (1974), who showed a positive relationship between user-participation and users' "perceived influence" and appreciation, respectively. Evidence from the process literature suggests that influence can lead to increased perception of usefulness. Therefore, participation should lead to a higher perception of usefulness of the IS.

As discussed earlier, users' perception of ease of use comes from direct hands-on experience, and in the absence of that, from the users' past experience. The importance of direct hands-on experience in forming ease of use perceptions is also supported by theoretical perspectives used to examine the role of direct experience in forming usefulness judgements

(Davis & Venkatesh, 2004). In summary, user-participation affects perceived usefulness as well as perceived ease of use.

The literature shows that usefulness and ease of use are also affected by prior experience (Taylor & Todd, 1995). Nevertheless, no literature can be found on how satisfaction with existing IS may mediate perceived usefulness and perceived ease of use of new systems. Satisfaction is a good measure of a system's success (McGill et al., 2003). It is highly likely that users will carry their past experience with IS while determining their perception about the new IS, especially when the new system may not be physically present. Research on decision-making suggests that users tend to use their experience with one member of a category in making judgements about the whole category (Kahneman & Tversky, 1973). The marketing literature is abundant with research proposing that past satisfaction with products or services leads to intention of repurchase (Kumar, 2002). The same theory may also be applied to IS. A positive satisfaction with current/past IS will lead to intention to accept new IS. Kumar (2002) argues that overall satisfaction has a significant impact on repurchase intent of IS products, which also implies that users who are satisfied with the IS have a positive intention to buy more IS.

To conclude, end-user satisfaction is a function of perceived usefulness and perceived ease of use. Perceived ease of use and perceived usefulness, in turn, are influenced by user-participation. Users' prior satisfaction with IS influences users' intention to use IS, and intention to use IS is a function of perceived usefulness and perceived ease of use (Davis, 1989). Therefore, satisfaction with current IS is expected to influence perceived usefulness and perceived ease of use of proposed IS.

CHAPTER THREE:
RESEARCH MODEL AND HYPOTHESES

Introduction

Having described the problem and established the relevance of user acceptance of IS, the methods for establishing a relationship between user participation and prior satisfaction with usefulness and ease of use are described. The research model for this study posits that current user satisfaction with IS and user participation act as independent variables that determine users' perception of ease of use and usefulness, which, in turn, influence users' acceptance. User acceptance is measured by end-users' perceived satisfaction with the new IS.

Conceptual Model

Figure 1 illustrates the relationship between current satisfaction with IS in general, perceived ease of use, perceived usefulness, and perceived satisfaction with new IS. In the context of perceived satisfaction with the new IS, this model proposes that a significant portion of the variance in perceived satisfaction can be explained by perceived ease of use and perceived usefulness. This framework is consistent with Davis' Technology Acceptance Model (TAM). Rather than measuring the outcome as intent to adopt, as in the TAM, this study measures outcome as the level of perceived satisfaction (as discussed in Chapter 2). Furthermore, in the model (Figure 1), variance in perceived usefulness and perceived ease of use is caused by current satisfaction with IS in general.

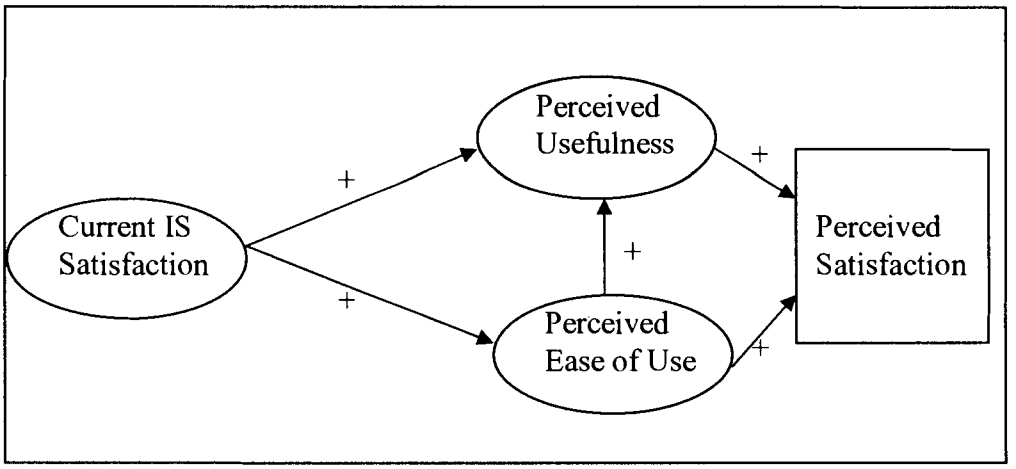

Figure 1: Conceptual Model Part 1

The effect of user involvement on perceived ease of use and perceived usefulness is illustrated in Figure 2. As described in Chapter 2, user participation has been well researched and documented as an antecedent of perceived ease of use and perceived usefulness. This research attempts to validate the earlier findings for a unique environment where users have an understanding that the new IS will be an interface over the existing IS.

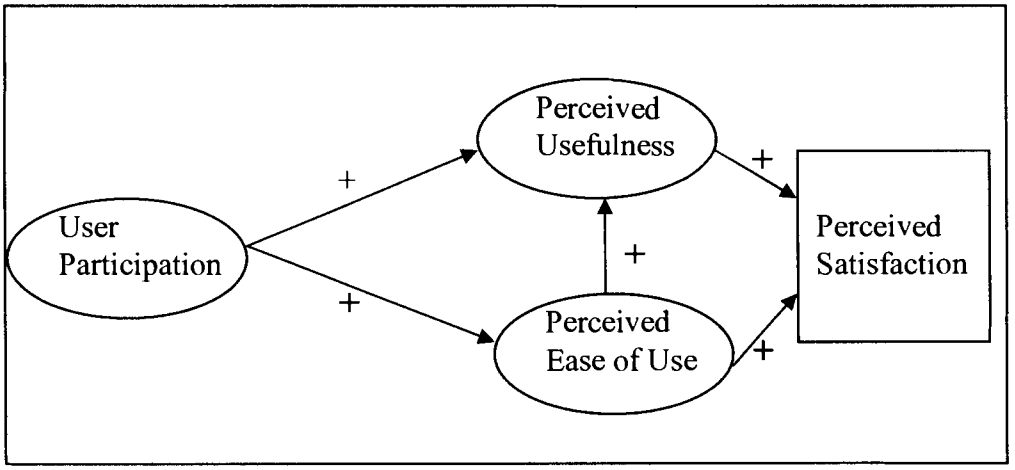

Figure 2: Conceptual Model Part 2

Hypotheses

The purpose of this study is to find whether or not user participation affects perceived usefulness, and perceived ease of use. Also, this study seeks to find if prior satisfaction of end-users with IS mediates their perception of usefulness and ease of use of new IS. Based on the model in Figure 3, several directional hypotheses were tested.

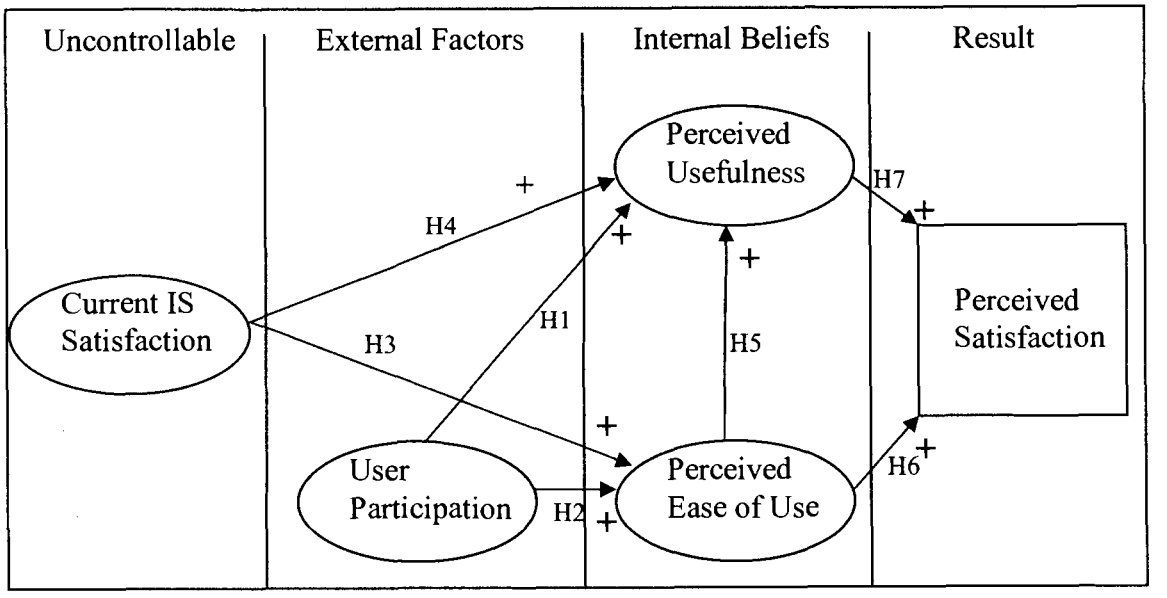

Figure 3: Hypotheses

Based on prior research on user participation and users' perception of ease of use and usefulness, higher user participation is expected to have a higher perception of the systems' ease of use and its usefulness. In other words, users involved in the development of the IS are expected to have a higher perception of its ease of use and its usefulness. The users' participation is regarded as the independent variable and perceived ease of use and perceived usefulness are the dependant variables.

Hypothesis 1: Higher user participation will lead to higher perception of usefulness.

Hypothesis 2: Higher user participation leads to perception of greater ease of use.

Users' perception of a new IS's ease of use and its usefulness is directly proportional to their existing satisfaction with the current IS. Users who are satisfied with their current IS are expected to perceive the new IS to be easier to use and more useful. The following hypotheses are based on prior, well-acknowledged marketing literature, that states that a positive customer's satisfaction has a positive affect on the customer's repeat purchase behaviour (Kumar, 2002; Oliver and Swan, 1989). Hence:

Hypothesis 3: A positive current IS satisfaction level with a similar IS will lead to a higher perception of ease of use.

Hypothesis 4: A positive current IS satisfaction level with a similar IS will lead to a higher perception of usefulness.

In revalidating Davis' Model (1989), this research expects to find a positive relationship between perceived ease of use and perceived usefulness with user acceptance. User acceptance in this research is operationalized as perceived satisfaction with the new IS. This differs from Davis' (1989) original research where intention to use the IS was a measure of system acceptance. As discussed earlier, satisfaction is a more reliable measure than usage in an environment where the system use is mandated. Also, consistent with Davis' (1989) work, perceived ease-of-use is expected to influence perceived usefulness.

Hypothesis 5: The higher the perception of ease of use, the higher is the perception of usefulness.

Hypothesis 6: The higher the perception of ease of use, the higher is the perception of satisfaction with the new IS.

Hypothesis 7: The higher the perception of usefulness, the higher is the perception of satisfaction with the new IS.

Background Information

Company Background

The context for this research is one of the largest telecommunication companies in Canada. The company maintains nearly 5 million access lines and provides Internet access to almost 1 million subscribers (including 690,000 DSL customers). The company's wireless branch serves almost 4 million mobile phone customers nationwide. This research focuses on Customer Facing Business Units (CFBU) of the companies wired business.

Process Background

For customers requesting the company's wired services with ADSL or fibre cables as the medium of transport for the services, an inquiry is initiated internally within the company to estimate the cost of the service, time duration within which the service can be provided, and the feasibility for providing the service at the requested location. Thus, if a customer requires a service (i.e., high speed Internet), which requires to be transported over fibre cables in any region in Canada, the Customer Facing Business Units (CFBU) initiate an internal inquiry to provide customers with the feasibility, cost (if any is to be borne by the customer), and the time duration to provide the service. This information is generated through different groups within the company that may include, but is not limited to, engineering, design, transport, planning, etc, which are referred to as the downstream groups. The involvement of these groups depends on the type of service being requested and the geographic region. After receiving the result of the inquiry from the downstream groups, the CFBU forwards the information to the customer for review. This whole information gathering process is termed a pre-qualification process. Once

the customer makes the final decision, a contract is signed between the customer and the company and the inquiry is now turned into a "firm" order (i.e., the inquiry is now a firm order placed by the customer). This contract is an official document prompting the company to start the actual work. Work may require laying new fibre lines, designing new circuits, modifying existing network etc.

Inquires are initiated by the CFBU by inputting information into various IS, depending on the medium over which the service is to be carried (T1, ADSL, Fibre) and the region (BC, Alberta, Quebec, Ontario, or other provinces). The IS supporting the pre-qualification process were developed at different points to support a de-centralized and unique process. The IS were also built on various platforms ranging from Microsoft-Access, Web-based, to main frame systems. As a consequence, the look and feel, the kinds of information required, and the terms used are system-centric and highly varied. Thus, the processed information that flows from the systems is non-standardized.

The Issues

Several issues exist within the existing applications. Employees under the CFBU are required to learn the different systems and the unique processes. The system used for submitting an inquiry depends on the location and services; however, many exceptions can be found to the rule. Therefore, employees need to have a good understanding of the systems and of the inquiry process to avoid delays in the prequalification process. The results from the inquiry are also presented in a format that is system dependent.

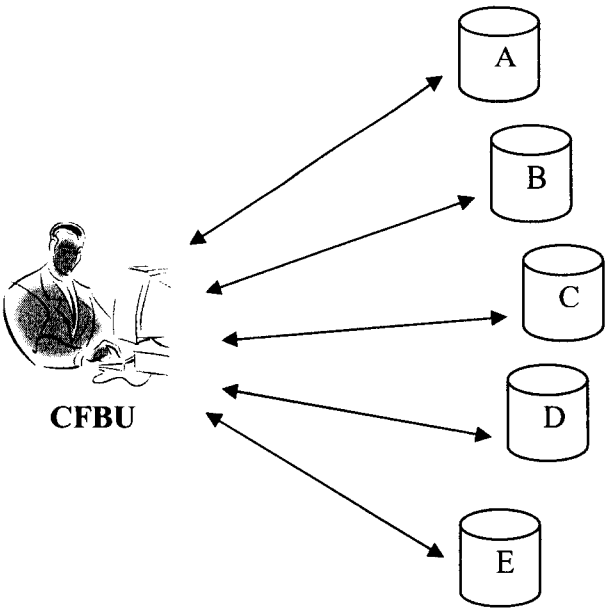

Figure 4: Multiple Applications and Multiple Interfaces

Once the CFBU initiates the inquiry, the status of the inquiry is not transparent until the time of its completion when the creator of the inquiry receives notification via email. Consequently, when a customer calls to check on the status of their request, the CFBU usually has to make an educated guess. This leads to additional frustration among employees. One of the directors of the CFBU said:

"I have employees who are so frustrated with the process that they are ready to leave their job"

The Solution

To solve some of the problems of the prequalification process, the PreQual Service Interface (PSI) was built. The PSI is a Web-based application that interfaces with multiple prequalification applications and provides a single interface to the CFBU. It also interprets the replies from the downstream groups in a standardized format for the CFBU. An instantaneous status is provided for inquires initiated, thus creating transparency. Also, the training time is

expected to be reduced since employees will need to learn only a single system, the PSI, instead of the existing multiple applications. Furthermore, the PSI determines the back-end system through which the inquiry must go, based on the matrix logic after the CFBU selects the service and region. The PSI provides a single interface for all inquires and enhances the capabilities that are currently lacking in the applications.

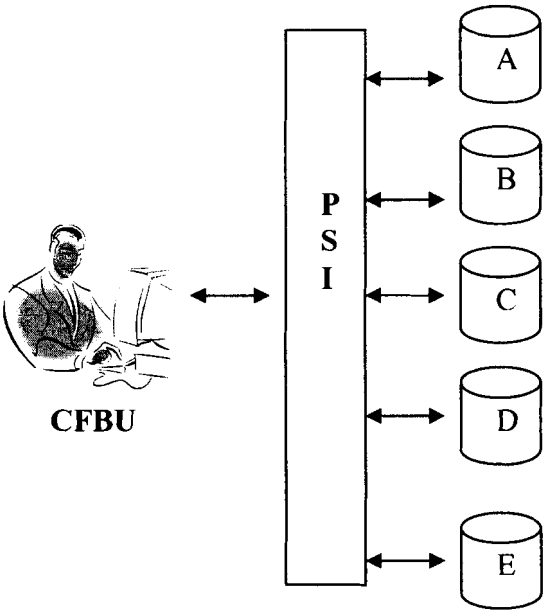

Figure 5: Multiple Applications and a Single Interface (PSI)

A proto-typing approach was used during the development of the application. Volunteers representing different interest groups within the CFBU were involved during the development of the application. Approximately 30 front-line users were involved in the development process. Weekly meetings were scheduled between the developers and the user groups, that were encouraged to perform daily work tasks using the PSI, to the fullest extent, to verify that it met the requirements and specifications of the user group. The application was modified upon request from the user group. The PSI is scheduled to be launched on 27 June, 2005 for all employees under the CFBU. To collect data for this research study, a questionnaire was developed.

Participants

The target sample of the survey was all company employees from the CFBU throughout Canada. Approval from the institutional ethics board was obtained. The specific company was chosen because a new IS was about to be launched there, making the company appropriate for collecting data. Also, the researcher was an employee of the company at the time of the study and the study was expected to contribute towards the knowledgebase of the company. The survey covered the period from 9 June 2005 to 9 July 2005 and 1,100 employees were invited to participate in the survey. During the period, 149 completed responses were received.

Research Design

An online survey was chosen as the method for collecting data because of the demographics of the participants. All participants had access to the company's Intranet where the survey was published. Participants were not located at a single geographic location, making any other form of survey less practical. Consequently, the online survey was appropriate as it was free from geographical constraints.

Programming of the online survey followed the recommendations of Dillman (2000). To ensure the representation of all end-user groups, invitations to complete a survey were sent to all end-users who were expected to interact with the new IS (the PSI). Permission to post an invitation to end-users was granted by the company's Communication Department. Non-response errors are nearly impossible to control for in an online survey since participation is self-selected. To offset this limitation, the survey was programmed to record the numbers of those who declined to participate after connecting to the survey. The first page of the survey informed the participants about the purpose and procedures of the study, provide contact information of the investigators, and assure confidentiality and anonymity to obtain informed consent.

The questionnaire had four sections. The first section measured the end-users' satisfaction with computing systems, measured by the extent to which users believe the system meets their information requirements (Ives et al., 1983). IS satisfaction is assumed to be a good substitute for objective determinants of IS success. Several instruments have been developed to measure user IS satisfaction (Bailey and Pearson, 1983; Ives and Olson, 1984). In this study, the 12-item end-user computing satisfaction scale developed by Doll and Torkzadeh (1988) was employed, which was developed and validated especially for the computing end-user community. The scale is comprised of five components related to user information satisfaction (content, accuracy, format, ease of use, and timeliness). Response options, anchored on a seven-point Likert-type scale, range from (1) almost never to (7) almost always. The measure is used twice in the questionnaire. It is first used to measure end-users existing level of satisfaction with the current IS. The measure is again used in the last section (Section 4), to measure the level of end-users' perception of satisfaction with the new IS.

The second section of the questionnaire is to measure the level of users' participation in the development of the new system. Three dimensions of user participation: Overall Responsibility, User-IS Relationship, and Hands-on Activity, were assessed in the study. The three dimensions were operationalized with six-, seven-, and five-item scales, as developed by Barki and Hartwick (1994).

The TAM, originally developed by Davis (1989), was used to measure the perceived ease of use and perceived usefulness of the IS in the third section of the questionnaire. The 4-item scale/construct, from the original TAM, as proposed by Davis et al. (1989), was used. The usefulness and ease of use items were measured with 7-point scales having likely-unlikely endpoints and the anchor points extremely, quite, slightly, and neither (identical to the format used for operationalizing TRA beliefs and as recommended by Ajzen and Fishbein 1980).

Minor adjustments were incorporated into the adopted scales to make it relevant to the current research. For example: "Learning to operate WriteOne would be easy for me" was changed to "Learning to operate PSI would be easy for me".

CHAPTER FOUR:
RESULTS

Reliability of Variables

The reliability of measurements scales was estimated using Cronbach's alpha. There were 5 scale variables: Current Satisfaction (12 items), Perceived Ease of Use (6 items), Perceived Usefulness (6 items), User Involvement (18 items) and Perceived Satisfaction (12 Items). The results are summarized in Table 1

Table 1: Cronbach's Alpha

Measure	Cronbach's alpha for the scale used
Current Satisfaction	.9055
Perceived Ease of Use	.9406
Perceived Usefulness	.9635
User Involvement	.93
Perceived Satisfaction	.9662

Cronbach's alpha for the 12-item Satisfaction scale was .9055 (prior satisfaction) and .9662 (perceived satisfaction). This is consistent with Doll and Torkzadeh's (1988) findings. The minimum standard of alpha > .80 is suggested for basic research and .90 is suggested for use in an applied setting where important decisions will be made with respect to specific test scores (Nunnally, 1978). Thus, the satisfaction scale is reliable for the purpose of the study. Further, the data is tested to measure the covariance of a 12-item scale with the criterion (single item overall satisfaction scale). The result: .498 (prior satisfaction measure) and .762 (perceived satisfaction measure)which is statistically significant beyond the 1 percent level.

Cronbach's alpha for perceived ease of use and perceived usefulness scales was found to be .96 and .94 for Davis'(1989), respectively. The User Involvement Scale was also highly reliable with a Cronbach's alpha of .93. These results suggest the scale variables satisfy the suggested minimum criteria.

Standardization of Variables

In this study, different scales were adopted to measure various attitudes, namely, Davis's scale was used to measure ease of use and usefulness, Doll and Torkzadeh's scale measured user's satisfaction, and Barki and Hartwick's scale measured user participation. Scale transformation procedures were used to standardize the different scales used in this study to make them comparable.

Analysis

This study seeks not only to find direct impacts of independent variables on dependant variables, but also, as an extension of the study, to find indirect effects of independent variables on perceived satisfaction (the final dependent variable). Path analysis is well suited to study these effects (Hair et. al., 1992). In the following section, a brief explanation of path analysis is provided followed by its application to this study, which is followed by a discussion of the results and hypotheses (Hair, et. al., 1992, p. 487-488).

Path Analysis

Path analysis refers to a framework for describing theories and can be particularly helpful in identifying specific hypotheses to test. Path analysis is based on calculating the strength of the casual relationships from the correlations or covariances among constructs.

The simple (bivariate) correlation between any two constructs can be represented as the sum of the compound paths of casual relationships connecting these points. A compound path is a path along the arrows that follows the following three rules.

1. After going forward on an arrow, the path cannot go backward again. Nevertheless, the path can go backward as many times as necessary before going forward.

2. The path cannot go through the same construct more than once.

3. The path can include only one curved arrow (correlated construct pair)

In path analysis, the terms "independent" and "dependent" variables are referred to as "exogenous" variables and "endogenous" variables. An exogenous variable has paths coming from it and none leading to it, excluding correlated construct pair. Similarly, an endogenous variable has at least one path leading to it. Figure 4 partially describes the study in a path diagram. With two exogenous constructs perceived EOU and perceived usefulness (X_1 and X_2), that are correlated, and one endogenous variable, perceived satisfaction (Y), the single casual relationship can be stated as:

$$\mathbf{Y = b_1X_1 + b_2X_2}$$

The path analysis rules allow the simple correlations between constructs to estimate the casual relationships represented by the coefficients b_1 and b_2. For ease in referring to the paths, the casual paths are labelled as A, B, and C. Casual Path A is a correlation between X_1 and X_2, Path B is the effect of X_1 predicting Y, and Path C shows the effect of X_2 predicting Y. The correlation if X_1 and Y can be presented as two causal Paths: B and A * C. The symbol B represents the direct path from X_1 to Y, and the other path (a compound path) follows the curved arrow from X_1

to X_2 and then to Y. Likewise, the correlation of X_2 and Y is composed of two causal Paths: C and A * B. Finally, the correlation of X_1 and X_2 is equal to A. This relationship forms three equations:

$$\mathbf{r_{x1x2} = A}$$
$$\mathbf{r_{x1y} = B + AC}$$
$$\mathbf{r_{x2y} = C + AB}$$

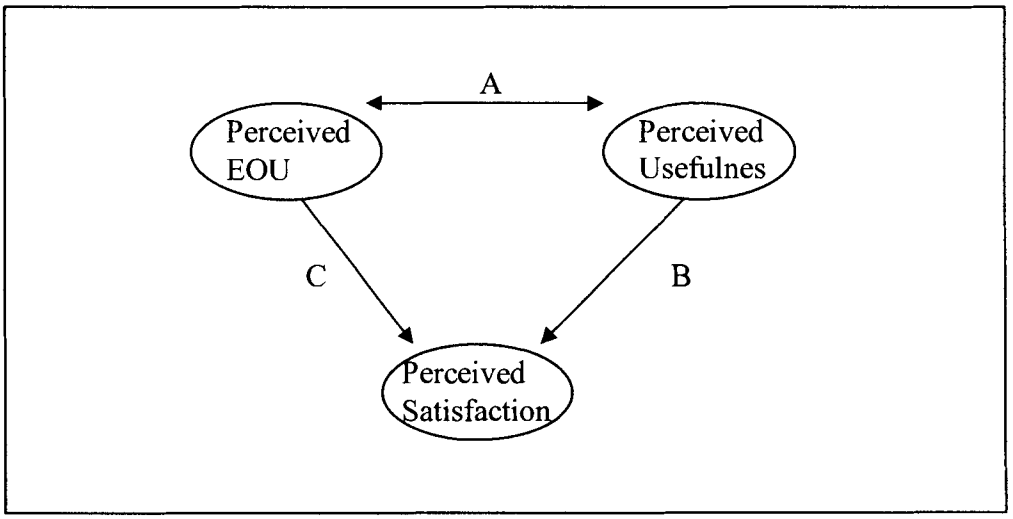

Figure 6: Path Diagram A

Figure 7 includes new Paths D and E to represent the effect of current satisfaction with IS predicting perceived EOU and perceived usefulness, respectively.

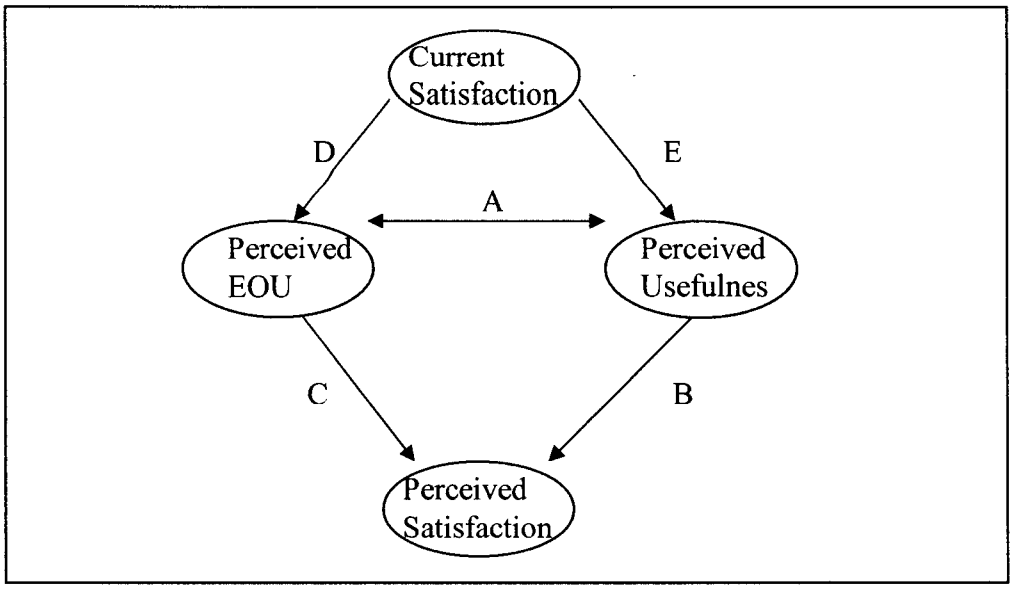

Figure 7: Path Diagram B

The value, r_{x1x2}, is calculated by using a single tail correlation test between X_1 and X_2. This value is substituted into the equations. By solving these equations, the other coefficients can be determined. The path coefficients are used to calculate t value to determine if the path is statistically significant. A t value above 1.96 is considered statistically significant at the 95% confidence level.

Applying Path Analysis

For simplicity, the explanation of the path analysis is divided into three sections. The first part tests hypotheses five (H5), six (H6) and seven (H7).

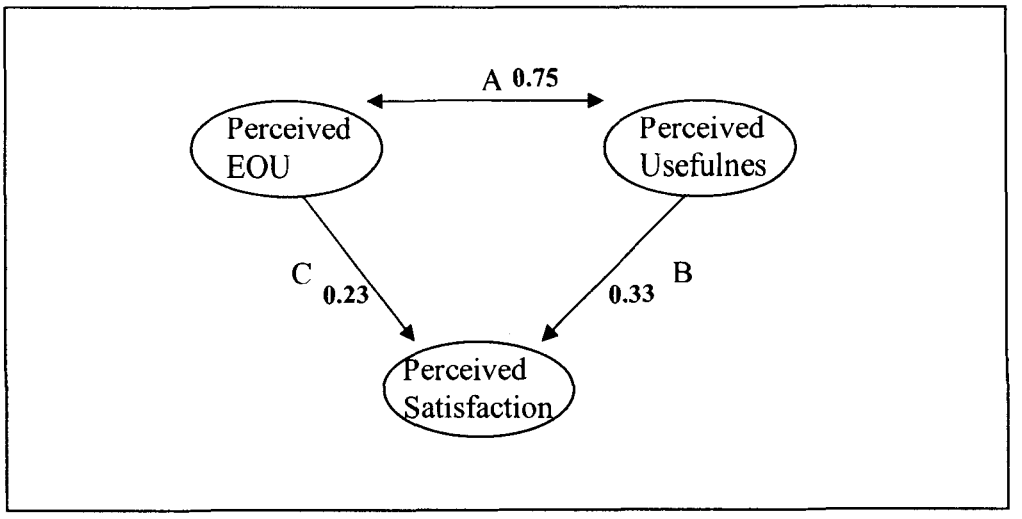

Figure 8: Path Coefficients (H5, H6, and H7)

Path coefficients are calculated for Paths A, B and C as 0.75, 0.33 and 0.23, respectively. The coefficients are calculated by solving the equations described earlier in the Path Analysis section. Using the coefficients calculated above, Student's t –tests are performed to test H5, H6 and H7. The Path A t-test is significant higher to support hypothesis five (H5). Path B is significant at a 95% confidence level and calculated to be 2.86. The t-test for Path C is 4.24, which is significant at a 99% confidence level. Thus, Hypotheses H5, H6, and H7 are supported and Davis' TAM model is re-affirmed. The results also confirm Davis' findings that perceived usefulness is a more important determinant of intention when compared to perceived ease of use.

Coefficients for Path D and Path E are calculated to be 0.18 and 0.07, respectively. H3 is supported at a confidence level of 95% with a t-test value of 2.21.

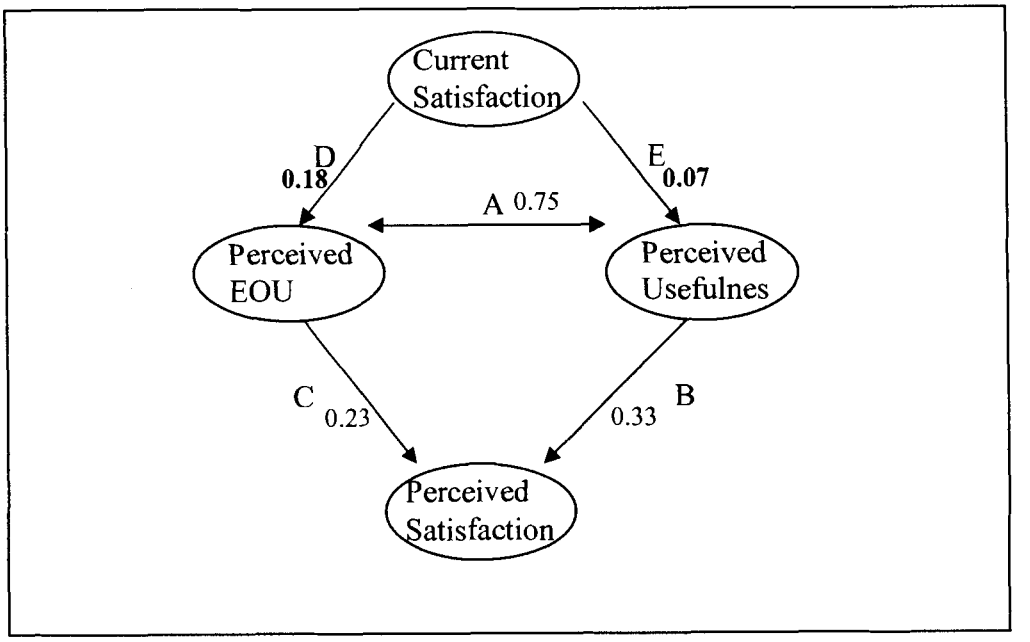

Figure 9: Path Coefficients (H3 and H4)

Even though the effect of current satisfaction on perceived EOU is significant, the variable is not found to have any indirect affect on the final measure of perceived satisfaction. This is consistent with Davis' findings that only perceived EOU and perceived usefulness are sufficient to predict users' acceptance of technology. The test of Hypothesis Four (H4) fails to support the suggested effect; hence, H4 is not supported.

The results of the hypotheses testing are interesting. Hypothesis one (H1), having a negative coefficient, is rejected, however, Hypothesis two (H2) is supported with a high coefficient of 0.35 and the t-test computed to be 4.53. Also of interest is the finding that user involvement has an indirect positive affect on the perceived usefulness through perceived ease of use.

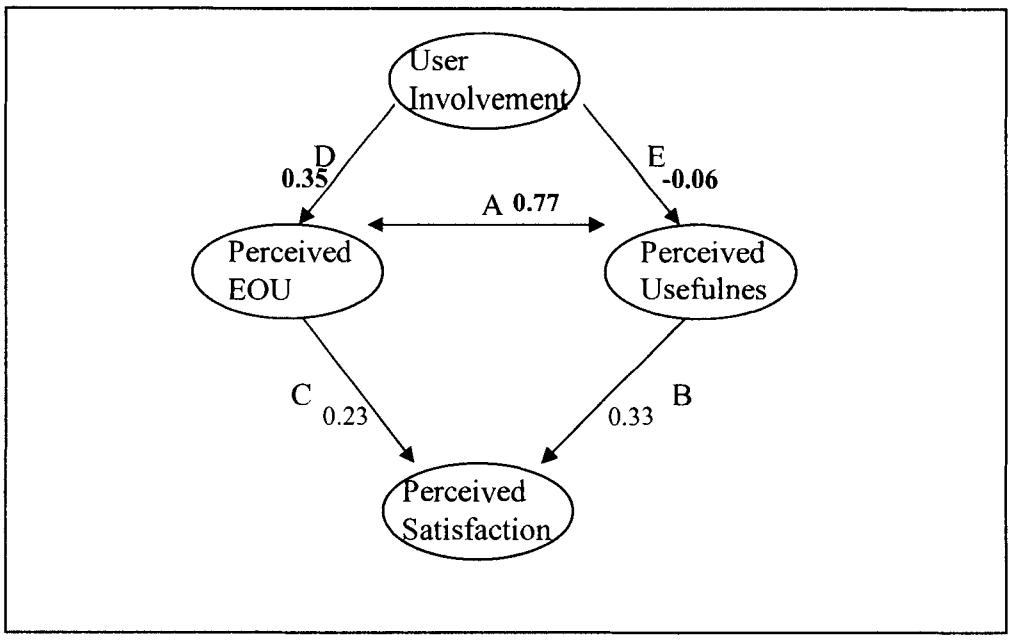

Figure 10: Path Coefficients (H1 and H2)

To summarize the findings, hypothesis two (H2), three (H3), five (H5), six (H6) and seven (H7) are supported, however, hypothesis one (H1) and four (H4) are not supported in this study.

Table 2: Hypotheses Summary

Hypotheses	Supported
Higher user participation will lead to higher perception of usefulness. **(H1)**	**No**
Higher user participation leads to perception of greater ease of use. **(H2)**	**Yes**
A positive current IS satisfaction level with similar IS will lead to higher perception of ease of use. **(H3)**	**Yes**
A positive current IS satisfaction level with similar IS will lead to higher perception of usefulness. **(H4)**	**No**
The higher the perception of ease of use, the higher is the perception of usefulness. **(H5)**	**Yes**
The higher the perception of ease of use, the higher is the perception of satisfaction with the new IS. **(H6)**	**Yes**
The higher the perception of usefulness, the higher is the perception of satisfaction with the new IS. **(H7)**	**Yes**

CHAPTER FIVE:
DISCUSSION AND CONCLUSION

Summary and Managerial Implications

The research results confirmed a positive relationship between users' current level of satisfaction with the existing IS, perceived ease-of-use, and perceived satisfaction. These findings indicate that users' current satisfaction with the existing IS positively affects the perception of ease-of-use for a new IS. Consequently, this study extends the existing research by linking current satisfaction level with perceived ease-of-use and perceived satisfaction.

As expected, and consistent with prior research (Davis and Venkatesh, 2004), user participation had a positive affect on users' perception of ease-of-use. This paper also confirms Davis' TAM (1989), which states that perceived usefulness and ease-of-use can predict and have a positive affect on users' intention to use the new IS. Consistent with H5, the perceived ease-of-use positively affected perceived usefulness. This result is again consistent with the TAM proposed by Davis (1989), where perceived usefulness was found to have prominence over perceived ease-of-use.

Although this study proposed that a positive relationship exists between current satisfaction level and perceived usefulness, the results did not confirm this idea. Interestingly, user participation and its positive affect with perceived usefulness, which is well documented in the literature (Davis and Venkatesh, 2004; Barki and Hartwick,

1989), was also not supported by these findings. Furthermore, even though current satisfaction level did not have any affect on perceived usefulness, an indirect positive effect of current satisfaction with the existing IS on perceived usefulness was noted by way of the effect of perceived ease-of-use. This result suggests that participants' knowledge of the nature of the new IS may influence its level of perceived usefulness. As discussed above, and contrary to prior research, user participation did not contribute towards the usefulness of the IS. These deviations from expected results may explain the participants' understanding that the new IS is an overlay on the existing IS, to make the new IS no more useful than the existing IS. These results also reveal opportunities for understanding perceived usefulness and perceived ease-of-use.

For managers, these findings have important implications to the IS in context. Based on the results of this study, the end-users perceive the new IS to be easy to use over the existing underlying IS. Consequently, users would be expected to have high intentions for using the new IS. As a recommendation, the communications that are sent during the launch and after the launch should highlight the easy to use features of the new IS. The results of this study may also be better understood in light of the expectation-confirmation theory (ECT) (Oliver, 1980), which is widely used in the consumer behaviour literature to study consumer satisfaction, post-purchase behaviour (e.g. repurchase, complaining), and service marketing, in general (Anderson and Sullivan, 1993). ECT was also successfully tested to confirm its validity and its affect on IS use by Bhattacherjee (2001). From the ECT, consumers are suggested to form an initial expectation of a specific product or service prior to purchase. Then, they accept and use that product or service. After a period of initial consumption, they form perceptions about

its performance. Then, they assess its perceived performance vis-à-vis their original expectations and determine the extent to which their expectation is confirmed (confirmation). Next, they form a satisfaction based on their confirmation level and expectations. Finally, satisfied consumers form a repurchase intention, while dissatisfied users discontinue any subsequent use. In the context of this study, repurchase constitutes the continual use of IS, and satisfaction, in the above case, may be expressed as:

Satisfaction = Confirmation level – Expectation

In the context of this study, if management is not confident that the new IS is more useful than the existing IS, it should refrain from communicating its usefulness to the end-users, and instead, emphasize the new IS ease-of-use. This study has determined that the users' expectation of usefulness from the new IS is negligible, and hence any usefulness that the users may find will result in an increased satisfaction (Bhattacherjee, 2001). If, however, any unsustainable claims about the usefulness of the new system are made to the end-users, higher expectations and lower confirmation level may result, leading to a lower satisfaction.

Users' participation and users' level of satisfaction with the existing IS significantly affects users' perception of ease-of-use of the new IS. Users' level of satisfaction is an uncontrollable factor, leaving user participation as a manipulative variable. By understanding the current level of satisfaction with the existing system, managers can fine-tune the participation level to achieve acceptable results. Thus, in this study, participation did not affect users' perception of usefulness of the IS, though a significant effect was found on users' perceptions of ease-of-use. Still, user participation

has a small yet significant positive indirect effect on perceived usefulness. The lack of effect on users' perception of usefulness may be due to the limitations of this study, as discussed earlier. Managers should be aware of the distinctiveness of the IS in context before generalizing these findings to future scenarios within a company. Prior studies indicate that user participation positively affects the perceived usefulness of the IS. By removing the constraints of the distinctiveness of the current IS, participation can also lead to higher perception of usefulness and consequently, higher probability of user acceptance of the new IS.

Several factors may affect the perceived ease-of-use and perceived usefulness with respect to the environment. In this study, some of the well established theoretical constructs were not supported due to the distinct characteristics of the IS. Managers are encouraged to determine the factors within their operating environment to formulate a specific study. Once the critical factors are discovered, managers should also use an approach to stimulate the factors to achieve optimal results, and the desired return on investment (ROI).

This study integrates and validates the theoretical perspective and empirical findings from previous research in TAM, satisfaction, participation literature, with a few exceptions. These results support most of the previous research findings. Moreover, this study was conducted in a real business environment with real users, making the results more generalizable to other business settings. Additional research is recommended to clarify those results that were in conflict to previous studies (as discussed in the Future Research Section).

Limitations

One of the limitations of this study can be attributed to users' experience with existing systems and the process with which PSI interfaces. The results defy a few theoretical constructs that perceived usefulness is significantly affected by user participation, and the hypothesis that users' current satisfaction with the existing IS will have a significant effect on perceived usefulness. PSI is an interface to the existing underlying IS and as a consequence, the PSI is restricted in its functionality to that of the underlying infrastructure of the existing IS. The PSI does not solve problems related to the prequalification process and hence is not perceived to be useful over the existing IS. The PSI makes it easier for the CFBU to interact with numerous IS, which is consistent with the findings of Kieras and Polson (1985). In this case, the users understand that the PSI is not an improvement over the existing systems but is an improved interface.

Another limitation of the study may be due to the low level of participation in the survey by the users' test group. The survey was sent to 1,100 users, of which about 30 users formed the test-user group. This small number may have accounted for the lack of support for Hypothesis Four (H4) and the deviation from the expected results in supporting Hypothesis Three (H3).

Future Research

The results from this study may provide a new dimension for the definition of perceived usefulness and perceived ease of use. Moreover, these results indicate that the new IS is not perceived to be useful, though it is perceived to be easy to use. This may be due to the fact that the users do not perceive the new IS to be any more useful than the existing IS since the new IS is an overlay on existing IS. Hence, future studies could perform a comparison between existing IS and new IS for the perception of usefulness and ease of use.

A similar between-group study may also be prepared. Group one should be informed that the new IS will be an interface over the existing IS and the process beneath the interface system remains unchanged. Group two should be informed that the new IS will be an interface over the existing IS and the process underlying the systems will also be improved. It would be interesting to see if any differences are seen between the perception of ease of use and usefulness between the groups. The way in which participants are informed may have a mediating effect on perceived ease of use and perceived usefulness.

Further, a similar study could be applied in an environment where a new IS and the process is being introduced. The results may be used to confirm Davis and Venkatesh's (2004) findings that user-participation leads to higher perception of ease of use and usefulness. If the results are supported, managers could take advantage of user participation to achieve a higher probability of user acceptance.

APPENDIX 1 - QUESTIONNAIRE

About the study:

Dear participants,
One of the developers on the PreQual Project is an MBA student at Simon Fraser University. As part of his degree, he is doing a study on factors influencing IS system acceptance. There are no right or wrong answers. The purpose of this study is to obtain statistical evidence to support his thesis. This survey will enable him to gain an understanding of factors that affect acceptance of an information system. Your participation in this survey is completely voluntary but is extremely important to the outcome of this study. This project is supervised by Professor Michael Parent at Simon Fraser University. If you have any concerns about the study, please contact Harpreet Singh at harpreet.singh@telus.com, or Professor Michael Parent at mparent@sfu.ca. We thank you for taking the time to respond.

Confidentiality

The data collected will be used solely for academic purposes and any personal information you provide will be kept strictly confidential. You will not be contacted for any sales solicitation as a result of your participation. Your response/non-response will not be reported for any purpose to any individual. Your employee id will be collected for the sole purpose of entering your name in the draw. The access to data collected will be limited to Harpreet Singh, Quick Win Team and Stephanie Vokey, Communication Prime for PreQual project. Upon completion of the draw all identifying information from the responses will be deleted. If you have any questions or concerns regarding the confidentiality of your responses, please feel free to contact Stephanie Vokey stephanie.vokey@telus.com or Harpreet Singh harpreet.singh@telus.com

Would you like to participate in study? Yes/No

Section I:

The following questions should be answered with respect to the existing information systems, in general, that you are using to perform your job

	Never	Seldom	Some of the time	Most of the time	All of the time
1. Do the systems provide the precise information you need?	1	2	3	4	5
2. Does the information content meet your needs?	1	2	3	4	5
3. Do the systems provide reports that seem to be just about exactly what you need?	1	2	3	4	5
4. Do the systems provide sufficient information?	1	2	3	4	5
5. Are the systems accurate?	1	2	3	4	5
6. Are you satisfied with the accuracy of the systems?	1	2	3	4	5
7. Do you think the output is presented in a useful format?	1	2	3	4	5
8. Is the information clear?	1	2	3	4	5
9. Are the systems user friendly?	1	2	3	4	5
10. Are the systems easy to you?	1	2	3	4	5
11. Do you get the information you need in time?	1	2	3	4	5
12. Do the systems provide up-to-date information?	1	2	3	4	5

	Not at all satisfied	A little satisfied	Neither satisfied nor dissatisfied	Somewhat satisfied	Very satisfied
1. Overall, how do you rate your satisfaction with existing information systems	1	2	3	4	5

Section II
The following section measures your participative role during the development of Pre-qual Service Interface (PSI). We expect a "No" response for most of the following question, if you were not involved in the project.

Overall Responsibility Scale

1. Were you the leader of the project team? Yes/No
2. Did you have responsibility for estimating development costs of PSI? Yes/No
3. Did you have responsibility for requesting additional funds to cover unforeseen time/cost overruns?
4. Did you have responsibility for selecting the hardware and/or software needed for PSI?
5. Did you have responsibility for the success of PSI?
6. I had main responsibility for the development project {during system definition/during physical design/during implementation}? Yes/No [item scored as an average of the three stage-specific answers]

User-IS Relationship Scale

1. Quick Win Team drew up a formalized agreement of the work to be done? Yes/No {during system definition/during physical design/during implementation}? [item scored as an average of the three stage-specific answers]
2. I was able to make changes to the formalized agreement of work to be done? Yes/No {during system definition/during physical design/during implementation}? [item scored as an average of the three stage-specific answers]
3. The Quick Win Team kept me informed concerning progress and/ or problems {during system definition/during physical design/during implementation}? Yes/No [item scored as an average of the three stage-specific answers]
4. I formally reviewed work done by Quick Win Team {during system definition/during physical design/during implementation}? Yes/No [item scored as an average of the three stage-specific answers]

5. I formally approved work done by the Quick Win Team {during system definition/during physical design/during implementation}? Yes/No [item scored as an average of the three stage-specific answers]
6. I evaluated PSI information requirements analysis developed by Quick Win Team? Yes/No
7. I approved an information requirements analysis developed by the Quick Win Team? Yes/No

Hands-on Activity Scale

1. For PSI, I defined/helped define input/output forms? Yes/No
2. For PSI, I defined/helped define screen layouts? Yes/No
3. For PSI, I defined/helped define report formats? Yes/No
4. I designed the user training program for PSI? Yes/No
5. I created the user procedures manual for PSI? Yes/No

Section III:
This section is about how you feel about the upcoming PSI. Please select one of the numbers to indicate how you feel.

	Extremely Unlikely	Quite Unlikely	Slightly Unlikely	Neutral	Slightly Likely	Quite Likely	Extremely Likely
1. Using PSI would improve my job performance	1	2	3	4	5	6	7
2. Using PSI in my job would increase my productivity	1	2	3	4	5	6	7
3. Using PSI would enhance my effectiveness on the job	1	2	3	4	5	6	7
4. I would find PSI useful in my job	1	2	3	4	5	6	7
5. Learning to operate PSI would be easy for me	1	2	3	4	5	6	7
6. I would find it easy to get PSI to do what I want it to do	1	2	3	4	5	6	7
7. It would be easy for me to become skilful at using PSI	1	2	3	4	5	6	7
8. I would find PSI easy to use	1	2	3	4	5	6	7

Section IV
The following set of questions should be answered with respect to your expectation from PSI

	Never	Seldom	Some of the time	Most of the time	All of the time
1. Will PSI provide the precise information you need?	1	2	3	4	5
2. Will the information content meet your needs?	1	2	3	4	5
3. Will PSI provide reports that seem to be just about exactly what you need?	1	2	3	4	5
4. Will PSI provide sufficient information?	1	2	3	4	5
5. Will the system be accurate?	1	2	3	4	5
6. Will you be satisfied with the accuracy of PSI?	1	2	3	4	5
7. Do you think the output will be presented in a useful format?	1	2	3	4	5
8. Will the information be clear?	1	2	3	4	5
9. Will PSI be user friendly?	1	2	3	4	5
10. Will PSI be easy to use?	1	2	3	4	5
11. Will you get the information you need in time?	1	2	3	4	5
12.Will PSI provide up-to-date information?	1	2	3	4	5

	Not at all satisfied	A little satisfied	Neither satisfied nor dissatisfied	Somewhat satisfied	Very satisfied
1. Overall, how do you expect to rate your satisfaction with PSI?	1	2	3	4	5

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