

An Examination of System Success Variables In a Financial Institution

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Abstract

A two-level model is developed to examine the implementation of a newly implemented information system for banking services. This study illustrates how to use a systematic approach to evaluate whether the implementation of the new system is successful in such a representative financial institution. It focuses on post evaluation by quantitatively investigating a number of variables in relation to end-users. The results suggest that end-user satisfaction of the system depends on perceived usefulness, ease of use and customer information need, which in turn influences system success. In addition, user friendliness and system reliability represent the determinants of perceived usefulness and perceived ease of use, and the satisfaction of customer information needs. More efforts and resources can therefore be usefully directed towards the enhancement along these avenues when introducing new information systems under similar conditions.

1. Introduction

The business environment is undergoing rapid changes as a result of globalization, technological innovation, shifts in the social and political structure, and increased awareness and demands on the part of consumers and regulators. The upshot is a dynamic environment in which private and public organizations and firms are subject to continuous pressure to enhance productivity, service quality, and competitiveness, with new management approaches such as Business Process Reengineering being introduced in support thereof. The driving force behind many of these initiatives is information technology (IT), which lies at the core of some of the most innovative changes introduced by firms and organizations to succeed or to survive.

The majority of firms and organizations in economically developed countries and regions have already computerized business processes, and the remainder is not far behind. Consider, in particular, teller operations in retail banking. As the most visible point of reference for the bank's retail operations, tellers enter as an important variable in the customer service equation. Yet these individuals are among the least endowed in human capital making it difficult to train or re-train competent tellers. Information technology offers a solution to this problem. In retail banking, managers have therefore focused on exploiting new systems to upgrade human resources and service delivery, reinvent business processes, and to develop strategies to attain and maintain a competitive advantage.

The impact of IS on user satisfaction, quality of work, and the acceptance of new information systems in organizations has been the subject of extensive research. Optimally integrated and utilized, IS support business processes, assists problem solving, unlocks creativity, and increases productivity. The more a firm or organization relies on IS, the more important it is to consider its high-touch aspects - i.e. the people side.

Our study involved a major financial institution with offices all over the world and explored the acceptance of new IS designed to support customer services in terms of the direct and indirect effects on people - bank executives and customers concerning the following factors: perceived usefulness, perceived ease of use, user satisfaction, customer information needs, system reliability, and user friendliness. It is found that perceived usefulness and perceived ease of use exerted significant first-level effects on the behavioral intention to use and therefore to accept IS, and that staff satisfaction and system reliability represented the two most important second-level determinants of perceived usefulness and perceived ease of use.

The new IS in question was introduced mainly to enhance customer-based banking functions and services. A number of executives from the bank participated in the survey. We attempted to solicit information from the system's end-users regarding consumer satisfaction, user satisfaction, system reliability, user friendliness, perceived usefulness, perceived ease of use, and their direct and indirect effects on the system acceptance. Though it is inappropriate to burden the text of this case study with detailed statistical analysis of the survey data, we report the overall results. Since many articles on IS acceptance employ a qualitative approach, inconclusive and contradictory results are often found in the literature. It is suggested that the quantitative approach would be useful if more precise conclusions and implications are available as a result of our analysis.

2. Background

The financial institution we studied is one of Singapore's leading universal banking groups, with some 286 offices and branches worldwide. The parent bank enjoys a Moody's 'B' rating for financial strength and Aa2 and prime-1 ratings

for long- and short-term deposits. A full range of banking, financial and commercial services is offered, including retail and wholesale banking, derivatives trading, factoring, fund management, hire purchase, insurance, life assurance, merchant banking, precious metals trading, private banking, stock-brokering, trust services, venture capital investment, hotel management, leasing, pharmaceuticals, property development and travel. For the first half of 2000, the total income amounted to US\$947 million, net profit to US\$408 million, yielding growth rates of 11.9% and 27.7% respectively, with a ROE of 12.8%.

In the use of IT, the corporate strategy was to embrace information technology emphasizing specific functional areas within the banking environment. Since 1996, this institution has invested about US\$45 million in this area, the bulk on a (back-end) customer-based retail banking IS in which relational databases enable interactive services and high transaction volumes over the Internet. Launched in June 2000, one of the systems is a fully integrated lending subsystem, which would shorten preparation time for credit applications by as much as 30%, leading to expected savings of US\$8 million per year. To support sales and marketing, a parallel subsystem allows customer value indices to be computed employing data from the parent's customer information system and enterprise data warehouse.

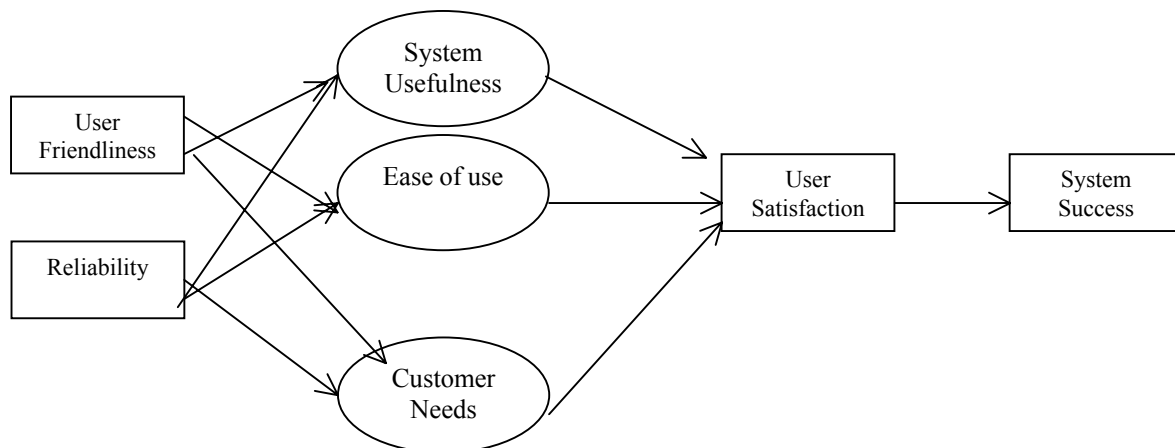
3. System Evaluation

The successful implementation of IS by firms and organizations has been the subject of extensive research. The technology acceptance model (TAM) was developed by Davis [1] [2] to evaluate the implementation of information systems in firms and organizations. According to the theory of reasoned action [3], beliefs influence attitudes, which in turn lead to intentions, which finally generates behavior. Under the TAM, this belief-attitude-intention-behavior relationship is applied to analyze user acceptance of IS, with the goal of "providing an explanation of the determinants of computer acceptance that is general, capable of explaining user behavior across a broad range of end-user computing technologies and user populations, while at the same time being both parsimonious and theoretically justified." The model's basic constructs are perceived usefulness and perceived ease of use, defined respectively as "the degree to which a person believes that using a particular system would enhance his or her job performance," and as "the degree to which a person believes that using a particular system would be free of effort." Expectancy theory, which models the role of beliefs in decision-making supports the importance assigned to perceived usefulness and perceived ease of use. This theory was tested in a longitudinal study of behavioral intentions to use a computer system [1] [2] with results which support the TAM. In particular, perceived usefulness was found to exert a strong influence on intentions, while perceived ease of use produced a smaller but still significant (direct) effect, which subsided over time. It has also been found that near-term perceived usefulness exerts a stronger positive influence than long-term perceived usefulness on behavioral intention [4].

Under the TAM, IS acceptance in firms and organizations is therefore measured in terms of behavioral intention to use and actual usage, which in turn are jointly (positively) determined by user perceptions towards the system's usefulness and ease of use. Figure 1 displays a schematic representation of the model, in which the arrows denote the direction of causal relationships. In particular, individual attitudes towards usage are jointly determined by perceived usefulness and perceived ease of use while perceived usefulness is affected by perceived ease of use and external variables such as system features, training, documentation, and user support.

4. The Success Model and Hypotheses

In this paper, TAM is applied by adapting its assumptions and concepts to the operational characteristics of the new IS which was introduced to enhance customer-based functions and services. As depicted in Figure 1, IS acceptance is proposed to depend on perceived usefulness and perceived ease of use which in turn are determined by second-level factors which capture efficiency and performance gains (organizational acceptance, staff/superior satisfaction, and customer satisfaction), and functional effects (system reliability and user friendliness).



USER FRIENDLY	The system operations are designed on basis of convenience of end-users
SYSTEM RELIABILITY	The system functions in a reliable manner
USEFULNESS	The system is useful to handle the related customer services
EASE OF USE	The system can be used by end-users easily
CUSTOMER	The system can satisfy customer needs
USER SATISFACTION	End-users satisfied with their job performance after using the new system
SYSTEM SUCCESS	The implementation of the system seems successful

Figure 1. The Evaluation Model

4.1 User Friendliness

User friendliness as part of successful system implementation is associated with the ability of end users to operate the system without constant recourse to external technical expertise and without high stress and strain. Since complexity deters users and reduces usage, a user-friendly system would encourage individuals to interact frequently thereby enabling the organization to reduce learning and training cost. User-friendliness is generally evaluated along two dimensions: end users' daily handling of the system with minimal difficulty, and the availability of productivity tools (e.g. hardware, software and peripheral devices) in support. In the present case, our target population consisted of banking staff who utilized the new system in the course of their work. The following questions were distributed to assess the user friendliness of the new system.

- (a) Menu structure of the system
- (b) The ability to deal with a wide range of tasks
- (c) Flexibility on loan processing
- (d) Validity check on data entry
- (e) Processing time to complete a job
- (f) Standardizing the loan processing procedure
- (g) Collecting errors in the process
- (h) Help function associated with the system
- (i) Limited clarification needed when using the system

4.2 System Reliability

System reliability refers to the capability of a system to support continuous and smooth functions and operations. Applied to the banking needs of customers, the intelligent use of IT would enhance existing product lines and improve operational efficiency with reliability being demonstrated by the system's competence in consistently supplying up-to-date, meaningful and unambiguous information, by the reduction of errors and system breakdown, and by services and requests being performed as required the first time round [5]. The following questions were distributed to assess the reliability of the new system.

- (a) System downtime
- (b) Well-documented trouble shooting guides
- (c) Data accuracy
- (d) Minimizing system breakdown
- (e) The number of errors being reduced
- (f) Eliminating the possibility of making errors
- (g) Vendor backup support

4.3 Perceived Usefulness and Ease of Use

The measure of perceived usefulness is related to the perception of users in terms of whether the new system could facilitate end-users to deal with the job requirements. The following questions were assessed by end-users with regard to this construct.

- (a) Rationalizing the loan processing procedure
- (b) Enhancing the efficiency of loan processing
- (c) Providing many useful tools for evaluate loan applications
- (d) The ability to identify unusual requirements

Based upon the questions above, our first hypothesis examines the relationship between perceived usefulness and user friendliness and system reliability as follows:

- H₁: The perceived usefulness of the new system is influenced by user friendliness and system reliability.

In addition, we measure perceived ease of use in terms of prospective users' subjective probability that the system can be used easily based on the following questions.

- (a) The system can be learned easily
- (b) Reduced demand for computing skills
- (c) Minimizing the training time
- (d) Customer records can be retrieved easily
- (e) Loan assessment policy can be referenced efficiently

Accordingly, hypothesis 2 is proposed as follows:

- H₂: The perceived ease of use of the new system is influenced by user friendliness and system reliability.

4.4 Customer Services

Since it is generally recognized that customer satisfaction is crucial for competitive advantage, the measurement of customer satisfaction has been a prime concern in quality management and business performance evaluation [6] [7] with improving customer satisfaction being a much investigated problem [8] [9] [10]. In the highly competitive retail banking market, the provision of fast, timely, reliable and accurate information to customers is a vital factor in survival and growth. Applying the TAM to evaluate the loan system, customer satisfaction can be measured in terms of perceptions of the bank's ability in meeting demands and needs in the above areas. Since it would be difficult to contact customers directly, our survey targeted the bank's marketing officers in their capacity as employees most informed with regard to customer preferences. The following questions were directed at assessing customer perceptions regarding whether value-added services were provided by the new system.

- (a) Customers' enquiries are answered quickly
- (b) Extracting relevant information to meet customers' needs
- (c) The details of information provided to customers
- (d) The accuracy of information supplied to customers
- (e) Accepting more enquiries from customers
- (f) Customer complaints are quickly solved
- (g) Minimizing complaints from customers
- (h) Maintaining cordial customer relationships
- (i) Handling customer requests promptly

Based on the above questions, hypothesis 3 is stated as follows:

- H₃: Both user friendliness and system reliability are essential to the achievement of satisfying the information needs of customers.

4.5 End-user satisfaction

Lucas [11] introduced the idea of including users when assessing IS acceptance, while in organizational behavior theory, user satisfaction is considered to be a major factor affecting effective and successful systems implementation [12] [13] [14] [15] [16]. It is therefore hypothesized that under the TAM, staff satisfaction positively affects perceived usefulness, systems usage, and IS acceptance. This argument derived from attitude theory [3], according to which individual attitudes towards an object is an important determinant of subsequent behavior towards it. In particular, researchers have found that staff attitudes are related strongly to IS success and user satisfaction represents a valid measure of system effectiveness [17] [18].

User satisfaction can be measured by the perceived short-term usefulness of new IS in supporting daily operations, and by perceived long-term usefulness as reflected by expected future rises in job status and better career prospects. In particular, intrinsic, extrinsic, and overall job satisfaction has been taken into account in our survey. The first refers to satisfaction derived from the work itself (such as feelings of accomplishment and personal growth), the second refers to the benefits associated with doing the job (pay, promotion and work conditions), and the third refers to general work aspects. As regards user satisfaction, we sought to measure the extent to which it was felt that the new system would improve their productivity and quality of work, on top of improvements in own productivity and quality of work. Survey respondents (mainly members of the two departments in constant contact with IT-based operations) were presented with the following questions regarding user satisfaction, and its effects on perceived usefulness and perceived ease of use of the new system support for loan evaluations.

- (a) A rise in job status for end users

- (b) Better career prospects
- (c) Providing an autonomous work environment
- (d) The end-users feel in control when using the system
- (e) Minimizing the variety in the loan processing
- (f) Creating a cooperative working environment
- (g) Improving communications with colleagues
- (h) Improving the productivity of loan processing
- (i) Enhancing the quality of loan processing

We should examine in an integrated manner whether perceived usefulness and ease of use, and the ability to provide satisfactory customer services have a positive impact on user satisfaction of the new system. Therefore, hypothesis 4 is proposed as follows:

H₄: Perceived usefulness, ease of use and satisfying the information needs of customers exert a direct effect on user satisfaction.

4.6 System Success

We adopt the standard measure of IS acceptance in terms of system usage [8] [19] [20] [21] [22] [23]. In particular, it has been demonstrated that “system usage has a notable practical value for managers interested in evaluating the impact of information technology” [22]. We assume that the more users would view the new system being useful to their work, the more frequently they would use the system. User satisfaction might thereby directly contribute to its overall acceptance and the successful implementation of the new system. Hence, we propose the following:

H₅: User satisfaction exerts a positive impact on successful system implementation.

5. Research Models and Methodology

5.1 Research Models

A two-level model is developed to facilitate the post evaluation of the system implementation and how successful it was on the basis of the model framework. The three models displayed below are used to test hypotheses 1-3 proposed in the previous section by examining the impact of ‘user friendliness’ and ‘reliability’ on ‘usefulness’, ‘ease of use’ and ‘satisfying information needs of customers,’ respectively.

Level 1 Models

$$\text{USEFULNESS} = \alpha_1 + \beta_{1,1} \text{USER FRIENDLY} + \beta_{1,2} \text{RELIABILITY} + \mu_1 \quad (1)$$

$$\text{EASE OF USE} = \alpha_2 + \beta_{2,1} \text{USER FRIENDLY} + \beta_{2,2} \text{RELIABILITY} + \mu_2 \quad (2)$$

$$\text{CUSTOMER} = \alpha_3 + \beta_{3,1} \text{USER FRIENDLY} + \beta_{3,2} \text{RELIABILITY} + \mu_3 \quad (3)$$

The fourth and fifth models displayed below considered the second level models are used to test hypotheses 4 and 5.

Level 2 Models

$$\text{USER SATISFACTION} = \alpha_4 + \beta_{4,1} \text{USEFULNESS} + \beta_{4,2} \text{EASE OF USE} + \beta_{4,3} \text{CUSTOMER} + \mu_4 \quad (4)$$

$$\text{SYSTEM SUCCESS} = \alpha_5 + \beta_5 \text{USER SATISFACTION} + \mu_5 \quad (5)$$

5.2 Research Methodology

An initial meeting with the financial institution’s Department of Consumer Services was arranged to introduce the project. In particular, we sought the bank’s participation in investigating the variables affecting acceptance for the bank’s new IS which was mainly intended to facilitate customer-based banking functions and services. The managers reacted positively and agreed to an internal survey among staff from departments most closely involved in computer-based operations. Further staff feedback was obtained in the subsequent months, after which the design of questionnaires specialized to different staff group is finalized. This document was distributed through their internal mail system to five local departments totaling 80 employees, who utilize the new system in the course of their work. This was accompanied by a cover letter stating the study’s nature and purposes, and that participation was voluntary, under strict confidentiality. Management strongly encouraged participation. Completed surveys were received from 60 employees, giving a high response rate of 75%.

Our questionnaire attempted to solicit information regarding individual biography and (as appropriate) the major variables displayed in Figure 1: system reliability, user friendliness, information needs of consumers, usefulness, ease of use, end-user satisfaction and system success. The users of the system were asked to indicate their agreement or disagreement to a number of questions mentioned in the previous section. Responses were measured in terms of a seven-point Likert-scale calibrated according to the following equivalences: (1) very strongly disagree, (2) strongly disagree, (3) disagree, (4) neutral, (5) agree, (6) strongly agree, to (7) very strongly disagree [24]. We presented a set of questions to the end users responsible for customer services to conduct a post evaluation of the system upon implementation. Respondents were invited to indicate their extent of agreement or disagreement on this seven-point Likert-scale. To ensure minimal demands on time and effort, a number of questions on a relevant factor or variable were formulated for each department. To obtain a general idea of users perception on various aspects in relation to the new system, we computed the mean and standard deviation from the survey data in an integrated manner. In addition, reliability test has been conducted. Finally, the responding scores of those variables were used for multiple regression analyses on the basis of the research models presented previously.

6. Results

Reliability tests are conducted and the results suggest that a number of variables associated with each of those major factors are internally consistent. All resulted values of standardized item alpha are greater than 0.7 for user friendliness, system reliability, customer services and end user satisfaction, respectively. In addition, the average score of a number of variables in relation to a major factor has been obtained on the basis of the assessments of respondents. As shown in Table 1, the respondents are generally satisfactory with the new system with a score of 6 or higher representing strong agreement.

Table 1 Descriptive Statistics

Major Variable	Mean	Std Dev	Variance
USER FRIENDLY	5.7067	0.6789	0.461
SYSTEM RELIABILITY	5.6220	0.5207	0.271
USEFULNESS	6.2167	0.5318	0.283
EASE OF USE	6.1833	0.7247	0.525
CUSTOMER NEEDS	6.0737	0.6791	0.461
USER SATISFACTION	6.1200	0.7152	0.511
SYSTEM SUCCESS	6.5000	0.6244	0.390

Regression analyses are conducted to test the impact of individual factors on various considerations associated with the use of the new system. The results of five different regression models are discussed.

6.1 Model 1: Perceived Usefulness

$$\text{USEFULNESS} = 3.3 + 0.242\text{USER FRIENDLY} + 0.277\text{RELIABILITY} \quad (1)$$

		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
Model 1*		B	Std. Error	Beta		
	α	3.300	0.628		5.257	0.000
	x_1	0.242	0.099	0.314	2.441	0.018
	x_2	0.277	0.116	0.307	2.385	0.020

* F = 11.490, 57,2, Sig. 0.000, $R^2 = 0.287$

The regression results shows that both system user friendly ($B = 0.242$, $p < 0.05$) and reliability ($B = 0.277$, $p < 0.05$) significantly impact the perceived usefulness of the system (Table 2), while the adjusted R^2 of 0.287 suggests that 28.7% of perceived usefulness is explained by system user friendly and reliability. As such, it appears that perceived usefulness is based on system user friendliness whereby users felt comfortable with the system and reliability such that users could be comfortable that the system will not break down when needed most. Therefore, Hypothesis 1 is basically supported.

6.2 Model 2: Ease of use

$$\text{EASE OF USE} = 1.23 + 0.578 \text{USER FRIENDLY} + 0.289 \text{RELIABILITY} \quad (2)$$

		Unstandardized Coefficients		Standardized Coefficients b*	t	Sig.
Model 2**		B	Std. Error			
	α	1.230	0.747		1.646	0.105
	x ₁	0.578	0.118	0.542	4.890	0.000
	x ₂	0.289	0.138	0.232	2.093	0.041

** F =25.360, 57,2, Sig.0.000, R²=0.471

The regression results shows that both system user friendly (B= 0.578, p<0.01) and reliability (B= 0.289, p <0.01) significantly impact on the perceived ease of use of the system. Actually, the adjusted R² of 0.471 suggests that 47.1% of perceived ease of use is explained by system user friendly and reliability. This model strongly demonstrates ease of use is predicated on user friendliness and system reliability. As a separate construct, ease of use is important for system success in that users may refrain from using a new system no matter how good it is unless they perceive it to be easy to use. Therefore, Hypothesis 2 is highly supported.

6.3 Model 3: Satisfying Customer Needs

$$\text{CUSTOMER} = 2.459 + 0.271 \text{ USER FRIENDLY} + 0.362 \text{ RELIABILITY} \quad (3)$$

		Unstandardized Coefficients		Standardized Coefficients b*	T	Sig.
Model 3***		B	Std. Error			
	α	2.459	0.833		2.952	0.005
	x ₁	0.271	0.132	0.271	2.054	0.045
	x ₂	0.362	0.154	0.310	2.351	0.022

*** F =9.587, 57,2, Sig.0.000, R²=0.252

The regression result shows that satisfying customer needs are partly influenced by user friendly (B=0.271, p<0.05) and reliability (B = 0.362, p < 0.05), because both significantly impact on the dependent variable being studied. The adjusted R² of 0.252 suggests that 25.2% of perceived customer needs is explained by system user friendliness and reliability. Having staff who deem the system to be friendly and reliable will certainly contribute toward meeting customer needs. Therefore, Hypothesis 3 is also supported.

6.4 Model 4: End-User Satisfaction

$$\text{USER SATISFACTION} = -1.114 + 0.513 \text{ USEFULNESS} + 0.398 \text{ EASE OF USE} + 0.257 \text{ CUSTOMER} \quad (4)$$

		Unstandardized Coefficients		Standardized Coefficients b*	t	Sig.
Model 4****		B	Std. Error			
	α	-1.114	0.857		-1.300	0.199
	y ₁	0.513	0.126	0.376	4.062	0.000
	y ₂	0.398	0.098	0.403	4.052	0.000
	y ₃	0.257	0.098	0.244	2.609	0.012

**** F =26.797, 57,2, Sig.0.000, R²=0.589

In this model, user satisfaction in terms of job performance appears as a dependent variable, and perceived usefulness and perceived ease of use, and satisfying customer needs as explanatory variables. The adjusted R² of 0.589 suggests that 58.9% of the dependent variable can be explained by these three aforementioned variables. When perceived usefulness, ease of use and reliability are taken care of, end user satisfaction will also be favorably perceived. Hence, Hypothesis 4 is supported. The results from the regression analysis for model 4 also show strong positive effect on user satisfaction. Perceived usefulness (y₁) was found to exert a significant positive effect with B = 0.513 and p < 0.01, perceived ease of use (y₂) resulted in B = 0.398 and p < 0.01 while satisfying customer information needs (y₃) has a considerable impact on user satisfaction (B = 0.257, p<0.05) as well.

These results show that end-user satisfaction is positively and significantly affected by perceived usefulness, ease of use and the information needs of customers. It is strongly believed that the productivity and work quality have been enhanced, and that more satisfied end-users tend to report greater impacts on job performance.

6.5 Model 5: System Success

$$\text{SYSTEM SUCCESS} = 3.012 + 0.570 \text{ USER SATISFACTION} \quad (5)$$

	Unstandardized Coefficients		Standardized Coefficients b*	t	Sig.
	B	Std. Error			
Model 5*****					
α	3.012	0.535		5.630	0.000
Y	0.570	0.087	0.653	6.564	0.000

***** F = 43.090, 57,2, Sig. 0.000 $R^2 = 0.426$

This regression was performed with user satisfaction as independent variable and overall system success as the dependent variable. The analysis of the survey data reveals that customer satisfaction has a considerable impact on the success of the system ($B = 0.57$, $p < 0.01$). This result is due to the fact that most of the benefits of the new system entered via operations on the side of bank employees. The adjusted R^2 of 0.426 actually suggests that 42.6% of system success can be explained by user satisfaction. Therefore, Hypothesis 5 is also supported.

7. Discussion, Assumptions, and Conclusions

This study explores the importance of perceived usefulness, perceived ease of use, user satisfaction, customer information needs, system reliability, and user friendliness on the success of system implementation at a financial institution in a representative international financial center. The results indicate support for the importance of perceived usefulness and perceived ease of use as immediate determinants of system success. It also points to the mediating role of system usage: viz., individuals are more likely to accept a new system, if they perceive it as being easy to use and that using it would increase performance and productivity.

Since a new system is accepted firstly on the basis of the functions it is expected to enhance and secondly because it is easy to use, the implication follows that firms and organizations may be willing to live with a certain degree of operational complexity if the system is able to support more efficient information management and utilization.

The perceived ease of use indicates that users are likely to possess clearer knowledge of new system capabilities, and to be better able to exploit them. As a result, more intensive training would increase perceptions of a new system's ease of use and contribute to optimal utilization.

Similarly, the experience of users enhances the ability to learn by doing and may serve to demystify the subject. Individuals with inadequate knowledge tend to be reluctant to use new systems thus defeating the purpose of IT investment. As far as this problem is concerned, training is particularly necessary to foster the individual's self-confidence and increase the perception of new system capabilities.

System reliability was found to exert a direct and significant effect on perceived ease of use and therefore indirectly on usage and acceptance. Good vendor support and the provision of adequate validation checks would therefore encourage IS acceptance. Since staff satisfaction significantly affects perceived usefulness, improvements in this direction can increase perceptions of system usefulness and encourage greater usage and acceptance. This result highlights the importance of psychological issues in systems development. Active participation of end-users should be encouraged from the early stages of implementation because involvement in system building would enhance individual endorsement of the new IS and increase usage and acceptance.

The means and standard deviations of the scores were computed to garner information on the effects of the TAM factors. In addition, valuable information was obtained by tailoring questionnaires to the circumstances and staff groups.

However, the interrelationships between system reliability, user friendliness, customer satisfaction, and end-user satisfaction are still a matter of on-going research. Empirical results obtained on unambiguous *ceteris paribus* conditions may provide useful suggestions for future investigations.

It has been found that superiors and supervisors of the bank basically were satisfied with the implementation of the system. In general, they are satisfied with the standard of work achieved. They also need less time to supervise their staff and can obtain up-to-date information from my staff easily. At the same time, the staff can now supply more detailed information. Delay of work caused by system downtime is reduced in comparison with the previous system.

As in all survey studies, the results must be constrained by its limitations. It is assumed that the participants answered honestly and that their answers truly reflected what they would have done in real life. The sample was limited to a single financial institution that we feel is representative of typical large financial institutions. Therefore, given our findings this study offers a few suggestions regarding insights into IS acceptance in firms and organizations. Perceived usefulness was found to be relatively more important to IS acceptance than perceived ease of use. In addition, user satisfaction and system reliability were the most important determinants of perceived usefulness and perceived ease of

use. This suggests that more effort can usefully be directed towards encouraging staff participation in the development of new systems and to secure maximum system reliability. In parallel, education and training programs should aim to increase staff awareness of potential applications and to emphasize the benefits of adopting the latest IT, as well as focus on improving the individual's self-efficacy. Software developers and vendors would find it profitable to emphasize ease of use as a design objective because no matter how good the latest information technology is, this technology still requires people to accept it, use it, and make it successful. Finally, given that the interrelationships among organizational acceptance, user and superior satisfaction, customer satisfaction, system reliability, and user friendliness are still a matter of on-going research, the findings obtained on unambiguous *ceteris paribus* conditions in this study may provide useful suggestions for further investigations and applications of IT usage in different operational environments, industries, and countries.

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