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Simulation of Dynamic Model of Information Systems Success in M-banking

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Abstract

Mobile commerce has significantly developed in the last decade. As mobile commerce grows, the need to use mobile banking systems becomes more serious. If mobile banking (m-banking) systems are assumed as information systems (IS), successful IS in m-banking means the banks are successful in managing their information systems. On the other hand, based on information success models, many factors play a role in banks' information systems in m-banking. This article is focused on simulating a dynamic model for IS success in m-banking. The system dynamic (SD) perspective helps us to elaborate better on the effects of each element of IS in m-banking. In this research, a dynamic model was developed based on two models of Delone and Mc Lean in information systems success. In previous studies, researchers analyzed the IS success with statistical methods that have so many limitations on the number of factors, but SD helps to overcome this limitation. Also, it helps to forecast the system's behavior for a long period. In this research, first of all, we start the modeling process by establishing a review of the literature and Delphi survey. The second stage was drawing Causal Loop Diagrams (CLD) and Stock Flow Diagrams (SFD) with VENSIM software based on the mental representations of the Delphi technique. In the third step, the VENSIM application was checked the model; In the fourth step, the model was formalized. Sensitivity analysis was the fifth step. After passing the sensitivity analysis step, the Delphi survey again checked the dynamic model. In this way, the dynamic model was validated and reliable. This research forecasts the behavior of each main factor for 132 months later with the VENSIM application. The results indicate that the main factors in the IS systems in m-banking should grow to be a successful information system. Two scenarios are developed in two extremes, optimistic and pessimistic. The dynamic model forecasts the behavior of each of the 6 systems for 44 quarters. Also, some sensitivity analyses show that security, easy learning, easy use, and user satisfaction are critical for the success of information systems in mobile bank systems. Tracking these paths helps the managers of IS systems in banks.

Keywords:
Simulation
Dynamic Model
Information Systems Success
M-banking

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INTRODUCTION

It is widely accepted in management information system studies that the success of an information system is not only based on the information system factors but also on how information flows in the system (Soror et al., 2015; Velasquez et al., 2009). Defining the path and ways of information flow in systems helps them to operate at an optimal level. This optimal level of information flow may be achieved through full control of the system information flow.

One of the most important information flows occurs in banking systems, especially in mobile banking. Some banks may be relatively better than others at the management of information systems (Gable et al., 2008; Palani and Yasodha, 2012; Vieira da Cunha et al., 2015; Abbasi et al., 2016). Managing an information system of mobile bank applications successfully is partly based on managing the flow of information in the mobile banking system. Different researchers explain how an information system could be successful, and Delone and McLean proposed two models for it (DeLone and Mclean, 1992; DeLone and Mclean, 2002; DeLone and Mclean, 2003; Ghobakhloo and Fathi, 2019). Each of these models expresses different variables for managing a successful information system. In the theoretical background of a successful information system, some variables of different models are the same, and some of them are different (DeLone and Mclean, 1992; DeLone and Mclean, 2003; Seddon, 1997; Seddon, 1999). Thus a range of different factors affect an information system in mobile banking; this research tries to consider all the factors based on the accepted models of Delone and McLean. Scholars argue that paying attention to some factors helps the information system to be successful (Dong et al., 2009; Petter, Delone, and McLean, 2008), and some researchers ranked the most important factors by different statistical and mathematical methods (Seddon and et al., 1998; Shaikh, 2013; Tharkurta and Ahlemann, 2010). However, our understanding of the flow of information in information systems, especially bank information systems, is not clear. To our knowledge, there are no studies investigating the flow of information in mobile banking systems. It is not to be assumed that the factors affecting information systems cannot lead them to be successful, but the flow of information needs to be better understood.

This study recognizes the factors affecting a successful information system to simulate a dynamic model for a successful information system in mobile banking. Based on this research, two research questions should be answered:

- Which factors are affecting successful information systems?
- What is the dynamic model of a successful information system in mobile banking?

We believe that the dynamic view of information systems, which to our knowledge, has not been applied to study information systems success, could provide a novel and valuable insight for a better conceptualization in the management of information systems.

This article makes a conceptual and empirical contribution to the successful management of information systems in mobile banking and simulates a dynamic model for a successful flow of information in mobile banking systems. The article concludes with a dynamic model that shows how the system components work together 44 quarters later in a successful and unsuccessful information system.

LITERATURE REVIEW

The theoretical background consists of two main parts. The first part is about the summary of information system success models and explains each model. The second part consists of reviewing a few studies that shed light on information system success in different kinds of banking (e-banking and m-banking). We point out that there is little study in banking based on information system success models (see Safeena et al., 2013; Abu-Taieh et al., 2022), and there is no study that simulates the dynamic model of the information system success model in m-banking.

The first model of information success (IS) was first developed by DeLone and McLean (D&M) in 1992, and it consists of 6 factors: system quality, information quality, IS use, user satisfaction, individual impact, and organizational

impact (Delone and McLean, 1992). Figu. 1 shows the model; in this model, system quality and information quality are the qualities needed for a successful IS.

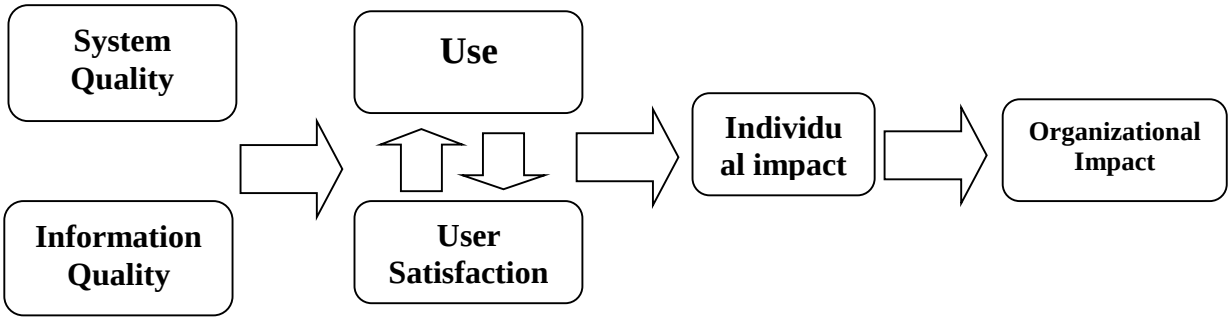

Fig1. DeLone and McLean's Model (1992)

After 11 years, in 2003, D&M updated their model of IS success by adding and omitting some components of the model. The model is revised by adding service quality measures; in this way, the quality of a successful IS is determined by system quality, information quality, and service quality. Another change made in the updated model is adding a net benefit factor to the revised model. They also omit individual and organizational impact from the model. The most important change in the model is the one-way relationship between factors in the previous model and the cycle relationship in the revised model. Although all the factors were not considered in this cycle, it helps the IS to feedback better; Fig. 2 shows the model.

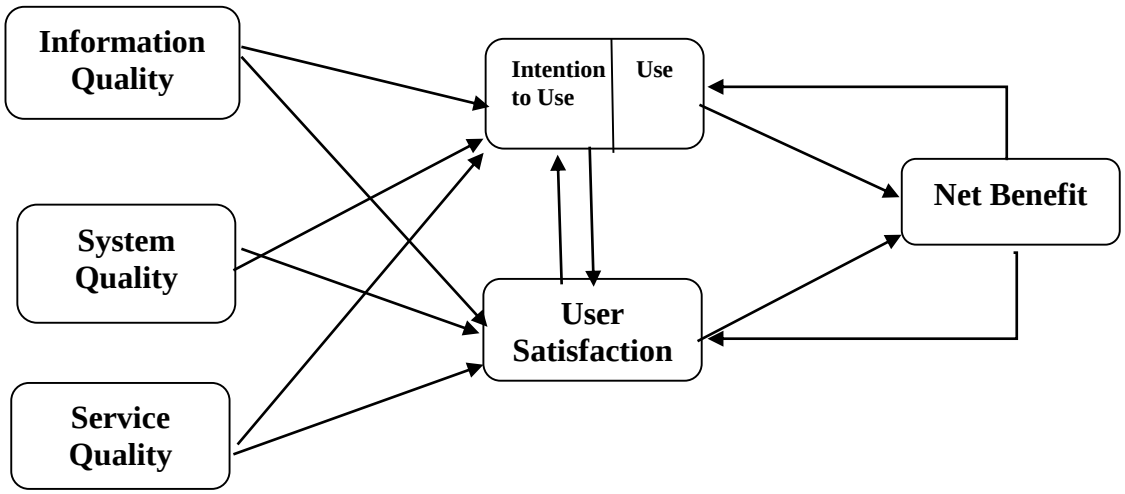

Fig. 2. DeLone and McLean's (2003) updated IS success model

Based on the system thinking, D&M added a loop to the revised model; although they did not have a system point of view on the other parts of the revised IS model, it helped to simulate the real world better than before. The next section introduces the conceptual framework that guides our analysis.

Quality of Service

Service quality in this study is defined as an evaluation that is understood by comparing the user's expectations with the services they receive. The research factors were adapted from the research conducted by Bayanati and Tolouie (2015) regarding the research conducted by

Delone and McLean (2003) with 3 items of reliability, reliability, and responsiveness and in another study has been reused by Hedayatullah (2020), and Saputro (2017).

Information Quality

Information quality measures the output quality of information systems (Jogiyanto, 2007). Similar to system quality, the desired information quality is the information quality that is subjectively measured by the user, hereafter referred to as the quality of perceived information quality. The index used to replicate Hedayatullah's research (2020) includes 4 measurement scales, which are completeness of the information (completeness), easy understanding (ease of understanding), the accuracy of information (accuracy), and relevance (relevance).

System Quality

System quality is used to measure the quality of the information system itself (Jogiyanto, 2007). That is, the quality of the system is the technical quality of that information system. The meaning of system quality is the quality of a combination of hardware and software. Delone and McLean (2003) explain that system quality is the performance of the system to the extent that the capabilities of the hardware, software, policies, and procedures of the information system can provide information about users' needs. The user subjectively measures the quality of the system, so the quality of the system used is the quality of the perception system or the quality of the perceived system. This index is used from the repetitions of Bayanati and Tolouie (2015) research, and also in other studies by Hedayatullah (2020), 7 measurement scales are used, which are: easy learning, easy access, fast connection, and reliable, fast information, convenient to use and quick improvement of facilities.

Variables extracted from the review of related literature are summarized in Table 1, which is given below:

Table 1: Factors Affecting Successful Information Systems

System Quality (Delon and McLean, 2006)	- Ease of learning (Delon and McLean, 2003) - Ease of use (Delon and McLean, 2003) - easy access (Youssef and Koljis, 2008) - Awareness of user needs (Peter et al., 2008) - Benefits, features, and functions of the system (Shannon and Weaver, 1949) - Active technical support (livari, 2007) - Compilation of an understandable user guide (Bayanati and Tolouie, 2015) - Compilation of answers to common questions (Dalle et al., 2020) - User-friendly interface design (livari, 2007) - Easy installation (Bayanati and Tolouie, 2015) - Using the common language of the country (Bayanati and Tolouie, 2015) - Technical health (Bayanati and Tolouie, 2015)

	- Correct needs assessment (Dalle et al., 2020) - Dealing with customer complaints (Ghazal et al., 2018) - regularly updating the software and fixing its errors (Dalle et al., 2020) - Knowledge of the world's developments in banking software - The ability to transfer to a memory card (Laudon and Laudon, 2017) - Not being too busy with the support lines (Dalle et al., 2020) - Providing immediate service to support staff to users (Irawan and syah, 2017) - Ability to work in different operating systems (Irawan and syah, 2017) - Fast installation capability (Irawan and syah, 2017) - Flexibility in network selection (Ghazal et al., 2018)
Information Quality (Delon and McLean, 2006)	- Security (Delon and McLean, 2003) - Communication (Ghazal et al., 2018) - Usefulness (Delon and McLean, 2003) - Timeliness (Pippino et al., 2002) - Readability (Dong et al., 2009) - Content (Bailey and Pearson, 1983) - Ability to personalize received information (Bayanati and Tolouie, 2015) - Updating transactions moment by moment (Irawan and syah, 2017) - Use of readable fonts (Ghazal et al., 2018) - Content that can be copied (Dalle et al., 2020) - Saveable content (Bayanati and Tolouie, 2015) - Detailed content (Ghazal et al., 2018) - Communicating the software with the bank (Dalle et al., 2020) - Ability to change software passwords (Bayanati and Tolouie, 2015)

	- Ability to change user account password (Laudon and Laudon, 2017) - Lack of access to user's personal information (Ghazal et al., 2018)
The Use of Information (Delon and McLean, 2006)	- Actual use versus reported use (Delon and McLean, 2003) - Type of use: use for specific purposes, appropriate use, type of information used (Dong et al., 2009) - Motivation to use (Dong et al., 2009)
User Satisfaction (Delone and McLean, 2006)	- Person satisfaction (Sedon et al., 1999) - Overall satisfaction (Seddon et al., 1999) - Information satisfaction: the difference between the information needed and received (Dong et al., 2009) - Satisfaction (Delon and McLean, 2006)
Net Benefits (individual and organizational-social) (Delone and McLean, 2006)	- Individual effect (Tarkurta and Ehlman, 2010) learning Impact on decision-making: decision-making quality, better decision-making analysis, accuracy, decision-making time Greater individual efficiency performance efficiency Identify problems Paying for information - Social-organizational effect (Seddon et al., 1999) and (Harrison and Pelletier, 2000) and (Laudon and Laudon, 2017) Reduce operational costs Reduction of manpower Increase in productivity Increase in revenues, sales, market share, profits Reduce workload Service effectiveness Reduction of face-to-face visits,

Service Quality (Delone and McLean, 2006)	- Feelings (Irawan and syah, 2017) Neat appearance and dress of support unit staff - Reliability (Dong et al., 2009) Carrying out the task given at a specific time by the support unit The sincere interest of the support unit to solve the problems of users - Accountability (Bayanati and Tolouie, 2015) Providing immediate service to users by the support unit Not being too busy with the support unit in response to users' requests - Assurance (Velasquez et al., 2009) Inducing confidence in users by the behavior of support unit employees Courtesy of support staff Knowledge of proper work in support unit employees - Oneness (Dong et al., 2009) Individual attention of employees to users of this system Understanding the specific needs of users by the support unit - Dealing with customer requests (Bayanati and Tolouie, 2015)

CONCEPTUAL FRAMEWORK

D&M updated model is a good conceptual framework for a wide range of studies about IS success topics, especially in banking services consisting of electronic banking services or mobile banking services. In most of the studies, researchers define elements for each model factor and, through a questionnaire, gather data, analyze them, and give some conclusions and suggestions. The problem is the studies based on statistical methods can not consider all elements of each factor because of statistics limitations. In the following paragraph, some of these related studies explain the problem more.

Most of the studies that focus on e-banking or m-banking are related to technology acceptance models (Donge et al., 2009; Palani and Yasodha, 2012; Safeena et al., 2013), although technology acceptance models have some similar factors to D&M models, it is fundamentally different between acceptance model and IS success models.

Some of the studies focus on IS success models, but most of these studies did not focus on IS success in m-banking, and some of their research about IS success model in e-banking or m-banking (Puschel et al., 2010; Sripalawat et al., 2011; Wang and et al., 2006; Wu and Wang, 2006). These articles choose statistical methods for analyzing the results, so researchers have limitations in choosing elements affecting the subject.

In summary, past studies reveal a limited range of important elements affecting a bank IS's a success, but most of the research cannot consider enough elements to explain how a bank IS could be successful; also, the loop of D&M updated model was not considered in any research. Our

study contributes to the literature on IS success, especially in banks, by considering a wide range of factors and simulating a system dynamic model to better forecast the system behavior over a long period.

RESEARCH METHOD

This research is designed to simulate a dynamic model for IS success in m-banking. System Dynamics simulation modeling (Sterman, 2000; Sterman, 2002; Bastan et al., 2017) is a hard and complex modeling method that helps users to build formal computer simulations of complex systems. This kind of modeling enables users to design more effective policies based on the dynamic model (Forrester, 1992).

Research Design

The current research is applied in terms of purpose, and its research method is descriptive modeling. For this reason, there is no sampling. Simulation is the process of designing a model of the real system, which is done by performing experiments using this model to understand the behavior of the system or evaluate various strategies, within the range applied by a criterion or a set of criteria, for the operation of the system. The purpose of the simulation is to provide models that are as close to reality as possible. Simulation is used when, due to the complexity of the desired system, the use of analytical methods is impractical. One of these methods of system study is through simulation (Shannon, 1949). For this reason, due to the multitude of variables discussed in the present simulation, it has been tried to use all the influencing variables in the simulation. As much as possible, it has been tried not to delete a variable so as not to damage the entire system.

Dynamic model designing consists of some stages; referring to this research, first of all, we start the modeling process by establishing a Delphi survey. A Delphi survey is a structured group interaction process that is directed in rounds of opinion collection and feedback (Turoff & Hiltz, 1996). Opinion collection is achieved by conducting a series of surveys using questionnaires. The result of each survey will be presented to the group, and the questionnaire used in the next round be built upon the result of the previous round (Delbecq, Ven, and Gustafson, 1975, Forrester, 1973). This method identifies the mental representations of research.

The second stage is drawing Causal Loop Diagrams (CLD) and Stock Flow Diagrams (SFD) with VENSIM software based on the mental representations of the Delphi technique. In the third step, the VENSIM application should check the model; if there is no error, again with the Delphi technique, the SFD should be checked. In the fourth step, the model should be formalized. The formalization aim is to establish the theoretical, logical, and mathematical relationships between variables that appear in SFD. The main points in formalization are the selection of appropriate theories for each variable; also, some of the existing theories need modifications. Delphi survey is used in formalization too.

Sensitivity analysis is the fifth step. There are many parameters in a medium-sized system dynamic model, so after formalization, the sensitivity of each parameter should be checked, so there are two kinds of parameters; some are sensitive, and some are none-sensitive. If the parameters are sensitive, obtaining them directly from secondary data sources such as databases, archives, or previous research is preferred.

After passing the sensitivity analysis step, the Delphi survey again checks the dynamic model. Some changes will be made based on the Delphi survey; after this stage, the dynamic model will be valid and reliable. In this way, running the dynamic model leads to diagrams that observe the IS success in m-banking during a specific time.

System Dynamic Modeling Process

The executive model for simulation of the dynamic model of information systems success in M-banking is shown in diagram 1:

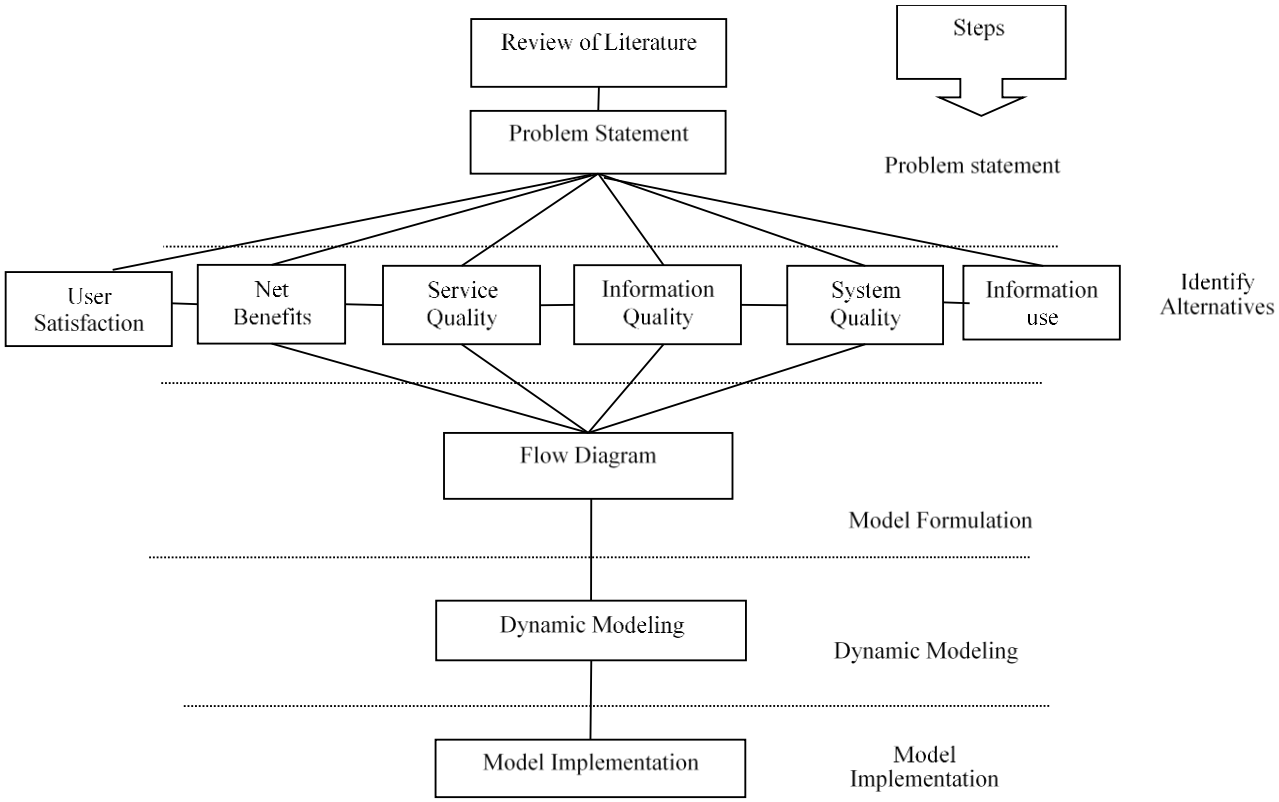

Diagram1: Executive Model

REPRESENTING MODEL

Fig. 3 and 4 is the stock flow diagram (SFD) for the IS success in m-banking systems. Due to the size of the model, it is proposed in two parts, Fig 3 and 4. The formation of this model is based on the combination of the D&M model in IS success systems. Most of the factors were gathered from a review of related literature. The stock factors are based on the main factors of D&M model, and the flows also are drawn based on the relationships between those two models.

Model Behavior

In this section, the behavior of each main factor, based on D&M model, is explained. All the factor's behaviors were forecasted in 132 months. Fig. 5 shows the behavior of system quality during the period.

Fig. 5. System Quality Behavior

Fig. 5 shows the behavior of system quality; it is not one of the standard behavior of system dynamics. There are so many swings, but the whole diagram shows improvement during 132 months.

The next factor is service quality, as figure 6 shows below. Service quality has goal-seeking.

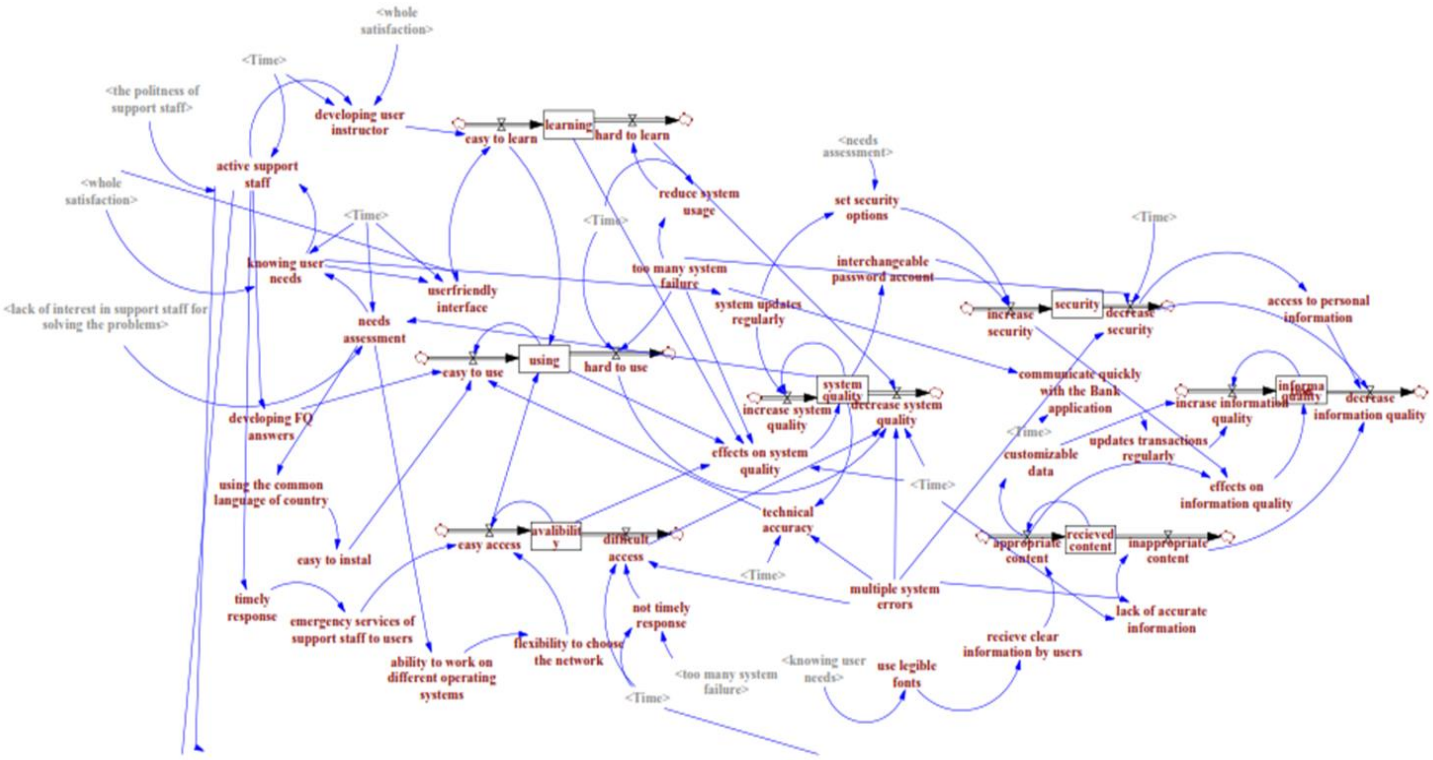

Fig. 3. System Dynamic Model (part one)

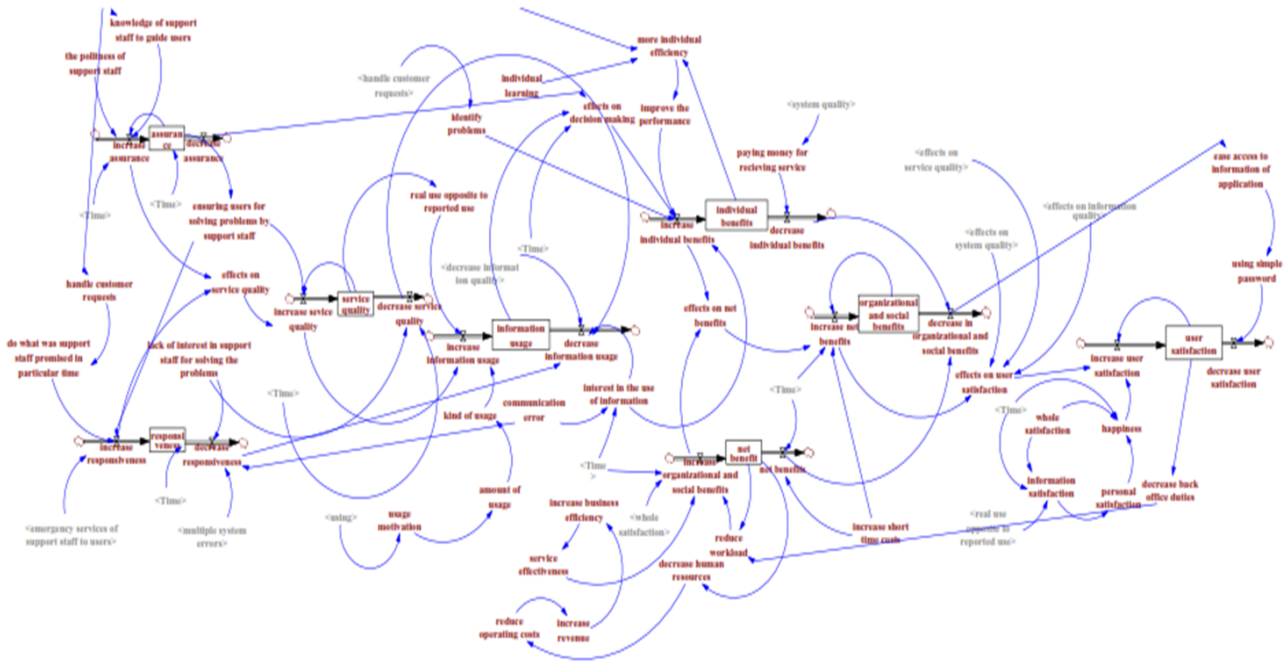

Fig. 4. System Dynamic Model (part two)

Fig. 6.Service Quality Behavior

Behavior; It means the quantity of service quality starts below a goal level and, over time, moves toward the goal.

Information quality is the other factor; as fig. 7 shows, information quality has exponential growth, which means the quality of the information system is getting better during the period of the dynamic model.

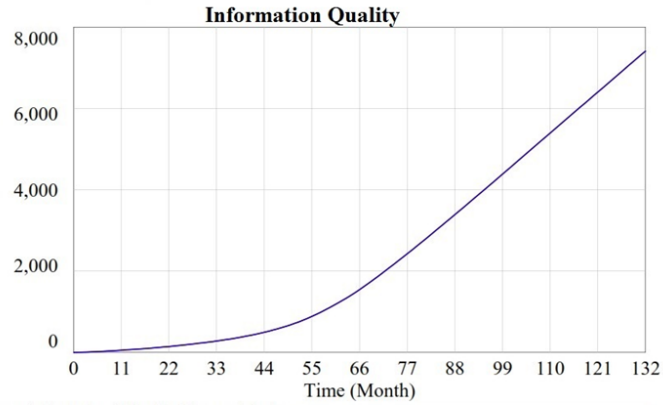

Fig. 7. Information Quality Behavior

The behavior of information usage is explained in Figure 8; the behavior of this factor is not one of the standard behavior of system dynamics. There are so many fluctuations, but the whole diagram shows improvement during 132 months.

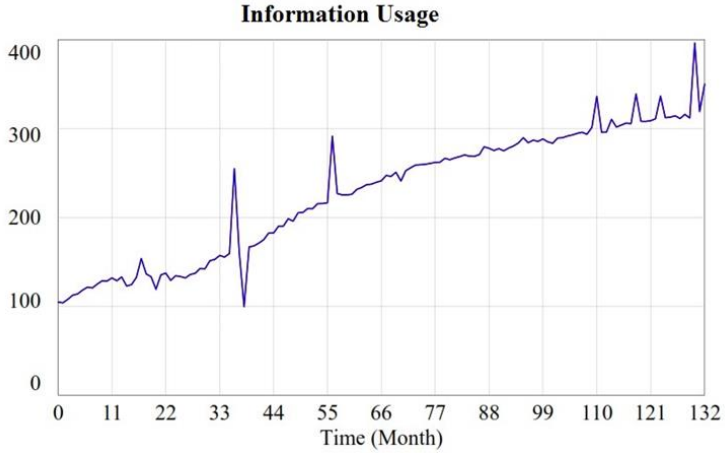

Fig. 8. Information Usage behavior

User satisfaction behavior that is shown in Fig. 9 is S-shape. It means initial exponential growth is followed by goal-seeking behavior, which results in user satisfaction leveling off.

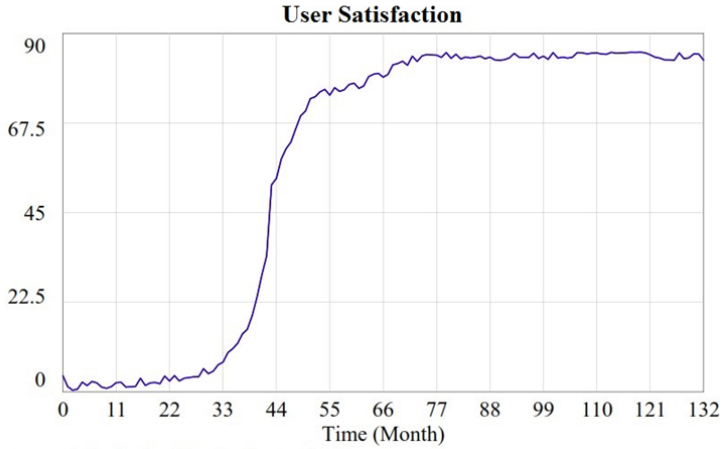

Fig. 9. User Satisfaction Behavior

The last system is a net benefit. As Fig 10 shows, the behavior of net benefit is similar to user satisfaction behavior; it is S-shaped with short-term fluctuations.

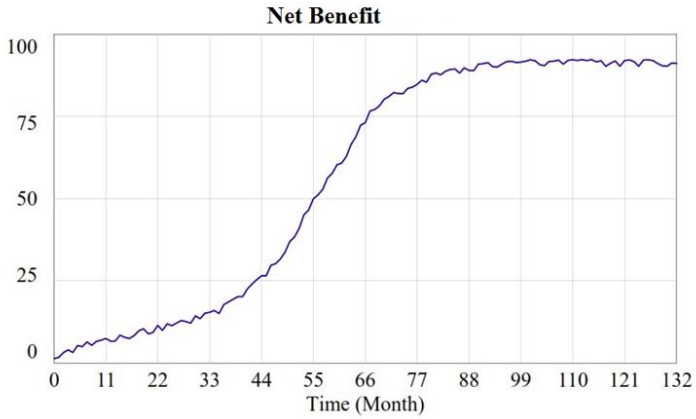

Fig. 10. Net Benefit Behavior

Validation of the Model

Dimensional Consistency Test

In the current model, the dimensional compatibility test was performed by Vansim software, and this test is designed to check the compatibility between the dimensions of the model. After designing the model, a dimensional compatibility test was performed for the final model, and the software gave no error.

Boundary Adequacy Test

This test examines the appropriateness of the range and boundary of the model for the intended purpose. The first step in this test is determining the boundary of the model. Useful tools include model boundary diagrams and subsystem diagrams (Esterman, 2000).

In the simulation process of this model, first, some variables such as reducing the number of customers visiting the branches in person, using the common language of the country, being aware of the developments in banking software, the ability to change user account passwords, the ability to personalize received information and storable content. They were not taken into account, but with further study and getting the opinion of experts, the effect of these variables was confirmed in the boundary of the model.

In addition to this, the relationships between the main variables of the model, such as system quality and information quality, were initially considered indirectly and as a percentage of their effect, but after further examining the model and receiving the opinion of experts, the effect of these variables was seen directly on each other.

On the other hand, in some other variables, such as designing a user-friendly interface and dealing with customer complaints, the effect should be seen in two or more main variables, and after receiving the opinion of experts and their approval, the model was modified.

Finally, due to many changes, some variables were considered look-up variables; according to the amendments made and the final opinion of the experts, the adequacy of the border test was made entirely for the model.

Optimistic Scenario

Considering the sensitive parameters in the base scenario, we change the parameters to the best state to compile the optimistic scenario. An optimistic scenario is obtained, assuming the most favorable conditions. In this scenario, it is assumed that the system parameters have their best possible values. In this scenario, the parameters and coefficients are changed first, and then the model is executed. The changes are made based on expert opinions about the optimistic scenario.

The changes applied are as follows:

1- 40% increase in the ability to quickly install the software in different systems

2- 40% increase in easy software installation in different systems
3- 40% increase in workability in different operating systems
4- 30% increase in the ability to personalize the information received by the user
5- 50% increase in the immediate service of support staff to users
6- 30% increase in awareness of the world's developments in banking software
7- 20% increase in correct needs assessment
8- 20% increase in the speed of communication with the bank with the software
9- 30% increase in the knowledge of support unit employees to guide users
10- 20% increase in doing the promised work in a specific time by the support unit
11- Creating the ability to transfer to the memory card in the software
12- 20% increase in the coefficient of ease of use
13- 10% increase in the effect factor of suitable content of the software
14- 20% increase in the effective coefficient of motivation to use
15- 15% reduction in the exit rate of covered customers
16- 10% reduction in the rate of customers visiting branches
17- 10% reduction in the duty rate of bank employees behind the counter

If you look optimistically at the model and change the values mentioned above, the behavior of the main variables of the model will improve significantly. The most improvement was seen in the variable of user satisfaction, and the least improvement was seen in the variable of information quality.

Pessimistic Scenario

Considering the sensitive parameters in the base scenario, we change them to their worst case to compile the pessimistic scenario.

In this scenario, the parameters and coefficients are changed first, and then the model is executed.

The changes applied are as follows:

1- 30% reduction in the ability to quickly install the software in different systems
2- 30% reduction in easy installation of software in different systems
3- 30% reduction in workability in different operating systems
4- 20% decrease in the ability to personalize the information received by the user
5- 40% reduction in providing immediate service of support staff to users
6- 20% reduction in awareness of the world's developments in banking software
7- 10% reduction in correct needs assessment
8- 10% reduction in the speed of communication with the bank software
9- 20% reduction in the knowledge of support unit employees to guide users
10- 10% reduction in doing the promised work at a specific time by the support unit
11- Absence of ability to transfer to the memory card in the software
12- 10% decrease in ease of use
13- 10% decrease in the effect factor of suitable content of the software
14- 20% decrease in the effective coefficient of motivation to use
15- 15% increase in the exit rate of covered customers
16- 10% increase in the rate of customers visiting branches
17- 10% increase in the duty rate of bank employees behind the counter

In the case of a pessimistic view of the model and change of the values mentioned above, the behavior of the main variables of the model is significantly reduced, and some variables, such as user satisfaction, become negative, which means complete dissatisfaction with the system. In this scenario, the system quality variable shows the highest decrease, and the information quality shows the lowest decrease.

CONCLUSION AND DISCUSSION

The main aim of this article is to develop an SD model for a successful IS in m-banking. This model is based on the combination of both D&M models. Reviewing the related literature on information system success indicates some important points. It shows that D&M models, the first model proposed in 1992 and the revised

model proposed in 2003, are useful in studying successful information systems.

Also, we reviewed the changes of the D&M revised model from SD. The main change in the updated D&M model referred to the cycle of usage intention, user satisfaction, and net benefit. The cycle shows that thinking linearly is not working for studying IS success. As a result, this research found that the SD point of view is more effective in studying IS success in different disciplines concerning D&M updated model.

In conclusion, among the 6 main variables of the success model of information systems in Iran's mobile banking system, the variable of user satisfaction is influenced by all variables. Therefore, the changes in this variable are closely related to the changes in other variables.

Also, based on the dynamic model of the success of information systems in Iran's mobile banking system, the variable of net benefits has two main dimensions, individual benefits, and organizational-social benefits, which under the system of organizational-social benefits has a greater effect on the behavior of the net benefits system. The two variables of ease of use and ease of learning affect the movement of the system quality chart more than other variables. This issue results from the higher weight of the two mentioned subsystems.

Furthermore, Security is the most important subsystem in the information quality system. Small changes in the security system cause significant changes in the movement process of the information quality chart. The service quality system has an effective subsystem called accountability. However, it is necessary to mention that the responsiveness itself is affected by the two shadow variables of dealing with customer complaints and active support, and since the items mentioned above are among the system quality variables; the service quality system is more dependent on the quality of the system; The sensitivity analysis of the model also proved the above issue.

Moreover, the system of information use is related to the subsystem of reducing the exit rate of the covered customers, which in the sensitivity analysis also shows the high impact of the information use system on the variable of the exit rate of the covered customers. User satisfaction, in addition to the fact that it is based on the studied literature and the way the model works, is considered a kind of successful result of information systems in the mobile banking system; they also have a significant effect on the net benefits.

At last, the variable of effect on user satisfaction is considered the model's main system, which has a shadow effect on user satisfaction along with other subsystems. Based on the sensitivity analysis, user satisfaction shows a high sensitivity to these shadow variables. The implementation of the SD model in m-banking shows that service quality, information quality, system quality, usage intention, user satisfaction, net benefit, responsiveness, organizational and social benefits, and information usage will significantly influence the IS success in m-banking.

The results of studies in the field of research literature show that In Delone and McLean's primary model, the system's impact on people and the system's impact on the organization are not related to the user's satisfaction dimension. This means that the effects of the system on people and organizations on user satisfaction are not studied in this model. This model seems unable to study individual and organizational effects on user satisfaction. Other weaknesses of this model are mentioned in the following cases. Also, in this model, the quality of service received by the user is not studied, and the effect of user satisfaction on individuals and organizations is not considered.

On the other hand, Delone and McLean's primary model studies the system's impact on people and its organizational impact. While in the revised model, these two works have become one. Delone and McLean's primary and revised model looks at the success of information systems in a process way, while other models, like Seddon's model, are behavioral models.

Finally, to present the success scenarios of information systems in the mobile system of Iranian banks, the collection of variables was used; To be able to design a comprehensive

obstacle model to present relevant and close to-real scenarios. This point of view is not mentioned in previous studies, which help researchers to find mobile bank systems as cause and effect loops with a dynamic perspective.

Based on the results obtained from the model, the user satisfaction variable is under the influence of all variables; which has not been detected in previous studies. Therefore, it is suggested that the managers of the banks' information systems pay special attention to the satisfaction of their users in order to have a more successful information system. They should be as diligent as possible in strengthening the subsystem of organizational-social benefits so that the behavior of the net benefits system will have a better performance.

Also, the system of using information is related to the subsystem of reducing the exit rate of covered customers, which has not been detected in previous studies, which shows the importance of using the information in the mobile banking system. Therefore, it is suggested that the country's bank managers prevent potential crises by regularly monitoring the rate of customer withdrawal from their mobile banking system.

Based on the D&M model's SD model is designed to elaborate how an information system success occurred in m-banking. So in this study, we found the optimistic and Pessimistic scenarios, and by analyzing the SD model behavior, we found how each IS success factor behaves under the optimistic and pessimistic scenarios.

After carrying out the research and studying the results, it is recommended that future researchers present another composite model based on the successful models of information systems but with the method of genetic algorithm or object orientation in the mobile banking system.

More studies should be done on an integrated model that is process-behavioral so that in addition to the study of system behavior, system processes are also considered, and information systems success models are discussed with an emphasis on security variables.

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