The Application of the Technology Acceptance Model: A New Way to Evaluate Information System Success

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Abstract:

In the modern era, the advances in information technology have been dramatically shaping the ways people live as well as the ways organizations manage their businesses in their professional business domains. Implementing various kinds of information systems, such as Decision Support Systems, has been recognized as one of the most crucial tasks for organizations in order to continue to be competitive or even to survive. Although considerable effort has been devoted to improving the performance of information system implementations, organizations are still constantly suffering from the failures of information system implementations. In this study an extensive framework that depicts the context of information system implementation is developed. A system dynamics approach is used to investigate the dynamic nature of information system implementations. By using the proposed system dynamics model, we contend, executives and information system professionals of organizations can gain comprehensive insights into organizational behaviors and substantial policy-making implications regarding information system implementations.

Keywords: Information System Success, System Dynamics, TAM

1. Introduction:

In the modern era, the advances in information technology have been dramatically shaping the ways people live as well as the ways organizations deal with their businesses in their professional business domains. Implementing various kinds of information systems, such as Enterprises Resource Planning (ERP) systems, Decision Support Systems (DSS), and Knowledge Management Systems (KMS), has been recognized as one of the necessary tasks organizations have to perform in order to continue to survive. Given the tremendous amount of efforts organizations have devoted to the implementation of information systems, organizations are still continuously suffering from the failures of information system (IS) implementation. The purpose of this study is to provide a comprehensive framework that can help information system professionals understand the context of information system implementation. By having accurate assessments, the framework can in turn help IS professionals develop effective strategies or policies in order to maximize the probability of success in implementing information systems.

Among all potential causes that might be responsible for the success or the failure of information system implementation, users' attitude and acceptance of an information system have been recognized as factors that have critical impacts on the performance of information system implementations (Davis 1989; Pikkarainen, Pikkarainen, Karjaluoto, and Pahnila 2004; Succi and Walter 1999; Venkatesh and Davis 1996). The Technology Acceptance Model (TAM) has been well known as the most cited and influential model for understanding the acceptance of information technology since it was developed by Davis (1986) and Davis, Bagozzi, and Warshaw (1989) in the late 80'. The DeLone and McLean (D&M) IS Success model, ten years after it was first proposed by DeLone and McLean (2002), has become a standard for the developing and justifying the measurement of the dependent variable in information systems research. A total of 285 papers, including published papers as well as proceedings, have referenced this model to discuss the evaluation of IS success during the period 1993 to mid-2002 (DeLone and McLean, 2003). Given both models are expanded and empirically validated by various scholars and practitioners, one question still interests many information system professionals: Is it possible to have a better and more thorough model for evaluating IS success?

In this research project we seek for the possibility of creating a new model for evaluating IS success by applying the concepts of both TAM and D&M IS Success Model. The discussion starts with a brief introduction of Technology Acceptance Model and an overview on the development of DeLone and McLean's (1992; 2002; 2003) IS success model. An integrated model for evaluating IS success that is generated by encompassing the fundamental theories of both the TAM and the D&M update IS Success Model is proposed. The approach of system dynamics is adopted for this study so as to demonstrate how the proposed model can be beneficial for decision makers in organizations on evaluating the implementation of information systems.

2. Development of the theoretical foundation:

2.1 Technology Acceptance Model (TAM):

Davis (Davis 1986; Davis 1989; Davis 1993; Davis, Bagozzi, and Warshaw 1989) introduced TAM, which is presented in Figure 1, for modeling user acceptance of information systems in 1986. TAM starts by proposing external variables as the basis for tracing the impact of external factors on two main internal beliefs, which are perceived usefulness and perceived ease of use, while perceived ease of use also affects perceived usefulness over and above external variables (Taylor and Todd 1995). These two beliefs both influence users' attitude toward using IS. Attitude toward using sequentially has influence on behavior intention to use, which is the key factor for determining actual conditions of system use, while belief of perceived usefulness also affects behavioral intention to use over attitude toward using (*Taylor & Todd, 1995*).

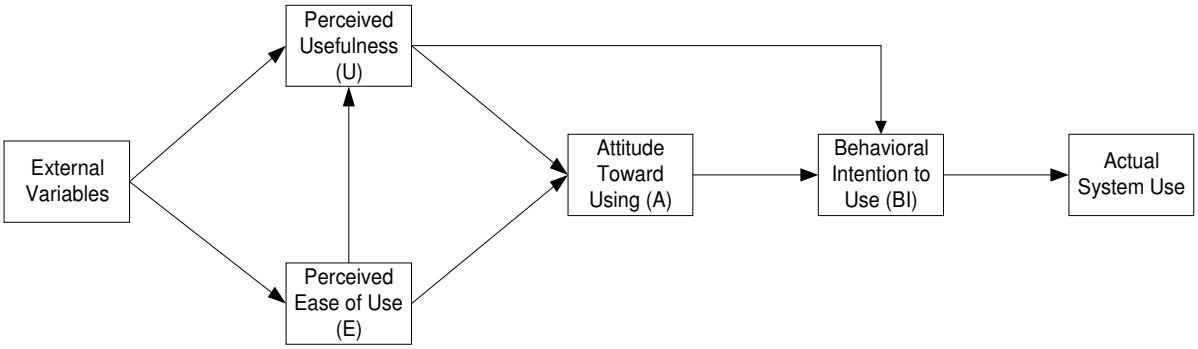

Figure 1: Technology Acceptance Model

2.2 The D&M IS Success Model:

The original D&M IS success model was proposed by DeLone and McLean (1992) back in 1992. The main purpose of this model was to "identify those factors that contribute to information systems success" (DeLone and McLean 1992, 60). They finally identified six most important categories of factors for evaluating IS success, which are information quality, system quality, use, user satisfaction, individual impact, and organizational impact, and a model was created using these factors as presented in Figure 2. "System quality" refers to the performance of an IS system itself, while "Information quality" refers to how good is the output from a particular IS system. "Use" is used to measure how well the output of the IS system, such as information or physical reports, are used. "User satisfaction" represents users' overall comments on the IS system. "Individual impact" that DeLone and McLean address here refers to the influence of the outputs of IS systems on individual users' behaviors, while "Organizational impact" refers to the effects of the usage of IS systems on the organizational performance. It is proposed that Information quality and System quality have influence on both Use and User satisfaction. Use and User satisfaction affects Individual impact, and Individual impact in terms influences Organizational impact. One thing needs to be addressed is that the model was built based on a process nature, and the focus while utilizing this model should be to examine how these six categories of factors are *interrelated* and *interdependent* with one another instead of concerning the causal relationships among them.

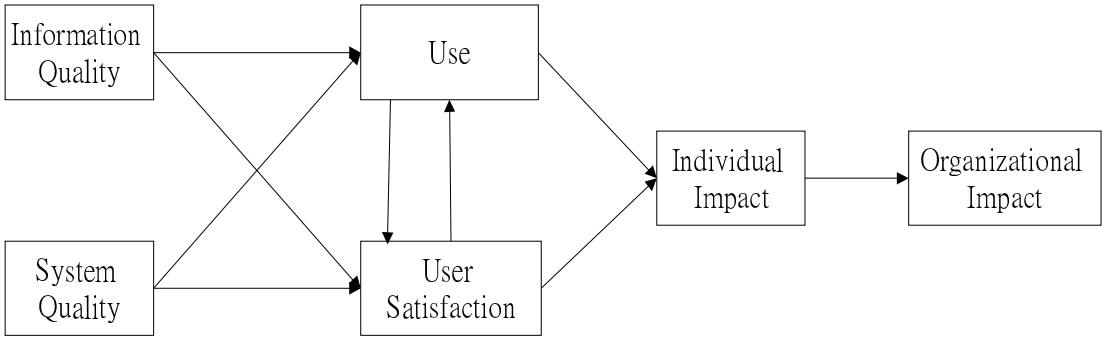

Figure 2: The Original D&M IS Success Model in 1992

DeLone and McLean (2002; 2003) reevaluate their original IS success model, which has been released more than ten years, by taking into consideration the opinions as well as criticisms from

other scholars and practitioners in the last decade. DeLone and McLean slightly modify their original model by including some factors that are newly considered important for evaluating IS success, especially factors that are necessary for measuring e-commerce systems success. This new D&M IS Success Model is presented in Figure 3. In DeLone and McLean's update model, they do not separately consider about individual impact, organizational impact, and some other kinds of emerging impact measures, such as work group impact and consumer impact. On the contrary, DeLone and McLean use the term "net benefits" to represent all the impact measures for the sake of simplifying the model. In addition, DeLone and McLean think the variable "use" in their original model is defined without considering the actual complexity of the usage behaviors. They realize that perspective system users, especially the e-commerce system users, are not always required to use the system. The usage of the systems performed by these users may not be able to totally represent the complex conception of "use" for the purpose of evaluating net benefits under certain circumstances. They state, "declining usage may be an important indication that the anticipated benefits are not being realized" (DeLone and McLean 2003, 16). As a result, they suggest "intention to use" as an alternative of "use" for some particular circumstances in their update model. Moreover, DeLone and McLean agree with the concepts, which are proposed by a number of scholars (Kettinger and Lee 1994; Pitt and Watson 1995), on the importance of service quality for evaluating IS success. Corresponding to these propositions, DeLone and McLean adopt service quality, along with system quality and information quality, as an important category of factors that has influence on intention to use/use as well as user satisfaction.

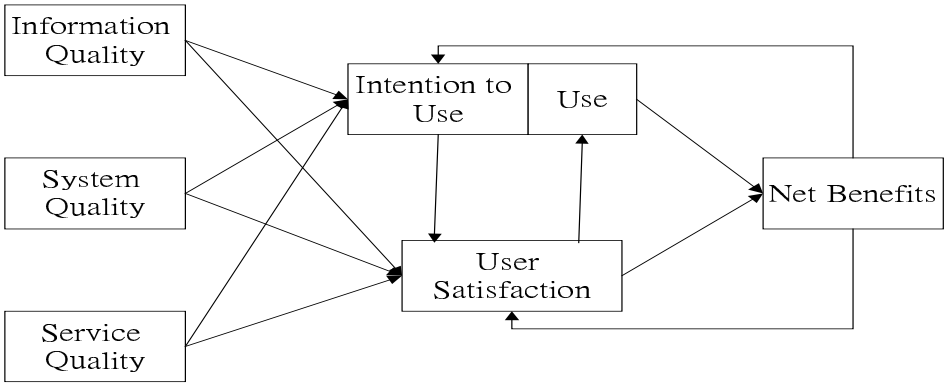

Figure 3: The Update D&M IS Success Model

DeLone and McLean address the point that their update model is still constructed in a process sense. However, it is flexible to utilize the model in a *causal* sense under certain circumstances. "The nature of these casual associations should be hypothesized within the context of a particular study" (DeLone and McLean 2003, 23).

2.3 The Integration of TAM and the D&M update IS Success Model:

From the comparison of TAM and the D&M update IS success model we may see more comprehensive concerns on the system use in TAM model than in D&M IS success model. It is reasonable since TAM was mainly developed to focus on evaluating system usage from users' perspective. However, the D&M update IS success model concerns about the relationships among

actual system usage, user satisfaction, and their influence on the overall benefits, while TAM does not. Both TAM and the D&M update IS success model have their own strengths and weaknesses in terms of evaluating the success of an information system.

However, by integrating the concepts of these two models, we can to a certain extent create a more comprehensive and solid model for evaluating IS success model, since these two models are complementary to each other in a certain way. The proposed model is presented in Figure 4.

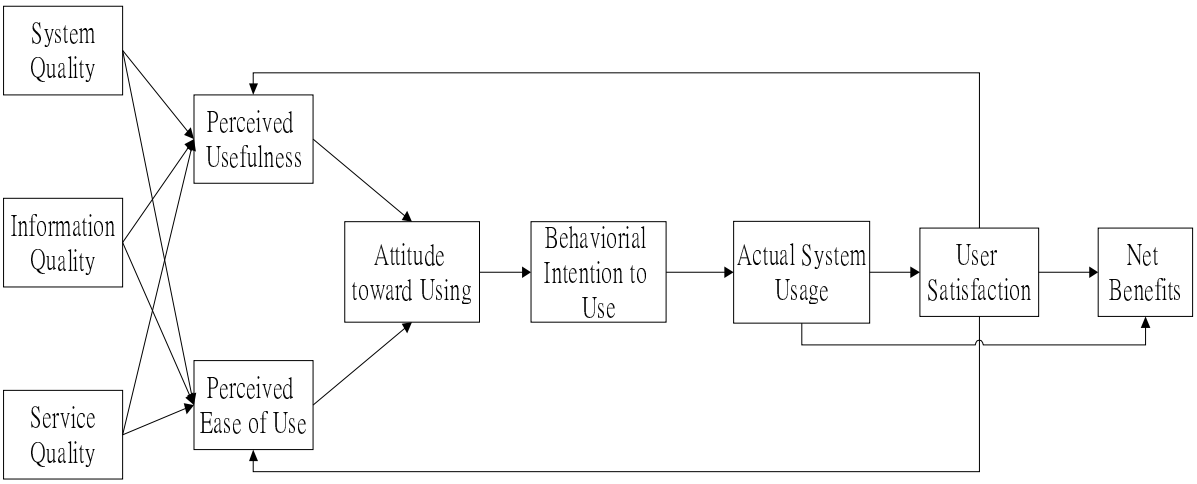

Figure 4: The Integrated IS Success Model

The proposed model is constructed by taking three variables, system quality, information quality, and service quality, in D&M IS success model as the replacements for the external variables in TAM, with a perception that they are the most important three external variables for evaluating system usage. As for the broad concept of system usage, we adopt the idea of TAM since TAM has more comprehensive concepts related to it. In the new model, we include the variables "perceived usefulness" and "perceived ease of use" which the D&M update IS success model does not have. By including these two variables, we argue that users' perceptions on usefulness and ease of use, instead of system quality, information quality, and service quality, have direct influence on system usage, while system quality, information quality, and service quality serve as the most important variables that affect perceived ease of use and perceived usefulness. In addition, we replace "intention to use/use" in the D&M update IS success model with the three factors that are proposed in TAM for evaluating system usage, which are attitude toward using, behavioral intention to use, and actual system usage in a sequential order (see Figure 4).

However, for the purpose of evaluating IS success, we keep the variable "user satisfaction" in our model. We contend with DeLone and McLean's (2003) idea that actual system usage has direct impact on both user satisfaction and the overall benefits that are generated by the implementation of the information system, and user satisfaction also directly affects the overall benefits. In addition, instead of adopting DeLone and McLean's argument that user satisfaction has direct influence on intention to use/use, we suggest that user satisfaction has direct influence on perceived ease of use and perceived usefulness, and in turn affects actual system usage indirectly. We argue that this suggestion is the key to link TAM and the D&M update IS success model

together. We also argue that this new model can be utilized in either a process sense or a causal sense, as DeLone and McLean's claim on their update D&M IS success model.

3. Context of the Development of IS Success System Dynamics Project:

3.1 Purpose of the Project

Although the fundamental structure of the proposed model is developed by referring to a number of existing theories in the area of management information systems, this study is conducted for the purpose of *making policy recommendations* instead of proving a theory. By conducting this study we can have a better understanding on the dynamics of information system implementations in organizations. The model of this study is developed based on the well known Technology Acceptance Model and D&S IS Success Model from the area of management information systems. The purpose of constructing this model is to identify key variables that are associated with the performance of information system implementations in order to have a basic foundation for study rather than starting from scratch. Since both reference models have been empirically validated and widely extended by researchers, it is plausible that the variables selected from the two reference models are the key factors that are associated with the dynamics of information system implementations. In addition, we also use the proposed model as the skeleton for identifying important variables and causal relationships that are related to the implementations of information systems in a more detailed manner. By doing so, we can develop a more comprehensive model in terms of properly exploring the dynamics of information system implementations.

3.2 Target Audience

There are two groups of target audience for this study, IS researchers and IS practitioners. This study is expected to benefit IS practitioners by providing them better insight into what major factors and causal relationships among these factors are dominating the implementation of information systems. IS practitioners can utilize the insights provided by this study to make better policies or to employ more proper strategies for information system implementations, in terms of cost effectiveness and efficiency, desired benefits from information systems, forces of support and barriers within organizations, etc., by taking advantage of a more appropriate and systematic logic of thinking.

In addition, since the context of information system implementation is very complex and somehow vague, it is difficult to identify all the dynamic structures of IS implementation across various perspectives. However, we are expecting that this study would give researchers more comprehensive ideas on what situations people are really facing when implementing information systems. By understanding it, researchers are able to have some leads regarding discovering dynamic structures that have not been identified or drawn the attention they deserve. These efforts will in turn contribute to the knowledge base of policy making in IS implementation.

4. Boundaries and Development of the System Dynamics Model of IS Success:

4.1 Endogenous, Exogenous, and Excluded Variables

From the perspective of system dynamics, the proposed model contains only endogenous variables that describe the story of information system implementation. However, we believe that there are two main excluded exogenous variables which also have notable impact on IS success, which are *Competition* and *Advances of information technology*. The variables "*Increase in user requirements on information system*" and "*Efforts on enhancing IS quality*", which are considered as endogenous variables, are embedded in the model to serve as the bridge between the internal IS implementation environment and the quality of information systems.

There are many exogenous variables proposed in the existing literature that are associated with information system implementation. At current stage we manage to include three most crucial exogenous variables whose values can be adjusted for the purpose of studying the behaviors of the system. These three exogenous variables are "*Training efforts*", "*User involvement in system development*", and "*Perceived sufficiency of organizational resources*". The model can be further expanded in terms of the complexity of policy-making implications by identifying more key exogenous variables in the future.

4.2 Model Structure

A system dynamics model of IS success is developed based on our previous discussions and its aggregated casual loop diagram is presented in Figure 5.

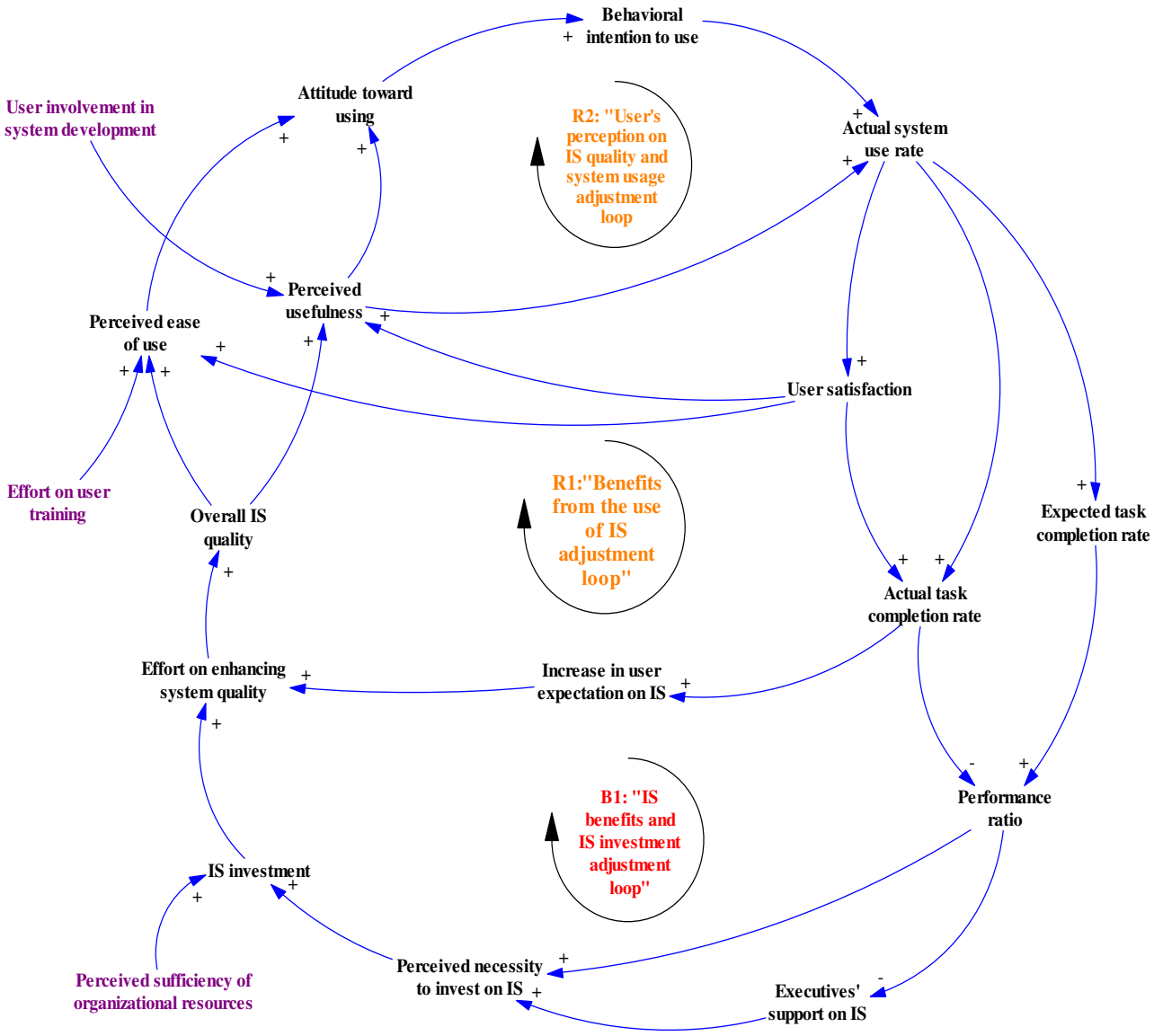

Figure 5: The System Dynamics Model of IS Success

From Figure 5 we can identify two reinforcing loops and one balancing loop that are dominating the behaviors of the system. The first reinforcing loop R1, which is named "*Benefits from the use of information systems adjustment loop*", is presented in Figure 6. The story behind the R1 loop is that the more the users in an organization are willing to use their information system, the more they are satisfied with the system. As a result, the users can use the information system in more effectively and efficiently ways and in turn increase the actual task completion rate. When the benefits the users get from the information system increase, users' expectations on the information system will increase. The increasing expectations of users will encourage or force the IS professionals of the organization to put more efforts on enhancing the quality of the information system, and in turn result in improvement in the overall IS quality. When the quality of the information system increases, the system are assumed to be capable of providing more useful

information, services, and user-friendly interfaces, which can make users feel that the system is becoming more useful and easier to use. As a result, the users will become even more willing to use the information system than they used to be in order to get even more benefits from it.

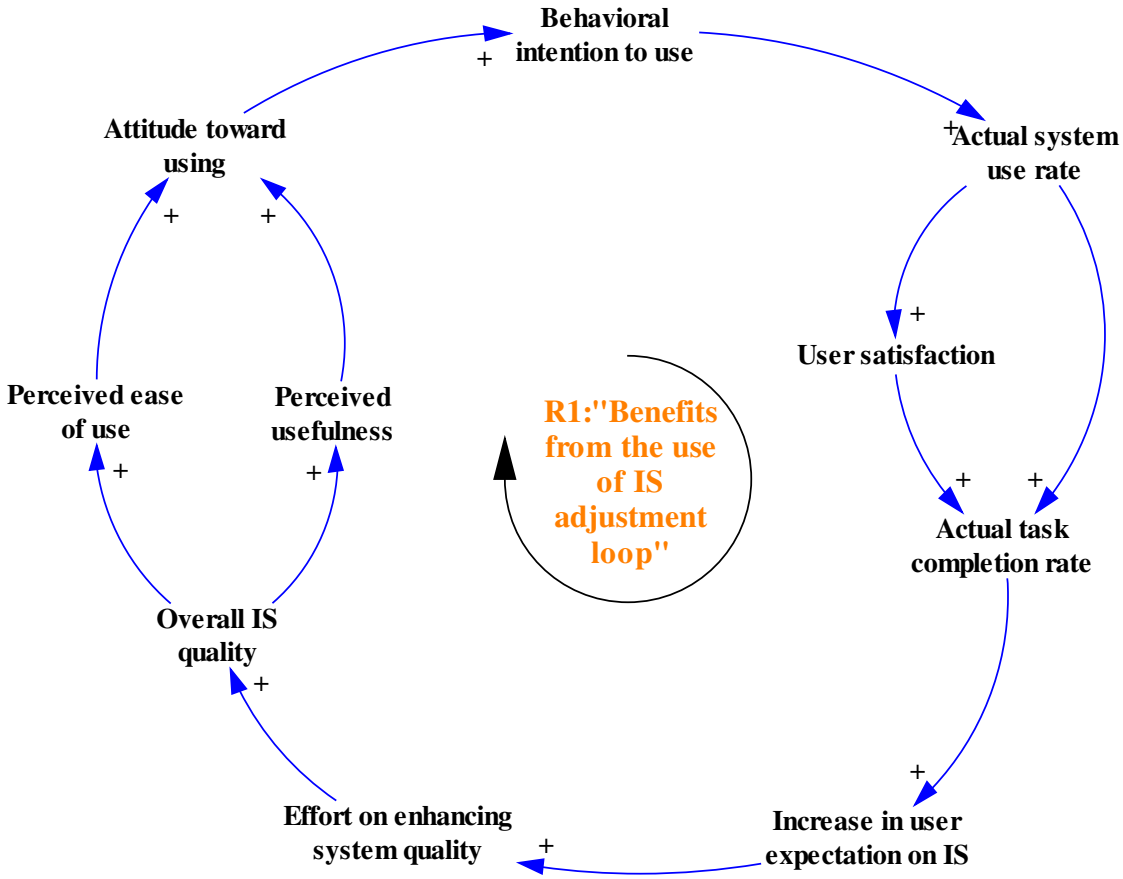

Figure 6: The R1 reinforcing loop in the IS Success Model

The second reinforcing loop R2, which is named "*User's perception on information system quality and system usage adjustment loop*", is presented in Figure 7. The story behind the R2 loop is that the more the users in an organization are willing to use their information system, the more they are satisfied with the system. The more the users are satisfied with the system, the more likely they will start to feel that the information system is becoming more useful and easier to use. As a result, the users will become even more willing to use the information system than they used to be.

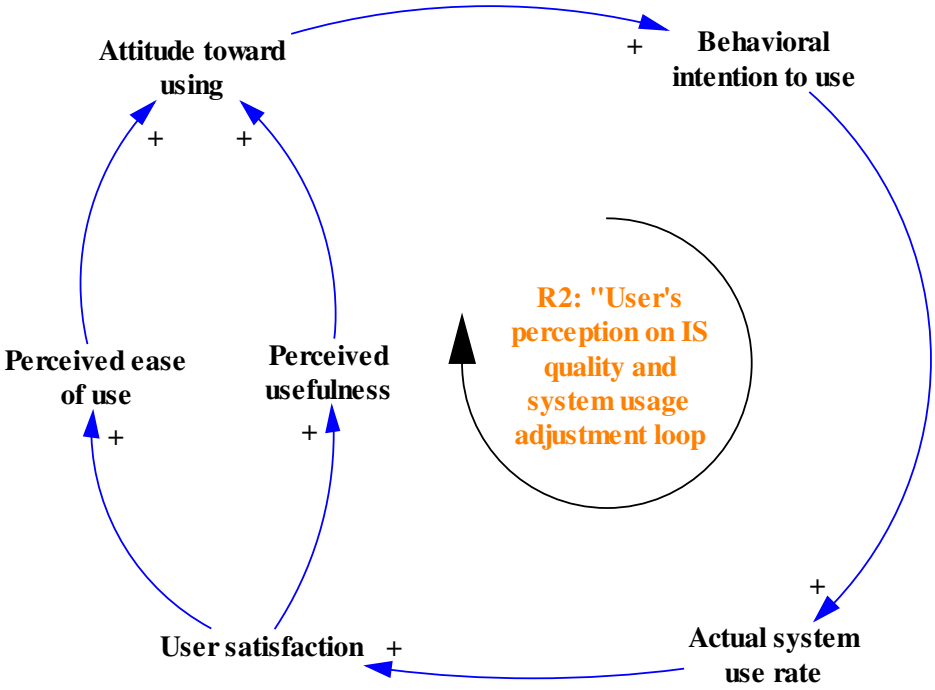

Figure 7: The R2 reinforcing loop in the IS Success Model

The balancing loop B1, which is named "*IS benefits and IS investment adjustment loop*", is presented in Figure 8. The story behind the B1 loop is that the more the users in an organization are willing to use their information system, the more benefits they can acquire, which reflect on the increase in actual completion rate as we discussed previously. When the benefits the users get from the information system increase, the gap between the expected and actual task completion rate, which is represented by the variable "performance ratio" in the model, will decrease. As a result, the users will have the perception that the information system is good enough for them and this kind of performance of the information system will last even though the organization did not do anything afterwards. This kind of perception will lead to the perception that there is no need to continue to invest as well as put more efforts on the information system since it is functioning pretty well. However, an information system must be properly maintained by devoting constant efforts in order to continue to provide the same quality of services to the users. These inadequate reactions will deteriorate the quality of the information system and in turn make it less useful and harder to use for the users. As a result, the users will become less willing to use the information system than they used to be.

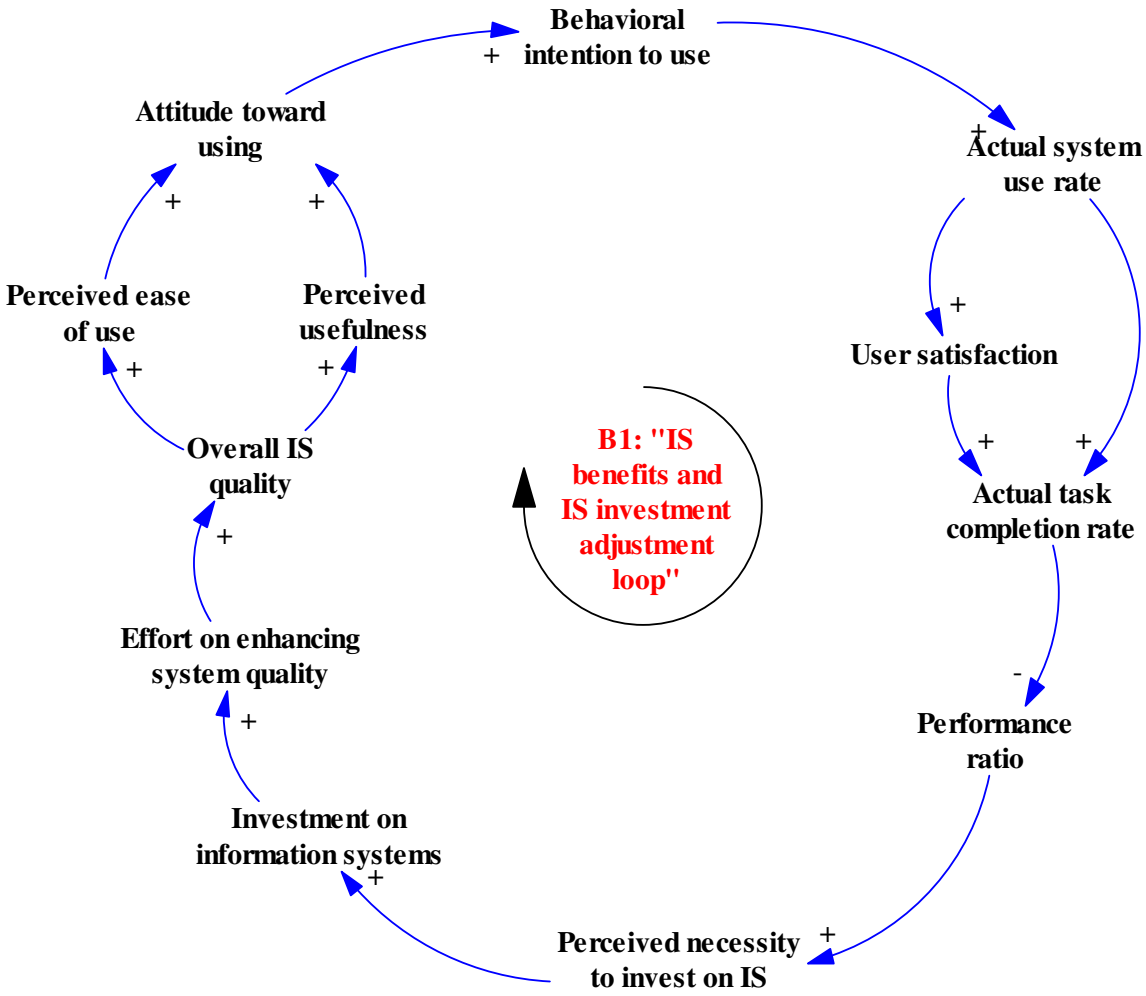

Figure 8: The B1balancing loop in the IS Success Model

The stock and flow diagram of the proposed IS model is presented in Figure 9 below. There are four stocks in the model, which are "*Actual system use rate*", "*Actual task completion rate*", "*IS investment*", *and "Overall IS quality*". These four stocks represent the main measures for organizations to evaluate the performance of the implementations of information systems. Generally, the ideal scenario for organizations is that the larger the IS investment is, the better the Overall IS quality is, the higher the Actual system use rate is, and the higher the Actual task completion rate is. Each stock has an expected or indicated value, which is influenced by a number of related variables. The net increase of a stock is mainly determined by the gap between its current value and its expected value. Each stock is also accompanied by a SMOOTH structure in order to reflect the effect of time delay on the stock.

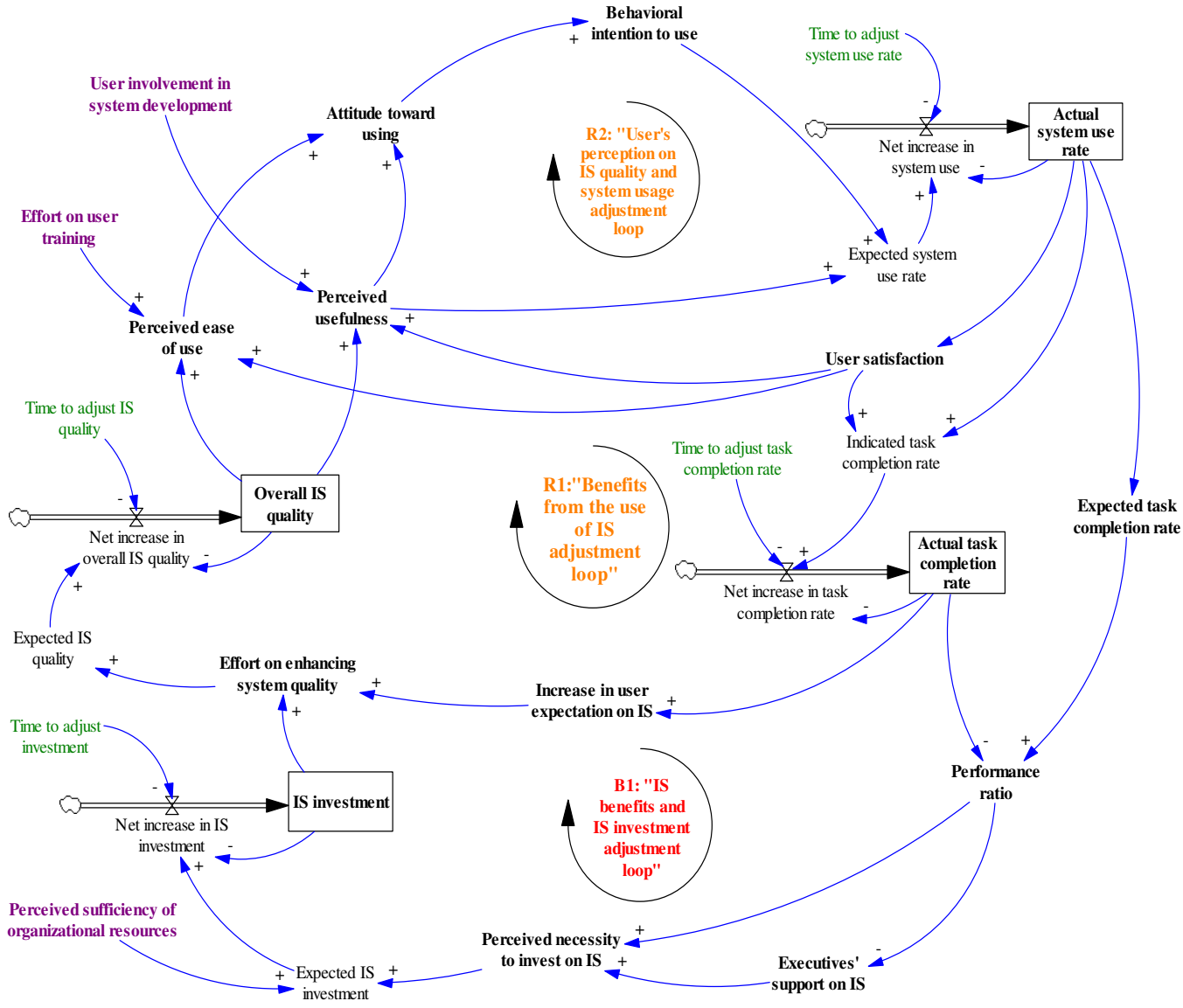

Figure 9: The stock and flow diagram of the IS Success Model

4.3 Application of System Archetype

The "Limits to Success" archetype structure in the proposed IS success model is composed of one balancing loop and one s reinforcing loop (see Figure 10). The balancing loop B1 represents the structure that contains the constraint and limiting action of the system. The s reinforcing loop R1 represents the structure that contains the efforts made for the purpose of enhancing performance.

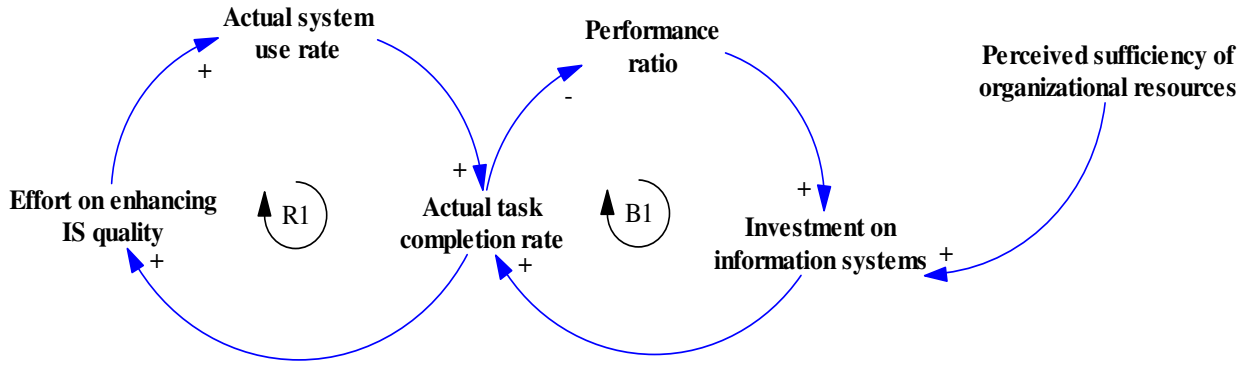

Figure 10: "Limits to Success" structure of the IS success model

The "efforts" loop R1 starts from Actual task completion rate (see Figure 10). When the Actual task completion rate increases, Efforts on enhancing IS quality increases, and eventually leads to the increase in Actual task completion rate. Although the structure of "efforts" pushes the system to move toward the direction for success, the effect of the "constraint" loop B1 includes a constraint that can limit the potential of the "efforts" structur in creating benefits. The indicated constraint is the limited organizational resources. The balancing loop B1 (see Figure 10) that includes the constraint starts from the Actual task completion rate. When the Actual task completion rate decreaes, the Investment on information systems increases, and eventually leads to the increase in the Actual task completion rate. However, when the Perceived sufficiency of organizational resources is lower than a certain level, it constaints the increase in the Investment on information systems, and in turn limits the potential for increasing Actual task completion rate.

4.4 Time Horizon

As far as we are concerned, there has not been a commonly accepted estimation on the average lifespan of an information system. However, since the length of the diffusion of an information system can be a few years to a few decades (Yang and Huang 2004), *ten to fifteen years* would be a plausible estimation of the time horizon for this system dynamics study. As a result, the time horizon for the proposed IS success model is set as ten years.

4.5 Sector Overview of the IS Success Model

The sector overview diagram of the IS Success model is presented in Figure 11 below. The diagram is presented in order to provide us a comprehensive insight into the key behaviors of the proposed model. There are six sectors and multiple flows in the system. These six sectors are "*Use of information system*", "*Benefit assessment of information system*", "*Contribution of information system*", "*Organizational investment on information system*", "*Quality of information system*", and "*User's assessment and attitude on information system*". Each sector represents an important behavior in regard to the use of an information system in an organization. Instead of isolating from other objects in the system, these sectors are associated with one another through the transfer of materials and information among them. The material or information flows provide necessary information to their designated sectors for the purpose of performing the main tasks of the sectors. Among all the flows in the diagram, only two of them are material flows, which are "*Investment on*

IS" and "*Training efforts*", while the others are information flows. The "Investment on IS" contains money, equipment, human resources, etc., while the "Training efforts" represents hours of efforts spent on training information system users.

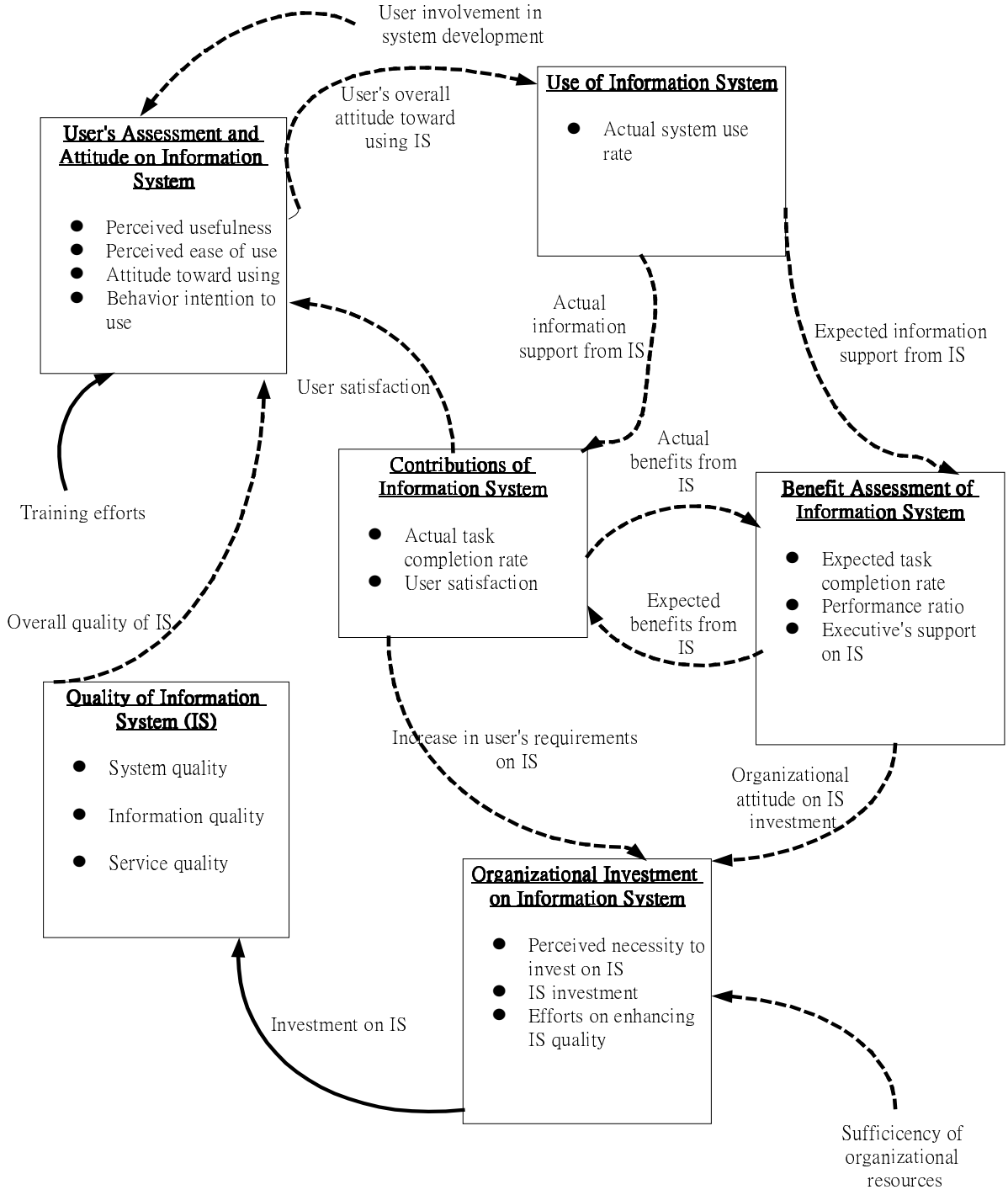

Figure 11: Sector overview diagram of the IS success model

4.6 Policy Structure Diagram of the IS Success Model

The policy structure diagram of the IS Success model is presented in Figure 12 below. The diagram provides a conceptual representation of the policy structure that is embedded in the proposed IS success model. The diagram is beneficial to the general public since it reveals the policy structure of the proposed model in a manner that people can easily comprehend. In this diagram, the information from two sectors, which are "Use of information system" and "Contribution of information system", help decision makers in an organization determine their performance gap in benefits from the use of an information system. This gap in turn serves as the main criterion for decision makers in the organization to determine how they are going to allocate their organizational resources. The amount of organizational resources assigned to information system implementation and the previous contribution of the information system determine the quality level of the information system. The quality level of the information system is used as the determinant for information system users to assess the usefulness of the information system. User's perception on the information system is the key for assessing the use rate of the information system. Finally, the level of use rate of the information system is used to evaluate the benefits that are generated from the use of the information system.

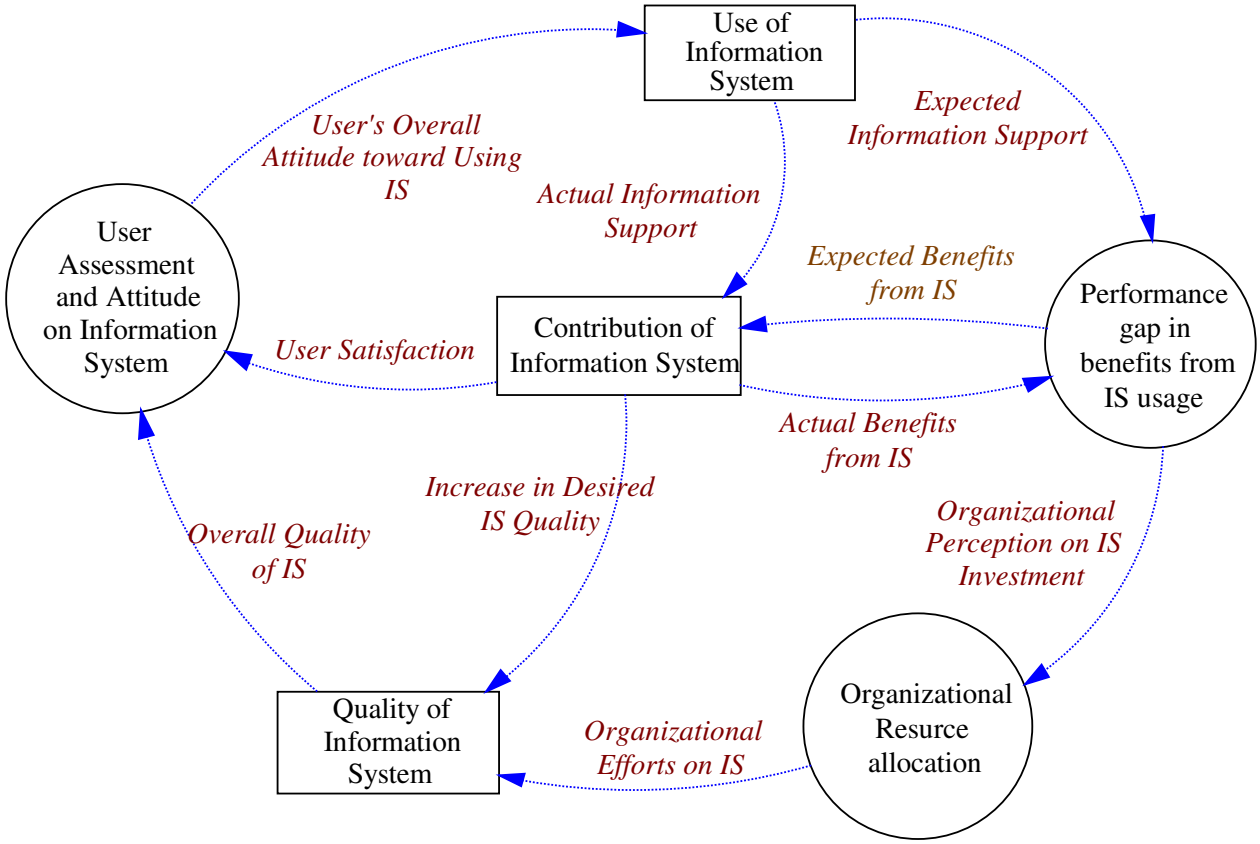

Figure 12: Policy structure diagram of the IS success model

4.7 Reference Mode

The reference modes of the dynamics system in this study is discussed based on the behaviors of the most four important variables, "*Actual system use rate*", "*Actual task completion rate*", "*IS investment*", and "*Overall IS quality*". These four major variables are responsible for the success or failure of information system implementation. One fundamental assumption for this model is that when certain normal level of investment on a particular information system is devoted continuously, the quality of information system and the actual system use rate of users are expected to become stable at certain normal levels. However, having the normal actual system use rate only allows an organization to perform its regular operations properly, but cannot significantly generate extra benefits for the organization. As a result, the task completion rate is also expected to stay at a certain normal level.

Another key assumption is that an organization can significantly increase the benefits generated from implementing an information system by boosting up the system use rate by taking advantage of employing accurate as well as effective organizational strategies or policies. Corresponding to these two assumptions, all of the four stocks are expected to start at certain equilibrium levels, and then increase gradually and eventually reach certain higher equilibrium levels if proper organizational policies were implemented. The reference modes of the IS success model are developed and presented in Figure 13, 14, 15, and 16.

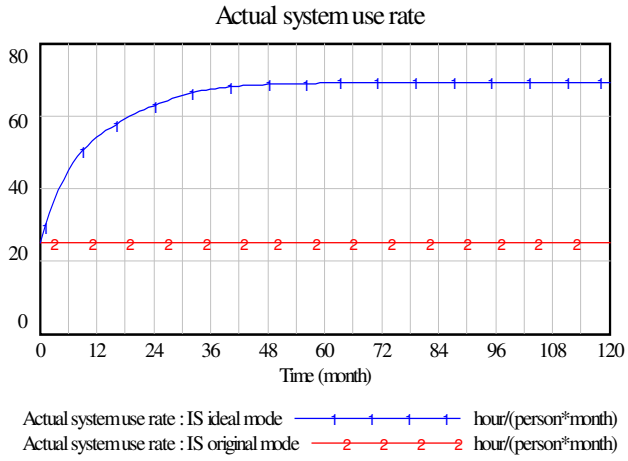

Figure 13: Reference mode- Actual system use rate

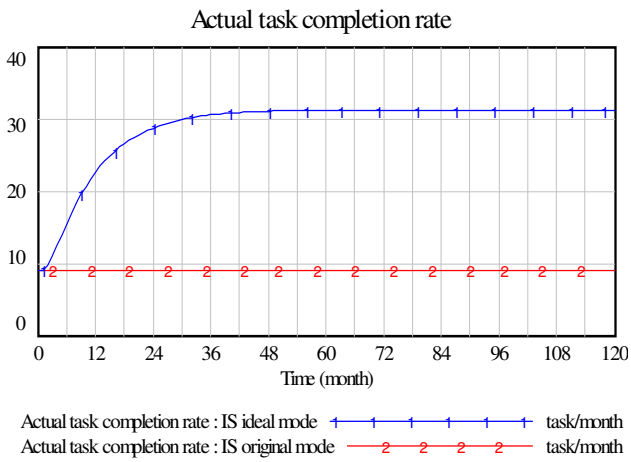

Figure 14: Reference mode- Actual task completion rate

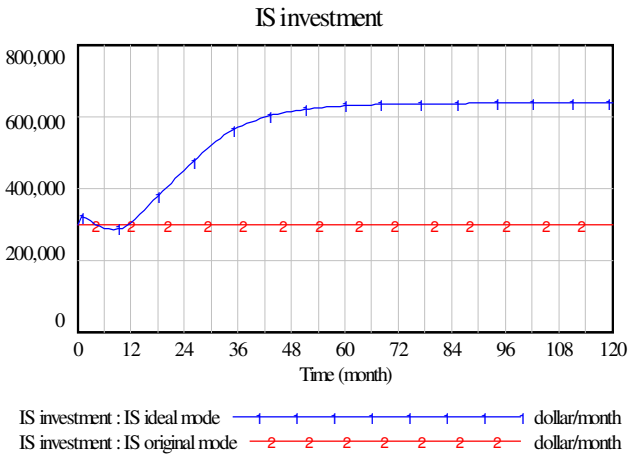

Figure 15: Reference mode- IS investment

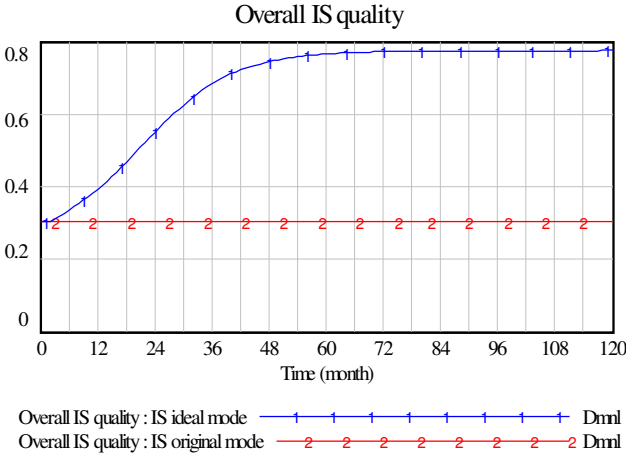

Figure 16: Reference mode- Overall IS quality

5. Application of the IS success System Dynamics model:

5.1 The Base Run

Three exogenous variables are included in the model for adjusting the behaviors of the system of IS implementation, which are "*User involvement in system development*", "*Effort on user training*", and "*Perceived sufficiency of organizational resources*", as presented previously in Figure 9. The changes in the values of these three variables are expected to significantly change the behaviors of the system. The graphs of the base run of the model are presented in Figure 17, 18, 19, and 20 below. In this base run, all of the four stocks stay at certain equilibrium levels throughout the whole simulation time period.

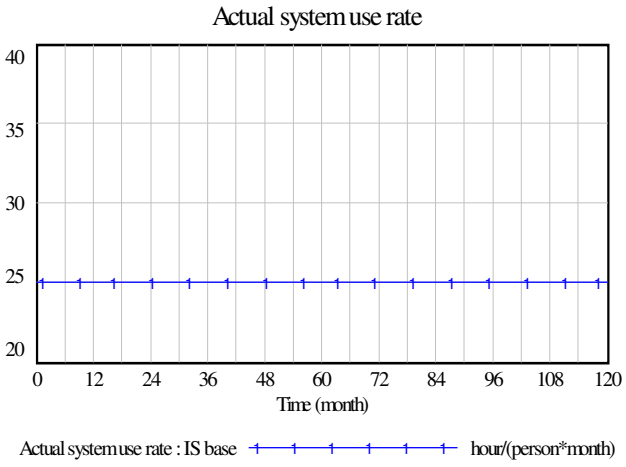

Figure 17: Base run - Actual system use rate

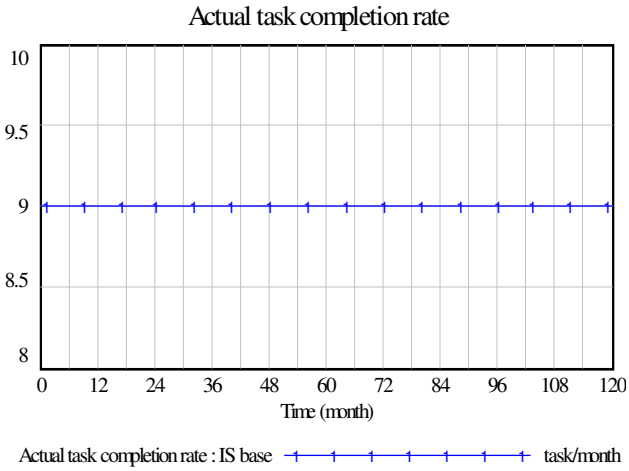

Figure 18: Base run - Actual task completion rate

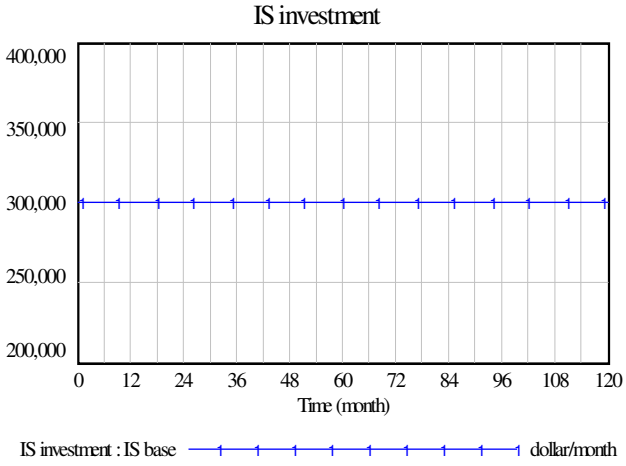

Figure 19: Base run - IS investment

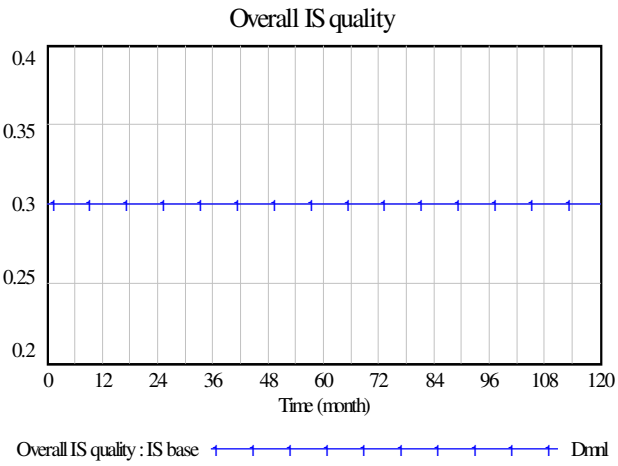

Figure 20: Base run - Overall IS quality

5.2 Adjustment on "User involvement in system development"

In this section we will demonstrate the behaviors of the system by adjusting the value of *"User involvement in system development"* while keep the values of all other variables constant. The summary of the simulation results is presented in Figure 21, 22, 23, and 24. From the results we can conclude that as the rate of User involvement in system development increases, "*Actual system use rate*", "*Actual task completion rate*", "*IS investment*", and "*Overall IS quality*" rise up to relatively higher equilibrium levels, while there are some oscillatory patterns on all four stocks in the beginning of the simulation period. In addition, it seems that the change in the value of *"User involvement in system development"* does not have significant effects on the final equilibrium levels of "*IS investment*", and "*Overall IS quality*" but have effects on how fast these two stocks reach their final equilibrium levels.

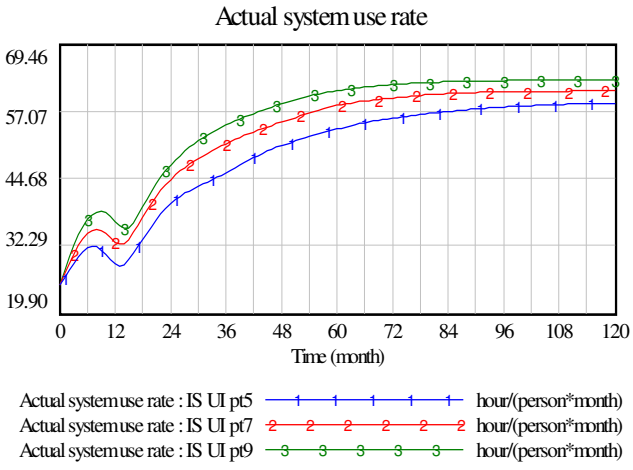

Figure 21: Actual system use rate

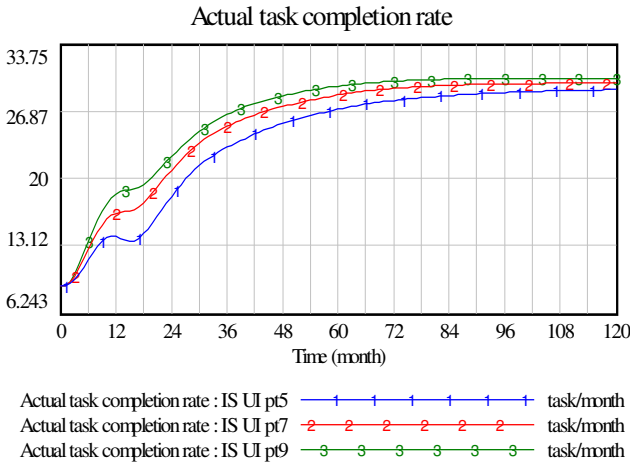

Figure 22: Actual task completion rate

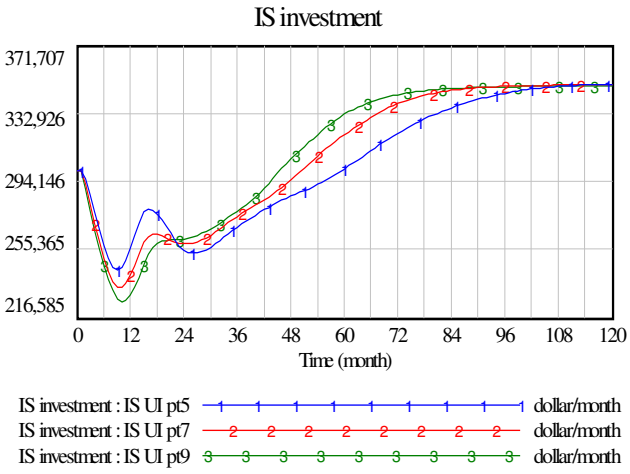

Figure 23: IS investment

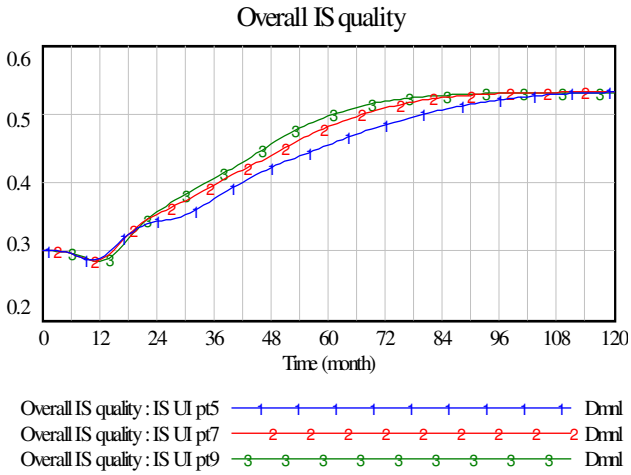

Figure 24: Overall IS quality

*Note: "User involvement in system development" = **0.5** in Run 1; = **0.7** in Run 2; = **0.9** in Run 3*

5.3 Adjustment on "Effort on user training"

In this section we demonstrate the behaviors of the system by adjusting the value of *"Effort on user training"* while hold the values of the other two exogenous variables constant. The summary of the simulation results is presented in Figure 25, 26, 27, and 28. From the results we can conclude that as the value of *"Effort on user training"* increases, "*Actual system use rate*", "*Actual task completion rate*", "*IS investment*", and "*Overall IS quality*" rise up to relatively higher equilibrium levels, while there are some oscillatory patterns on "*Actual system use rate*", "*IS investment*", and "*Overall IS quality*" in the beginning of the simulation period. In addition, it seems that the change in the value of *"Effort on user training"* does not have significant effects on the final equilibrium levels of "*IS investment*" and "*Overall IS quality*" but have effects on how fast these two stocks reach their final equilibrium levels.

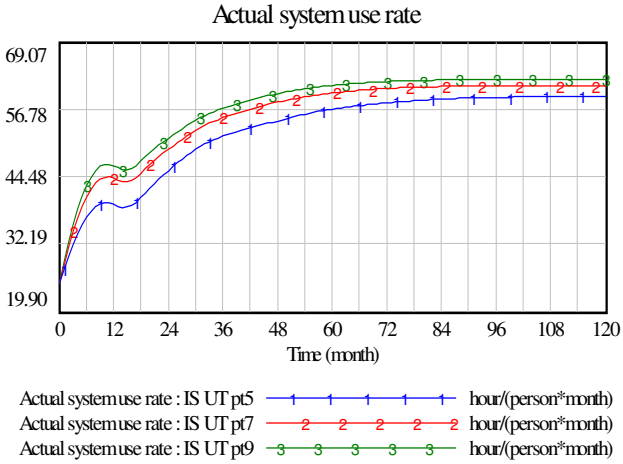

Figure 25: Actual system use rate

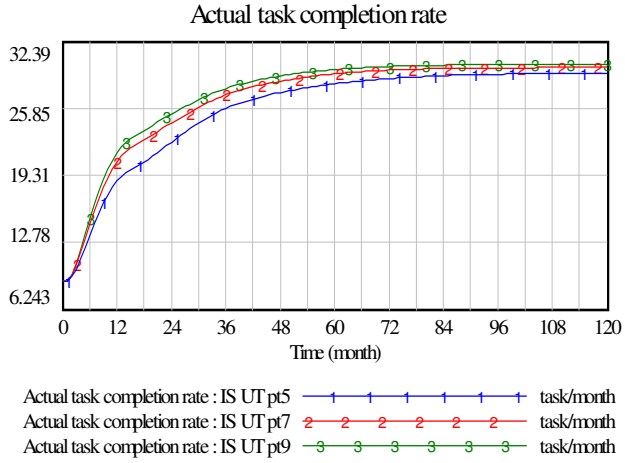

Figure 26: Actual task completion rate

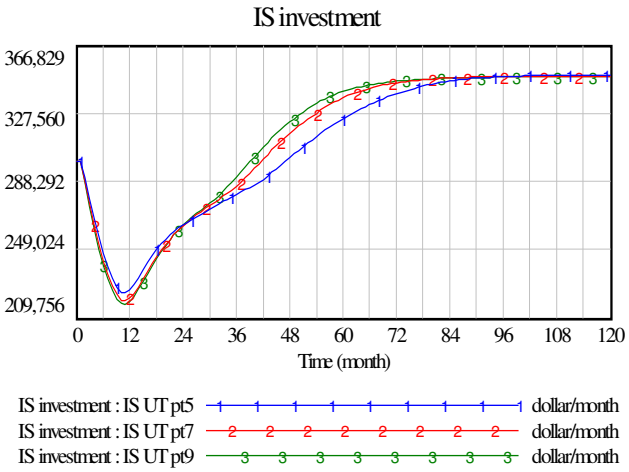

Figure 27: IS investment

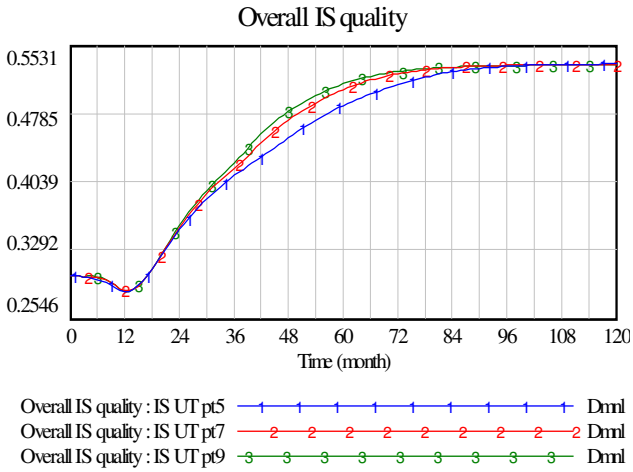

Figure 28: Overall IS quality

*Note: "Effort on user training" =**0.5** in Run 1; =**0.7** in Run 2; = **0.9** in Run 3*

5.4 Adjustment on "Perceived sufficiency of organizational resources"

In this section we demonstrate the behaviors of the system by adjusting the value of *"Perceived sufficiency of organizational resources"* while keep the values of the other exogenous variables unchanged. The summary of the simulation results is presented in Figure 29, 30, 31, and 32. From the results we can conclude that as the rate of *"Perceived sufficiency of organizational resources"* increases, "*Actual system use rate*", "*Actual task completion rate*", "*IS investment*", and "*Overall IS quality*" rise up to relatively higher equilibrium levels, while there are some oscillatory patterns on "*IS investment*" in the beginning of the simulation period.

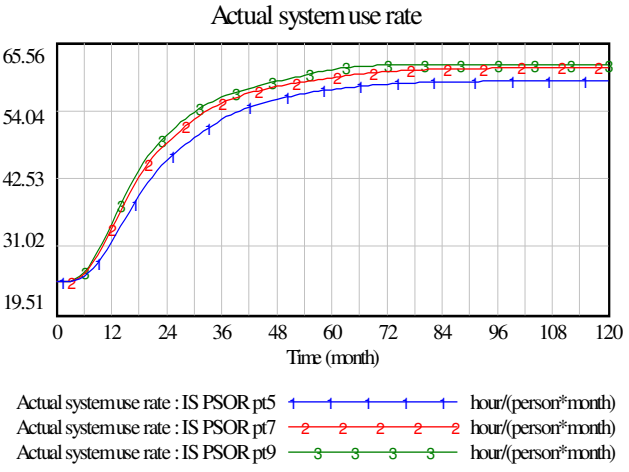

Figure 29: Actual system use rate

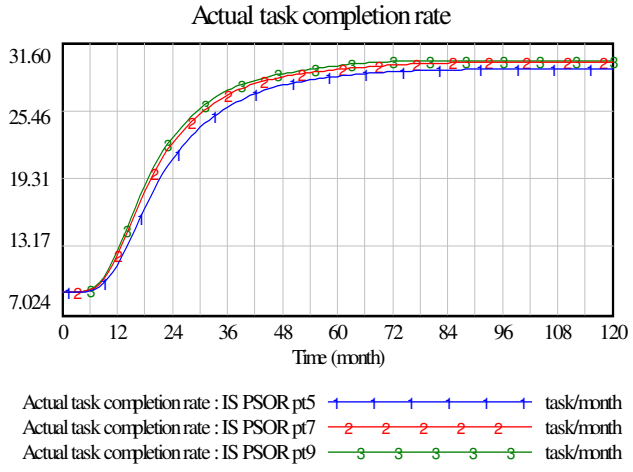

Figure 30: Actual task completion rate

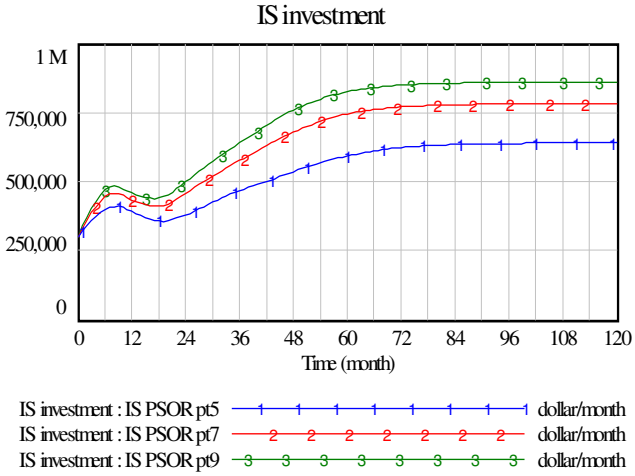

Figure 31: IS investment

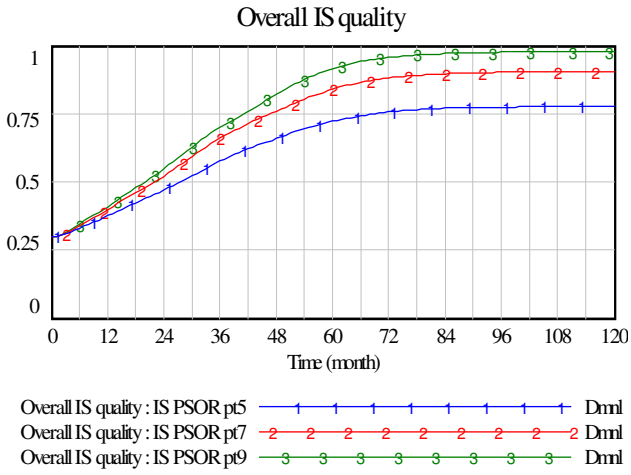

Figure 32: Overall IS quality

*Note: "Perceived sufficiency of organizational resources" =**0.5** in Run 1; =**0.7** in Run 2; = **0.9** in Run 3*

6. Conclusion and Future work:

From the previous discussion, we have demonstrated the usefulness of the proposed IS success model by showing how it can help decision makers to develop policies of information system implementation in order to make the best use of these information systems. The model has shown us that by making proper decisions on policies of information system implementation, such as user training and user involvement in system development, the major reinforcement loop R1, which is the "*Benefits from the use of information systems adjustment loop*", will dominate the behaviors of the model. As a result, organizations can facilitate the usage rate of their information systems and in turn increase their net benefits generated from the information system usage.

Inevitably, there exist few weaknesses of the proposed model. Although the proposed model has a solid theoretical ground, it is limited to a certain extent since it is generated mainly based on two specific models. More efforts on literature review are expected in order to seek for relevant concepts that can be used to reevaluate or to refine the proposed model. In addition, due to the lack of empirical data and the time constraint at the current stage, it is difficult to either identify more variables and stocks or to develop more detailed structures that are associated with the dynamics of the information system implementation in organizations. Furthermore, the lack of data also makes it difficult to formulate the variables in a way that allows the model to show behaviors that better fit with the reality. As a result, the next step is to do a more extensive literature review and to gather empirical data in order to develop a more persuasive and comprehensive model, and in turn acquire more insights into the behaviors as well as the policy-making implications of information system implementation.

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