

RESEARCH ARTICLE | OCTOBER 03 2017

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AIP Conf. Proc. 1891, 020037 (2017)

<https://doi.org/10.1063/1.5005370>



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How Change Management Can Prevent the Failure of Information Systems Implementation Among Malaysian Government Hospitals?

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Abstract. Fail to prevent or control challenges of Information System (IS) implementation have led to the failure of its implementation. Successful implementation of IS has been a challenging task to any organization including government hospitals. Government has invested a big amount of money on information system (IS) projects to improve service delivery in healthcare. However, several of them failed to be implemented successfully due to several factors. This article proposes a prevention model which incorporated Change Management (CM) concepts to avoid the failure of IS implementation, hence ensuring the success of it. Challenges of IS implementation in government hospitals have been discovered. Extensive literature review and deep interview approaches were employed to discover these challenges. A prevention model has been designed to cater the challenges. The model caters three main phases of implementation; pre-implementation, during implementation, and post-implementation by adopting CM practices of Lewin's, Kotter's and Prosci's CM model. Six elements of CM comprising thirteen sub-elements adopted from the three CM models have been used to handle CFFs of Human and Support issues; guiding team, resistance avoidance, IS adoption, enforcement, monitoring, and IS sustainability. Successful practice of the proposed mapping is expected to prevent CFFs to occur, hence ensuring a successful implementation of IS in the hospitals. The proposed model has been presented and successfully evaluated by the domain experts from the selected hospitals. The proposed model is believed to be beneficial for top management, IT practitioners and medical practitioners in preventing IS implementation failure among government hospitals towards ensuring the success implementation.

INTRODUCTION

Successful implementation of Information System (IS) has been a challenging task to any organization. To date, IS projects failure have become a global issue as it happens everywhere around the globe. A study of 50,000 software development projects around the world by Standish Group International in 2015 shown that the number of failed projects for the last five years fluctuates between 17 to 22 percent.

At the implementation phase of IS project, there are two categories of failure, namely total failure and partial failure [1]. The IS project implementation is categorized as total failure when the developed system has been implemented, but immediately after that it has been abandoned. On the other hand, a partial failure may happen in several situations. The first situation is where the project is facing with the sustainability issue where the project is successfully implemented at the early stage, however after a year and so, the project fails. The second situation is where the project has been implemented, but not all functions or features have been used by users. The third situation is where the system is utilized by only a number of designated users or departments or units while others just ignored it.

Human is a very important element in IS projects implementation. Resistance to change is one of the common issues during the implementation of a new system that need to be handled wisely [1], [2], [3], [4], [5]. The success or failure of the implementation is closely related to their level of adoption to the change introduced. Staff in one organization may respond to change differently from staff in other organizations because different organization may

have different culture [6], [7]. Commitment from user and team member (Levasseur, 2010) is the key to the success in IS implementation.

In some situation, conflict between users in different departments may affect the overall success of the IS project implementation [8]. Cooperation between departments is very important to eliminate any obstacles during IS implementation. Monitoring and control as well as effective communication helps to overcome issues and sustain the implementation [6], [8], [9], [10]. In a sensitive environment like hospital, it is quite risky because patient lives may depend on the proper work of the systems [10]. For example, patient information received from Hospital Information System (HIS) is crucial in order to prescribe correct medicine to patient. In Malaysia, previous studies show that IS projects in Malaysian government agencies are inevitable from suffering of failure due to several factors [2], [4], [11], [12], [13].

Based on the issues discussed, a prevention model is needed to prevent the failure of IS projects implementation in Malaysian government hospitals. This article focuses on how the failure of IS project implementation can be prevented in human context, particularly in Malaysian government hospitals. Change Management (CM) is chosen as a solution since it caters human aspect. The organization of this articles as follows; the following section discusses concepts of CM. Section 3 presents current scenarios of IS project implementation in government hospitals. The proposed solution is presented in Section 4, while Section 5 covers conclusion and discussions on future works of the study.

CHANGE MANAGEMENT

Change management (CM) is defined as a set of basic tools or structures, used to control change efforts. It comprises of process, tools and techniques used in managing change at people-side to achieve business objectives. CM helps towards successful individual transition by consolidating the organizational tools which will provide a positive implication towards the change [14]. CM concept has been applied in various industries either in public or private sector. Many organizations have proved that CM has helped to improve their efficiency. [15] has highlighted two organizations that has adopted CM in their organizations, California State University and British Airways. The California State University has applied CM in order to implement a new version of IT system to all 23 satellite campuses which affects thousands of staffs and students [15], while British Airways used CM approach to restructure the company and turn it to be a profitable company.

CM could be conducted in any phase of IS project because change happens everywhere. For example, during software development, there might be changes in requirement compared to the initial requirements. CM should be in place so that the change can be managed well. However, during the implementation of IS project, the factors that determine whether the project is implemented successfully or turn to fails is highly dependent on organizational factors. In order to ensure the success of the IS projects implementation, organization should first execute CM. Change agent roles in CM is very important to stimulate, facilitate, and coordinate the change effort [16].

In IS project implementation, Ziemba & Oblak [17] has proved that CM has contributed to a successful implementation of IS project. They have conducted a case study on two IS projects implementation in Polish public organizations. Those two projects are similar in scope and size. However, one project has been implemented without CM, while CM has been conducted in the implementation of another project. As a result, the project in which CM has been introduced shown a successful implementation where the system has been fully used by the users, while the project implemented without CM only partially success as it has not been fully used by the users and the implementation period need to be extended. Other success story of CM adoption was in the implementation of Technology Roadmapping (TRM) where CM was applied to overcome challenges and limitations occurred during the implementation process [18]. On the other hand, Leyland, Hunter and Dietrich [19] has recommended CM to be integrated into Clinical Health Information Technology project to elevate the adoption among the users.

Through extensive literature review, three Change Management models which suitable to prevent the discussed issue have been identified; i) Three-stage Process of Change by Kurt Lewin (1951); ii) Kotter's Change Management Model by John P. Kotter (1996); and iii) ADKAR Model by Prosci (1999). Table 1 describes briefly these three models.

TABLE 1. Change Management models

Lewin's Model	Kotter's Model	Prosci's ADKAR Model
Lewin's Change Management Model has been introduced by Kurt Lewin in 1951. In managing change, Lewin promotes a top-down management-driven approach. There are three stages of change processes which involves Unfreeze, Change, and Refreeze.	Kotter's Change Management Model which introduced in 1996 comprises of eight steps that need to be followed to drive a successful change in organizations; establish a sense of urgency, create a guiding coalition, develop a clear shared vision, communicate the vision, empower people to act the vision, create short term wins, consolidate & build on the gains, institutionalize the change	The ADKAR Model has been introduced by Prosci (1999). ADKAR is an acronym for <i>Awareness, Desire, Knowledge, Ability and Reinforcement</i> ; the important elements to prepare individuals to accommodate change. This model has been used as a tool to drive individual change [3]. It shows the milestones that an individual must achieve for change to be successful.

SCENARIO OF IS IMPLEMENTATION IN MALAYSIAN GOVERNMENT HOSPITALS

From the study conducted at four government hospitals in Northern Region of Malaysia, there are two categories of hospitals under Ministry of Health; IT hospital, and non-IT hospital. Out of four hospitals involved in this study, only Hospital Sultanah Bahiyah is categorized under IT hospital while others are non-IT hospital. Each hospital implemented different types of IS, either developed by vendors or hospital's IT Department.

HIS is the main IS used in hospitals to manage patients record. For example, the main IS in Hospital Pulau Pinang (HPP) is Sistem Pengurusan Pesakit (SPP) since 1990s, while Hospital Sultanah Bahiyah (HSB) is using Total Hospital Information System (THIS) since 2007. In Hospital Tuanku Fauziah (HTF) Tele-Primary Care (TPC) is implemented since 2008 while in Hospital Kulim (HKulim), Electronic Health Information System (eHIS) is used since 2004. Each hospital faced a lot of challenges in implementing the systems. For example, although Sistem Pengurusan Pesakit Dalam (SPPD) in Hospital Pulau Pinang (HPP) has been implemented since 1990s, it was found that the system has been used only by certain wards. The Diet Order module has been abandoned. In Hospital Tuanku Fauziah, the implementation of Tele-Primary Care is very suffering. The scope of the system is complete, except that it is not integrated with other important system in the hospitals such as LIS and financial system. Since its implementation in 2008 until now, the system has been utilized by only a small group of users. During the early years of implementation, the system is used by ENT Specialist Clinic, Medical Department, Radiology Department and some wards. Other departments such as Obstetric & Gynaecology, Orthopaedic and Surgical Department are not using it. Since early 2016, ENT Specialist Clinic is no longer using the system. Hospital Kulim seems to share the same problem as the other hospitals. The implementation of its Hospital Information System (eHIS) is not successful. The system is not integrated with other systems in the hospital.

From the study, the implementation of HIS in three of the hospitals can be categorized as partial failure because the implemented HIS still in use until now, although it is not fully utilized. Analysis of the data collected from the preliminary study, revealed the challenges in IS projects implementation in government hospitals in Northern Region of Malaysia. There are thirty-six challenges in implementing IS projects have been discovered. Fourteen challenges are from human issues (workload, readiness, priority, skill, mentality, preference, attitude, impression, initiative, understanding, commitment, awareness, self-interest, user dependency). There are six and for challenges from support and technology issues respectively, while twelve challenges are from software limitation issues. The challenges are categorized into four main factors; human issues, technology and infrastructure issues, software limitations, and support issues. This article focuses on challenges from human and support issues. CM will be used to prevent these challenges to occur, thus ensuring a success implementation of IS projects.

THE PROPOSED SOLUTION

Current practice in government hospitals only concentrated on user training, then directly followed by the implementation of IS projects. During the implementation, if resistance occurs due to numerous reasons, it is already late and hard to change users' negative mindset and perception of the IS. No emphasis given on the team preparation

and ongoing monitoring process. Therefore, this article proposes three sub-phases of IS projects implementation namely pre-implementation, during implementation and post-implementation have been proposed. All thirteen elements of three selected CM models are embedded into relevant processes in the three sub-phases as depicted in Figure 1.

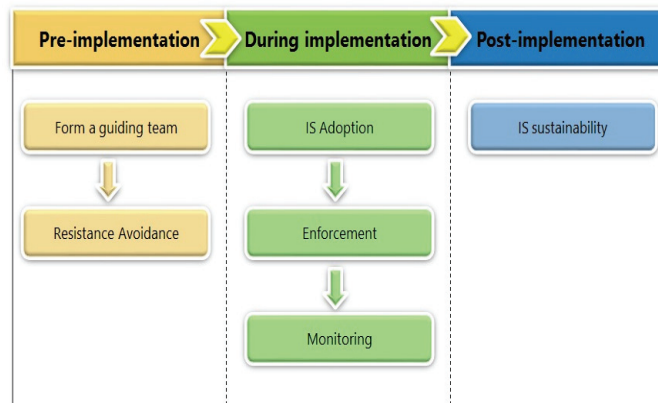


FIGURE 1. IS projects implementation guideline

Based on the guideline, a prevention model is designed by mapping the human issues and support issues of IS projects implementation to the CM elements from CM model introduced by Lewin, Kotter and Prosci in 1951, 1996 and 1999 respectively to prevent the failure of IS project implementation. Based on the proposed model, IS projects implementation guideline has been produced. The whole idea of preventing the failure of IS implementation is modelled as shown in Figure 2.

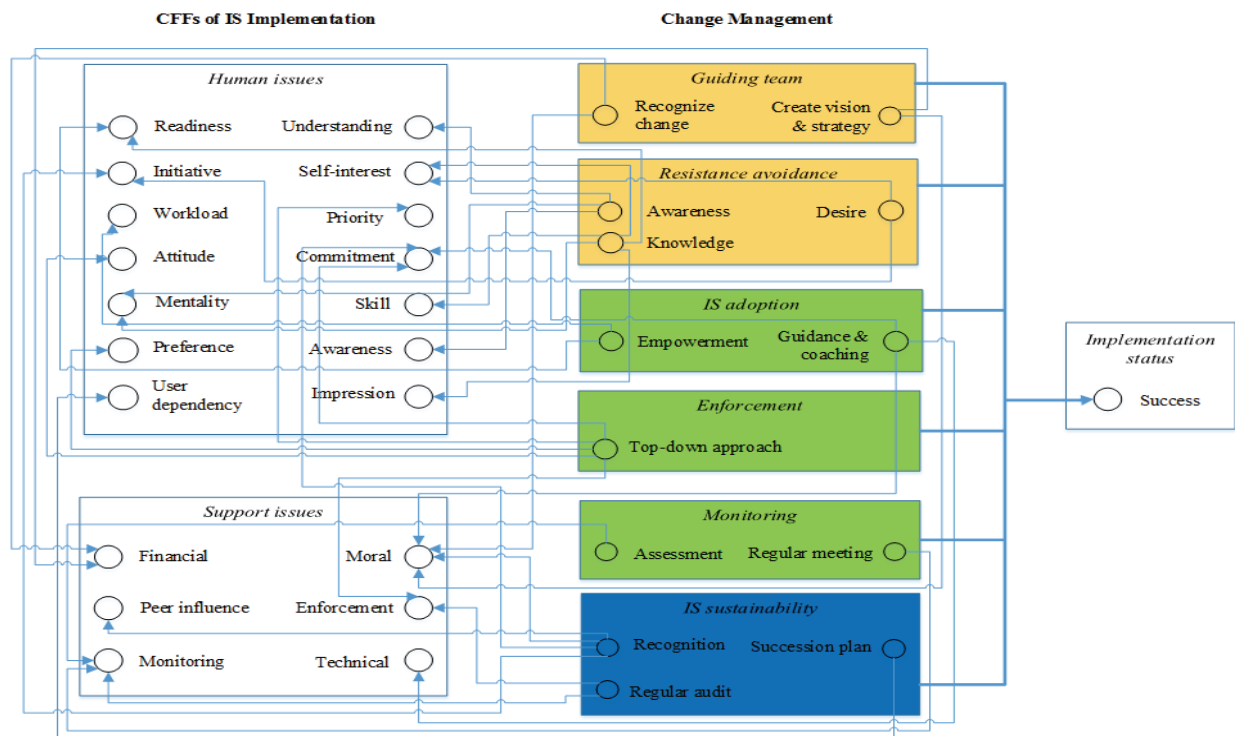


FIGURE 2. A proposed CM-based Prevention Model for IS Projects Implementation Failure in Malaysian Government Hospitals

For pre-implementation, Lewin and Kotter emphasized on the importance of guiding team to drive a successful change. It is important to form a group of people with shared commitment and having enough power to lead the change effort. In IS implementation, the guiding team should not only consist of IT personals but also top

management, system owner and other relevant individuals. Having sufficient power enables the group to make a decision that can facilitate the change. When a new IS to be implemented, the guiding team need to recognize the change; what will be changed and whom will be affected with the new approaches; any changes or adjustment need to be done to any work procedures or policies to fit the new approaches; and what is the impact of the new IS to the practitioners as well as the organization. In IS project implementation, one of the important things is to prevent user resistance as early as possible. From Prosci's ADKAR model, three elements of individual Change Management have been adopted to prevent user resistance in IS implementation; awareness, desire and knowledge. Creating awareness is essential to prepare individuals for change. Guiding team need to communicate the vision set and the reasons why the IS is to be implemented, to develop their understanding of the need to utilized the IS. Moreover, the guiding team need to highlights how the IS will give a good impact to them; to change their mentality that the implementation of the new IS is a burden and adding more workloads to them.

During the implementation of a new IS, guidance and coaching from the guiding team not only helps them to adapt to the IS but also helps to gain practitioners' commitment to utilize the IS. Visible support especially from the top management by getting involved during the implementation provides a very good moral support to the practitioners. Since the guiding team also consists of IT personnel, it helps to tackle the issue of technical support.

The adoption process needs to be followed with enforcement. In government hospitals, instruction from the top management is very powerful. Hence, the top-down management driven as promoted by Lewin in 1951 is suitable to enforce the practitioners to use the IS. Although awareness, training and coaching has been carried out, some practitioners still prefer to use the manual system, while some others prioritize more on patient care. In this situation, enforcement from the top management is the best way to tackle the problem. The approach may help to gain practitioners commitment to use the IS and to change their negative attitudes on the adoption of the IS.

After a successful implementation of IS project, actions need to be taken to sustain the IS; to make the IS as a part of the culture in the organization. According to Kotter, Lewin, and Prosci, recognition and reward should be practiced as an appreciation to those contributes to the success of the IS implementation and may influence others to participate and support the IS implementation. Besides offering moral support, the approach helps to motivate other practitioners to take appropriate initiatives and giving their commitment to ensure the success of the implementation. Post-implementation is to ensure the continuity of the IS in organization. Kotter emphasized on the importance of developing a succession plan to avoid the dependency on certain users. In IS implementation in hospital, dependency on certain users or champion is very risky due to frequent relocation of staffs within healthcare agencies. In Kotter's CM approach, he noted on the need for continuous assessment to sustain the change. An assessment procedure need to be developed to identify what is working and the things that need to be improved. The assessment need to conducted regularly to ensure that the change stick as the culture in the organization. Other than that, regular audit can be considered as a kind of enforcement and monitoring to ensure that IS is continuously implemented by the practitioners.

CONCLUSION

Fail to prevent or control the challenges have led to the failure of the IS implementation. The challenges identified in the study have been used to construct a prevention model of IS projects implementation failure for government hospitals in Northern Region of Malaysia. Change Management concept has been incorporated into the model by adapting the CM models introduced by Lewin, Kotter and Prosci.

The outcome of this study is a CM-based prevention model to prevent the failure of IS projects implementation. Although the study focused on HIS, but the proposed model can be used as a guideline by government hospitals in Northern Region of Malaysia to implement other IS as well. As CM is one of the important components in project management, this model provides a guideline for IS project managers in planning of IS projects implementation to prevent the failure. The prevention model also act as a guideline by top management in IS project planning to prevent the failure of the projects implementation.

ACKNOWLEDGMENTS

This research is funded by Universiti Utara Malaysia (UUM) through University Research Generation Grant [SO code : 13447 (2016)]. The authors fully acknowledged UUM for the approved fund which makes this important research viable and effective.

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