Managing Change: A Model for Organisational Readiness to Adopt Pharmacy Information Systems

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ABSTRACT

Although research in organisational readiness is growing, there are still gaps in the context of adopting pharmacy information systems. Evaluating factors that affect organisational readiness to adopt pharmacy information systems might help the health sector to be more successful and avoid negative impacts or losses due to its failure. This paper discussed a proposed model for organisational readiness to adopt pharmacy information systems and factors that affect organisational readiness. A qualitative case study was conducted using interviews, document analysis and observations. This study identified four main categories of factors that influence the organisational readiness to adopt information systems, such as (1) change valence that contributes towards improving the commitment to change, (2) organisational ability that contributes to change efficacy, (3) contextual factors and (4) implementation methods that affect both, commitment to change and efficacy. The study’s findings supported and extended the theory of organisational readiness for change and expanded its use in the context of adopting pharmacy information systems. This study also provides the basis for evaluating organisational readiness on a wider domain such as adopting information systems.

Keywords: Change management; organisational readiness; information systems; pharmacy information systems; evaluation

INTRODUCTION

Emerging technology plays an important role in the healthcare sector. The application of information systems (IS) in healthcare that encompasses various activities leads to a healthcare system that is highly dependent on health information systems (HIS). Complex HIS implementation increases the risk of failure, which inadvertently affects cost and delivery of healthcare, including the quality of care. Change management leading to HIS adoption can guide the management of organisational readiness and subsequently increase the system’s success.

Although studies in organisational readiness are increasing (Shea et al. 2014; Yusif et al. 2017), their evaluation aspects are difficult to measure and incomprehensive. Complex systems require extremely thorough assessment methods and high skills to enhance its effectiveness (Andargoli et al. 2017). Established evaluation tools and models are limited, even for common constructs (Yusif et al. 2017). In the pharmacy information systems (PIS) context, limited knowledge on relevant factors results in the lack of emphasis on the organisational aspect and subsequently, a low level of organisational readiness in adopting PIS. Low levels of organisational
readiness can increase the risk of IS failure. Therefore, this paper discussed an evaluation study on organisational readiness to adopt a PIS.

THEORETICAL BACKGROUND

ORGANISATIONAL READINESS IN THE ADOPTION OF INFORMATION SYSTEMS

Most definitions on organisational readiness are related to psychological and human behaviour aspects. According to Shea et al. (2014), organisational readiness is a state where organisational members are mentally and physically ready to implement changes. In general, organisational readiness to adopt IS can be defined as the commitment and organisational ability regarding thoughts and actions associated with the adoption of IS in organisations. The implementation of IS requires detailed and continuous planning in change management to ensure the successful accomplishment of the system’s objective (Li et al. 2012; Zheng et al. 2009). Organisational factors and a complex IS implementation process result in unpredictable project outcomes (Wyatt 2003) and frequent failure in adopting planned changes (Timmings et al. 2016). Problems in organizations especially involving complex processes can prevent positive changes and need to be addressed continuously (Billsten et al. 2018). This explains why many studies focus on the organisational readiness aspect during the formative evaluation of IS, which is to facilitate planning and determining targets from the early stages (Wyatt 2003).

Preliminary knowledge from the evaluation of organisational readiness provides an opportunity for the organisation to plan properly, particularly in change management activities (Khoja et al. 2007; Li et al. 2012). Evaluation of organisational readiness is recommended at the inception of HIS planning (Li et al. 2012) to enable the organisation to take corrective and preventive measures to facilitate IS implementation successfully and avoid unrealistic target setting and inappropriate implementation strategies (Zheng et al. 2009). IS implementation generally involved high investment in terms of cost, time, and manpower. However, benefits are only realised after the system is widely adopted; hence, IS adoption is crucial and needs to be prioritised (Coeurderoy et al. 2014; Oliveira et al. 2011). IS adoption is defined as a decision and action taken to fully accept and use IS (Michel-Verkerke & Spil 2013).

Organisational Readiness Construct

A number of methods can be used to determine the organisational readiness construct, which could be generally classified according to two approaches, namely psychological and structural (Shahrsabi & Paré 2014), as featured in Table 1. The psychology approach views organisational readiness from the psychological and behavioural aspects (Jennett et al. 2003; Shea, Jacobs et al. 2014; Weiner 2009). According to this approach, organisational readiness is achieved through commitment by organisational members and their views on organisational capability to implement HIS. Other factors, known as contextual factors, provide an indirect effect on readiness through organisational commitment and capability to change. Structural approach

### Table 1. Components related to organisational readiness based on the evaluation by psychological and structural approaches

<table>
<thead>
<tr>
<th>Approach</th>
<th>Measure</th>
<th>Study examples</th>
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<tbody>
<tr>
<td>Psychological Readiness</td>
<td>Organisational members’ commitment</td>
<td>Oostendorp et al. 2015; Shea et al. 2014; Weiner 2009</td>
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<td></td>
<td>Perception on organisational capability</td>
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<td>Structural Readiness</td>
<td>Change requirement readiness</td>
<td>Coleman &amp; Coleman 2013; Sun &amp; Qu 2014</td>
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<td>Social readiness</td>
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<td>Basic readiness</td>
<td>Jennett et al. 2003</td>
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<td>Unreadiness</td>
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<td></td>
<td>Change attributes</td>
<td>Paré et al. 2011; Yusof &amp; Aziz 2015</td>
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<td>Leader support</td>
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<td>Organisational context</td>
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<td>Change target attributes</td>
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<td></td>
<td>Adapting capability</td>
<td>Pförtmiller et al. 2011</td>
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<td>Effective communication</td>
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<td>Individual commitment</td>
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<td>Support towards change</td>
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<td></td>
<td>Organisational culture and policy</td>
<td>Zheng et al. 2009</td>
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<td>Leadership</td>
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emphasises more on contextual factors that influence organisational readiness by looking at it from the fit of change with other components that can be generally classified as human, organisational and technological (Paré et al. 2011; Yusof & Aziz 2015; Zheng et al. 2009).

ORGANISATIONAL READINESS FRAMEWORK AND MODEL
Organisational readiness frameworks proposed by Paré et al. (2011) and Yusof and Aziz (2015) consist of a number of parameters that were classified into four categories, namely change attributes, leadership support, internal context and attributes of the change target that focuses on factors related to IS implementation, individuals and organisations (Figure 1). The role of factors that were evaluated based on a number of readiness parameters related to IS implementation differed according to the implementation phase and they were specific to IS and organisation type. Moreover, dependency on time results in the challenge to apply models that monitor the level of readiness to accept the change process. This results in the challenge to apply the models in a general evaluation study on organisational readiness to implement IS.

Lippit Model
Zheng et al. (2009) adapted the Lippit Model (Figure 3) when evaluating organisational readiness to implement IS. Zheng suggested that organisations...
should possess five aspects to ensure the successful implementation of IS, namely vision, skills, incentives, resources, and action plans. Weaknesses in any of these aspects would result in numerous problems such as confusion, worry, resistance, frustration and mistakes in the early stages. Adaptation of the Lippit model for evaluating the level of organisational readiness enables early identification and mitigation of potential problems that could occur during and at the post implementation phases.

THEORY RELATED TO ORGANISATIONAL READINESS

Activity Theory  
Coleman & Coleman (2013) and Sun & Qu (2014) applied Activity Theory (Figure 3) to evaluate organisational readiness levels towards changes in IS implementation. Activity Theory views IS implementation from a wider perspective by involving other components, such as individuals, organisations, technology and implementation of change. The wider coverage enables a more holistic evaluation at both, individual and social levels. Social evaluation examines the impact from multiple aspects of implementing changes. However, evaluation measures of this model are not clear.

The organisational readiness theory for change  
(Weiner 2009) defines organisational readiness as a common psychological condition among organisational members who are committed to implement changes and optimistic about the organisation’s capability to implement changes (Figure 4). Commitment towards change is defined as a mutual determination by various organisational parties to implement change. This commitment is influenced by the extent to which organisational members appreciate the desired changes. This mutual appreciation, known as change valence, is the main determinant of the commitment to change.

The effectiveness of change is defined as the organisational members’ view on the organisation’s capability to successfully implement changes (Armenakis & Harris 2009; Weiner 2009). The effectiveness of change is determined by the organisational members’ assessment of the balance between three determinant factors, namely

![Figure 3. Constructs for evaluation of e-Health Readiness based on Activity Theory (Coleman & Coleman 2013)](image1)

![Figure 4. Theory of organizational readiness for change (Weiner 2009)](image2)
task demands when implementing change, availability of resources, and the current situation or environment such as duration of change implementation (Weiner 2009). A positive evaluation of these three factors could increase confidence among organisational members on implementing successful change that could subsequently increase the effectiveness of change.

CONCEPTUAL MODEL

A comparison between the conceptual models are summarised in Table 2. Several important components were also involved in organisational readiness towards change, such as purpose of change, appropriateness of change, change valence or appreciation towards changes, leadership roles and organisational context.

<table>
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<th>Table 2. Previous studies on organisational readiness components</th>
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<tr>
<td>Change valence</td>
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<td>Purpose of change</td>
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<td>Appropriateness of Change</td>
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<td>Leadership role</td>
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<td>Change capability</td>
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<td>Task demand</td>
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<td>Contextual factor</td>
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Purpose of change refers to an organisational belief towards the need to change based on the gap between the weaknesses in the current situation and achievable potentials through planned changes (Armenakis & Harris 2009). Information related to the purpose of change disseminated through effective communication could increase organisational readiness to accept and implement changes (Evans et al. 2014; Jennett et al. 2003).

Appropriateness of change is defined as the perceived appropriateness of planned changes to overcome identified organisational gaps or problems (Armenakis & Harris 2009). The belief in the appropriateness of change for overcoming identified problems could increase readiness and commitment among organisational members to implement changes (Paré et al. 2011).

Change valence refers to appreciation of organisational members based on perceived benefits of changes from an organisational or individual perspective (Armenakis & Harris 2009). According to Holt et al. (2007), organisational and individual valence are among the most influential factors of change readiness. Weiner (2009) argued that appreciation culminates due to the positive view on the purpose and appropriateness of change as well as social influence, particularly from the top management level. Change valence is arguably the main determinant of commitment to change.

Leadership role is an important aspect that influences organisational factors and increases organisational capability to implement complex changes, including HIS (Zheng et al. 2009). Support and commitment from top management and change agents are needed to ensure sufficient resource allocations as well as providing infrastructure required for attaining successful implementation of change (Armenakis & Harris 2009; Paré et al. 2011).

This study’s proposed model was developed based on the theory of organisational readiness for change (Figure 5). Organisational readiness was assessed based on two
core components, namely commitment to change and effectiveness of change. Commitment to change is defined as the organisation’s determination to adopt IS, which is reflected through the way of thinking, while effectiveness of change refers to the organisation’s capability to adopt IS effectively, reflected through capability from a structural aspect. This is strongly related to organisational readiness, which is defined as the commitment and organisational capability to change mentally and physically.

Commitment to change is determined by change valence; i.e. organisational appreciation towards the adoption of IS. In this study’s model, change valence was influenced by four factors, namely purpose of change (Armenakis & Harris 2009), appropriateness of change (Armenakis & Harris 2009; Paré et al. 2011; Yusof & Aziz 2015; Zheng et al. 2009), organisational members acceptance (Michel-Verkerke & Spil 2013) and leadership role (Armenakis & Harris 2009; Paré et al. 2011; Weiner 2009; Zheng et al. 2009). Effectiveness of change is determined by organisational capability, including team size and sufficient resources, task demand (using available resources) and environmental factors such as duration (Armenakis & Harris 2009; Oostendorp et al. 2015; Paré et al. 2011; Yusof & Aziz 2015).

According to Timmings et al. (2016), contextual factors can have either a positive or negative effect on the implementation of change. These factors affect organisational readiness through its effect on the commitment to change and effectiveness components. Examples include policy, culture, flexibility, past experience and organisational structure.

METHODS

This qualitative case study employed a purposive sampling to evaluate PIS in a Pharmacy Service Department (PSD) at a Malaysian hospital. Data were collected over two months from March to May 2016 using interviews, direct observations and document analysis. Semi-structured, face-to-face and one-on-one interviews involving nine informants lasted approximately one hour per session. Informants were involved in PIS implementation and selected from multiple categories (Table 3). Three of the informants were owners of system modules and responsible for designing system requirements, two informants were system users and the rest were project management team members and technical committee members. The interview’s agenda was sent to the informants prior to the interview session for their reference. Interviews were recorded and transcribed. Interview transcriptions were given to the informants for verification purposes. Data were analysed and reflected upon each interview session and used as input to modify the interview agenda for the next session.

Documents were chosen from six project files related to PIS involving 323 documents dated over 28 months from November 2013 to March 2016. Only 74 documents consisting of 472 pages were examined based on their relevancy to the study’s objectives from socio-technical aspects. For example, inter-organisational communication among vendors, staff, stakeholders and committee appointments. Semi-participatory observations were also conducted on related events such as meetings and daily work practices. Data were maintained in a comprehensive database involving field notes, interview transcripts, and audio recordings.

Data were analysed manually using the instructed content analysis technique. Field notes were examined by identifying the main elements that were reduced, and marked using the open coding technique (Burnard et al. 2000).
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These elements were categorised based on the identified codes. Uncategorised data were reanalysed to determine whether they needed to be categorised under a new code or as a sub-category under the existing code. This category was further refined by comparing it with overlapping or similar codes.

The study’s credibility was ensured by triangulating data from multiple informants and other modes of data collection. Trustworthiness was further increased by building rapport with the organisation and informants, emphasising information transparency given by informant, careful data examination and verification. Informants had participated voluntarily and disclosed information to build trust and were afforded flexibility during the interview to ensure valid informant opinions were excluded from external bias.

RESULTS

PSD implemented activities in three pharmacy units, namely enforcement, practice and development, as well as policy and management. PSD was also responsible for coordinating activities at external organisations under different administrations, which included nationwide state PSDs, health office, hospitals, and public clinics. This resulted in a complex organisational structure. The PIS consisted of five main modules that included activities implemented in two of the three pharmacy units. Part of the modules were redeveloped from the existing systems. PSD also had a history of failure in previous IS projects. The Forensic Lab module involved a number of activities, including delivery, handling, monitoring, endorsement of analysis certificates, and sample reports of lab analysis related to intelligence and operation activities in the Pharmacy Enforcement Unit. The licensing module involved processing activities for monitoring, issuing licenses, and permits handled by national pharmacy enforcement branches. The checking module involved checking activities on premises that distribute, sell, process, and consume drugs, products, and controlled substances. The module also interacted with the licensing module, where information from the checking process are needed for approving licenses and permits in the licensing module. The Drug List Module involved activities that managed the drug list such as adding, cancelling, and drug reclassification. The Drug Pricing module activities were handled by the Drug Price Unit. The Practice and Development unit consists of several main sub-modules such as pricing, drug price evaluation, cost pricing, insurance, and fees. This study identified twelve factors that influenced organisational readiness to adopt IS. They were classified into four categories, namely change valence, organisational capability, contextual factors and implementation method.

CHANGE VALENCE

The purpose for change is motivated by the need to improve work processes that are facing problems such as inefficiency, high workload and the need to improve work quality and productivity. Inefficient processes in the sample screening of the forensic lab resulted in increased workload, whilst complex and inefficient drug classification and drug price checking resulted in waste of time, manpower, and resources. Long turnaround time for drug license processing, integrity improvement through error reduction during analysis in the forensic lab and drug pricing data as well as technology advancement, lends pressure on PSD to increase work quality and productivity.

Appropriateness of change is viewed from a task-PIS fit perspective in terms of task clarity, standardization and modification flexibility that aligns with the system and facilitates transformation from current to new methods during PIS adoption. According to Informant 4, designing a proper process through a standard operating procedure (SOP) and process reengineering eases the integration of the

<table>
<thead>
<tr>
<th>Informant (N = 9)</th>
<th>Position</th>
<th>Work Experience (year)</th>
<th>Role</th>
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<tbody>
<tr>
<td>Informant 1</td>
<td>Pharmacy officer</td>
<td>8</td>
<td>Module owner</td>
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<tr>
<td>Informant 2</td>
<td>Pharmacy officer</td>
<td>9</td>
<td>Module owner</td>
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<tr>
<td>Informant 3</td>
<td>Pharmacy officer</td>
<td>10</td>
<td>User</td>
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<tr>
<td>Informant 4</td>
<td>IT officer</td>
<td>15</td>
<td>Project management team</td>
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<td>Informant 5</td>
<td>Pharmacy officer</td>
<td>11</td>
<td>User</td>
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<tr>
<td>Informant 6</td>
<td>Pharmacy officer</td>
<td>8</td>
<td>Module owner</td>
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<tr>
<td>Informant 7</td>
<td>Pharmacy officer</td>
<td>7</td>
<td>Project management team</td>
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<tr>
<td>Informant 8</td>
<td>Pharmacy officer</td>
<td>15</td>
<td>Project technical committee</td>
</tr>
<tr>
<td>Informant 9</td>
<td>Pharmacy officer</td>
<td>30</td>
<td>Project technical committee</td>
</tr>
</tbody>
</table>

Notes: Module owner: prepare the requirements for module specification; User: Appointed module user; Project Management team: appointed project management team; Project technical committee: Appointed members from relevant section representatives.
process with PIS. Informant 1 argued that a flexible policy enables a more significant improvement and optimization of the process through PIS implementation.

Acceptance of PIS adoption depends on the PSD members’ views on potential benefits compared to challenges in adopting the system. PIS benefits were evaluated based on its impact on the organisation and clients. Perceived PIS potential for improving work performance and easing the work process influences PSD members to highly appreciate the system and “trigger the commitment to successfully implement PIS” (Informant 4). “A structured process cases its implementation” (Informant 3), while a flexible online process “enables prompt action on critical cases” (Informant 5).

Informant 2 believed that PIS facilitated clients when applying for drug licence through faster, easier and user-friendly service. In addition, benefits were forthcoming from improved integrity and productivity (that included license processing and speedy generation of drug price report), as well as error or risk reduction when analysing forensic lab samples. Perceived challenges based on gaps in knowledge, skill, and communication among suppliers, system development teams and users also influenced system acceptance. Active user involvement in PIS development requires users to “understand wider work processes beyond routine tasks” (Informant 6), in addition to difficulties in documenting user requirement specification due to communication gaps when interacting with the system’s vendor.

Social influence from leaders and peers also affects PSD’s commitment to PIS adoption. According to Informant 4, leadership support through enforcement and advocating PIS use, allocating resources, and making decisions when handling issues increased organisational commitment and acceptance of PIS. Experienced co-workers act as reference sources (during discussions between user and vendor); they also skilfully deliver information that was easily understood by the user. Moreover, members involved in pre-implementation activities had also indirectly assisted in promoting the system, which included disseminating the current status of system implementation. Peer influence also resulted in a negative impact, where “negative individual perception had negatively affected other individuals” (Informant 6) and this “could lead to system abandonment should there be a failure in correcting the perception” (Informant 4). This situation led to leadership intervention to increase system acceptance.

ORGANISATIONAL CAPABILITIES

Resource availability in terms of human, infrastructure, knowledge and skills affects the PSD’s capability to adopt PIS. The number of project management team members was inadequate for fulfilling task demands, which resulted in the failure to play a more efficient role in pre-implementation activities, including “failure to guide and commit appropriate actions for handling all issues” (Informant 3). Providing appropriate infrastructure and technology enabled “ease of system access and subsequently increased PIS use” (Informant 2). Knowledge and skills in the work process allowed PSD to generate detailed user requirement specifications whilst IS related knowledge enhanced PSD capabilities when handling problems. Knowledgeable and skilful individuals were seen as critical assets for PIS implementation, while continuous training could “facilitate system use and increase system acceptance” (Informant 1).

Task demand, coupled with routine tasks during PIS development, increased staff workload and subsequently limited the staff’s active involvement in pre-implementation activities. Furthermore, short system development duration also increased daily workload. Informant 6 felt that extremely short training duration resulted in difficulties to develop the system properly.

Contextual factors. “PIS was implemented according to existing policy” (Informant 5) to ensure it complied with current policy. However, Informant 2 argued that a more flexible policy could improve work process and produce more significant output through better methods. Moreover, according to Informant 8, new policy enforcement, such as mandatory IS use, also increased PSD readiness to adopt PIS.

Work culture. The use of technology during routine work at the Forensic Laboratory Unit increased user acceptance as well as reduced the negative perception on PIS adoption. Complex organisational structure in PSD and external organisations resulted in a communication gap as well as an unclear instruction mechanism that affected information dissemination, such as the system’s objective that resulted in misunderstandings and affected user appreciation of PIS.

Past experience enabled PSD to plan and manage change in a proper manner. Experience in applying technology helped to increase staff members’ buy-in. Past experience was used as a benchmark - PIS failure to compete with the positive aspects of previous systems raised doubts about vendor credibility. PIS users viewed system development as more challenging due to the big difference in PIS users’ role compared to previous project developments. Past failures in system implementation resulted in negative views on PIS’s potential to succeed as well as pressure on PSD, causing the organisation to strictly adhere to the implementation schedule, which subsequently hindered detailed specifications of users’ requirements that could affect PIS acceptance.

IMPLEMENTATION METHOD

Members’ active involvement at the outset of the system allowed users to familiarise themselves and subsequently
increase PIS acceptance. Continuous communication during members’ active involvement could also “increase members’ confidence in a successful system” (Informant 1) that positively affects PSD’s commitment. Increased workload and difficulties faced by involved members during implementation activities could, however, negatively affect user appreciation. Failure to involve members adequately hampered early identification of incomplete process requirement. This resulted in major changes to the work process that caused disappointment among the members involved.

Employing inefficient communication methods during the implementation of PIS hindered both, vendor and user, from understanding the users’ requirements and express complete and clear requirements, respectively. This subsequently resulted in inaccurate development of the system’s functions. The consequences of poor information dissemination methods include misunderstanding, confusion, missing and inaccurate information that contributed to the failure to involve all relevant stakeholders when discussing problematic modules.

**DEVELOPMENT OF PROPOSED MODEL**

The refined model was updated according to three aspects, as illustrated in Figure 6. First, the leadership role in change valence was replaced with social influence to include peer influence, where knowledge sharing, experience and the members’ perception influenced appreciation of IS. Second, the environmental factor in organisational capability was removed since it was included in contextual factors and implementation method. Third, the members’ involvement factor and communication efficacy were added in the implementation method component. Members’ active involvement and effective communication method enabled messages related to the adoption of the system to be disseminated clearly and enhance change valence and commitment, in addition to increasing organisational capability through increased manpower and effectiveness of work implementation through effective communication.

**DISCUSSION**

Most adoption factors for PIS are generic in nature and relevant to all types of IS. The factors include system usefulness, fulfilment of user requirements, training, service provider quality, empathy, security assurance, technical support, responsiveness, system use: duration and user experience, user satisfaction of specific functions, decision making and communication (Yusof et al. 2008a; Yusof 2015; Nordin & Deros 2017). However, a number of PIS adoption factors are very specific to the pharmacy domain in terms of unit structure, process, and standards. These factors are related to: 1) pharmacy process such as process flow (Nanji et al. 2009); 2) pharmacy unit: structure, culture, pharmacy unit routine (Andersen 2002); required workflow adaptation (Nanji et al. 2009); 3), specific function of medication management process, links to medication related information, monitoring and patient education (El Mahalli 2016); 4), technical requirement and information to support plan, standards, policy and law for medication (Isfahani 2013); data input mechanism and report format in accordance to international medication standards (Azizi 2011).
This study identified four main factor categories that influenced organisational readiness to IS: 1) change valence that contributes to increased commitment to change; 2) organisational capability that attributed to effectiveness of change; 3) contextual factors and 4) the implementation method that affects commitment and effectiveness of change. All factors need to be considered to ensure a high level of organisational readiness to adopt IS and subsequently IS success. Change valence can be increased by focusing on requirements and appropriateness of change such as clear dissemination of vision and objective for system implementation (Paré et al. 2011; Yusof & Aziz 2015) as well as training activities and demonstration during awareness promotion campaigns concerning IS implementation (Jennett et al. 2003). The effectiveness of the strategy was observed from the IS’s capability to improve work processes in terms of timesaving and smooth implementation, increased productivity through reduced errors and flexibility of online access. This perceived trust can be increased through the members’ active involvement and subsequently increased organisational readiness to adopt IS (Paré et al. 2011).

Work process-system fit was also identified and supported by Bhattacherejee and Hikmet (2007), who found that organisational members only appreciate IS benefits if the system fits the current work process. This study observed that acceptance of IS adoption could be increased through the members’ active involvement, training, support from a more experienced party, and possessing experience in technology use. According to Culler et al. (2009) and Evans et al. (2014), members’ involvement during the pre-implementation phase could increase acceptance by organisational members as well as reduce the risk of resistance towards IS adoption. This is because organisational members can familiarise themselves with the system through active engagement during the implementation process. Organisational members can give opinions on any potential issue that can be mitigated earlier. This enables them to understand decision making and appreciate efforts contributed during the implementation and subsequently increase the desire and commitment to ensure successful IS adoption.

Effective training can increase organisational members’ skills in using IS to complete their task. This facilitates organisational members during the transition process, which from the current work process to using IS, and indirectly reduce resistance risk, such as the reluctance to change old working methods. This study also identified social influence by leaders and peers on organisational commitment when adopting IS. Being the most important social factor (Coeurderoy et al. 2014), leaders play an important role in advocating IS use, allocating manpower and time, making decisions regarding potential issues to ensure sufficient resource allocation (Armenakis & Harris 2009; Paré et al. 2011) and accelerate the adoption (Bawack & Kamdjoug 2018) as well as motivating organisational members to adopt IS (Coeurderoy et al. 2014).

The influence of more experienced peers in increasing acceptance among organisational members (Coeurderoy et al. 2014; Culler et al. 2009; Yusof 2015) was observed during promotional activities and voluntary dissemination of IS related information. These influential members also played an effective role as mediators during training sessions and discussions between users and vendors. The role was informal and voluntary as no individual was officially appointed or assigned as a champion.

This study also identified peer influence on the negative perception of other individuals. The negative perception stemmed from resistance towards change that was triggered by the current working system and scepticism about potential IS adoption (Hammar et al. 2015; Hartzema et al. 2007). The leader’s role in enforcing system use that involves implementation of the system and training, can overcome this problem (Culler et al. 2009; Evans et al. 2014).

The organisation’s capability to implement changes determines the effectiveness of change, where a high level of change effectiveness allows the organisation to be prepared physically for adopting IS. Organisational capability is determined based on the balance between the availability of resources and task demands when adopting IS (Weiner 2009). In order to increase organisational capability, leaders should play their role in allocating sufficient resources to support task demand (Cresswell et al. 2013; Nordin 2012; Yusof 2015). In addition, comprehensive planning of the job scope and implementation schedule also affects organisational capability.

Contextual factors such as policy, work culture, organisational structure and past experience varies across organisations. Although these factors influence commitment and effectiveness of change, these factors are difficult to change. Nevertheless, knowledge and awareness of these factors are crucial when preparing the organisation to take precautions in controlling the risk of negative effects culminating from these factors. Therefore, the organisation needs to focus on increasing change valence and organisational capability, as well as appropriate implementation methods that include members’ involvement and effective communication.

PSD readiness to adopt IS is implemented in two phases: pre- and post implementation. For the pre-implementation level, PSD commitment to change was very high, where members were committed to implementing the system. Despite low levels of manpower of the project management team, the project was still managed properly. According to Chaudoir et al. (2013), the IS implementation method also affects the implementation of technology in the healthcare system, including various resistance and risks as well as the duration of the implementation. Member’s involvement and communication effectiveness also influences organisational readiness to adopt IS. Although this study excluded these factors in the proposed model, these factors were discussed in a number of studies that associated the effects of implementation methods on commitment to change and effectiveness of change.
Organisational members’ involvement in activities involved in system implementation influenced organisational readiness to adopt IS. According to Armenakis and Harris (2009), members’ active involvement in the planning and decision-making processes could increase appreciation and the effectiveness of IS adoption. In addition to providing manpower for increasing organisational capability, early involvement of organisational members at the pre-implementation phase enabled users to familiarise themselves with the system and subsequently encourage acceptance of the system. This is because the active involvement of members allows them to receive the system’s benefits as well as limitations that influence the acceptance of the system (Jennett et al. 2003). Ongoing communication during active involvement also increases the members’ confidence in forging success that positively affects organisational commitment (Coleman & Coleman 2013). However, the involvement of organisational members could also yield negative effects in terms of heavy workload and challenges when implementing the system that could lead to system resistance.

An effective communication method is crucial for ensuring the successful adoption of IS. Coeuretroy et al. (2014) recommended early communication efforts, particularly regarding the benefits of the system in order to ease IS adoption. Activities related to IS in this study, including promotion and awareness campaigns, were not emphasised by the management team. Ineffective communication, particularly related to objectives and the potential to adopt the system, resulted in low commitment among organisational members (Evans et al. 2014).

An ineffective communication method involving users, vendors and project management could affect information dissemination. Organisations should employ effective communication methods to increase the potential of a successful adoption of IS (Shahrasbi & Paré 2014; Yusof et al. 2008b). PSD emphasises less on activities related to message dissemination related to the requirement and appropriateness of change at the organisational level. Active member involvement at the pre-implementation level enabled message dissemination and communication, yielding a high appreciation for IS among involved members. Available resources, including staff and technology infrastructure, were adequate for supporting the requirements for IS adoption. However, limited manpower in the project management team affected pre IS implementation activities. In order to increase the readiness level for IS adoption, PSD needs to promote the system by disseminating information about the system and conduct practical training by involving a larger user group. Identifying champions and building a support group to become change agents could also increase organisational commitment through social influence. High member involvement, an effective communication method and medium, as well as frequent information dissemination could enhance members’ understanding of the system’s potential benefits and subsequently increase organisational readiness and commitment to adopt IS.

The post-implementation level was more critical, whereby the failure of PSD to emphasize the dissemination of information related to the system, training, and wider campaigning efforts beyond users involved in the pre-implementation phase could affect organisational commitment to adopt IS. Even with sufficient resources, poor commitment to change resulting from lack of system acceptance reflects a low level of organisational readiness, which subsequently leads to the abandonment of IS and ultimately, its failure.

CONCLUSION

Organisational readiness to adopt IS is determined by the commitment to change, (the extent of the organisation’s commitment) and the effectiveness of change – (the extent to which the organisation is able to adopt IS effectively). This study identified 12 factors that influenced organisational readiness to adopt IS. The factors were classified into four categories, namely (1) change valence that contributes to increased commitment to change, (2) organisational capability that contributes to effective change, (3) contextual factors, and (4) implementation methods that influence commitment to change and effective change.

This study contributed by supporting and expanding the theory for organisational readiness for change through the identification of specific factors for each component besides the proposed additional components for implementation methods that include members’ involvement and effective communication. The identified factors proposed model could also be used as a guide to enhance organisational readiness as well as a basis for developing an evaluation for any IS type.

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REFERENCES


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