# Determining the KMS Success Factors for Healthcare

**Nor'ashikin Ali, Alexei Tretiakov, Dick Whiddett**
*Massey University,Department of Management*
*Private Bag 11222, Palmerston North, New Zealand*
*s.ali@massey.ac.nz, a.tretiakov@massey.ac.nz, R.J.Whiddett@massey.ac.nz*

## Abstract

*Although a number of studies have been conducted on KMS in healthcare, as yet little research exists that measures KMS success. This study is intended to examine what determines the success of KMS in healthcare and how physicians' knowledge sharing behaviour contributes to the success of KMS. Using some parts of existing models such as the DeLone and McLean IS Success Model, the Technology Acceptance Model, and the KMS Success Model of Kulkarni, Ravindran and Freeze combined with a few new dimensions derived from the literature, a new KMS Success model (KMSH) is developed to suit the healthcare environment. The hyphotheses and descriptions of constructs are presented in this paper which may provide initial insights into factors that are likely to be significant antecedents of KMS success in healthcare. Future work will be conducted to test and validate these hyphotheses which might provide useful guides to successful implementation of knowledge management systems in healthcare.*

## 1. Introduction

Knowledge management (KM) initiatives have emerged in the business sector, public sector and more recently in healthcare [1]. Healthcare is an information-rich industry; medical knowledge is expected to double during a professional lifetime [2] and thus, managing knowledge in this industry is an enormous task. KM holds great promise for improving healthcare delivery and, more critically, for dealing with information overload suffered by physicians. It can facilitate the interaction, collaboration, and sharing of knowledge among physicians to improve patient care. To enable these processes, the information technologies for KM (IT-based KM), or popularly known as knowledge management systems (KMS), have been adopted by healthcare organizations that have KM initiatives. In most literature found on implementation of KM in healthcare, the IT-based KMS are mostly web-based technologies which allow interactions among physicians for knowledge sharing. Examples of web-based KMS in healthcare are portal for nurses [3], telemedicine with KM capabilities [4], the intranet/internet [5] and decision support systems with KM [6].

Although healthcare organizations have started to invest in knowledge management initiatives, there is still a lack of adequate theoretical modelling and empirical examination of factors leading to KMS success and it remains unclear to what extent they are successful in delivering the anticipated outcomes, and why [7]. Therefore, this study is intended to examine the factors that may lead to KMS success in healthcare by focusing on the use of KMS for knowledge sharing by physicians. The aims of this study are to investigate how knowledge sharing behaviour among physicians may contribute to the success of KMS and to explore the relationships of the factors that are assumed to affect KMS success in healthcare. Thus, the constructs are developed into a model known as Knowledge Management Systems Success Model for Healthcare (KMSH). It is intended that the model proposed in this paper will provide a framework for the evaluation of some KM initiatives in both primary and secondary healthcare.

The first section of this paper will discuss the review of Knowledge Sharing and KMS in Healthcare, followed by KMS Success Models and related studies. Then the research model is presented, followed by the development of constructs and hyphotheses.

## 2. Background and Literature Review

### 2.1. Knowledge Sharing and KMS

Knowledge sharing, the behaviour of disseminating and transferring knowledge with other members within one's organisation, is a key enabler of knowledge management. Effective knowledge sharing involves the dissemination and

transfer of knowledge as well as its retrieval and reuse. The importance of knowledge sharing by physicians has long been recognized in practical and theoretical perspectives, the objective being to improve healthcare delivery. However, the biggest challenge for healthcare providers, which other organisations have also experienced, is to encourage knowledge sharing among their employees. To support knowledge sharing, many organisations have employed information technologies, known as KMS. Knowledge management systems (KMS), as defined by Alavi and Leidner [8], are "a new class of information systems as a class of information systems applied to managing organizational knowledge. That is, they are IT-based systems developed to support and enhance the organizational processes of knowledge creation, storage/retrieval, transfer and application". Intranets and the internet are among IT-enabled KM which allow communication by using applications like electronic mail, online discussions, and document management [8]. However, even if KMS are available, how effective are they in promoting knowledge sharing? While knowledge management systems are important, organisations implementing KMS have found that technology alone cannot guarantee that knowledge will be shared [9].

There are several factors that may influence the use of KMS. In terms of what has been empirically studied [10], technical aspects (such as knowledge content quality and system quality) as well as attitudes (such as perceived usefulness and user satisfaction) are important factors that may influence the use of KMS. However, these factors alone are not sufficient; people are unlikely to use KMS if they are not motivated to share knowledge. Before they use KMS, the environment and the mechanisms that are conducive to knowledge sharing must exist, which contribute to the success of KMS. In the healthcare environment, where there exist strong professional boundaries and the nature of the work demands a great deal of physicians' time, knowledge sharing is not simply carried out. A review by Nicolini, Powell, Conville, and Martinez-Solano [7] on managing KM in healthcare states that culture of sharing, leadership and incentives are among the factors critical to knowledge sharing in healthcare [7]. Although these factors are not different from those identified in different industries, these factors have been highlighted as among the most critical factors in healthcare; a highly institutionalised environment. For this kind of environment, the culture of sharing has to be promoted to reduce the barrier to knowledge sharing among the professional groups. Alavi and Leidner [8] in their literature review posit that a major cultural shift would be required to change their employees' attitudes and behaviour so that they willingly and consistently share their knowledge and insights. They argue that organizations where the culture does not value and support information sharing will find it difficult to integrate KMS. The culture that says "if knowledge is power, then hoard it" must be transformed into one where "if knowledge is power, then share it". If the sharing of knowledge becomes an enjoyable experience, then the tendency to use KMS to share knowledge will be greater.

Strong leadership and commitment from top management as well as incentives that can act as compensation for extra demands on time are also among the factors that can motivate physicians to share knowledge. Leaders must take the lead in knowledge sharing. Most of the time employees tend to follow the management's direction and the presence of role models who exhibit sharing behaviour can be a motivating factor. The senior management can become a role model beyond just providing the lip service in initiating the use of KMS for sharing knowledge. Furthermore, incentives can also be an effective tool to increase the prospects of knowledge sharing among employees, particularly in healthcare where knowledge sharing is very difficult to realize in practice due to professional boundaries [7]. Incentives, which can be in the form of appraisal, stock options, promotion, etc., are one of the mechanisms to reward people for knowledge sharing behaviours.

As physicians are professional groups with the tendency to operate within mono-disciplinary communities which create social and cognitive boundaries [7], a social psychology approach is useful in predicting their behaviour in social settings like healthcare [11]. From the perspective of social psychology, the physicians' intention to share knowledge may be influenced by subjective norm [11]. Subjective norm has been empirically tested and validated on physicians in Korean hospitals by Ryu, Ho and Han [11], and has been found to have the strongest effect on physicians' behavioural intention to share knowledge. They suggested that further empirical evidence be accumulated so that the result can be generalized to other healthcare workers in other countries. Therefore, this study will continue this effort by testing the subjective norm on healthcare workers in New Zealand.

Another issue that might have an impact on KMS success is security of shared knowledge. Security of shared knowledge is less identified in most of the KM literature because KM researchers assumed that security is built into KMS components, and therefore, that topic does not need to be addressed separately [12]. The issue of security in KM relates to more than just the technology embedded in the system. Knowledge is an asset, and losing it to other organizations means losing competitive advantage. Ensuring the right individuals retrieve the knowledge, protecting knowledge against theft of intellectual property and ensuring it is applied appropriately are the concerns of the knowledge contributors when sharing knowledge.

The organization must address issues such as breach of copyright and intellectual property act, to protect knowledge from falling into the wrong hands and being misused by the knowledge users. The risks involved when knowledge is transferred are loss of critical knowledge, misuse of critical knowledge and disclosure of critical knowledge to those that should not receive it [12]. If a security policy exists to support the existing security technology, the employee will

perceive that the security issues have been dealt with, to protect their valuable knowledge and, thus, they will be willing to contribute to KMS. Therefore, the perception that knowledge is protected is critical prior to contributing to KMS and, consequently, we believe that perceived security should be considered as a factor influencing tendency to share knowledge. Therefore, the term *perceived security* is used as a construct which refers to the security felt by physicians while contributing knowledge to KMS and this should be separate from the System Quality construct.

All factors discussed above are assumed to affect the KMS success and, thus, the model is proposed to underpin knowledge sharing enablers for KMS success. The next section will review previous KMS Success Models and identify the model to be adopted in this study.

## 2.2. KMS Success Models and Related Studies

Even though the KMS have long been recognized in major industries, not many empirical studies have been conducted into the success of KMS. Alavi and Leidner [8] mentioned in their survey of KMS conceptual foundations and research issues, that little IT research exists on the design, use, or success of systems to support knowledge management. Since then, more researchers have begun to explore this research issue. Since KMS also falls under the group of information systems, the DeLone and McLean Information Systems (IS) Success model (hereafter referred to as the "D&M IS Success Model") has been adapted to assess KMS success. The D&M IS Success Model [10] has gained strong theoretical and empirical support, and has been widely accepted by most of IS researchers in the study of information systems success. For example, Jennex and Olfman [12] have performed empirical KMS research and proposed a KMS Success model based on the D&M IS Success Model [10]. This model has been extended to include technological resources for system quality and knowledge strategy/process for knowledge/information quality variables, and it was tested in an engineering organization.

Another KMS Success Model was developed by Wu and Wang [13]; it is also an extension of D&M IS Success Model which was empirically tested in firms in Taiwan. Halawi, McCarthy and Aronson [14] proposed a model to measure the success of knowledge management systems by adopting the generic framework of the D&M IS Success Model. All these studies proposed a specialization of DeLone and McLean's IS Success Model around a specific type of IS, that is, a KM system, but with less attention to factors such as culture and other organizational issues that may influence the success of KMS. Effective knowledge management systems involve far more than just technology; cultural and organisational issues were identified as major concerns in the deployment of KMS, and this is consistent with the IT management literature which advocates organizational and behavioural change management as critical success factors in their implementation of information systems [8]. The KMS Success Model developed by Kulkarni, Ravindran and Freeze [15] considers organisational issues. Their model, which was tested in a US university, is an extension of the D&M IS Success Model, with additional variables of organizational issues: leadership, incentives, coworker and supervisor. The organizational focus of the Kulkarni, Ravindran and Freeze's model makes it more relevant to our research, though it has been modified and improved to suit the healthcare environment.

We adopted the generic framework of Kulkarni, Ravindran and Freeze's KMS Success Model [15] and customized it to the context of knowledge management systems in healthcare. Organizational issues are proposed to be part of KM success because KM, like any other information systems, involves both people, and the organization and the model recognises organizational support features as factors contributing to KMS success. This model is proposed to be tested in a healthcare setting, since empirical studies on the success of KMS in healthcare have not yet been conducted. To differentiate our KMS Success Model from the models used in other organisations, we use KMSH Success Model (Knowledge Management Systems for Healthcare Success Model) as the name. Since this model will be tested in a healthcare setting, we propose some adaptations of the KMS Success Model of Kulkarni, Ravindran and Freeze [15] which are assumed to be applicable to healthcare context. Our proposal extends the existing Kulkarni, Ravindran and Freeze [15] model to include three additional factors, which are *culture of sharing*, *subjective norm* and *perceived security* as has been discussed in section 2.1. Coworker and supervisor from Kulkarni, Ravindran and Freeze's KMS Success Model [15] have been replaced with *culture of sharing*. Coworker and Supervisor refer to the interactions of employees with coworkers and immediate supervisors in their day-to-day work, and thus influence the attitude towards knowledge sharing. Through daily interactions, they share ideas and insights naturally. If the team of employees (co-workers and supervisors) share values, beliefs, and practices, these are considered as culture as defined by Schein [16]. To inculcate positive social interaction, trust, openness of communication, and a knowledge-friendly culture must exist to allow smooth communication among employees. As culture of sharing is more than just interactions of coworker and supervisor, we find that *culture of sharing* is more appropriate to this study.

Figure 1 depicts our research model.

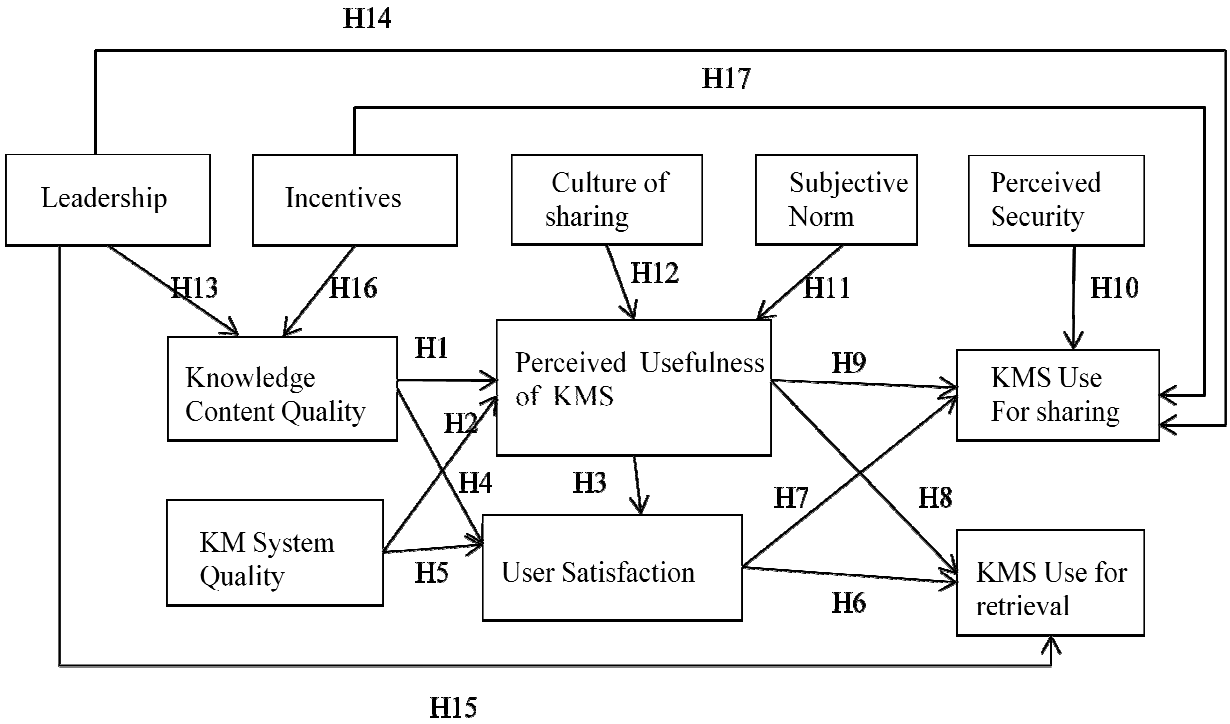


**Figure 1 – KMSH Success Model**

## 3. Constructs and Hypotheses

### 3.1. Definitions of Constructs

A summary of constructs appearing in the model and their definitions are provided in Table 1.

**Table 1 –Constructs Definitions**

| Construct | Definition | Operationalization |
|---|---|---|
| KMS Use for Retrieval | The extent to which KMS is being used for the retrieval, and use of knowledge of various types for decision-making activities. | [10, 13] |
| KMS Use for Sharing | The extent to which KMS is being used for sharing knowledge with colleagues. | [10, 13, 15, 17] |
| Perceived usefulness of KMS | Degree to which a physician believes that using KMS would enhance his or her job performance. | [10, 15, 18, 19] |
| User satisfaction | The extent to which physicians believe that the KMS available to them meets their requirements, such as ease of obtaining the information/knowledge needed, satisfaction with access to knowledge and the quality of knowledge content and the adequacy of information/knowledge. | [13, 15, 20] |
| Knowledge/Information content quality | Quality of relevant organizational knowledge in terms of its accuracy, relevance, timeliness, applicability, comprehensibility. | [10, 13, 15, 21] |
| KM system quality | Quality of KM systems in terms of facilitating knowledge sharing and retrieving, e.g. ease of use for retrieval, search capability. | [10, 15, 17, 22] |

| | | |
|---|---|---|
| Culture of sharing | The shared values, beliefs and practices of the employees in the organization with regard to knowledge sharing. | [14, 23, 24] |
| Incentive | The acknowledgement and recognition of efforts for physicians who are committed to knowledge sharing and as a way of motivating knowledge sharing | [14, 25] |
| Leadership | The level of managerial support for knowledge sharing and the top management commitment in being the champion in knowledge sharing. | [14, 25, 26] |
| Perceived security | The extent to which physicians believe that the KMS is secure for transmitting knowledge and trust that the knowledge shared is well-protected. | [27, 28, 29, 30] |
| Subjective norm | A physician's perception that people who are important to him think he should or should not use KMS to share knowledge. | [32] |

## 3.2. Descriptions of Constructs and Hyphotheses

### 3.2.1. KMS Use

System Use, in terms of the amount of use of a system, has been one of the most frequently proposed measures of IS success and is a key variable in understanding IS success [11, 33]. Kulkarni, Ravindran and Freeze [15] adapted this measure to be "Knowledge use" which reflects the extent to which a worker captures and uses knowledge in various activities. However, instead of "Knowledge use", we use "KMS Use", as our focus of study is on physicians' contribution towards knowledge sharing that may affect KMS use. The process of *knowledge sharing* through KMS involves people contributing knowledge to KMS (sharing) and people seeking knowledge (retrieval) from KMS for reuse. Therefore, success of KMS requires the willingness of knowledge contributors to share knowledge and the desire of knowledge seekers to reuse the codified knowledge (Kankanhalli et al., 2005). KMS success is measured by examining these two behaviours: (1) contributions to KMS for sharing; (2) accessing KMS for retrieving. Therefore, we propose that when determining KMS Success, two types of use can be recognised, firstly there is *KMS use for sharing* (i.e. where a worker actively contributes knowledge to the knowledge-base) and secondly, there is *KMS use for retrieval* (simply the reuse of existing knowledge). We suggest that these two types of behaviour might be independent of each-other and may be influenced by different variables. We have, therefore, separated these two variables in our model.

### 3.2.2. Knowledge Content Quality and KM System Quality Determines the Perceived Usefulness

Medical professionals have a broad range of knowledge needs and produce a great amount of knowledge; without high quality and up-to-date knowledge, doctors cannot practice high quality medicine [2]. Biomedical knowledge and evidence-based medicine (EBM), which cover many aspects of diagnosis, treatment, and prescribing, are examples of quality knowledge which are essential to healthcare professionals [34]. Therefore, capturing the high quality content of knowledge is critical in measuring the success of KMS in healthcare.

People will use the system when they believe it will help them perform their job better and this is referred to as perceived usefulness. Perceived usefulness is defined by Davis [18] as "the degree to which a person believes that using a particular system enhances his or her job performance". In the existing KMS Success model of Kulkarni, Ravindran and Freeze [15], the finding indicates that the effect of Knowledge Content Quality on Perceived Usefulness was not statistically significant. However, due to nature of healthcare, which requires high quality of knowledge content [7], we expect that the Perceived Usefulness of KMS is likely to depend on the quality of knowledge content. If KMS can produce a high quality of knowledge content, the physicians may find using KMS can be useful to them and thus, the tendency to use KMS is higher. It is believed that Knowledge Content Quality leads to Perceived Usefulness of KMS.

Equally, another finding from Kulkarni, Ravindran and Freeze [15] shows that the system quality does not significantly affect Perceived Usefulness. System quality has been represented in many researches by ease of use [9, 17, and 35] which is defined as the degree to which a system is "user friendly" [33] or to what extent using it is free of effort [18]. Ease of use is probably the most widely used construct when talking about system quality. Seddon [35] considers system quality to be concerned with ease of use, interface user-friendliness, reliability and availability. In the healthcare context, we believe the finding on the effect of system quality on Perceived Usefulness might be different. Like any other IS systems, the KMS should be accessible and available whenever knowledge seekers need it. A system cannot be regarded as being successful if it has frequent problems and crashes. One of the reasons that knowledge sharing among physicians is inhibited may be a fear of technology or "technophobia" [36]. Physicians may not be willing to use the system if they find it difficult to use. This may be due to the poor quality of the system. Thus, a good quality system may play a role in positively influencing the perceptions of physicians towards using the system. As physicians are always under time pressure [36], they may find value in sharing and using knowledge, if the KMS system reduces the extra effort required to share and use knowledge [15]. Thus, the better the quality of the system is, the higher is the perceived usefulness.

*Hypothesis 1: Higher level of Knowledge Content Quality leads to higher level of Perceived Usefulness of KMS.*

*Hyphothesis 2: Higher level of KM System Quality leads to higher level of Perceived Usefulness of KMS.*

### 3.2.3. Knowledge Content Quality, KM System Quality and Perceived Usefulness Determine User Satisfaction

User satisfaction is one of the most frequently measured aspects of IS success which is also a useful measurement of KMS success [13, 15]. As reported in other literature, the KMS user satisfaction variable is also determined by Knowledge Content Quality, KM System Quality, and Perceived Usefulness [17, 33]. The empirical results of Wu and Wang's [13] study indicated that system quality and knowledge content quality have a significantly positive influence on user satisfaction. Kulkarni, Ravindran and Freeze [15] found that the User Satisfaction measure is reinforced by Perceived Usefulness which results in knowledge use for retrieving and sharing. If physicians feel that the content of knowledge is of good quality, the system they are using reduces their tasks and they perceive the knowledge sharing is useful, they will be satisfied and are likely to use the system. Therefore, the following hypotheses are proposed:

*Hyphothesis 3: Higher level of Perceived Usefulness of KMS leads to higher level of User Satisfaction.*

*Hyphothesis 4: Higher level of Knowledge Content Quality leads to higher level of User Satisfaction.*

*Hyphothesis 5: Higher level of KM System Quality leads to higher level of User Satisfaction.*

### 3.2.4. User Satisfaction has direct impact on KMS Use for Sharing and KMS Use for Retrieval.

User satisfaction is a critical factor in determining the IS Success Model. It is supported by Seddon [35] who includes only one causal relationship leading from User Satisfaction to IS Use. We believe this also applies to the KMS context. In the KMS context, the finding from Kulkarni, Ravindran and Freeze [15] shows that User Satisfaction affects Knowledge Use. The study by Wu and Wang [13] shares the same finding. Therefore, we propose that User Satisfaction has direct impact on KMS use for retrieval and sharing. This has led to the following hyphotheses:

*Hyphothesis 6: Higher level of User Satisfaction leads to higher level of KMS Use for Retrieval.*

*Hyphothesis 7: Higher level of User Satisfaction leads to higher level of KMS Use for Sharing.*

### 3.2.5. Perceived Usefulness has direct impact on KMS Use for Sharing and KMS Use for Retrieval.

Kulkarni, Ravendran and Freeze [15] in their findings, found that the direct effect of Perceived Usefulness on KMS Use for Sharing was not statistically significant. This finding is different from the findings of Adams, Nelson and Todd [37] and Davis, Bagozzi and Warshaw [38] who indicate that perceived usefulness is an important determinant of usage. In line with their findings, we believe that this finding is applicable to the KMS context. Specifically in healthcare, physicians who are facing the pressure of time might find using the system is an additional task for them and thus, they might be reluctant to use the system. They are willing to use the system if only the system has been proven to be useful to them. Therefore, it is proposed that Perceived Usefulness has direct impact on both KMS Use for Retrieval and Sharing. Therefore, we hyphothesized:

*Hyphothesis 8: Higher level of Perceived Usefulness of KMS leads to higher level of KMS Use for Retrieval.*

*Hyphothesis 9: Higher level of Perceived Usefulness of KMS leads to higher level of KMS Use for Sharing.*

### 3.2.6. Perceived Security has direct impact on KMS Use for Sharing

As discussed previously, security can be an influential factor in the use of KMS for knowledge sharing. The belief that the shared knowledge is protected can increase the likelihood of the KMS being used for knowledge sharing. Studies on how belief can impact the behaviour of users have been found in previous literature [27, 28, 29]. For example, Yenisey, Ozok and Salvendy [29] in their study on perceived security as one of the determinants in Turkish students using e-commerce, posited that for e-commerce to be successful, it is important that the users have the belief that the system is secure. The relationship between perceived security and use of e-commerce has had a positive effect on the use of e-commerce. We believe this is also applicable to the KMS context, especially in healthcare where the physicians possess specialized knowledge which must be protected to ensure the knowledge will not be misused. Misuse of knowledge can result in medical errors which lead to wrong decisions and, thus, impact the quality of healthcare. In this context, perceived security can be antecedent to KMS use for sharing, because the more physicians perceive that the KMS is secure, the more likely they are to be willing to use the KMS to share their knowledge. However, we believe that security is not as critical for knowledge retrieval. Based on the above explanation, we offer the following hypothesis:

*Hyphothesis 10: Higher level of Perceived Security leads to higher level of knowledge sharing via KMS.*

### 3.2.7. Subjective Norm has an impact on KMS Use for Sharing and Retrieval via Perceived Usefulness

Subjective norm, which describes the social influence that may affect a person's intention to use a KMS [39], has received considerable empirical support as an important antecedent to usage behaviour. Xu and Quaddus [39] found that social norms, i.e. influence from peers, leaders, respected people, superiors, subordinates, do have an impact on people's acceptance and use of a KMS. Ryu, Ho and Han [11] suggested in their study that physicians' subjective norms with regards to knowledge sharing have a strong effect to their intention to share knowledge. Both of these findings indicate that subjective norm had a direct effect on intention to use. Venkatesh and Davis [31] argue that subjective norm had a direct effect on intention to use only for mandatory, but not voluntary, usage contexts. In line with Venkatesh and Davis's [31] finding, we contend that subjective norm has indirect effect on KMS Use via Perceived Usefulness, because in this context, we expect use of KMS for knowledge sharing to be voluntary. This leads to the following hypothesis:

*Hyphothesis 11: Higher level of Subjective Norm to share knowledge will lead to higher level of KMS Use via Perceived Usefulness of KMS.*

### 3.2.8. Culture of sharing has an impact on KMS Use via Perceived Usefulness

One of the barriers to the successful implementation of KM in organizations is culture [40]. For effective knowledge sharing, a culture of sharing must exist among workers. Ruppel and Harrington [41] indicated that employee acceptance of or resistance to knowledge-sharing is a management and corporate culture issue rather than a technology issue. A knowledge-sharing culture, where people are encouraged to interact and share ideas openly, enables the use of KMS, because it positively influences the perception of the usefulness of the system. This is supported by Kulkarni, Ravindran and Freeze [15] who, in their findings, indicates that the interactions between employees with coworkers and immediate supervisors can influence the perceived usefulness of KMS and value of knowledge sharing. If the culture of sharing exists and the employees find that this culture has improved their work performance and improved job productivities, employees will not hesitate to contribute to be part of the culture. Open and participative structure, trust and knowledge-friendly culture will motivate more knowledge sharing, while lack of knowledge-friendly culture can impede knowledge sharing [42, 43]. The better the culture of sharing is, the better the perceived usefulness of KMS will be.

*Hyphothesis 12: Higher level of Culture of Sharing leads to higher level of Perceived Usefulness of KMS.*

### 3.2.9. Leadership determines the Knowledge Content Quality and has direct impact on KMS Use for Knowledge Sharing and Retrieval

Of the organisational issues proposed in Kulkarni, Ravindran and Freeze's model [15], we have adopted the factors of *leadership* and *incentives* directly. *Leadership* encapsulates the role and commitment of top management in motivating knowledge sharing among employees. The importance of top management support in IS implementation has been recognized often in the IS literature since the late 1960s [5, 26, 44, 45]. In the context of healthcare, Booth [46]

mentioned that an organization needs a 'chief knowledge officer' to be responsible for managing knowledge and to ensure that employees are involved in KM initiatives. Top management support for KMS promotes the quality of knowledge content and influences the others to use the KMS for knowledge sharing and retrieval. The hyphotheses for the leadership factor are:

*Hyphothesis 13: Higher level of Leadership leads to higher level of Knowledge Content Quality.*

*Hyphothesis 14: Higher level of Leadership leads to higher level of KMS Use for Sharing.*

*Hyphothesis 15: Higher level of Leadership leads to higher level of KMS Use for Retrieval*

### 3.2.10. Incentives determine Knowledge Content Quality and have direct impact on KMS Use for sharing

*Incentives* refer to formal appraisal and recognition of efforts by knowledge workers to encourage knowledge sharing and reuse. Kulkarni, Ravindran and Freeze [15] are of the opinion that incentives and rewards stimulate sharing of knowledge in the form of high quality content. In the context of healthcare, Booth [46] mentioned that mechanisms for rewarding information sharing are required so that benefits to individuals and organizations can be seen to outweigh the threats that giving up such knowledge might incur. Our argument to include incentives as a factor contributing to KMS Success in healthcare is that physicians who face increasing demands on their time should be compensated as well. In healthcare, where the quality of knowledge content cannot be compromised, the rewards stimulate more contribution of knowledge sharing with high quality of knowledge content. Hence, we contend that the Incentives factor is an antecedent of Knowledge Content as well as KMS use for sharing. However, for knowledge retrieval, incentives are not a crucial factor. Therefore, we hypothesized:

*Hyphothesis 16: Higher level of Incentives leads to higher level of Knowledge Content Quality.*

*Hyphothesis 17: Higher level of Incentives leads to higher level of KMS use for sharing.*

## 4. Research Method

We intend to test the model by developing a survey instrument and sending the questionnaire to physicians in healthcare in New Zealand. The questionnaire is chosen as the method of data collection because it is more economical, and efficient than other methods of data collection [47]. The questionnaire will be administered to physicians in healthcare who are using or have experiences using IT-based knowledge management. Prior to this survey, an initial survey will be conducted to identify the organizations that use KMS. The target subjects for an initial survey will be twenty-one District Health Care Boards (DHBs) and five Management Services Organizations (MSOs). Based on this initial survey, the physicians from the identified organizations will be identified as potential respondents for the actual survey. All constructs and measures, except *culture of sharing*, can be constructed using previously validated instruments with minor modifications based on the healthcare context. No instruments exist for a single construct *culture of sharing;* we are developing these instruments based on the discussions on the attributes of culture found in the literature. Although most of the measurements have been validated by prior research, the adopted instrument will be examined to ensure content validity and reliability within the targeted context.

## 5. Conclusion

The primary objective of this paper is to highlight the factors that may affect the KMS Success in Healthcare by developing the integrated model adapted from Kulkarni, Ravindran and Freeze's Success Model [15], with additional support from organisational issues. Several limitations of this study must be recognized. First, we do not employ all the factors that enable KM in other industries, because we find that those factors are not as critically important as the ones adopted in this study. Those factors can be further tested in future research. Second, these factors will be confined to one particular professional group: physicians. Thus, for other professional groups, further studies may be conducted. This study may further sharpen the understanding of the role of knowledge sharing behaviour in the success of KMS and may be helpful for harnessing knowledge management activities in organisations, particularly in healthcare. The emphasis on the organisational and cultural factors might indicate that for KMS to be successful, the technology alone is not sufficient. In summary, it is assumed that the variables used in the KMS Success Model of Kulkarni, Ravindran and Freeze [15] are useful for determining the KMS Success model in the context of healthcare together with the additional variables, *culture of sharing*, *subjective norm* and *perceived security*. Finally, it is hoped that the findings of the study will provide some insight into the relative importance of the various factors which influence the success of

KMS projects in healthcare, which will be of value to practitioners who are developing new knowledge management systems.

## 6. References


[1] Davenport TH, Glaser J. Just-in-Time Delivery Comes to Knowledge Management. Harv Bus Rev. 2002; 107-111.

[2] Heathfield H, Louw G. New challenges for clinical informatics: KM tools. Health Informatics J. 1999; 5(2): 6-13.

[3] Hsia TL, Lin L-M, Wu J-H, Tsai H-T. A Framework for Designing Nursing Knowledge Management Systems. Interdisciplinary J Inf, Knowl Manage. 2006;1:13-22.

[4] Paul DL. Collaborative Activities in Virtual Settings: A Knowledge Management Perspective of Telemedicine. J Manage Inf Syst. 2006; 22(4):143-176.

[5] Koumpouros Y, Nicolosi GL, Martinez-Selles M. Critical success factors for establishing a multidisciplinary health community knowledge management system using internet-based ICTs: the cardiology paradigm. Int. J. Healthc Technol Manage. 2006; 7(3/4):283-302.

[6] Bose R. Knowledge management-enabled health care management systems: capabilities, infrastructure, and decision-support. Expert Syst Appl. 2003; 24(1): 59-71.

[7] Nicolini D, Powell N, Conville P, Martinez-Solano, L. Managing knowledge in the healthcare sector. A review. Int J of Manage Rev. 2007;10(3):245-263.

[8] Alavi M, Leidner DE. Review: Knowledge Management and Knowledge Management Systems: Conceptual Foundations and Research Issues. MIS Quarterly. 2001;25(1):107-136.

[9] Kankanhalli A, Tan BCY, Wei KK. Contributing Knowledge to Electronic Knowledge Repositories: An Empirical Investigation. MIS Quarterly. 2005;29(1):113-143.

[10] DeLone W, McLean ER. Information Systems Success: The Quest for the Dependent Variable. Inf Syst Res. 1992;3(1):60-95.

[11] Ryu S, Ho SH, Han I. Knowledge sharing behaviour of physicians in hospitals. Expert Syst Appl. 2003; 25(1): 113-122.

[12] Jennex ME, Olfman LL. A Knowledge Management Success Model: An Extension of DeLone and Mc Lean's IS Success Model. Ninth Americas Conference on Information Systems. 2003;2529-2539.

[13] Wu JH, Wang YM. Measuring KMS success: A respecification of the DeLone and McLean’s model. Inf and Manage. 2006;43:728-739.

[14] Halawi LA, McCarthy RV, Aronson JE. An Empirical Investigation of Knowledge-management Systems’ Success. The J of Comp Inf Syst. 2007;48(2):121-135.

[15] Kulkarni UR, Ravindran S, Freeze R. A Knowledge Management Success Model: Theoretical Development and Empirical Validation. J Manage Inf Syst. 2006;23(3): 309-347.

[16] Schein E. Organizational Culture and Leadership. San Francisco, CA: Jossey-Bass,1985.

[17] Rai, A, Lang SS, Welker RB. Assessing the validity of IS success models: An empirical test and theoretical analysis. Inf Syst Res. 2002;13(1):50-69.

[18] Davis, FD. Perceived Usefulness, Perceived Ease of Use and User Acceptance of Information Technology. MIS Quarterly.1989;13(3):319-340.

[19] Seddon, PB, Kiew MY. A Partial Test and Development of DeLone and McLean's Model of IS Success. Aust J Inf Syst. 1996;4(1): 90.

[20] Wu JH, Wang SC, Lin, LM. Mobile computing acceptance factors in the healthcare industry: A Structural Equation Model. Int J Med Inform. 2007;76:66-77.

[21] Ong, CS, Lai, JY. Developing an instrument for measuring user satisfaction with knowledge management systems. Proceedings of the 37th Hawaii International Conference on System Sciences; 2004.

[22] Liu C, Arnett KP. Exploring the factors associated with Web site success in the context of electronic commerce. Inf & Manage. 2000;38(1):23-33.

[23] Alavi M, Kayworth T, Leidner D. An Empirical Examination of the Influence of Organizational Culture on Knowledge Management Practices. J Manage Info Syst. 2005;22(3):191-224.

[24] Davenport TH, De Long DW, Beers MC. Successful Knowledge Management Projects, Sloan Manage Rev. 1998,39(3):43-57.

[25] Ash, J. Organizational Factors that Influence Information Technology Diffusion in Academic Health Sciences Centers. J Am Med Inform Assoc. 1997;4:102-111.

[26] Thong JY, Yap CS, Raman KS. Top Management Support, External Expertise and Information Systems Implementation in Small Businesses. Inf Syst Res. 1996,7:248-267.

[27] Suh B, Han I. The Impact of Customer Trust and Perception of Security Control on the Acceptance of Electronic Commerce. Int J Electro Commerce. 2003;7(3):135-161.

[28] Salisbury DW, Pearson RA, Pearson, AW, Miller, DW. Perceived Security and World Wide Web Purchase Intention. Ind Manage Data Syst. 2001;101(4):65-176.

[29] Yenisey MM, Ozok AA, Salvendy G. Perceived security determinants in e-commerce among Turkish university students. Behav Inf Technol. 2005;24(4):259-274.

[30] Fang X, Chan S, Brzezinski J, Xu S. Moderating Effects of Task Type on Wireless Technology Acceptance. J Manage Inf Syst. 2006;22(3):123-157.

[31] Venkatesh, V, Davis FD. A Theoretical Extension of the Technology Acceptance Model: Four Longitudinal Field Studies. Manage Sci. 2000;46(2):186-204.

[32] Chau, PYK, Hu, PJ. Examining a Model of Information Technology Acceptance by Individual Professionals: An Exploratory Study. J Manage Inf Syst. 2002;18(4):191-229.

[33] Doll WJ, Torkzadeh G. Developing a multidimensional measure of system-use in an organizational context. Inf Manage. 1998;33(4):171-185.

[34] de Lusignan, S., Robinson, J. Clinical Knowledge Management: A Model for Primary Care. Health Informatic Series, Springer, New York 2007.

[35] Seddon, PB. A Respecification and Extension of the DeLone and McLean Model of IS Success. Inf Syst Res. 1997; 8(3): 240-253.

[36] Treister, NW. Physician acceptance of new medical information systems: The field of dreams. Physician Executive. 1998; 24(3):1-5.

[37] Adams DA, Nelson RR, Todd P. Perceived Usefulness, Ease of Use, and Usage of Information Technology: A Replication. MIS Quarterly. 1992; 16(2): 227-247.

[38] Davis FD, Bagozzi, RP, Warshaw PR. User Acceptance of Computer Technology: A Comparison of Two Theoretical Models. Management Science. 1989; 35(8): 982-1003.

[39] Xu J, Quaddus M. Exploring the perceptions of knowledge management systems. J Manage Dev. 2005; 24(4):320-334.

[40] McDermott R, O'Dell C. Overcoming cultural barriers to sharing knowledge. J Knowl Manage. 2001; 5(1):76-85.

[41] Ruppel, CP, Harrington SJ. Sharing Knowledge through Intranets: A Study of Organizational Culture and Intranet Implementation. IEEE Transactions on Professional Communication. 2001; 44(1):37-52.

[42] Hendriks, P. Why share knowledge? The influence of ICT on the motivation for knowledge sharing. Knowl Process Manage. 1999;6(2):91-100.

[43] Damodaran L, Olphert, W. Barriers and facilitators to the use of knowledge management systems. Behav Inf Technol. 2000;19(6):405-413.

[44] Doll, WJ. Avenues for Top Management Involvement in Successful MIS Development. MIS Quarterly. 1985;9(1):17-35.

[45] Purvis, RL, Sambamurthy V, Zmud RW. The Assimilation of Knowledge Platforms in Organizations: An Empirical Investigation. Organ Sci. 2001;12(2):117-135.

[46] Booth, A. Managing knowledge for clinical excellence: ten building blocks. J Clin Excell. 2001;3:187-194.

[47] Newsted PR, Huff SL, Munro MC. Survey instruments in information systems. MIS Quarterly. 1998;22(4):553-554.