Knowledge Management System Adoption and Practice in Taiwan Life Insurance Industry: Analysis via Partial Least Squares

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Abstract
This study examines the factors affecting the adoption and practice of knowledge management system (KMS) in Taiwan life insurance industry, using a mixed methodology approach. The research was carried out in three phases: field study, pilot survey and main survey. The main survey data were analyzed through Partial Least Squares (PLS) technique. The results indicate that the external factors affect employees’ attitudes via perceived usefulness and subjective norm in adopting and applying KMS, which would then impact the perceived performance of the organization. This study offers a comprehensive research model for future KMS studies and provides managerial implications particularly for those life insurance enterprises embarking on the adoption and practice of KMS in Taiwan or elsewhere.

Keywords: Knowledge Management System, Life Insurance, Partial Least Squares

Introduction
Organizations are using Knowledge Management System (KMS) to manage their internal and external knowledge in terms of knowledge generation, preservation, sharing and utilization (Bonner 2000; Duke et al. 1999). Though KMS has been discussed widely (Alavi & Leidner 2001; Hung et al. 2005), there is a scarcity of empirical studies regarding KMS adoption and applications for life insurance industries. Therefore, this study attempts of fill this gap by addressing the following questions:

1. What are the factors and variables affecting KMS adoption and practice in Taiwan life insurance industry?
2. How are the factors and variables perceived to affect KMS adoption and practice in Taiwan life insurance industry?

The paper is organized as follows. The next section presents the background and relevant theories. The research method is presented in Section 3. Section 4 presents the proposed research hypotheses. Next, the results of main survey are analyzed using partial least squares techniques and discussed. Finally, conclusions with future research directions are presented.

Background
The life insurance industry has been growing exponentially and playing a significant role in the financial sector in Taiwan. According to “The Important Indexes of Insurance Industry, Taiwan 2006/06” of Taiwan Insurance Institute (http://www.iicroc.org.tw/), the population of household registered in Taiwan up to 2005 was 22.770 million, and the ratio of life insurance policies to population was 176.13 %. The income from premiums of Taiwan life insurance industry in 2004 was US$ 33,851 million and ranked top 9 globally. Due to the enormity of premium income, which is predominantly from the general public, and the associated social
responsibility, the life insurance companies aim at providing better professional knowledge and service to achieve superseding competitive advantages.

According to Wang and Plaskoff (2002), knowledge management system (KMS) is defined as a system that is comprised of knowledge workers using knowledge management technologies and tools to perform knowledge tasks in a knowledge organization in order to increase organizational and individual productivity and innovation. A successful KMS is suggested to have several elements, including people and their behaviors inside the organization, the knowledge management process, the management practices (e.g., senior management’s support), culture and structure of the organization, information technology, as well as information exchange (Avarn 2000).

Yang (2004) indicated that Taiwan life insurance enterprises had initiated to develop relevant information systems recently in embarking on knowledge management. However, it was suggested that the life insurance organizations should employ the concepts and suggestions of innovation in putting such systems into place. According to Rogers (1995), an innovation is defined as an idea, practice, or object that is perceived as new by an individual or another unit of adoption. Therefore, KMS can be seen as an innovation for the life insurance enterprises and their employees. Based on the innovation-development process and organizational innovation process of Rogers (1995), this study suggests that the adoption and practice of KMS involves its acceptance and diffusion at both organizational and individual levels.

In addition, the Theory of Reasoned Action (TRA) holds that a person’s behavior is a function of the person’s intention determined by the attitude toward the act and the beliefs about the expectations of others (Ajzen & Fishbein 1980). Davis’s (1986) Technology Acceptance Model (TAM) suggests that the user’s intention to use a new system is determined by two beliefs: perceived usefulness (PU) and perceived ease of use (PEOU). Thus, this study, based on Innovation Diffusion (ID) (Rogers 1995), the TRA (Ajzen & Fishbein 1980) and TAM (Davis 1986), postulates that, some external factors influence the perceptions, which in turn affect people’s attitudes toward KMS adoption, and KMS practice would be influenced by such attitudes and affect the perceived performance of the organization.

**Research Method**

This research uses a mixed methodology approach (Tashakkori & Toddle 1998). A tentative research model was proposed through extensive literature review, and fine-tuned via a field study, in which ten interviewees were invited to participate. The transcripts were transcribed rigorously by the researchers and the data were analyzed using content analyses (Berg 2004). Stage one dealt with single interview transcripts, and stage two dealt with cross interview transcripts to integrate all the individual factors, variables and their relationships, referring to the literature. The details of the field study can be found in Huang et al. (2006). A comprehensive model was thus produced combining the tentative research model and the results of the field study.

In the second stage, a preliminary research questionnaire was developed based on the combined research model. The questionnaire was revised via pre-test and back-translation and then pilot tested among 40 managers and staffs in various departments of a life insurance company in Taiwan, receiving 26 valid responses with the effective response rate of 65%.
The internal consistency of the constructs was found to be satisfactory through reliability tests.

In the third stage, a nation-wide survey was conducted among 605 employees of the life insurance enterprises in Taiwan. A total of 362 valid responses were collected, resulting in a 59.8% effective response rate. Using cross-sectional approaches, various segments of Taiwan life insurance industry in terms of history, size and location were sampled at a single point in time (Zikmund 2000). The questionnaires were distributed to the target respondents, i.e., office managers and staffs who worked full time and were involved in knowledge work to some extent in their companies. The data of the main survey were analyzed via Partial Least Squares (PLS) and the results will be presented in section 5.

**Hypothesis Development**

![Research Model of KMS Adoption and Practice](image)

Based on the combined research model, the proposed hypotheses in the form of a research model are presented in Figure 1 (see the statements in Table 2). Environmental factors have been identified to influence system adoption and diffusion (Belassi & Fadlalla 1998). Via the field study, it is proposed that environments and industrial factors (H1) would affect the perceived usefulness (PU) of KMS, referred as the degree to which a person believes that using KMS would enhance his or her job performance (Davis 1986). In addition, individual features (Ajzen & Fishbein 1980), IT support (Alavi & Leidner 2001), KMS promotion (Brand 1998), organizational characteristics (Belassi & Fadlalla 1998; Gold et al. 2001) and cultural factors (Alavi & Leidner 2001) were identified to be influential in affecting people’s behaviors via their opinions regarding such behaviors. Through the interviews, it is suggested that individual features (H2a, 2b), IT support (H3a, 3b), KMS promotion (H4a,4b) and organizational characteristics (H5a,5b) would have impacts on the employees’ PU and complexity of KMS, described as the degree to which KMS is perceived as difficult to understand and use (Rogers 1995). Individual characteristics were identified to have direct impacts on PU (H2c). Cultural factors were proposed to have effects on both PU (H6a) and subjective norm (SN) (H6b) regarding KMS, referred as the person’s beliefs that specific individuals or group think the person should or should not adopt KMS (Ajzen & Fishbein 1980).
Perceptions, such as perceived usefulness (Davis 1986, Gefen & Straub 2000,), complexity (Rogers 1995; Venkatesh et al. 2003) and subjective norm (Ajzen & Fishbein 1980; Rogers 1995) have been suggested to be the significant factors in innovation acceptance and diffusion. These arguments were supported by the interviewees by suggesting that PU (H7), complexity (H8) and SN (H10) would affect KMS practice via attitudes toward adopting KMS. Meanwhile, complexity was considered to have negative impacts on PU (H9). The attitudinal factor (H11) (Ajzen & Fishbein; Venkatesh et al. 2003) was identified to be essential in affecting the practice of KMS, which refers to the employees using KMS to conduct knowledge management activities, e.g., knowledge gathering, organizing, sharing and utilizing. Finally, the use of KMS (H12) (Gold et al. 2001) was suggested to influence the perceived performance of the organization in several aspects, such as customer service, overall operational efficiency, ability to adapt to changes, image, as well as providing in-time and correct information for decision makers.

Results

Demographic Information

The demographic information of the main survey is summarized in Table 1.

<table>
<thead>
<tr>
<th>Demographic Characteristics</th>
<th>%</th>
<th>Demographic Characteristics</th>
<th>%</th>
<th>Demographic Characteristics</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Tenure in the current company</td>
<td>3. Age:</td>
<td>5. Position</td>
<td>20 or below</td>
<td>21.3</td>
<td>0.6</td>
</tr>
<tr>
<td>Less than 2 years</td>
<td>21.3</td>
<td>21-30</td>
<td>18.8</td>
<td>29.8</td>
<td>Assistant Vice President</td>
</tr>
<tr>
<td>2+ to 5 years</td>
<td>2+ to 10 years</td>
<td>5+ to 10 years</td>
<td>31.5</td>
<td>53.0</td>
<td>Office Director</td>
</tr>
<tr>
<td>10+ to 15 years</td>
<td>21.5</td>
<td>41-50</td>
<td>16.0</td>
<td>Department Manager</td>
<td>2.2</td>
</tr>
<tr>
<td>More than 15 years</td>
<td>6.9</td>
<td>51 or above</td>
<td>0.3</td>
<td>Associate Manager</td>
<td>8.6</td>
</tr>
<tr>
<td>2. Gender:</td>
<td>4. Education</td>
<td>Assistant Manager</td>
<td>5.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>36.2</td>
<td>High School or equivalent</td>
<td>5.5</td>
<td>Division Chief</td>
<td>1.1</td>
</tr>
<tr>
<td>Female</td>
<td>63.6</td>
<td>Technical School</td>
<td>23.5</td>
<td>Supervisor</td>
<td>4.7</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Tertiary</td>
<td>57.7</td>
<td>Staff</td>
<td>70</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Master Degree or above</td>
<td>13.0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Data Analysis via PLS

The nation-wide main survey data were analyzed using PLS-Graph 3.0 (www.plsgraph.com). The data with 362 cases met the sample size requirement of PLS (Gefen et al. 2000). Besides, PLS is robust regarding multivariate normality deviation since there is no need of normality assumption (Gefen et al. 2000). Further, Barclay et al. (1995) indicate that PLS is more suited when the measures are not well established. Hence, using PLS is considered to be appropriate in this study.

Assessment of Measurement Properties

According to Barclay et al. (1995), the measurement model was assessed by examining: (i) item reliability, (ii) internal consistency; and (iii) discriminant validity. After removing ten variables with item loading less than 0.7, the measurement properties were considered appropriate for further analysis with relatively sufficient reliability and validity (Barclay et al. 1995). The interested reader can obtain further details of data analysis and assessment of measurement properties from the authors on request.
**Hypothesis Testing**

Table 2 presents the results of hypothesis testing in the structural model. 12 proposed hypotheses were found to be significant, while 6 proposed hypotheses were not supported at 5% confidence level. The structural model as a whole explained 52.1% of perceived expected performance.

<table>
<thead>
<tr>
<th>Hypothesis</th>
<th>Findings</th>
<th>t-value</th>
<th>Support</th>
</tr>
</thead>
<tbody>
<tr>
<td>H1 Environments and Industrial Factors positively influence the PU of KMS.</td>
<td>0.080</td>
<td>1.717</td>
<td>Yes</td>
</tr>
<tr>
<td>H2a Individual Characteristics positively influence the PU of KMS.</td>
<td>0.065</td>
<td>1.322</td>
<td>No</td>
</tr>
<tr>
<td>H2b Individual Characteristics positively influence the Complexity of KMS.</td>
<td>0.138</td>
<td>1.989</td>
<td>Yes</td>
</tr>
<tr>
<td>H2c Individual Characteristics positively influence the Attitude toward KMS Adoption.</td>
<td>0.167</td>
<td>3.398</td>
<td>Yes</td>
</tr>
<tr>
<td>H3a IT Support positively influences the PU of KMS.</td>
<td>0.084</td>
<td>1.625</td>
<td>No</td>
</tr>
<tr>
<td>H3b IT Support positively influences the Complexity of KMS.</td>
<td>0.221</td>
<td>3.283</td>
<td>Yes</td>
</tr>
<tr>
<td>H4a KMS Promotion positively influences the PU of KMS.</td>
<td>0.346</td>
<td>4.536</td>
<td>Yes</td>
</tr>
<tr>
<td>H4b KMS Promotion positively influences the Complexity of KMS.</td>
<td>0.070</td>
<td>0.971</td>
<td>No</td>
</tr>
<tr>
<td>H5a Organizational Characteristics positively influence the PU of KMS.</td>
<td>0.099</td>
<td>1.536</td>
<td>No</td>
</tr>
<tr>
<td>H5b Organizational Characteristics positively influence the Complexity of KMS.</td>
<td>0.164</td>
<td>2.005</td>
<td>Yes</td>
</tr>
<tr>
<td>H6a Cultural Factors positively influence the PU of KMS.</td>
<td>0.181</td>
<td>2.947</td>
<td>Yes</td>
</tr>
<tr>
<td>H6b Cultural Factors positively influence the SN of KMS.</td>
<td>0.410</td>
<td>8.368</td>
<td>Yes</td>
</tr>
<tr>
<td>H7 PU positively influences the Attitude toward KMS Adoption.</td>
<td>0.513</td>
<td>10.386</td>
<td>Yes</td>
</tr>
<tr>
<td>H8 Complexity negatively influences the Attitude toward KMS Adoption.</td>
<td>-0.013</td>
<td>0.239</td>
<td>No</td>
</tr>
<tr>
<td>H9 Complexity negatively influences the PU of KMS.</td>
<td>0.127</td>
<td>2.913</td>
<td>No</td>
</tr>
<tr>
<td>H10 SN positively influences the Attitude toward KMS Adoption.</td>
<td>0.146</td>
<td>2.385</td>
<td>Yes</td>
</tr>
<tr>
<td>H11 Attitude toward KMS Adoption positively influences the KMS Practice.</td>
<td>0.587</td>
<td>13.829</td>
<td>Yes</td>
</tr>
<tr>
<td>H12 KMS Practice positively influences the Perceived Expected Performance</td>
<td>0.722</td>
<td>20.341</td>
<td>Yes</td>
</tr>
</tbody>
</table>

**Discussion**

In line with the literature (as described briefly in section 4), hypotheses H1, H2b, H3b, H4a, H5b, H6a, H6b, H7, H10, H11 and H12 were supported in this study. Arising from the field, H2c suggesting that individual characteristics have direct impacts on attitudes, was also accepted. Nonetheless, the proposed relationships from complexity to the attitude toward KMS adoption and PU were not found to be significant. The findings provide managerial implications that, when KMS is perceived beneficial in enhancing an employee’s job performance and there is an environment in which using KMS is valued and esteemed, the employees would be willing to accept KMS since its complexities were not the major issues and could be overcome via IT support. Besides, this study verified that the attitudinal factor would play an important role in people’s utilizing KMS, and KMS practice could enhance the perceived performance of the organization.
Conclusions and Directions for Future Research
This paper empirically tested the research model of KMS adoption and practice among Taiwan life insurance enterprises. The main survey data were analyzed using Partial Least Squares (PLS) technique. The results show that perceived usefulness, subjective norm, as well as the employees’ attitudes toward KMS adoption, play significant roles in having KMS into place. However, complexity, which was identified to be a negative antecedent of innovation adoption and diffusion in past research, was not found to be the employees’ main concern in this study.

This research contributes to KMS literature in that it uses both qualitative and quantitative research approaches to present a comprehensive model of KMS adoption and practice. The findings also assist organizations, especially those life insurance enterprises embarking on adopting KMS in Taiwan or elsewhere, to recognize the value and obstacles of KMS by providing a checklist via referring to the significant factors and variables in the research model. The applications of this study could be extended via investigating in other financial service sectors or different geographic contexts.

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