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# An application of the knowledge management maturity model: the case of credit unions

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**Abstract**
The purpose of this study is to investigate the level of knowledge management (KM) maturity of credit unions. The application of a maturity model to 15 credit unions in North America revealed that an overall level of KM maturity is at an early stage of development, but there are signs of future improvement. Credit unions operate in a highly competitive, knowledge-intensive financial industry and experience various pressures to increase their efficiency, which they can achieve through the implementation of KM solutions. Despite the absence of official KM strategies, KM projects were introduced locally in order to fill particular knowledge gaps. The availability of IT infrastructure and the implementation of KM-related technologies alone are insufficient to ensure universal success of organizational KM activities. Credit union managers periodically access and use academic research in their decision making. At the same time, they prefer accessing scholarly knowledge in translated form from books, practitioner magazines, and consultants. It was concluded that organizations competing in the knowledge-intensive sector have an inner need for KM solutions.
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## Introduction

In today's global economy, knowledge has been widely recognized as one of the most important assets that needs to be successfully managed to gain competitive advantage. According to the *knowledge-based view* of the firm, knowledge is a key resource required for superior organizational performance that is difficult to identify, acquire, sustain, and imitate (Grant, 2002). As a field of practice, knowledge management (KM) emerged in the second half of the twentieth century in response to exponentially growing pressure on organizations to increase their effectiveness and efficiency (Prusak, 2001; Ragab & Arisha, 2013). KM has deep historical roots (Lambe, 2011; Serenko & Dumay, 2015). It is based on the notion that individuals, organizations, and nations possess intellectual capital (IC) that needs to be managed to achieve specific objectives. In the early 1990s, many organizations realized that it is critical to identify, measure, and manage their IC. This gave birth to the KM discipline (Edvinsson, 1997; Stewart, 1997). In recent years, a link between KM practices and the level of organizational competitiveness and economic performance was established (Kianto *et al*, 2013; Massingham & Massingham, 2014).

Research shows that individual organizations usually differ in terms of their levels of KM maturity. This may be assessed through an application of

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KM maturity models, which describe an evolution of organizational KM initiatives over time. Since the birth of KM as a field of science, various KM maturity models have been introduced, which were developed in both academic and practitioner settings (Kuriakose *et al*, 2010). In 1999, Microsoft created a software application 'Knowledge Management Landscape', and, in 2000, KPMG introduced a five-stage 'Knowledge Journey' model. The recent developments include an Intellectual Capital Management Capability Model (Shang & Lin, 2010), a social network scorecard for knowledge flows evaluation (Grippa, 2009), a knowledge-generation maturity approach (Arling & Chun, 2011), the People Capability Maturity Model (Curtis *et al*, 2009), and a knowledge manager's decision-making guide (McKenzie *et al*, 2011).

The application of KM principles has also attracted the attention of the financial services industry (Taherparvar *et al*, 2014) and, particularly, credit unions (Bontis & Serenko, 2009). It behoves credit unions to implement various KM activities for several reasons: a potential conflict of interest between their member-savers and member-borrowers, shrinking profit margins resulting from deregulation, the inability to generate sufficient cost savings from mergers and acquisitions, increasing competition from a new breed of online businesses, and losses from a recent financial crisis. At the same time, there is limited empirical evidence demonstrating the maturity, usefulness, and potential impact of KM principles in credit unions. This study attempts to fill that void by extending and applying the Knowledge Navigator Model (Hsieh *et al*, 2009) to the financial services industry, specifically to credit unions.

## Theoretical background

### KM in the financial industry

Among the various types of financial institutions, credit unions occupy a unique position (MacPherson, 2012). First, they do not have customers; instead, their clients are referred to as 'members' who own the financial co-operative and elect the board of directors through a democratic process. Second, credit unions focus on the prosperity of their members, social responsibility, and community instead of profit maximization. As a result, in some countries, such as the United States, credit unions are granted a not-for-profit status. Third, members create both supply of and demand for loanable funds, and the credit union serves as an intermediary between internal savers and borrowers (Smith *et al*, 1981). Credit unions represent a co-operative enterprise focusing on the specific financial needs of its members. Currently, over 14% of the economically active population in Canada – and 40% in the United States – are credit union members.

Despite the numerous advantages of credit unions, a potential conflict arises between their member-savers and member-borrowers (Walker & Chandler, 1977; Patin & McNiel, 1991) because it is impossible to simultaneously maximize the dividend and minimize the loan interest rate. The theoretical models of credit unions suggest that they may be saver-dominated, borrower-dominated, or neutral. Domination appears when a credit union focuses on the needs of one group at the expense of the other. Neutrality is also difficult to achieve because each group may perceive itself in relative disadvantage compared with the members of the other credit unions that focus on their respective group. Moreover, there should be a difference between the saving and lending rates to generate revenue to support the operations. The best solution, therefore, is to minimize the savings-lending margin by reducing expenses and increasing efficiency, which may be achieved by implementing successful organizational KM activities.

In addition, there are other forces affecting the profitability and even the very existence of credit unions. First, over the previous several decades, many countries have deregulated the financial industry: this allowed national institutions to expand their domestic operations and to establish an international presence. At the same time, deregulation has inevitably increased competition and squeezed profit margins. Second, the financial sector has been experiencing a consolidation trend that has helped traditional banks increase their market power, diversify risks, and improve the efficiency of payment systems. However, mergers and acquisitions rarely generated substantial cost efficiencies (Berger *et al*, 1999) because the elimination of work duplication and the facilitation of knowledge sharing was rarely achieved. Third, with the advent of the internet, a new breed of competitors emerged including virtual banks, online money transmitters such as PayPal, micropayment systems, and even alternative digital currencies – for example, BitCoin. Fourth, the financial crisis of 2008 severely damaged the world's financial sector, revealed its weaknesses, and eventually boosted the competition among those who survived it.

To respond to the environmental pressures discussed above, all financial institutions, including credit unions, have become interested in the factors that may improve their performance and provide them with competitive advantage. As a result, many financial services organizations have institutionalized formal or informal KM initiatives. At the same time, financial institutions differ in terms of their overall level of KM maturity (Curado, 2008). Some financial services organizations are aware of KM and associate it with positive outcomes. They redesign their structures to facilitate knowledge flows, focus on training, develop knowledge retention policies, and install KM systems. Such practices, however, are not commonplace: whereas some financial institutions are on the leading edge of KM initiatives, others are lagging behind. Therefore, it is critical to investigate the level of KM maturity in all types of financial institutions, including credit unions because they occupy a unique niche in the financial services marketplace. For this, maturity models, which are discussed in the following sub-section, may be employed.

### What are maturity models?

Maturity models – which are also referred to as stage models, stage theories, and stages-of-growth concepts – serve as a lens of analysis to assess and evaluate the evolution of an entity, a concept, or an object over time as it follows a path from an initial state to the highest maturity level (Hsieh *et al*, 2009). Generally, maturity refers to the state of perfection, fullness, or readiness which evolved from an initial (embryonic) to an advanced stage. Maturity models follow a natural life-cycle approach, which may be observed in various forms of human activities. They also have the following properties (Klimko, 2001): (1) the evolution of an entity is described based on several (four to six) maturity levels; (2) each maturity level is characterized by its unique attributes; (3) levels are presented sequentially, from the lowest to the highest; and (4) the entity progresses consecutively from one level to another without omitting any level. An entity should progress successively from one stage to another without skipping any level because each lower stage creates a need for the next level of development. A classic example of a maturity model is Maslow's Hierarchy of Needs.

With respect to KM, the use of maturity models is important for several reasons. First, successful implementation of KM initiatives requires a holistic, systematic, and structured approach to develop, launch, accelerate, measure, and continuously improve related organizational processes (Kruger & Johnson, 2010; Sandhawalia & Dalcher, 2011). Maturity models, in turn, help KM managers accomplish these tasks. Second, maturity models serve as an effective tool to facilitate organization-wide KM governance, which is a critical mechanism for guiding and monitoring KM programmes (Schroeder *et al*, 2012). Third, they help managers identify barriers to KM implementation, remove them, and assess the impact of this intervention. Fourth, the application of maturity models facilitates short- and long-term planning. Overall, maturity models are an important tool for a manager. More empirical research is needed to demonstrate the usefulness of the application of maturity models in various contexts, including KM in the financial sector.

### The adapted maturity model

Various maturity models have been introduced in the KM domain (Oliva, 2014). Out of them, the Knowledge Navigator Model (Hsieh *et al*, 2009) was adapted in the present study to the credit union environment. Its modification represents a comprehensive assessment framework that includes 14 key areas that comprise unique KM activities. Each activity belongs to one of the three target management objects – culture, KM processes, and information technology – which play a critical role in facilitating organizational knowledge flows. Even though the developers of the Knowledge Navigator Model consulted other KM maturity models, their model is based on uniquely designed research methods. First, Hsieh *et al* (2009) developed a new instrument that operationalizes high-level constructs with low-level assessment items. Second, the model was developed based on extant literature and validated through a survey of 30 knowledge-intensive companies. Third, data used in the development of the Knowledge Navigator Model were obtained from KM scholars, practitioners, managers, and public sector officials who represent the potential end users of this model. Fourth, each key knowledge area was assessed along three dimensions, such as culture, KM process, and IT. It is these characteristics that distinguish this model from the previous ones and make it very suitable in the context of the present study.

The model suggests that, as organizations embrace various KM solutions, they advance through five sequential maturity stages. In the appendix, Table A1 shows the Knowledge Navigator Model maturity levels, and Table A2 presents an adapted maturity model used in the present study.

## Methodology

To achieve this study's objective, KM-related data were obtained from 15 credit unions in North America (7 in the United States and 8 in Canada; 12 of them were located in different states or provinces that increased the generalizability of the findings). These credit unions were selected with the assistance of two professional organizations that provide credit union services (Filene Research Institute and Credit Union Central of Canada). No inclusion or exclusion criteria were applied to recruit these organisations. Interviews with up to three senior managers from different functional areas at each credit union were conducted. The most common titles of the interviewees were 'president', 'chief operating officer', 'chief executive officer', 'vice president of HR and/or IT' (or 'associate vice president'), 'innovation officer', and 'communications officer'. In most cases, each credit union was represented by either an HR or an IT person who was, presumably, the most knowledgeable organizational member with respect to KM activities. In order to reduce social desirability bias and solicit accurate responses from the interviewees, this study was described in general terms as a routine investigation of KM practices and technologies. No references to the maturity model were made.

These credit unions employed 281 full-time equivalent (FTE) employees on average, ranging from 49 to 1076 employees. On average, they reported US$177,000 in revenues per FTE, $40,000 in profits per FTE, and $54,000 in compensation plus $13,000 in benefits per FTE. Average voluntary turnover was 10.7%, and average involuntary turnover was 2.4%. All had internal HR and IT personnel. Overall, these credit unions exhibited attributes of knowledge-intensive organizations operating in a highly competitive environment.

A protocol for semi-structured interviews was developed based solely on the adapted maturity model. For example, to understand various IC issues, respondents commented on their current IC valuation, reporting, disclosure and use practices (e.g., Have you made an attempt to evaluate or

measure the intellectual capital of your organization? Do you consider intellectual capital in evaluating the financial performance of the organization?) All interviews were conducted over Skype, recorded, transcribed, and subjected to content analysis by two coders who had substantial expertise in the KM domain (e.g., they published articles on KM topics in academic journals and employed a similar research method in the past). On the basis of the coders' interpretation of the interviewees' answers, scores were assigned to each factor listed under the key areas in the maturity model. In rare cases of discrepancies, the coders reviewed the answers and discussed the issue in person to achieve mutual agreement. To understand the use of IT tools (see Table 1 in the Results section) and decision making sources (see Table 2 in the Results section), the participants were asked to complete a brief online survey that listed these tools/information sources. For IT tools use, the respondents were asked to indicate the degree to which their organization employs each tool. For information sources used to support decision making, the respondents were asked to indicate the extent to which their organization employs each information source.

**Table 1 IT tools used (measured on a 5-point Likert-type scale ranging from always (5) to never (1))**

| *IT tool* | *Score* |
|---|---|
| Electronic calendaring | 5.00 |
| Email | 5.00 |
| Internet | 5.00 |
| Shared drives | 4.93 |
| Document repository | 4.87 |
| Intranet | 4.80 |
| Voice-Over-IP (e.g., Skype) | 3.27 |
| Web meeting | 3.27 |
| Facebook | 3.00 |
| Instant messaging | 3.00 |
| Shared online workspaces | 2.73 |
| Twitter | 2.60 |
| Big data analytics | 2.40 |
| Message boards | 2.20 |
| YouTube | 2.20 |
| Internal wiki space | 2.07 |
| Blogs | 1.93 |
| Expertise locator | 1.80 |
| Podcasting | 1.47 |

## Results

### KM strategy – Level II

None of the studied credit unions had an explicit, well-documented, KM strategy. Instead, most had an unofficial strategy at the initial stage of development. The formulation of an informal strategy was motivated by various factors, including anticipated retirements, voluntary turnover, organizational changes, and environmental pressures. This informal strategy resulted in the implementation of various KM initiatives. However, no processes or regulations to continually improve KM strategy existed, and no clear link between KM strategy and business vision/mission was established.

Data revealed the existence of an interesting phenomenon. When the interviewees were asked about the existence of KM strategy in the beginning of an interview, the most common response was 'we have none'. However, almost all credit unions had various semi-official and unofficial KM initiatives at various stages of development. In fact, these activities emerged naturally from the regular operations of credit unions in order to improve efficiency,

**Table 2 Information sources used to support decision making (measured on a 5-point Likert-type scale ranging from always (5) to never (1))**

| *Information source* | *Score* |
|---|---|
| Internal experts and colleagues (from the same credit union) | 4.47 |
| External experts and colleagues (from other credit unions, banks, or financial institutions) | 3.33 |
| General websites | 3.27 |
| Consultants | 3.13 |
| Books | 3.13 |
| Subscription-based, online, practitioner journals/trade magazines | 3.00 |
| Hard copies of practitioner journals/magazines | 2.93 |
| Forums | 2.93 |
| Subscription-based, online, academic journals and article databases | 2.67 |
| Electronic distribution lists | 2.60 |
| Social networking websites (e.g., LinkedIn, ResearchGate, etc.) | 2.33 |
| Online discussion groups | 2.33 |
| Hard copies of academic journals | 2.27 |
| Blogs | 2.00 |
| Open-access journals | 1.87 |
| Microsoft Academic Search | 1.47 |
| Google Scholar | 1.47 |

retain knowledge, increase the level of IC, streamline operations, and fill communication gaps. As such, KM was often initiated at the lower (i.e., non-senior executive) levels in response to environmental changes and growing competition due to the availability of relevant information technologies. In addition, many KM activities, especially T&D and knowledge sharing, were, in fact, approached from a strategic perspective.

### KM promotion – Level II/Level III

Several credit unions had an officially designated person for KM under the titles of Chief Operating Officer, Director of Organizational Effectiveness, Vice-President Operations, and Chief Knowledge Officer. Within a few credit unions, KM was managed by several people from human resources or IT departments. Approximately one-half had no individuals responsible for KM activities. Yet, despite not having official, organization-wide, KM strategies, most credit unions implemented various KM mechanisms. Examples included succession planning, job shadowing, professional development programmes, mentoring initiatives, work coordination systems, intranet applications, departmental and inter-departmental meetings, open-door policies, online Q&A forums, resource centres, KM systems, knowledge-sharing policies and procedures, internal and external training, newsletters, communication bulletins, announcement boards, multi-disciplinary and cross-functional teams, focus groups, round-table discussions, operations manuals, mistakes documentation, idea labs, open spaces, best-practices documentation, and so on. Several credit unions embedded the KM activities above in ordinary operating processes. Senior managers held weekly meetings and communicated the summary of key issues to their staff in electronic form. Employees were required to access forms, documents, and policies on the intranet as part of regular business operations. When a mistake was made, it was supposed to be documented and communicated to all individuals who might be potentially concerned or affected. Many credit unions, however, employed KM programmes on an 'as needed' basis and not as part of regular operations. For instance, a succession planning programme was sometimes initiated only when a mission-critical employee announced his or her resignation.

Only a couple of credit unions considered the expense of implementing KM activities in an official budget. A few had KM expenses hidden in the overall organizational budget or as part of the training and development budget. Expense categories mostly included the intranet, KM software, training, and conference travel.

### KM assessment – Level I/Level II

The use of quantitative measures to assess KM initiatives, KM links to organizational performance, the tangible or intangible benefits of KM, and the return on KM investment were virtually non-existent. For example, despite having active KM tools, most credit unions had no measures to assess their performance and impact. One credit union successfully employed Google Analytics to analyse the use of the intranet site that was used for KM purposes, but it still did not link it to employee effectiveness and efficiency. No return on KM investment metrics were employed.

### IC – Level I/Level II

Only three credit unions undertook an attempt to measure the IC they possessed. They also considered IC in evaluating the financial performance of their organization. Two of them consequently developed the IC reports of their credit union, but none officially disclosed this information to internal and external stakeholders.

### Knowledge identification and classification – Level II/Level III

All credit unions conducted formal interviews to identify the knowledge, expertise, training, and so on that newly hired employees possessed. In most cases, these interviews were conducted by a team that included a department manager and an HR representative. Occasionally, the team included IT experts, C-level executives, and representatives from other departments. However, after a new hire joined the workforce, his or her expertise was rarely re-evaluated. Only a small number of credit unions performed periodic audits of the knowledge possessed by their current employees, and none implemented official, institution-wide, knowledge audits as part of the measurement of their IC.

### Knowledge sharing – Level IV

A vast majority of credit unions facilitated the development of a collaborative, knowledge-sharing culture. The key purpose was to encourage the development of intra-organizational knowledge flows and ensure that collaboration was continually embedded in the culture of the organization. A number of credit unions wanted their employees to feel they were part of the organization, develop a sense of self-actualization, and create a high degree of organizational identity. Their executive leadership teams also supported internal collaboration around various strategic initiatives and led by example. People were assigned to projects outside of their regular responsibilities where they had to interact with their colleagues from other departments and share their expertise. Occasionally, credit unions organized regular meetings at which employees shared their previous mistakes in order to prevent their repetition in the future. In some cases, senior employees were especially encouraged to contribute to the knowledge base and were consequently rewarded. Sometimes, a team met upon the completion of a project and documented the key facts, best practices, and mistakes. In rare cases when little collaboration and knowledge sharing existed, credit unions tended to be highly segmented and to have strong inter-departmental boundaries.

Almost all credit unions had regulations or processes to facilitate knowledge sharing. Many also had regulations or processes to encourage knowledge sharing behaviours. For instance, performance appraisal tools included knowledge sharing activities. Employees who assisted their co-workers, contributed to training, or provided advice to others were sometimes officially acknowledged by their organizations. Initially, most of the related processes or regulations were focused on a task, process, or single organizational unit; eventually, knowledge sharing was approached from a strategic, organization-wide point of view despite the lack of an explicit organizational KM strategy. Most interviewees were very optimistic about the value and impact of their chosen knowledge sharing activities.

**Knowledge capture – Level III**

A vast majority of credit unions had explicit policies that helped their employees locate internal knowledge, while only a minority had such policies to help employees locate external knowledge. Examples of internal knowledge included memos, templates, policies, procedures, manuals, best practices, success stories, and other documents accessible through the intranet or another local IT system. The use of the intranet was mandatory in several cases, but usually it was a natural choice of employees who needed internal documentation to perform their routine jobs. There are at least two factors explaining the discrepancy between the capture of internal and external knowledge. First, frontline credit union employees had a strong need to access and use internal documentation and information on a continuous basis. Internal knowledge is more relevant for operational level tasks, whereas external knowledge is usually required for strategic decision making on the senior executive level and, therefore, is needed less often. Second, as discussed in the subsequent 'IT Infrastructure' sub-section, most of the technologies employed by credit unions centred on internal processes, including the capture and use of internal knowledge, whereas technologies needed for capturing external knowledge were less frequently employed. Again, however, knowledge capture was rarely considered part of organizational routine processes or approached from a strategic perspective.

**Knowledge storage – Level III**

For almost all organizations, employees were able to contribute to the company's knowledge base, and their contributions were stored electronically for subsequent use. Only in rare cases was the prerogative of updating the knowledge base limited to the middle- or senior-level management. Overall, this is a positive sign of the facilitation of organization-wide KM activities and fosters a knowledge sharing culture. At the same time, fewer credit unions had clear regulations or processes pertaining to the contribution to the knowledge base and the storage of this knowledge. Despite the lack of explicit knowledge contribution and storage policies, it seemed that a majority of organizations were able to successfully accumulate and store internal information and knowledge in digital form. However, it is likely that the lack of relevant policies resulted in knowledge losses.

**Knowledge mobilization and reuse – Level II**

Only one-third of the studied credit unions had explicit policies and procedures to support and encourage knowledge reuse in order to make it part of the overall organizational culture. Examples of official knowledge reuse policies included using templates created by other or previous employees; reading and following manuals; accessing internal reports, memos, and other documents; and consulting internal and external experts. Electronic documents were accessed through an internal KM system, and internal experts were consulted during departmental or inter-departmental meetings, round-table discussions, or electronic communication sessions. Overall, credit unions did not take full advantage of a policy-based approach to knowledge reuse. Instead, their management hoped that employees would realize that locating, accessing, and reusing internal organizational knowledge is the most efficient way to do their routine work.

**Learning and training – Level IV**

All, except one credit union, had an institutionalized training and development budget and policy. The T&D amount per FTE ranged from $400 to 2500, averaging at $1400 per year. It usually represented 1–2% of the entire organizational budget. As part of their T&D, employees took courses; participated in collaboration training; attended seminars, workshops, and conferences; purchased books and journal subscriptions; and received reimbursements for formal education. Most credit unions successfully promoted and established a learning culture that spread across all organizational levels. Sometimes, the T&D budget and related activities were considered part of KM support and IC development. A vast majority had structured on-the-job training projects, succession planning, mentorship, temporary inter-departmental reallocations, work in pairs, job shadowing, and so on. All, except one, had a learning management system, e-learning tools, or a related educational training system (or access to an external training system). A majority of credit unions also helped their employees prepare a personal development path (e.g., personal growth, certification, etc.). Half of them also linked their employees' performance evaluation to the learning or training programme. Overall, learning and training were approached from a strategic perspective and were occasionally integrated with routine organizational activities.

**Knowledge retention – Level III**

Factors focusing on knowledge retention pertained to exit interviews, organization-wide succession planning programmes, and employee retention programmes. All except one credit union conducted exit interviews. Their purpose, however, did not pertain to knowledge retention. Instead

of soliciting and documenting tacit and explicit knowledge possessed by the departing employees, exit interviews focused on the reasons for voluntarily turnover, improvement of practices and processes, internal culture, working environment, overall employment experience, turnover trends, and job satisfaction. Moreover, the validity of the obtained information may be questioned because exit interviews were conducted internally, mostly by human resources. Only in one case was the exit interview process outsourced to an external company in order to ensure the confidentially of the interviewee and to obtain unbiased responses.

Almost all credit unions had succession planning and job shadowing programmes, which are important KM tools. Some of these activities were very formal and administered organization-wide: when employees expressed their interest in a particular position, they teamed up with a respective employee and gradually prepared themselves for that job. This increased an employee's familiarity with the company's operations, improved productivity, and instilled loyalty. In several cases, succession planning and job shadowing initiatives existed informally and focused on select, mostly higher-level positions. Job shadowing was also used as a training tool for new or transferred employees. A few credit unions had retention programmes to encourage employees who were identified by the management as having critical expertise to stay with the company.

### IT infrastructure – Level IV

IT infrastructure, which is a key antecedent of successful KM initiatives, received the highest scores among all key areas. All credit union employees were able to use electronic calendars, e-mail, and the internet (see Table 1). All organizations utilized an integrated information system with a centralized database, which facilitated the transfer and deposit of information. Databases were updated electronically and contained consistent information. Having this part of an IT infrastructure is, in fact, necessary for this type of organization to ensure continuous operations. A majority also employed a customer relationship management system; most were purchased as commercial off-the-shelf solutions, and a few were developed in-house. Those who did not have such a system at the date of the study often considered acquiring one in the near future. Many also used voice-over-IP, Web meetings, Facebook, and instant messaging applications. Most IT tools focused on the capture, storage, use of internal knowledge, whereas technologies for locating external knowledge were less common. Overall, the level of IT infrastructure met the requirement for implementing organization-wide KM initiatives.

### KM system – Level III/Level IV

All, except one credit union, employed a KM system that successfully facilitated knowledge sharing. In most cases, this was an intranet site created and maintained in-house. Several used MS SharePoint, which is an excellent tool to support individual and group work, and a few considered its acquisition in the future. In a few instances, KM systems were represented by shared hard drives and Web 2.0 technologies, including Wikis, Learning Management Systems, and blogs, which have become very popular knowledge sharing tools (Jackson & Klobas, 2013; Zhao & Chen, 2013). The key purposes of a KM system were to store documentation, templates, policies, manuals, and procedures; to achieve internal consistency; to communicate important news; to improve communication; to achieve better efficiency; and to share best practices. Only a couple of credit unions that employed MS SharePoint used its expert or expertise location facilities. Most KM system implementations were initiated by HR and IT departments, which is a commonly observed phenomenon. Most KM system implementations were not closely linked to the overall organizational strategy. At the same time, many credit unions were going to re-examine the KM system-strategy gap in the future. Several credit unions had formal procedures for the acquisition of (predominantly) internal and external knowledge. The use of the KM system sometimes became part of the organizational culture embedded in daily operations.

### Evidence-based decision making – Level II

With respect to decision making, internal experts from the same institution were the most frequently accessed source of knowledge, which demonstrates a high level of intra-organizational knowledge sharing. These were followed by external experts, general websites, and consultants (Table 2). Approximately one-half of the studied organizations directly accessed practitioner literature for decision making. Sometimes, departments subscribed to practitioner journals and magazines based on their area of interest. Academic knowledge was utilized by means of direct and indirect knowledge dissemination channels (Booker *et al*, 2012). The direct channel assumes that decision makers directly access scholarly publications, read them, and apply relevant knowledge in practice. It was found that several credit union managers utilized academic (i.e., peer-reviewed) publications. This was done mostly at the senior executive level, for specific narrow topics (e.g., how to deal with employee sick leaves), and for long-term planning when making critical decisions.

The indirect knowledge dissemination channel assumes that the academic body of knowledge, which mostly exists in scholarly journals, is translated into a format that is suitable for busy practitioners who generally lack the necessary skills and time to read and comprehend scholarly works. It was observed that various knowledge translation mechanisms were used, such as management consultants, books, experts, university faculty members, university interns who possessed the latest knowledge, seminars, workshops, and so on. In one exemplar, knowledge transfer was performed in-house: there was an internal research team that performed various business

intelligence functions, analysed industry data, performed competitive analysis, interacted with external researchers, and delivered relevant academic knowledge to those who needed it – thereby performing the function of a knowledge broker. Overall, practitioner and academic literature was accessed on an *ad-hoc* basis, as needed. In addition, evidence-based decision making was mostly emphasized at the middle and senior management level, and it rarely became part of the organizational culture.

Relationships with professional associations – for example, Credit Union Central of Canada (i.e., the national trade association for Canada's credit unions), Filene Research Institute (an institution dedicated to the scientific analysis of issues affecting credit unions), and Credit Union Leagues (a trade association) – were considered of paramount importance. They provided industry trends, data, reports, sample documents, benchmarking information, metrics, critical issues, and legal materials. As well, they acted in the role of consultants and organized conferences. As such, professional associations were mostly considered a credible source of knowledge and a link with the rest of the industry. Policies and regulations pertaining to evidence-based decision making were relatively rare.

Most participating organizations acknowledged the importance of evidence-based decision making. Many were in the process of re-considering decision making processes from the evidence-based perspective that included the use of credible information sources. Several also considered decision making part of their short- and long-term organizational strategy. This initiative, however, was at an early stage of development and implementation.

### KM success factors

A visual analysis of the maturity scorecards of the studied credit unions revealed an interesting pattern. First, organizations that scored highest on the key areas pertaining to KM strategy and promotion also scored higher on all other KM areas. Second, they were also more likely to measure their level of IC. Particularly, the two credit unions that developed IC reports were among the leading KM institutions based on their overall ranking. Third, KM leaders also tended to have more developed official KM policies and procedures. In contrast, all credit unions that had very few successful KM activities had no unofficial or semi-official KM strategy, made no attempt to identify and measure their IC, and had immature KM-related policies.

### Overall level of KM maturity

Figure 1 summarizes the overall level of KM maturity of the studied credit unions and reveals several interesting factors. The credit unions had an adequate level of IT infrastructure to support various KM activities. IT infrastructure had been developed to perform routine activities, whereas KM-related systems were launched as part of unofficial or semi-official KM initiatives. Learning and training had also reached a high maturity level and become part of an overall organizational strategy. Generally, T&D activities

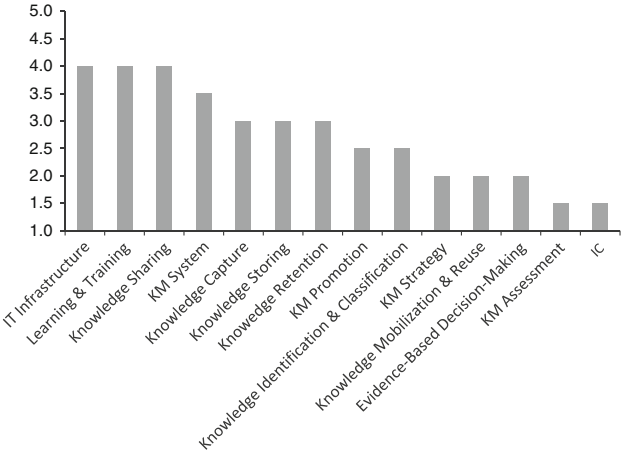


**Figure 1** Overall level of KM maturity.

appeared before the emergence and implementation of KM concepts; eventually, T&D also started to include KM-related education. The available IT and KM infrastructure facilitated the development of successful knowledge sharing activities, which were mostly driven by the individual employees' need to improve their effectiveness and efficiency. As such, knowledge sharing had been mostly driven by the needs of frontline employees and not by an overall organizational strategy. Knowledge capture, storage, and retention activities lagged behind knowledge sharing. A possible explanation is that knowledge sharing activities are intrinsically motivated and take place locally, whereas knowledge capture, storage, and retention require organization-wide KM planning and strategic direction. A low level of strategic KM direction resulted in inadequate reuse of organizational knowledge. Even though knowledge is captured, stored, retained, and shared, it needs to be embedded in routine organizational processes, which is the key objective of a successful KM programme.

Recall that the maturity model employed in this study (adapted from Hsieh *et al*, 2009) measures all factors along three dimensions: culture, KM process, and IT. It was found that all credit unions had a high level of IT infrastructure. KM was also approached and promoted from an intrinsic motivation perspective to ensure that KM would eventually become part of organizational culture. Whereas the long-term benefits of this direction are unarguable, KM processes require appropriate policies and procedures, which were missing in many KM-related areas. It is the lack of strategic support for KM that hindered several critical KM undertakings, such as knowledge reuse, KM assessment, knowledge-based decision making, and the use of IC principles. Thus, the studied credit unions have made progress towards KM success, but they have not yet realized their full potential.

## Implications

*Implication #1*: Maturity models are effective tools to evaluate the state of knowledge management initiatives.

An overall purpose of KM maturity models is to allow researchers and/or practitioners to assess the level of development of KM-related initiatives in contemporary organizations. The present study demonstrates that the existing maturity models may be successfully adapted to the context of various organizations, including the ones operating in the knowledge-intensive financial sector. Practitioners agree that all best practices, models, and tools must be adapted to the context of each organization individually (Booker *et al*, 2008). Maturity models are operationalized with a number of key areas and corresponding activities, which should be also adapted to the context of each industry and organization. First, adjustments should be made depending on the sector (i.e., public *vs* private). For example, profitability and competitiveness items are of parsimonious importance in the commercial sector, whereas public organizations should focus on the role of KM in cost savings and increased citizen satisfaction. Second, the size of an organization should be considered. For instance, IC reporting indicators are important for large and publicly traded businesses, but they are less critical for small enterprises, which may value external knowledge capture. Third, the role of national culture should be evaluated and included in the model. For example, differences may be identified between individualistic and collectivistic cultures. Fourth, all areas should be reviewed in light of the overall organizational strategy to ensure capturing the most relevant information about the state of the organization.

From the academic perspective, maturity models help researchers observe and document the actual organizational practices and establish a link between theory and practice. From the practitioner viewpoint, maturity models may help managers identify deficient areas, remove barriers to KM success, and observe changes. They may also facilitate benchmarking and short- and long-term planning.

*Implication #2*: The overall level of KM maturity of credit unions is somewhat low (Level II – the conscientious stage), but most are progressing well towards the next stage.

A majority of the studied credit unions were at the knowledge conscientious stage (Level II), and several were at, or slightly above, the intermediate stage (Level III). They employed basic KM principles, launched pilot or isolated KM projects, and had a limited number of active KM managers. More advanced organizations had formal, well-established KM programmes. They captured, retained, and promoted best practices and lessons learned. Gradually, some of them developed KM policies, procedures, and mechanisms and considered the adoption of organization-wide KM solutions from the strategic perspective. None of them, however, fully integrated KM activities into routine organizational practices.

*Implication #3*: Organizations operating in a knowledge-intensive industry exhibit a strong need for knowledge management solutions.

None of the studied credit unions had an official KM strategy guiding all related activities. Instead, KM initiatives were launched in individual departments in relative isolation as a response to anticipated retirements, operational deficiencies, and efficiency requirements. Credit unions operate in the knowledge-intensive financial industry where IC has become one of the most important organizational assets. As a result, despite the absence of formal KM strategy, KM projects were still introduced locally in order to fill a particular knowledge gap. Examples include the use of information technologies for knowledge storage and distribution, succession planning, job shadowing, internal meetings, electronic communication, and local KM policies.

Previously, a number of scholars and practitioners became concerned about the future of KM as a field of theory and practice. Particularly, there were claims that KM is merely a management fad with little influence on the state of theory and practice (Wilson, 2002). A management fad appears when a new domain of interest is discovered, attracts the attention of academics and practitioners, becomes very popular, grows exponentially, and abruptly collapses because of undelivered promises, lack of impact, and unmet expectations (Abrahamson & Fairchild, 1999). Presently, there is no consensus whether KM is a management fad or a young, growing domain progressing towards academic and practical maturity (Serenko, 2013). In contrast to the previous claims that KM has made no impact on the state of practice, the present investigation revealed that organizations competing in the knowledge-intensive sector have an inner need for KM solutions, which shows that KM has a future in practical settings. This is consistent with the fact that the first KM principles, ideas, and tools were invented and promoted by practitioners (Serenko & Bontis, 2013a, b). Thus, KM research is likely to continue, and KM will progress towards maturity and recognition.

*Implication #4*: The availability of IT infrastructure and the implementation of KM-related technologies alone are insufficient to ensure universal success of organizational KM activities.

All studied credit unions had well-developed IT infrastructure (Level IV) and KM systems (Level III/Level IV), which helped them successfully implement a number of KM solutions. However, most of the key KM activities were only at Level II or Level III, and they were not realized to the full potential to achieve the highest level (i.e., Level V) to deliver full value for their organizations. This took place because of the lack of an overall strategic KM direction, official KM leaders, KM-specific training, incentives to leverage the infrastructure, and dedicated budget. It is the alignment of all KM activities with an overall organizational strategy that creates synergy and ensures universal KM success. Whereas strong IT infrastructure and KM technologies are necessary, their availability does not guarantee the success of KM solutions unless they are approached from a strategic perspective, supplemented by appropriate policies, accompanied by cultural changes, and reinforced through various forms of encouragement.

It is for this reason the credit unions that scored high on their overall level of KM maturity also had more developed KM strategies and considered IC a very important organizational asset.

*Implication #5*: Academic research is relevant for business practitioners.

There are views that scholarly research in the business discipline is mostly irrelevant for the needs of practitioners because managers are usually unaware of academic publications, rarely read them, and hardly benefit from scholarly findings (Bennis & O'Toole, 2005). The present investigation empirically demonstrated that such claims are not fully warranted. Instead, it was observed that many senior managers of credit unions accessed academic knowledge by reading peer-reviewed articles and attending conferences when they needed to obtain credible knowledge on particular topics or to make critical decisions with a long-term impact. At the same time, identifying, accessing, and using external academic knowledge was limited to a select number of executives and had not yet become part of organizational routine.

*Implication #6*: Knowledge transfer mechanisms play a critical role in the dissemination of academic findings among business practitioners.

Academic knowledge may reach practitioners by means of direct and indirect knowledge dissemination channels. The direct channel is used when practitioners read academic publications, such as peer-reviewed journals and conference proceedings, digest knowledge published in these sources, and apply it in their routine work. In contrast, the indirect knowledge dissemination channel assumes that academic knowledge published in peer-reviewed sources is converted to the format that is suitable for practitioners who do not have time and relevant education to understand academic works, which are mostly written by academics and are targeted at other academics.

Managers of the studied credit unions accessed scholarly knowledge by means of several knowledge transfer mechanisms, which acted as indirect knowledge dissemination channels. These included books, electronic and hard copies of practitioner journals and trade magazines, and consultants. Books are an excellent tool to disseminate scholarly knowledge to a wider non-academic audience. Empirical research shows that peer-reviewed sources – such as academic journals, book chapters, and conference proceedings (augmented by the author's personal research experience) – are used in the development of book content (Serenko *et al*, 2011; Serenko *et al*, 2012). Practitioner and trade magazine articles often contain summaries of key research findings and practical recommendations derived from academic studies. Consultants are an important intermediary group from the knowledge dissemination perspective because they often implement solutions that originate in academic settings. For example, active academics often consult businesses. Consultants who hold doctoral degrees may facilitate the dissemination of scholarly knowledge among their clients (Moshonsky *et al*, 2015). Overall, this study's findings confirm those of previous studies on the practical relevance and impact of academic management research by emphasizing the importance of indirect knowledge distribution mechanisms.

## Conclusions, limitations, and future research directions

The purpose of this study was to investigate the level of KM maturity of credit unions. For this, the Knowledge Navigator Model developed by Hsieh *et al* (2009) was adapted and utilized to collect data from 15 credit unions in North America. Credit unions occupy a unique position in the knowledge-intensive financial industry because of an inherent conflict of interest between their member-savers and member-borrowers. The best way for credit unions to meet the needs of all their members is to increase their efficiency. As a result, credit unions have recognized the value of KM and introduced various KM technologies and processes. However, most KM implementations are not yet integrated with other organizational processes and not aligned with the overall organizational strategy. KM implementations did not follow the most commonly used top-down approach; instead, they evolved bottom-up when each KM initiative was introduced to address a particular need. Examples include sharing documents through hard drives and intranet applications, succession planning, job shadowing, training programmes, electronic resource centres, mentoring initiatives, communication bulletins, and operations manuals. As documented in previous studies, bottom-up KM initiatives may also generate value in various contexts (Martins & Solé, 2013; Connell *et al*, 2014).

The value and impact of these basic KM activities are unarguable. However, a more holistic, strategic, and top-down approach is required to establish universal success of these initiatives. The first steps are to establish a formal KM strategy, create a link between an overall organizational vision and KM direction, introduce a dedicated KM budget, and assign a person responsible for KM (e.g., a chief knowledge officer) and KM implementing department/team. Second, KM assessment and promotion mechanisms should be established – including identifying, measuring, and reporting IC; developing quantitative measures to assess the progress and impact of KM (e.g., ROI); and introducing related policies. Third, intrinsic and extrinsic reward systems should be designed and aligned with the organizational strategy, values, and culture. Fourth, special attention should be paid to knowledge mobilization policies because the captured and retained knowledge should be embedded in all organizational activities. Fifth, credit unions need to reconsider the purpose of exit interviews. Their objective should be not only to understand various organizational issues (e.g., reason for leaving, employee satisfaction, internal relationships) but also to capture the unique knowledge the departing employees possess. Most importantly, exit interviews should be conducted by a third party, and their results should be reported in aggregate form to protect the

confidentiality of the informant and facilitate the most truthful responses.

Despite its contribution, this study had several limitations. First, it focused on the generation of implications for practitioners instead of generating theory. Second, only credit unions from North America were included in this study, and the findings may not be generalizable to all countries. Third, whereas credit unions are very popular financial institutions in North America, other types of financial organizations, for example, large banks, may have different KM needs. Thus, maturity models should be applied to other forms of financial organizations in order to fully establish their validity. Fourth, because of a relatively small sample size (i.e., 15 organizations), this study does not do a cross analysis or comparative analysis among credit unions. Future researchers are encouraged to increase sample size in order to identify salient factors that distinguish KM leaders.

In conclusion, most organizations that participated in this study acknowledged that KM is an important issue that must be considered in organizational strategy discussions. As the field of KM research matures, so will the use of empirical metrics that can also aid senior executives with their evidence-based decision making.

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## References

ABRAHAMSON E and FAIRCHILD G (1999) Management fashion: lifecycles, triggers, and collective learning processes. *Administrative Science Quarterly* **44**(**4**), 708–740.

ALAVI M and LEIDNER DE (2001) Knowledge management and knowledge management systems: conceptual foundations and research issues. *MIS Quarterly* **25**(**1**), 107–136.

ARLING PA and CHUN MWS (2011) Facilitating new knowledge creation and obtaining KM maturity. *Journal of Knowledge Management* **15**(**2**), 231–250.

BENNIS WG and O'TOOLE J (2005) How business schools lost their way. *Harvard Business Review* **83**(**5**), 96–104.

BERGER AN, DEMSETZ RS and STRAHAN PE (1999) The consolidation of the financial services industry: causes, consequences, and implications for the future. *Journal of Banking & Finance* **23**(**2–4**), 135–194.

BONTIS N (1998) Intellectual capital: an exploratory study that develops measures and models. *Management Decision* **36**(**2**), 63–76.

BONTIS N (2001) CKO wanted – evangelical skills necessary: a review of the chief knowledge officer position. *Knowledge and Process Management* **8**(**1**), 29–38.

BONTIS N (2003) Intellectual capital disclosure in Canadian corporations. *Journal of Human Resource Costing and Accounting* **7**(**1**/**2**), 9–20.

BONTIS N and SERENKO A (2009) A causal model of human capital antecedents and consequents in the financial services industry. *Journal of Intellectual Capital* **10**(**1**), 53–69.

BOOKER L, BONTIS N and SERENKO A (2008) The relevance of knowledge management and intellectual capital research. *Knowledge and Process Management* **15**(**4**), 235–246.

BOOKER L, BONTIS N and SERENKO A (2012) Evidence-based management and academic research relevance. *Knowledge and Process Management* **19**(**3**), 121–130.

BOSUA R and VENKITACHALAM K (2013) Aligning strategies and processes in knowledge management: a framework. *Journal of Knowledge Management* **17**(**3**), 331–346.

CONNELL J, KRIZ A and THORPE M (2014) Industry clusters: an antidote for knowledge sharing and collaborative innovation? *Journal of Knowledge Management* **18**(**1**), 137–151.

CRICELLI L and GRIMALDI M (2010) Knowledge-based inter-organizational collaborations. *Journal of Knowledge Management* **14**(**3**), 348–358.

CURADO C (2008) Perceptions of knowledge management and intellectual capital in the banking industry. *Journal of Knowledge Management* **12**(**3**), 141–155.

CURTIS B, HEFLEY WE and MILLER SA (2009) *The People CMM: A Framework for Human Capital Management*. Addison-Wesley Professional, New York.

DARROCH J (2003) Developing a measure of knowledge management behaviors and practices. *Journal of Knowledge Management* **7**(**5**), 41–54.

DONATE MJ and CANALES JI (2012) A new approach to the concept of knowledge strategy. *Journal of Knowledge Management* **16**(**1**), 22–44.

DURST S and WILHELM S (2012) Knowledge management and succession planning in SMEs. *Journal of Knowledge Management* **16**(**4**), 637–649.

EDVINSSON L (1997) Developing intellectual capital at Skandia. *Long Range Planning* **30**(**3**), 320–373.

EIJKMAN H (2011) The learning organization as concept and journal in the neo-millennial era: a plea for critical engagement. *The Learning Organization* **18**(**3**), 164–174.

GRANT RM (2002) The knowledge-based view of the firm. In *The Strategic Management of Intellectual Capital and Organizational Knowledge* (CHOO CW and BONTIS N, Eds), pp 133–148, Oxford University Press, Oxford.

GRESSGÅRD LJ, AMUNDSEN O, AASEN TM and HANSEN K (2014) Use of information and communication technology to support employee-driven innovation in organizations: a knowledge management perspective. *Journal of Knowledge Management* **18**(**4**), 633–650.

GRIPPA F (2009) A social network scorecard to monitor knowledge flows across communication media. *Knowledge Management Research & Practice* **7**(**4**), 317–328.

HSIEH PJ, LIN B and LIN C (2009) The construction and application of knowledge navigator model (KNM™): an evaluation of knowledge management maturity. *Expert Systems with Applications* **36**(**2**), 4087–4100.

JACKSON P and KLOBAS J (2013) Deciding to use an enterprise wiki: the role of social institutions and scripts. *Knowledge Management Research & Practice* **11**(**4**), 323–333.

JAYASINGAM S, ANSARI MA, RAMAYAH T and JANTAN M (2013) Knowledge management practices and performance: are they truly linked? *Knowledge Management Research & Practice* **11**(**3**), 255–264.

KIANTO A, ANDREEVA T and PAVLOV Y (2013) The impact of intellectual capital management on company competitiveness and financial performance. *Knowledge Management Research & Practice* **11**(**2**), 112–122.

KLIMKO G (2001) Knowledge management and maturity models: building common understanding. In *Proceedings of the Second European Conference on Knowledge Management*, Bled, Slovenia, pp 269–278.

KRUGER CJ and JOHNSON RD (2010) Principles in knowledge management maturity: a South African perspective. *Journal of Knowledge Management* **14**(**4**), 540–556.

KURIAKOSE KK, RAJ B, MURTY SAVS and SWAMINATHAN P (2010) Knowledge management maturity models – a morphological analysis. *Journal of Knowledge Management Practice* **11**(**3**), article 232.

LAMBE P (2011) The unacknowledged parentage of knowledge management. *Journal of Knowledge Management* **15**(**2**), 175–197.

LEVY M, HADAR I, GREENSPAN S and HADAR E (2010) Uncovering cultural perceptions and barriers during knowledge audit. *Journal of Knowledge Management* **14**(**1**), 114–127.

LIEBOWITZ J *et al* (2000) The knowledge audit. *Knowledge and Process Management* **7**(**1**), 3–10.

MACPHERSON I (2012) Historic changes in the Canadian credit union movement. In *Businesses with a Difference: Balancing the Social and the*

*Economic* (Mook L, Quarter J and Ryan S, Eds), pp 19–39, University of Toronto Press, Toronto.
Markus LM (2001) Toward a theory of knowledge reuse: types of knowledge reuse situations and factors in reuse success. *Journal of Management Information Systems* **18**(**1**), 57–93.
Martins B and Solé F (2013) Roles-purpose-and-culture misalignments: a setback to bottom-up SME clusters. *Journal of Knowledge Management* **17**(**4**), 598–616.
Martín-Pérez V, Martín-Cruz N and Estrada-Vaquero I (2012) The influence of organizational design on knowledge transfer. *Journal of Knowledge Management* **16**(**3**), 418–434.
Massingham PR and Massingham RK (2014) Does knowledge management produce practical outcomes? *Journal of Knowledge Management* **18**(**2**), 221–254.
Matayong S and Mahmood AK (2013) The review of approaches to knowledge management system studies. *Journal of Knowledge Management* **17**(**3**), 472–490.
McKenzie J, van Winkelen C and Grewal S (2011) Developing organisational decision-making capability: a knowledge manager's guide. *Journal of Knowledge Management* **15**(**3**), 403–421.
Moshonsky M, Serenko A and Bontis N (2015) Examining the transfer of academic knowledge to business practitioners: doctoral program graduates as intermediaries. *International Journal of Knowledge Management*, in press.
Oliva FL (2014) Knowledge management barriers, practices and maturity model. *Journal of Knowledge Management* **18**(**6**), 1053–1074.
Patin RP and McNiel DW (1991) Benefit imbalances among credit union member groups: evidence of borrower-dominated, saver-dominated and neutral behaviour? *Applied Economics* **23**(**4**), 769–780.
Peralta CF and Saldanha MF (2014) Knowledge-centered culture and knowledge sharing: the moderator role of trust propensity. *Journal of Knowledge Management* **18**(**3**), 538–550.
Perrin A (2012) The practices of knowledge managers in Lafarge. *Journal of Knowledge Management* **16**(**2**), 204–214.
Prusak L (2001) Where did knowledge management come from? *IBM Systems Journal* **40**(**4**), 1002–1007.
Ragab MAF and Arisha A (2013) Knowledge management and measurement: a critical review. *Journal of Knowledge Management* **17**(**6**), 873–901.
Sandhawalia BS and Dalcher D (2011) Developing knowledge management capabilities: a structured approach. *Journal of Knowledge Management* **15**(**2**), 313–328.
Schroeder A, Pauleen D and Huff S (2012) KM governance: the mechanisms for guiding and controlling KM programs. *Journal of Knowledge Management* **16**(**1**), 3–21.
Serenko A (2013) Meta-analysis of scientometric research of knowledge management: discovering the identity of the discipline. *Journal of Knowledge Management* **17**(**5**), 773–812.
Serenko A and Bontis N (2013a) The intellectual core and impact of the knowledge management academic discipline. *Journal of Knowledge Management* **17**(**1**), 137–155.
Serenko A and Bontis N (2013b) Investigating the current state and impact of the intellectual capital academic discipline. *Journal of Intellectual Capital* **14**(**4**), 476–500.
Serenko A and Dumay JC (forthcoming) Citation classics published in knowledge management journals. Part I: articles and their characteristics. *Journal of Knowledge Management*, in press.
Serenko A, Bontis N and Hull E (2011) Practical relevance of knowledge management and intellectual capital scholarly research: books as knowledge translation agents. *Knowledge and Process Management* **18**(**1**), 1–9.
Serenko A, Bontis N and Moshonsky M (2012) Books as a knowledge translation mechanism: citation analysis and author survey. *Journal of Knowledge Management* **16**(**3**), 495–511.
Shang SSC and Lin S-F (2010) A model of intellectual capital management capability in the dynamic business environment. *Knowledge Management Research & Practice* **8**(**1**), 15–23.
Smith DJ, Cargill TF and Meyer RA (1981) Credit unions: an economic theory of a credit union. *Journal of Finance* **36**(**2**), 519–528.
Stewart TA (1997) *Intellectual Capital: The New Wealth of Organizations*. Doubleday Currency, New York.
Taherparvar N, Esmaeilpour R and Dostar M (2014) Customer knowledge management, innovation capability, and business performance: a case study of the banking industry. *Journal of Knowledge Management* **18**(**3**), 591–610.
Walker MC and Chandler GG (1977) On the allocation of the net monetary benefits of credit union membership. *Review of Social Economy* **35**(**2**), 159–168.
Wilson TD (2002) The nonsense of 'knowledge management'. *Information Research* **8**(**1**), article 144.
Zhao R-Y and Chen B-K (2013) Study on enterprise knowledge sharing in ESN perspective: a Chinese case study. *Journal of Knowledge Management* **17**(**3**), 416–434.

## Appendix

**Table A1 Knowledge Navigator Model maturity levels**

| *KM maturity level* | *Description* |
|---|---|
| Level I – chaotic stage | ● No formal KM processes exist<br>● No discussion of KM occurs<br>● Knowledge exists in tacit form only<br>● No mechanisms are present to harness internal and external knowledge |
| Level II – conscientious stage | ● KM principles are considered but not yet widely implemented<br>● Partial and isolated KM activities develop<br>● KM is promoted by a limited number of KM pioneers<br>● Pilot KM projects are launched |
| Level III – intermediate stage | ● Business cases justifying KM activities are explored<br>● Formal KM programmes are in place<br>● Lessons learned are captured and promoted throughout an entire organization on a large scale<br>● KM activities become continuous in nature<br>● KM regulations, mechanisms, and systems are in place |
| Level IV – advanced stage | ● KM is strategy-oriented and uses a standardized approach<br>● Dedicated KM budget exists<br>● Knowledge is collected from multiple sources<br>● KM is integrated with daily and routine operations<br>● Internal knowledge sharing barriers are removed<br>● The value of KM is measured and linked to performance<br>● KM delivers tangible and intangible benefits<br>● Intellectual capital metrics are publicly reported |
| Level V – integration stage | ● KM processes may be changed, adapted, and rearranged without decreasing the level of organizational KM maturity<br>● A complete integration of internal and external KM processes occurs<br>● Knowledge is embedded into products, services, operations, and management practices<br>● Adaptive learning and knowledge sharing environments emerge<br>● Strong KM fostering culture develops<br>● Functional KM control mechanisms are in evidence |

*Source*: Hsieh *et al* (2009).

**Table A2 An adapted KM Maturity Model**

| *Key areas* | *KM activities* | *Rationale* |
|---|---|---|
| 1. KM strategy | 1.1. Formally defined KM strategy<br>1.2. Processes or regulations to continually improve KM strategy<br>1.3. A link between business vision/mission and KM strategy | A well-articulated, well-executed, and continuously improved knowledge strategy, which is linked with vision and mission, has a positive impact on business performance and innovation (Donate & Canales, 2012; Bosua & Venkitachalam, 2013) |
| 2. KM promotion | 2.1. A person responsible for KM, e.g., chief knowledge officer (CKO)<br>2.2. A pilot or formal KM programme<br>2.3. A KM implementing unit (department)<br>2.4. KM activities embedded in ordinary operating processes<br>2.5. Dedicated annual KM budget | An official position of a chief knowledge manager, KM implementing unit, and dedicated budget are essential in establishing formal KM programmes and ensuring that KM has become part of culture and everyday activities (Bontis, 2001) |
| 3. KM assessment | 3.1. The use of (preferably) quantitative or qualitative measures to assess the success of KM activities<br>3.2. KM assessment methods are linked to the organization performance management<br>3.3. Identification of the overall tangible (productivity, product improvement) and intangible (customer satisfaction, reputation, brand) benefits of KM | Progress and performance of KM implementations should be continuously assessed by means of reliable and valid measurement techniques (Darroch, 2003; Perrin, 2012), and the results should be analysed in terms of the overall organizational performance. In order to secure the long-term success of any business initiative, it is important to establish and continuously apply a set of metrics measuring its progress |

Table A2: (*Continued*)

| *Key areas* | *KM activities* | *Rationale* |
|---|---|---|
| | 3.4. Consideration of return on investment in KM in decision making | |
| 4. Intellectual capital | 4.1. Valuation of intellectual capital<br>4.2. Consideration of intellectual capital in evaluating the financial performance of the organization<br>4.3. Development of intellectual capital reports<br>4.4. Disclosure of intellectual capital reports | To ensure the continued success of knowledge management initiatives, it is critical to measure the level of intellectual capital within the organization (Bontis, 1998, 2003; Serenko & Bontis, 2013a, b). Valuation and voluntary disclosure of intellectual capital in the annual reports should become a norm in the knowledge-intensive financial industry |
| 5. Knowledge identification and classification | 5.1. Identification of the knowledge possessed by newly hired employees<br>5.2. Identification of the knowledge possessed by current employees<br>5.3. Periodic knowledge audits | The first and most important step to establish KM initiatives is to perform a knowledge audit in order to identity the knowledge an organization possesses and requires, which helps to remove barriers interfering with KM success (Liebowitz *et al*, 2000; Levy *et al*, 2010) |
| 6. Knowledge sharing | 6.1. Positive knowledge sharing culture<br>6.2. Regulations or processes to facilitate and encourage knowledge sharing<br>6.3. Knowledge sharing is part of regular activities | A positive knowledge sharing culture (Peralta & Saldanha, 2014), accompanied by extrinsic and intrinsic reward systems, is a critical characteristic of a learning organization (Martín-Pérez *et al*, 2012) |
| 7. Knowledge capture | 7.1. Regulations or processes to assist employees to obtain internal knowledge<br>7.2. Regulations or processes to assist employees to obtain external knowledge | Knowledge acquisition and its subsequent reuse positively impact organizational performance (Jayasingam *et al*, 2013) |
| 8. Knowledge storage | 8.1. Employees' ability to contribute to the organizational knowledge base (i.e., their contributions are stored for later use)<br>8.2. Regulations or processes pertaining to contribution to the knowledge base<br>8.3. Regulations or processes pertaining to storing knowledge in the knowledge base | Knowledge storage is an irrevocable part of basic KM processes (Cricelli & Grimaldi, 2010). All employees should be able to contribute to the knowledge base, and such behaviours should be well-regulated |
| 9. Knowledge mobilization and reuse | 9.1. Policies and procedures to support knowledge reuse<br>9.2. Policies and procedures to encourage knowledge reuse<br>9.3. Culture promoting knowledge reuse | Knowledge mobilization and reuse is an ultimate goal of KM implementations (Markus, 2001) |
| 10. Learning and training | 10.1. Formal training and development budget<br>10.2. Promotion of a learning culture<br>10.3. Structured on-the-job training projects<br>10.4. An e-learning or related educational training system<br>10.5. A link between learning and training programme and employees' performance evaluation<br>10.6. Development of personal development paths (e.g., personal growth, certification) | The concept of organizational learning has attracted the attention of researchers for over 40 years (Eijkman, 2011). Learning and training programmes contribute to the intellectual capital of a firm, improve its competitiveness, and increase innovativeness |
| 11. Knowledge retention | 11.1. Formal exit interviews<br>11.2. Organization-wide succession planning programmes<br>11.3. Retention programmes targeted at the most valuable employees | Knowledge attrition is one of the most serious issues facing contemporary organizations (Durst & Wilhelm, 2012). Organizations need to respond to the knowledge retention problem in a proactive manner |
| 12. IT infrastructure | 12.1. Members' ability to use email, internet, search engine, and various Web 2.0 technologies<br>12.2. An integral information system to transfer and deposit information<br>12.3. Periodically updated database and the consistent content of the database across the entire organization<br>12.4. Accessible CRM system | IT infrastructure is a key antecedent of successful KM initiatives (Gressgård *et al*, 2014). It should also include various Web 2.0 technologies to facilitate communication, collaboration, and knowledge retention |
| 13. KM system | 13.1. An operational KM system<br>13.2. The use of a KM system is part of organizational culture | A KM (or knowledge-based) system is a backbone of organizational knowledge processes (Alavi & Leidner, 2001; Matayong & Mahmood, 2013). It should provide access to a knowledge base, have expertise location tools, facilitate tacit and |

Table A2: (*Continued*)

| *Key areas* | *KM activities* | *Rationale* |
|---|---|---|
| | 13.3. Regulations or processes to acquire internal knowledge to improve the quality and quantity of knowledge on a KM system<br>13.4. Regulations or processes to acquire external knowledge to improve the quality and quantity of knowledge in a KM system<br>13.5. A KM system that provides expertise or expert location facilities<br>13.6. A KM system that provides functions for knowledge sharing<br>13.7. A KM system that provides functions for supporting individual and group KM tasks<br>13.8. Connection of a KM system to daily work<br>13.9. Connection of a KM system with (or including) business intelligence or big data analytics tools<br>13.10. Alignment of KM system with an overall organizational strategy | explicit knowledge sharing, support individual and group KM tasks, employ business intelligence mechanisms, connect to daily work, and link to external organizations. A KM system use should be aligned with an overall organizational strategy |
| 14. Evidence-based decision making | 14.1. Practitioner literature is used for managerial decision making<br>14.2. Academic literature is used for managerial decision making<br>14.3. Knowledge from professional association(s) is used for managerial decision making<br>14.4. Knowledge from consultants is used for managerial decision making<br>14.5. Evidence-based decision making is part of organizational culture<br>14.6. Evidence-based decision making is part of organizational strategy<br>14.7. Policies and procedures for evidence-based decision making<br>14.8. IT tools to access/receive evidence-based knowledge for decision making support | The concept of evidence-based management suggests that organizational practices should be based on valid scientific evidence. Therefore, it behoves managers to use academic and practitioner literature for decision making instead of relying on their intuition or anecdotal evidence (Booker *et al*, 2012) |

*Source*: Hsieh *et al* (2009).

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