# Using the Soft System Methodology for Designing an Integrated and Inter-firm Knowledge Management Capabilities Maturity Model in municipal organization

Jean-Pierre Booto Ekionea, Gérard Fillion, Michel Plaisent, and Prosper Bernard

***Abstract*—**The purpose of this paper is to suggest an integrated and inter-firm knowledge management capabilities maturity model (KMCMM). These capabilities should help individuals, organizational entities, and organizations in the inter-firm context to share data, information, and knowledge more fluently. The literature recognizes that information technologies (IT) alone cannot get the awaited value. Indeed, since organizations need information helping decision making or action, it is rather the combination of the capabilities related to infrastructures, processes, and competences which help to get the awaited value. The literature related to knowledge management (KM), management, and IT shows that the development of the organizational capabilities is strongly related to the use of a maturity model and it establishes a link between the level of maturity in KM capabilities and the level of organizational performance. However, few works related to KM develop an integrated and inter-firm maturity model for KM capabilities which could use together KM infrastructures, KM processes, and KM competences. So it is what we try to do in the present paper using the Soft System Methodology for municipal organization.

***Keywords*—**IT Value, Knowledge Management, Organizational Capabilities, Inter-firm Context, Resource-based View, Soft System Methodology.

## I. Introduction

IN the last twenty years, research on the impact of knowledge management (KM) as a strategic resource on business performance has been mainly limited to strategic alignment (Abou-Zeid 2002; Asoh et al. 2003; Booto Ekionea and Swan 2008) and do not take into account the inter-firm context in which organization is evolving (Saraf et al. 2007). This is why the actors need to develop the organizational and inter-organizational knowledge capabilities to make sure that they contribute to business performance (Peppart and Ward 2004; Mitchell 2006; Puri 2007; Saraf et al. 2007; Bas, 2012).

In the municipal context, from professionals to managers, each takes his share for a series of decisions and needs of knowledge essential to good decision making (Wahle and Groothuis, 2005). Thus, for the establishment of a knowledge management system that facilitates information sharing among key stakeholders (professionals, managers, policy makers, customers and other partners), the city would promote the standardization of procedures, the increasing the learning capacity of various stakeholders, a cost reduction due to efficiency and to increase communication between players and improving service quality (Lawrence & Lorsch, 1967; Wahle and Groothuis , 2005; MASSINGHAM AND MASSINGHAM, 2014) hence the need for a municipality to develop organizational capabilities specific to knowledge management to facilitate proper management of municipal knowledge (Kamaluddin et al., 2013).

Otherwise, the literature establishes a link between maturity level in KM capabilities and organizational performance (Venkatraman 1994; Dekleva and Drehmer 2001; Ramasubbu et al. 2008). However, few works related to KM develop an integrated maturity model for KM capabilities which is using together KM infrastructures, KM processes, and KM competences. So using Soft System Methodology (SSM) this paper proposes an integrated KM capabilities maturity model (KMCMM), as suggested by Abou-Zeid (2003) and Chang and Ahn (2005). In this work, the concept of organizational capability is defined as a skill to carry out the deployment, combination, and coordination of resources and competences through various value flows in order to achieve strategic objectives such as sustainable competitive advantage and organizational performance (Amit and Schoemaker 1993; Ordóñez de Pablos and Lytras 2008; Wilhelm, 2014).

The paper is structured as following: first, we present a literature review; and second, using eight steps adapted from the Soft System Methodology (SSM), we try to find a consensus on the KM capabilities concept from academic experts and to design a KMCMM applied to the municipal contexts.

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## II. Literature Review

### *A. Organizational and inter-organizational capabilities and knowledge management*

The concept of organizational and inter-firm capability is widely defined as a skill to carry out the deployment, combination, and coordination of resources and competences through various value flows in order to put forth the strategic objectives defined previously (Grant 1991; Amit and Schoemaker 1993; Collis and Montgomery 1995; Saraf et al. 2007; Ordóñez de Pablos and Lytras 2008). It is in the strategic approach of the resource-based view that the concept of organizational and inter-firm capability is better explained because this theory refers to the means which belong to the organization and which are necessary to perform the transformation of the inputs into outputs by developing the specific organizational capabilities (Grant 1991; Amit and Schoemaker 1993; Kamaluddin et al., 2013). In this context, the concept of organizational and inter-firm capability is then referenced to the strategic application of organizational competences, their use, and their deployment in order to achieve the business goals, on the one hand, and to the firm abilities to assemble, integrate, and deploy the value resources in combination with other organizational resources in order to reach the business performance, on the other hand (Bharadwaj 2000; Peppart and Ward 2004; Ordóñez de Pablos and Lytras 2008; Kamaluddin et al., 2013). This position reinforces those of the literature supporting the fact that what is bringing the difference in the organizational performance is the way to which the organization manages the activities of its internal resources and not the control of its technical aspects or the market (Barney 1991; Peppart and Ward 2004). This is why Amit and Schoemaker (1993) argue that the key capabilities, by definition, require strategic visions, time of development, and substantial investments. This would explain the partial success reached by some organizations which do not base their business strategies on the diversification of resources, but rather on the observation and the valorization of the internal resources and capabilities (Dierick et al. 1989).

Thus, the concept of organizational and inter-firm capabilities is answering to the lack of theoretical assumptions in strategy, in general, and to the widespread theoretical thought that the fact to align a resource or its strategies with the business strategies is enough to guarantee the business performance, in particular (Venkatraman 1989; Venkatraman and Prescott 1990; Henderson and Venkatraman 1993; Barki et al. 2001; Earl 2001; Abou-Zeid 2002; Booto Ekionea and Swan 2008; Swan and Booto Ekionea 2008). The development of the internal and inter-firm capabilities in accordance with the business objectives is more and more perceived as the only way to gain the sustainable competitive advantage and to support the business performance (Peppart and Ward 2004). In addition, concerning the KM capabilities, KM literature (e.g., Abou-Zeid 2003 and Chang and Ahn 2005) analyzes the concept of organizational capability following three main dimensions: knowledge infrastructures, knowledge processes, and knowledge competences.

The City of Atlantic is officially bilingual since August 2002. It is a city in Westmorland County, south-eastern province of New Brunswick in Canada. The City of Atlantic is the second largest city in the province, with 64,128 people in 2006 and an area of 14,117 km2. The city lies at the center of the Maritime Provinces in Canada, she has a mixed form of government guaranteed by a board and a CEO. The CEO is responsible for the ongoing operation of the City and reports directly to City Council. The latter is composed of elected representatives of citizens and takes major policy decisions. The City Manager acts as chief administrator of the municipality. He was appointed by City Council in a government they manage jointly. It provides leadership for all aspects of municipal services in the daily operation of the municipality and is responsible for a staff of nearly 700 employees. An emphasis on principles of professional management and performance management, it must also report to the Council for managing operating budgets and capital.

The City Manager is the City representative to a number of boards, commissions and committees. As the main link between the Council of the City of Atlantic and the administration, the city manager shall ensure that the Council receives staff recommendations and professional and objective advice.

### *B. The problem*

Most managers and policy makers have recognized the crucial role that could play a good knowledge management within their organization. Because they are bombarded daily with information in the form of emails, voicemails, faxes, reports, memos (etc.) repeatedly: they are overwhelmed and are in knowledge management solution to their bottleneck (Sharma et al., 2005). Indeed, professionals spend most of their time looking for information they need by organizing meetings, going to search the web, sending emails, calling on the phone, searching through reports in paper or computer (Sharma et al., 2005). This is even evident at the level of public organizations in general and municipal in particular. Indeed, these organizations are concerned about the proper management of information and knowledge to organize and facilitate conservation, circulation and use of data, information and knowledge of the administration of public services (municipal ), different levels of governments (municipal, provincial and federal), the various business partners and customers.

Thus, the capture, storage, dissemination, and effective use of information and knowledge in civic organizations are the main tasks. Indeed, information and knowledge are stored in different formats that do not allow their treatment and make it difficult on their storage media easily accessible except by adopting a policy of deliberate strategies of good information and knowledge management within organization. Thus it is increasingly evident that the development of organizational capabilities for capturing, transferring, and disseminating data, information, and knowledge across the organization, is a

critical factor in almost all areas of business (Earl, 2001). However, the development of organizational knowledge management capabilities (KMC) to through the development and use of specific maturity models (Siemens, 2001; Klimko, 2001, Kaner and Karni, 2004; Harigopal and Satyadas, 2001; Dayan and Stephen, 2006; Berztiss, 2002, Johnson and Brodman, 2002).

Indeed, during this study, KMC in municipal organization are evaluated using the Maturity Model for knowledge management Capabilities (MMKMC) is an integrated model of five levels and comprising three dimensions: knowledge management infrastructure, process management knowledge and skills in knowledge management (Booto Ekionea & Abou-Zeid, 2005). For the application of this model in the context of this study will help diagnose specific KMC in the municipal context. This evaluation allows us to identify the level of maturity for each dimension and characteristic of each organization entity studied in order to consider improving or developing KMC. Indeed, organizations need secure channels that can support them in the capture, storage, processing, sharing, and applying knowledge about past experiences and lessons learned in order to meet current and future (Rubenstein and Geisler, 2005, p.45).

### *C. Existing maturity models*

Taking into account these three main dimensions of KM capabilities developed by Abou-Zeid (2003) and Chang and Ahn (2005), we observe that the few models suggested in the literature refer to five maturity levels. Venkatraman (1994) describes level 1 (the initial level; dimension of KM infrastructures) as a localized exploitation where the technological infrastructures are not integrated into the whole organization, but rather into local functions. It is actually a level where information technologies (IT) are emerging like an asset at the local level, but there is a misunderstanding between IT and the business world (Luftman et al. 2004) in the sense that IT development is not necessarily aligned with business objectives. At level 2, there is an internal desire of IT integration (Venkatraman 1994) in order to support the transactions and take the decisions (e.g., the use of executive support systems (ESS) and decision support systems (DSS)) (Luftman et al. 2004). As for level 3, the step consists in establishing a good understanding between IT and the business world (Luftman et al. 2004) so that to ensure the alignment between IT strategies and business strategies (Henderson and Venkatraman 1993). At level 4, IT are perceived as a strategic resource on which the organization develops its business strategy and vision (Barney 1991; Mata et al. 1995; Bharadwaj 2000). Thus, IT architectures are integrated at the various organizational partners (Luftman et al. 2004; Saraf et al. 2007; Ye Du et al. 2008). Finally, at level 5, the IT infrastructure and the business are adapted to the various external partners of the organization (Luftman et al. 2004).

It is therefore important to know that, according to Abou-Zeid's (2003) understanding, the dimension of knowledge infrastructures includes IT which support the KM activities and the cultural KM infrastructures integrating elements such as the corporative vision and the organizational system values (Armbrecht et al. 2001; Gold et al. 2001). In the second dimension of the organizational knowledge capabilities, KM processes are classified into three main categories: knowledge generation, knowledge mobilization, and knowledge application. With regard to business or IT processes, there are five maturity levels. At level 1, the exploitation of the resource processes is localized (Venkatraman 1994). The processes are at an early stage and slightly controlled (Dekleva and Drehmer 2001; Ramasubbu et al. 2008) because there is no formal process and thus the reaction to the situations is made up step by step: no defined priorities (Luftman et al. 2004). At this level, the development of organizational capabilities is ad hoc and chaotic (St-Amant and Renard 2004). At level 2, there is an internal integration of the processes (Venkatraman 1994; Mitchell 2006; Puri 2007) on a resource, the processes are structured and reproducible (Dekleva and Drehmer 2001; Ramasubbu et al. 2008), and the organizational capabilities are expressed and put forth in definite and documented processes (St-Amant and Renard 2004). At level 3, the organization reaches the level of business process reengineering (BPR) (Venkatraman 1994) under the influence of a resource (Markus and Robey 1988). It develops and exploits the processes relevant and integrated into the whole activities (Luftman et al. 2004; Mitchell 2006; Puri 2007; Booto Ekionea and Swan 2008; Swan and Booto Ekionea 2008). At level 4, the organization controls its processes while being capable to measure them (Dekleva and Drehmer 2001; Ramasubbu et al. 2008). It proceeds to the re-design of business networks (Venkatraman 1994) on the resource basis. And its practices are documented and its results are quantitatively controllable and measurable (St-Amant and Renard 2004). At level 5, the organization redefines its business mission (Venkatraman 1994) which will be oriented on the resources. The business vision and the processes are elaborated with the partners in the inter-firm context (Luftman et al. 2004; Saraf et al. 2007; Ye Du et al. 2008; Bas, 2012), and the resource processes are continuously optimized and improved (Dekleva and Drehmer 2001; St-Amant and Renard 2004; Ramasubbu et al. 2008). Thus, knowledge can be used to develop new processes, new products, new services, etc., or to improve those existing (Abou-Zeid 2003).

Finally, the third dimension is related to KM skills or competences. This dimension refers to the capability which can have an organization to facilitate the continuous process of knowledge generation and sharing (Ordóñez de Pablos and Lytras 2008). In addition, knowledge skills refer to the capability with which an organization could develop the human and cultural infrastructure and use the available KM technologies (Abou-Zeid 2003; Chang and Ahn 2005). At level 1 of this dimension, people apply their knowledge (Peppart and Ward 2004) with few motivation or rewards (Luftman et al. 2004), and the success depends on the individual efforts and competences (St-Amant and Renard

2004; Ordóñez de Pablos and Lytras 2008) given the major part of the necessary knowledge for task execution is inside people (Nonaka 1994). At level 2, people integrate their knowledge (Nonaka 1994; Peppart and Ward 2004) and the organization improves individual, groups, and organizational efforts, competences, and knowledge (St-Amant and Renard 2004; Ordóñez de Pablos and Lytras 2008; Atapattu and Jayakody, 2014). At level 3, people interiorize knowledge (Nonaka 1994) and interact with others (Peppart and Ward 2004) for the achievement of a task or business objectives. At level 4, people coordinate their activities (Peppart and Ward 2004) and share the risks and the rewards with their partners (Luftman et al. 2004), and the organization identifies competences, knowledge, and the best practice so that to integrate them into its action processes (St-Amant and Renard 2004; Ordóñez de Pablos and Lytras 2008; Atapattu and Jayakody, 2014). And, at level 5, the organization develops the leadership, ensures the career and staff training, and rewards its employees and the business partners that contribute to the process enrichment by the new knowledge, product improvement, and customer services (Luftman et al. 2004; Riege and Lindsay 2006; Saraf et al. 2007; Ye Du et al. 2008; Serdar et al., 2014).

## III. Using the Soft System Methodology for Designing the KMCMM in Municipal Organization

First, as said in introduction, the definition of knowledge in the organizational and inter-organizational context is a very difficult task to perform (Spiegler 2000). Also, organizational knowledge needs a good management using specific capabilities because the KM capabilities concept is one of the critical factors that help to rich organizational performance and sustained competitive advantage (Earl 2001). So which KM capabilities the organization needs to develop and how to evaluate them? That is the question! In this paper, we use the eight steps of the SSM to try finding a consensus on the KM capabilities concept from academic experts and to design a KMCMM applied to the municipal contexts. In fact, we adapt the SSM steps in order to design the KMCMM, as depicted in Figure 1.

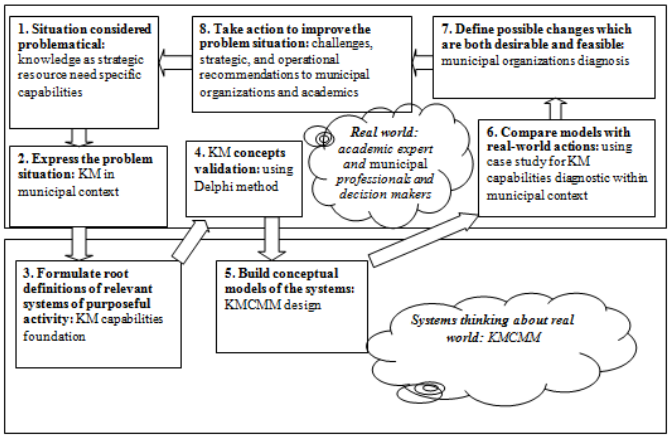


Fig 1. The Soft System Methodology for Designing the KMCMM (adapted from Checkland 1981)

*Step 1: Finding the problematic situation*

The literature clearly shows that knowledge is one of the strategic organizational resources likely to provide a sustainable competitive advantage and to promote the business performance (Barney 1991). But the organizational KM is a very difficult task to perform as it requires the development of specific organizational capabilities to achieve a competitive advantage and the business performance (Peppart and Ward 2004; St-Amant and Renard 2004).

*Step 2: Expressing the problematic situation*

In the municipal context, KM is one of a critical importance given the mass of data, information, and knowledge which flows there. A municipal organization is formed of a set of professionals, decision makers, and others who bring services to citizens. Clearly, this type of organization has advantage to develop capabilities to create, disseminate, and share data, information, and knowledge throughout the organization in order to improve services. Thus, the municipal organizations which manage and share data, information, and knowledge could effectively note processing time reduction, costs reduction, return on investment, a high level of satisfaction, and a better professional and decision maker's formation (Antrobus 1997). Indeed, the municipal sector is confronted to high levels of quality and services which require managing and sharing data, information, and knowledge.

*Step 3: Formulate root definitions of relevant systems of purposeful activity*

This step is primarily devoted to describe the KMCMM foundation. Indeed, in the literature review, it was noted that there was no integrated KMCMM that consider the Abou-Zeid's (2003) and Chang and Ahn's (2005) KM capabilities dimensions. But it seems evident that the organizations need a tool which could help them to establish the diagnosis of their KM capabilities given they want to know at which level they are currently and what to do. For this reason, the step 3 proposes some guiding principles which are the foundation of the KMCMM design. First, the development of the KMCMM is a process of organizational learning and knowledge

accumulation over time which can be spread out in several stages (Cyert and March 1963; Nelson and Winter 1982; Burgelman 1988; Cohen and Levinthal 1990). Second, the development of the KMCMM is seen as a set of skills to develop by the leader or the manager with an aim of guaranteeing, in combination with the other organizational resources, the deployment and the effective use of knowledge (Stevenson 1976; Quinn 1979; Maidique 1980; Roberts 1990). Third, the KMCMM development is a strategic planning which requires strategic specific skills of KM in order to guarantee a strategic positioning of the organization to the assistance or a good organizational KM (Abernathy and Utterback 1978; Miles and Snow 1978; Porter 1985).

*Step 4: KM concepts validation*

As conclusion of a Delphi investigation conducted from November 2006 to March 2007 to examine the elements defining the concept of KM capabilities, we noted that: (1) the concept of KM capabilities (KMC) is the sum of the whole organizational and inter-firm capacities related to the KM infrastructures, the KM processes, and the KM actors/people; (2) the KM infrastructures are the whole of organizational and inter-firm capacities related to the KM technological infrastructures and the KM structures; (3) the organizational and inter-firm capacities related to the KM processes are the whole of the organizational capacities related to the KM processes of knowledge generation, the KM processes of knowledge manipulation, and the KM processes of knowledge application; (4) the organizational and inter-firm capabilities related to the KM actors/people (or competences) are the whole of the organizational capabilities related to the KM culture, with the KM motivation, KM rewards, and KM inciting

*Step 5: Building conceptual models of what the system must do for each root definitions.*

Considering the results of the Delphi investigation on academics, and in comparison to the models provided in the literature, while being inspired by the maturity model suggested by Venkatraman (1994), we suggest in Figure 2 a KMCMM which can reach an organization.

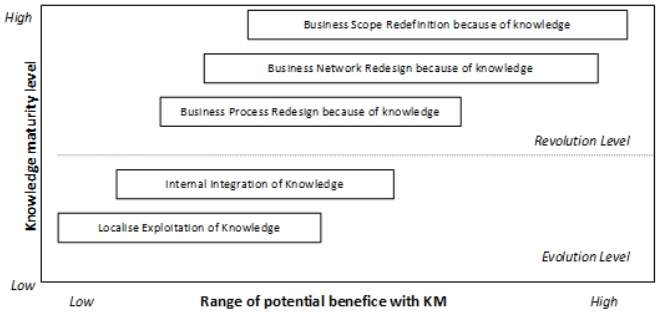


Figure 2. Maturity Levels of the Municipal Organization with KM

This model shows five maturity levels which an organization or an organizational network can reach or use with KM. It considers that, when the maturity level of KM capabilities in an organization is low, the awaited benefits are also low (Venkatraman 1994). The more the maturity level of KM capabilities in an organization is high, the more the awaited benefits would be also high. We can then see that the maturity levels of KM capabilities in an organization are regrouped in two main categories: first, the evolution levels (level 1: localized exploitation; and level 2: internal integration); and second, revolution levels (level 3: re-engineering; level 4: networks re-design (Riege and Lindsay 2006); and level 5: redefinition of the business mission). The model proposed here has five maturity levels and it will be supported by a comparative table of the various characteristics of the existing KMCMM in order to highlight its relevance (see Table 1 and Table 2).

*Step 6: Comparison of the conceptual models with the real world*

In accordance with the sixth stage of the SSM that consists of comparing the ideal model conceptualized with the real-world actions (see Figure 1, Table 2, and Table 3), this step shows the KMCMM developed in the previous step to diagnose the level of maturity of the municipal organization. This case study aimed at identifying the level of maturity reached by the municipal regarding the KM capabilities in order to produce, if necessary, the recommendations which are essential to help the development of the specific capabilities that this organization need. Table 1 shows the results of the KMCMM applied in the City of Atlantic. The validation of the KMCMM in a particular context of the municipality helped, on the one hand, to understand the place of a KMCMM in a municipal organization and, on the other hand, to perform a first qualitative validation of the model.

TABLE I
KMCMM APPLIED IN THE CITY OF ATLANTIC

| No | KMC Characteristics | Level of maturity reached |
|---|---|---|
| 1 | KM Technology Infrastructures | 3 |
| 2 | KM Specific Structures | 2 |
| 3 | Knowledge Generation Processes | 2 |
| 4 | Knowledge Manipulation Processes | 2 |
| 5 | Knowledge Application Processes | 2 |
| 6 | KM Culture | 2 |
| 7 | KM Motivation | 2 |
| 8 | KM Rewards | 1 |
| 9 | KM Inciting | 2 |

*Step 7: Define possible changes which are both desirable and feasible*

In accordance with the seventh stage of the adapted SSM which consists in defining the desirable and feasible changes (see Figure 1 and Table 2), this seventh step aims at emphasizing, for each of the nine characteristics of KM capabilities and according to the results discussed in the previous step, the weaknesses and challenges of the organization studied and for each dimension and characteristic of KM capabilities.

TABLE II.
SAMPLE OF THE CITY OF ATLANTIC

| Dimensions | Characteristics | The City of Atlantic Diagnosis |
|---|---|---|
| KM Infrastructures | Technology Infrastructures | The City of Atlantic is at the third level of maturity of KMCMM: there is internal integration of IT dedicated to KM throughout the organization, IT support KM, and there is understanding between the KM and businesses (Luftman et al., 2004). |
| | Specific Structures | The City of Atlantic is at the 2nd level of maturity of KMCMM: there is emergence of specific structures in knowledge management but they isolated and not integrated into the overall operations of the city. |
| KM Processes | Knowledge Generation Processes | The City of Atlantic is at the 2nd level of maturity of KMCMM: there is emergence of knowledge-generation process at the entity level internal to the exchange of data and information. |
| | Knowledge Manipulation Processes | The City of Atlantic is the 2nd level of maturity of KMCMM: there is emergence of structured and repeatable process for manipulating knowledge with the existence of collaboration tools such as Oracle, ERP, Outlook, etc. |
| | Knowledge Application Processes | The City of Atlantic is at the 2nd level of maturity of KMCMM: there are emerging process of applying knowledge expressed and implemented in the internal processes by the existence of procedure manuals in transaction levels. |
| KM Skills | KM Culture | The City of Atlantic is at the 2nd level of maturity of KMCMM: there is no culture of KM, however, knowledge management is seen as a support to organizational transactions and good decision making at every organizational level, and all respondents recognize the need to share information and knowledge. |
| | KM Motivation | The City of Atlantic is at the 2nd level of maturity of KMCMM: people integrate their knowledge but are not sufficiently motivated by management. |
| | KM Rewards | The City of Atlantic is at the 1st level of maturity of KMCMM: there is very little motivation or rewards. |
| | KM Inciting | The City of Atlantic is at the 2nd level of maturity of KMCMM: success of processes, operations, and organization depends on individual efforts and skills, as individuals and entities are not always encouraged to share systematically their knowledge with others. |

TABLE III
CHALLENGES, STRATEGIC AND OPERATIONAL RECOMMENDATIONS TO THE CITY OF ATLANTIC

| Dimensions | Characteristics | Challenges, Strategic, and Operational Recommendations to the City of Atlantic |
|---|---|---|
| KM Infrastructures | KM Technology Infrastructures | 1- Strengthen and make effective use of technological infrastructures with a view to integrate of information and knowledge; 2- Promote internal integration of technologies and contents across the city divisions; 3- Promote technology integration with key partners. |
| | KM Specific Structures | 1- Reform the current structure of the information systems division in order to: facilitate the full integration of data management, information, and knowledge; 2- to adapt the KM policies across divisions of the city and taking account of key business partners and customers. |
| KM Processes | Knowledge Generation Processes | 1- Encourage support for total quality - Streamline and evaluate the operational effectiveness by the IKM - Ensure the interdependence of business processes by IKM - Create internal and inter-firm IKM processes; 2- Encourage the use of the Internet and Social Web technology (Web 2) to facilitate the knowledge generation. |
| | Knowledge Manipulation Processes | 1- Develop new business logic based on good knowledge management - Adopt effective systems of knowledge manipulation; 2- Ensure that the processes of manipulation of knowledge are relevant and integrated and that they are standard, consistent and understood by the city and its partners. |
| | Knowledge Application Processes | 1- Increase the sources of data, information, and key knowledge to dispose of those who need it at crucial moments; 2- Evaluate and realign policies and practices of knowledge management for each group of individuals, organizational units, the direction of the city, customers, and business partners. 3- Identify, develop, and implement specific training programs and fostering a culture of innovation, learning and scholarly organization. |
| KM Skills | KM Culture | 1- Ensure constant monitoring of the benchmark results compared to other cities in Canada and North America; 2- Articulate its strategy and vision on the re-design of business networks by KM; 3- Develop a business vision supporting organizational transactions and making good decisions; 4- Integrate the knowledge of the client and his involvement as a stakeholder in the process of generation, manipulating, and application of knowledge. |
| | KM Motivation | 1- Define a political motivation of the KM; 2- Establish an incentive to knowledge management policy; 3- Support and encourage individuals and organizational entities to interact with others; 4- Establish processes facilitating knowledge and maintain continuous improvement. |
| | KM Rewards | 1- Develop training programs promoting culture and knowledge management skills 2- Develop measures to assess the value added per employee and return the KM; 3- Develop an organizational policy to reward the KM; 4- Define a policy of sharing of risks and rewards to the KM internally and with partners. |
| | KM Inciting | 1- Develop training programs that promote the development of technology skills in KM; 2- Develop, through the organization and its business partners, specific technical skills technological infrastructure supporting the KM; 3- Identify the skills, knowledge, best practices, and integrate business processes. |

*Step 8: Take action to improve the problematic situation.*

In accordance with the eighth stage of the adapted SSM which consists in taking measures to improve the problematic situation (see Figure 1 and Table 3), this eighth and last step try to present the organizational challenges and strategic and operational recommendations for one of the health organizations studied. First, we briefly present the consolidated results of the cases of the City of Atlantic. And second, we propose some recommendations to the organization in the form of challenges according to the best of the KMCMM and the literature.

## IV. Comparative Study of the KMCMM with Existing Models

The KMCMM is a model designed on the basis of existing maturity models in order to meet their identified insufficiencies and the needs for application of the existing maturity models in the context of KM capabilities. In fact, it is often very difficult to use or apply as such, in the specific context of KM capabilities, the existing maturity models developed in IT or management. As shown in Table 4, none of the existing studies is taking into account at the same time the three dimensions of the KM capabilities. The capability maturity model integration (CMMI) is a model which would help to study the levels of maturity that an organization reach or can reach in the development of its KM processes. However, the CMMI is unaware of two other KMCMM dimensions: KM infrastructures and KM skills. This would seriously limit its adoption to measure the levels of maturity in KM capabilities. The maturity model of St-Amant and Renard (2004) and Ordóñez de Pablos and Lytras (2008) stresses the development of individual competences via the business processes because, according to these authors, the organization must identify competences, knowledge, and the best practices, and must integrate them into its action processes (Bas, 2012). This concern meets those of Peppart and Ward (2004) and those of the KMCMM which recommends a dimension on the level of maturity reached or to reach by an organization on its KM processes. It is what Luftman et al. (2004) support, while they recommend particularly the development of leadership, staff training, and improvement of product and customer services. However, on the contrary to the KMCMM, the model suggested by St-Amant and Renard (2004) do not take into account the dimensions of KM infrastructures and KM processes.

Table IV.
Comparative Study Of The KMCMM With Existing KM Maturity Models

| V. **Criterions (capabilities)** | ***(a) Do the following models include the capabilities of*** | | | | | ***(b)*** ***(c)*** ***(d) Remarks*** |
|---|---|---|---|---|---|---|
| | **KMCMM (suggested model)** | **CEMM (Harigopal and Satyadas 2001)** | **DM-CMM (Kaner and Karni 2004)** | **The Siemens KMMM (Siemens 2001)** | **KMMM (Klimko 2001)** | |
| ♦ Development, deployment, and use of KM infrastructures | YES | NO | NO | NO | NO | Organizational capabilities related to the KM infrastructures |
| ♦ Development, deployment, and use of KM processes | YES | YES | YES | YES | YES | Organizational capabilities related to the KM processes |
| ♦ Development, deployment, and use of KM skills | YES | NO | NO | NO | YES | Organizational capabilities related to the KM skills |

The comparisons of the KMCMM with some maturity models proposed by the IT and management literature conclude that the KMCMM would be a model adapted to the diagnosis of KM capabilities. It is also noted that the Venkatraman's (1994), Dekleva and Drehmer's (2001), Luftman et al.'s (2004), and Ramasubbu et al.'s (2008) models are the maturity models which help to evaluate the IT capabilities reached or which an organization can reach. From these models, Dekleva and Drehmer (2001) and Ramasubbu et al. (2008) stress the fact that the software engineering process is similar to the knowledge process that the KMCMM recommends. The St-Amant and Renard's (2004) and Ordóñez de Pablos and Lytras's (2008) models have the merit to approach the concept of the maturity model in a context of capabilities development and organizational competences in the field of management. The suggestion of KM capabilities in three dimensions by Abou-Zeid (2003) and Chang and Ahn (2005) brings an advanced level of analysis of the maturity level reached or that could reach an organization or organizational network by the development of their KM capabilities. So, the majority of the studies on the KM maturity models are related to the processes (Dekleva and Drehmer 2001; Harigopal and Satyadas 2001; Klimko 2001; Siemens 2001; Berztiss 2002; Johnson and Brodman 2002; Kaner and Karni 2004; Dayan and Stephen 2006; Ramasubbu et al. 2008), and very few are interested in KM competences (Klimko 2001; Ordóñez de Pablos and Lytras 2008; Atapattu and Jayakody, 2014) and KM infrastructures. In addition, to our knowledge, none of these studies takes into account at the same time the three dimensions of the KM capabilities.

## VI. Conclusion

When asked why a public administration in general and a particular municipality does it need a new system of knowledge management, Rubenstein and Geisler (2005, p. 44) give the answer by advancing eight reasons (that is for): 1- build a bridge and break the isolation between specialists and other organizational entities; 2- learn from his own experiences and the experiences of other organizations; 3- to avoid repeating the same mistakes or disasters in several aspects including the management needs of customers, process control, misuse of equipment, and technology available; 4- support training at all levels; 5- to support weak or organizational entities with fewer resources by experience and strong organizational units rich in resources; 6- share "tips and tricks"; 7- to avoid the malfunction at the organizational design, management (staffing), and the distribution of tasks (workflow); 8- changing the methods of productivity improvement, cost reduction and customer service.

Thus, this research has set a goal of diagnosis to identify avenues that might lead to improved organizational KM capabilities (KMC) with a KMC maturity model (KMCMM). However, the limited number of respondents and only if the City of Atlantic cannot allow to generalize the results of the study. However, these results can aid in understanding the phenomenon of KMC in the context of municipal government.

### 5.1. Theoretical Implications

The particular contribution of this study is the particular application of KMCMM in the context of municipal government.

### 5.2. Practices Implications

The KMCMM applied in the context of the municipal government will, therefore, first, for researchers, research base for further research on strategic planning in knowledge management in general and the design of a KMC maturity model in the context of municipal government in particular. Secondly, for professionals, managers, and policy makers in the municipal sector, will guide needs analysis, serve as diagnostic tool, and strategic planning of KMC within their respective municipalities.

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