INTEGRATION MODEL FOR THE TRANSFER OF INFORMATION AND KNOWLEDGE BETWEEN SME's IN THE TERTIARY SECTOR

VICTOR HUGO MEDINA GARCÍA, DANIELA MEJIA CASTRO & JOSÉ IGNACIO RODRIGUEZ
MOLANO

Universidad Distrital Francisco José de Caldas, Facultad de Ingeniería, Cra 7 No 40B-53, Bogotá, Colombia

ABSTRACT

Given the growing need for SMEs to adapt in the process of transforming current cities to smart cities, the current situation of London as a smart city in process is taken as a reference, to develop the ideal environment assumed for the city of Bogotá and starting From this to propose the integration of the Organizational Epistemology Model and the Knowledge Creation Spiral, achieving through this make use of the Information Technology and Communication tools promoted in the environment of smart cities, to achieve enhance the competitiveness of SMEs of the Tertiary Sector of the Economy (Services) Bogotanas with the large companies of the sector that lead the market in the city. Achieving with this analysis to postulate a model that meets the needs of these and allows a competitive democratic development in the government processes that are expected to be generated in the coming years in the city of Bogotá.

KEYWORDS: *SME's, Smart City, Organizational Epistemology Model, Creation Spiral, Tertiary Sector of the Economy*

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1. INTRODUCTION

The current social evolution is directed towards the use of intellectual resources that in past industrial revolutions we had not had the opportunity to take advantage of, the interconnection provided by information networks in the current information systems of smart cities allow us to receive information and selection thereof for particular uses in a matter of seconds, so much so that it allows governments to cover and make important decisions about ongoing situations, improving the quality of life of societies, thus having the tools provided in the The smart city development framework has been interpreted as a real-time problem solving tool (Drapalova et al., 2020).

However, although the above is a positive aspect of the cities that we currently face, the exponential growth of the communities that live in them is a concern for governments, from all economic points of view, even though this enriches of innovation and progressive ideas to societies, it is still a challenge.

The companies that make up these societies seek to analyze the transition to smart cities as a problem-solving tool and an opportunity for growth and adaptation to the new ICTs, many authors evaluating this point of view, have proposed the analysis of the transition to cities intelligent as a political or administrative reform, making the transformation process more user-friendly, but they bring to the fore that this process leaves SMEs and NGOs aside (Cowley et al., 2018).

Due to the aforementioned and taking into account that the United Kingdom was ranked as the fifth largest economy in the world, contributing 3.2% of the world gross domestic product (GDP), with the Tertiary Sector of the British economy being the largest contributor to gross domestic product, with 82.4% of the GDP of the EU, it is decided to take as an example the current roadmap the process carried out by the London mayor's office to strengthen the conditions of information transfer between London SMEs (OEE, 2019), and adapt as an assumption these same to the SMEs of the Tertiary Sector of the Economy of the city of Botoá, generating, of course, an ideal assumption so that this transfer of information and knowledge can be given and in turn measure the situation current situation of SMEs in Bogota in order to measure the model's application capacity.

In order to correctly frame SMEs from Bogota, it is necessary to contemplate the current situation in which they are developing, being one of the sectors best supported by the Ministry of Economic Development, seeking in these moments of crisis to promote 5,000 direct employees and 3,000 indirect aspects of the sector (Pulido, 2020). It is also one of the sectors of the economy that has been authorized to resume work in the midst of the pandemic, this being one more reason to measure the sector's ability to reinvent itself in a situation like the current one.

In order to understand the current problems to come, two models are studied that allow the understanding and transfer of information within companies in the same sector, taking advantage of the information database developed for the project "Challenge of Civic Innovation" through the which is proposed to collect, select and transform the tacit and explicit knowledge of the different SMEs of the Bogota Tertiary Sector, taking as an example the environment in which London SMEs develop and the Knowledge Management Model developed by the Xerox company during the 80's.

2. THEORETICAL BASES

2.1 Smart City

In the first place, it is necessary to define the concept "Smart City", which despite being a concept under development, given its progress, application and implementation, the political community of the European Union (EU) has defined it as the use of scalable solutions that achieve the use of Information and Communication Technologies (ICT), based on increased efficiency, reduced costs and improved quality of life (Zvolska et al., 2019), even knowing that The definition of the EU guides us towards the objective of this, several authors have taken the course of the particular approaches that have been identified, of which we can rescue mainly two; The first approach allows the development of a technology-centered knowledge economy, while the second focuses on improving public sector operations through the use of technology by the government driven by the corporate development of ICT (Caird, 2018).

2.2 London Smart City

Therefore, knowing the main objective of the transformation of a current city into a smart city, it is decided to work with the English capital, given its renowned worldwide recognition for the current course that its mayor's office has taken towards the transformation of the city. through the Smart London Board, formed to discuss and fulfill the established agenda that seeks investment in Information infrastructure, as well as advise and guide the London mayor towards the implementation of new digital technologies that comply with the highest possible performance in terms of London's infrastructure, utilities and utilities (LDN_gov, 2020).

However, within the particular dependencies of the London Smart Board (JIL), they opened the field to the "Civic Innovation Challenge" (Civic Innovation Challenge - CIC), this being an open call to find innovative solutions to current challenges of the city, specifically to the anti-democratic conjuncture that generates the opening of the public sector market to direct interaction with innovative private companies and SMEs. Forcing the JIL to carry out the construction of a sub-unit in which members who wish to be more involved in the process of creating the project model and the management of the new technological platform that seeks to show the London market from a comprehensive point of view for SMEs.

2.3 Xerox Eureka

For all the above and framing London SMEs as a weak link in the accelerated development process in which the city is currently, it is necessary to adapt a knowledge management model that allows the use of the tools provided by the infrastructure of smart cities, to increase the competitiveness of SMEs. For this, the von Krogh and Ross Model of "Organizational Epistemology" (1995) and the Nonaka and Takuchi Model of "Theory of Organizational Knowledge Creation" (1995) are identified, inspiring the article in the application carried out in the "Palo Alto de Xerox Research Center" during the 1980s, led by John Brown de la, the knowledge integration project, better known as EUREKA, was born (KMWorld, 1999).

This System is mainly based on the dynamization of the socialization of knowledge based on technology through computers and databases, thus improving its photocopiers repair system (Customer Service), thus reducing its operating costs by 10% (Hope et al., 2012).

2.4 Knowledge Management and Organizational Epistemology

Taking into account that the model implemented by Xerox is not in the public domain, a detailed study was carried out on the case, managing to identify that the company's perspective on Knowledge Management can be defined as one that identifies and takes advantage of collective knowledge in an organization to help it compete (Panizo et al., 2019), this being not only a definition established by von Krogh and Ross, but also opening up their perspective on the importance of knowledge as an asset in organizations, supporting it with the following reasons:

- "Knowledge implies a heterogeneous and sustainable distribution of resources, which derives from its complex and idiosyncratic nature. Thus, the development of a strategy based on the valuable knowledge of the organization is likely to allow a sustainable competitive advantage. "
- Knowledge changes the nature of resource investment decisions. A company must be able to identify current knowledge inside and outside the company and decide on knowledge development projects. "
- "Knowledge changes the nature of work and property and this causes new working relationships to develop. Thus, for example, companies attract workers who can offer interesting knowledge development projects "
- "Knowledge emphasizes the social context making it necessary to share experiences and knowledge with other workers." (Panizo et al., 2019).

Opening the field to the Knowledge Management model developed in 1995 by these two authors, which distinguishes between individual knowledge and social knowledge; and takes an epistemological approach to organizational knowledge management, thus defining the connective and cognitive approach of its Organizational Epistemology Knowledge Management Model as:

- Cognitive Approach:
 - The cognitive system, be it the human brain or a computer, creates representations of reality (models) and learning occurs when those representations are manipulated.
 - Humans take information from the environment through their senses and use that information to create models.
 - It can be said that an organization also takes information from the environment and processes, since the organization as such is a sum of all the individuals that are part of it.
- Connective Approach:
 - It presents a more global perspective, where the brain is no longer seen as a machine that only takes information from the environment, but also generates it internally.
 - From this approach, knowledge does not only reside in the minds of individuals, but also in the connections between those individuals.

Thus planting the following epistemological assumptions of knowledge (Table 1):

Table 1: Epistemological assumptions of knowledge. Source: (Baca, 2017)

	Cognitive Epistemology	Connective Epistemology
Notion of Knowledge	Representable, universal, abstract, related to problem solving, similar to information and data.	Representable, resides in connections, dependent on history, related to problem solving, stored in databases.
Notion of data and information	Like knowledge.	
Learning	Formulation of more and more precise representations of worlds that are given to us, from the input data processing in accordance with << Universal Laws >>.	Based on relationships and communication, input data processing, according to the <<local>> rules.
Characteristics of the truth	Degree to which internal representations correspond to the external world. The main criterion is internal consistency. Assessments and probability judgments are also part of the process.	Different entities have accumulated information about parts of objective reality <therefore a negotiation about the truth takes place.
Organization	Information processing system, open to knowledge.	Networks that are self-organizing, composed of relationships and directed by communication.

The above being not enough, for their model Van Krogh and Ross establish five factors that can impede the success of Organizational Knowledge Management, these being the following:

- The way of thinking of people.
- Organizational communication
- Organizational structure.

- The relationship between the members.
- The management of human resources.

2.5 Theory of Organizational Knowledge Creation

This is not enough to frame London Service SMEs within a model, it is considered necessary to cover the Organizational Knowledge Creation Theory model by Nonaka and Takeuchi (1995), designed to manage knowledge specifically oriented to the creation of knowledge within organizations. Thus, they define a distinctive ontology that refers to knowledge creation entities at different levels: individual, Group, organizational and inter-organizational, governed by the proposal of "Knowledge creation spiral" (Aguilera, 2017).

It is important to highlight that, in the model proposed by these two authors, knowledge is understood as tacit and explicit, allowing these definitions to differentiate between knowledge that is easy to transfer and that which is explicit as knowledge that can be transmitted through a type of language. Through the model, the main proposal is governed by the scoop on the conversion of tacit knowledge into explicit (Aguilera, 2017).

Figure 1: The dynamic creation of knowledge. Source: (Nonaka y Takeuchi, 1995)

Figure 2: Knowledge creation spiral. Source: (Nonaka y Takeuchi, 1995)

3. METHODOLOGY

The study carried out is applied to SMEs from Bogotá in the service sector, through a survey that allows evaluating the perception of their workers regarding the organizational climate of the company, framed in an assumption of decisions focused on the transfer of knowledge in the itself, taking this as the case study.

30 employees from different small and medium-sized Bogota companies were taken, thus respecting the randomness of the information collected. Once the population was selected, the following questionnaire was designed, which allowed identifying the behavior of companies and their ability to evolve to an environment framed by the smart cities of the future.

4. RESULTS OF THE SURVEY APPLICATION

The questions that were applied in the survey, as well as its results were:

Are you the owner or worker of a company that includes activities related to services or transformation of material goods?

The first question of the questionnaire allows filtering the population and closing the research niche towards only SMEs in the tertiary sector and their workers and / or owners.

- Do you agree with the strategic decisions made by the company's management?

The following question allows us to frame the worker's perception of the transformation capacity that the company in which they work currently has.

- Do you consider that there is effective communication with your competitors or other companies in the economic sector?

This question allows us as researchers to understand how communication is currently between companies in the sector, if there is a transfer of information and empirical knowledge that allows the translation of this to a knowledge management model and can be measured through city managers smart in the future.

- Within this existing communication, have you found an effective transfer of information and knowledge that you could or could adopt in the company in order to improve any area or aspect?

The applicability and usefulness of the information and perceived knowledge of the competitors, allows to identify how much noise exists in the current system, allowing to identify the need for data science tools that filter said information as stipulated in the roadmap of improvement of the city of London, thus identifying that the ICTs currently used in the British city may be necessary to adopt in the Colombian capital.

- In which areas of the company has this information or knowledge been useful?

The identification of the most obsolete areas of the company in the organizational environment of the SMEs of the sector is imminent from this collection of information, the model is focused on the specific need for development of the companies in the sector and it is sought through From this a future investigation may or may not delve into the most neglected areas.

- Would you be willing to share your knowledge and experience with your competitors?

On the other hand, it is not only necessary to measure the capacity that companies have to apprehend information and knowledge, but also the need to transform the thinking of human capital of organizations towards the understanding of the need for knowledge transfer between companies in the sector with a common goal, allowing this selection of information collected to identify the need for training this capital belonging to the third world economy, guiding it towards evolution and reinvention.

- How often are you interested in exploring new ways of working?

Like the previous one, this question allows us to identify the human capital in development and the remaining percentage that must be guided towards the evolutionary casino of information.

- Do you consider that there is an ideal organizational climate that allows you to identify, retain, share and apply new knowledge in the company?

For all the previously analyzed, the organizational climate in which these companies are developing their attention and the route that the administration of these organizations is taking is key, this question allows us to identify how transformed the sector is and how much the Bogota mayor's office must work to achieve absolute transformation.

- Does the company have hardware and software to support knowledge management?

- What knowledge engineering tools are used in the company?

The ability to contract and identify the need for software and hardware to manage company information not only allows us to identify as researchers the financial behavior of organizations in the sector, but also to identify the percentage of investment required that the administration of the capital must have to support the development of these organizations.

- Does the company have the ideal accounting structure to quantify the intellectual capital of the organization?

The last question in the questionnaire is the most robust, allowing both researchers and respondents to create an ideal environment and identify the necessary tools and components in a knowledge management model that allows adopting the conditions of the fourth industrial revolution, human capital.

5. INTEGRATION MODEL FOR THE TRANSFER OF INFORMATION AND KNOWLEDGE

From the structural analysis carried out to the aforementioned models, the needs identified by the behavior of London SMEs and the responses obtained by the sector study carried out, the following model is proposed (Figure 3):

Figure 4: Integration model for the transfer of information and knowledge between SMEs in the tertiary sector.

Source: Own elaboration.

Where its components have the following functions:

- *Sharing tacit knowledge*: translation of the implicit knowledge of each position in the organization into a common language through either a programming and / or written language, allowing to identify the limitations of each organization for its translation and the need for tools and training in each area of the company.
- *Create concepts*: The creation of concepts in order to generalize and translate the internal knowledge of the organization into terms of common understanding in the sector.
- *Justify the concepts*: Determination of the relevant information and knowledge that supports the need for the concept in the individual organizational system from which it was generated.
- *Build an archetype*: Transformation of the knowledge of another organization into your own, through the application of the same transformed to the conditions of the company and organization that receives it.
- *Distribute knowledge*: initiate the feedback process among the organizations involved in the transfer of information and knowledge.

- *Exposure of explicit knowledge in applied strategies:* Exposure of use cases and the information and knowledge transformation process to provide feedback on the cycle.
- *Tacit knowledge of customers:* Use of tools that allow quantifying the utility and perception of customers in the face of the change generated in the organizational system.

6. CONCLUSIONS

Even though the base information and the sample analyzed for the development of the model was limited and small compared to the current number of workers in the sector and existing companies, a clear need to strengthen critical thinking is identified throughout the organizational structure of the sector. With which it is expected that the guidelines set forth in the model will open the field for the development of its architecture based on the identified needs of the system.

On the other hand, the adaptation that companies have had towards the need for hardware and software for managing information in the company was identified, allowing this adaptation to a smart city to require less investment than it may require in other sectors.

It was also possible to identify that the current work of the Chamber of Commerce institution, in terms of the integration of companies in the sector, has been inefficient and the city hall must strengthen the programs if it wants the implementation of a knowledge management model proposed to become effective and strengthen the sector.

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