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Case Report

KNOWLEDGE MANAGEMENT, INNOVATION AND SOCIAL CAPITAL IN CHIHUA-HUAHUENSE ORGANIZATIONS

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ABSTRACT

The objective was to analyze the relationship between innovation and knowledge management with the social capital held by organizations. The research design was cross-sectional-causal, with a single cut in 2014, through a probabilistic random sample of organizations from all economic sectors in the city of Chihuahua, measuring three major constructs: 1) Organizational Social Capital; 2) Knowledge management and 3) Organizational Innovation, with interval scales designed for this purpose. The sample information was subjected to an exploratory factor analysis to detect underlying structures in the data, and then the theoretical model with structural equation was contrasted under a Factorial Confirmatory Analysis. The results suggest that organizations with high levels of social capital can maintain high knowledge management capabilities and therefore promote to a greater extent organizational innovation. It was also found that the two most important factors to increase innovation within an organization are trust between personnel, and information management.

INTRODUCTION

The existence of a culture of social interaction that allows the collective work of several people in order to achieve common goals, is addressed by the concept of "social capital". This term has gained relevance int he last 20 years in a wide range of social cience disciplines, becoming the common theoretic thread to explain some phenomena of economic, sociological, political, and even anthropological varieties, that present themselves inside organizations and are based in organizational culture. Márquez (2006) analyzed the concept of social capital as a trigger for development or undervelopment in a geographic region o territory and proposed it as an alternative that goes beyond traditional inversions in physical or human capital. Hoffman, *et al*. (2005) described conceptually the relationships between social capital and knowledge management, explaining how both resources can help organizations obtain superior results in the market. Pérez *et al*. (2008) highlight the importance of knowledge clusters as structures that enable knowledge management between organizations belonging to specific sectors interconnected by common and complementary practices, thus increasing their competitively. More recently, García and Parra (2008) developed an explanatory model that allows an analysis of the role played by social capital in the acquisition of knowledge and its applications; and thus, its role in the level of innovation and organizations belonging to different industrial districts. In the new information and knowledge society, the success of organizations will depend more heavily on its innovation and learning capacities, as sources of competitive advantages. For this reason, both innovation and organizational knowledge management will become everyday practices of high value. However, in order for innovation and knowledge management to be successful, they will need a platform or foundation of social capital in organizations that allow and facilitate their internal and external relationships. Consequently, before implementing innovation and/or knowledge management programs, a diagnosis of the conditions that surround social capital in the organization, should be conducted. In the specific case of a negative diagnosis, certain politics and actions should be designed in order to increase said social capital until it reaches acceptable levels that would allow for the success of innovation and knowledge management. On the contrary, in case of a positive result, it is possible to proceed and design an intervention plan for organizational innovation and/or knowledge management. In Mexico, and particularly in the state of Chihuahua, significant delays in information and knowledge society indicators, can be observed. The objective of the investigation was to analyze the relationship between innovation and knowledge management with the social capital possessed by Chihuahuense organizations. The methodology used in the investigation is based in bibliographical research

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and the first phase was a compilation of theoretical concepts that would be useful when dealing with the practical phase. An approximation to the concept of knowledge management and its relationship with innovation was done, and another section shows a description of the investigation universes and how the sample was defined. Then, the most representative results of the investigation are shown, and at last, conclusions and recommendations are established based on the data obtained in the investigation.

MATERIALS AND METHODS

The main research questions formulated from the problem, where as follow: 1) Which are the descriptive characteristics of social capital, knowledge management, and innovation in Chihuahuenses' organizations?; 2) The level of innovation in Chihuahuense organizations has relied on the level of knowledge management and the foundation of social capital that they posses? and 3) Is an organization's social capital a critical success factor for innovation and knowledge management programs? The investigation was of non-experimental nature; that is, it was of an observational nature, where facts are given and there is no control or manipulation over the environment. It was a non-experimental design with one cut in the year 2014, in order to cover the objectives of the investigation. The population of interest was corporate organizations in the city of Chihuahua, Mexico although there was special interest in those organizations that had implemented or plan to implement knowledge management programs or formal organizational innovation processes. The analyzed unit was made up of a corporate organization, no matter if it had implemented or not formal knowledge management programs and/or innovation processes. The type of sampling was probabilistic and the sampling method simple random. The main stratification criteria were the sector or economic branch of the organization, size (number of employees), seniority, and main headquarters location. The critical variable was considered to be the one regarding the implementation of formal organizational innovation processes, and with an estimate of sample variability to the occurrence of said event; where p=85% and q=15%, and with an estimate of population variability with a standard error of 5% to 10% and using a a trust level of 95%, the size sample was calculated in 49 to 196 units of analysis.

This size sample matches the inferior limits of the sizes used by other investigators in regional studies, who suggested from 50 to 200 units of analysis or organizations (Hernández, 1994).

The instrument chosen for the measurement of the different variables, for organizational social capital as well as knowledge management and innovation, was a survey. The rank used to measure the categories studied was a six point interval range, from cero to five, although in order to better approach the interviewee, ordinal instructions with six order categories were used. The measurement tool included the four basic sections: 1) social capital; 2) knowledge management; 3) organizational innovation, and 4) the organization's general information. The measurement tool used included three scales corresponding to the three studied categories: 1) Organizational Social Capital, with five subcategories (trust, cooperation and collaboration, organizational norms, association, and social networks) and 18 questions; 2) Knowledge Management, with four subcategories (ICTs, knowledge management, human resources management, and knowledge management processes) with 35 questions; and 3) Organizational Innovation, with six subcategories (Leadership, strategy and personal management; generation of new concepts; development of new products or services; redefinition of productive processes; innovation organization; technological and surveillance management) with 24 questions as shown in table 1.

RESULTS

1. Organizational Social Capital Level. The level of social capital estimated over the sample gave an average, calculated with the arithmetic mean, of 200.15 points with a standard deviation of 86.053 with a 356 points range, where the organization with the least social capital reported 26 points and the one with the most social capital reported 382 points. The probabilistic distribution of the variable was the normal distribution, according to Shapiro-Wilk's test (sig=0.846).
2. Level of Knowledge Management. The level of knowledge management estimated over the sample gave an average, calculated with the arithmetic mean of 519.8 points with a standard deviation of 309.507 with a 1218 points range, where the organization with the lowest level of knowledge management reported 18 points and

Table 1 Cronbach's Alfa test for each of the three scales.

Cathegory or dimension	Subcathegories	N° of questions	Cronbach's Alfa	Measurement Error
1. Organizational Social Capital	a) Trust b) Cooperation and collaboration c) Organizational norms d) Association e) Social networks	18	0.898	10.2%
2. KowledgeManagment	a) Information and Communication Technologies (ICTs) b) Kowledgemanagment c) Human resources managment d) Knowledge management processes	35	0.959	4.1%
3. Organizational Innovation	a) Leadership, strategy and personnel management b) Generation of new concepts c) Development of new products or services d) Redefinition of productive processes e) Innovation organization f) Technological and surveillance management	24	0.945	5.5%
Three cathegories	15 subcathegories	77		

the one with the highest level reported 1237. The probabilistic distribution of the variable was the normal distribution, according to Shapiro-Wilk's test (sig=0.220).

Level of Organizational Innovation. The level of organizational innovation estimated gave an average, calculated with the arithmetic mean of 89.58 points with a standard deviation of 32.073 with a 138 points range, where the organization with the lowest level of organizational innovation reported five points and the one with the highest level of organizational innovation reported 143. The probabilistic distribution of the variable was the normal distribution, according to Kolmogorov-Smirnov's test (sig=0.423).

Structure of the organizations analyzed on this investigation

1. Economic sector of the organization. The total sample of organizations was distributed between the three main economic sectors: 70% on the tertiary or commerce and service sector, 16% on the secondary or industrial sector, and 14% on the primary or agricultural and extraction related activities sector.
2. Product or main service provided. The descriptive information of this trait was widely spread due to the preservation of the product or main service denomination given by the organization. With the exception of "higher education" with an obsolete frequency of seven organizations, and "food commercialization" with two instances, the remaining 35 organizations were distributed with an occurrence for each one.
3. Size and type of organization according to the number of employees. The organization's size estimated by the number of employees showed an average, calculated with mean, of 22.5 employees with an interquartile range of 136 workers, where the organization with the least number of employees reported 3 workers and the biggest one 4000 employees. The probabilistic distribution of the variable is not the normal distribution, according to Shapiro-Wilk's test (sig=0.000). Using the organization's size according to the number of employees to define the type of size in four categories (micro, small, medium, and big) according to the economic sector that they belong in, used by the Secretariat of Economy (2010), the frequency distribution of the sample settled as follows: 30% are micro-organizations; 36% are small organizations; 7% are medium sized, and 27% of the sample are of the highest type of organizations as shown in table 2.

Analysis of the Association and Dependency between Innovation and Knowledge Management with Organizational Social Capital.

A correlation analysis was used to establish whether and organization's social capital is related to the level of knowledge management and organizational innovation, calculating its significance and in its case the level or rank of relation. The statistical used is Person's correlation coefficient, since there are lineal relationships between variables with an interval scale and a normal probabilistic distribution, as shown in the previous section of analysis in the traits of dimensional measurements. Table 3 summarizes the results of said correlation analysis.

Table 2 Summary of the factorial exploratory analysis of Social Capital (SC), Kowledge Management (KM), and Organizational Innovation (OI).

Cathegory	Noticed Structures
1) OrganizationlSocial Capital (SC) (67.3% of explained variance)	**By economic sector:** None **By size**: Medium sized organizations group together in high values of SC and big organizations in norms and social networks. **By seniority:** Organizations between 6 and 10 years old group together in high levels and those between 21 and 31 years old group in low levels. While organizations older than 30 years show high values in norms and social networks, the newly created ones show very low values. **By main headquarters location:** Outsider organizations group un high values of SC and local ones in low values.
2) Kowledge Management (KM) (68.7% of explained variance)	**By economic sector**: Slight grouping of the primary sector in low levels of KM and high levels of KM processes in the secondary sector. **By size**: Medium sized organizations group in high values of KM and KM processes, while big and micro organizations group in low levesl of KM. **By seniority**: Organizations between 6 and 10 years old group in high levels of KM and those between 21 and 30 years old group in low levels. Meanwhile, in KM processes, newly created organizations show high values. **By main headquarters location:** Outsider organizations group in high values of KM and KM processes, but local organizations show low values.
3) Organizational Innovation (OI) (70.7% or explained variance)	**By econonomic sector:** The secondary sector shows medium levels of OI and innovation organization. **By size**: None in particular, except in small organizations with a slight grouping in medium and high levels of OI. **By seniority**: Organizations between 6 and 10 years old group in medium and high levels of OI and organizational innovation processes. While those between 21 and 30 years old group in medium levels of innovation organization, organizations between 2 to 5 years old show very low values in organizational innovation. **By main headquarters location:** Slight structuring of outsider organizations towards medium and high values of OI.

Table 3 Association and relation SC-KM-OI in Chihuahuense organizations

Correlated cathegories	Sig	Significance of the association	R	Asoc. level	Relation
Social Capital vs Knowledge Managment	0.000	Highly significant	+0.842	Very high	At higher levels of social capital, higher levels of knowledge management
Social Capital vs Organizational Innovation	0.000	Highly significant	+0.775	High	At higher levels of social capital, higher levels of organizational innovation
KowledgeManagment vs Organizational Innovation	0.000	Highly significant	+0.802	Very High	At higer levels of knowledge management, higher levels of organizational innovation

That is, an organization's social capital is associated with knowledge management in a highly significant manner, the level of said association being very high and positive. It's the same with organizational innovation, but in this case the association, although very high and positive, only reaches a high level. Likewise, knowledge management is associated with organizational innovation in a highly significant manner, in a positive way and at very high level. With this information, the association or relation between the main variables of the current study is demonstrated. In the scatter plots it was found that at higher levels of organizational social capital, there are higher levels of knowledge management, and at higher levels of organizational social capital there are higher levels of organizational innovation. It can also be observed that the points with the highest level of social capital and thus organizational innovation correspond to organizations dedicated to providing financial services, physical health rehabilitation, and corporate consulting. On the contrary, the lowest points of the same variables correspond to organizations that provide wood products, powder chili, computer systems services, training consulting, and secondary education. The dependency analysis between the variables concerned was made with four simple lineal regression analyses, whose results conclude that the level of organizational innovation and knowledge management depend mainly on their internal or intraorganizational social capital, more so than on their external or interorganizational social capital, in light of the determination coefficients being of higher magnitude in the case of internal social capital, that is, they account vastly for the behavior or variable levels in organizational innovation and knowledge management.

DISCUSSION

Putnam (1993) held the idea that there is as tight relationship between the social interactions and the democratic and economic performance of a country or community, and that the concept of social capital can be used as basis to study said relationship. Several studies have shown that social capital has a positive impact in economic performance, life quality, and regional competitively; while a social capital deficit has been related to poverty levels, corruption, criminality, and impunity. Kliksberg (1999) and Durston's (1999) studies in Latin America are clear examples of the effects social capital has over the development level of a region.

Social capital has been analyzed in relation to its positive effects over a society and the its encouraging impact in economic performance, human development, competitively, and life quality; for example, Sen (2000) studied its negative effects when analyzing its contribution to the perpetuation of social exclusion and poverty propagation.

The negative effects of social capital are felt when a society presents mistrust betwwen citizens, corruption prevail, there are high levels of violence and impunity, and collaboration and cooperation among the community are reduced to the bare minimum.

Studies carried out by international organism such as the World Bank (2001), the PNDU (2003) and the Economic Comission for Latin America (Comisión Económica para la América Latina CEPAL, 2003 and 2007) in several regions of the world, have used social capital as a strategic resource in order to overcome poverty.

Pérez *et al.*(2008) pointed out the importance of knowledge clusters as structures that facilitate knowledge management between organizations belonging to specific and interconnected sectors by common and complementary practices, thus allowing them to increase their competitively. These authors analyzed successful cases of international clusters and proposed research projects to develop models, methodologies, and information technology applications that would enable the identification, representation and recovery of existing knowledge in the clusters, through knowledge audits, maps analysis, and knowledge flows.

When analyzing a shoe industry cluster in Spain, Galán *et al.* (2007) proposed that the social capital level of an organization belonging to a geographic cluster, could provide it with advantages in information flows that would allow the organization to obtain resources and enhance its innovation results. These researchers mainly studied the exchanges of tacit information inside the cluster and proposed a conceptual model that related social capital with innovation levels, contrasting said model through a structural educations system, derived from empiric information obtained from 45 interviews with owners or managers of organizations from the studied cluster. In this particular case, it was shown that organizations with more social capital where more innovative in products and processes.

Coming from three theoretical approaches (knowledge networks, social capital, and innovation systems), Dettmer (2007) analyzed the way in which knowledge networks are constructed in Northern Mexico aquaculture. The investigation comprised 28 deep interviews and 72 surveys applied to micro, small, and medium aquaculture related organizations. The study concluded that although there is a set of abilities for the generation of knowledge, a permanent interaction or knowledge transference cannot be observed between the main responsible of this productive activity.

More recently, García and Parra (2008) developed an applicative model that allows for the analysis of the role played by social capital in the acquisition of knowledge and its

application, and thus, in the level of innovation in organizations belonging to the different industrial districts.

The previous is relevant because, according to Ink pen and Tsang (2005), social capital is more observable in systems where organizations keep close relationships, as would be the case of industrial districts, productive conglomerates or clusters, and local productive systems, where knowledge transfer and innovation generation are easily detected.

Now, it is clear that not all organizations that maintain inter organizational relationships are of the same size and seniority, which is why diverse results in organizational innovation are to be expected, but maintaining certain relation to these collateral factors to the social capital that they posses. However, Camisón *et al.* (2002) found contradictory evidence and notorious divergences from these factors in innovation results.

CONCLUSSION

It was found that organizational trust given by trust between the same employees, between employees and managers, and a transparent climate, as well as good information management, is what accounts for the cause or a high level of organizational innovation, which in time will lead the organization into acquiring competitive advantages.

According to a literature revision, the three main sources of intra organizational social capital are trust between its members, the quantity and intensity of its informal social relationships and in less quantity of its formal ones, while the main source of inter organizational social capital is given by the relationships that an organization maintains with other similar organizations in order to share experiences, information, and resources, as well as relationships with other institutions that can help in its development, such as government entities, chambers, associations, unions, etc.

The organizations that have implemented innovation and knowledge management projects in several levels, have accompanying levels of social capital. The level of innovation in a given organization depends on its level of knowledge management and the social capital at its disposal, organizational social capital being a critical success factor in the implementation of innovation and knowledge management projects, having a positive impact in the economic development, life quality, and competitively of a region; meanwhile, a social capital deficit has been associated to poverty levels, corruption, criminality, and impunity.

Nowadays, intangible resources have become the main source for wealth and wellbeing generation. In accordance, an organization's capacity to know, measure and manage said resources, such as intellectual capital, is a key element in its competitive advantages. In the new information and knowledge age, an organization's success will depend in no small way on its innovation and learning capacities as sources of competitive advantages. For this reason, both innovation and organizational knowledge management will become everyday practices of high value.

That is why one of the strong recommendations that come from this work is that, if organizations want to increase organizational innovation, both in the products and services provided as in its productive processes, they must establish development politics that increase organizational trust and set good information management practices. It is also important to do similar studies in productive chains, industrial zones or districts, technological parks, and clusters or productive conglomerates, in order to provide more specific development politics that encourage innovation based on organizational social capital and knowledge management, in light that in said entities these variables tend to be more homogeneous.

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