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THE IMPACT OF COMPETITIVE INTELLIGENCE ON THE INNOVATIVE CAPACITY OF INDUSTRIES IN CIUDAD JUAREZ: RESEARCH PROPOSAL

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Abstract -- Nowadays globalized markets and technological changes lead companies to implement management systems that allow information to be analyzed and converted into organizational intelligence [1, 2], this should lead companies to manage information for effective decision making.

This process is developed starting at the level of the company's strategy, up to the manufacturing strategy in the creation, development and deployment of the technological capabilities needed to provide fast and flexible responses to customers, taking into account market situations and their respective changes [3].

It is possible to collect and manage information through various models mainly in competitive intelligence and knowledge management. It is proposed to use the modeling through the structural equations methodology, where the critical factors of competitive intelligence and knowledge management will be identified, as well as the importance and impact it has on the innovation capacity of companies.

Keywords: Competitive Intelligence, Absorptive Capacity, Intellectual Capital, Innovation, Technological Changes.

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information management systems that allow their analysis and conversion into intelligence [1, 2], this should lead companies to manage information for effective decision making.

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INTRODUCTION

The Mexican National Financial Institution (NAFIN) has reported that there are significant opportunities for improvement for industries with national capital, mainly because the products they offer are handmade, so they have not been able to compete in international markets.

The information management systems are classified as small enterprises and approximately 80% are classified as micro enterprises, their organization is usually managed by the family itself, they are not subject to credit and about 75% operate with obsolete technologies, and given that in the highly competitive business environment, companies need efficient ways to manage information for decision making. Because this is a difficult management function and deciding on the needs, type and specific information may prove to be a problem, as is design and characteristics of the required information management system.

For any business organization it is vital to have useful, timely and available information for the determination and management of technological capabilities in order to achieve the right goods and/or services. Such information comes from various sources and can be obtained through specific activities that can be managed through competitive intelligence (CI), knowledge management (KM) and intellectual capital (IC).

General Objective

Analysis and comparison of predictive statistical models that contribute to determine a forecast of the impact related to the relevant factors of competitive intelligence on the innovation capacity (CInn) of companies in three regions of the country (Ciudad Juarez Chih., Lagunera Region of Coahuila and Hermosillo Sonora).

Specific objectives

- To identify the significant factors of CI, QA and CInn in three regions of the country.
- Design a structural equation model that integrates the critical factors of CI, QA and CInn of the three regions under study.
- To analyze the relative impact of the significant factors of competitive intelligence on the innovative capacity of companies in the three regions under study.

DEVELOPMENT

Methodology.

Competitive Intelligence

CI is a practice that has grown in the last three decades to become a common language in business [1, 2] due to the importance for companies of identifying technological changes, reducing associated risks, investing in the acquisition of advanced and appropriate technologies [3]. Leading companies such as IBM, Kodak, and Motorola, to name a few, have adopted and exploited the CI practice, being documented in a

variety of CI books and case studies [4, 2], as well as in studies conducted by business experts and management schools [5, 6]. [7], define IC as "any actionable intelligence that can provide a competitive advantage"; for Fleisher and Bensoussan cited in [8]; CI is the result of capturing, evaluating, analyzing, integrating and interpreting all available information that relates to one or more aspects of the maker's needs, and that is immediately or potentially important.

According to [4], he mentions that the IC is described as a systematic effort that is oriented to the achievement of specific objectives, with an ethical approach and established in a timely manner, its objective is to collect, synthesize and analyze the most important information on the relevance of competition, market behavior and the dynamics of the external environment, its fundamental purpose is to produce relevant information for effective decision making.

A variety of definitions of competitive intelligence are found in the literature; there is no general concept among practitioners and academics; corporate intelligence, business intelligence, market intelligence and other similar terms are often used interchangeably and most of the , the differences are more of semantics than substance [9], this can be explained CI is a process used in dynamic situations and in a constantly changing business environment and the variety of definitions of CI may be a reflection of that constantly changing process [4]. This variety of definitions of CI is explained by the fact that it is relatively a new theory, which is only a few years old in exploration, so it is in full development. At present, it is convenient to analyze and evaluate the impact that could have the exercise of this practice in Mexican companies and to observe the benefits that could be generated according to what was found in the literature review.

Knowledge Management

Making the right decisions in any company is a daily occurrence and making the right decision will depend on the analysis of the information available. Therefore, the great challenge for companies is to have current and correct information from different sources and to transform it into relevant and useful knowledge. This leads us to understand the relevance of studying and managing information and knowledge through effective means. Basically, information is generated from data that have a significant behavior [10]; this flow of information is the basis of knowledge.

[11] They have pointed out that information is a flow of messages, unlike knowledge, which is created based on the same flow of information, based on the beliefs and commitment of its components. It is possible to express explicit knowledge through a formal and systematized language, sharing it in simple ways through a system of data and information codification. On the other hand, tacit knowledge is more difficult to manage, because it is personal, subjective and resides in the minds of individuals [12], it is complex knowledge that is formed through learning and experience, it is developed and reproduced through complex thought operations [13] and because it cannot be easily formalized and systematized, it cannot be managed [14]. Functionally, knowledge is the ability to act based on explicit and tacit elements [15]. In organizations, both types of knowledge are used: tacit knowledge is based on common sense and explicit knowledge is based on academic achievements, both being underutilized [16].

KM is the development of capabilities and activities that enable an organization to design new products and improve existing ones, as well as to modify and improve its administrative and production processes; it is know-how in a global context [13]; KM is the systematic process of searching, organizing, filtering, and presenting information with the aim of improving people's understanding of a specific area of interest [17], and helps an organization to gain knowledge and understanding of its own expertise [18]. Different definitions of KM are found in the literature, although a common element in the definitions refers to tactical and operational aspects; KM focuses on facilitating and managing knowledge-related activities, such as its creation, capture, transformation, and use; its function is to plan, implement, operate, and control all knowledge-related activities and programs, which requires effective management [19].

Intellectual Capital

All companies possess a series of assets of recognized strategic importance such as market knowledge; capabilities and resources for product development; human resources with certain skills, in addition to activities, experiences, knowledge; work rules and policies; information systems and specific databases; relationships with other organizations and entities; in the literature these resources are called Intellectual Capital (IC) [13]. The IC is the set of intangible assets that a company possesses and that, properly managed, can generate sustainable competitive advantages over time; it is knowledge

useful, which serves a specific purpose; different from a simple collection of data; moreover, it is valuable knowledge, because from it, the company is able to create value and obtain higher revenues [20].

In the literature it is recurrent the establishment of three elements of IC; Human Capital as the attitudes, skills and experiences of the people in an organization; Structural Capital as patents, documented processes, databases, vision, strategy and policies and Relational Capital as the value of the relationships of a company with the people with whom it does business [21, 22, 23].

Innovation Capabilities

A crucial aspect for knowledge transfer and its absorption by the firm is the way in which Global Value Chains and Regional Assets fit into an interface that arises as a result institutional capabilities across different geographical and organizational scales, [24]; technological capabilities (TC) play an important role. TC are defined as those technical, managerial or organizational skills, applied for an efficient use of equipment and technological information, which allow any type of technological change process to be carried out in companies. The definition of technological capabilities implies knowledge and skills to acquire, use, absorb, adapt, improve and generate new technologies and that support the central concepts to offer products [25, 26]. [27] They have pointed out that, based on the understanding the definition of TCs, technological capabilities also include innovation capabilities and absorptive capabilities. The knowledge absorption capability of organizations can be defined as the ability of firms to value, obtain and apply knowledge from external sources for commercial purposes. In recent years, definitions of absorptive capacity have highlighted its power to convert knowledge acquired from external sources into usable ideas, products, goods, services and models [28].

On the other hand, innovation capabilities are a particular set of organizational capabilities, with a dynamic, innovation-oriented character that enables the organization to formulate and successfully implement innovation-oriented strategies, seeking to build lasting competitive advantages that will enable it to have reliable formulas to respond to market challenges with greater accuracy and flexibility [29]. [27] They mention that innovation capacity should be understood as those skills that are developed to obtain different combinations of elements that exist internally in an organization,

as well as in the external environment. The more companies are able to learn from the interaction with external resources, the more pressure they will be able to put on those who follow them, and thus increase their innovation capacity and that of the system as a whole.

Impact or benefit

Today's global competition forces organizations to increase the level of competitiveness they have developed. Among the possible strategies that can have an impact on increasing competitiveness is the application of knowledge creation and management methodologies. CI is considered as a predictor of innovation and technological development, which will have a positive impact on organizations that have products and processes with efficient indicators and therefore more competitive.

Among the expected results of this research work will be to offer companies a variety of benefits in decision making, well as to professionals dedicated to providing advice and consultancy to companies and also to research professors of higher education institutions.

The benefits considered are:

1. Design and implement strategies for the development of competitive advantages, based on the identification of the relationship between the critical factors of CI with QA and its effect on CInn.
2. Obtain relevant information on CI factors, as well as evaluate the relationship between CI, QA with CInn, etc.) that can contribute to the design of a Competitive Intelligence and Innovation center among the three regions under study.
3. The predictive model to be proposed for the response variable defined as defined as

Competitive Intelligence/Knowledge, will be able to contribute to clearly explain the relationship between the identified critical factors of CI, QA, and its effect on CInn in the three regions under study.

This project is aligned to the lines of generation and application of knowledge of the master's program in industrial engineering, and will support the training of human resources, as well as allow the development of an academic production of the Academic Bodies of the Instituto Tecnológico de Ciudad Juárez, and will also allow the participation of students from different educational programs of the institution itself.

Description of the study Methods and techniques

The proposed research methodology is with a quantitative approach, since it will use data collection to test the hypotheses raised based numerical measurement and multivariate statistical analysis. It will be performed through a set of research methodology processes, where data are collected, quantitative data analysis is performed, their integration and discussion of the results obtained [30, 31, 32].

This study will be correlational, whose purpose is to obtain and understand the interaction of the variables under study, to analyze their relationship or degree of association that exists between these factors, concepts, categories or variables in a particular context.

The research design is non-experimental, in which the variables that will be observed will be analyzed under a natural context, without attempting to manipulate the regressor or independent variables.

It is of the transactional or cross-sectional correlational-causal type, information will be collected at single moments and it is intended to describe the relationships between two or more categories, concepts or variables, either in correlational terms and/or in terms of cause-effect (causal) relationship [32].

DISCUSSION AND ANALYSIS OF RESULTS

The results identified in the literature in the type of analysis mentioned in the previous section have shown that there is evidence of a significant correlation between organizational practices and the maturity of the company with the level of innovation developed in the companies. By examining the correlations presented in the literature between individual variables, it is possible to observe a concordance, or not, with the conclusions of various authors and the preliminary expected findings of the present research proposal. A structural model of the relationships between these organizational practices can be seen in Figure 1.

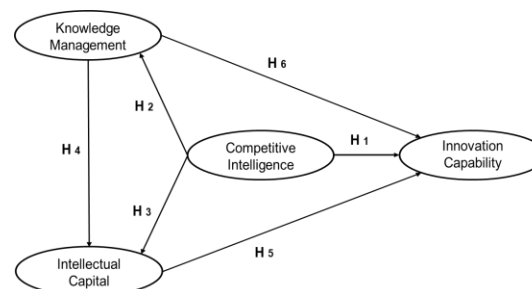


Figure 1. Hypothetical structural model of Competitive Intelligence.

Given that [33] highlights the importance of innovation maturity models, and the present study seeks to support this assertion by aiming to identify a

substantial correlation (correlation coefficient greater than zero) between the level of maturity and the level of innovation. This could confirm the relevance of maturity levels in the context of organizational innovation.

[34] They highlight the relevance of knowledge management and collaboration in fostering innovation. In line with this perspective, the research aims to demonstrate that the factor "learning and collaboration" presents a correlation coefficient greater than 0.50, which would validate the idea that learning capacity and collaboration between individuals are crucial aspects to boost innovation in a company.

[35] They underline the importance of portfolio and relationship management. In this study, it is intended to demonstrate that the resource management factor exhibits a significant correlation coefficient of at least 0.815 with the level of innovation. This factor not only facilitates network and knowledge management (learning and collaboration), but also highlights the additional importance of human resources and time allocated to promote activities that generate innovation, in contrast to the perspective of [35].

[36] They highlight the importance of networks to strengthen innovation, and although they indicate that centralized networks improve innovation performance, the present research will attempt to reveal a strong positive correlation coefficient for the factor of adaptability to the environment. [37] They explain the relevance that innovation generation does not depend only on internal aspects of the organization, but that ecosystems also play a crucial role. [38] also reinforce the idea that various elements of the environment, such as suppliers, customers, industry, university and workers, contribute significantly to the level of innovation. [39] They propose emotional capabilities, learning capabilities and environmental dynamics as elements that influence innovation. This finding is reflected in the results of the data analysis, confirming the coefficient of 0.616 identified in the learning and collaboration factor, which evaluates elements of the environment. However, the present research does not address emotional aspects, since they are not within the scope of the proposed study.

In contrast, [40] find that human, organizational and technical innovation are the elements that generate the level of innovation. However, he points out that these constructs are quite general and do not allow the identification of specific areas that facilitate the understanding of the drivers of innovation.

[41] They argue that to carry out incremental innovations it is necessary to expand the network and the environment to obtain improvements in products or processes. However, to achieve disruptive innovations it is required to deepen research, since this allows identifying totally different solutions. These findings are related to the adaptability factor, where a strong positive correlation coefficient is expected.

Regarding creative problem solving, where a coefficient of 0.752 is identified to achieve a high level of innovation, [42] supports this element by identifying that creativity arises when both parts of the brain participate. The Kruskal-Wallis test analysis confirms the relationship between the maturity and innovation variables.

In addition, Spearman's correlation coefficient test reveals that the independent variables have a higher correlation with the variables associated with products, processes and management systems, but present a lower level of correlation with the creation of business models and financial performance.

The possible hypotheses that could be put forward in the research on the impact of competitive intelligence among various factors are shown in Table I.

Table I. Testing of possible hypotheses.

Hypothesis
H_1 : Competitive intelligence influences the capacity to innovation;
H_2 : Competitive Intelligence Influences the Management of the Knowledge;
H_3 : Competitive Intelligence Influences Capital Intellectual;
H_4 : Knowledge management the capital of the company intellectual;
H_5 : Intellectual capital influences the capacity to innovation;
H_6 : Knowledge management influences the ability of the company to innovation.

CONCLUSIONS

Nowadays, every organization has the great challenge not only to survive in the face of the great global competition they are facing, this situation forces to improve the knowledge of how competitive intelligence works through the different factors, and its correlation with the management of Knowledge and Innovation Capacity. This is why it is necessary to make use of statistical methodologies that provide clarity on the relevance of this relationship and its components. A structural equation model provides us with a greater capacity to develop, explore and confirm the results of this research. Statistical analysis will allow us to test the hypotheses

on the multiple relationships identified between the observed and latent variables.

This project requires the participation of students from the various study programs of the Institute, who are doing their professional residencies or thesis research project. Through student collaboration, the application of the Measurement Instrument will be carried out through surveys in the companies of the region. Collaboration with the Department of Technological Management and Liaison will be carried out to maintain the validity of agreements or in the creation new liaison-collaboration agreements with the National Chamber of the Industrial Transformation Industry (CANACINTRA) if necessary. The results obtained, as well as the strategies and conclusions will be registered as intellectual property in INDAUTOR for later dissemination.

For future research, it is suggested that the business model factor be examined more specifically to identify particular aspects that can drive innovation in this area. It is also recommended that the application of studies structural equation studies are also recommended to better understand how the different factors, overcoming the conception of dependent and independent variables. In addition, the scope of the study could be broadened by incorporating aspects such as organizational culture, emotions, work climate and ethics, in order to obtain more complete understanding of the elements that influence innovation levels. Given the rapid evolution of the uses of artificial intelligence, it would be interesting to explore how it can contribute to and favor innovation in organizations. Finally, it is suggested to include a prospective variable that measures the impact of the level of innovation on competitiveness, using methods such as structural equation analysis.

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