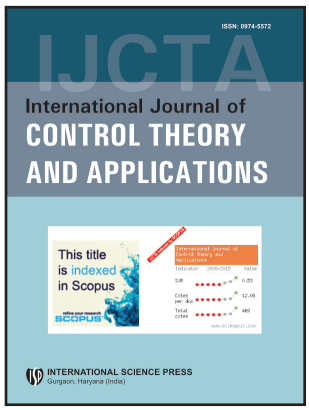

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Impact of Competitive Intelligence in Knowledge-Based Organizations. A Proposed Methodology for Measuring

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Abstract: This paper presents a methodological proposal to evaluate the impact of a competitive intelligence system on knowledge-based organizations. In this type of institutions, knowledge and innovation play a significant role in their business model as a source of competitive advantages, however, the measurement difficulty persists due to the nature of the variables involved. A structured analysis model is developed in four blocks, the variables used, their form of measurement and the periodicity of the measurement are defined. By following the steps we present, it is possible that an organization improve its competitiveness level.

Keywords: Impact measuring, competitiveness, knowledge-based organization, business intelligence.

1. INTRODUCTION

Theoreticians and economic analysts call current conditions such as the knowledge economy, and more broadly as a knowledge-based society [1], [2]; This has led organizations to modify their business models, organizational structures and processes. In this context, knowledge is an integral component of the business processes to develop competitive advantages in globalized and dynamic environment where innovation is a fundamental element for survival [3].

2. THEORETICAL FOUNDATION

This section presents a brief approach to the main issues addressed in this paper. Highlighting the works related to based-knowledge organizations, competitive intelligence and some efforts to measure the impact of this on organizational performance.

The literature on knowledge-based organizations highlight two points of view, the first sees the organization as an open system that develops knowledge [4]–[6]; the second poses the organization as a system open to

Information but closed to knowledge, since this is generated inside firm by the proper interpretation of reality [7]–[9].

For this work, the knowledge-based Organization is defined as an organization which incorporates knowledge as a fundamental part of its processes, captures information from the environment through an intelligence subsystem to incorporate it into its structure, assimilate it, and create new knowledge to optimize its processes and to generate innovations that allow it to develop competitive advantages. [10].

Competitive Intelligence is a structured process by methods that allows organizations to transform information into knowledge for their survival and thrive in the globalized economy [11]. As a result of this process, knowledge of the environment in terms of competition, customers, suppliers, technologies, products and the market in general is obtained with a high degree of certainty to predict and/or anticipate changes as a contribution to the making decisions, a key factor in creating an innovative and competitive profile [11]–[14].

In terms of measuring the impact of competitive intelligence two approaches are identified: the first and most common is associated with the justification of investing in Intelligence activities in terms mainly monetary policies [15]–[17].

Table 1
Strategies for measuring effectiveness an intelligence system

Author	*Strategies for measuring effectiveness*
Herring (1996)	– Save in time – Half cost savings – Opportunity cost – Proof of income
Sawka (2000)	– Save on unnecessary investments – Improvement of income – Optimization in the allocation of resources – Results of business (eg, customer satisfaction)
Davidson (2001)	– Inclusion of subjective measures aimed at customer satisfaction (decision maker)
Marin & Poulter (2004)	– Cost of consultants in relation to division results – Quantification of the strategic agreements in which the intelligence team has been involved in relation to the gain/loss ratio of the agreements in which it has not been.
Williams & Williams (2004)	– Culture of continuous improvement – Information analysis culture – Technical preparation – Proportion of managers using intelligence tools – Reference frequency of intelligence tools
Hou (2016)	– Operations management process (OMP) – Customer management process (CMP) – Innovation process (IP) – Product attribute (PA) – Customer satisfaction (CS) – Firm image (FI) – Human capital (HC) – Information capital (IC) – Organizational capital (OC) – Profitability (PR) – Revenue growth (RG) – Cost structure (CST) – System usage (SU)

The second approach is aimed at measuring the system to detect opportunities for improvement in the management of the Competitive Intelligence (CI) process and in this way ensure the effectiveness of the results in order to satisfy the information needs of the system users [18], [19]; Some works on measuring impact of competitive intelligence is found in [20]–[28]. The main variables identified for the evaluation and monitoring of this type of systems are presented [29]–[31]. Table 1.

3. METHODOLOGY

Three phases were developed. Starting with a comparative study of the intelligence systems of knowledge-based Organizations in Colombia, a sample of 15 institutions with research, development and innovation units, and with defined process of intelligence/technological surveillance was taken, and applied an instrument designed for this purpose. In the second phase, an institution was selected from the sample because of maturity level of its processes, procedures and management mechanisms associated to intelligence systems; the selected institution leads the Naval, Maritime and Fluvial sector in Colombia and is an important player in Latin America. The next phase is the design of the impact assessment model through the analysis of the bibliography and study of ex post evaluation models, identifying the most relevant variables and indicators for knowledge-based organizations.

4. RESULTS

A methodology is presented to answer the need to measure the impact of competitive intelligence systems in knowledge-based organizations. This methodology is structured in four analysis blocks. Figure 1.

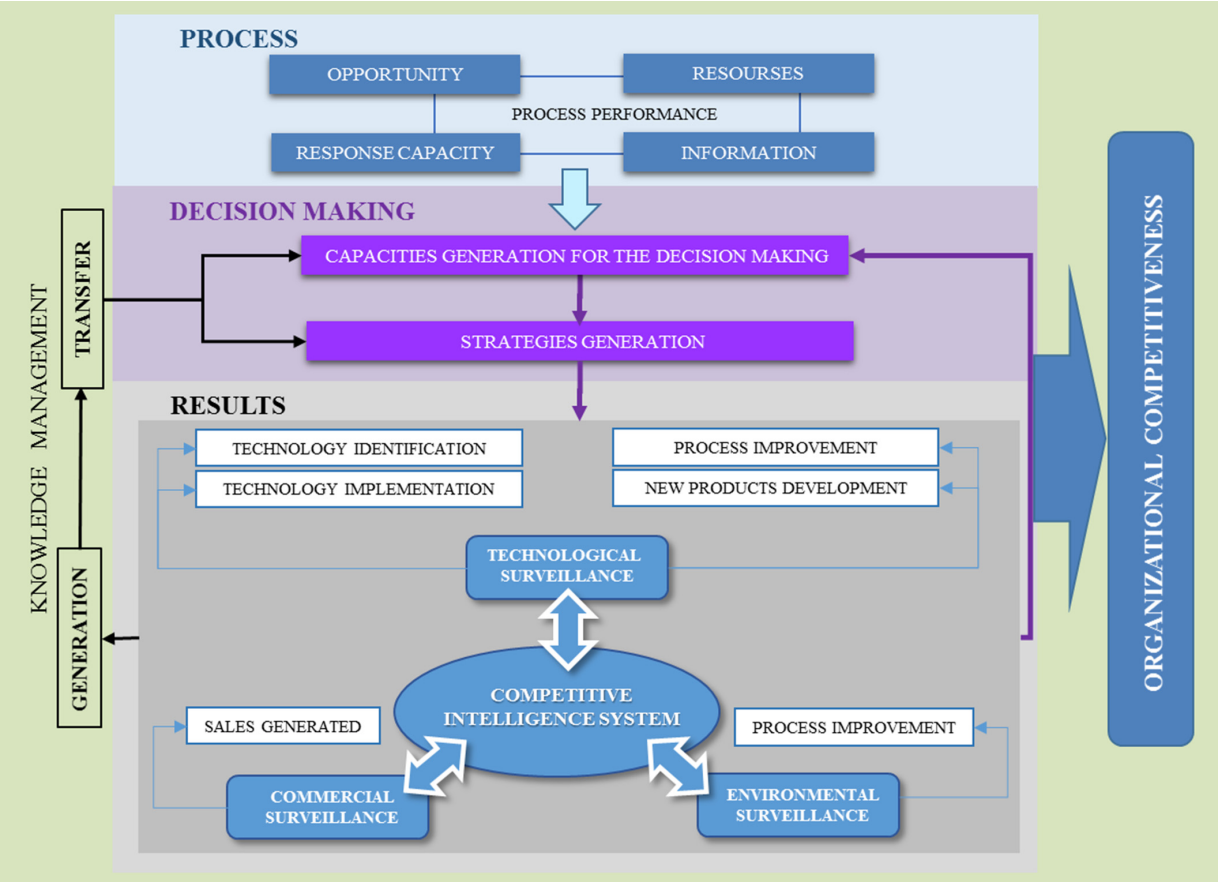

Figure 1: Methodology for measure impact of competitive intelligence systems

A. Methodology Proposed for Impact Measurement of Competitive Intelligence in Knowlwdge-based Organizations

The methodology operates according to parameters that allow the Organization to have a system of monitoring, feedback and dynamic improvement over time, associated with the improve processes performance, decision making and results of a competitive intelligence system. Proposed methodoly is conformed by 3 blocks or approaches: PROCESS, the management/performance of the system in general is verified; the approach DECISION-MAKING, evaluate the decision makers capacities and how they contribute to strategies formulation or action plans. Finally, an specifically analysis in each of the RESULTS of surveillance core, whether technological, commercial or environment is realized. The whole system is related with KNOWLEDGE MANAGEMENT, specifically to the variable of knowledge generation, where it is analyzed that both of these results have been appropriated in the organization and after both have been transferred as contribution to the generation of capacities for decision-making. To conclude, the proposed methodology as a whole improve the performance, and organization competitiveness level.

B. Understanding Variables in the Model Proposed

The variables are descripted and its measurement formula is defined. See Tables 2, 3, 4, and 5.

Table 2
Evaluation variables associated with the process approach

Approach	*Variable*	*Description*	*Measurement*
PROCESS	Opportunity	Response time from the request to the delivery of the intelligence report.	Planned Time (No. days)/Run Time (No. Days)
	Response capacity	Attention related to the number of requirements met in a period of time.	No. of requirements met/period
	Resourses	Relationship between budget and resources used by each activity.	Budgeted Resources/Budgeted Resources Used
		Compliance of the profile and Human Talent Competence for Competitive Intelligence activities.	% Compliance with the profile.
	Information	Information Quality	(1 Low, 2 Medium, 3 High)
		Information Availability	(1 Low, 2 Medium, 3 High)

Variables are measured taking into account pre-established criteria to minimizes subjectivity in the evaluation by the person in charge for DECISION-MAKING approach.

Table 3
Variables associated with decision making approach

Approach	*Variable*	*Description*	*Measurement*
DECISION MAKING	Capacity building for decision-making	Combines analysis and definition of actions and strategies.	Quality of the analysis, (1 Low, 2 Medium, 3 High) Clarity in the definition of actions/ strategies. (1 Low, 2 Medium, 3 High)
	Strategy Generation	Review coherence of the strategies with the organization, implementation time, scope and resources.	Coherence (1 Low, 2 Medium, 3 High) Range (1 Low, 2 Medium, 3 High) Time (1 Low, 2 Medium, 3 High) Resources (1 Low, 2 Medium, 3 High)

Table 4
Variables associated with results approach

Approach	*Variable*	*Description*	*Measurement*
RESULTS (Technological surveillance)	Technology identification	Results of technological surveillance activities whose scope is the exploration or identification of technologies.	No. New Technologies Identified/No. Technology Surveillance Activities
	Technology implementation	Application/adaptation of technologies in the organization processes	No. New Technologies Implemented/ No. Technology Surveillance Activities
	Process improvement	Improved processes for introduction/ application of new knowledge technologies resulting from technological surveillance activities. (times/costs)	No. Improved Processes/No. Technological Surveillance Activities
	New products development	New products generated related to results of technological surveillance activities.	No. New Products developed/No. of Technological Surveillance Activities
RESULTS (Commercial surveillance)	Sales generated	Sales invoiced related to Commercial Surveillance Activities.	Investment in activity/Sales invoiced result of the activity..
RESULTS (Enviromental surveillance)	Process improvement	Improved processes for introduction application of new knowledge resulting from intelligence activities. (times/costs)	No. of Improved Processes/No. of Activities Technological surveillance

Table 5
Variables associated with knowledge management approach

RESULTS (Knowledge Management)	Knowledge Generation	It presents the way knowledge is obtained in the organization in a systemic way, combining endogenous and exogenous factors.	(1 Low, 2 Medium, 3 High)
	Knowledge Transfer	It presents the way knowledge is transferred, appropriated, understood and replicated the intelligence results.	(1 Low, 2 Medium, 3 High)

The scale used to measure the variables related to Knowledge Management, Generation and Transfer, is done according to [29]. Tables 6 and 7.

Table 6
Measure scale for knowledge generation

Low level 1	*Medium level 2*	*High level 3*
It is possible to have knowledge about the organization's endogenous and exogenous performance, but not in a systemic vision	Knowledge about exogenous and exogenous performance of the organization is achieved but disarticulously.	It is possible to articulate endogenous and exogenous knowledge to the organization.

Table 7
Measure scale for knowledge transfer

Low level 1	*Medium level 2*	*High level 3*
The contact staff achieves the transfer of knowledge necessary to understand the methodology and strategies generated	The contact staff achieves transfer of knowledge necessary to understand the methodology and strategies generated, as well as the knowledge necessary to reformulate strategies and replicate the intelligence system in an assisted way.	The contact staff achieves the transfer of knowledge necessary to understand the methodology and strategies generated, as well as the knowledge necessary to reformulate strategies and replicate the intelligence system autonomously by the organization.

The measurement process will be carried out periodically, in the case of the variables of PROCESS, DECISION MAKING and KNOWLEDGE MANAGEMENT approaches, they will be measured in a general way about the competitive intelligence system and in the RESULTS approach, specifically on each intelligence project/activity.

5. CONCLUSION

The measurement or evaluation of the impact of competitive intelligence has gained relevance in the literature since the first decade of 2000. Two approaches to measurement are presented. From the perspective of the effectiveness of results, most agree on the difficulty of measuring the return on investment in this type of process considering that a large part of the benefits cannot be translated to costs, because many are non-financial and even intangible ones such as the improvement of the quality and the time of response. The second approach consider that its impact in the organizations could only be measured in the long term after having taken the decision and applied the action.

In this sense, it is considered that the presented methodological proposal can be implemented in the short term in any type of organization based on knowledge in an approximate time of three months, and that after six months the effectiveness of its implementation must be assessed.Aspects to take into account are validation of the results of the measurement of the process, its performance and how the results of the intelligence activities in the technological, commercial and environmental component have been used.

Similarly, projecting the transition to Business Intelligence is important to structure a plan or logical design for the convergence of the different tools of Information Technology and Communications (TIC's) from external source with the knowledge bases or internal memory of the organization, in order to optimize the information capture process within the framework of a more robust intelligence process, oriented to knowledge generation/transfer for decision making with a view to improving the performance and competitiveness of the organization.

The validation of proposal methodology in several knowledge-based organizations is arised as future work or investigation lines, in order to integrate the knowledge gained from this experience.

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