Literature Review about the Cooperation and Integration influencing Innovation

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Abstract

This paper aims to show by literature review how Cooperation and Integration act efficiently in order to promote Innovation. In this sense, the study investigates practices and tools used on improvement systems. Questions are raised about Cooperation and Integration related to strategic planning, organizational structure, standardization, benchmarking and technology resources. The methodology of the article is applied and qualitative one, exploratory bibliography techniques are used, including those related to the Supply-Chain Operations Reference (SCOR) model, a framework for evaluating and improving enterprise supply-chain performance and management. The SCOR principles and variables are used to assess Cooperation and Integration in an organizational system. The research points the Innovation as a consequence of combining Cooperation and Integration within the organizational environment, generating thus competitive advantage and allowing the processes of reflection, awareness and maturity of managers, students, academics and other stakeholders.

Keywords
Cooperation, Integration, Innovation and Competitive Advantage

1. Introduction

1.1 Context
The old organizational model based on vertical integration, autocracy, economies of scale, does not bring the required value for the differentiation of the organization today. Harrison [1] reinforces the idea of the philosophy of war, where one uses the literature that comes from the war to study business and competitiveness between them. From this perspective, the company is a battle; competitors are enemies, always governed by the rules of the governments of countries.

Porter [2] talks about the strong rivalry between competitors in a competitive scenario. Such power requires an organization to formulate an organizational strategic planning, covering an analysis of the available tools and opportunities for improvement exist, so that it excels in this harsh environment.

Kanter [3] to analyze the options and requirements for the current corporate world, points to the importance of alliances, partnerships and external collaboration in the form of networks, whose power will help businesses excellence within a competitive environment.

1.2 Problem for researching
Businesses facing an international competitive environment, analyzing the growing rivalry between the companies, surge the question: how may cooperation and integration influence an organization in an efficient manner to promote innovation?

Besides the central research problem, we try to analyze which project management processes are parts of integration, their key elements, which management practices facilitate cooperation, what project manager can do to adjust the work environment in order to produce innovation, how internal and external influences can affect the development of the project, how all stakeholders can contribute to influence positively on your organization, what problems comes up when performing partnerships with companies whose target market are the same or similar, how the integration and dissemination of all those data happens within a performed co-operation.
1.3 Objective
This work aims to show how cooperation and integration act efficiently in order to promote innovation. In this sense, we investigate what the best practices and tools are used in these processes. Cooperation and integration issues related to strategic planning, organizational structure, standardization, benchmarking, resources and technology are raised.

2 Theoretical framework

2.1 Cooperation
The study on the concept of cooperation has been exploited by various areas of knowledge, with no single theory to explain this process. However, the setting that best explains the phenomenon, when it comes to an inter-organizational system, is presented by Verschoore [4], the simple desire to join a particular group does not motivate joint action, unless there is a common goal that unites them. In the business field, cooperation appears aimed at competitive gains [5].

The consolidation of structures of cooperation network, connecting different companies through the formation of strategic alliances, involving formal and informal agreements, which allow an exchange of information and an agglutination of skills, exploration of technological and market opportunities. The concept of strategic alliances is extensive and the reasons for the formation of these alliances have been addressed by a large literature, e.g. [6-8]. The information collected corroborate the thesis that these alliances have been assembled from a strategic positioning of agents, which involves the exploitation of opportunities and adaptation to trends set within a new technological paradigm, based heavily on so-called information technology. Furthermore, the assembly of these alliances has been correlated to the increasing complexity of the R & D process, which requires increasingly agglutination skills and enhancing the exchange of information among agents involved in a technological and/or market common effort.

Britto [9] analyzes the integration logic skills, tending to favor a first step, pre-competitive arrangements that facilitate the introduction of innovations in the market and at a later stage, the assembly of stable relationships between firms, capable of boosting increased operational efficiency.

Ramirez-Rangel [10] emphasizes the state's role in promoting cooperation, with reference to the concepts of social capital, showing that the formation of inter-organizational networks often with the help of their associations and regional and local governments, institutions allow the creation of collective benefits such as training, research and development, marketing, sales and corporate acquisitions.

According with Pedrozo and Pereira [11], the majority of studies attempts to demonstrate that organizations embedded in interorganizational networks are more likely to achieve sustainable competitive advantages. Among the networks established, many of their participants are committed to obtain significant results, as demonstrated by studies of Ende [12], Wegner, Wittmann and Dotto [13] and Wittmann, Dotto and Wegner [14].

2.2 Integration
Similarly as with cooperation, many scholars have discussed and analyzed the integration as a critical factor in an organization [15-18]. While some studies have used one-dimensional operationalization [19], others have distinguished between internal and external integration [20], or just focused on interorganizational dimension of integration [21].

After the latest research on this subject [22, 23] conceptualizes the integration of supply chain as a set of three dimensions of supplier, customer and internal integration. Thus, integration of the supply chain involves both inter-organizational interface (integration between customer and suppliers) and the intra-organizational interface (internal integration) intraorganizational, that facilitate coordination and efficiency and effectiveness of information flows, material, resources and decisions, with the objective to maximize customer value [22, 24].

The integration between customers and suppliers are the dimensions of an external integration, which form the key components of integration concepts for Frohlich and Westbrook [15]. Customer integration refers to the sharing of information and collaboration activities with key customers, which provide the company strategic ideas to market
expectations and other existing opportunities [22], allowing a more efficient response and effectively to customer needs [25]. Integration with the supplier involves sharing of information and collaboration with key suppliers activities, allowing more effective planning, better design processes and transaction management [26]. In contrast, the internal integration refers to the internal enterprise collaboration and exchange of information that occurs through processes and interconnected and synchronized systems sharing activities [27].

In order to achieve a high level of integration with suppliers and customers in the supply chain, the company must have the ability and willingness to integrate with external partners [28]. The literature about the subject reveals that confidence and commitment to the relationship generate cooperation between trading partners [29, 30]. The commitment to customer-company relationship significantly influences the degree of customer integration [16]. Likewise, the ability of internal integration can also expand the role of commitment to improve external integration [23].

2.3 SCOR Model

The SCOR model (Supply Chain Operations Reference) is used to analyze a supply chain and identify opportunities to improve workflow and information. The model was created by the Supply Chain Council, in 1996 and launched in February 1997, after being tested in various industrial segments. In April 2005 the 7th version of SCOR model was presented [31].

The SCOR has a set of definitions, standards of performance and benchmarking measures that help in developing strategies to improve logistics processes and presents four relevant points [32]:

- Defining procedures for managing supply chains
- Relation of performance data related to processes
- Description of best management practices in logistics chains
- Presentation of information in the selection of programs for the supply chain management process.

Table 1: Framework for indicators of SCOR model. Source: Adapted from Guimaraes [32]

<table>
<thead>
<tr>
<th>Performance attributes</th>
<th>Definitions</th>
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<tbody>
<tr>
<td>Confidence in the distribution of supply chain</td>
<td>Distribute the right product, in place, on time, with quality and to the right customer</td>
</tr>
<tr>
<td>Flexibility of the chain</td>
<td>Quick response to market demands</td>
</tr>
<tr>
<td>Cost of chain</td>
<td>Related to the chain operation</td>
</tr>
<tr>
<td>Efficiency in resource management</td>
<td>Capability to manage facilitators of customer service</td>
</tr>
<tr>
<td>Reaction of chain</td>
<td>Speed of supplying products to the customer</td>
</tr>
<tr>
<td>Delivery performance</td>
<td>Capacity to deliver right product at the right time and place</td>
</tr>
<tr>
<td>Perfect order</td>
<td>Capacity to deliver a quality product for meeting customer needs</td>
</tr>
<tr>
<td>Response time</td>
<td>Fast response and quality of response of chain links</td>
</tr>
</tbody>
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One can summarize the SCOR model in three concepts [32]:

- Reengineering of business processes - description of the current state and future processes
- Benchmarking - Quantifying the performance of companies, and developing internal goals
- Process Improvement - Adoption of best management practices

The model evolves five business processes:

- Planning - Analyzes the whole chain, from procurement until delivery of the products
- Supply - Purchases of raw materials and logistics infrastructure
- Production - Analyzes the internal environment, product manufacturing
- Distribution - Analyzes demand management, applications and storage
- Returns - Analyzes the return of products throughout the supply chain
These five cases correspond to the first level of the SCOR model [31]. The company must meet the following levels of detail for improvements in supply chain performance [33]:

- Level I: Definitions of processes, setting performance to be achieved in relation to competition
- Level II: Configuration - defines the categories of processes to uncover inefficiencies and can assess the impact of a potential improvement
- Level III: Elements of procedures - identifies elements configured in Level II and establishes performance indicators to monitor the tasks performed during the execution of processes
- Level IV: Implementation - set to achieve competitive advantage and to adapt to changes in business conditions, focusing on the improvement of the actions

2.4 Innovation
Innovation is studied and defined by various scholars from different perspectives [34-37]. The definition that will be explored in this article is the Innovation that relates to the new applications of knowledge, ideas, methods and skills that can generate unique capabilities and leverage the competitiveness of an organization [38].

The degree of novelty can be used to distinguish the generation of innovation from its adoption [39]. The generation of innovation results in an outcome - a product, service or technology that is at least new to an organizational population. The adoption means that innovation is developed elsewhere, not in the adopting organization [40]. Existing researches on innovation in organizations often do not distinguish between generation and adoption processes, and has called both the innovation process. This approach is consistent with the influential and widely used definitions of innovation in organizations, which often include both the generation and adoption [41-44].

Empirical innovation studies have explored five types of innovation: incremental product, incremental process, radical product and radical process administrative innovation [45-49]. It is argued that investigate the various types of innovation helps professionals to focus their global innovation strategies in a particular type of innovation area and allocate resources efficiently for a specific type of innovation [50]. But innovation does not always appear on the scene as allied to the success of an organization. Rosenbusch et al. [51], for example, discussed the relationship between innovation and performance of small and medium enterprises.

Innovation is a central concept to economic growth and can be a source of sustainable competitive advantage for firms [39, 52]. According to some experts, innovation is inevitable for companies that want to grow and maintain a gain in new markets [53-56].

3. Research Methodology
It is observed, since the advent of the popularization of the Internet, enabling the provision of scientific papers from all research institutions around the world, formed a vast universe of information available, which needs to be managed, as which may be a complication in the identification of knowledge reliable quality process. According to Araujo [57], "bibliometrics, statistical and quantitative technique for measuring the rates of production and dissemination of scientific knowledge (...) appears at the beginning of XXI century, as a symptom of the need for the study and evaluation of activities production and scientific communication". Thus, bibliometrics help us select items through quantitative methods, and mapping the current discussion of the area related to the topic of our research knowledge.

Thus, the literature search performed in this study aimed to understand these issues, from the analysis of the following elements: alignment with the theme of research; selection of articles with citations; JCR Impact Factor (Journal Citation Reports) of the journal, and Half-Life. The Impact Factor JCR (Journal Citation Reports) of the journal - abbreviated as IF - is a measure that reflects the average number of citations of scientific articles published in a given journal. The IF was created by Garfield [58], founder of the Institute for Scientific Information (ISI), now part of Thomson Reuters Corporation. Since 1972 IFs are calculated annually for ISI - indexed journals and later published in the Journal of Citation Reports (JCR), also from Thomson Reuters. It is often used to evaluate the importance of a given journal in its area, and the importance is directly proportional. Journals with higher IFs are considered more important than those with a lower IF. In mathematical terms, in a given year the IF of a journal is calculated as the average number of citations of articles that were published during the previous biennium. The concept of Half-Life - refers to the age of cited articles (useful in managing collections and archiving decisions).
According to Elsevier (2013) [59], the Half-Life (Cited Half-Life) is a measure of useful life of the contents of a specific journal, or how long your content is referenced after publication. The calculation of the Half-Life of a journal J in year X, is the number of years, after which 50% of the quotes (lifetime) of the contents of J, published in X, were received.

This research began with the reading of article DURF 3 Collaboration and Integration of the Chain. This article served as the basis of inspiration for the proposed research problem. After reading the article, the TreeCloud™, aimed at lexical analysis of texts, in order to get a general overview. It is worth mentioning that this is a dynamic and iterative process, where each step analyzes may be revised, making the search process, so that it is understood and knowledge is constructed and consolidated. After copying snippets of interest based on Article TreeCloud™ tool, we removed the text tags to pages, labels, headers and footers to be analyzed. As a result of lexical analysis TreeCloud™ Figure 1, shown below was obtained.

The text of the article and its basic lexical analysis inspired the literature review on the effect of collaboration and integration influencing innovation process and competitive advantage. From the words in red in TreeCloud™ gained and the experience and collaboration of the authors, we constructed a tree of keywords that guided the search for scientific production in line with the research topic. The strategy for the construction of the keyword tree, according to Farias Filho [60], has the characteristic to help in building a decision tree that seeks to represent the research objectives in key words or key terms that unfold in horizontally and vertically, with different purposes. The depth should be ensured to the splitting of the subject area in keywords or key terms that amplify the possibilities of ensuring that the subject area is covered by several conceptual aspects. Specialization has the function of causing the subdivision should be made of several layers, in order to allow researchers a perfect command of the object you want to search. Figure 3 helps to understand this process. In search Boolean logic was used to connect using "AND" and "OR", where the words within the same subject area are connected by "OR", and thematic areas are connected by "AND", since it is desired to articles found contemplate the 3 thematic areas simultaneously, as shown in Figure 2.

![Figure 1: Lexical Analysis using TreeCloud. Source: Author](image-url)
The initial search in "Periodicos Capes" website, with 4 thematic areas returned 8,642 articles, which induced a more specific search in the thematic sub-areas, resulting in the universe of 2,054 articles. Then, all the items eliminated without quotes and citations, returned a total of 623 items. Then the articles with impact factor indexed and Half-Life in JCR were selected, reducing the universe of items to 98 works. From the returned items, aiming closer to the goals and purposes of the research, a selective reading was conducted by the authors, who obtained a final sample of 39 articles aligned with the theme of the research.

4. Cooperation and Integration influencing Innovation

One of the main opportunities of the current international business scenario is to act jointly and associated form, sharing their resources and important data, from the definition of strategies for specific operations. It is necessary to expand the networks of relationship and cooperate to keep being competitive, outlining strategies that have as main aspects flexibility and adaptability. However, it is also important to recognize that many business cooperation initiatives not fully achieve their objectives or are terminated prematurely. Not all companies choose the cooperative strategy, precisely because the process of network management is complex and poorly understood. Besides the difficulties inherent in managing an inter-organizational arrangement consisting of several companies, several current theories suggest factors that may contribute to the failure of cooperation. The lack of trust between the participants or an unfavorable relational environment, for example, may hinder the development of cooperation. Misalignment of strategic companies, difficulties in defining common goals or even opportunistic actions of some participants are limiting factors of collective action and can lead to failure of the venture. Benefits of lower costs or participants who fail to achieve the expected goals cooperation are also reasons for loss of interest in collective strategy and finalization of the collective activities [61].

Along with the benefits, integration activities may also involve setbacks such as high investment. Higher levels of integration may require investments in technologies and communication protocols expensive and safer ones. Some scholars suggest that integration can lead to a decreased potential for innovation as well as increased stiffness due to increased interdependence among organizations [62]. Thus, integration schemes developed may not be appropriate depending on the nature of the company [63] and its competitive priorities products. In general, however, researchers assume that the benefits derived from integration activities outweigh the costs, leading to higher levels of operational performance.
In an attempt to quantify the benefits of integration were created mathematical models. Featured SCOR model, because, unlike some trends that are oriented towards mathematical models for supply chain management, are geared to making decisions. The SCOR model provides a common framework, a standard and common performance measures associated with benchmarking and best practice terminology. These features make the SCOR model a reference to the service industry, although a strategy consistent with the operations of the company's business strategy for the successful implementation of the model is necessary. This must be organized to support rapid decision processes, and their management practices supported by appropriate systems, including information technology. Finally the performance measures and goals should motivate behavior that produces the expected results [31]. These anticipated results or expectations of a business in a global market, are related to the ability to identify new opportunities to reconfigure and protect technologies, skills, knowledge, goods and complementary assets in order to generate a sustainable competitive advantage [64].

5. Conclusion
Innovate and understand innovation can contribute to the excellence of administration practices [65,66], in a cyclic process, feedback, two-way, where the momentary result of an improvement becomes to improve itself by continuous practice improvement. From the point of view of managers, the main goal of innovation is the introduction of changes into the organization to create new opportunities or explore existing ones [67]. And it is through the enhancement of this capacity to change, to seek new, venturing born innovation, may be disruptive, creative, autonomous, or incremental, discrete and directed initiative, but will always be innovation.

Organizations operating under the current conditions of global competition, fast technological advances and scarce resources must innovate to grow, to be effective, and even to survive. However, it is pertinent to emphasize that the role of collaboration and integration of resources, whether material, financial, human is key, but certainly the promotion of innovation is the essence of success. From the analysis of results of the actions involving cooperation and integration within the organizational environment, the ability of manage people is crucial to achieve goals, providing competitive advantage for business. The manager must be the facilitator for this process of knowledge exchange. During this event everyone has to gain with learning experience. The parameters of SCOR model make possible the measurement, control and management of this process and the coordinating tasks applied on innovation promotion and implementation.
To meet the research objectives and the questions posed therein, practices and tools that related cooperation and integration to innovation were investigated. This research allowed us to approach the SCOR model as a mathematical measurement model of collaboration and integration and its effects. Certainly, the research developed in this article does not exhaust the subject and that the amplitude and the various dimensions of the issue are subject to further investigations. Thus, among several possible possibilities, we suggest future work as a case study involving quantitative investigations on the influence or importance of collaboration and integration for innovation. Such studies are justified because to promote innovation represents a major challenge for business executives and an area where academic research can make contributions.

References


57. Garfield, Eugene. "Citation analysis as a tool in journal evaluation." American Association for the Advancement of Science, 1972.