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Information and Communication Technology as a Key Strategy for Efficient Supply Chain Management in Manufacturing SMEs

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Abstract

Proper Supply Chain Management (SCM) has proven essential for the competitiveness of organizations, since it ensures the effectiveness of supplies, and the proper coordination with suppliers, intermediaries and market needs. The use of Information and Communication Technology (ICT) in the SCM has proven to have a positive impact in companies that have implemented it, particularly in relation to procurement, since this enhances collaboration, improving the quality of information shared between suppliers and buyers [1]. This paper aims to analyze the relationship between ICT, strategies and SCM. In order to do this, a survey was conducted among managers in 288 manufacturing SMEs in Aguascalientes. Data was analyzed using structural equation, EQ software support, as well as through linear regression models with SPSS software support. The importance of this work is that in the analyzed region (Aguascalientes) there have been few studies about the manufacturing industry, especially in aspects related to factors that influence productivity and hence competitiveness. The study of the SCM and the strategies followed by this industry explains the economic growth of the region in recent years, its improvement in infrastructure, and a substantial increase in jobs; and, above all, it accounts for almost all exports. This study is therefore essential, particularly for SMEs which, in spite of being the most dynamic subsector in the industry, are still having the most challenging problems in terms of how they are organized, how they link with other sectors and in terms of general efficiency. The results show that, indeed, the strategies and ICT have an impact on the performance of the SCM. The use of ICT facilitates the handling of information resources (materials) and the avoidance of delays, which results not only in cost reductions but also in an increase in client compliance [2-3]; and thus it fosters the overall competitiveness of the organization.

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1. Introduction

Small and medium enterprises (SMEs) in the manufacturing industry require the implementation of strategies that allow them to make decisions that influence the process of obtaining results that are consistent with the objectives designed by managers [4-5]. Porter [6] has argued that an appropriate strategy is important for the development of SMEs, which makes it necessary for the businessmen to focus on assessing the specific needs of manufacturing SMEs and thus align their strategies [7- 9].

The increasing integration of information and communication technology (ICT) has led to favorable results in terms of goal accomplishment either generally or specifically in the functional areas of organizations [10-11]. The implementation of ICT in businesses such as manufacturing SMEs should be integrated in dynamic areas, such as the management of the supply chain [12], as this allows for better controls in the management of material resources, avoiding delays in production and thus enhancing compliance with customers [10 y 13]. This raises several research questions: Does the integration of strategies allow for a better usage in the adoption of information and communication technology? Does a greater integration of information and communication technology improve the supply chain management in manufacturing SMEs?

2. Literature Review

2.1 Strategies and Supply Chain

Regarding the analysis of strategies, Ansoff [14] considers that the operational expressions within the administrative system define the operational criteria on which specific programs could be implemented in companies; and, once implemented, to introduce the idea that every company has a common thread between performed actions and achieving the objectives for which it was created. Likewise, Mintzberg [15] states that the strategy is not only a notion of how to deal with competitors in a specific market, but also a way to reconcile the principles of the organization with the desired purposes within a uniform collective perception that may seek the development of competitive advantage or the organization's survival.

According to Bantek and Osborn [16], although there is plenty of literature that discusses the typology of strategies, few studies relate strategy to the performance of operational activities in companies. In this regard, it is important that the integrated strategies in the operational activities of the company are appropriate for the natural activity of organizations [14, 17], and thus it is important to identify the organization's natural operational characteristics. [6 and 9].

The identification of strategy types leads to understanding the answer given by companies often faced with administrative problems [33-35] and therefore it also allows us to distinguish companies by the type of strategy used [9]. Some researchers such as Snow and Hrebiniak [36] pointed out that organizations classified as explorers, analyzers or defensive, are more likely to succeed, while companies classified as reactive are usually unable to react to the demands of the environment and thus they usually get a lower performance compared to companies that are not reactive [33, 37- 38]. Meanwhile, Hambrick [39] argues that in defensive and explorer companies, their performance depends heavily on the nature of their environment, and defensive companies perform better than explorer companies. On the other hand, explorer companies usually have a better performance than defensive ones in terms of gain market share.

2.2 Information and Communication Technology in Supply Chain Management.

Currently, the supply of material resources is influenced by different factors [18]. One of them is the implementation of ICT strategies; according to Rose, Singh and Rose [19] this should be tactical and applied primarily by segment. Over the last years, companies such as manufacturing SMEs that have integrated the usage of computer systems in their business operating activities, have benefited greatly from information management and from the decision making that the businessman has to do constantly in order to improve organizational development [20], and these benefits are reflected mainly in relation to procurement, having better collaboration and specific support agreements with the purpose of avoiding delays in the delivery of material resources [10 and 21].

For manufacturing SMEs, proper adoption of ICT will enable the SCM to have a reliable management

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