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# Information technology adoption and assimilation: Focus on the suppliers portal

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ABSTRACT

This study aims to analyse the relationship of assimilation of suppliers portal, integration of supply chain and performance. The understanding of effect magnitude (direct or indirect) whose variables related to assimilation of IT have on the integration of supply chain and value creation for organizations may represent an important contribution to the development of management practices that enable the creation of a work environment that is receptive to the effective use of a new information system. The method applied for research was quantitative being conducted a survey with 95 suppliers of a company in the automotive segment was carried out. The results indicated that the technological factor and environment had greater effects on assimilation of the collaborative platform. Another important result is that the constructs analysed in the research explain 46.7% of the variation of assimilating the collaborative platform.



## 1. Introduction

Research on the use of IT in supply chain management has found different results. Inconsistent results arise because the factors relevant for the successful implementation of supply chain management through IT are still not well understood, as discussed by Russell et al. [1], Chan et al. [2], Liu et al. [3] and Mendoza et al. [4] and Garcia and Grabot [5].

One of the factors that accounts for the impact on performance is related to the adoption and assimilation of information technology, as mentioned by Mu et al. [6]. Thus, to investigate the relationship of technology assimilation capacity in the organizational context with performance becomes an important element of the quest to understand the results and to contribute to the competitiveness of organizations. According to Mu et al. [6], to assimilate enterprise technologies requires broad adaptation, both of technology and organization. A significant proportion of companies cannot accomplish this adaptation mentioned above; therefore, many of the benefits are not achieved through the adoption of different corporate systems, as discussed by Carr [7]. Also according to Mu et al. [6], although there have been studies suggesting that IT managers can influence assimilation through their actions, it is unclear which practices and structures can be implemented to facilitate the assimilation of enterprise platforms. Saraf et al. [8] also emphasized the need to understand the dimensions involved in information technology assimilation processes for value creation. Discussion of the assimilation of technologies for the pursuit of the supply chain management closes the gap in research acknowledged by Russell et al. [1], Chan et al. [2], Sodero et al. [9], and Mendoza and Ravichandran [10], who mentioned the need for studies that broaden the discussion of the adoption of IT tools focused on supply chain management. Mendoza et al. [4] reinforced that there is a need for studies on the adoption of supplier portals and the integration of the chain because, despite the potential benefits of the platforms based on the management of supply chains, the related literature has suggested a number of challenges to successful adoption, which must be explained and understood. Garcia and Grabot [5] argued that Web portals are increasingly used to facilitate this relationship, but the consequences of their implementation for real cases have still seldom been analysed.

Based on this context of assimilation, three research questions were formulated as drivers of this study.

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(1) Which factors drive the assimilation of suppliers' portals?
(2) What is the impact of the assimilation of suppliers' portals on supply chain integration?
(3) What is the impact of the assimilation of suppliers' portals on the achievement of benefits?

Considering these research questions, the general objective of this study is to analyse the relationships of assimilation of suppliers' portals, integration of supply chain and performance, identifying the factors that can drive the assimilation of suppliers' portals and their effects on the integration of supply chains and obtained benefits. The method used to study the development was quantitative, conducted with 95 providers from a company in the car parts industry.

By addressing these three issues, our study theoretically develops a comprehensive research model explaining assimilation, supply chain integration and the benefits achieved through the adoption of suppliers' portals.

## 2. Theory

Regarding suppliers' portals, the reasons why they do not reach their full utilization despite several academic studies suggesting their great benefits have been the subject of research by several authors. Each author has worked on different approaches, such as Mendoza et al. [4], who discussed the issue of the redesign of processes; other authors, such as Russell [1], address relational aspects (e.g., reliability). Among the discussions, one of the factors is related to IT assimilation.

### 2.1. IT assimilation

The assimilation of technology can be defined by the extent to which the use of technology spreads across organizational processes and becomes routinized in activities (Purvis et al.) [11]. Gallivan [12] reported that IT assimilation can be set according to the extent and depth of use in an organizational process. The assimilative capacity of a technology depends on the purchase or absorption of information by a company, as well as the company's ability to exploit it (Cohen et al.) [13]. The assimilation of information technology can be defined under a multidimensional perspective that involves the following (Kouki et al.) [14]:

- Acceptance or rejection by the user;
- The institutionalization and diffusion of the system in the company's business processes; and
- Support for operational control and management and monitoring of business strategies.

Raymond et al. [15] and Xu et al. [16] stated that IT adoption and assimilation in an organization are determined by numerous factors that can be placed into one of three categories of TOE (Technology, Organization and Environment) proposed by Tornatzky and Fleischer [17]. The TOE framework as originally presented and later adapted in studies of IT adoption provides a convenient analytical framework that can be used to study the adoption and assimilation of different types of IT innovation (Oliveira and Martins) [18].

Technological factors describe the characteristics of the technological environment, which can influence the spread of systems in an organization. These features include various dimensions of technology due to the advantage to the quality of the system's information, which increases the spread of information technology in the organization. Organizational factors refer to the scope, resources and size of the organization, and the environment dimension refers to the context in which the company develops its industry, competitors and government relations (Tornatzky and Fleischer) [17].

In addition, other theories such as DOI (Rogers) [19] have emerged in the context of the adoption of new technologies. Based on DOI theory, innovation is related to variables such as individual characteristics (leadership), structural features of internal organization and the external characteristics of the organization. Most empirical studies have been derived from the DOI theory and TOE framework. Because the framework includes the TOE environmental context (not included in the DOI theory), it is better able to explain intra-enterprise adoption of innovation.

The authors Zmud and Cooper [20] proposed a six-phase model to discuss the assimilation of technology, as shown below.

1. Introduction: The company decides to implement a technology because it finds a relationship between an innovation and its application in the organization.
2. Adoption: The company invests in assets for the adoption of new technologies
3. Adaptation: The company undertakes the implementation and maintenance of an IT application
4. Acceptance: Acceptance consists of the user's engagement regarding the use of an IT application
5. Routinization: The use of technological innovation is seen as a normal activity, so it is incorporated into the company's routine.
6. Infusion: Increased organizational effectiveness is obtained by applying IT in a more comprehensive and integrated manner to support aspects of organizational processes.

The relevant point of the model is the idea that, to create value through the use of IT, the organization should reach the level of infusion. Hsieh and Zmud [21] noted that, through infusion, the introduction of technology to business processes and learning can lead to innovative use of IT.

According to Bajwa et al. [22], the gap between the initial implementation of IT and its generalized use can compromise performance; i.e., it can be widely adopted (accessible to a large number of final users in the organization) but partially used without an impact on the results, which is an important point that organizations must understand to act to minimize this gap assimilation.

Other authors, such as Huber et al. [23], Chan and Chong [24], Rao and Rahul De [25], Angeles [26] and Hossain et al. [27], have conducted research adopting the TOE framework to analyse the assimilation of technologies in the context of supply chains for retail and manufacturing companies. Saldanha et al. [28] performed a study in which they began from the institutional perspective in working on the theme of assimilation of technologies for supply chains in emerging markets (conducted in India).

Iacovou et al. [29] analysed interorganizational systems (IOS) and the characteristics that influence the adoption of this type of IT tool. The proposed model is based on three factors: the perceived benefits, organizational preparation and external pressure. Compared to the TOE framework, the aforementioned authors added to the TOE model external pressure as a critical factor in the adoption of inter-organizational systems. This addition is important for this study because suppliers' portals have inter-organizational characteristics, which generate many specifics. Specifically for the development of this research, the TOE [17] perspective was adopted according to Iacovou et al. [29] to define the variables tested in the field.

### 2.2. Supply chain integration and information technology

Internal and external integration from the perspective of IT seeks interoperability between systems, which is an important