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Model for the development of innovation as a dynamic capability for an organization in the furniture industry

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Abstract

Innovation plays a key role in achieving and maintaining a competitive advantage. However, in order for innovation to be able to address rapid changes in the environment, it must be developed as a dynamic capability, i.e., it must enable the integration and reconfiguration of resources and capabilities to this effect. Consequently, this study approaches innovation by proposing a model for its development as a dynamic capability for an organization in the furniture industry in the city of Barranquilla. This perspective of dynamic capabilities explains how competitive advantages are achieved in a rapidly changing environment, and it also characterizes the organizational factors that promote its development.

Keywords: Innovation, dynamic capability, furniture.

1. Introduction

An axiom among managers and academics is that the current economic environment in which organizations operate is subject to constant and rapid change. This implies that companies that wish to remain and stand out in their

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industry must develop practices that contribute to responding or adapting to the dynamics of their environment. Based on the premise that in today's highly changing world competitive advantages are achieved through permanent innovation, this article will address innovation in a furniture factory using the dynamic capabilities approach, as this theory explains how such advantages ae achieved in rapidly changing environments.

According to [1], the dynamic capabilities approach holds that the capabilities that favor the adaptation and development of companies are associated with a given set of criteria that explain their value and scarcity, arising from the heterogenous nature of companies and their imperfect mobility. At the same time, such capabilities are non-substitutable, difficult to imitate and non-transferable [2].

Based on the above, this study propose a model for the development of innovation based on dynamic capabilities, in a manner that enables responding to a changing environment by developing the capability to change itself repeatedly and rapidly, in order to continue creating value, and transforming business processes in order to achieve a more competitive, nimble and effective organization [3]. However, there are very few studies on the conditions that promote innovation in the household furniture industry, particularly in the case of wood furniture. Basically, the studies available [4,5] are exploratory and descriptive, aimed at providing a general characterization of the industry, and do not explore the key organizational capabilities and factors that enable innovation. This study will therefore assist the selected organization in understanding the factors that promote the development of innovation capabilities, to enable the organization to make deliberate, systematic and recurrent decisions that lead to the development of new processes, business models, products or services that add value to the organization [6].

2. Methods

This study is of an exploratory and descriptive nature [7]. It also explains the behavior of the dependent and independent variables and their possible relations. The study's target population is an organization in the furniture industry, from which a sample was taken involving all senior management and some middle managers. The study's methodology involves the use of the following statistical techniques: A survey of senior managers, middle managers and operators at the studied organization. The questionnaire has 46 items measured on a Likert scale [8]. The questionnaire items were validated by research and innovation experts. The methodology consists of 3 statistical analyses: calculation of the Cronbach alpha, exploratory factor analysis (EFA) and confirmatory factor analysis (CFA). The studied population is an organization based in the city of Barranquilla that markets and provides financing to acquire furniture in Colombia. It has stores and financing service centers in the main cities of the Caribbean region, Antioquia, Santander, and Cundinamarca, and is a leader in all the cities in which it operates, driven by an inclusive model and the strategic value of innovation.

3. Results

3.1 Reliability and preliminary assessment for exploratory factor analysis (EFA).

The first step of the methodological analysis was to perform tests in the SPSS statistical package, firstly to measure the reliability of the questionnaire, and secondly to determine whether the instrument is suitable for performing exploratory factor analysis (EFA). The reliability of the instrument was statistically measured using the Cronbach alpha, the result of which applied to the total sample of 93 employees was 0.976. The second step of the preliminary analysis is to determine whether the questionnaire is suitable for application of exploratory factor analysis. This is achieved by calculating the statistics of the Kaiser-Meyer-Olkin (KMO) rule and the Bartlett sphericity test, applied in accordance with [9]. The result of the Kaiser-Meyer-Olkin (KMO) statistic was .907, which means that it is highly suitable for performing exploratory factor analysis (EFA). The result of the Bartlett sphericity test was a Sig. (p-value) of 0.000, which implies that we reject the null hypothesis that the variables are not correlated, i.e., it is feasible to perform exploratory factor analysis (EFA). The purpose of this analysis is to reduce the complexity of a large number of variables by grouping them into a smaller number of sets called factors. The process is based on grouping items that are strongly correlated with each other, and whose correlations with other factors are low. In other words, each factor groups together the inter-correlated items that are also relatively independent from the other sets or factors [10]. Through extraction, a total of 7 components or retained common factors was obtained with self-values greater than 1. In the exploratory factor analysis (EFA), the first component has a self-value of 22.854 and it explains 49.682% of the variance of the variables. The second component explains 5.154% of the variance, the third component explains

4.189%, the fourth explains 3.942%, the fifth explains 3.574%, the sixth 2.851% and the last factor explains 2.463%. The 7 components or factors explain 71.854% of the explained variance. Based on the components matrix produced by the exploratory factor analysis (EFA) and their factor loadings, the Varimax rotation technique was applied with Kaiser normalization. Following this statistical process, confirmatory factor analysis was performed.

3.3 Confirmatory factor analysis (CFA)

In order to overcome the limitations of EFA for the effects of the principal components method, confirmatory factor analysis (CFA) was performed. For CFA, the SPSS program was used again to calculate the Kaiser-Meyer-Olkin (KMO) rule and the Bartlett sphericity test. The KMO was once again excellent, with a score of 0.907, and the Bartlett sphericity test once again rejected the null hypothesis with Sig. of 0.000. When the commonalities were applied to extract the principal components by means of analysis, we found that the 7 extracted components remain, because they all have a self-value greater than 1 (see table 1). Using SPSS, in order to obtain a better interpretation of the components, the Varimax orthogonal rotation technique was applied with Kaiser normalization. The components are displayed in table 1, which indicates the name of the factors, the variables that form part of each factor, and the factor loading.

Table *1*. Confirmatory factor analysis (CFA), total explained variance.

	Square			Rotation sums of charges squared		
Component	Total	Variance	Accumulated	Total	Variance	Accumulated
1	22,854	49,682	49,682	7,938	17,257	17,257
2	2,371	5,154	54,835	6,607	14,363	31,620
3	1,927	4,189	59,024	6,487	14,101	45,722
4	1,814	3,942	62,967	3,907	8,493	54,214
5	1,644	3,574	66,541	3,586	7,796	62,010
6	1,311	2,851	69,391	2,706	5,882	67,892
7	1,133	2,463	71,854	1,823	3,962	71,854

3.4 Interpretation of the factors and their component variables

The purpose of this section is to indicate the variables that were included under each of the 7 factors and their consistency with the theory, i.e., the one-dimensional nature of the resulting factors:

Component 1: Absorption capacity

Table 2 displays the variables that comprise the absorption capacity component and their factor loadings.

Table 2. Absorption capacity

Variable	Factorial Load	Variable	Factorial Load
5	,680	**3**	,583
46	,642	**9**	,582
19	,636	**18**	,550
6	,632	**48**	,549
30	,612	**23**	,539
4	,593	**28**	,530

The absorption component is comprised by 12 items, of which the item is the highest loading factor is item 5, which is the organization's capacity to identify opportunities and threats in the environment, in line with what is described by [11]. The second variable (item 46) of this factor is monitoring of current and potential competitors. The third variable (item 19) is the organization's capacity to incorporate new human, financial and technological resources in order to develop innovations; even though in chapter two this component was grouped under capacity for integration, the arguments made by [12] on absorption imply having the capacity to integrate external knowledge into organizational innovation processes, and human resources are the repository of knowledge, and [11] holds that this capacity involves the selection of new internal technologies and ratifies the importance of carrying out R&D. The fourth variable (item 6) measures the capacity to identify target market segments and the fifth variable measures creative thinking (item 30). The latter item is of vital importance for the absorption strategy and because of its

innovative nature, given that an organization cannot achieve differentiation factors if it is based on a standard thinking environment. The sixth variable (item 4) of this factor is the assimilation of the key success factors of the environment that produce changes in the furniture industry; the seventh (item 3) consists in constantly monitoring the environment with the purpose of finding opportunities to make innovations in products, services and processes. The eighth variable (item 9) is the organization's capacity to constantly incorporate new technologies for the effects of innovation. The ninth variable (item 18) is on the promotion of spaces for dialog among the organization's employees on decision-making involving innovation decisions on new products, services and processes. The tenth variable (item 48) is that the absorption capacity must take into consideration global technology trends in order to detect opportunities and threats, i.e., technologies must not only be identified, but the organization must be proactive in searching for the drivers in this regard in order to generate in one way or another a sequence of technology selection and integration that is not excessively costly, given the ever-shortening useful life of existing technology and considering the organization's long-term needs [13]. The eleventh variable (item 23) refers to experimenting with new knowledge to develop innovations in products, services and processes, i.e., its application for commercial purposes; and lastly variable twelve (item 28), which is making use of strategic partnerships with suppliers to develop innovations in the organization, marketing, products, services and processes, given that the acquisition of new knowledge is a reason for seeking to establish inter-organizational relationships of mutual collaboration [14].

Component 2: Organizational factors.

Table 3. Organizational factors

Variable	Factorial Load
40	,755
33	,723
41	,680
43	,626
45	,570
34	,537
25	,529

The organizational factors component includes transformation leadership expressed as empowerment (item 40), and a management style that promotes innovation (item 41), cross-cutting communications (item 33) in the organization and the definition of specific strategies to develop each type of innovation (item 43). It also includes motivation expressed as economic incentives to increase productivity and employee commitment to innovation processes (item 45), the creation of vital environments for innovation activities (item 34), and lastly that the organization also knows how to utilize its customers' creativity in order to produce innovations in goods and services (item 25).

Component 3: Organizational learning capacity

Table 4. Organizational learning capacity

Variable	Factorial Load
21	,751
22	,702
15	,692
14	,653
16	,627
20	,606

The third component is organizational learning, defined as the third learning competency or type, after individual and group learning, in which the company develops internal capabilities to create and disseminate knowledge within the organization [11]. The first two variables (items 21 and 22) are on whether the organization allocates resources to research and development, as well as the ability to make additions whenever it wishes to quickly address new market requirements; in other words, in order to learn, resources must be available for research [15,16]. This component also includes the development of knowledge management plans (item 15) and the acceptance of risk in learning processes (item 14), the development of an organizational learning model (item 16), and the organization's ability to develop and integrate new capabilities for innovation (item 20); in other words, the organization learns faster when it has the capacity to unlearn and learn new skills.

Component 4: Relational capacity

Table 5. Relational capacity

Variable	Factorial Load
26	,755
24	,735
7	,539

The fourth component, relational capacity, is comprised by 3 items: the first (item 26) is that the organization has agreements with higher education institutions for training and research in the framework of its industry. The second is that the organization has agreements with specialized research centers, and the third variable (item 7) is that these strategic interactions with research centers are productive in terms of developing new products, processes and services [17].

Component 5: Inter-organizational learning capacity

Table 6. Inter-organizational learning capacity.

Variable	Factorial Load
27	,676
37	,586
29	,566
47	,523

Its first variable is item 27, which is the participation in clusters; even though in the model's theoretical framework it was placed under the relational capacity component, the confirmatory factor analysis (CFA) indicated that the organization's interaction with a cluster is different in nature from entering into agreements with research and higher education institutes, because belonging to a cluster provides a propitious environment for the constant flow of knowledge between the cluster's members. The second variable is item 37, on the creation of learning groups with suppliers in order to develop innovations in products, processes, marketing and the organization; The third variable (item 29) of this component is having and creating spaces for interaction between members of the business units to generate ideas and develop proposals of value for the organization. This finding suggests that the flow of knowledge and information between an organization's strategic business units is important for the dynamics of the innovation model. And lastly, variable 47 is working with consultants and specialized agencies to analyze macroeconomic trends and detect opportunities and threats in the environment.

Component 6: Knowledge sharing spaces (BA)

Table 7. Knowledge sharing spaces

Variable	Factorial Load
38	,602
36	,586
12	,585

The sixth component has three items, the first of which (item 38), is that the organization creates spaces where employees can share knowledge to develop organizational, marketing, product and process innovations; the second is promoting the creation of organizational learning groups to share knowledge (item 36), and the third is to carry out learning processes based on experimentation in order to generate innovations (item 12), which requires promoting the spaces to develop and validate pilot tests.

Component 7: Learning from trial and error

The seventh component consists in the organization's capacity to learn from trial and error (Variable 13) had a 0,849 factorial load. Experimentation processes imply that organizations must permanently assess the final results of the applied knowledge; this means that it is not enough to introduce an innovation, but that it must be continuously improved, taking into considerations the errors and faults made during its creation.

4. Conclusions

Through the statistical analysis of the initial proposal to develop innovation as a dynamic capability, by means of exploratory and confirmatory factor analysis the final proposal or adjusted model was developed, thereby fulfilling the general objective of this study, which is to propose a model for the development of innovation as a dynamic capability at an organization in the city of Barranquilla. The model also enabled us to characterize the dynamic capabilities that contribute to the development of innovation, such as absorption capacity, finding that it has more explanatory power on the development of innovation as a dynamic capability. Within this capability, it was found that creative thinking is one of this component's variables. Creative thinking is of vital importance in the absorption strategy, and because of its innovative nature, given that an organization cannot achieve differentiated outcomes if it is based solely on standard thinking in the environment.

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