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Determining the mediating effect of innovation on the relation between absorptive capacitive and business performance

Determinación del efecto mediador de la innovación entre la absorción del conocimiento y el desempeño empresarial

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Abstract

Objective: To analyze the mediating effect of innovation on the relation between absorptive capacitive and business performance in manufacturing companies in the dairy sector of the Colombian Caribbean, contributing to the development of the industry from a dynamic capabilities approach. **Method:** The research employed a positivist approach, an explanatory scope, and non-experimental transactional design. For the analysis, data were collected from 75 companies, and partial least squares structural equation modeling was used for analysis. **Results:** Innovative capacity positively mediated the relation between absorptive capacity and business performance. When opportunities are identified in the market, organizations reconfigure their capacities to seize them. They manage cooperation links (internal and external), adjust (disruptively) the degree of innovation (of products, processes, marketing, and administrative), and balance their potential and realized absorption capacity. This approach enables them to anticipate market demands, obtaining superior performance. However, the trajectory set forth by the seminal authors of dynamic capabilities should be corrected: organizations first sense and then reconfigure to seize. The sequence of sensing, seizing, and then reconfiguring is not logical. **Conclusions:** Cooperative relations facilitate the reconfiguration of resources and capacities, aligning disruptive innovation (knowledge frontier) with market demands.
Keywords: Business performance; Dynamic capabilities; Innovation; Knowledge absorption.
JEL Classification: M10, M11, O14, C38

Resumen

Objetivo: Analizar el efecto mediador de la innovación en la relación entre la absorción del conocimiento y el desempeño empresarial en las empresas manufactureras del sector lácteo, para contribuir desde el enfoque de las capacidades dinámicas con el desarrollo de la industria. **Método:** La investigación fue de enfoque positivista, explicativo y no experimental transeccional. Para el análisis se obtuvo respuesta de 75 empresas y se utilizó la modelación con ecuaciones estructurales. **Resultados:** Se encontró que la capacidad innovativa media positivamente la relación entre la capacidad absortiva y el desempeño empresarial. Cuando se detectan oportunidades en el mercado, las organizaciones reconfiguran sus capacidades para aprovecharlas, en ese sentido, gestionan vínculos de cooperación (interna y externa), ajustan (disruptivamente) el grado de innovación (de productos, procesos, marketing y administrativo), y equilibran su capacidad de absorción potencial y realizada, lo cual les permite anticiparse a las exigencias del mercado, obteniendo un desempeño superior. Sin embargo, se sugiere corregir la trayectoria planteada por los autores seminales de capacidades dinámicas, las organizaciones primero detectan, y luego reconfiguran para aprovechar. No es lógico detectar, aprovechar y luego reconfigurar. **Conclusiones:** Los vínculos relacionales de cooperación facilitan la reconfiguración de recursos y capacidades, y el emparejamiento de la innovación disruptiva (frontera conocimiento), con las exigencias del mercado.
Palabras clave: Absorción del conocimiento, Capacidades dinámicas; Desempeño empresarial, Innovación.
Clasificación JEL: M10, M11, O14, C38

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Introduction

According to the Ministry of Agriculture and Rural Development, the dairy sector in Colombia plays a key role in the country's economic development. It contributes to food security, poverty reduction, and regional development, generating more than 700,000 jobs in the production chain (Minagricultura, 2022, Resolution 00160). The National Administrative Department of Statistics (DANE, 2021) stated that the dairy industry contributes 1.4% to the GDP of the manufacturing sector. Thus, the country has to overcome the existing disparities compared with international benchmarks such as those set by the United States, New Zealand, and the European Union (Minagriculture, 2022, Resolution 00160).

Authors such as Valderrama et al. (2022) noted that although the consumption of dairy products increased from 140 liters of milk per capita to 152 liters between 2013 and 2022, there is still an 18-liter shortfall to reach the consumption level recommended by the Food and Agriculture Organization (FAO) of the United Nations. In addition, the demand for food significantly increased during the pandemic, resulting in higher consumer prices, especially in the dairy sector, which saw a 37% rise by the end of 2022. (Minagricultura, 2022, Resolution 00160).

Moreover, the Organization for Economic Cooperation and Development and the Food and Agriculture Organization (OECD/FAO, 2022) noted in their global projections that "in 2021, the FAO dairy price index rose by 17%, with increases across all dairy products" (p. 224). Therefore, the latest consumption figures reveal a scenario marked by uncertainty and volatility (Federación Colombiana de Ganaderos, Fedegan, 2023), despite the fact that the impact of COVID-19 on the dairy chain was classified as moderate (OECD/FAO 2022).

According to Minagricultura (2022), consumers are increasingly demanding differentiated dairy products with better specifications; however, supply is still limited. The consumption of processed dairy products is relatively low compared to that in Europe, where consumption is split between 55 to 60% of milk and 40 to 45% of processed dairy products. In Colombia, milk consumption represents 92% of the total consumption, while processed dairy products only represent 8%. In this regard, DANE (2021) mentioned that the industrial dairy sector has seen some growth in dairy production and exports; however, industrial productivity, as well as production scale, is well below that of developed countries (Minagricultura, 2022, Resolution 00160).

The Agricultural Rural Planning Unit (UPRA, in the Spanish acronym) (2020) stated that increasing efficiency and lowering the costs of milk production requires technologies, automation, robotics, and personnel training. The government's goal is to improve R&D indicators, knowledge transfer, and technology

in the dairy sector to increase productivity and competitiveness within 20 years. However, the Colombian dairy sector continues to register low levels of associativity, dispersion, and atomization; low level of product diversification; technological lag; poor knowledge and technology transfer; low productivity; high-production costs; insufficient transformation and processing capacity; and informality in marketing. Addressing these issues requires management to create strategies that may consolidate the sector in domestic and external markets (Minagricultura, 2022; Consejo Nacional de Política Económica, CONPES, 2017).

Ever since Forés and Camisón (2011) first correlated internal learning capacity, absorptive capacity (ACQ), innovation capacity, and business performance, several studies have addressed the topic from different approaches and variables. Yet, there is still insufficient clarity in this field of knowledge (Arcidiacono et al., 2022; Pangarso et al., 2020; Popescu et al., 2019; Telles et al., 2022). It is important to mention the contribution of dynamic capabilities (DCs) in the context of resource-based valuation (RBV), where sustainable competitive advantage is derived from the valuable, rare, inimitable, and irreplaceable resources and capabilities that a company controls and with which it can develop its strategy (Barney, 1991). The dairy sector could close its gaps and improve its business performance if it focused its efforts from the perspective of DC.

In this scenario, DCs are becoming increasingly important in the managerial arena. According to Helfat et al. (2007), they "are defined as an organization's ability to deliberately create, extend, or modify its resource base" (p. 4). "They represent the environmental focus of an organization on continuously integrating, reconfiguring, renewing, and regenerating resources and capabilities in response to changing environments to maintain competitive advantage" (Wang & Ahmed, 2007, p. 35). As suggested by the seminal authors of DCs, "they have the ability to sense, seize, and reconfigure a company's (intangible and tangible) assets" (Teece, 2007, p. 1,341). A recent (qualitative) study mentions that "When organizations develop DC, they adjust and reconfigure resources and capabilities to meet the demands of the environment" (Cadrazco-Parra et al., 2020, p. 325).

With this in mind, the premise of this research work is that DCs contribute to the strengthening of business performance, given that, according to Teece (2007, (pp. 1,319-1,320), they are "difficult to imitate and are required to adapt to changing customers and new technological opportunities."

After mentioning the benefits of seminal DCs, the study variables are defined. Absorptive capacity is the ability to appropriately absorb external business knowledge and transform it into valuable business insight. (Božič & Dimovski, 2019). According to Zahra and George (2002), "absorptive capacity can impact both from being potential (AsbPot) and achieved (AbsRea), through the creation and maintenance of competitive advantage" (p. 185). Yaseen et al. (2020) mentioned that the process of re-converting capabilities to

leverage knowledge for commercial purposes is facilitated by the insights previously accumulated and assimilated by the organization through the learning process.

Moreover, Camisón-Haba et al. (2019) defined "innovation as the ability to create new value for current or new markets" (p. 163). Along these lines, Müller et al. (2021) mentioned that "technological innovations often lead to transforming the business models of incumbents. This forces them to incorporate new external knowledge into internal activities" (p. 333). Therefore, if no change is made in the analysis of how innovation is mediating the relation between knowledge absorption and business performance among dairy manufacturing firms in the Colombian Caribbean, some firms could lose ground to the competition or even disappear.

Given the problem situation, the following question was posed: Do technological, administrative, and marketing innovations positively (significantly) mediate the relation between knowledge absorptive capacity and firm performance?

The research employed a quantitative approach, explanatory scope, and non-experimental transactional design to determine how technological innovation mediates the relation between absorptive capacity and business performance. The variables involved were AbsPot (absorption and assimilation), AbsRea (transformation and exploitation), innovation capacity (technological, administrative, and marketing), and business performance. Given the difficulty of extracting a response from a large sample size, we used the benefits of the SmartPLS software to work with structural equation models with small sample sizes. In addition, most companies in the dairy sector lack databases or indicators associated with DCs, which made it difficult to carry out a longitudinal study.

The scope of the study, from the DC approach, requires management to commit to the development of strategy in highly competitive environments and strive to achieve competitive advantage. This involves anticipating new market demands based on the ability to innovate. The theme is justified by the expansion of the definition of technological innovation and the introduction of marketing and administrative innovation (OECD, 2006). The background evidences new possibilities for value creation based on marketing, human talent, and administrative DCs, particularly by providing support in the management of collaborative relationships, coordination, and integration (both internally and externally) that help to match market innovation with technological innovation (Božič & Dimovski, 2019; Bruni & Verona, 2009; Camisón-Haba et al., 2019; Huijun et al., 2021; Pavlou & El Sawy, 2011). The tension created by the requirement to adapt to market demands and disruptive innovation triggers the (administrative) need to coordinate and integrate AbsPot and AbsRea's contribution to value creation.

The evidence indicates that the technological level, production scale, and productivity linked to the absorptive and innovative capacity of companies in emerging economies are underdeveloped compared to those in specialized industries in the sector (Cuervo-Cazurra & Rui, 2017; Khan et al., 2019; Minagricultura, 2022, Resolution 00160). This is the case of the dairy chain in Colombia, where companies have a different knowledge accumulation process, which is poorer than that of companies in developed countries. The business size of micro, small, and medium-sized companies, coupled with a lack of vertical and horizontal integration, influence the low technological level of the sector, with the exception of a few large companies (Minagricultura, 2022).

The relevance of this study for emerging economies, the industry, and the dairy chain, in particular, lies in its contribution to management theory by addressing gaps in the sector. Academia plays a key role in technological development, knowledge conveyance, and R&D+i. This research found that innovation capacity positively mediates the relation between absorptive capacity and business performance. The theoretical contribution suggests that a correction should be made in the path proposed by the seminal authors of DC, clarifying that organizations should first identify and then reconfigure to leverage. Based on the DC approach, it was found that organizations, through their marketing function, constantly monitor and explore the market, identify opportunities (usually product innovation needs), and reconfigure their resources and capabilities to take advantage of them. In this sense, identifying, reconfiguring, and exploiting involves the management of collaborative, coordination, and integration relationships (internally and externally) to align innovative capacity (product, process, marketing, and management) with the market needs, leveraging potential and realized absorptive capacity.

The relationship ties of collaboration, coordination, and integration are the central connecting elements that reconfigure resources and capabilities, aligning externally and internally acquired knowledge—such as disruptive innovations in processing, production, marketing, and management—with the knowledge frontier, thereby achieving a sustainable competitive advantage. This integrates the aforementioned dynamic capabilities and, especially, knowledge absorption capacity, according to the management's role as a creator of value.

Theoretical Background

Relationship between knowledge absorption, innovation, and performance - (Hypothesis)

Knowledge Absorption

In hypercompetitive business sectors, companies need to adapt to the scenario's dynamism to achieve

or maintain their competitive advantage (Miroshnychenko et al., 2021; Senivongse et al., 2019). In this regard, Cohen and Levinthal (1990), the pioneers of the concept of "absorptive capacity," defined it as "the ability of a company to acknowledge the value of new external knowledge, assimilate it, and apply it for business purposes, which is essential for developing innovative capabilities" (p. 128). Ambidextrous innovation strategies (Mahmood & Mubarik, 2020; Müller et al., 2021) help create and exploit new knowledge, develop the flexibility to change, and compete in dynamic markets (Zahra & George, 2002).

Thus, potential knowledge absorption capability (AbsPot), the acquisition and assimilation of external knowledge, is related to the incorporation and understanding of information from external sources. The achieved absorption capacity (AbsRea) refers to the ability of a company to develop previously acquired and assimilated knowledge from external sources (Zahra & George, 2002). AbsPot and AbsRea are considered value-creating features a business model should possess (Amit & Zott, 2001).

Authors like Foss and Saebi (2017) defined business model innovation, as "well-designed, innovative, and non-trivial changes to the key elements of an organization and/or the architecture that binds those elements together." (p. 216). In the absorptive capacity, this innovation occurs by combining internal learning and knowledge and external knowledge (Božič & Dimovski, 2019; Müller et al., 2021).

The aforementioned underlies the concept of DC as "a company's ability to integrate, build, and reconfigure internal and external competencies to rapidly address changing environments" (Teece et al., 1997, p. 516). This includes the ability to sense, which is understood as the constant scanning, searching, and exploring of technologies and markets (Teece, 2007).

Table 1 presents the four processes of absorptive capacity: acquisition, assimilation, transformation, and exploitation. The first two are grouped in AbsPot, and the last two are grouped in AbsRea (Zahra & George, 2002).

Table 1. *Knowledge Absorption (ABS)*

Item	**Potential Absorption Capacity (AbsPot)** Acquisition
AD1	Level at which management shows a trend toward reactivity rather than proactivity by monitoring, recognizing, and taking advantage of the possibilities offered by the environment (management orientation toward external knowledge acquisition).
AD2	Frequency and relevance of collaborating with research and development institutions as partners or sponsors for generating knowledge and fostering innovation (R&D cooperation).
AD3	A company's ongoing ability to obtain relevant and up-to-date information and knowledge on present and future competitors (competitor knowledge).
AD4	A company's ability to create programs focused on internal technological skills development in R&D, as well as in its suppliers and customers (effectiveness in the acquisition of technological know-how).
Item	Assimilation
AS1	The company gains advantages by incorporating key concepts, essential business knowledge, and technologies successfully, which are used by other companies in the same sector, through industrial benchmarking.
AS2	A company's technological assimilation capacity is defined as its ability to effectively integrate and accept the latest beneficial technologies and innovations.
AS3	A company's ability to take advantage of the knowledge, experience, and skills of its employees in the process of assimilating new knowledge.
AS4	The level of participation of a company's employees in scientific and academic conferences, as well as visits from other company's investigators, indicates the interaction and cooperation level in research activities.
AS5	Level of employee participation in training courses (formal and informal assimilation).
AS6	Ability of the organization to implement knowledge management programs to ensure that employees can thoroughly understand technological knowledge from other companies.
Item	**Achieved Absorptive Capacity (AbsRea)** Transformation
TR1	A company's ability to take advantage of information technology to improve the flow of information, foster knowledge exchange, and facilitate interaction among employees.
TR2	The level of restriction that the company imposes on workers to voluntarily share scientific and technological knowledge they have acquired.
TR3	A company's ability to adjust the technology developed by third parties to its specific requirements.
TR4	A company's understanding of its capabilities to innovate, especially in relation to vital technological knowledge, and its ability to dismiss useless internal knowledge, thus encouraging the search for innovative alternatives.
TR5	A company's ability to manage and unify all stages of the R&D process, as well as its interactions with engineering, production, and marketing operations.
Item	Exploitation
EX1	Level of implementation of the knowledge and experience gained in the field of technology and organization in the company's strategy, which enables it to sustain its position as a sector leader.
EX2	A company's ability to take advantage of new knowledge in the work environment to quickly adjust to changes in the context.
EX3	A company's ability to use technological knowhow to create patents for products and processes.
EX4	A company's ability to adjust to market or competitor demands rather than seek innovation as a means to obtain a competitive advantage by expanding its portfolio of new products, capabilities, and technological ideas.

(Zahra & George, 2002).

In the context of emerging countries, suppliers' absorptive capacity is essential for driving exploratory and exploitative innovation. However, the propensity for learning facilitates AbsRea and, in conjunction with AbsPot, drives innovation (Khan et al., 2019). An extension of the theory of absorptive capacity found evidence of how different dimensions of it can generate multiple benefits for firms that cooperate [collaborate and manage relationships] with each other (Huijun et al., 2021).

In this regard, Ferreras-Méndez et al. (2019) mentioned that absorptive capacity is crucial for leveraging external knowledge in the international context. They stated that a company's orientation toward collaboration with industrial and non-industrial partners and its focus on innovation can facilitate business performance, provided that an effective level of absorptive capacity has been developed in response to market dynamics. This is important because progressive or radical innovations, which are subject to the creative destruction proposed by Schumpeter (Burlamaqui & Kattel, 2018), and referred to as disruptive innovations, progress rapidly. Consequently, organizations must keep up with change (Tzokas et al., 2015).

In sum, the ability to relate is an important promoter of dynamic capabilities (Singh et al., 2022). Božič and Dimovski (2019) clarified that "internal human, technological, and relational resources seem to be the necessary prerequisites for the process of knowledge transformation" (p. 94). Resources aimed at improving farm performance and management are estimated to increase production (OECD/FAO, 2022). However, current research does not yet provide clear evidence of the role of AbsPot and AbsRea in the development of cooperative innovation (De Oliveira & Da Silva, 2020).

Innovation

Innovation capacity is considered an expression of internal learning capacity and absorptive capacity (Winter, 2003; Zahra & George, 2002). Accordingly, innovation is understood as the capacity to create novel ideas and knowledge with the aim of obtaining business benefits. This entails ongoing improvement in both product offer (product innovation) and the methods used to create and deliver such an offer (process innovation) (Guerrero-Sánchez, 2021; Rush et al., 2007; Smith et al., 2005).

The constructs related to technological innovation (Table 2), administrative innovation (Table 3), and marketing innovation (Table 4) are presented below.

Table 2. Technological Innovation

Item	Description
IT1	The company has introduced a great number of new products and services
IT2	Numerous new production or service delivery processes have been initiated
IT3	The company has entered into a lot of new markets
IT4	A large number of new raw materials have been introduced
IT5	The relative rate of introduction of new innovations in the organization has grown rapidly
IT6	Compared with its competitors, our company has become much more innovative

Source: Adaptation from García-Morales et al. (2008); Gutiérrez et al. (2010); Lloréns-Montes et al., 2005).

Table 3. Administrative Innovation

Item	Description
IA1	A large number of new information flow mechanisms have been introduced
IA2	A lot of new organizational structures or redesigns have been initiated
IA3	A great number of new standards, procedures, or policies have been initiated
IA4	A large number of new management methods have been introduced

Source: Adaptation from Gutiérrez et al. (2010); Lloréns-Montes et al., 2005).

Table 4. Marketing Innovation

Item	Description
IM1	Product differentiation due to its design
IM2	Product distribution
IM3	Advertising, promotion, and public relations for the product
IM4	Pricing policies

Source: Adaptation from Camisón and Villar (2011).

Given that innovation extends beyond products and processes, the concept of innovation has been broadened. This is based on the assumption that innovation also involves changes in the way marketing strategies are developed. Therefore, in line with the study of Camisón and Villar (2011), a scale of four indicators was adapted to the previous scales to measure innovation in marketing (Table 4).

Marketing innovation refers to the application of novel approaches to marketing strategies, which involve major changes in product design or packaging, product placement in the market, promotional techniques, or product pricing (OECD, 2006). It encompasses significant changes in product design, such as its shape and appearance without affecting its functionality, as well as changes in packaging. It focuses on the introduction of new sales channels for product placement. Furthermore, it involves the use of new concepts in the promotion of goods and services. Finally, pricing innovations refer to the use of novel strategies to market a company's products or services (Camisón & Villar, 2011).

The ability to acquire new knowledge benefits marketing innovation. Feedback from the market and its implementation are key to developing new marketing strategies and improving results. Accordingly, AbsPot is essential to absorb information for innovation success in the market (Guerrero-Sánchez, 2021). The adaptation of the absorptive capacity through innovation in products, processes, and marketing creates an awareness on the part of senior managers of the importance of monitoring the environment. This approach enables resources to be reallocated, opportunities to be identified, and value to be created in existing or new markets, in addition to fostering collaboration with specialized organizations to acquire technology and skills (Camisón-Haba et al., 2019).

Performance

According to some experts, knowledge absorptive capacity is described as an ongoing exchange process that yields economic benefits from relationships with strategic partners. These benefits or income arise from the effective cooperation with industrial partners and other companies (Ferreras-Méndez et al., 2019; Huijun et al., 2021). One of the most prevalent practices in recent research on performance measurement in the strategy literature is the practice of measuring performance against key competitors. (Steensma and Corley, 2000).

In addition, a large body of literature has demonstrated the validity of using objective and subjective measurements to determine a company's performance. Objective measurements include profitability on sales, assets, and capital. Subjective measurements include a company's market share, job satisfaction, and ability to acquire, transfer, and use new knowledge (García-Morales et al., 2007, 2008; Homburg et al., 1999; Dess & Robinson, 1984). Some authors have claimed that superior performance can be considered as an indirect result of dynamic capabilities (Zahra et al., 2006). The constructs related to entrepreneurial performance are presented below (Table 5).

Table 5. Business Performance

Item	Description
D1	The profitability of the company measured as profit on assets.
D2	The profitability of the company measured as the profit on own resources.
D3	The profitability of the company measured as the profit on sales.
D4	The company's market share in its main products and markets.
D5	The level of employee satisfaction (salary satisfaction).
D6	The ability to acquire, transmit, and use the new knowledge learned.

Source: García-Morales et al. (2007, 2008); Homburg et al. (1999); Dess and Robinson (1984).

Hypotheses

Knowledge absorptive capacity has been associated with innovation and business performance. This entails an analysis based on the disaggregation of the dimensions of absorptive capacity (Ahmed et al., 2020; Camisón & Villar-López, 2010, Chatterjee et al., 2022; Kale et al, 2019; Zahra & George, 2002). Some authors have argued that after the acquisition of information, the use dimension, which includes the assimilation, transformation, and exploitation of information, positively impacts business performance (Kale et al., 2019). Ahmed et al. (2020) claimed that AbsCap does not seem to have a significant relation with business performance, while AbsRea positively mediates the relation between the elements of intellectual capital and business performance.

Other authors have indicated that business model innovation specifically depends on potential absorptive capacity. Companies prioritize the acquisition and assimilation of knowledge over the transformation and exploitation of knowledge (Miroshnychenko et al., 2021).

Considering the aforementioned narrative, the following hypothesis are proposed:

H_1: A significant direct relation exists between knowledge absorption and business performance.

To associate the DCs of innovation and knowledge absorption, some authors have associated the variability level in innovations with absorptive capacity; thus, an increase or decrease in innovation produces the requirement to adjust absorptive capacity accordingly. If innovation increases, absorptive capacity must also increase to adjust to the dynamism of the environment and maintain competitiveness. By contrast, if the level of innovation decreases, absorptive capacity must also decrease (Forés & Camison, 2008; Warner, 2003).

In emerging or developing countries, the role of inter- and intra-organizational learning in supporting innovation helps managers incorporate AbsPot training programs that enhance employees' ability to recognize and apply valuable external knowledge for business purposes and develop AbsRea marketing capabilities. Immersing in state policy development government support, explicitly targeting new product commercialization and marketing innovation, plays a vital role in the successful commercialization of innovation and business performance (Medase & Barraza, 2019).

H_2: A significant indirect relation exists among knowledge absorption, innovation, and business performance.

Cooperation is an important factor to develop absorptive capacity and innovation (Khan et al., 2019; Medase & Barraza, 2019; Zahra & George, 2002). Thus, the business size and knowledge and innovation levels play a key role (Forés & Camisón, 2016). However, problems in the relation are more pronounced in the case of emerging countries (Medase & Barraza, 2019). In the process of cooperative innovation, the ability to absorb knowledge is an important factor affecting the outcome of innovation. Depending on the type of cooperation, companies can develop their absorptive capacity and innovations to a greater or a lesser extent (Yang et al., 2023).

H_3: The effect of knowledge absorption on business performance is positively mediated by innovation capabilities.

Method

The study employed a quantitative, non-experimental, and transactional research design, with an explanatory scope. The research, based on the positivist model, proved the establishment of causal relations among absorptive capacity, innovation, and business performance. Specifically, it determined the mediating role of innovation in the relation between knowledge absorption and business performance. For the data analysis and processing, a structural equation modeling using the partial least squares method (PLS-SEM) and the SmartPLS software were used (Ringle, et al., 2022).

The study population comprised 504 manufacturing companies in the dairy sector in the Colombian Caribbean, classified as ISIC 1040 for dairy product production. The selection of the sample was made on the basis of a requirement of a minimum of 5 years of experience in management positions in the sector. This criterion implied a higher level of objectivity in the responses to the questionnaire, thus facilitating its application and reducing statistical bias.

The sample size was determined based on the recommendations of authors such as Cohen (1988) and Erdfelder et al. (2009), considering the required significance (α = 5%), statistical power (1-β = 80%), and the effect size of the population (f^2 = 0,15, mean). Additionally, the benefits of PLS-SEM for working with small samples were considered (Cohen, 1992; Hair et al., 2014; Ringle et al., 2022). Given that the LV model includes a maximum number of two predictors pointing to a construct, a minimum sample size of 68 companies was determined. However, an effective response was obtained from 75 companies. The calculations were performed using G*Power 3.1.9 software (Erdfelder et al., 2009).

Instruments to measure variables for hypothesis testing

To collect the data, the questionnaire was sent by email. Follow-up visits and telephone calls were made to obtain responses. Before sending the email, a test was conducted with six (6) companies in the sector. It was also validated with experts, which allowed necessary adjustments to be made to the questionnaire. The fieldwork was conducted between 2017 and 2019. The inclusion criteria for answering the questionnaire involved people at management level with at least five (5) years of experience in companies within the sector. Responses were obtained from managers at 75 companies, categorized as follows: 11% were large companies (>200 employees), 5% were medium-sized companies (51-200 employees), 31% were small (11-50 employees), and 53% were microenterprises (<10 workers).

Several scales were selected and adapted to develop the instruments. The approach to absorptive capacity was based on the scale proposed by Zahra and George (2002), comprising four

activities: acquisition, assimilation, transformation, and exploitation. The first two are classified as AbsPot and the other two as AbsRea.

For measuring innovation, the study utilized the constructs of Gutiérrez et al. (2010) and Llorens et al. (2005), which originally comprised eight items divided into two groups: technological innovation, with four indicators related to product, process, raw material, and market innovation, and administrative innovation, with four other indicators related to information management, organizational configuration, regulatory aspects and policies, and new management methods. Two additional indicators from the study of García-Morales et al. (2007) were adapted to the technological innovation scale. These additional indicators measure the relative rate of introducing innovations and the level of innovation compared with competitors, which is crucial given the differences in the size of the companies in the sector.

In addition to technological and administrative innovation, marketing innovation was added, considering that innovation is not only present in products, processes, and administrative management but also involves innovation in marketing strategies. According to Camison and Villar (2011), four indicators were adapted to measure marketing innovation.

To measure business performance, the study adapted the scale from the study of García-Morales et al. (2007), (2008); Homburg et al. (1999); Dess and Robinson (1984), incorporating six (6) indicators (divided into three objective and three subjective measures). The objective measures included profitability on sales, return on assets, and the return on equity. The subjective measures included the company's market share, job satisfaction, and the ability to acquire, convey, and use new knowledge.

All constructs were measured using latent constructs assessed through a Likert-type questionnaire with a 1 to 7 scale. This scale comprised (previously coded) measurable and statistically observable indicators based on managerial perception, with 1 indicating "totally disagree" (minimum score) and 7 indicating "totally agree" (maximum score). To ensure the validity and reliability of the measurement model, including the constructs of absorptive capacity, innovation, and performance, feedback was obtained from three experts in the first stage.

The content quality of the questionnaires was checked, and the individual factor loadings were filtered, thus ensuring the reliability of the constructs. The Fornell and Larcker (1981) criterion was applied to verify convergent validity. In the second stage, or assessment of the structural model, Cronbach's Alpha internal consistency and composite reliability (CC) were verified. Finally, to prove discriminant validity (DV) of the SEM, the Chin (1998) criterion of cross loading was applied, in addition to the Fornell and Larcker (1981) criterion.

PLS-SEM Partial Least Squares Method

The method used for the structural analysis and hypothesis verification was PLS-SEM, for which the SmartPLS software and the bootstrapping procedure were used. A higher-order construct (HOC), specifically, a second-order model, was developed using the two-station method and the repeated indicator approximation method in PLS-SEM (Lohmöller, 1989).

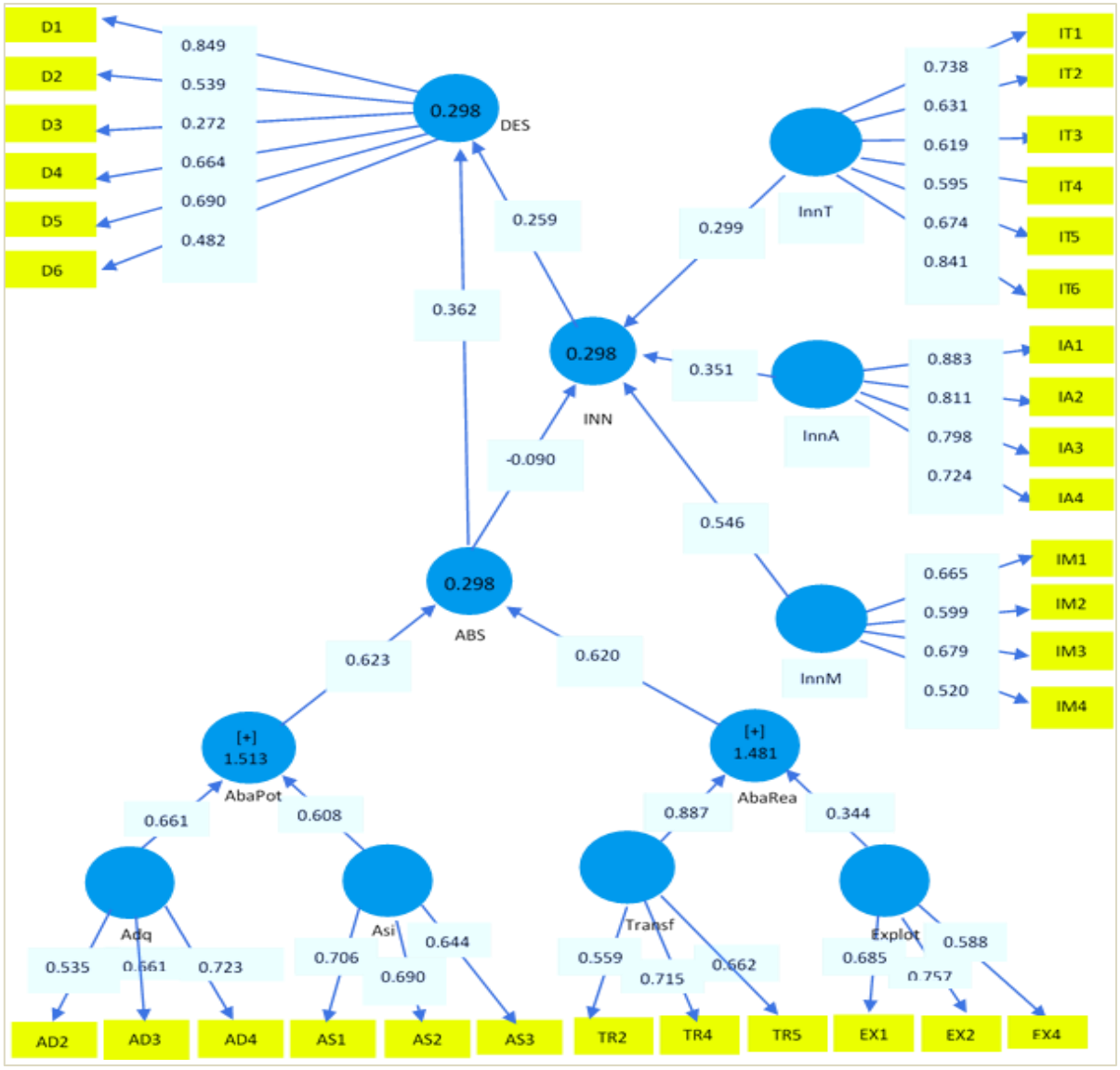
Results

Mediating effect of innovation on the relation between knowledge absorption and business performance

When the PLS algorithm was run, the measurement model provided values for the correlations between the observed variables (OV) and latent variables (LV), the R^2 values, and the linear regression path coefficients between LV pairs. Variables with lower factor loadings, such as AD1, AS4, AS5, TR1, TR3, and EX4, which affected model quality were excluded. A construct was designed to test the relation between knowledge absorption and business performance, in addition to the positive mediating role of innovation capacity. LV scores were first calculated through the two-station approximation (Henseler & Chin, 2010).

In the first stage, the repeated indicator approach was used to obtain the LV scores for lower-order constructs (LOC). In the second stage, these were explicit variables in the model or HOC (Hair et al., 2014). Subsequently, the quality characteristics of the data were verified, for which the PLS and bootstrapping algorithm was run as many times as necessary. In the first runs of the PLS algorithm, loadings of the measured variables were obtained for analysis and debugging. Figure 1 indicates the loadings of the measurement model.

Figure 1. Knowledge Absorption SEM - Innovation - Performance ABS_INN_DES (displaced)



Note: In Figure 1, it can be seen that AD1, AS4, AS5, TR1, TR3, EX4, and AS6 are displaced, and it is found that the reliability and validity indicators of the construct do not worsen.

After running the PLS algorithm and obtaining the measurement model, the factor loadings obtained were reviewed to verify individual reliability. To ensure the reliability of the latent construct, variables with external loadings less than 0.4 and those with loadings between 0.4 and less than 0.7 that affected the model fit were displaced. Only variables whose elimination did not increase CR or the average variance extracted (AVE), were retained (Hair et al., 2022). It is observed that all factor loadings were above 0.4, except for D3.

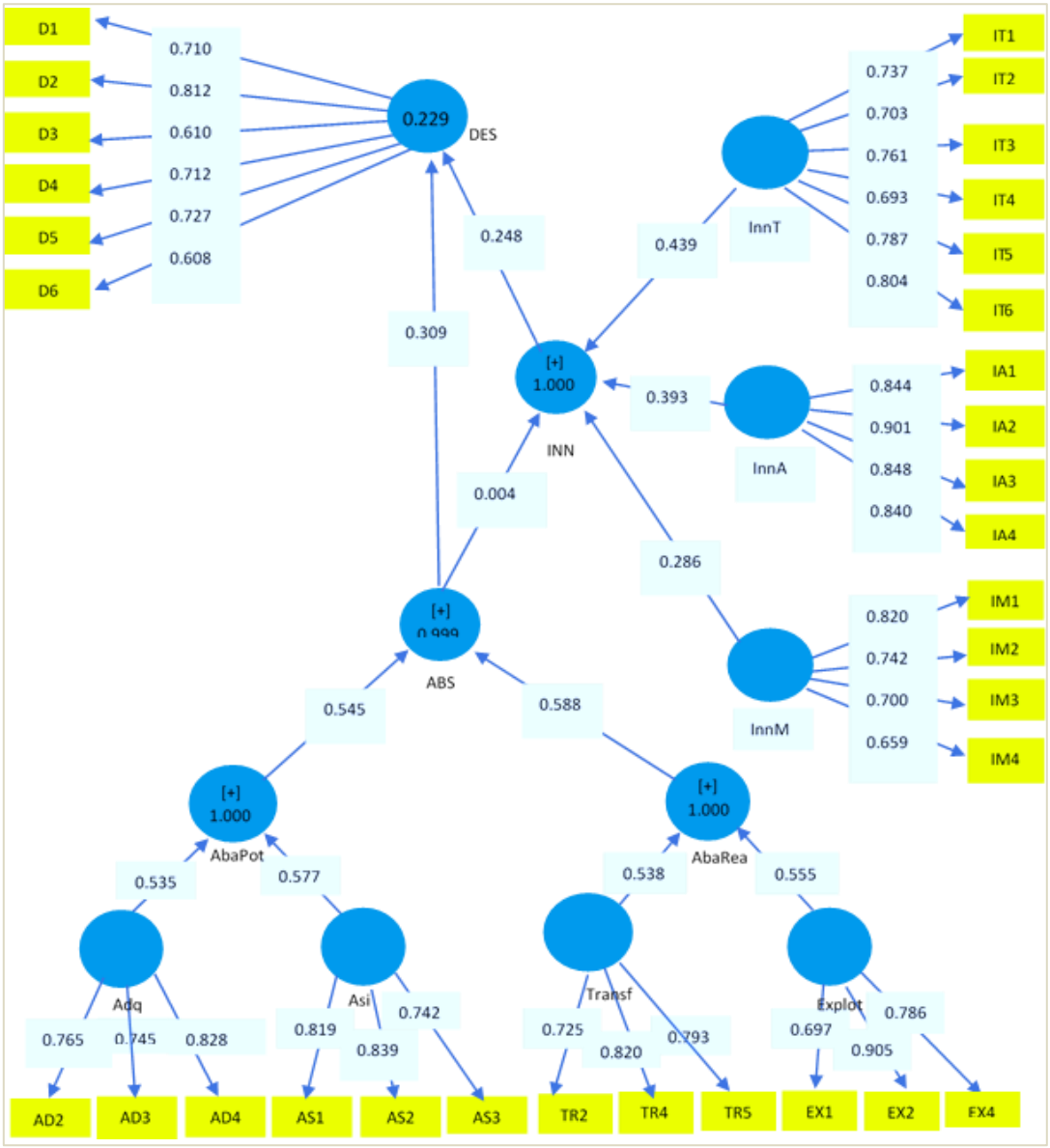
Table 6. Loads Obtained from the PLS Model

	ABS	AbsPot	AbsRea	Adq	Asi	DES	Exploit	INN	InnA	InnM	InnT	Transf
AD2				0.535								
AD2		0.537										
AD2	0.470											
AD3				0.661								
AD3		0.627										
AD3	0.578											
AD4				0.723								
AD4		0.689										
AD4	0.636											
AS1					0.706							
AS1		0.685										
AS1	0.624											
AS2					0.690							
AS2		0.661										
AS2	0.596											
AS3					0.644							
AS3		0.618										
AS3	0.579											
D1						0.849						
D2						0.539						
D3						0.272						
D4						0.664						
D5						0.690						
D6						0.482						
EX1							0.685					
EX1			0.658									
EX1	0.614											
EX2							0.757					
EX2			0.723									
EX2	0.649											
EX3							0.588					
EX3			0.547									
EX3	0.484											
IA1									0.883			
IA1								0.847				
IA2									0.811			
IA2								0.787				
IA3									0.798			
IA3								0.741				
IA4									0.724			
IA4								0.667				
IM1										0.665		
IM1								0.645				
IM2										0.599		
IM2								0.629				
IM3										0.679		
IM3								0.701				
IM4								0.558				
IM4										0.520		
IT1											0.738	
IT1								0.655				
IT2											0.631	
IT2								0.583				
IT3											0.619	
IT3								0.520				
IT4											0.595	
IT4								0.475				
IT5											0.674	
IT5								0.542				
IT6											0.841	
IT6								0.770				
TR2												0.559
TR2			0.553									
TR2	0.491											
TR4												0.715
TR4			0.732									
TR4	0.671											
TR5												0.662
TR5			0.679									
TR5	0.635											

Note: In Table 6, it can be seen that all factor loadings are above 0.4, except for D3, which is kept to guarantee the content validity of the construct.

While it is necessary to ensure that all constructs have been validly measured, it is not necessary to interpret the path coefficients at this point (Figure 2).

Figure 2. SEM to Obtain the Scores of the Latent Variables (Obtained Through PLS)



Note: The only purpose of station 1 is to obtain the LV scores for station 2 (Hair et al., 2014). The figure shows the LV scores, which will be used in station 2.

Next, model fit analysis was performed in two steps: First, the measurement model was evaluated, and then its adjustments, the path model, were evaluated (Götz et al., 2009; Henseler, et al., 2009).

Convergent Validity

To ensure convergent validity (CV), the Fornell and Larcker (1981) criterion was applied. This involved verifying that the AVE for each construct met the criterion of AVE > 0.50. All constructs met this threshold, except for the DES performance, which had an AVE of 0.49. This value is considered acceptable as it is very close to the threshold of 0.50 (Fornell & Larcker, 1981; Henseler et al., 2009).

The second stage, after ensuring CV, was to observe the values of internal consistency (Cronbach's Alpha) and CR. For the calculation, the minimum threshold of 0.7 was used based on the study by Hair et al. (2014). All indicators exceeded the threshold, with the exception of acquisition (Adq) 0.678 and assimilation (Asi) 0.679. These were retained, as eliminating them did not significantly contribute to an improvement in the reliability and construct validity indicators or in the AVE (Table 7).

Internal Consistency (Cronbach's Alpha) and Composite Reliability

The second stage involved observing the values of a) internal consistency (Cronbach's Alpha (CA)), b) CR, and c) (ρ - Dillon-Goldstein rho). CA values above 0.60 and 0.70 are considered adequate in exploratory research and values of 0.70 and 0.90 for CR are deemed satisfactory (Hair et al., 2014).

Table 7 indicates that the values of AC and CR are satisfactory. CA and CR values were above 0.7, except for acquisition (adq) with a CA value of 0.678 and transformation (transf) with a CA value of 0.679, which are considered adequate as per the criteria of Hair et al. (2014).

Table 7. Reliability and Construct Validity (All External Loads Included)

	Cronbach's Alpha (CA)	rho_A	Composite Reliability (CR)	Average variance extracted (AVE)
Adq	0.678	0.684	0.823	0.608
Asi	0.719	0.724	0.843	0.641
DES	0.795	0.803	0.851	0.490
Exploit	0.713	0.742	0.841	0.641
InnA	0.881	0.881	0.918	0.737
InnM	0.711	0.726	0.821	0.536
InnT	0.842	0.846	0.884	0.560
Transf	0.679	0.686	0.823	0.609

Note: All indicators exceeded the pertaining threshold, except for acquisition (Adq), which was 0.678 and assimilation (Asi), which was 0.679. AVE > 0.50. Cronbach's alpha AC > 0.7. Composite Reliability CR > 0.7.

Discriminant Validity

The third stage was the evaluation of the DV of the SEM. DV ensures that the constructs or LVs are independent of each other (Hair et al., 2014). There are two ways: a) The criterion proposed by Chin (1998), as in (Table 8).

Table 8. Values of the Cross-loadings of the Observed Variables (OV) and the Latent Variables (LV)

	ABS	AbsPot	AbsRea	Adq	Asi	DES	Exploit	InnA	InnM	InnT	Transf
AD2	0.492	0.624	0.275	0.765	0.377	0.067	0.226	0.172	0.127	0.146	0.273
AD3	0.606	0.691	0.400	0.745	0.507	0.070	0.339	0.153	0.172	0.237	0.387
AD4	0.676	0.760	0.442	0.828	0.548	0.225	0.426	0.332	0.248	0.310	0.373
AS1	0.659	0.763	0.418	0.545	0.819	0.148	0.310	0.251	0.343	0.314	0.452
AS2	0.637	0.743	0.387	0.485	0.839	0.283	0.276	0.361	0.250	0.308	0.432
AS3	0.629	0.671	0.429	0.450	0.742	0.360	0.398	0.344	0.289	0.285	0.383
D1	0.424	0.350	0.387	0.229	0.392	0.710	0.388	0.202	0.255	0.132	0.321
D2	0.247	0.029	0.392	0.006	0.045	0.812	0.387	0.214	0.319	0.049	0.337
D3	0.133	0.048	0.188	0.042	0.045	0.610	0.153	0.134	0.172	0.106	0.198
D4	0.321	0.233	0.326	0.236	0.184	0.712	0.361	0.308	0.250	0.263	0.230
D5	0.320	0.209	0.344	0.105	0.264	0.727	0.340	0.404	0.403	0.286	0.289
D6	0.221	0.141	0.238	-0.046	0.287	0.608	0.264	0.281	0.308	0.164	0.177
EX1	0.664	0.500	0.650	0.465	0.432	0.237	0.697	0.370	0.345	0.323	0.476
EX2	0.708	0.382	0.853	0.338	0.347	0.442	0.905	0.323	0.423	0.215	0.656
EX3	0.537	0.249	0.683	0.247	0.203	0.440	0.786	0.348	0.386	0.175	0.468
IA1	0.463	0.367	0.438	0.229	0.423	0.476	0.446	0.844	0.577	0.608	0.354
IA2	0.437	0.328	0.430	0.241	0.345	0.357	0.433	0.901	0.529	0.519	0.350
IA3	0.376	0.354	0.309	0.300	0.336	0.230	0.300	0.848	0.557	0.683	0.260
IA4	0.290	0.262	0.242	0.215	0.254	0.285	0.296	0.840	0.589	0.650	0.139
IM1	0.283	0.194	0.298	0.041	0.300	0.426	0.298	0.601	0.820	0.589	0.251
IM2	0.350	0.194	0.407	0.062	0.277	0.359	0.440	0.389	0.742	0.453	0.305
IM3	0.396	0.367	0.336	0.390	0.275	0.231	0.333	0.526	0.700	0.564	0.279
IM4	0.314	0.243	0.307	0.220	0.216	0.190	0.371	0.366	0.659	0.380	0.186
IT1	0.335	0.356	0.233	0.240	0.394	0.227	0.193	0.488	0.577	0.737	0.229
IT2	0.293	0.307	0.207	0.244	0.305	0.159	0.277	0.494	0.386	0.703	0.096
IT3	0.220	0.237	0.148	0.178	0.243	0.120	0.152	0.503	0.470	0.761	0.115
IT4	0.169	0.177	0.121	0.229	0.095	0.055	0.248	0.618	0.429	0.693	-0.035
IT5	0.185	0.237	0.093	0.190	0.235	0.186	0.149	0.562	0.591	0.787	0.017
IT6	0.388	0.389	0.295	0.279	0.416	0.395	0.293	0.562	0.617	0.804	0.246
TR2	0.541	0.266	0.669	0.088	0.378	0.359	0.511	0.186	0.331	0.134	0.725
TR4	0.719	0.477	0.789	0.464	0.397	0.287	0.628	0.262	0.278	0.082	0.820
TR5	0.676	0.521	0.667	0.470	0.468	0.239	0.425	0.301	0.211	0.145	0.793

Note: In Table 8 it can be seen that all the cross-loadings (highlighted in blue) are greater than their corresponding LVs, confirming the Discriminant Validity as per the criterion of Chin 1998.

b) The criterion of Fornell and Larcker (1981). It can be clearly seen that the factor loadings of the OVs on the original LVs are always higher than the loadings of other constructs (Table 9).

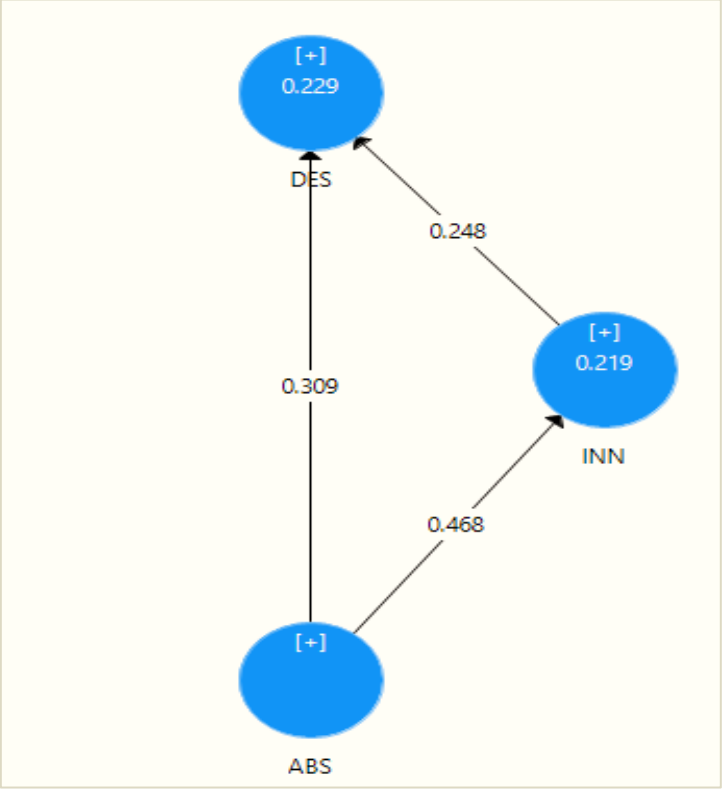
Table 9. Correlation Values between VL and Square Roots of AVE Values on the Main Diagonal (highlighted).

	Adq	Asi	DES	Exploit	InnA	InnM	InnT	Transf
Adq	0.780							
Asi	0.618	0.801						
DES	0.161	0.323	0.700					
Exploit	0.431	0.406	0.472	0.801				
InnA	0.287	0.395	0.391	0.428	0.859			
InnM	0.238	0.367	0.421	0.482	0.657	0.732		
InnT	0.303	0.378	0.260	0.291	0.719	0.690	0.749	
Transf	0.444	0.529	0.377	0.675	0.320	0.350	0.151	0.781

Note: Table 9 shows that the square roots of the variances extracted from the mean AVEs are greater than the values of the correlations between the LVs, guaranteeing Discriminant Validity as per the criterion of Fornell and Larcker (1981).

Once the DV was guaranteed, the adjustment of the measurement model was completed and the analysis of the structural model continued. In the second station, the new database was imported, and a new model was created only with LVs. Figure 3 presents the structural model, in which the explained variances and the path indicators obtained are depicted. Figure 3 shows the model analyzed.

Figure 3. SEM Obtaining the Scores of the Latent Variables ABS_INN_DES (With PLS)



Note: The explained variables are observed: R^2 = 22,9% for performance DES and R^2 = 21,9 % and for innovation INN. In addition, the path indicators are observed.

In the analysis of the SEM, it can be observed that the main routes from ABS to DES were significant, as indicated in Table 10.

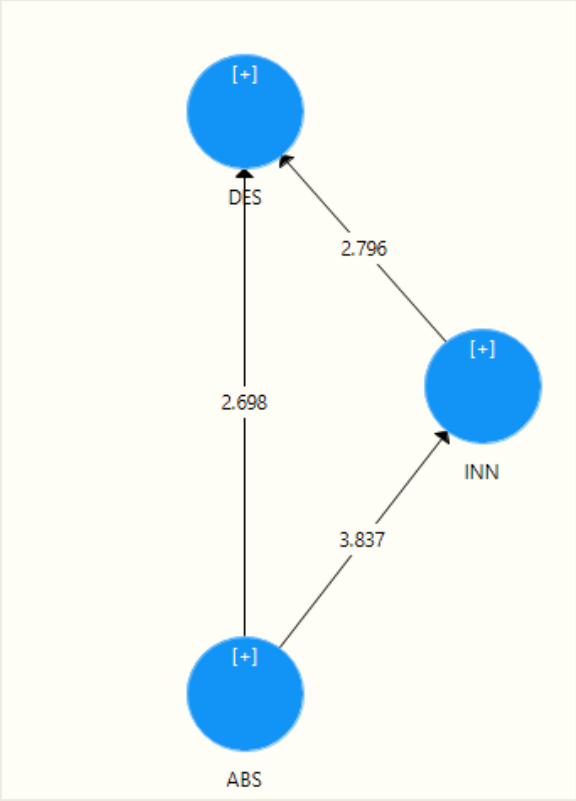
Table 10. Coefficients Path

	Initial Sample (I)	Sample Mean (M)	Standard Deviation (STDEV)	Statistical t (|O/STDEV|)	P Values
ABS -> DES	0.309	0.304	0.115	2.689	0.007 ***
ABS -> INN	0.468	0.458	0.121	3.862	0.000
INN -> DES	0.248	0.252	0.087	2.842	0.005

Note: The table shows the statistical significance in the main paths ABS -> DES: **** p < 0.001, *** p < 0.01, ** p < 0.05

The structural model was analyzed using the bootstrapping algorithm, through "Scenario Scheme" path analysis. To test mediation, the conventions proposed by Zhao et al. (2010) based on indirect effects were used. The total variance explained was R^2 = 22.9% for DES and R^2 = 21.9% for INN. The main paths from ABS to DES were significant (Table 10).

Figure 4. Structural Model ABS_INN_DES



Note: The figure shows the proposed structural model.

Table 11 shows that the direct effect of ABS to DES was significant.

Table 11. Total Effects

	Initial Sample (I)	Sample Mean (M)	Standard Deviation (STDEV)	Statistical t (|O/STDEV|)	P Values
ABS -> DES	0.425	0.422	0.116	3.672	0.000 ****
ABS -> INN	0.468	0.458	0.121	3.862	0.000
INN -> DES	0.248	0.252	0.087	2.842	0.005

Note: Statistical significance: **** p < 0.001, *** p < 0.01, ** p < 0.05

In addition, when testing the significance of the bootstrapping individual indirect effect, Table 12 indicates that it is significant.

Table 12. Individual Indirect Effects

	Initial Sample (I)	Sample Mean (M)	Standard Deviation (STDEV)	Statistical t (|O/STDEV|)	P Values
ABS -> INN -> DES	0.116	0.118	0.058	2.003	0.045**

Note: Statistical significance: **** p < 0.001, *** p < 0.01, ** p < 0.05

The above indicates, as per Zhao et al. (2010), a significant positive effect or relation (H_1) between knowledge absorption and performance (ABS →DES). In addition, a significant indirect relationship (H_2) can be observed among knowledge absorption, innovation, and performance (ABS→INN→DES). Both relations go in the same direction, and the product of the three is positive (axbxc →0,309x0,468x 0,248). Therefore, there is a "complementary mediation." In conclusion, innovation (INN) positively mediates the relation between knowledge absorption (ABS) and business performance (DES), thus confirming Hypothesis (H_3). Table 13 summarizes these results.

Table 13. Model Results Summary ABS→INN→DES

Hypotheses	Std. indirect	Std. direct	Conclusion
ABS -> INN -> DES	0.116 *	0.309 ***	Complementary Mediation
P < 0,001*** p < 0,1*			

Note: Statistical significance level: **** p < 0.001, *** p < 0.01, ** p < 0.05 *

Discussion

The discussion on how innovation mediates the effect between knowledge absorption capacity and business performance is validated by the inclusion of marketing and administrative innovation capacity in the innovation construct. The various internal and contextual aspects of companies, balanced with

absorptive capacity through cooperation, integration, and coordination, are crucial mechanisms in navigating the rapid dynamism of hypercompetitive environments (Miroshnychenko et al., 2021; Senivongse et al., 2019). These mechanisms are essential for achieving and sustaining a competitive advantage (Wang & Ahmed, 2007; Zahra & George, 2002). Initially limited to product and process innovation, the OECD and FAO (2022) broadened the concept's orientation toward market innovation and management innovation. The former is for commercial value creation (Camisón- Habba et al., 2019), and the latter is for key integrative elements of organizations, organizational value proposition, architecture, and new business models (Amit & Zott, 2001; Foss & Saebi, 2017).

This study analyzed the mediating effect of innovation in the relation between absorptive capacity and firm performance, assuming innovation (in technology, management, and marketing) as mediating variables. For this, theoretical support was found in the dynamic capabilities approach, according to which organizations must be prepared to sense, seize, and reconfigure the resource and capability base (Teece, 2007), in addition to coordinating and integrating tangible and intangible assets (Pavlou & El Sawy, 2011). Moreover, support was found in the RBV resource theory, according to which resources are considered valuable, rare, inimitable, and irreplaceable (Barney, 1991) as a basis for achieving sustainable competitive advantage (Wang & Ahmed, 2007; Zahra & George, 2002).

The results indicate that innovation positively mediates the relation between knowledge absorptive capacity and business performance. Thus, the relation between absorptive capacity and business performance was first analyzed in the model, and it could be proven through hypothesis H_1 that a significant direct positive effect exists between knowledge absorption and performance, which was also confirmed by other studies (Ali et al., 2016; Kale et al., 2019; Sancho-Zamora et al., 2021). These studies are similar in terms of the estimation of variables, so H_1 is accepted. While some authors have focused on the benefits of knowledge absorption capacity, as a source of learning acquired internally and externally to develop innovation and impact performance, achieving competitive advantage (Božič & Dimovski, 2019; Camisón & Forés, 2010; Forés & Camison, 2008; Müller et al., 2021), others have only prioritized one of the two, the power of the AsbPot (Miroshnychenko, 2021) or the AbsRea (Kale et al., 2019).

Some have highlighted the capacity of internally acquired knowledge over externally acquired knowledge (De Oliveira & Da Silva, 2020). This indicates a certain imbalance in the company's ability to integrate the stored knowledge base developed internally through its experience and the knowledge acquired, imparted or purchased externally, which can be attributed to a lack of management capacity. There is no absolute clarity on the role of knowledge absorption capacity and innovation in achieving sustainable competitive advantage.

This study suggests that the learning proneness proposed by Khan et al. (2019) is inadequate to maximize the balance between internally and externally acquired knowledge, let alone its use or exploitation

(AbsPot and AsbRea), in terms of innovation and business performance. To do so, it is necessary to train or link human resources, with the ability to innovate (disruptively) and create value propositions, original VRIN (innovation in products, raw materials, materials, processes, services, distribution, etc.), which requires the ability to coordinate and integrate (Pavlou & El Sawy, 2011), to close the gap between externally acquired knowledge and internally stored knowledge, with all phases of the R&D&I process and its interrelations with the functional tasks of engineering, production, and marketing.

When observing the order proposed by the seminal authors of DC, the following is found: first sensing, seizing, and then reconfiguring (Teece et al., 1997; Teece, 2007, p.1341). However, the process of mediating innovation capacity between absorptive capacity and performance arises from, first, the identification or detection of opportunities in the environment in management's orientation toward external learning (market orientation in response to growing customer demands). Subsequently, what companies do is reconfigure their resources (training or linking people, innovation of processes, products, equipment, packaging) to take advantage of market opportunities, thus generating benefits in performance (financial, commercial, labor, and absorption). In short, it actually occurs in the following order: sensing, reconfiguring, and then seizing.

Understanding that the knowledge frontier of DCs is represented by technological, administrative, and marketing innovation and corresponds in its maximum expression or degree to the companies that have achieved a notable sustainable competitive advantage in a particular way (or original VRIN) (11% - large companies with more than 200 employees), this study, consistent with the findings of Forés and Camison, 2008; Warner, 2003, raised the question of the relation among absorptive capacity, innovation, and performance and tested the hypothesis H_2. Thus, there is a significant positive relationship among knowledge absorption, innovation, and performance, which is confirmed in other research works such as that of Camisón-Haba et al. (2019), due to the significance in similar constructs; therefore, hypothesis H_2 is accepted.

Finally, hypothesis H3 is proposed in which innovation positively mediates the relation between knowledge absorption and firm performance. Thus, the mediation of innovation involving integration and absorptive capacity led to the improvement of business performance. It should be clarified that to achieve this, management had to develop coordination and integration (internal and external) and cooperation with other units and R&D&I centers. Medium-sized companies, which make up 5% of the sample (with 51 to 200 employees), small companies, which represent 31% (with 11 to 50 employees), and microcompanies, which account for 53% (with fewer than 10 employees), are generally not market leaders. However, they manage to achieve a certain level of innovation on a smaller scale and at a later stage. The results show that innovation positively mediates the relation between absorptive capacity and business performance, thus confirming hypothesis H3.

Theoretical Implications

Previous studies on dynamic capacities have emphasized technological innovation (García- Morales et al., 2008; Gutiérrez et al., 2010; Lloréns-Montes et al., 2005). This research work broadens the scope used by other researchers, who focused on marketing capacity (Camison & Villar, 2011) and administrative capacity (Gutiérrez et al., 2010; Lloréns-Montes et al., 2005). This study confirms that under certain cooperation, coordination, and relationship conditions, once an opportunity is identified, innovation capacity (in technology, marketing, and administration) grows. This is balanced by absorptive capacity, which in turn improves business performance (profitability, market positioning, shareholder value, job satisfaction, and the ability to absorb knowledge).

The reconfiguration of resources results in the adaptation of marketing innovation, technological innovation (products and processes), and administrative innovation after the identification of opportunities. This makes it possible to increase the absorptive capacity of the knowledge acquired both internally and externally. The importance of adapting the potential and the achieved absorptive capacity, particularly the reconfiguration or matching of innovation (radical or disruptive) to market demands, has been shown to be important for administrative capacity in achieving competitive advantage. This is consistent with the ideas of researchers (Forés & Camison, 2008; Warner, 2003) concerning the adjustment of the absorptive capacity according to the variability of innovation.

Practical Implications

After verifying this hypothesis, managers are advised to devote great efforts to redirect resources to product, process, and marketing innovation (product differentiation through design, product distribution, advertising, promotion and public relations, pricing policy, etc.) and administrative innovation to close industry's technological gap. The management's priority is to develop cooperative relationships with R&D+I organizations, governmental organizations, and all types of organizations interested in the chain. This approach will help coordinate and integrate engineering, production, and marketing to acquire, assimilate, transform, and exploit knowledge and respond to frequent market demands.

Based on the administrative capacity, relationship and cooperation links (RCL) are created, which make innovation management dynamic and adaptable, in addition to enhancing absorptive capacity and business performance. The company's participation in the market, financial profitability indicators, job satisfaction (compensation), as well as the capacity to acquire, transfer, and use the new knowledge learned are improved. For future research, it is suggested that this line of investigation be pursued in longitudinal studies developed by the SEM method, in addition to other dynamic capabilities.

It is crucial to analyze the mediating effect in the relation between absorptive capacity and business

performance among manufacturing companies in the dairy sector of the Colombian Caribbean to help contribute to the development of the industrial sector, particularly the dairy chain. It was confirmed that technological, administrative, and marketing innovation positively (significantly) mediates in the relation between knowledge absorptive capacity and business performance.

The administrative capacity must be attentive to the identification of opportunities, the creation of a knowledge frontier, and the innovation of its products, processes, marketing strategies. It is crucial for organizations to focus on transforming themselves comprehensively to generate new value propositions, achieve a competitive edge, and establish industry leadership. To do this, strengthening cooperation, coordination, and integration with R&D organizations and other relevant entities is essential. This approach will help harmonize and balance AbsPot and AbsRea capacities, leading to significant improvements in business performance.

Conclusion

The infinite possibility of radical or disruptive innovation from the perspective of DCs poses challenges to the dynamism of the environment and management. These challenges result in the frequent, deliberate, planned, and coordinated reconfiguration of resources and capabilities.

Innovation in the market, marketing strategies, and technology include RCLs that propel customers to meet new expectations, perceptions, and experiences and unleash within the organization the need for periodic reconfiguration of resources to respond to market demands and disruptive innovation. These RCLs enable the internal and external coordination and integration necessary to develop process and management innovations (new collaboration mechanisms, organizational structures or redesigns, rules, procedures, policies, and management methods) based on absorptive capacity and help achieve improved business performance and value creation. It is necessary to adjust the DC path to first identify opportunities and then manage and balance the flow of resources in accordance with the tensions created by market disruptive innovations and technological developments. In other words, the path must be corrected for sensing and reconfigured for seizing.

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