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The relationship between innovation and performance in MSMEs: The case of the wearing apparel sector in emerging countries

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ABSTRACT

In a global context of change and uncertainty, the innovation capacity of organizations is key to their sustained development. The objective of this study is to empirically analyze the relationship between innovation and firm performance of micro, small and medium-sized enterprises (MSMEs) in emerging countries and to study the moderating role of investment and collaboration in these relationships. The least squares structural equation model (PLS-SEM) analyzed a sample of 104 SMEs in the wearing apparel sector in Peru and Colombia. Product Innovation together with Business Process Innovation, explained 47.1 % of organizational performance, 41.0 % of economic performance, 39.5 % of commercial performance and 36.9 % of productive performance. However, Product Innovation was not a significant predictor of productive or organizational performance. The moderating effect of Investment on the relationship between Product Innovation and Business Process Innovation and Firm performance was only significant for organizational and productive performance and with respect to the moderating effect of Collaboration on the relationship between Product innovation and Business Process Innovation and Firm performance, in the quantitative analysis no significant prediction was obtained, supported by the results of the surveys where 62.8 % of the MSMEs never received supported from others actors for the development of innovation activities. The application of the findings of this study can contribute to the validation, updating or implementation of public policies that promote collaboration between actors of the innovation ecosystem, as well as in proposal of investment strategies for the development of innovation in emerging countries.

1. Introduction

Micro, Small and Medium-sized Enterprises (MSMEs) account for about 90 % of enterprises, contributing to 60 % of employment and half of GDP worldwide. They are the economic lifeblood of communities that help fight poverty, create decent jobs, foster entrepreneurship for women, youth and vulnerable groups, safeguard livelihoods and economic growth. All these efforts and achievements of MSMEs contribute to the achievement of the 2030 Agenda for Sustainable Development and the Sustainable Development Goals (SDGs). However, they have been negatively affected by the series of events that have disrupted economies, from the climate catastrophe, the COVID-19 pandemic, and the war in Ukraine (Department of Economic and Social Affairs, 2022; Guterres, 2022; International Council for Small Business, 2022).

In Latin America, MSMEs constitute 99 % of the textile industry, generating 61 % of employment (Dini and Stumpo, 2020). However, during the last decades these MSMEs obtained the lowest productivity results if compared to other similar developing economies, resulting a GDP of 0.46 % in 2000 and 0.88 % in 2010–2019 (Paus and Robinson, 2022). The COVID-19 outbreak had an unprecedented impact on the fall of 6.8 % of GDP in 2020, a decrease in the value of exportations to 13 %, and more than 2.7 million companies that permanently closed their activities, generating an unemployment crisis in Latin America (Economic Commission for Latin America and the Caribbean, 2021). This situation is consequence of the high dependence on international production and its weak regional integration, highlighting the need to determine the capacity of companies to address technological gaps, foster collaborations, generate alliances, create regional value chains that help develop and consolidate scientific and technological capabilities. Overcoming these issues would strengthen competitiveness,

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create high quality employment, and generate a dissemination of new science and technologies that enable MSMEs of proposing innovations in products and processes at higher standards (Economic Commission for Latin America and the Caribbean, 2021; OECD et al., 2021).

In Peru, MSMEs represent 99.5 % (1788,117) of formal ventures, formed by micro- (95.2 %), small- (4.1 %) and medium-sized companies (0.2 %), generating 62.6 % of total employment (Ministerio de la Producción, 2021). In the case of Colombia, they represent 99.6 % (1941,890) with a business structure made up of micro- (95.7 %), small- (3.3 %) and medium-sized companies (0.8 %) that generate 79.1 % of total employment (Heredia Zurita and Dini, 2021; Ministerio de Comercio Industria y Turismo, 2022).

Global manufacturing has demonstrated that is the backbone of economies. However, there is a high inequality between countries with higher capacities and more diversified industrial sectors, which have been more resilient to economic, health and geopolitical shocks, versus manufacturing sectors in emerging countries that have a weak productive structure, low technological content exports, deficiencies in logistics infrastructure and problems in supply chain management (Shahid et al., 2020).

According to the country's income and level of industrialization, economies have been classified as: high-income industrial, middle-income industrial, high-income industrializing, middle-income industrializing and low-income economies; most Latin American countries are classified as "middle income industrial economy", including Peru and Colombia, according to their stage of industrial development (United Nations Industrial Development Organization, 2022a, 2022b).

There is a classification manufacturing industries based on research and development (R&D), expenditure relative to value added, that assigns three technology categories: medium-high and high technology (MHT), medium technology (MT) and low technology (LT). The wearing apparel manufacturing industry is considered as an industry with low technological intensity.

Worldwide, the performance of the wearing apparel manufacturing sector (ISIC 4 division 14) between 2000 and 2020 has had a contribution of 2.6–2.4, respectively, to the total manufacturing value added (MVA) (United Nations Industrial Development Organization, 2022a). In the case of Latin America countries, in Peru, the share of division 14 to national GDP decreased from 1.7 % in 2010 to 0.7 % in 2020. This reduction was also reflected in the lower share of manufacturing production, which decreased from 10.6 % (2010) to 5.7 % (2020) (Sociedad Nacional de Industrias, 2022); in case of Colombia's manufacturing industry contributes 25.1 % of national GDP, and the wearing apparel manufacturing division contributes 2.4 % of manufacturing GDP (Departamento Administrativo Nacional de Estadística, 2021).

Innovation in SMEs has been the subject of several research, which have explored innovation capabilities and firm performance by multiple perspectives and approaches (Fitriati et al., 2020; Haroon et al., 2019; Kamalrulzaman et al., 2021; Maldonado-Guzmán et al., 2019; Ribau et al., 2017; Sok et al., 2016). Researchers had explored different types of innovation and their impact on business performance (Expósito and Sanchis-Llopis, 2019; Zhang, 2022); and the influence of technological innovation (product, process) (Castillo-Vergara and García-Pérez-de-Lema, 2020; Chege and Wang, 2020; Jusufi et al., 2020; Lee et al., 2019; Leyva Carreras et al., 2020; Salisu and Bakar, 2018). Also, researchers explored the impact of non-technological (organizational, marketing, management) innovation on firm performance (Boubakary et al., 2020; Dabić et al., 2019; Ngah et al., 2022; Prange and Pinho, 2017; Sawaean and Ali, 2020; Udriyah et al., 2019). Despite these developments, the Latin American context as emerging economic area was little explored in literature.

The investigation of product and business process innovation in emerging economies from an integrative perspective is the focus of this study. Recent data from developed countries show that companies that introduce more than one type of innovation outperform those that introduce only one type of innovation at a time (Zhang, 2022). Likewise, there are moderating variables on innovation and its impact on organizational performance, such as investment (Gherghina et al., 2020). Investments is a gap that should be investigated by exploring the causal relations between investments, innovation, and territorial economic growth. Collaborations to innovation is also not fully understood phenomenon (Ebersberger and Herstad, 2013; Kang and Park, 2012; Prokop et al., 2019; Temel et al., 2013).

In this context, the goal of this research is to empirically analyze the relations between innovation and the performance of MSMEs of wearing apparel sector (WAS) in Peru and Colombia.

This study contributes empirically and theoretically to the literature: i) Analyzes the integrative impact of product innovation (products or services) and business process innovation in its six categories (production of goods and services, distribution and logistics, marketing, sales and after-sales services; information and communication technology (ICT) services to the firm, administrative and management functions, engineering and technical services related to the firm, and product and business process development) on firm's performance; ii) analyzes the moderating effect of investment in innovation activities, iii) analyzes the moderating effect of collaboration, as a source of information and knowledge, and a linkages between companies and other agents in the innovation system.

The remainder of this article is organized into six sections: The next section begins with a review of the literature related to innovation and its impact on firm performance, followed by a description of the research methods. Next, the empirical results of the study are presented, followed by a discussion and the limitations of the study and future research are suggested.

2. Literature review

2.1. Innovation

Innovation plays an important role in the development of companies and nations. Schumpeter stated that innovation does not only depend on individuals, which can act as an entrepreneur, because involves the cooperation of many different actors. Innovation requires cognitive abilities that increase the diffusion and then, leading to entrepreneurship (Śledzik, 2013) considered as a source of competitive advantage, the ability to innovate is identified as one of the important determinants of business performance (Fonseca-Retana et al., 2016). For this reason, United Nations Development Programme has set the following targets for Agenda 2030: Enhancing scientific research, improving the technological capabilities of industrial sectors in all countries, particularly in developing countries, including fostering innovation and substantially increasing the number of research and development workers per million people, and public and private spending on research and development (R&D) (Sustainable Development Goals | United Nations Development Programme, n.d.).

According to the Oslo Manual, an innovation is a new or improved product or process that differs significantly from previous products or processes and that has been made available to potential users or has been put into use by the production unity (OECD/Eurostat, 2018). Innovation is also defined as the commercial application of an idea in such a way that new or improved products, processes or services are originated, allowing the generation of business benefits (CEEI Ciudad Real, 2007).

With the accelerated speed of technological change, the role of innovation in the survival of firms has received considerable attention from scholars (López-Cabarcos et al., 2019; Rubera and Kirca, 2012) and practitioners (Batra et al., 2015; Hutahayan, 2021; Potter and Watts, 2014). Some scholars (Lee et al., 2015; Otero-Neira et al., 2009) added that innovation is the successful implementation of creative and innovative ideas, while (Rhee et al., 2010) define innovation as the ability to create something new and use something that already exists.

Innovation is one of the key factors of growth strategies to enter new markets, increase existing market share, and to provide the firm with a competitive advantage (Marín-Idárraga and Cuartas-Marín, 2019; Norris and Ciesielska, 2019; Radicic et al., 2019). Motivated by the increased competition of global markets, companies have more importance to innovation (Bamfo and Kraa, 2019; Biégas, 2018). Therefore, innovations are an indispensable component of corporate strategies because they will make it possible to apply more productive manufacturing processes, to improve market performance, to seek positive reputation in the perception of customers and, to obtain a sustainable competitive advantage (Albors-Garrigos et al., 2018; Gunday et al., 2011a; Julison et al., 2017).

2.2. Firm performance

Conceptually, two extreme trends have emerged among managers and scholars to address the shortcomings of performance measurement. The first focuses primarily on financial indicators, while the second focuses primarily on operational measures. Some attempted to improve financial performance measurement methods by developing concepts such as economic profit, Economic Value Added, or free cash flow analysis. Others tried to improve operational efficiency by developing concepts and methods, such as Activity Based Costing, Activity Based Management, Quality Management, JIT systems, etc. (Adam and Alarifi, 2021; Adams et al., 2008; Sousa and Aspinwall, 2010).

Firm performance can be characterized as the firm's ability to create acceptable results and actions (Pfeffer and Salancik, 2002). However, it can be conceptualized, operationalized, and measured in several ways. (Gunday et al., 2011b) categorizes firm performance into four categories, financial performance, innovative performance, productive performance and market performance.

According to the commercial and marketing perspective, firm performance relates to market share, sales determinants, revenue premium of products and services (Aksoy, 2017); achieving customer satisfaction more efficiently and effectively than the company's competitors (Elfarmawi, 2019; Riswanto et al., 2020); customer loyalty; achieving financial-profit performance, and creating market value (Biégas, 2018); as well as improving products or services, expanding the range of products or services, creating new markets, increasing reputation, brand awareness or visibility of goods or services, as well as compliance with market regulations, adoption of standards and accreditations are also evaluated (OECD/Eurostat, 2018; Rodil et al., 2016).

Economic performance can be measured through variables such as: annual growth in sales volume, market share and profits (Anderson et al., 2012). Thus in terms of employment, productivity, exports, gross capital, numbers of patents, R&D investment, cost reduction, which in turn impacts the economic profitability of firms (Barletta et al., 2014; Beneki et al., 2012; OECD/Eurostat, 2018).

According to Sawaean and Ali (2020) organizational performance is composed of three aspects: individual performance with its specialized organizational units; the performance of organizational units within the overall framework policies of an organization; an organizational performance within the framework of the economic, cultural and social environment. This performance is assessed by taking into account; the capacity to absorb, process and analyze knowledge with other organizations; the effectiveness or functioning of the firm's value chain; communication within the firm; the development of new relationship with external entities, working conditions, job satisfaction and well-being, the health or safety of the firm's personnel, as well as implementing a new business model (Asif et al., 2019; OECD/Eurostat, 2018; Pap et al., 2022).

On the other hand, we have the production and delivery performance, which is measured through evidencing aspects such as updating technology or obsolete process methods, improving the quality of goods or services, improving flexibility to produce goods or services, increasing the speed of production of goods or provision of services, reducing labor costs, material, energy or operating costs per unit of production, reducing time to market, the level of product reliability of its customers (Adams et al., 2008; Madero Gómez and Barboza, 2015; Neely et al., 1995, 2001; OECD/Eurostat, 2018; Rousseau et al., 2016; Ulusoy et al., 2008).

2.3. Innovation and business performance

The relations between innovation and performance are supported by the Resource Base View (RBV), proposed by (Barney, 1991; Barney et al., 2011, 2021). RBV defends that the competitive advantage of companies is based on those scarce, habitual, inimitable, valuable, and non-sustainable resources that the company possess, but require good management. As indicated by Barney and Wright (Barney et al., 2021), the RBV can be used by underperforming firms to achieve competitive parity by studying the sources of success of top-performing firms and then, imitating all the resources and capabilities of these successful firms.

The SMEs have demonstrated advantages due to their size, flexibility to change, ability to face risks, and speed of response to market evolutions. According to Aksoy (2017), pressures towards innovation are applicable to both large and small firms, and several studies have observed that SEMs' fertility, comparative advantages if compared to large companies in terms of innovation, could transform SMEs more competitive than large firms (Arias-Aranda et al., 2001; Paus and Robinson, 2022). Moreover, different authors (Anderson et al., 2012; Büschgens et al., 2013; Dabić et al., 2019; Hilmarsson et al., 2014; Hogan and Coote, 2014; Siguaw et al., 2006; Tang et al., 2020) agree that if SMEs must promote innovative culture to improve their innovativeness. Prasetyo et al. (2022) showed that some small businesses in Java communities were interacting among each other, which was beneficial to the community of companies and fostered the growth of innovation, increased people's income, and contributed to increasing regional income.

Others (Alshanty et al., 2019; de Zubielqui et al., 2016; Issau et al., 2022; Sok et al., 2013) identified that companies' efforts to obtain improvements in marketing management, not only led them to develop market innovations, but product and process innovations were needed to be competitive.

3. Hypothesis development

3.1. Product innovation and firm performance

According to what is established in the Oslo Manual, "a product innovation is a new or improved good or service that differs significantly from the firm's previous goods or services and that has been introduced in the market" (OECD/Eurostat, 2018, p.70); also establishing that product innovations can use new knowledge or technologies, or be based on new uses or combinations of existing knowledge or technologies. This is how companies maximize the benefits of product innovation to increase business efficiency, being one of the key factors contributing to organizational success (Aksoy, 2017; Polder et al., 2010).

One of the objectives of product innovation is to attract new customers, as they introduce new products or modify existing ones to satisfy the needs of their own consumers, which then converts into higher returns for the organization (Jusufi et al., 2020; Ramadani et al., 2019); but all this implies a creative and detail analysis capability by R&D departments; these two approaches worked simultaneously limit the contribution of collaborators and could generate impact on financial performance, as argued by (Sok and O'Cass, 2015). It is an important management strategy to increase market share and ensure improved business performance (Castillo-Vergara and García-Pérez-de-Lema, 2020; Demmel et al., 2017; Shin et al., 2022).

In its turn, product development allows the company to gain market leadership in terms of profitability (Dai and Cheng, 2018; Demmel

et al., 2017; Goedhuysa and Veugelers, 2012; Shin et al., 2022). Even if the profitability of new products is not maintained in the long run, a company that constantly introduces new products can maintain high performance (Falahat et al., 2020; Tung, 2012). According to the findings of Farida and Nuryakin (2021) a firm requires doing three essential things to improve product innovation performance: performing knowledge transfer activities, having networking capabilities, and building relational capabilities with other stakeholders.

In accordance to the discussion presented above, it is possible to propose the following research hypothesis:

Hypothesis H1. : Product innovation contributes positively to the performance of MSMEs in the WAS.

3.2. Business process innovation and firm performance

Business Process Innovation considers significant improvement of production and logistical methods or the introduction of significant improvements in support activities, such as purchasing, accounting, maintenance, and IT (Polder et al., 2010). The Oslo Manual (OECD/Eurostat, 2018) defined business process innovation as a new or improved business process for one or more business functions that differs significantly from the firm's previous business processes and has been put into use by the firm. All business functions can be the object of innovation activity, including the core business function of production of goods and services and support functions such as distribution and logistics, marketing, sales, and after-sales services; information and communication technology (ICT) services to the firm, administrative and management functions, engineering and related technical services to the firm, and product and business process development.

Companies seek process innovation; adopting a new process to compete with other companies, decrease the cost of production and have a significant impact on productivity. For example, studies showed that the incorporation of automation in production methods increased the efficiency and productivity of organizations (Demmel et al., 2017; Hall et al., 2009; Huergo and Jaumandreu, 2004; Inter-American Development Bank, 2016).

In the results of the study by Azar and Ciabuschi (2017) showed that the adoption of innovations for foreign market development generated benefits for the export performance of companies. Likewise that new technologies, more efficient production techniques and new products and processes resulting from innovation made it possible to face technological and environmental changes in increasingly competitive global markets.

The research by Damanpour et al. (2009) suggests that it is detrimental for organizations to focus on a single type of innovation; however, a focus on the adoption in management, service and technological processes could be beneficial for the firm's performance. Studies on the impact of marketing innovation on business performance show positive and significant effects for industrial MSMEs, which have developed information that will allow owner to make decisions on business strategy (Cuevas-Vargas et al., 2020).

Thus, the second hypothesis is formulated as follows.

Hypothesis H2. : Process innovation contributes positively to the performance of MSMEs in the WAS.

3.3. Investments

According to the World Innovation Index 2022 (World Intellectual Property Organization (WIPO, 2022), investments in innovation flourished in times of pandemic and multiplied in 2021. The countries that invested the most in research and development (R & D) obtained an increase in patent applications and trademark registration, even though there is evidence that innovation showed a significant decreased, seen in productivity growth, representing the lowest historical levels.

The literature suggests that, in developed economies, investments have added origin the own private market, and in developing economies there is strong support from state-owned entities or other international organizations. The provide funds for research, technological development and innovation are among the most common investments of such public organizations (Díaz and Kuramoto, 2008; Liao and Rice, 2010; Longhini et al., 2018; Voytolovskiy et al., 2020).

In the research of Henley and Song (2020) it was observed that, in MSMEs, the resources for financing innovation are difficult to acquire. Similarly, Tran et al. (2018) evidenced that SMEs did not use their financial slack to invest in innovation activities; however, if self-efficacy creativity is developed by employees, then the SME can generate a positive effect on innovation. Lewandowska (2021) highlighted the existence of positive or negative relations depending on the type of investments in innovation are undertaken.

Similarly, Hall et al. (2013) identified that the selective investment made by companies in activities to promote innovation had a different effect on productivity results, while the decision to invest in R&D or in information and communication technologies (ICTs) resulted in different innovation performance for each company.

It is important to have an effective investment management for innovation, because if investments are not made under a well-designed strategy, the failed decision comprising investments could generate risks for the company's survival. Even innovations that are considered a technological success may not bring benefits to certain organizations (Lewandowska, 2021; Voytolovskiy et al., 2020).

Therefore, this study presumes that MSMEs in emerging countries consider critical the investments in innovation activities, such as: R & D activities, product engineering and design, software, IT and database development, training, marketing, market research and brand management, intellectual property, management, acquisition and improvement of machinery and equipment (OECD/Eurostat, 2018).

The following hypotheses are therefore proposed for assessing the moderation of innovation for the improvement of business performance.

Hypothesis H3. Investment contributes positively in moderating the relation between product innovation and the performance of MSMEs in the WAS.

Hypothesis H4. : Investment contributes positively in moderating the relation between business process innovation and the performance of MSMEs in the WAS.

3.4. Collaborations

According to ISO (Innovation management-Innovation management system-Guidance, ISO 56002:2019, 2019), when establishing the purpose of innovation and determining its strategy, the organization must consider that this can be done through collaboration and a culture of support; collaboration will make it possible to share knowledge and other intellectual assets and resources. MSMEs, being mostly lacking in technology, raw materials, markets, quality labor and transportation, have found ways to gain scale advantages in the use of technology through networking, business organizations, forums, and various forms of partnerships, demonstrating that a collaborative approach leads to product development and adaptation through innovation, and helps companies enter new or diverse markets (Prasanna et al., 2019). Firms acquire different levels of capacity to engage in collaborations for the development of innovation activities depending on their size, sector, and geographical location (Antonelli et al., 2010; Grillitsch and Nilsson, 2015; Patricio et al., 2018; Salisu and Bakar, 2018).

According to Greco, Grimaldi and Cricelli (Greco et al., 2017), local and national public subsidies for European firms' R & D activities have contributed to promote open innovation, increasing innovation efficiency, through knowledge spillovers from strategic collaborations.

Similarly, Prokop et al. (2019) already stressed the importance of the innovation environment for developed economies, and the importance of incentives to promote collaborations.

Previous research already identified the influence of collaborations on innovation; (Bach et al., 2019; Ferasso and Grenier, 2021) evidencing that collaborations are important to a certain degree. For the present study, collaborations have been considered from four groups of actors: a) commercial companies, such as customers, competitors, or investors; b) government or support offices; c) educational institutions; and d) private companies or entities such as chambers, guilds, institutes, among others (Negassi et al., 2019).

Similarly, the role of information technology (IT) collaboration in improving innovation performance in companies is evidenced in the case of (Jimenez-Jimenez et al., 2019), which shows the contribution of IT in strengthening relationships between members of the supply chain in external collaboration strategies, where IT plays an important role in accessing, sharing and transforming external knowledge. The study by al Hakim et al. (2022) presented a conceptual model and a prototype design of a digital platform, where with the support of IT tools, research institutions or universities and companies were able to exchange knowledge and collaborate in an innovation ecosystem. The research by García-Machado et al. (2021) explored the factors of companies that explain the demand for technological services with the purpose of contributing to the growth and promotion of R&D collaborations between universities and companies.

Based on the above discussios, the study considers that collaboration is a source of information and knowledge for generating links among companies and other agents and externalities that influence innovation and, consequently, will impact the relations of innovation with business performance. This is formalized through the following hypotheses:

Hypothesis H5. Collaboration contributes positively in moderating the relation between product innovation and performance of MSMEs in the WAS.

Hypothesis H6. Collaboration contributes positively to moderating the relation between business process innovation and the performance of MSMEs in the WAS.

3.5. Research model proposal

The existing literature provides evidence of the impact of Product Innovation and Business Process Innovation on firm performance. However, there is little information on this effect in the case of MSMEs in emerging countries.

The research model considers product innovation, business process innovation, organizational performance, economic performance, productive performance, commercial performance, investment, and collaboration. The research model details the relationship between the variables (Fig. 1).

The latent exogenous and endogenous variables (constructs) and the references of their definitions, are in Table 1. The constructs and their indicators are summarized in Table 2.

4. Research design

4.1. Survey methodology

The population considered in this study is manufacturing MSMEs in Peru and Colombia. For the sample, it was stratified according to the criteria established in the Oslo Manual (OECD/Eurostat, 2018), and the main characteristics of the target sample are the type of statistical unit, the main activity sector of the unit, the size and geographical location of the unit.

The statistical unit is the MSME, the classification regulated in Law 590 of 2000/ DS No. 957 (Decreto_957_de_ Colombia Mipymes, 2019, 2019), also known as the MSME Law in Colombia. In Peru, the Law No. 30056 (Congreso de la República, 2013) was considered. The selected industry for analysis was the textile sector of wearing apparel, which is defined under division 14 of the International Standard Industrial Classification ISIC 4.

4.2. Instrument

The questionnaire was designed based “Oslo Manual 2018: Guidelines for Collecting, Reporting and Using Data on Innovation”, which provides guidelines on the measurement of scientific, technological and innovation activities, and aims to facilitate international comparability and provide a platform for research and experimentation in the measurement of innovation (OECD/Eurostat, 2018, p.19). The survey was conducted using combined data collection method, with online questionnaires and face-to-face interview for the completion of the questionnaires.

For the present study, a database was prepared from a list of companies provided by the Sustainable Fashion Clusters and the Textile Committee of the National Society of Industry of Peru and the support of EAFIT University and Inexmoda of Colombia.

The survey was conducted between July 2019 and August 2022. From a total of 650 companies invited to participate in the research, a total of 104 valid questionnaires were received with adequate data for statistical estimations; representing a response rate close to 16 %. The companies participated voluntarily and were informed of the research goal through the protocol made available to the participants. The demographic description of the study sample is shown in Table 3.

This research includes 06 main variables named product innovation, business process innovation, organizational performance, economic performance, productive performance and commercial performance, and two moderating variables named collaboration and investment. In this study a Likert scale was applied, for the innovation variables of four points (from 1 no innovation to 4 new innovation for the global market), for the performance variables of 5 points (from 1 no compliance 0 % to 5 total compliance 100 %) and for the moderating variables of 5 points (from 1 does not apply/not done to 5 rest of the world).

4.3. Data analisys

Partial least squares structural equation modeling (PLS-SEM) was used to examine the research hypotheses using SmartPLS 4.0.8.4 software (Ringle et al., 2022). PLS-SEM has been used in business research to test theories represented in the form of complex models (Hair et al., 2012). The SmartPLS software was used in the present research in two phases. First, the assessment of the reflective and formative measurement models (internal model) was developed and, subsequently, the evaluation of the structural (external) model is made by establishing the linkage relations between the latent variables of the research model (Hair et al., 2019).

5. Results

5.1. Model description

In the model described in Fig. 1, there are four latent variables (LV) made up of reflective indicators: Organizational Performance (OP), Economic Performance (EP), Productive Performance (PP) and Commercial Performance (CC). There are two latent variables made up of formative indicators: Product Innovation (Pdi) and Process Business Innovation (Pri). There are also two moderating latent variables: Investment (II) and Collaboration (CO).

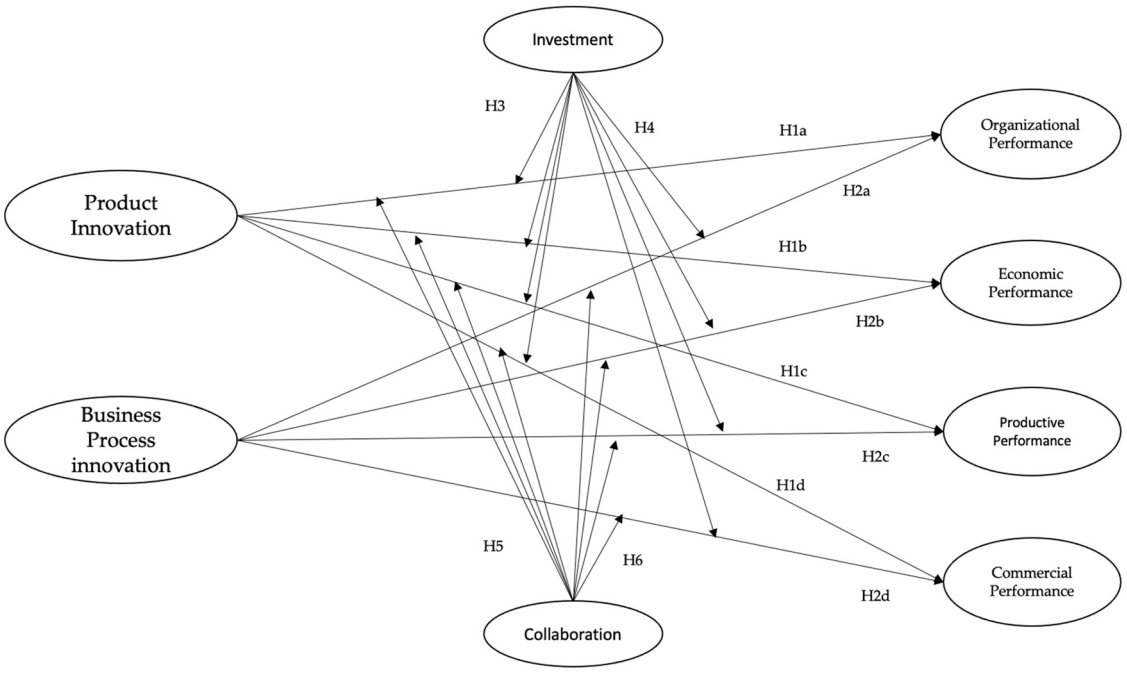

Fig. 1. Research Model.

5.2. Measurement model

Table 4 presents the results of the evaluation of the reflective measurement model: loadings, average variance extracted (AVE) composite reliability and Cronbach's alpha. Table 5 shows the Heterotrait-monotrait ratio (HTMT) Matrix that justifies the discriminant validity of the model. Given these values, the reliability of the constructs and their convergent validity are accepted.

For the independent variables Product Innovation and Business Process Innovation, as well as for the moderating variables of the model, the degree of collinearity of the indicators of the formative measurement model was examined and the significance and relevance of the formative indicators were assessed. According to the results shown in Table 6 of the collinearity statistics (VIF), pdi05 has the highest VIF value (3.262); consequently, the model values are uniformly below the threshold value of 5. Next, the external loadings are analyzed according to their significance and relevance, by means of the bootstrapping process, generating 5000 bootstrap samples.

5.3. Structural model

Through the evaluation of the structural model, showed in Figure 2, the predictive capacity of the model and the relations between the constructs are examined. Table 7 shows the R^2 and Adjusted R^2 values, which represent a moderate level of prediction of the model for the four dependent variables: Commercial_Performance, Economic Performance, Organizational Performance and Productive_Performance. The Q^2 values obtained for the four variables indicate the predictive relevance of the model for the dependent constructs. This implies that Product Innovation and Business Process Innovation explain 47.1 % of organizational performance, 41.0 % of economic performance, 39.5 % of Commercial Performance, and 36.9 % of productive performance.

The results of hypothesis testing can be seen in Table 8, corresponding to the independent variables, showing a significant effect of Product Innovation on Economic Performance indicated by a path coefficient value 0.205 and p-value 0.033, $p < 0.05$, so H1b is supported. Likewise, Product Innovation influences firm performance

Table 1
Constructs and source of definitions.

Constructs	Indicator	Source of definitions
Product Innovation (Pdi)	5	(Aksoy, 2017; Castillo-Vergara and García-Pérez-de-Lema, 2020; Dai and Cheng, 2018; Demmel et al., 2017; Falahat et al., 2020; Farida and Nuryakin, 2021; Jusufi et al., 2020; OECD/Eurostat, 2018; Polder et al., 2010; Ramadani et al., 2019; Shin et al., 2022; Sok and O'Cass, 2015)
Business Process Innovation (Pri)	7	(Aksoy, 2017; Aliasghar et al., 2020; Azar and Ciabuschi, 2017; Biégas, 2018; Damanpour et al., 2009; Damanpour; Demmel et al., 2017; Gupta et al., 2016; OECD/Eurostat, 2018; Sok et al., 2013; Ulusoy et al., 2008)
Organizational Performance (OP)	6	(Asif et al., 2019; OECD/Eurostat, 2018; Sawaean and Ali, 2020)
Economic Performance (EP)	3	(Anderson et al., 2012; Barletta et al., 2014; Beneki et al., 2012; OECD/Eurostat, 2018)
Productive Performance (PP)	9	(Farida and Nuryakin, 2021; OECD/Eurostat, 2018; Ulusoy et al., 2008)
Comercial Performance (CP)	6	(Aksoy, 2017; Biégas, 2018; Elfarmawi, 2019; OECD/Eurostat, 2018; Riswanto et al., 2020)
Investment (II)	8	(Díaz and Kuramoto, 2008; Lewandowska, 2021; OECD/Eurostat, 2018; Sirmon and Hitt, 2009; Voytolovskiy et al., 2020)
Collaboration (CO)	4	(Antonelli et al., 2010; Bach et al., 2019; García-Machado et al., 2021; Grillitsch and Nilsson, 2015; ISO 2 Innovation management-Innovation management system-Guidance, 5600, 2019; Negassi et al., 2019; OECD/Eurostat, 2018; Prokop et al., 2019)

Table 2
Constructs and indicators of the measurement models.

Constructs	Indicator
Product Innovation (Pdi)	
Have you introduced a new product (good) or service to the market?	pdi01
Did changes in materials or components improve the performance of an asset?	pdi02
Did you develop an improved use for one of your goods or services?	pdi03
Did you add an enhanced feature to one of your goods or services?	pdi04
Did you make it easier and more attractive for customers to use one of your goods or services?	pdi05
Business Process Innovation (Pri)	
Have you introduced a new production or engineering method?	pri01
Have you introduced a new distribution and logistics process?	pri02
Have you introduced a new marketing and sales process? *	pri03
Have you introduced a new information and communication systems process?	pri04
Have you introduced a new management and governance process?	pri05
Have you introduced a new product development and design process?	pri06
Have you introduced a new business model or process?	pri07
Organizational Performance (OP)	
Did the Innovation impact on the improvement of new knowledge learning capabilities?	op01
Did the innovation improve knowledge sharing or transfer with other organizations?	op02
Did the innovation improve communication within the firm?	op03
Did the innovation increase adaptability to change?	op04
Did the innovation improve working conditions, health or safety of the company's personnel?	op05
Did the innovation improved staff satisfaction, commitment and/or retention?	op06
Economic Performance (EP)	
Did innovation have an impact on the increase in sales revenue?	ep01
Did the innovation improved company's profitability?	ep02
Did the innovation have an impact on cost reduction?	ep03
Productive Performance (PP)	
Did the innovation make it possible to update obsolete technology or process methods?	pp01
Did the innovation hace impact on improving the quality of goods or services?	pp02
Did innovation improve flexibility in producing goods or services?	pp03
Did the innovation increase the speed of production of goods or provision of services?	pp04
Did the innovation reduce labor costs per unit of production?	pp05
Did the innovation reduce material costs per unit of production?	pp06
Did the innovation reduce energy or operating costs per unit of production?	pp07
Did the innovation improve productivity?	pp08
Did the innovation reduce lead times?	pp09
Comercial Performance (CP)	
Did the innovation make it possible to update goods or services?	cp01
Did the innovation expand the range of goods or services?	cp02
Did the innovation succed in creating new market niches?	cp03
Did the innovation increase or maintain market share?	cp04
Did the innovation improved company's brand and reputation?	cp05
Did the innovation increase the visibility of products or services?	cp06
Investment (II)	
Did your company invest in R&D (research and development) activities? *	ii01
Did your company invest in Engineering, Fashion design and product design or creative activities? *	ii02
Did your company invest in Software and database / IT development activities? *	ii03
Did your company invest in Training activities?	ii04
Did your company invest in Marketing and brand equity activities; market research?	ii05
Did your company invest in Product Testing and Evaluation and Intellectual Property activities?*	ii06
Did your company invest in Management certification / accreditation; Strategic or management consultancies; Sustainability certifications? *	ii07
Did your company invest in acquisition of machinery, equipment, PCs or other capital goods. Improvement or reconversion of machinery to reduce waste generation (liquid, gases, solids)? *	ii08
Collaboration (CO)	
Did your company rely on commercial companies as innovation partners? Suppliers (equipment, materials, services); customers, competitors, investors	co01
Did your company have Government Entities as Innovation Partners? Government research institutes; commercial offices; business support office; other government departments and agencies.	co02
Did your company have educational institutions as innovation partners? Universities, academic institutes or public and private technical schools	co03
Did your company have private companies as innovation partners? Private research institutes, Associations, Chambers of Commerce, NGOs or others.	co04

(*) The removed items are marked with an asterisk.

($\beta = 0.266$, $p = 0.004$). Hypotheses suggest an effect of Process Innovation on firm performance have been supported for Organizational, Economic, Productive and Commercial performance.

5.4. Moderation test

Moderation describes a situation in which the relationships between two constructs are not constant, but depend on the values of a third variable, called the moderating variable (Hair et al., 2019). Table 9 shows the results of the moderator effect assessed through PLS-SEM bootstrapping, for Investment (II) and Collaboration (CO) on the relationships of Innovation and firm performance. It was found that Investment only has a moderating effect on the relationship between Business Process Innovation (Pri) and Organizational Performance (OP), since the interaction effect of II x Pri →OP is significant ($\beta = -0.227$, $p = 0.046$), thus supporting Hypothesis H4a. Hypothesis H4c is also supported, with interaction effect of investment on Business Process Innovation on Productive Performance (II x Pri →PP) with a significant predictor ($\beta = -0.266$, $p = 0.018$). There was no significant prediction of the effect of Collaboration on the relationship of Innovation and firm performance.

Table 3
Demographic data.

Characteristics		Frequency	Percentage
Country	Perú	69	66.35
	Colombia	35	33.65
Sex	Female	49	47.12
	Male	55	52.88
Company Age	1–5	32	30.76
	6–10	25	24.04
	11–15	17	16.35
	15 and above	30	28.85
Size	Micro	55	52.88
	Small	30	28.85
	Medium	19	18.27
Market	Local	22	21.15
	National	36	34.62
	International	13	12.5
	National + International	33	31.73

5.5. Interaction plot

The PLS-SEM analysis allows to graphically visualize the moderating effect, through the slope of the predictor, which will no longer be constant, because it depends linearly on the level of the moderator (Hair et al., 2017). Fig. 3 shows the slope graphs corresponding to the moderating effect of Investment on the relations between Business Process Innovation and Firm Performance, showing that in the Organizational Performance (a) with high levels of Investment, the moderation is positive but weak, and the lower the investment, the greater the moderation on OP. The Economic Performance (b) moderation proved to be weak, while the Productive Performance (c) is positive but with a weak moderation. The Commercial Performance (d) showed that the investment in Business Process Innovation has a weak moderation, both for high investment and for low investment.

Fig. 4 shows the slope graphs corresponding to the moderation effect of Collaboration on the relations between Business Process Innovation and firm performance. It is observed that, with high levels of Collaboration, the moderation of the relations between Business Process Innovation is positive but weak with respect to Organizational_Performance (a), and the lower the collaboration. The Economic_Performance (b) showed that the moderation effect is relatively smaller than the effect of a lower collaboration. The curve of Productive_Performance (c) showed that there is no moderation of collaboration; and in Commercial_Performance (d), collaboration has a positive effect on Business Process Innovation, i.e., the higher the collaboration, the greater the moderation.

Fig. 5 shows the slope graphs corresponding to the moderation effect of Investment on the relations between Product Innovation and Firm Performance. It can be seen that in Organizational_Performance (a) at lower investment, the moderation is weak and at higher investment it shows a high level of moderation. The Economic_Performance (b) showed that there is no moderation effect (c); while Productive_Performance at higher investment has the higher level of moderation, and in Commercial_Performance (d) there is no moderation effect.

Fig. 6 analyzes the moderation of collaboration in the Product Innovation and Collaboration relations. The results show that in Organizational_Performance (a) with less collaboration there is no moderation; in Economic_Performance (b) the lower the collaboration, the higher the level of moderation related to the situation of greater collaboration. The Productive_Performance (c), in case of high collaboration the moderation level is negative; and in the case of Commercial_Performance (d) at low levels of collaboration, the moderation effect is high, with respect to that observed in the case of low collaboration the effect is positive but moderate.

6. Discussion and conclusion

Previous study results confirm that innovation has a positive impact on firm performance as supported by different authors (Atalay et al., 2013; Barletta et al., 2014; Chen, 2017; Kumar and Sundarraj, 2016; Marín-Idárraga and Cuartas-Marín, 2019; Mohamed Amine and Abbas, 2021). However, as indicated in the report "Performance of SMEs" (SME Performance - OECD, n.d.) most SMEs show low levels of productivity, below-market wages, lack of technology adoption and innovation, low internationalization, and participation in global value chains. That is why this research was conducted to study the relationship of product innovation and business process innovation on the business

Table 4
Reflective measurement models.

Latent variable	Indicator	Loading	AVE	CR	Cronbach's alpha
Commercial Performance	cp01	0.853	0.759	0.94	0.937
	cp02	0.914			
	cp03	0.854			
	cp04	0.842			
	cp05	0.880			
	cp06	0.885			
Economic Performance	ep01	0.932	0.865	0.923	0.922
	ep02	0.958			
	ep03	0.900			
Organizational Performance	op01	0.899	0.762	0.94	0.937
	op02	0.867			
	op03	0.875			
	op04	0.881			
	op05	0.816			
	op06	0.898			
Productive Performance	pp01	0.823	0.732	0.96	0.954
	pp02	0.847			
	pp03	0.856			
	pp04	0.885			
	pp05	0.893			
	pp06	0.795			
	pp07	0.826			
	pp08	0.901			
	pp09	0.867			

Keys: AVE: Average variance extracted; CR: Consistency reliability.

Table 5
Discriminant validity (Heterotrait-monotrait ratio (HTMT) – Matrix).

Construct	CP	EP	OP	PP	Co x Pdi	II x Pri	II x Pdi	Co x Pri
Commercial _Performance (CP)								
Economic _Performance (EP)	0.849							
Organizational _Performance (OP)	0.836	0.756						
Productive _Performance (PP)	0.750	0.762	0.743					
Collaboration x Product _Innovation (Co x Pdi)	0.067	0.042	0.136	0.100				
Investment x Business_ Process_Innovation (II x Pri)	0.090	0.058	0.152	0.208	0.108			
Investment x Product _Innovation (II x Pdi)	0.047	0.046	0.068	0.078	0.014	0.518		
Collaboration x Business_ Process_Innovation (Co x Pri)	0.090	0.090	0.141	0.145	0.880	0.060	0.077	

Table 6
Collinearity (VIF).

Indicator	VIF	p*
co01	1.354	0.000
co02	1.269	0.000
co03	1.305	0.000
co04	1.591	0.000
ii02	1.551	0.000
ii04	1.512	0.000
ii05	1.600	0.000
pdi01	1.893	0.000
pdi02	2.728	0.000
pdi03	2.123	0.000
pdi04	1.722	0.000
pdi05	3.262	0.000
pri01	1.416	0.000
pri02	1.290	0.000
pri04	1.351	0.000
pri05	1.210	0.000
pri06	1.818	0.000
pri07	1.912	0.000

(*) p-values refer to loadings obtained through bootstrapping with 5000 samples.

performance of MSMEs in emerging countries and to study the moderating role of investment and collaboration in these relationships.

This research concluded, supported by quantitative analysis, that there is no strong evidence of a positive contribution of Product Innovation on the firm performance of MSMEs in the wearing apparel sector in emerging Latin American countries. Product innovation was a significant predictor of economic performance ($\beta = 0.205$, $p < 0.033$) and product innovation significantly predicts firm performance ($\beta = 0.266$, $p < 0.004$). The impact on organizational performance and production performance was not statistically supported.

Regarding the results of the survey on the introduction of Product Innovation, 78 % of the companies indicated having introduced an improvised product in its characteristics, both to the local, national, and international market. But only 21.15 % have developed some introduction of new materials or components in their products or goods, which is related to the low activity in R&D&I. This result is reflected in its weak impact on the achievement of firm performance objectives. Studies (Dai and Cheng, 2018; Elfarmawi, 2019; Nuryakin, 2018; Shin et al., 2022; Verbees and Meulenberg, 2004) showed that product innovation allowed obtaining market leadership, both in the case of large companies and MSMEs, due to conducting re-research activities to identify the needs of specific niches, which ensures the successful introduction of products to the market.

The results of the study show that Business Process Innovation is a significant predictor of firm performance of MSMEs in the wearing apparel sector in emerging countries. With a value of ($\beta = 0.282$, $p < 0.004$) on organizational performance; ($\beta = 0.351$, $p < 0.000$) on economic performance, ($\beta = 0.338$, $p < 0.003$) on productive performance and ($\beta = 0.249$, $p < 0.014$) on commercial performance. It is highlighted that 63 % of the surveyed companies have introduced new marketing and sales processes, product development and design process, but with a level of novelty or improvement of scope of their own company. Innovation in business processes has become a fundamental pillar to obtain improvements in organizational, economic, commercial, and productive performance. This is also evidenced by research by (Bolinao, 2009; Dziallas and Blind, 2019; Gajendran et al., 2014; Hervas-Oliver et al., 2014; Huergo and Jaumandreu, 2004; Muafi et al., 2020; Scuotto et al., 2017), innovation in management and organizational processes is a very important area in developed countries, however the survey shows that only 50.96 % incorporated some management process.

The moderation effect of investment on the relationship between innovation and firm performance was only statistically supported in the relationship II x Pri →OP ($\beta = -0.227$, $p < 0.046$) and II x Pri → PP ($\beta = -0.266$, $p < 0.018$). The survey results show that for MSMEs in the wearing apparel sector in emerging countries very difficult to reach levels of investment to carry out different innovation activities, in the way as their larger counterparts, the large company. The study showed that 48 % of MSMEs have not made any investment in innovation activities in strategic management consulting, management accreditation or sustainability certifications; 44 % have never invested in product or intellectual property testing and evaluation; 42 % have never invested in software or IT development activities; 38 % have never invested in R &D activities; 32 % have not invested in the acquisition or improvement of machinery and equipment; 28. 32 % have not invested in the acquisition or improvement of machinery and equipment; 28.8 % have not invested in marketing and business innovation activities; and 25 % have not invested in engineering, design, or creative or training activities. Of those that have carried out training activities, marketing-sales and acquisition of machinery and equipment, 52 % have invested with their own resources. It was also observed that the innovation activities in which 14.4 % of the MSMEs have received external funds are training, software acquisition and product testing and evaluation. Likewise, according to the results obtained, it was identified that in the case of the MSMEs surveyed in the Latin American countries, 89 % of the investment for innovation activities comes from 30 % of the company's own funds.

With respect to the moderating effect of collaboration on the relationship between Product Innovation and Business Process Innovation and Organizational Performance, there was no significant prediction. As a result of the surveys, it was found that 67.30 % of the MSMEs had never received support from governmental entities for the development of innovation activities; 63.46 % indicated that they had not received collaboration for innovation from private companies such as trade associations, chambers or research institutes; 61.53 % had not obtained collaboration from their suppliers, clients, investors or competitors and 59.62 % indicated that they had not received collaboration from educational institutions, neither public nor private. In the study by García, Sroka and Nowak (García-Machado et al., 2021), the factors that promote the approach of companies to universities to generate technological services that promote innovation were identified.

The results obtained show that although it has been proven that innovation generates performance and growth in organizations, there must be an internal and external context in the business ecosystem for

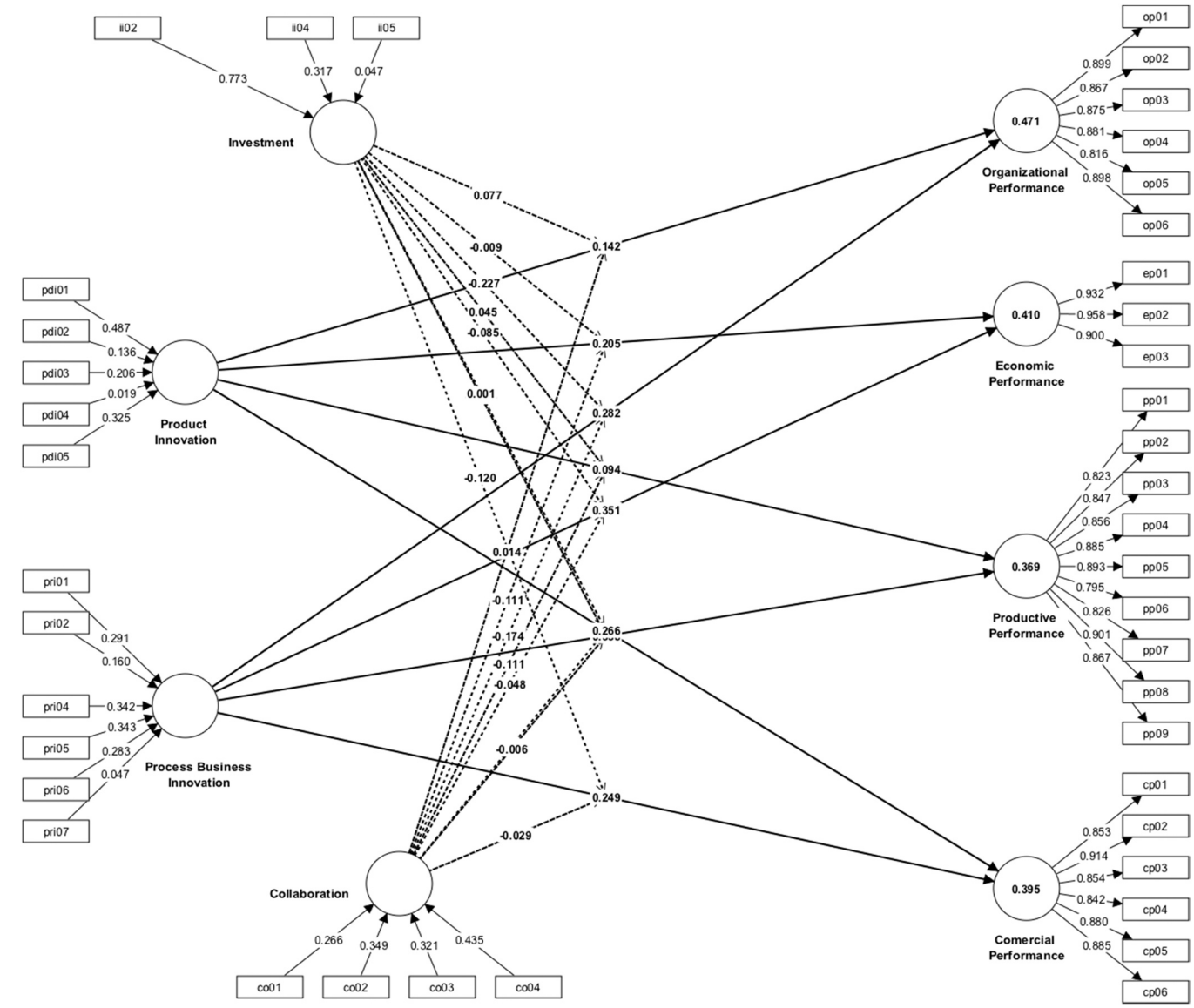

Fig. 2. Structural Model.

Table 7
Structural Model.

Variables	R^2	R^2 Adjusted	Q^2predict
Commercial _Performance	0.395	0.344	0.219
Economic _Performance	0.410	0.360	0.238
Organizational _Performance	0.471	0.426	0.265
Productive _Performance	0.369	0.316	0.176

innovation to be generated, since it is not an isolated process, nor an independent activity, it is a set of actions, processes, and feelings that companies must consider to bet on a culture of innovation. Research (Gherghina et al., 2020; Voytolovskiy et al., 2020) suggests that it is necessary for companies to determine their own strategy for managing innovative activities, as well as to consider possible collaborations for the execution of such activities or for investment in the development of innovation, which also considers an openness in their form of management, learning, adoption of new technologies and flexibility.

Table 8
Hypotheses testing – Independent Variable.

Hypotheses	Hypothetical relationships	Beta	t-Statistic	*p*-value	Description
H1a	Pdi - > OP	0.142	1.489	0.137	
H1b	Pdi - > EP	0.205	2.128	0.033	Supported
H1c	Pdi - > PP	0.094	0.861	0.390	
H1d	Pdi - > CP	0.266	2.877	0.004	Supported
H2a	Pri - > OP	0.282	2.888	0.004	Supported
H2b	Pri - > EP	0.351	3.587	0.000	Supported
H2c	Pri - > PP	0.338	2.992	0.003	Supported
H2d	Pri - > CP	0.249	2.468	0.014	Supported

Table 9
Hypotheses testing – moderated variable.

Hypotheses	Hypothetical relationships	Beta	t-Statistic	*p*-value	Description
H3a	II x Pdi - > OP	0.077	0.656	0.512	
H3b	II x Pdi - > EP	-0.009	0.090	0.928	
H3c	II x Pdi - > PP	0.045	0.374	0.708	
H3d	II x Pdi - > CP	0.001	0.011	0.992	
H4a	II x Pri - > OP	-0.227	1.996	0.046	Supported
H4b	II x Pri - > EP	-0.085	0.851	0.395	
H4c	II x Pri - > PP	-0.266	2.362	0.018	Supported
H4d	II x Pri - > CP	-0.120	1.083	0.279	
H5a	CO x Pdi - > OP	0.014	0.113	0.910	
H5b	CO x Pdi - > EP	-0.111	0.879	0.380	
H5c	CO x Pdi - > PP	-0.111	0.715	0.475	
H5d	CO x Pdi - > CP	-0.121	0.917	0.359	
H6a	CO x Pri - > OP	-0.174	1.576	0.115	
H6b	CO x Pri - > EP	-0.048	0.401	0.688	
H6c	CO x Pri - > PP	-0.006	0.042	0.967	
H6d	CO x Pri - > CP	-0.029	0.234	0.815	

Collaboration should be perceived as a window for the acquisition of new knowledge, new links that generate the active participation of external agents that influence their capacity to innovate, to reduce investment risks, through the formation of collaboration networks, associations, or conglomerates.

6.1. Implications of the study

The findings of the empirical study, which could be generalized to other emerging economies, provide a vision of the external and internal context in which MSME manufacturers develop their innovation capabilities. Evidencing that in our countries there is no successful generation of Product Innovation or Business Process Innovation. All this can shed light on the need to develop public policies to strengthen 99.6 % of the business fabric of our countries. The disarticulation between MSMEs - large companies - state - academia and the lack of knowledge of the reality of MSMEs and the wearing apparel sector on the part of stakeholders is of vital importance to promote timely programs for capacity building or knowledge and technology transfer and to develop a successful ecosystem for innovation.

The application of the conclusions of this study can contribute to the validation and updating of the MSME business sector in emerging Latin American countries and to the development of public policies that promote the innovation ecosystem in the regions, which will result in improved firm performance, better communication and synergy between the public-private-academic sector to optimize the use of resources and generate productivity.

7. Limitations and future research

One limitation of the study was the state of health emergency due to the Covid-19 pandemic, which affected Latin American countries

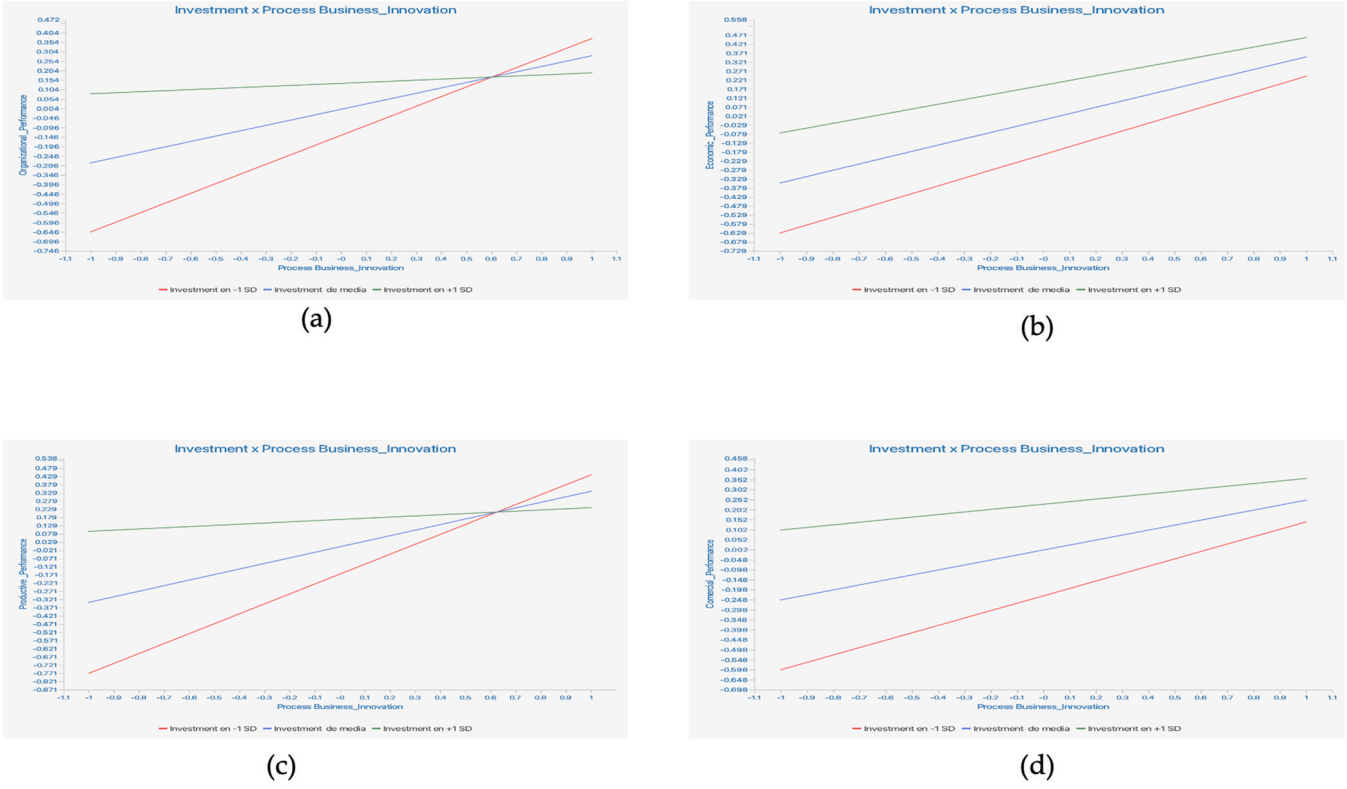

Fig. 3. Investment moderation effect – business process innovation.

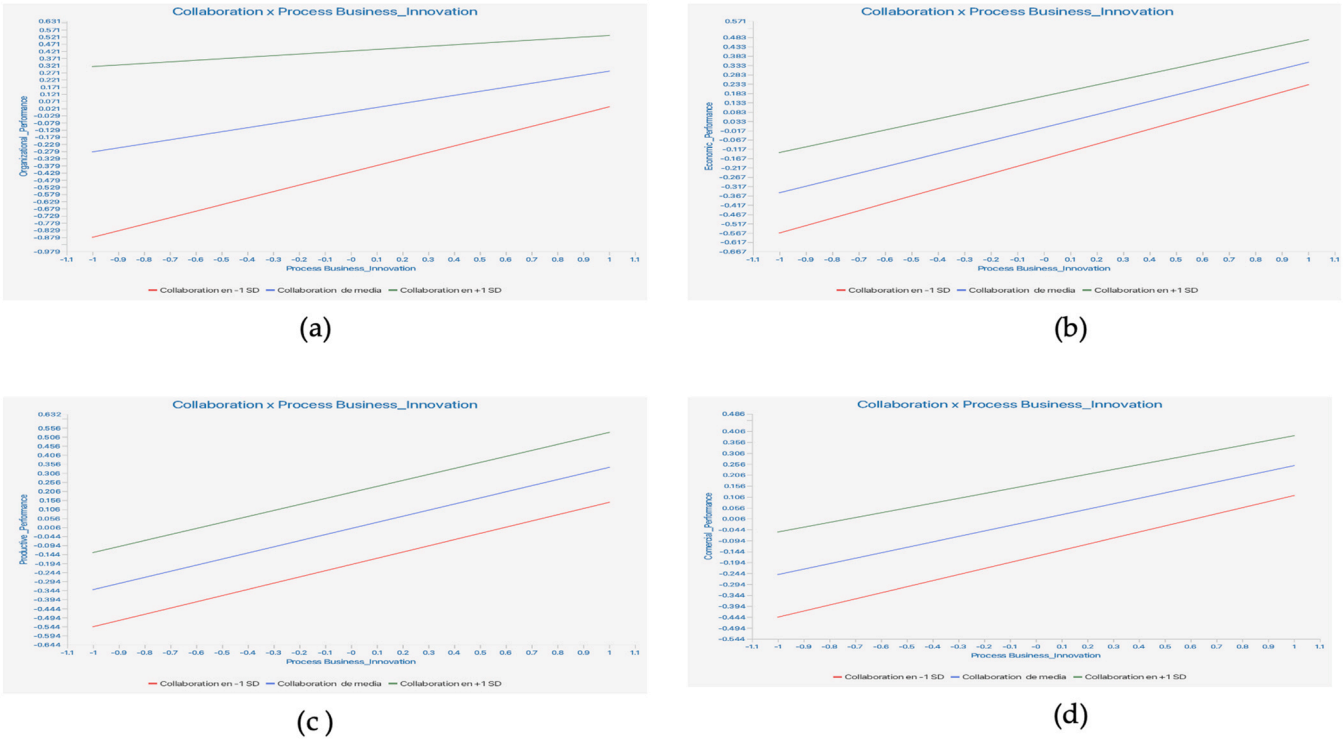

Fig. 4. Collaboration moderation effect – business process innovation.

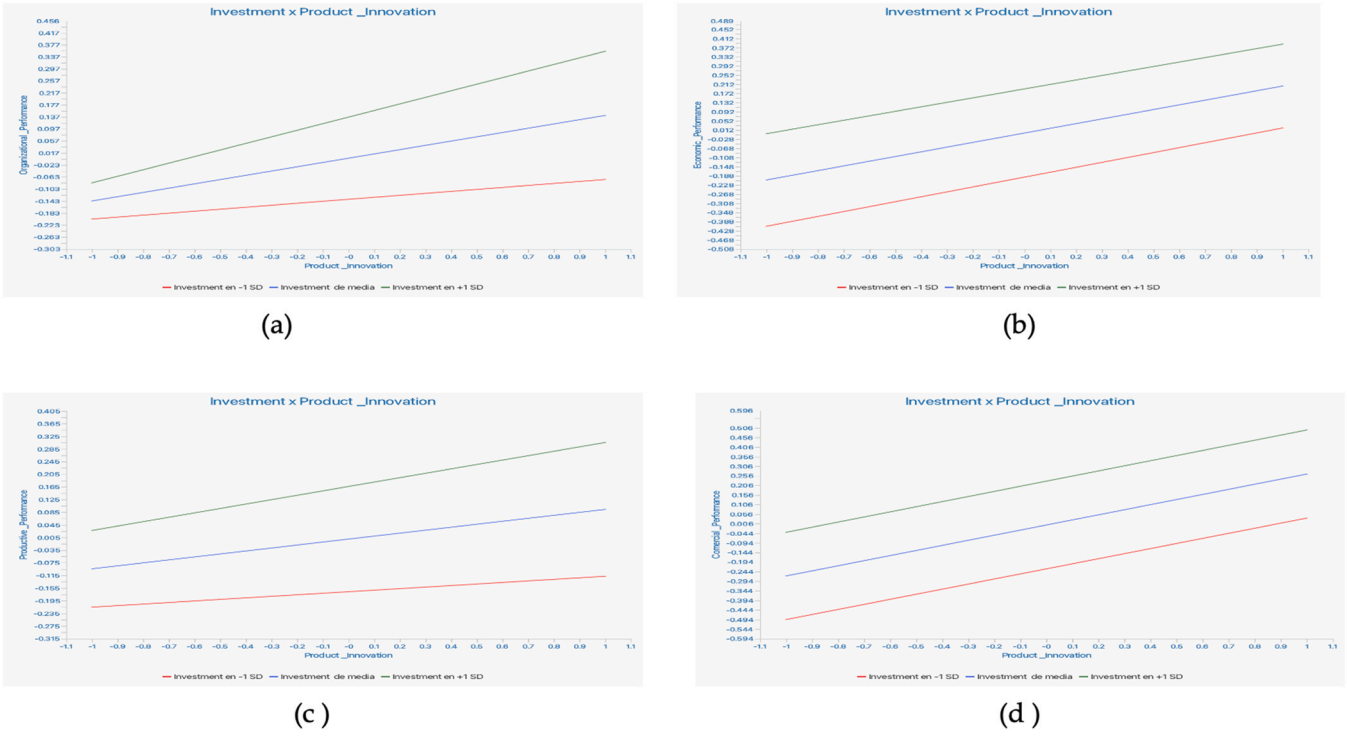

Fig. 5. Investment moderation effect – Product Innovation.

throughout the year 2020. One of the most affected manufacturing sectors worldwide was the wearing apparel manufacturing sector, which had negative results in 2020 and 2021 and is still in the process of recovery. For this reason, for the data collection of the Peru sample, face-to-face surveys and interviews had to be replaced by surveys in virtual formats and interviews through online platforms. It is suggested that the results of the model be explored in other sectors of the manufacturing and service industries in emerging countries. It is also

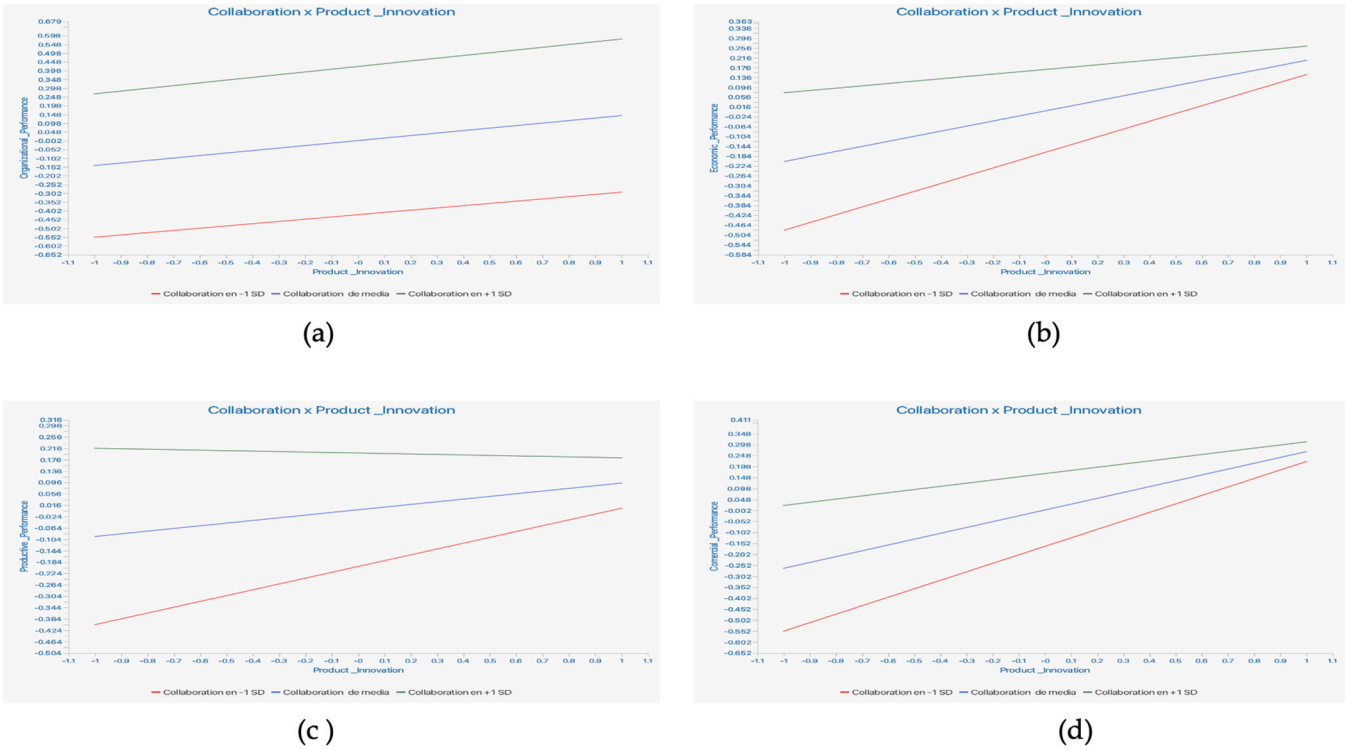

Fig. 6. Collaboration moderation effect – product innovation.

recommended to extend the analysis to large companies, since studies show that in the case of Latin American economies the incorporation of innovation in business strategy is not yet generalized.

Institutional review board statement

Not applicable.

Informed consent statement

"Informed consent was obtained from all subjects involved in the study."

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Data Availability

Not applicable.

Conflicts of Interest

The authors declare no conflict of interest.

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