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**Article**

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## MANAGEMENT | RESEARCH ARTICLE

# Relationship between innovation and sustainability in Latin American countries: Differences by perceptual characteristics of early-stage entrepreneurs

Gustavo Barrera Verdugo<sup>1\*</sup>

**Abstract:** This research evaluates the relationship between innovation and sustainability in Latin American early-stage entrepreneurship. Besides, the study seeks to recognize differences in the relationship between innovation and sustainability by the perception of opportunities, the fear of failure, and companies' perceived social role, in early-stage entrepreneurs. Responses obtained in 11 Latin American countries are analyzed using correlation parameters and multinomial regressions. The results indicate a low association between innovation and sustainability in new businesses. Additionally, the findings demonstrate that entrepreneurs' perceptual conditions affect this connection. Notably, it is evidenced that entrepreneurs who perceive good opportunities, less afraid of failure, and identify an active social role of enterprises, tend to incorporate, jointly, higher innovation and sustainability in their new ventures. These outcomes extend the understanding about the effects of entrepreneurs' psychological characteristics on the development of innovation and sustainability in Latin American countries.

**Keywords:** Business sustainability; product innovation; process innovation; perception of opportunities; fear of failure; social perception of enterprises; early-stage entrepreneurs

### ABOUT THE AUTHOR

Gustavo Barrera Verdugo is a Titular Professor at the Faculty of Engineering and Business of Universidad de las Américas in Chile. He is Doctor and Master in Administration Sciences at Universidad de Santiago de Chile, Master in Marketing at Universidad de Chile, and Commercial Engineer at Pontificia Universidad Católica de Chile. His research lines are associated with demographics and psychology attributes in entrepreneurs and consumers. He has studied topics such as demographic and motivational conditions that affect e-commerce in small businesses, and the manager's demographic characteristics that are incidents on research and development in companies.

### PUBLIC INTEREST STATEMENT

Currently, innovation and sustainability have become central issues in Latin American countries. Consequently, it is relevant to measure the relationship between sustainability and product and process innovation in new ventures, besides recognize the impact of Latin American entrepreneurs' perceptions on this link. Various authors highlight the incidence of perceptions on entrepreneurial behaviors; therefore, understanding the importance of perceived business opportunities, the fear of failure, and the perceived companies' social role, on sustainability and products and process innovation shows ways to strengthen, jointly, sustainability and innovation. Latin American governments could achieve this purpose using diffusion campaigns regarding sustainable entrepreneurship and developing public policies that support new businesses with training, financing, subsidies, or tax reduction.

## 1. Introduction

Nowadays, the damage caused by global warming and pollution to agricultural production, flora, and fauna, and people's lives is widely recognized (e.g., Harrison, 2018; Malm, 2018). A relevant factor for global environmental and social wellbeing is companies' activities, which obtain, transform, and dispose of natural resources in their operations, and incorporate people to develop their processes (Leone & Belingheri, 2017; Schroeder et al., 2019). In this regard, there is consensus on the need to create and maintain sustainable companies; in other words, organizations with profitable businesses under guidelines of environmental care and social awareness (Glavič & Lukman, 2007).

At the same time, in the last decade, innovation has been a central topic in business management and academic research, since evidence from studies and the community considers that it contributes to solving problems and improving the quality of life of the population and economic growth (Dolan & Metcalfe, 2012; Van Aken & Berends, 2018). So, previous researches regarding this topic have addressed: the innovation's contribution on economic development and industrial sectors (e.g., Grazi & Pietrobelli, 2016; Lundvall, 2007); the impact of business's innovation ecosystem on enterprises (Oh et al., 2016; De Vasconcelos Gomes et al., 2018); the organizational qualities that facilitate or hinder innovation, such as, organizational structure and the work climate (Dedahanov et al., 2017; Song et al., 2020) and managers' characteristics that contribute to innovation, such as, transformational leadership (Zhang et al., 2017; Zuraik & Kelly, 2019).

Coincidentally, it has been recognized that the search for original alternatives, associated with innovation, is consistent with the business orientation towards sustainability. This approach implies convergence between the creation of original products or processes and the fulfillment of actions that favor the care of the environment and society; that is, it is argued that innovation and sustainability are two complementary approaches that tend to be linked (Adams et al., 2016; Varadarajan, 2017). For instance, in this regard, Dangelico et al. (2017) have studied the relationship between innovation and sustainability from the perspective of dynamic capabilities, proposing that the combination of processes (integration of external resources, integration of internal resources, and creation and reconfiguration of resources) change the ordinary capabilities in organizations to achieve ecological innovation.

Besides, the knowledge about entrepreneurs' psychological attributes, associated with a propensity towards their ventures' sustainability is limited. Most research in this area analyzes sustainable business models, operational processes, and organizational capacities that favor sustainability's implementation in organizations or influence companies' sustainability performance (Baldassarre et al., 2017; Bocken et al., 2014; Dangelico et al., 2017). A smaller group of researches has analyzed the relationship between manager's psychological conditions and sustainability; as an example, it has been argued that orientation towards sustainability is related to managers' motivations, lifestyles, and personal meta-cognitions (Tur-Porcar et al., 2018). Also, the relationship between the manager's personality traits with developing sustainable enterprises is supported (Schiebel, 2005).

To date, there is still little knowledge about the relationship between innovation and sustainability in Latin America, particularly concerning its magnitude in ventures that are beginning operational activities. Researches in this region have studied cases of jointly innovation and sustainability in some strategic economic sectors, such as agriculture (Toledo, 2011) and energy generation (Ramírez-Montoya & Mendoza-Domínguez, 2019). For example, Pereira de Carvalho and Barbieri (2012) analyzed the supply chain of a cosmetics company, demonstrating that, to reduce the adverse social and environmental effects of the innovative product, the company's managers require the support of its suppliers. Regarding the entrepreneur's characteristics associated with innovation and sustainability in companies, the evidence is also scarce in this region; Parra Aguirre (2016) points out that entrepreneurs' perseverance and their ability to solve problems, represent innovative entrepreneurs' features in the south of Mexico. Due to the relationship between

innovation, sustainability, and entrepreneur's perceptual attributes has not been evaluated extensively in Latin America, it is observed that there is a knowledge gap associated with psychological characteristics that are incident in new venture's development

Consequently, the objective of this research is to evaluate the relationship between product and process innovation with sustainable actions in early-stage ventures in Latin America, distinguishing the magnitude of this relationship by the recognition of opportunities, the fear of failure, and the perception of the social role of the ventures, in the entrepreneurs. To achieve this objective, companies less than 42 months old are studied, since, in this phase, entrepreneurs experience relevant challenges (Van Gelderen et al., 2011), and must make innovation and sustainability compatible with the subsistence of their ventures.

This research focuses on product and process innovation. The selection of product innovation is because this type has been recognized as a determining factor for the new ventures' success (e.g., M. Song et al., 2008), also due to its benefits on business performance (e.g., Sandvik & Sandvik, 2003), since product innovation helps to develop differentiated products that better satisfy the market's needs. Concerning process innovation, new businesses often must solve novel and complex problems with few resources; this kind of innovation can help overcome these obstacles (Bremner & Eisenhardt, 2019). Besides, process innovation is linked to product innovation, Milling and Stumpfe (2000) support that these are interdependent and integrate the same system. Several studies have analyzed innovation without including all categories defined by the OECD (2005) and have focused in the product or process innovations (e.g., Antolín-López et al., 2015; Avermaete et al., 2004; Medda, 2020; Xie et al., 2019; Xie & Wang, 2020); in this regard, publications in Latin America addressed topics such as the relevance of product and process innovation for economic development (Suárez & Erbes, 2014), their effect on the performance of MSMEs (García-Pérez deLema et al., 2016) and on the productivity of manufacturing firms (Demmel et al., 2017). Due to their importance for new businesses and several studies focusing on these kinds of innovations, the analysis of product and process innovation is considered relevant and valuable in this research.

The findings obtained to strengthen the understanding of the link between innovation and sustainability in Latin America, and also about the psychological characteristics of entrepreneurs, of a perceptual nature, which simultaneously favor the development of innovative businesses, the protection of natural resources, and the wellbeing of suppliers, workers, and consumers. This knowledge regarding entrepreneurs' perceptual attributes can guide programs' implementation to improve the joint integration of innovation and sustainability in new ventures.

## 2. Theoretical framework

### 2.1. Sustainable businesses

Although sustainability is a concept that has become particularly important for the business world in recent decades, there have been divergences in its definition. A widely recognized approach is based on a pyramidal model founded on three principles: the ecological—which usually takes priority -, social and economic (Corso et al., 2001). This perspective supports that sustainability is related to the maintenance of organizational systems linked to the expression of these three principles in business; in other words, sustainable enterprises express care for ecology, economic welfare, and social development. More recently, Salcedo et al. (2010) have highlighted a common zone of interaction between the environmental, economic, and social spheres as a requirement for business sustainability. So, authors define sustainable development as: "the design of human and industrial systems to ensure that humankind's use of natural resources and cycles do not lead to diminished quality of life due either to losses in future economic opportunities or to adverse impacts on social conditions, human health and the environment" (Mihelcic et al., 2003, p.5315).

It has also been recognized that sustainability is a beneficial condition for companies. In this line, research highlights several benefits for organizations that follow its principles. Kiron et al.

(2013) argue that a change in the corporate business model supported by the top management, which is close to the customers and creates economic value through decisions oriented towards sustainability, favors the generation of business profits. More recently, Kim and Kim (2018) have shown that companies with Corporate Sustainability Management obtain benefits in the market, through a higher profit of their shares, because investors value it. In Latin America, Martínez and Romo (2018) have argued that product innovation positively correlates with SMEs' financial performance in Aguascalientes, México.

The literature acknowledges a transition from corporate responsibility inside enterprises to the whole sustainable enterprise concept (Chirinos et al., 2012). This change of paradigm is oriented towards the predominance of sustainable business models, as part of the interests of their managers and investors, that is based on the creation of value for clients and simultaneously contribute to the environment and social wellbeing (Bocken et al., 2014). Likewise, the concept of sustainable development implies a dynamic and long-term vision of companies that incorporate sustainability and use it as an advantage for their progress in the market and, at the same time, contribute to the economic growth of countries (Rodríguez et al., 2002).

Additionally, since the ecological, social, and economic spheres are interconnected, companies must adopt inclusive practices when linking with their environment (Hart et al., 2003), and when using natural and social resources. These practices enable enterprises to achieve sustainability from different perspectives (Gold et al., 2010; Salzmann et al., 2005); also, the performance of such actions must be evaluated with specific indicators associated with a company's sustainability in areas of environmental and social sustainability (Callens & Tyteca, 1999; Pope et al., 2004).

Recent research on sustainable companies focuses on studying their performance and the factors influencing their growth and the magnitude in organizations (e.g., Teh et al., 2018). These studies consider, for example, the analysis of their costs (Smith et al., 2019), evaluation of the influence of organizational size (Bourlakis et al., 2014), and the orientation towards sustainability of companies in particular industrial sectors (Mariadoss et al., 2016). Likewise, new methodologies have been published to systematize organizational processes that allow the implementation and strengthening of sustainability in companies (Hossain et al., 2020); these methodologies support sustainability's implementation in business models.

## **2.2. Product and process innovation**

A main category of innovation is associated with creating new products adapted to market changes and competition (Dougherty & Hardy, 1996). This innovation, called product innovation, involves developing new technologies or their combination to meet market needs (Utterback & Abernathy, 1975). Product innovation can be incremental, expressed in a new line or line extension that improves previous products, or disruptive, evidenced by the launch of a radically new product that creates new markets or by changing the way people satisfy their needs (Kleinschmidt & Cooper, 1991; Veryzer, 1998).

On the other hand, process innovation refers to the way a good or service is produced and distributed (Barras, 1986). A process can be understood as a series of structured and designed activities to generate outputs -product or service- (Davenport, 1993); it implies management of materials, equipment, tasks, and the administration of workers and information (Damanpour & Gopalakrishnan, 2001). In general, process innovation has an internal focus; instead, product innovation is evidenced in the outcomes or outputs of processes (Utterback & Abernathy, 1975).

Sustainability has been highlighted as a key driver for innovation. Nidumolu et al. (2009) point out that the search for sustainability is affecting the competitive environment, forcing companies to change their thinking about products, technologies, processes, and business models, also, that the key to progress in this direction is innovation. In this sense, the concept of sustainable innovation has acquired particular importance regarding the care of the environment and social groups, which

focuses on the efficient and cyclical use of resources (Dangelico et al., 2017; Severo et al., 2017). So, in the last decade, the link between innovation and sustainability has been endorsed (El Bilali, 2018; Fellnhofner, 2017; Pedersen et al., 2018); also, success factors for sustainable innovation have been proposed to strengthen their performance (De Medeiros et al., 2014; Varadarajan, 2017).

Regarding the level of innovation in Latin America, the Global Innovation Index (2019) does not include any Latin American country among the world's 50 most innovative nations. The first country from this region in the ranking is Chile, which reached 51st place. Concerning corporate sustainability, development on social and environmental issues is not comparable with developed countries despite progress in the region. Besides, although the relevance of innovation and sustainability for Latin America is known (Arond et al., 2011), to date, there has been no further measurement of their linkage in early-stage ventures.

Complementary studies have shown that Latin Americans' wellbeing and development require innovation and sustainability in industries, such as agriculture, energy distribution, and mining (e.g., Toledo, 2011; Milanez & de Oliveira, 2013; Ramirez-Montoya & Mendoza-Domínguez, 2019). In this regard, Arond et al. (2011) point out that in recent years, the governments in this region have increased their focus on science and technology policies, since governors consider that innovation should contribute to poverty reduction, to sustainability, and to reduce the severe inequality in populations.

Due to previous publications suggest that sustainability is a driver of innovation, and due to the importance that has been attributed to these concepts in recent years in Latin America, which is evidenced through public policies for their promotion, it is possible to propose that there should be a positive relationship between innovation and sustainability in Latin American's early-stage companies. Consequently, the following hypothesis is proposed:

**H1:** There is a positive relationship between innovation and sustainability in early-stage ventures in Latin America.

### **2.3. Perception of opportunities**

A business opportunity can be defined as the possibility of introducing a new product on the market with a profit, or a favorable situation in which entrepreneurs create new solutions to satisfy needs (Companys & McMullen, 2007). In economic theory, opportunities arise from an economic imbalance, particularly because entrepreneurs practice their knowledge or judgment and initiate actions to align demand and supply better. The benefits of the perception of opportunities on business creation have been widely analyzed (Krueger, 2003), also, the entrepreneur's and context's conditions that contribute to the identification of business opportunities (Aparicio et al., 2016; Jamali et al., 2018). In general terms, the perception of opportunities is positively linked to business development because it facilitates companies' creation and investments (Adelino et al., 2017).

Besides, the recognition of opportunities is considered a condition that favors innovation; it has been supported that to develop an innovative business model, companies need to identify business opportunities and coordinate their organizational resources to exploit them (George & Bock, 2011). In this regard, Shepherd and DeTienne (2005) argue that people with prior knowledge about a problem are more likely to focus on relevant information for identifying opportunities; they also support that people with higher knowledge about a problem show a higher capacity to identify opportunities for innovation. In this sense, Dyer et al. (2008) developed a theory that explains why the entrepreneur's capacity to identify opportunities favors the probability of generating ideas for innovative businesses; they state that innovative entrepreneurs are information seekers and can identify opportunities for innovation and change the status quo.

Regarding the relationship between the perception of opportunities and sustainability, previous evidence suggests that opportunities contribute to the formation of positive opinions about business activities (McMullen & Shepherd, 2006). Particularly from the social sustainability perspective. Yitshaki and Kropp (2016) developed a theoretical model that links the motivations, recognition of opportunities, and prosocial activities in entrepreneurs; they argue that entrepreneurs' experiences foster awareness about unsatisfied social needs and promote recognition of opportunities for social entrepreneurship. It is possible to conclude that the previous evidence suggests that perceiving good opportunities tends to favor companies' sustainability.

Additionally, in the field of both sustainability and innovation, specific terms such as "opportunities for sustainability" (DiVito & Ingen-Housz, 2019) and "opportunities for innovation" (Fayard et al., 2016) have been adopted, which reinforces the idea that there is a positive relationship between innovation and sustainability. Based on this evidence, it is reasonable to project that the perception of good opportunities contributes to the development of sustainable ventures, and in the same sense, facilitates the companies' orientation towards innovation (Carlson et al., 2018; O'Regan & Ghobadian, 2005). Consequently, this research suggests that early-stage entrepreneurs who perceive good opportunities in Latin America, should express higher joint performance in innovation and sustainability. The following research hypothesis is proposed:

**H2:** The relationship between innovation and business sustainability is higher among early-stage entrepreneurs who claim to recognize good business opportunities in Latin America.

#### **2.4. Fear of failure**

Fear of failure is avoiding failure due to the tendency to experience shame and humiliation as a consequence of failing. Also, it is a propensity towards anxiety in the face of potential failure (Atkinson, 1987). In entrepreneurship, fear of failure is connected with risk aversion, and mainly, its concept has been studied as an inhibitor to the business' creation (Ng & Jenkins, 2018). It is also a factor that positively impacts effort and achievement orientation (Brunstein & Heckhausen, 2018; Giel et al., 2020).

Besides, fear of failure has been considered a disincentive to innovative entrepreneurship. Gurteen (1998) has pointed out that knowledge, creativity, and innovation are blocked by various factors, including the fear of failure. Nemeth (1997) states that companies that promote innovation try to limit the fear of failure and promote risk-taking. Recently, Standing et al. (2016) argue that the fear of failure is an individual barrier that limits innovation capabilities; also, Arabiyat et al. (2019) find evidence that supports that the fear of failure harms innovation activities in companies. Although these researches have been developed outside Latin America, they show a negative relationship between fear of failure and innovation.

Complementary, Hoogendoorn et al. (2019) evidence differences between sustainable and regular entrepreneurs regarding the types of risk they fear. Furthermore, sustainable entrepreneurs are more likely to take risks than regular entrepreneurs, and sustainable entrepreneurs are less likely to experience fear about financial risks than regular entrepreneurs. Besides, Nicolás et al. (2018) study cognitive determinants of social entrepreneurship -a field related to social sustainability-, noting that social entrepreneurs express a lower level of fear of failure.

Additionally, innovation and sustainability imply the search for new processes and solutions in companies, which benefit clients, the environment, and society in general (Byerly, 2014; Caliendo et al., 2009); this guideline it is associated with creativity and uncertainty and is contrary to the fear of failure and the aversion to risk (Shaw & Carter, 2007). It is possible to conclude that previous publications tend to point out a negative relationship between fear of failure and business sustainability. In Latin America, few research publications have investigated the incidence of fear



of failure on innovation and sustainability. For example, Del Río Cortina (2012) supports that fear of failure discourages the development of innovative and sustainable ventures in Cartagena de Indias, Colombia; however, extensive evidence with a continental scope has not been developed. As indicated, evidence from Europe or Asia suggests that fear of failure reduces the propensity for innovation and sustainability; hence, it is reasonable to argue that the fear of failure should also inhibit both the orientation towards sustainability and innovation in Latin America's new companies. Consequently, the following research hypothesis is proposed.

**H3:** The relationship between innovation and business sustainability is lower in early-stage entrepreneurs who express fear of failure in Latin America.

### **2.5. Perception regarding the social role of enterprises**

Social entrepreneurship consists of developing businesses that seek social purposes over financial results (Byerly, 2014). In particular, this concept involves ventures that prioritize solving problems in society or the environment, rather than maximizing profitability on the owners' capital. The influence of the social context is relevant to participation in social enterprises since people learn the value of a business by observing people who are role models, also through the information from close relationships such as family members (Braga et al., 2014; Yitshaki & Kropp, 2016); in this way, people exposed to favorable influences tend to create businesses with a social focus.

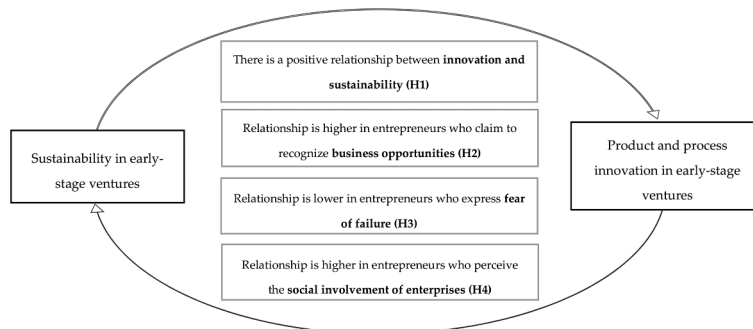
Bargh et al. (1996) support the perception-behavior link, showing that perception of other people's behavior effectively increases the possibility of performing such behaviors oneself. Their findings suggest that, despite the common belief that we control our behaviors, social behavior is affected by unconscious processes. In this line, entrepreneurship research has recognized for decades the concept of "perceived desirability," which has been promoted by Shapero and Sokol (1982). Perceived desirability is related to a person's perception of the attractiveness of particular behavior, in this case, entrepreneurial actions. Glavas and Godwin (2013) have analyzed the incidence of perceived desirability on sustainable entrepreneurship, recognizing its positive effect on this kind of venture.

Additionally, the Theory of Planned Behavior (Ajzen, 1991) supports that three key factors influence an individual's intent to carry out a specific behavior: attitude toward the act, social norms, and control of the perceived behavior. The social norms factor has been appreciated for decades as a construct that affects individual entrepreneurship behaviors (e.g., Arshad et al., 2016; Wach & Wojciechowski, 2016). A social norm is a rule of conduct that individuals prefer to adhere to because they believe that (a) most people in their reference network conform to it, and (b) most people in their reference network believe that they must conform to it (Bicchieri, 2016). In this line, Dooley et al. (2016) used the theory of social norms, seeking to strengthen Community Approaches to Total Sanitation and sustainability behaviors in populations; Glavas and Godwin (2013) also analyzed the social norms' incidence over sustainability, evidencing that these rules affect sustainable characteristics of entrepreneurship.

Complementarily, it has been supported that the employees' perception regarding companies' social responsibility in which they work affects their attitudes and behaviors. In particular, researchers have argued that the workers' positive perception of social responsibility has a favorable impact on their organizational citizenship behaviors; these behaviors can be oriented to their employer or other co-workers (Choi & Yu, 2014; Pérez et al., 2018). Likewise, this concept influences the innovative labor in workers; in this regard, Afridi et al. (2020) evidence that workers' positive perception of corporate social responsibility is related to innovative labor behavior in Pakistan's hotel companies.

Additionally, due to the recognized relationship between social entrepreneurship, creativity, and innovation (Dentchev et al., 2016), it is feasible to propose that the entrepreneurs who

**Figure 1. Conceptual framework.**



perceive an essential companies' social role are more likely to develop, jointly, sustainable business and innovation in their products and processes. Accordingly, the theory of perceived desirability, the theory of social norms, and the evidence about employees' corporate responsibility perceptions, supporting that a favorable perception of enterprises' social role in entrepreneurs should positively impact sustainability and innovation on Latin American early-stage ventures. The following hypothesis is proposed:

**H4:** The relationship between innovation and business sustainability is higher in early-stage entrepreneurs who perceive positive enterprises' social involvement in Latin America.

Figure 1 below represents a summary of the concepts analyzed and the relationships proposed in the research hypotheses.

### 3. Materials and methods

#### 3.1. Variables

From Adult Population Survey (APS), questions and statements are chosen to evaluate the enterprises' level of novelty and originality of products and processes. Also, are selected items that measure new entrepreneurs' appreciation and actions regarding environmental and social protection. These questions and affirmations chose from APS of Global Entrepreneurship Monitor -GEM-, evaluate recognized conditions that explain behaviors in entrepreneurship (Kautonen et al., 2013; Misra & Kumar, 2000). Table 1 describes the statements and questions chosen, their theoretical basis for analysis in this research, and their measurement scale.

#### 3.2. Sample

GEM's Adult Population Survey (APS) data (Global Entrepreneurship Monitor, n.d.) collected in 2015 and publicly available are analyzed. From there are selected early-stage entrepreneurs' responses whose business is less than 42 months old, these entrepreneurs are part of the Early-stage Entrepreneurship Activities group (TEA). The TEA definition has been widely used in several sub-topics of research (e.g., Hechavarría & Ingram, 2019; Wong et al., 2005); its relevance is based on the fact that in the initial stages, entrepreneurs experience challenges before reaching the established enterprise phase -after 42 months-. Due to the financial lack that many early-stage companies face (Bosma et al., 2020), this research seeks to analyze how these early-stage businesses reconcile their financial difficulties with innovation and sustainability.

The responses analyzed in the APS dataset include the following countries: Argentina, Brazil, Chile, Colombia, Ecuador, Guatemala, México, Panamá, Perú, Puerto Rico, and Uruguay. Table 2 presents the total number of complete and valid answers linked to innovation and sustainability, after the data filtering and the conformation of groups belonging to TEA. The number of responses

**Table 1. Affirmations and questions incorporated in the analysis**

Code	Affirmation/Question	Theoretical basis	Scale
<b>INPROD</b>	My organization offers products or services that are new to the market.	Product innovation can be a change in a product line or the launch of a new product.	Ordinal: Likert with five levels. From strongly agreed=5 to strongly disagreed=1. 1 = Strongly Disagree. 2 = Somewhat Disagree. 3 = Neither Agree nor Disagree. 4 = Somewhat Agree. 5 = Strongly Agree.
<b>INPROC</b>	My organization offers a new way to produce a product or service.	Process innovation is a new mode of production and distribution of a good or service, incorporating aspects such as modification of materials, equipment, tasks, and administration of work and information.	
<b>IMPSUST</b>	Social and environmental values are more important than financial value.	The statements refer to businesses that consider social and environmental care as part of the interests of their managers and investors, and that take particular actions such as measuring environmental impact and reinvesting profits. They are consistent with the principles of sustainability.	
<b>VSOCIAL</b>	The company places greater emphasis on social value than on environmental value.		
<b>RPROFIT</b>	Profits are reinvested for social and environmental purposes.		
<b>IMPACT</b>	The company makes efforts to measure its environmental and social impact.		
<b>GOPPORT</b>	In the next six months, there will be good opportunities to start a business in the region where you live.	The statement directly evaluates the perception of opportunities and expresses their positive relationship with business creation.	
<b>FAILURE</b>	Could the fear of failure prevent you from starting a new business?	The question directly concerns the negative influence of fear of failure over business development.	
<b>SPROBLEM</b>	In my country, you often see businesses whose main objective is to solve social problems.	The statement evaluates the perception of social entrepreneurship, according to its definition.	

is presented by gender; also, the average and the standard deviation of the age. Due to the responses are obtained from GEM's APS, and this study is widely used, it has not been necessary to request ethics approval.

### 3.3. Data analysis

To evaluate the link between innovation and sustainability, correlation analysis with Spearman's statistician is performed, which is used on ordinal variables with the absence of normality (De Winter et al., 2016), also the rho-p hypothesis test to evaluate the statistical significance of Spearman's correlations. Complementarily, a multinomial regression analysis is performed to corroborate relations, assessing goodness of fit in the model through the Chi2 parameter and significance in the regression coefficients with p-Value. The regression formulas used are the following:

**Table 2. Total valid observations in the sample and ages**

	<b>INPROD</b>	<b>INPROC</b>	<b>IMPSUST</b>	<b>VSOCIAL</b>	<b>RPROFIT</b>	<b>IMPACT</b>
Number of Men	812	814	1.033	1.026	806	812
Number of Women	590	593	761	756	585	589
Average age	40.84	40.79	41.47	41.52	40.97	40.86
Age standard deviation	14.81	14.72	15.29	15.21	14.79	14.77

**Note:** INPROD = My organization offers products or services that are new to the market. INPROC = My organization offers a new way to produce a product or service. IMPSUST = Social and environmental values are more important than financial value. VSOCIAL = The company places greater emphasis on social value than on environmental value. RPROFIT = Profits are reinvested for social and environmental purposes. IMPACT = The company makes efforts to measure its environmental and social impact.

$$INPROD = \beta_1 * IMPSUST + \beta_2 * VSOCIAL + \beta_3 * IMPACT \quad (1)$$

$$INPROC = \beta_1 * IMPSUST + \beta_2 * VSOCIAL + \beta_3 * IMPACT \quad (2)$$

The differences in the correlation coefficients, based on the perception of opportunities, fear of entrepreneurship failure, and social perception of entrepreneurship, are tested through Cohen's *q* coefficient. Spearman's correlation coefficients were transformed into Pearson's correlation coefficients to calculate Cohen's *Q* parameter. Before making this transformation, the Spearman and Pearson correlations were compared to corroborate that these correlations, calculated with both methods, integrate similar magnitude interval. Subsequently, Fisher's *Z* parameter was calculated using Pearson's correlations, with the formula  $0.5 \times \ln [(1 + \text{Corr}) / (1 - \text{Corr})]$ . Finally, Cohen's *Q* is defined as:

$$Q_{\text{COHEN}} = Zr_1 - Zr_2 \quad (3)$$

Cohen's *Q* value of less than 0.10 implies no difference between the correlations compared. The magnitude in the interval of 0.10 to 0.30 expresses a small effect, the range 0.31 to 0.50 moderate effect, and results greater than 0.50 represent significant differences (Ventura-León & Caycho, 2017).

## 4. Results

### 4.1. Global correlations analysis

Correlation results based on Spearman's coefficient, with 546 complete responses, are shown in Table 3. Correlation levels in the range of 0.1279 to 0.4166 are found, and hypothesis tests with *rho p*, confirm the correlation between variables with 99% confidence (*p*-Value < 0.01). These magnitudes represent a low or medium level of association (Dancey & Reidy, 2007). The correlations between offering new ways of producing products, associated with process innovation, and orientation towards sustainability, shows a higher range from 0.1279 to 0.4166. This last magnitude, which represents the link between a process innovation and reinvestment of profits, evidence a moderate correlation. As expected, the supply of new products and a new way of producing a product or service is highly correlated (0.5118).

### 4.2. Multinomial regression analysis

The results of multinomial regressions (Ologit) are consistent with the correlations shown in Table 3. The regression's coefficients presented in Table 4 demonstrate that, a higher emphasis on social value than the environmental value (95% confidence, *p*-Value < 0.05), the reinvestment of profits (95% confidence, *p*-Value < 0.05), and the effort to measure social and environmental impact (99% confidence, *p*-Value < 0.01), also involve a higher probability of offering

**Table 3. Spearman’s correlations**

		<b>INPROD</b>	<b>INPROC</b>	<b>IMPSUST</b>	<b>VSOCIAL</b>	<b>RPROFIT</b>	<b>IMPACT</b>
<b>INPROC</b>	Coefficient	<b>0.5118</b>	<b>1.000</b>				
	P- value	0.0000					
<b>IMPSUST</b>	Coefficient	<b>0.1391</b>	<b>0.1470</b>	<b>1.000</b>			
	P- value	0.0011	0.0006				
<b>VSOCIAL</b>	Coefficient	<b>0.1544</b>	<b>0.1279</b>	<b>0.2940</b>	<b>1.000</b>		
	P- value	0.0003	0.0028	0.0000			
<b>RPROFIT</b>	Coefficient	<b>0.2329</b>	<b>0.4166</b>	<b>0.3235</b>	<b>0.2278</b>	<b>1.000</b>	
	P- value	0.0000	0.0000	0.0000	0.0000		
<b>IMPACT</b>	Coefficient	<b>0.2246</b>	<b>0.3821</b>	<b>0.2981</b>	<b>0.2122</b>	<b>0.6160</b>	<b>1.000</b>
	P- value	0.0000	0.0000	0.0000	0.0000	0.0000	

**Note:** INPROD = My organization offers products or services that are new to the market. INPROC = My organization offers a new way to produce a product or service. IMPSUST = Social and environmental values are more important than financial value. VSOCIAL = The company places greater emphasis on social value than on environmental value. RPROFIT = Profits are reinvested for social and environmental purposes. IMPACT = The company makes efforts to measure its environmental and social impact.

**Table 4. Multinomial regressions**

	<b>INPROD</b>		<b>INPROC</b>	
	<b>Beta</b>	<b>P &gt; z</b>	<b>Beta</b>	<b>P &gt; z</b>
<i>IMPSUST</i>	0.094	0.207	-0.131	0.106
<i>VSOCIAL</i>	<b>0.144</b>	0.013	0.113	0.061
<i>RPROFIT</i>	<b>0.182</b>	0.038	<b>0.550</b>	0.000
<i>IMPACT</i>	<b>0.292</b>	0.002	<b>0.391</b>	0.000
<i>N</i>	547		546	
<i>LR Chi2(4)</i>	62.63		138.05	
<i>P &gt; Chi2</i>	0.000		0.000	
<i>Pseudo-R2</i>	0.037		0.089	

**Note:** Beta represents regression coefficients. INPROD = My organization offers products or services that are new to the market. INPROC = My organization offers a new way to produce a product or service.

new products or services in the market. In the case of a new way to produce a product or service -linked to process innovation-, the coefficients related to the reinvestment of profits and the effort to measure the total impact are significant (99% confidence,  $p$ -Value < 0.01). As in correlations analysis, although the influence of sustainable activities on the novelty of products, services, and their form of elaboration can be appreciated, the magnitude of this incidence is low. Despite the small link between these variables in both correlation and regression analysis, the evidence confirms the relationship between innovation and sustainability in Latin American’s early-stages ventures and allows the validation of Hypothesis 1.

#### 4.3. Correlation differences by perceptions

Firstly, correlation coefficients are compared between the entrepreneurs in the initial phase (TEA) that declare to perceive good business opportunities in the next six months and the group of entrepreneurs in TEA without this perception. Table 5 shows that the correlation between innovation—of products and processes—and the orientation towards sustainability, tends to be higher in early-stage entrepreneurs who declare to perceive good business opportunities.

**Table 5. Comparison of correlations by the perception of opportunities**

	GOPPORT	INPROD	INPROC	IMPSUST	VSOCIAL	RPROFIT
<b>INPROC</b>	Yes	0.5153***	1.0000			
	No	0.4793***	1.0000			
	Q- Cohen	0.0674				
<b>IMPSUST</b>	Yes	<b>0.1749***</b>	<b>0.1374***</b>	1.0000		
	No	-0.0015	0.1102	1.0000		
	Q- Cohen	0.1769	0.0327			
<b>VSOCIAL</b>	Yes	<b>0.1619***</b>	<b>0.1146**</b>	0.2889***	1.0000	
	No	0.1159	0.1199	0.2365***	1.0000	
	Q- Cohen	0.1025	0.0967	0.1383		
<b>RPROFIT</b>	Yes	0.2370***	0.4050***	0.3632***	0.2309***	1.0000
	No	0.2355***	0.4240***	0.1986***	0.2014**	1.0000
	Q- Cohen	-0.0381	-0.0528	0.1267	0.0726	
<b>IMPACT</b>	Yes	0.2250***	0.3314***	0.2535***	0.1920***	0.6440***
	No	0.2164***	0.4737***	0.3111***	0.2137**	0.5149***
	Q- Cohen	-0.0007	-0.1139	-0.0351	0.0310	0.1398

**Note:** \*\*\*, \*\* and \* represent significant correlation, with 99%, 95%, and 90% confidence, respectively, with *rho p* test. INPROD = My organization offers products or services that are new to the market. INPROC = My organization offers a new way to produce a product or service. IMPSUST = Social and environmental values are more important than financial value. VSOCIAL = The company places greater emphasis on social value than on environmental value. RPROFIT = Profits are reinvested for social and environmental purposes. IMPACT = The company makes efforts to measure its environmental and social impact. GOPPORT = In the next six months, there will be good opportunities to start a business in the region where you live.

Regarding the statement “social and environmental values are more important than the financial value,” the correlation is significant with product innovation, only in entrepreneurs who claim to perceive opportunities. In the case of process innovation, Cohen’s Q parameter recognizes differences between groups that see or do not view good opportunities (0.1769); the affirmation, “the company places greater emphasis on social value than on environmental value,” is higher in people who perceive good opportunities with Cohen’s Q parameter near 0.10. No significant differences are recognized regarding the prioritization of social innovation, reinvestment of profits, and impact measurement. It is concluded that these findings partially support Hypothesis 2.

Complementarily, Table 6 includes the correlation coefficients, distinguishing groups of early-stage entrepreneurs (TEA) with and without fear of failure. The group that expresses an absence of fear of failure tends to reveal higher correlations between innovation and sustainable actions. The relationships between the statements “social and environmental value are more important than the financial value” and “more emphasis on social value than environmental value” with product and process innovation are not significant in the group that recognizes fear of failure. Likewise, in the comparison between the correlations of “Social and environmental values are more important than the financial value” and process innovation, Cohen’s Q parameter obtains smaller magnitudes within the range of 0.10 to 0.30. No significant differences are recognized regarding the reinvestment of profits and impact measurement. It is concluded that these results partially support Hypothesis 3.

Table 7 shows the differences between entrepreneurs in the initial stages who perceive entrepreneurial activities with a social focus in their region and entrepreneurs that does not recognize this condition. This table evidence higher correlations between sustainability and innovation—of products and processes—in the group that appreciates good enterprises’ social orientation. Particularly in the phrases “social and environmental values are more important than the financial value,” “more emphasis on social value than the environmental value,” “profits are reinvested for

**Table 6. Comparison of correlations by the fear of failure**

	FAILURE	INPROD	INPROC	IMPSUST	VSOCIAL	RPROFIT
<b>INPROC</b>	Yes	0.5860***	1.00			
	No	0.4888***	1.00			
	Q- Cohen	0.0750				
<b>IMPSUST</b>	Yes	0.0767	-0.0122	1.00		
	No	<b>0.1562***</b>	<b>0.1902***</b>	1.00		
	Q- Cohen	-0.0279	-0.1733			
<b>VSOCIAL</b>	Yes	0.0711	0.1129	0.3559***	1.00	
	No	<b>0.1746***</b>	<b>0.1323***</b>	0.2733***	1.00	
	Q- Cohen	-0.1249	-0.1513	0.0971		
<b>RPROFIT</b>	Yes	0.2535***	0.3836***	0.2345**	0.3057***	1.00
	No	0.2277***	0.4249***	0.3425***	0.1955***	1.00
	Q- Cohen	0.0604	0.0178	-0.1169	0.0120	
<b>IMPACT</b>	Yes	0.2322***	0.3892***	0.0537	0.2322***	0.5579***
	No	0.2189***	0.3781***	0.3506***	0.1969***	0.6262***
	Q- Cohen	-0.0044	-0.0055	-0.3337	-0.0907	0.0229

**Note:** \*\*\*, \*\* and \* represent significant correlation, with 99%, 95%, and 90% confidence, respectively, with *rho p* test. INPROD = My organization offers products or services that are new to the market. INPROC = My organization offers a new way to produce a product or service. IMPSUST = Social and environmental values are more important than financial value. VSOCIAL = The company places greater emphasis on social value than on environmental value. RPROFIT = Profits are reinvested for social and environmental purposes. IMPACT = The company makes efforts to measure its environmental and social impact. FAILURE = Could the fear of failure prevent you from starting a new business?

**Table 7. Comparison of correlations by the perception of the social role of enterprises**

	SPROBLEM	INPROD	INPROC	IMPSUST	VSOCIAL	RPROFIT
<b>INPROC</b>	Yes	0.5253***	1.000			
	No	0.5091***	1.000			
	Q- Cohen	0.0673				
<b>IMPSUST</b>	Yes	<b>0.2216***</b>	<b>0.2469***</b>	1.000		
	No	0.05830	0.06780	1.000		
	Q- Cohen	0.1892	0.2422			
<b>VSOCIAL</b>	Yes	<b>0.3204***</b>	<b>0.2544***</b>	0.3770***	1.000	
	No	0.0109	0.0229	0.2219***	1.000	
	Q- Cohen	0.3076	0.2932	0.1721		
<b>RPROFIT</b>	Yes	<b>0.3152***</b>	0.4382***	0.4126***	0.3751***	1.000
	No	0.1673***	0.3976***	0.2570***	0.1121**	1.000
	Q- Cohen	0.1139	0.0812	0.2589	0.3105	
<b>IMPACT</b>	Yes	<b>0.3508***</b>	<b>0.4929***</b>	0.3971***	0.3182***	0.6039***
	No	0.1317**	0.3129***	0.2231***	0.1381**	0.6219***
	Q- Cohen	0.2378	0.2980	0.2783	0.3117	0.0404

**Note:** \*\*\*, \*\* and \* represent significant correlation, with 99%, 95%, and 90% confidence, respectively, with *rho p* test. INPROD = My organization offers products or services that are new to the market. INPROC = My organization offers a new way to produce a product or service. IMPSUST = Social and environmental values are more important than financial value. VSOCIAL = The company places greater emphasis on social value than on environmental value. RPROFIT = Profits are reinvested for social and environmental purposes. IMPACT = The company makes efforts to measure its environmental and social impact. SPROBLEM = In my country, you often see businesses whose main objective is to solve social problems.

**Table 8. Synthesis of theoretical background, hypothesis, and findings**

THEORETICAL BACKGROUND	HYPOTHESIS	FINDINGS	SUPPORT
Previous publications suggest that sustainability is a driver of innovation (Nidumolu et al., 2009) and that these concepts are linked (Fellnhofer, 2017; Pedersen et al., 2018; El Bilali, 2018).	<b>H1:</b> There is a positive relationship between innovation with sustainability in early-stage ventures.	The evidence confirms the relationship between innovation and sustainability in the group of early-stage entrepreneurs	Yes
Yitshaki and Kropp (2016) linked motivations, recognition of opportunities, and prosocial activities in entrepreneurs. Specific terms such as “opportunities for sustainability” (DiVito & Ingen-Housz, 2019) and “opportunities for innovation” (Fayard et al., 2016) have been adopted.	<b>H2:</b> The relationship between innovation and business sustainability is higher among early-stage entrepreneurs who claim to recognize good business opportunities.	The correlation between innovation and the orientation towards sustainability tends to be higher in early-stage entrepreneurs, who declare to perceive good business opportunities. No significant differences are recognized regarding the prioritization of social innovation, reinvestment of profits, and impact measurement.	Partially
Fear of failure has been considered a disincentive to innovation (e.g., Gurteen, 1998; Standing et al., 2016). Sustainable entrepreneurs are more likely to take risks than regular entrepreneurs (Hoogendoorn et al., 2019).	<b>H3:</b> The relationship between innovation and business sustainability is lower in early-stage entrepreneurs who express fear of failure.	The group that expresses an absence of fear of failure tends to reveal higher correlations between innovation and sustainable actions. No significant differences are recognized regarding the reinvestment of profits and impact measurement	Partially
The social norms affect individual entrepreneurship behaviors (e.g., Arshad et al., 2016; Wach & Wojciechowski, 2016). Glavas and Godwin (2013) evidenced that social norms affect entrepreneurship’s sustainable characteristics. Afridi et al. (2020) support that workers’ positive perception of corporate social responsibility is related to innovative labor behavior.	<b>H4:</b> The relationship between innovation and business sustainability is higher in early-stage entrepreneurs who perceive the social involvement of enterprises.	The correlations are statistically significant in the group that appreciates the social orientation of the companies in their region.	Yes

social and environmental purposes,” and “the company makes efforts to measure its environmental and social impact.” Additionally, Cohen’s Q coefficient highlights differences, with a smaller magnitude, between both groups in these correlations, with quantities between 0.081 and 0.3076. The findings obtained allow validating Hypothesis 4 of the research.

Finally, Table 8, presented below, summarizes the theoretical background and findings to support the proposed hypotheses. As indicated, hypotheses 1 and 4 are supported; instead, the results show partial evidence to accept hypotheses 2 and 3.

**5. Conclusions and discussion**

To date, the joint analysis of innovation and sustainability is scarce in Latin America, as well as its link with entrepreneurs’ perceptual attributes. This research provides new evidence about the magnitude of the relationship between innovation and sustainability in this region, and the intervention of early-stage entrepreneurs’ perceptions. The positive relationship between product



and process innovation and sustainability, which has been proven, is consistent with previous publications that analyzed other geographical areas (Neutzling et al., 2018; Pedersen et al., 2018).

The link between innovation and sustainability found is statistically significant, although low in magnitude. It means that most new ventures in this region that develop product and process innovation do not attribute significant relevance to sustainability, do not reinvest their profits for this purpose, or do not measure social or environmental impact. In the opposite sense, most enterprises that declare to adhere to sustainability principles do not develop novelty in their products or processes.

Likewise, it has been shown that the link between innovation and sustainability in Latin America tends to be more significant in new entrepreneurs, who perceive good opportunities from the environment, do not express fear of failure, and recognize an active social role in the enterprises. Findings are consistent with previous researches that positively relate the perception of opportunities with new businesses and creativity (Matlay et al., 2011; Monllor & Altay, 2016), that favorable associate the fear of failure with an aversion to risk (Costa & Mainardes, 2016; Morgan & Sisak, 2016), and that positively link the perception regarding social environment with entrepreneurial orientations (Kibler et al., 2015; Sunny & Shu, 2019). The evidence associated with an active social role in the companies is remarkable; these findings suggest that in Latin America is relevant to promote a good social perception of companies through communication campaigns and social responsibility policies, to foster the sustainability and innovation in new ventures.

Besides, findings extend the knowledge about the entrepreneurial psychology on sustainable ventures, since new evidence supports that people's perceptual characteristics affect the link between innovation and sustainability in early-stage entrepreneurship. This contribution is relevant because the line of knowledge associated with the psychology of sustainable entrepreneurship is still incipient. In recent years, mainly, research has related enterprise sustainability with the characteristics of business models (Baldassarre et al., 2017; Bocken et al., 2014), organizational process attributes (Feng et al., 2020; Singh, 2018; Yu et al., 2020), and the effects of public policies and the generation of social benefits on communities (Jain et al., 2018; Mathew & Sreejesh, 2017).

Early-stage ventures in Latin America are mostly micro or small businesses engaged in trade or service provision, and they hire a significant percentage of the labor force (Dini & Stumpo, 2018). Consequently, this research recommends the development of government policies that, simultaneously, strengthen the innovation and sustainability of these businesses in the region through training, subsidies, or tax reductions. These actions could be implemented from the central government or local governments such as municipalities.

Particularly, from a practical perspective, this research proposes implementing holistic interventions, which integrate training, incentives, mentoring, and networking to improve the perceptions of the environment and reduce the fear of entrepreneurial failure. This framework considers that an entrepreneur with a fear of failure, low perception of opportunities, and a reduced appreciation of companies' social role can receive support to develop innovative and sustainable businesses; however, their perceptual characteristics will diminish the effectiveness of such assistance.

In conclusion, the results challenge government and private institutions to strengthen the convergence between sustainability and innovation, because social and environmental conditions of the last years in Latin America demand that the new businesses integrate the originality in products and processes to strengthen their competitiveness, achieving, jointly, the protection of the environment and the wellbeing of different vulnerable social groups. Because this study evidence a low relationship between sustainability and innovation in new businesses in this region, Latin American countries require a change of mentality that protects the welfare of their population; in the medium and long term, this wellbeing will depend on changes in business and consumption paradigms, which affect the use of economic, environmental, and social resources.

## 6. Limitations and future research

The results have not been differentiated by control variables such as age, gender, and educational level, due to the number of valid responses did not allow the analysis of demographic subgroups; among a total of 20 Latin American countries, the sample incorporates 11 countries; also, the study focuses on product and process innovation. Despite these limitations, the consistency between the correlation analyses and the regressions support the findings that have been exposed. Besides, the research provides information on types of innovation that are relevant to the success of new ventures. Future research could incorporate complementary psychological characteristics, such as entrepreneurial motivations, and include demographic control variables, such as gender, age, and educational attainment. Additionally, future studies could extend the analysis to other innovation categories.

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