

## Research Article

## Internationalization moderating the relationship between investment and innovation in small businesses in Latin America

Anderson Freitas dos Santos , Priscila Rezende da Costa , Camila Naves Arantes\* ,  
Adriana de Castro Pires , and Claudia Brito Silva Cirani 

<sup>a</sup> Universidade Nove de Julho (UNINOVE), São Paulo, SP, Brasil



### Editorial Details

Sistema double-blind review


#### Article History

Received : June 6, 2023  
Accepted : Mar. 06, 2024  
Available online : May 13, 2024

JEL classification: F00, G00

Article ID: 2407

#### Editor-in-Chief<sup>1</sup> or Adjunct<sup>2</sup>:

<sup>1</sup> Dr. Edmundo Inácio Júnior   
Univ. Estadual de Campinas, UNICAMP

#### Associate Editor:

Dr. Cássio Garcia Ribeiro   
Univ. Federal de Uberlândia, UFU

#### Executive<sup>1</sup> or Assistant<sup>2</sup> Editor:

<sup>1</sup> M. Eng. Patrícia Trindade de Araújo  
<sup>2</sup> Camille Guedes Melo

#### Translation / Proofreading:

The authors

#### How to cite:

Santos, A. F. dos, Costa, P. R. da, Arantes, C. N., Pires, A. de C., & Cirani, C. B. S. (2024). Internationalization moderating the relationship between investment and innovation in small businesses in Latin America. *REGEPE Entrepreneurship and Small Business Journal*, 13(2), e2407. <https://doi.org/10.14211/regepe.esbj.e2407>



Article verify by:  Crossref  
Similarity Check  
Powered by iThenticate

#### \*Corresponding author:

Camila Naves Arantes  
[camilanarantes@gmail.com](mailto:camilanarantes@gmail.com)

### Abstract

**Objective:** This paper's main objective was to examine the extent to which internationalization efforts moderate the relationship between investments in research and development (R&D) and innovation outputs taken by small businesses, that is, small and medium-sized enterprises - SMEs. **Methodology:** The methodology used consisted of quantitative research with data from 10,621 SMEs, from 17 countries in Latin America. The present study involved factorial and regressive analysis as well. **Theoretical contributions:** At the end of the research, it was also concluded that R&D investments positively influence innovation outputs and that companies that invest in R&D and additionally employ internationalization efforts are more likely to present innovation. **Main results:** The results obtained led to the conclusion that internationalization efforts have a positive and statistically significant influence on innovation outputs, allowing SMEs in Latin American countries to increase their competitiveness through constructing or improving products, services, or processes. **Relevance and originality:** It was the first time that a study jointly and empirically evaluated the moderating effect of internationalization efforts on the relationship between investments in R&D and innovation outputs, totaling a sample of 10,621 SMEs. **Managerial and social contributions:** This study also contributed to the knowledge of Latin America, therefore, it is expected that a greater understanding of the barriers to the development of SMEs will be achieved, through the advancement of internationalization efforts, investment in R&D and innovation. In this way, the aim is to encourage academics and practitioners to search for solutions to break these barriers.

**Keywords:** Internationalization efforts. R&D investment. Innovation outputs. Small Business.

## Internacionalização moderando a relação entre investimento e inovação em pequenas empresas na América Latina

### Resumo

**Objetivo:** O principal objetivo deste estudo foi examinar em que medida os esforços de internacionalização moderam a relação entre investimentos em pesquisa e desenvolvimento (P&D) e resultados de inovação realizados por pequenas empresas, ou seja, pequenas e médias empresas - PMEs. **Metodologia:** A metodologia utilizada consistiu em uma pesquisa quantitativa com dados de 10.621 PMEs de 17 países da América Latina. O presente estudo envolveu análises fatoriais e regressivas. **Principais Resultados:** Os resultados obtidos levaram à conclusão de que os esforços de internacionalização têm uma influência positiva e estatisticamente significativa nos resultados de inovação, permitindo que as PMEs dos países da América Latina aumentem sua competitividade por meio da construção ou melhoria de produtos, serviços ou processos. **Contribuições:** No final da pesquisa, também foi concluído que os investimentos em P&D influenciam positivamente os resultados de inovação e que as empresas que investem em P&D e também empregam esforços de internacionalização têm mais probabilidade de apresentar inovação. **Relevância e originalidade:** Foi a primeira vez que um estudo avaliou conjuntamente e empiricamente o efeito moderador dos esforços de internacionalização na relação entre investimentos em P&D e esforços de inovação, totalizando uma amostra de 10.621 PMEs. **Contribuições gerenciais e sociais:** Este estudo também contribuiu para o conhecimento da América Latina, portanto, espera-se que se alcance uma maior compreensão das barreiras para o desenvolvimento das PMEs, por meio do avanço dos esforços de internacionalização, investimentos em P&D e inovação. Dessa forma, o objetivo é incentivar acadêmicos e profissionais a buscar soluções para superar essas barreiras.

**Palavras-chave:** Esforços de internacionalização. Investimento em P&D. Resultados de inovação. Pequenas empresas.



## INTRODUCTION

Small and medium-sized enterprises (SMEs) are of utmost importance in developing economies (Mendy et al., 2020) and, as a result, in society, as they contribute to the generation of wealth and people's employment (Abbasi et al., 2021; Beck & Demircug-Kunt 2006; Reynolds, 1997; Zafar & Mustafa, 2017). However, despite their critical contribution, SMEs face numerous challenges in investing in R&D and in making efforts towards internationalization and innovation, due to factors such as minimal relationships with technological centers, deficiencies in infrastructure, and professional staff turnover, in addition to low access to financial resources (Bagheri et al., 2019; Berne et al., 2019; Markus & Rideg, 2020). Management factors and business strategies are equally important for the success of such companies (González-López et al., 2021). Associated with this factor, it is clear how companies face constant changes in the business environment, requiring quick and continuous adaptability and flexibility as a requirement for modern management (Milovanovic et al., 2022; Tomljenović, 2016).

As a consequence of the emergence of economic globalization, SMEs have shown a growing interest in developing international strategies, which in turn has led to an increased effort towards internationalization as a factor for competitiveness (Baier-Fuentes et al., 2019; Tambunan, 2008). Internationalization is positive for the expansion of operations that lead to growth and development, however, for companies operating in the international market, the complexity of the challenges is even greater (Milovanovic et al., 2022). Geographical expansion is a path of great relevance for business growth (Lu & Beamish, 2001).

In the current business environment, internationalized SMEs need to respond to the constant needs of stakeholders and enact more investments and efforts to innovate in products, services, and processes (Zahra, 2021; Sang et al., 2022). Despite making significant contributions to the economy, small and medium-sized enterprises (SMEs) have been found to generate low levels of added value to exports (Genc et al., 2019). However, it is important to note that innovation plays a crucial role in international competition, as highlighted by Zahra and George (2002). SMEs that have recently entered the international market have less comparative popularity and may face legitimacy assessments based on limited information, biases, or stereotypes. However, high-tech companies commonly find themselves at an advantage for their internationalization, making their contribution to internationalization relevant (Pinho et al., 2018), even because technological innovation is necessary to stimulate the increase in productivity of economic enterprises (Ključnikov et al., 2022; Surya et al., 2021).

At this time, implementing R&D investments and innovation efforts can differentiate the products of newly internationalized SMEs and change the disadvantaged situation (Zucchella, 2021). In this sense, companies that seek innovation tend to have strategies guiding processes that involve change and innovation (Do et al., 2023). Therefore, internationalization is crucial in moderating the relationship between investments in R&D and innovation efforts. It is an important opportunity for the growth and value creation of SMEs (Do et al., 2023), even if the internationalization process entails increasing financial costs and risks for the company (Freixanet, 2012; Johanson & Vahlne, 1977).

Some Latin American countries have several institutional obstacles, such as corruption and the informal economy, requiring formal companies to compete with informal businesses, resulting in a significant cost disadvantage for the former (Vassolo et al., 2011). This puts even more pressure on limited resources for investments, internationalization, and innovation in SMEs. Still, the change to the international environment requires strategic decisions that must be related to internal business capabilities in order to avoid failures (Raymond & St-Pierre, 2011). In addition, there is difficulty in connecting SMEs and innovation systems, both national and international (Viglioni et al., 2020). As a result, the relationships between investments in R&D and internationalization

and innovation efforts (new product and process on the market) lack a greater understanding of SMEs in Latin American countries (Viglioni et al., 2020).

Studies that embrace the theme of innovation efforts continue to develop rapidly. In the last four decades, since the first publications, empirical studies on innovation and R&D in Latin America increased by 64% (Bustinza et al., 2019; Viglioni et al., 2020). However, these studies are often limited to large companies due to the simplified access to their information, thus, limiting studies that evaluate SMEs (Berne et al., 2019; Lin & Wang, 2021). Such studies are limited by not understanding data from developing regions and considering countries in isolation (Vuorio et al., 2020) or being specific to microregions (Berne et al., 2019), which can limit their applicability to a broader context.

Several authors have conducted research on the correlation between investment in research and development (R&D) and innovation efforts, such as the introduction of new products and processes into the market. In their studies, Bogliacino and Pianta (2013), Bustinza et al. (2019), Martínez-Sánchez et al. (2020), Lin and Wang (2021) and Smolarski and Kut (2011) have demonstrated that investment in R&D can bring about significant benefits in innovation efforts. Despite the considerable attention given to this topic, there is still a notable gap in the literature when it comes to the influence of internationalization on the relationship between investment and innovation in small and medium-sized enterprises (SMEs). Given this gap, the main objective of this study is to investigate the extent to which internationalization efforts moderate the relationship between R&D investments and innovation efforts in SMEs in Latin America.

This article makes a significant contribution to the research as it is the first time a study jointly and empirically evaluated the moderating effect of internationalization efforts on the relationship between R&D investments and innovation efforts. We considered 17 different economies in Latin America and the Caribbean, totaling a sample of 10,621 SMEs (based on the World Bank's Enterprise Survey). This study also contributes to the knowledge and regional development of Latin America. This paper expects to generate a greater understanding of the barriers to the development of SMEs through the advancement of internationalization efforts, investment in R&D, and innovation. It also aims to the aim is to encourage academics and practitioners to search for solutions in breaking to break these barriers.

## THEORETICAL FRAMEWORK

The bibliometric review conducted by van Oorschot et al. (2018) consisted of an extensive analysis of over 1,260 publications and more than 45 thousand citations. Their study revealed that a multitude of scientific investigations have demonstrated the positive impact of innovation efforts on a company's competitive advantage. In fact, such efforts are widely regarded as essential for the survival and longevity of businesses (van Oorschot et al., 2018; Vuorio et al., 2020). The study by van Oorschot et al. (2018) corroborates the origins of Schumpeter's (1961) thoughts on innovation and entrepreneurship.

The innovative process is closely interconnected with the solution of problems arising from interactions derived from a dynamic environment, which requires multiple input factors (Liao & Barnes, 2015). Innovation capacity is linked to an ability to explore knowledge external to the company (Valentim et al., 2016). The effectiveness of innovation initiatives within SMEs is closely tied to their flexibility due to their smaller size, and the proximity between managers and teams, which facilitate the decision-making process, communication, team engagement, and, consequently, the receptivity of innovation (Berne et al., 2019; Paul et al., 2017). As a result, SMEs are able to maintain their focus on ideas, motivation, and flexibility within the organization (Markus & Rideg, 2020).

SMEs are often seen as more flexible and responsive to market changes and customer needs than their larger counterparts. In fact, Dutot et al.'s (2014) research suggests that SMEs have the ability to adapt more quickly to changes in circumstances and are more likely to embrace innovation. However, this type of business also faces significant internal challenges that can impair its ability to internationalize, particularly their strategic capability (Raymond & St-Pierre, 2011). Associated with this, as noted by Liao and Barnes (2015) and van de Vrande et al. (2009), SMEs often struggle with the lack of knowledge, skills, and adequate personnel, which can limit their ability to innovate and grow.

Aligning such theoretical foundations with the current innovation environment in Latin America, it was found, in the systematic review conducted by Viglioni et al. (2020), a contribution that validates Schumpeter's (1961) metaphorical concept of innovation. In addition, this builds a theoretical relationship that puts investments in R&D and innovation efforts in the process of growth in the Latin American industry. However, the literature illustrates deficiencies concerning innovation and R&D efforts in countries in the same territory (Viglioni et al., 2020). Furthermore, studies like the one conducted by Bogliacino and Pianta (2013) are even more forceful when classifying innovation as a result (dependent variable) of an explanatory variable to R&D resources (independent variable) (Bogliacino and Pianta, 2013).

In accordance with the principles of the Resource-based View (RBV) theory, tangible or intangible assets such as information, knowledge, and patents are part of a company's resources (Barney, 1991). The ultimate goal of investments in R&D focuses on increasing the stock of knowledge to develop new applications or innovations (Hall et al., 2010). From this theoretical perspective, this work has RBV as its primary focus because of the potential to explain investments in R&D as sources of resources that provide competitive advantage (Barney, 1991; Martínez-Sánchez et al., 2020). The OECD categorizes R&D investment as efforts undertaken to increase the stock and conceive the application of knowledge, which are segregated into three types: (i) basic research - experimental or theoretical; (ii) applied research - investigative with a specific purpose; (iii) experimental development - development of a new product or process (OECD, 2018).

The available resources provide ample opportunities for companies to identify and explore opportunities that arise from development and investment, improving their performance (Brown et al., 2009; Hardy & Sever, 2021). As a result, companies can create them through R&D investments and innovation outputs (Costa et al., 2021; Drnevich & Kriauciunas, 2011). In this way, we propose hypothesis:

*H1: R&D investment positively influence the innovation outputs of SMEs in Latin America.*

When considering resources as the origins of the generation of competitive advantage, the work of Lin and Wang (2021) produces another critical addition: the theoretical contribution, in which companies that invest more in R&D are more susceptible to international markets. In their study, the authors demonstrate that investments in R&D are connected and can increase the internationalization efforts of family businesses and that the existence of a CEO who is not a family member has a strong influence on this relationship (Lin and Wang, 2021).

Internationalization can provide a valuable competitive advantage, as it allows the company to reduce its exposure to market risk, being able to buy and sell its products in several countries (Rasmussen & Madsen, 2002). Among the companies that proactively seek international opportunities (Andersson, 2011) are those called "born global" (Knight & Cavusgil, 2004). The concept of accelerated internationalization originated in the 1990s and reflects the growing trend of small and medium-sized companies expanding globally. The study developed by McKinsey

and Co. states that typically young and entrepreneurial companies operating in international markets (Knight & Cavusgil, 2004) within less than two years of their formation (Knight & Liesch, 2016; Rasmussen & Madsen, 2002), were grouped. The research findings suggested that their efforts to internationalize contribute to their overall competitiveness.

When companies decide to start their internationalization efforts, they usually begin by searching for opportunities and sales in foreign markets, which is the most common action taken (Bołkunow, 2019; Boso et al., 2019; Sukaatmadja et al., 2021). These efforts often lead to improved performance and a competitive advantage for SMEs, even in their domestic market. In fact, companies that do not pursue internationalization often find that their businesses have lower performance levels compared to those that do (Cho and Lee, 2018). Even because global companies operate in a dynamic and competitive scenario it is essential to boost the acquisition of knowledge, creations, and development, translating into an innovative context (Rodríguez-Serrano & Martín-Armario, 2019). Therefore, it is crucial for companies to consider internationalization as a means to grow and remain competitive in the long term.

Regarding already internationalized SMEs, the systematic implementation of R&D investment enhances innovation outputs and, consequently, improves the acceptance of their products, services, and processes among stakeholders in the international context (Zahra, 2021). In the case of newly internationalized SMEs that make one-off investments in R&D, resulting in late innovation, this can result in bias among local stakeholders. Most SMEs must improve R&D investment and innovation outputs to satisfy stakeholder requirements and expectations to ensure competitiveness (Baier-Fuentes et al., 2019). Effective and fast stakeholder engagement helps SMEs gain recognition abroad, attract stakeholder attention, and deliver positive financial influence and innovation (Zucchella, 2021).

There is theoretical support that internationalization efforts moderate the relationship between R&D investment and innovation outputs. Furthermore, it is established that such internationalization initiatives have a direct and favorable impact on the exertion of innovation, as evidenced by scholarly works such as Cho and Lee (2018), Costa et al. (2021), and Sukaatmadja et al. (2021). In light of these findings, we hereby suggest the following hypothesis:

*H2: Internationalization efforts moderate the relationship between R&D investment and innovation outputs of SMEs in Latin America.*

*H3: Internationalization efforts positively influence innovation outputs of SMEs in Latin America.*

## METHOD

The method of this research has limitations, as does the dataset studied, given the temporal scope of the research, covering data over a 12-year interval, from 2006 to 2018, for all the countries considered. Table 1 lists the countries in the sample and the number of companies by size, with the focus of this study being on small and medium-sized enterprises (10,621 SMEs). That is, companies that employ from 5 (five) to 99 (ninety-nine) employees, this being the definition of SMEs adopted in this study as the criterion for the number of employees used by the Brazilian Institute of Geography and Statistics (IBGE) in Brazil.

Based on the literature, this study developed a hypothetical model in which R&D investments (IPD), which are resources that can be managed by the organization (RBV Theory), have a significant impact on innovation outputs. The innovation outputs result from the effort to generate products or new processes on

the market (Schumpeterian Innovation Theory). This relationship is moderated by internationalization efforts, which are the company's effort to gain an advantage and compete in new markets (Competitive Advantage Theory), which also influences innovation outputs. Table 2 presents the details of the study variables.

**Table 1**

Sample countries and number of companies by size

Country	Companies	Small <sup>1</sup>	Medium-sized <sup>2</sup>	Large <sup>3</sup>
Argentina	1822	648	685	489
Bolivia	521	230	172	119
Chile	1265	381	523	361
Colombia	1704	666	659	379
Costa Rica	264	104	98	62
El Salvador	854	379	255	220
Ecuador	512	185	200	127
Guatemala	731	283	250	198
Honduras	441	228	133	80
Mexico	1999	839	646	514
Nicaragua	526	292	178	56
Panama	322	144	138	40
Paraguay	568	203	252	113
Peru	1566	556	557	453
DO <sup>4</sup>	199	37	83	79
Uruguay	702	303	267	132
Venezuela	68	19	28	21
Total	14064	5497	5124	3443

Notes: World Bank (2021). <sup>1</sup> 5-10employees. <sup>2</sup> 20-99employees. <sup>3</sup> Above 99 employees.

<sup>4</sup> Dominican Republic. Elaborated by the authors.

The data used in the study are secondary, obtained from the World Bank, based on the Enterprise Survey, considering companies in the formal and non-agricultural private economy of Latin America, including the manufacturing, services, transport, and construction sectors. The Enterprise Survey has been performed since 2006 and follows a high standard of standardization (World Bank, 2021), on small and medium-sized companies (SMEs), which are businesses that have a staff size ranging from 5 to 99 employees. In total, the study analyzed a significant sample size of 10,621 SMEs to draw insightful conclusions. In addition to this research, other studies have also utilized the World Bank's Enterprise Survey database as a means of assessing the impact of corruption on innovation. For instance, Souza et al. (2020) and Wellalage and Thrikawala (2021) are among the scholars who have employed this database to explore the relationship between corruption and innovation in SMEs.

**Table 2**

Aggregate synthesis of variables and the transformations perform

Variables	Code	Descriptions	Transformations <sup>1</sup>
Innovation outputs (Dependent)	EI	Introduction of innovations in the last three years	0 = no introduction of new or significantly improved products, services, or processes in the last three years; 1 = introduction of new or significantly improved products, services, or processes in the last three years.
R&D investment (Independent)	IPD	Investment in R&D in the last fiscal year	0 = no investment in research and development (R&D) in the last fiscal year; 1 = presence of research and development (R&D) investment in the last fiscal year.
Internationalization efforts (Moderator)	IA	Company with internationalization efforts	0 = Company without evidence of internationalization efforts; 1 = Company with evidence of internationalization efforts. Evidence of internationalization efforts refers to: (a) at least 5% of sales are exported directly; (b) use of technology licensed from foreign companies; and/or (c) obtaining internationally recognized quality certification.
Business Characteristics (Control)	ID	Company age in years	ID = Number of years since foundation, considering the year of data collection.
	PT	Size according to total number of employees	1 = Small: 5-19 workers; 2 = Medium size: 20-99 workers; 3 = Large: 100+ workers.

Note: <sup>1</sup> Transformation of data obtained from the World Bank's Enterprise Survey. Elaborated by the authors.

In order to carry out the research, the initial step involved preparing the microdata for analysis by implementing various data processing techniques. The process included meticulous cleaning and standardization procedures to ensure the accuracy and reliability of the data. Strategies for handling missing data and outliers were also put into effect to minimize any errors or biases in the analysis. Subsequently, a descriptive analysis of the variables was conducted, wherein absolute and relative frequencies were examined alongside the mean and standard deviation. This helped to gain a comprehensive understanding of the data set and the distribution of values within it.

Factor analysis created the indicators of innovation outputs, investments in R&D, and internationalization efforts, and evaluated through a validation process of the constructs, as follows: (a) dimensionality, by the criterion of parallel lines (Hoyle and Duvall, 2004); (b) reliability, when the indicators Cronbach's Alpha (CA), and composite reliability (CR) (Chin, 1998) showed values greater than 0.70 (Tenenhaus et al., 2005) or 0.60, in the case of research exploratory (Hair et al., 2009); and (c) adequacy of the sample to the model, using the Kaiser-Meyer-Olkin (KMO) indicator, which verifies the proportion of variance of data common to all variables – in this case, between 0 and 1. The use of factor analysis is adequate when the KMO is greater than or equal to 0.50. For innovation outputs and R&D investments, formed by dichotomous items, the tetrachoric correlation in the calculations of the indicators to treat the binary structure was used (Drasgow, 2006).

To verify the impact of investments in R&D on innovation outputs, linear regressions were adjusted (Montgomery et al., 2021) hierarchically, inserting the hypotheses, one by one, until the final model was reached. For the analysis of the moderating effect (caused by a variable that influences the strength or direction of the relationship between an independent variable and a dependent variable) of the variable of interest (internationalization efforts) on the relationship between investments in R&D and innovation outputs, interaction into the latest model was inserted (Hayes & Montoya, 2017; Prado et al., 2014).

The following was also used: (a) the Mann-Whitney test, to relate the categorical variables of characterization (size and year of foundation) and their indicators; (b) Spearman's correlation – limited measure between -1 and 1, where the closer the coefficient is to -1, the greater the negative correlation, and to 1, the greater the positive correlation (Hollander et al., 2013), to verify the correlation between numerical or ordinal variables and indicators; and (c) SPSS software, version 28 (Oliveira et al., 2018).

## RESULTS ANALYSIS

The final sample resulted in a set of 10,521 observations, of which the origin of the companies was highlighted, the largest representations being: Mexico (13.9%), Argentina (12.5%), Colombia (12.5%), and Peru (10.8%). Regarding size: 51.7% are small companies (up to 19 employees) and 48.3% are medium-sized companies (between 20 and 99 employees). Age of SMEs: 30.3% are infants, with less than 12 years since foundation, 26.1% are young companies (from 13 to 21 years since foundation), 24.3% are adults (from 22 to 34 years since foundation), and 19.3% are mature companies (more than 34 years since foundation).

Pearson's coefficient evaluates the correlations between the different variables of the model. High correlation rates demonstrate that the variables can represent the same understanding from different perspectives, which is not interesting in constructing statistical models (Peres, 2017). Table 3 shows the absence of strong correlations between the variables, with the highest correlations between International Certificates and International Licenses, with a coefficient of .21, and International Certificates and R&D investment, with .18. However, these values are considered moderate correlations (Peres, 2017).

**Table 3**

### Pearson's correlation

	1	2	3	4	5
1- Company Age	1				
2- Company Size	.147	1			
3- Innovation efforts	.006	.131	1		
4-Internationalization efforts	.078	.289	.167	1	
5-R&D investment	.024	.192	.323	.237	1

Note: Elaborated by the authors.

Table 4 exhibits an important value for constructing the model, which is the collinearity test. From tolerance items close to 1 and Variation Inflation Factor (VIF) less than 10, it is possible to take comfort in the absence of multicollinearity. That is, the variables added to the model do not have a high correlation with each other and there is no need to exclude or reassess any of them (Peres, 2017). The Bartlett and KMO tests were conducted to improve the analysis of correlations. The first test showed that H0 is null, that is, the variables are not intercorrelated, and, as the KMO is greater than .5, it ensured that the construction of the model is not composed of statistical research bias (Table 5).

**Table 5**

### Bartlett and KMO tests

Determinant of the correlation matrix	
Det = .645	Degrees of freedom = 15
Bartlett test of sphericity	p-value = .000
Chi-square = 1929.651	H0: variables are not intercorrelated
Kaiser-Meyer-Olkin Measure of Sample Adequacy	
KMO = .666	

Note: Elaborated by the authors.

**Table 4**

### Coefficients and collinearity

Model <sup>a</sup>	Non-standardized coefficients		Standardized coefficients Beta	t	Sig.	Collinearity Statistics	
	B	Error				Tolerance	VIF
(Constant)	.459	.006		78.769	.000		
Internationalization: Export	.084	.013	.062	6.479	<.001	.932	1.073
Internationalization: International Licenses	.090	.016	.054	5.813	<.001	.968	1.033
Internationalization: International Certificates	.002	.014	.001	.112	.911	.925	1.082
R&D investment	.310	.010	.292	30.747	<.001	.938	1.066

Note: <sup>a</sup> Dependent Variable: Product Innovation (EI1). Elaborated by the authors.

## Multiple linear regression, Binary logistic regression, and Moderating effect analysis

The theoretical model of this study, in which statistical validation was sought, assumes a moderating effect. Thus, it is believed that a third variable (internationalization efforts) moderates the relationship between the dependent (innovation outputs) and independent variables (R&D investment). For the moderation relationship test, the pre-existence of a statistically significant relationship between the independent variable and the dependent variable is necessary (Hayes, 2013).

To assess the pre-existence of a relationship between R&D investment and innovation outputs, a binary logistic regression analysis was conducted. The analysis showed the existence of a statistically significant relationship between R&D investment and innovation outputs  $F_{(1,10619)} = 1233$ ,  $p < .01$ ;  $R^2 = .10$ . The results identified a significance of less than 5% ( $p < .01$ ) and the model demonstrates that the variation in R&D investment accounts for 10% ( $R^2 = .10$ ) of innovation outputs. Additionally, the correlation analysis showed a low-moderate correlation, with the coefficient value equal to .32 ( $R = .32$ ) (Table 6 and Table 7).

**Table 6**

### Summary simple linear regression Model 1<sup>a,b</sup>

Model	R	R-squared	Adjusted R-squared	Standard error of the estimate
1	.323	.104	.104	.441

Notes: <sup>a</sup> Predictors: (Constant), Independent variable: R&D investment (IPD).

<sup>b</sup> Dependent variable: Innovation efforts.  
Elaborated by the authors.

**Table 7**

### Tests for innovation efforts from linear regression

Independent variables	Model 1		
	Beta	T	p-value
R&D Investment (IPD)	.323	35.120	.001
N	10621.000		
F	1233.790		
R <sup>2</sup>	.104		

Note: Elaborated by the authors.

For the purposes of statistical significance, the use of linear regression with a dichotomous dependent variable does not show differences in significance. In this sense, the analysis in models with a dichotomous dependent variable is not restricted to logistic regression, that is, in this case, linear regression can be used (Hellevik, 2009). The following sections contain the results of the tests based on the hypotheses raised in the theoretical framework.

H0: [Rejected] R&D investment not influence the innovation outputs of SMEs in Latin America.

For testing statistical hypotheses, at the time of this research, the null hypothesis was described. The null hypothesis is not the object of study in this work; however, it is presented to demonstrate and test the absence of type 1 error and/or type 2 error. The

null hypothesis is the statement that there is no influence of the dependent variable on the independent variable. Thus, regardless of the R&D investment, it would not influence innovation outputs. If the null hypothesis were confirmed, all the alternative hypotheses object of this study would be annulled (Dancey, 2013; Malhotra, 2012).

Based on the results described, since the model demonstrates a significant relationship between R&D investment and innovation outputs (p-value = .001), this rejects the null hypothesis, as demonstrated in Table 7.

### H1: [Confirmed] R&D investment positively influence the innovation outputs of SMEs in Latin America

A binary logistic regression was performed to evaluate the direct effect of R&D investment on innovation outputs. The logistic regression method is proposed; thus, the existence of a dichotomous dependent variable is observed. The objective of this analysis was to verify whether R&D investment positively and significantly influence innovation outputs in SMEs in Latin America. The model presented confirms the hypothesis ( $\chi^2_{(1)} = 1261$ ;  $p < 0.001$ ,  $R^2$  Nagelkerke = .157) (Table 8).

**Table 8**

Tests for innovation efforts from logistic regression

Independent variable	Model 1		
	Beta	T	p-value
R&D investment	1.906	-	.001
N	10621		
Chi-squared	1261		.001
LL2	12023		
R <sup>2</sup> (Nagelkerke)	.157		

Note: Elaborated by the authors.

Latin American SMEs that invest in R&D are 6.7 times more likely to present a new or improved product, service, or process than a company that does not make R&D investment (Exp(B) = odds ratios, OR = 6.729; 95% CI = 5.94 - 7, 62) (Table 9).

The logistic regression and its coefficients, presented in Table 9 show a view of the effect of R&D investment on innovation outputs. In the first regression model, in which only the R&D investment variable is included, it was observed that the dependent variable is significant (Sig. p-value < .001), and that there is also a positive relationship between them (B = 1.906).

**Table 9**

Variables of logistic regression Model 1<sup>a,b</sup>

Model 1	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I. - EXP(B)	
							Lower	Superior
R&D Investment	1.906	.063	919.47	1	<.001	6.729	5.949	7.612
Constant	.322	.024	182.83	1	<.001	1.379		

Notes: <sup>a</sup> Predictors: (Constant), Independent variable: R&D investment (IPD).

<sup>b</sup> Dependent variable: Innovation efforts.

Elaborated by the authors.

The statements derived from the analysis of this research contribute to the validation of the hypothesis. Even though this work doesn't seek to build a predictive model, the equation that describes this relationship is:

$$P_{(y)} = \frac{e^{(b_0 + b_1 \cdot x)}}{1 + e^{(b_0 + b_1 \cdot x)}}$$

or

$$P_{(Innovation\ outputs)} = \frac{e^{(0,322+1,906 \cdot (R\&D\ investment))}}{1 + e^{(0,322+1,906 \cdot (R\&D\ investment))}}$$

Finally, this model, which contains only the R&D investment variable, explains 15.7% of innovation outputs. That is, variables not added to this model should contribute to the understanding of whether an SME in Latin America presents or not innovation outputs ( $R^2$  Nagelkerke = .157,  $p < .001$ ). Table 8 contains the model summary.

### H2: [Confirmed] Internationalization efforts moderate the relationship between R&D investment and innovation efforts of SMEs in Latin America

A moderation analysis with logistic regression of the analysis program written by Hayes (2013) was conducted to assess the effect of R&D investment on innovation outputs, with internationalization efforts as moderator.

The Process program has several pre-designed models and is freely available on the internet, interacting with statistical software such as SPSS, SAS, and R. For these analyses, it was used the latest version of the Process macro (4.0), was available in December 2021. The analysis process executed macro model 1, which presents a simple moderation relationship.

In its initial stage, the system developed by Hayes (2013) shows an orientation summary of the process performed. Therefore, Model 1 was executed, evaluating the moderation of the relationship between the independent variable (R&D investment), with the dependent variable (innovation outputs), caused by the moderating variable (internationalization efforts).

This analysis aimed to verify the influence of internationalization efforts have on the relationship between R&D investment and innovation outputs. The model presented demonstrates that hypothesis 3 is true, that internationalization efforts showed the statistical significance of moderation between R&D investment and innovation outputs of SMEs in Latin America (B = -.2895; 95% CI = -.55 - .03;  $p < .03$ ) (Table 10).

Table 10 details the behavior of the variables in the model. The analysis of the intersection of the variables demonstrates the significance of the model, with the p-value being less than 0.05 (ULCI = .282). The polarity of the coefficient of internationalization efforts, in this case, is positive at .5193, which expresses the direction of the effect (which may be positive or negative).

**Table 10**

Variables of logistic regression Model 1 with Process macro

Variables	B	SE	Z	p-value	LLCI	ULCI
Constant	.9475	.0252	37.5271	.0000	.8980	.9970
R&D Investments	1.8136	.0643	28.2059	.0000	1.6875	1.9396
Internationalization efforts	.5193	.0556	9.3422	.0000	.4104	.6283
Intersection	-.2895	.1333	-2.1718	.0299	-.5507	-.0282

Note: Elaborated by the authors.

The Model 1 summary presented in Table 11 provides relevant evidence to understand the model. The  $R^2$  (Nagelkerke) of .17 indicates that in this model, R&D investment are moderated by internationalization efforts, explaining 17% of the occurrences for a company to present innovation outputs or not. In other words, for the company to present a new or improved product, service, or process.

**Table 11**

Tests for innovation efforts from linear regression with Process macro

Independent variables	Model 1		
	Beta	T	p-value
R&D Investment	1.8136	-	<.001
Internalization efforts	.5193	-	<.001
N	10621		
LL2	11906		
R <sup>2</sup> (Nagelkerke)	.1705		

Note: Elaborated by the authors.

Companies that demonstrate innovation outputs are more prone to internationalization than companies that do not (Vuorio et al., 2020). However, the design that defines innovation outputs is complex and involves several functions of an organization. Only process innovation involves six different functions of a company (OECD, 2018). In addition to this complexity, institutional obstacles such as corruption, political instability, the informality of competitors, taxes, and the workforce are serious or moderate obstacles to developing innovation outputs (Costa et al., 2021). This work highlights the fact that the inclusion of internationalization efforts in the model contributes to a better understanding of innovation outputs, with this model explaining 17% of innovation outputs ( $R^2 = .1705$ ;  $p < .001$ ).

### H3: [Confirmed] Internationalization efforts positively influence innovation outputs of SMEs in Latin America

To assess the direct and residual effects of internationalization efforts on innovation outputs, a moderation analysis was performed with logistic regression of the analysis program written by Hayes (2013). The moderation model was used as a foundation, discerning that internationalization efforts moderate the relationship between R&D investment and innovation outputs.

This analysis was designed to verify the influence of internationalization efforts on innovation outputs, with a direct effect resulting from moderation in preconceived relationships. The statistical model presented demonstrates that the hypothesis is true, that is, that internationalization efforts positively impact innovation outputs in Latin American SMEs ( $B = .5193$ ; 95% CI = .41 – .62;  $p < .001$ ), as shown in Table 10.

This analysis established the direct residual effect, that is, the existence of a previous relationship between R&D investment and innovation outputs was considered in this model. Its results confirmed that despite contributing to its explanation, the impact of adding this variable to the model is not very expressive. As a counterargument, an additional analysis was performed, using a binary logistic regression model, in which only the variable internationalization efforts were isolated.

Table 12 summarizes the result of this evaluation, in which it was observed that, in isolation, the internationalization efforts positively and with statistical significance, impact the innovation outputs. ( $\chi^2_{(1)} = 1062$ ;  $p < .001$ ,  $R^2$  Nagelkerke = .04).

**Table 12**

Tests for innovation efforts from logistic regression

Independent variable	Model 1		
	Beta	T	p-value
Internacionalization efforts	.853	-	.001
N	10621		
Chi-squared	1062		
LL2	12973		
R <sup>2</sup> (Nagelkerke)	.040		

Note: Elaborated by the authors.

## DISCUSSIONS

Using an objectivist epistemology and rigorous statistical methods, the findings of this study robustly confirm three hypotheses.

The test of the first hypothesis of this work (H1) showed that R&D investment in positively influence the innovation outputs of SMEs in Latin America. In other words, companies that invest in R&D are more likely to introduce new or improved product, service, or process in Latin America: ( $\chi^2_{(1)} = 1261$ ;  $p < 0.001$ ,  $R^2$  Nagelkerke = 0.16, see Table 9).

The relationship between R&D investment and innovation outputs has been discussed and is now widely recognized by academics and practitioners (Vigliani et al., 2020), through theoretical models, such as the work of Bogliacino and Pianta (2013). For these authors, there is a direct relationship in which R&D investment influence innovation outputs. In their work, the authors also build a theoretical relationship between innovation outputs and profit generation, which cyclically allows new investments in R&D.

Hall et al. (2010) contribute to this theoretical construction since they understand that the objective of R&D investment focus on increasing the stock of knowledge to develop new applications or innovations. Thus, with a view to RBV, the increase in knowledge, through R&D investment, favors the construction of innovation outputs and the creation of competitive advantage (Barney, 1991; Martínez-Sánchez et al., 2020). Along the same lines is the assessment by Costa et al. (2021), in which companies can create resources through R&D investment and innovation outputs.

A common disposition in continuity is the influence of R&D investment in the construction of new and/or improved products/services or processes, which, in this paper, we refer to as innovation outputs. Our study sought to quantify this relationship through validated and recognized statistical models, such as multivariate linear regression, binary logarithmic regression, and moderation effects in regression analyses.

Based on this quantification, this study statistically confirms the hypothesis that when the company invests in R&D, it favors innovation outputs, with the creation or modification of new products/services and/or processes. It also demonstrates that companies that invest in R&D are 6.7 times more likely to undertake innovation outputs (H1).

Studies on innovation outputs often examine the commitment of internationalization efforts, which include the search for new markets and the breadth of international business, through obtaining competitive advantage (Barney, 1991; Martínez-Sánchez et al., 2020; Sukaatmadja et al., 2021).

The study by Vuorio et al. (2020) builds an inverse cause-and-effect relationship, in which they identify that innovation outputs have a negative effect on internationalization efforts. Contrary to this statement, Sukaatmadja et al. (2021) finds a different outcome in which innovation outputs positively affect internationalization efforts. This study sought an alternative relationship, in which, hypothetically, internationalization efforts can moderate, increase, or attenuate, the existing and known relationship between R&D investment and internationalization efforts. Statistical methods prove it was possible to measure this impact and its direct and indirect relationships, demonstrating that the hypothesis that internationalization efforts moderate the relationship between R&D investment in and innovation outputs (H2) is true.

The study by Sukaatmadia et al. (2021), tested a moderation relationship, in which competitive advantage moderates the relationship between innovation outputs and internationalization efforts. Sukaatmadja et al. (2021) claims that competitive advantage is defined as the company's ability to manage and understand management processes and transform them into skills that generate opportunities. The acquisition of equipment and resources that can differentiate companies from competitors is essential to R&D investment activities. Such an understanding connects the three

variables. In this way, our study corroborates the connection of the three variables: internationalization efforts, investment in R&D, and innovation outputs. The internationalized SME is more likely to capture and make investments in R&D that may reverberate in innovations and, consequently, competitiveness. Considering what the empirical literature on the subject commonly uses as an analytical methodology, the methodology is suitable for this study as explained in the above paragraphs.

The theoretical and empirical discussions presented throughout the work demonstrated the existence of a connection between the variables: innovation outputs (dependent variable), R&D investment (independent variable), and internationalization efforts (moderating variable). In addition, the study findings fill theoretical and empirical gaps, as detailed in [Table 13](#).

[Table 13](#) affirms that this is the first time a study has jointly and empirically evaluated the moderating effect of internationalization efforts on the relationship between R&D investment and innovation outputs. This study considered 17 different economies in Latin America and the Caribbean, totaling a sample of 10,621 SMEs (based on the World Bank's Enterprise Survey).

SMEs often struggle to invest in R&D and to pursue innovative activities. This challenge arises from various factors, including a weak connection with technological institutes, shortcomings in their infrastructure, and high turnover within their professional staff. These issues are compounded by limited access to financial resources ([Berne et al., 2019](#)). Particularly in Latin America, where institutional barriers like corruption and the prevalence of informal economies are common, formal businesses find themselves at a competitive disadvantage against informal ones in terms of costs ([Vassolo et al., 2011](#)). This competitive landscape further strains their ability to allocate resources for investment purposes. Latin American SMEs invest less in innovation outputs and focus their spending on the acquisition of machinery and equipment, compared to large companies ([Yang, 2017](#)).

## CONCLUSIONS

This study examined the moderating effect of internationalization efforts on the relationship between R&D investment and innovation outputs of SMEs in Latin America. The statistical analysis, using regression models, successfully confirmed all three hypotheses of this research study. Thus, it is valid to say that R&D investment influence the construction of innovation outputs, allowing SMEs in Latin America to create or modify products or processes, and that internationalization efforts change this relationship. In turn, they also positively influence innovation outputs.

The hypothesis "H1 - R&D investment positively influence the innovation outputs of SMEs in Latin America" was tested and confirmed, which led to the conclusion that Latin American SMEs that invest in R&D are more likely to implement innovation outputs.

The hypothesis "H2 - Internationalization efforts moderate the relationship between R&D investment and innovation outputs of SMEs in Latin America" was also tested and confirmed. Therefore, it was possible to infer that when SMEs, in addition to investing in R&D, also make efforts to become international, they are more likely to implement innovation outputs.

Finally, the hypothesis "H3 - Internationalization efforts positively influence innovation outputs of SMEs in Latin America" was tested and confirmed as well. This finding validated that an SME seeking to internationalize its activities is considerably more likely to actively implement innovation outputs.

For academic purposes, this study provides evidence that helps to understand the macro environment, relating a vast set of observations of SMEs in a macro-region and the behavior of these private organizations. Additionally, it explores data analysis techniques that can be reused in conjunction (or not) with the World Bank's vast database enabling researchers to conduct more in-depth analyses of SMEs in different regions and contexts.

This work also presents practitioners, especially those involved in the management of SMEs, the evidence of a relevant relationship between internationalization and innovation. It indicates that the SME operating in the international market is more likely to innovate and, consequently, obtain a competitive differential. Therefore, the urgency of pro-internationalization and pro-innovation management development programs in emerging markets such as Latin America and the Caribbean is notable.

**Table 13**

*Theoretical and empirical gaps and our contributions*

Authors	Focus of the article	Gap	Our contribution
Bogliacino and Pianta (2013)	R&D investment and innovation efforts ratio.	Only deals with OECD member countries.  It does not distinguish company size	Our study considered 17 different Latin American economies.  Our study offered a broad overview of SMEs, totaling a sample of 10,621 companies that have between 5 and 99 employees, as classified by the World Bank (2021).
Lin and Wang (2021)	Ratio of R&D investment and internationalization efforts.	Only deals with SMEs in Taiwan	Our study provided a broad understanding of the geography of innovation, as 10,621 SMEs from 17 Latin American and Caribbean countries were considered.
Viglioni et al. (2020)	Ratio of R&D investment and innovation efforts  Overview of investments in R&D and innovation in Latin America and the Caribbean.	Does not relate cause and effect between R&D and innovation.  It does not cover all Latin American countries, especially the Caribbean.  It deals only with large companies; suggests investigating the context of SMEs.	Our study has shown that Latin American SMEs that invest in R&D are more likely to implement innovation efforts.
Sukaatmadja et al. (2021)	Lists R&D investments, innovation efforts, and internationalization efforts.	It only deals with the internationalization of SMEs in Bali - Indonesia.	Our study proved that when SMEs, in addition to R&D investing, also make efforts to become international, they are more likely to implement innovation efforts.

Note: Elaborated by the authors.



The study also emphasizes the critical importance of promoting innovative entrepreneurship, through the development and implementation of effective public policies, programs, and instruments of both direct and indirect support, including seed capital, venture capital, private equity, tax incentives, economic subsidies, and various other measures.

Some limitations are observed in this work, highlighted to contribute to future studies and the development of applied research. These limitations are related, among other factors, to the data set and objectives. The construction of a predictive model was not part of this work, and the model built responds to 17% of understanding of the factors that influence innovation outputs. Consequently, in order to achieve a more comprehensive understanding of the conditions that drive innovation in SMEs, it will be necessary to identify and account for additional variables that may exert a significant influence.

It is important to mention that secondary data was used to construct the study, so that some broad questions may be limited to the data set. Even so, the frequency of field collections has intervals that can change the scenario, given the speed with which the innovation and technology environment change over time. For instance, it is worth mentioning that the last time data was collected in Brazil was in 2009, which means that the information may not reflect the most current conditions and developments in the field.

For future studies, it is suggested that: (i) expanding the studies of variables that can influence innovation outputs, to build a predictive model; (ii) additionally, it would be highly beneficial to broaden the data sources to assess the economic impact on the company and/or the regional economy; (iii) Another area worthy of study is the moderation of internationalization in the relationship between investment and innovation considering the born global companies of emerging, transitioning, and developed economies.

### Conflict of interest statement

The authors declare that there is no conflict of interest.

### Authors' statement of individual contributions

Roles	Contributions				
	Santos, A. F. dos	Costa, P. R. das	Arantes, C. N.	Pires, A. de C.	Cirani, C. B. S.
Conceptualization	■				
Methodology	■				
Software	■				
Validation	■				
Formal analysis	■				
Investigation	■				
Resources	■				
Data Curation	■				
Writing - Original Draft	■				
Writing - Review & Editing		■	■	■	■
Visualization		■	■	■	■
Supervision		■			
Project administration		■			
Funding acquisition			N.A.		

Note: Acc. CRediT (Contributor Roles Taxonomy): <https://credit.niso.org/>

### REFERENCES

- Abbasi, K., Alam, A., Du, M. A., & Huynh, T. L. D. (2021). FinTech, SME efficiency and national culture: Evidence from OECD countries. *Technological Forecasting and Social Change*, 163, 120454. <https://doi.org/10.1016/j.techfore.2020.120454>
- Andersson, S. (2011). International entrepreneurship, born globals and theory of effectuation. *Journal of Small Business and Enterprise Development*, 18(3), 627-643. <https://doi.org/10.1108/14626001111155745>
- Bagheri, M., Mitchelmore, S., Bamiatzi, V., & Nikolopoulos, K. (2019). Internationalization Orientation in SMEs: The Mediating Role of Technological Innovation. *Journal of International Management*, 25(1), 121-139. <https://doi.org/10.1016/j.INTMAN.2018.08.002>
- Baier-Fuentes, H., Hormiga, E., Miravittles, P., & Blanco-Mesa, F. (2019). International entrepreneurship: A critical review of the research field. *European Journal of International Management*, 13(3), 381-412. <https://doi.org/10.1504/ejim.2019.10018148>
- Barney, J. (1991). Firm Resources and Sustained Competitive Advantage. *Journal of Management*, 17(1), 99-120. <https://doi.org/10.1177/014920639101700108>
- Beck, T., & Demirguc-Kunt, A. (2006). Small and medium-size enterprises: Access to finance as a growth constraint. *Journal of Banking & Finance*, 30(11), 2931-2943. <https://doi.org/10.1016/j.jbankfin.2006.05.009>
- Berne, D. F., Coda, R., Krakauer, P., & Donaire, D. (2019). The innovation challenge in micro and small enterprises (MSE): An exploratory study at São Paulo metropolitan region. *Innovation & Management Review*, 16(3), 235-252. <https://doi.org/10.1108/INMR-03-2019-0031>
- Souza, R. C. F., Bittencourt, V. D. S., Pigola, A., & Costa, P. R. da (2020). Esforços de inovação face aos obstáculos institucionais na América Latina: Identificando os efeitos da internacionalização acelerada e dos gatilhos relacionais. Proceedings of Encontro Internacional sobre Gestão Empresarial e Meio Ambiente (ENGEMA). <https://engemausp.submissao.com.br/22/anais/arquivos/71.pdf?v=1683924372>
- Bogliacino, F., & Pianta, M. (2013). Profits, R&D, and innovation: A model and a test. *Industrial and Corporate Change*, 22(3), 649-678. <https://doi.org/10.1093/icc/dts028>
- Bołkunow, W. (2019). Internationalization of European Small and Medium-Sized Companies. In Bilgin, M. H., Danis, H., Demir, E. and Can, U. (Eds.), *Eurasian Business Perspectives*. *Eurasian Studies in Business and Economics*, 10(1). Springer, Cham., 39-51. [https://doi.org/10.1007/978-3-030-11872-3\\_3](https://doi.org/10.1007/978-3-030-11872-3_3)
- Boso, N., Adeleye, I., Ibeh, K., & Chizema, A. (2019). The internationalization of African firms: Opportunities, challenges, and risks. *Thunderbird International Business Review*, 61(1), 5-12. <https://doi.org/10.1002/tie.21977>
- Brown, J. R., Fazzari, S. M., & Petersen, B. C. (2009). Financing Innovation and Growth: Cash Flow, External Equity, and the 1990s R&D Boom. *The Journal of Finance*, 64(1), 151-185. <https://doi.org/10.1111/j.1540-6261.2008.01431.x>
- Bustanza, O. F., Gomes, E., Vendrell-Herrero, F., & Baines, T. (2019). Product-service innovation and performance: The role of collaborative partnerships and R&D intensity: Product-service innovation and performance. *R&D Management*, 49(1), 33-45. <https://doi.org/10.1111/radm.12269>
- Chin, W. W. (1998). The partial least squares approach for structural equation modeling. In G. A. Marcoulides (Ed.), *Modern methods for business research* (pp. 295-336). Lawrence Erlbaum Associates Publishers.
- Cho, J. & Lee, J. (2018). Internationalization and performance of Korean SMEs: The moderating role of competitive strategy". *Asian Business & Management*, 17(2), 140-166. <https://doi.org/10.1057/s41291-018-0036-8>
- Costa, P. R., Bittencourt, V. da S., Falaster, C. D., Carvalho, L. M. C. & Pigola, A. (2021). Innovation Efforts in the Face of Institutional Obstacles in Latin America. *International Journal of Business, Economics and Management*, 8(2), 100-118. <https://doi.org/10.18488/journal.62.2021.82.100.118>
- Dancey, C. (2013). *Estatística sem Matemática para Psicologia*. (5a ed). Penso.
- Dragow, F. (2006). Polychoric and Polyserial Correlations. In Kotz, S., Read, C. B., Balakrishnan, N., Vidakovic, B. & Johnson, N. L. (orgs.). *Encyclopedia of Statistical Sciences*. John Wiley & Sons, New Jersey, p. ess2014.pub2. <https://doi.org/10.1002/0471667196.ess2014.pub2>

- Drnevich, P. L., & Kriauciunas, A. P. (2011). Clarifying the conditions and limits of the contributions of ordinary and dynamic capabilities to relative firm performance. *Strategic Management Journal*, 32(3), 254–279. <https://doi.org/10.1002/smj.882>
- Do, H., Nguyen, B., & Shipton, H. (2023). Innovation and internationalization in an emerging market context: Moderating effects of interpersonal and organizational social networks. *Journal of International Management*, 29(2), 101014. <https://doi.org/10.1016/j.INTMAN.2023.101014>
- Dutot, V., Bergeron, F., & Raymond, L. (2014). Information management for the internationalization of SMEs: An exploratory study based on a strategic alignment perspective. *International Journal of Information Management*, 34(5), 672-681. <https://doi.org/10.1016/j.IJINFORMGT.2014.06.006>
- Freixanet, J. (2012). Export promotion programs: Their impact on companies' internationalization performance and competitiveness. *International Business Review*, 21(6), 1065-1086. <https://doi.org/10.1016/j.IBUSREV.2011.12.003>
- Genc, E., Dayan, M., & Genc, O. F. (2019). The impact of SME internationalization on innovation: The mediating role of market and entrepreneurial orientation. *Industrial Marketing Management*, 82, 253-264. <https://doi.org/10.1016/j.INDMARMAN.2019.01.008>
- González-López, M. J., Pérez-López, M. C., & Rodríguez-Ariza, L. (2021). From potential to early nascent entrepreneurship: the role of entrepreneurial competencies. *International Entrepreneurship and Management Journal*, 17(3), 1387-1417. <https://doi.org/10.1007/s11365-020-00658-x>
- Hair, J. F., Black, W. C., Babin, B. J., Anderson, R. E., & Tatham, R. L. (2009). Análise multivariada de dados. Bookman.
- Hall, B. H., Mairesse, J., & Mohnen, P. (2010). Chapter 24 - Measuring the Returns to R&D. Hall, B. H. & Rosenberg, N. (Eds.), *Handbook of the Economics of Innovation*. Elsevier, 2. (1033-1082). [https://doi.org/10.1016/S0169-7218\(10\)02008-3](https://doi.org/10.1016/S0169-7218(10)02008-3)
- Hardy, B., & Sever, C. (2021). Financial crises and innovation. *European Economic Review*, 138, 103856. <https://doi.org/10.1016/j.eurocorev.2021.103856>
- Hayes, A. F. (2013). Introduction to Mediation, Moderation, and Conditional Process Analysis: A Regression-Based Approach. (3th ed.). Guilford Press, New York.
- Hayes, A. F., & Montoya, A. K. (2017). A Tutorial on Testing, Visualizing, and Probing an Interaction Involving a Multicategorical Variable in Linear Regression Analysis. *Communication Methods and Measures*, 11(1), 1-30. <https://doi.org/10.1080/19312458.2016.1271116>
- Hellevik, O. (2009). Linear versus logistic regression when the dependent variable is a dichotomy. *Quality and Quantity*, 43, 59-74. <https://doi.org/10.1007/s11135-007-9077-3>
- Hollander, M., Wolfe, D. A., & Chicken, E. (2013). Nonparametric Statistical Methods. John Wiley & Sons.
- Hoyle, R., & Duvall, J. (2004). Determining the number of factors in exploratory and confirmatory factor analysis. In Kaplan, D. *The Sage handbook of quantitative methodology for the social sciences*. Sage.
- Johanson, J., & Vahlne, J. E. (1977). The Internationalization Process of the Firm - A Model of Knowledge Development and Increasing Foreign Market Commitments. *Journal of International Business Studies*, 8(1), 23-32. <https://doi.org/10.1057/palgrave.jibs.8490676>
- Ključnikov, A., Civelek, M., Červinka, M., Vozňáková, I., & Vincúrová, Z. (2022). The Role of SMEs' Innovativeness and Competitiveness in Their Financial Risk Management Concerns. *Journal of Competitiveness*, 14(4), 97-116. <https://doi.org/10.7441/joc.2022.04.06>
- Knight, G. A., & Liesch, P. W. (2016). Internationalization: From incremental to born global. *Journal of World Business*, 51(1), 93-102. <https://doi.org/10.1016/j.jwb.2015.08.011>
- Knight, G. A., & Cavusgil, S. T. (2004). Innovation, organizational capability, and the born-global firm. *Journal of International Business Studies*, 35, 124-141. <https://doi.org/10.1057/palgrave.jibs.8400071>
- Kuo, H. C., & Li, Y. (2003). A Dynamic Decision Model of SMEs' FDI". *Small Business Economics*, 20(3), 219-231. <http://dx.doi.org/10.1023/A:1022819206036>
- Liao, Y., & Barnes, J. (2015). Knowledge acquisition and product innovation flexibility in SMEs. *Business Process Management Journal*, 21(6), 1257-1278. <http://dx.doi.org/10.1108/BPMJ-05-2014-0039>
- Lin, W.-T., & Wang, L. C. (2021). Family firms, R&D, and internationalization: The stewardship and socio-emotional wealth perspectives. *Asia Pacific Journal of Management*, 38(1), 91-119. <https://doi.org/10.1007/s10490-018-9636-2>
- Lu, J. W., & Beamish, P. W. (2001). The internationalization and performance of SMEs. *Strategic Management Journal*, 22(6-7), 565-586. <https://doi.org/10.1002/SMJ.184>
- Malhotra, N. (2012). Pesquisa de marketing - uma orientação aplicada, Bookman.
- Markus, G., & Rideg, A. (2020). Understanding the connection between SMEs' competitiveness and cash flow generation: An empirical analysis from Hungary. *Competitiveness Review: An International Business Journal*, ahead-of-print(ahead-of-print). <https://doi.org/10.1108/CR-01-2020-0019>
- Martínez-Sánchez, A., Vicente-Oliva, S., & Pérez-Pérez, M. (2020). The relationship between R&D, the absorptive capacity of knowledge, human resource flexibility and innovation: Mediator effects on industrial firms. *Journal of Business Research*, 118, 431-440. <https://doi.org/10.1016/j.jbusres.2020.07.014>
- Mendy, J., Rahman, M., & Bal, P. M. (2020). Using the "best-fit" approach to investigate the effects of politico-economic and social barriers on SMEs' internationalization in an emerging country context: Implications and future directions. *Thunderbird International Business Review*, 62(2), 199-211. <https://doi.org/10.1002/TIE.22119>
- Milovanovic, B. M., Bubas, Z., & Cvjetkovic, M. (2022). Employee Readiness for Organizational Change in the SME Internalization Process: The Case of a Medium-Sized Construction Company. *Social Sciences*, 11(3), 131. <https://doi.org/10.3390/SOCSCI11030131>
- Montgomery, D. C., Peck, E. A., & Vining, G. G. (2021). Introduction to linear regression analysis. John Wiley & Sons.
- OECD (2018). Oslo Manual 2018: The Measurement of Scientific, Technological and Innovation Activities: Guidelines for Collecting, Reporting and Using Data on Innovation (4th ed.). OECD Eurostat. <https://doi.org/10.1787/9789264304604-en>
- Oliveira, P. F., Guerra, S., McDonnell, R., & Gonzaga, S. (2018). Introdução. In Oliveira, P. F. et al. *Ciência de Dados com R*. <https://cdr.ibpad.com.br/>
- Paul, J., Parthasarathy, S., & Gupta, P. (2017). Exporting challenges of SMEs: A review and future research agenda. *Journal of World Business*, 52(3), 327-342. <https://doi.org/10.1016/j.jwb.2017.01.003>
- Peres, F. (2017). Regressão Logística Binária no SPSS (Aula 13 - Parte 1). [https://www.youtube.com/watch?v=ROAb\\_R2VmrC](https://www.youtube.com/watch?v=ROAb_R2VmrC)
- Pinho, J. C. M., Martins, L., & Soares, A. M. (2018). Small businesses' internationalization: International readiness in the context of Asian countries. *Asia-Pacific Journal of Business Administration*, 10(1), 50-63. <https://doi.org/10.1108/APJBA-05-2017-0043/FULL/PDF>
- Prado, P. H. M., Korelo, J. C., & Da Silva, D. M. L. (2014). Análise de mediação, moderação e processos condicionais. *Revista Brasileira de Marketing*, 13(4), 4-24. <https://doi.org/10.5585/remark.v13i4.2739>
- Rasmussen, E. S., & Madsen, T. K. (2002). The Born Global concept", paper presented at the 28th EIBA Conference 2002. University of Southern Denmark, Athens, 8-10. [https://www.scirp.org/\(S\(i43dyn45teexjx455qlt3d2q\)\)/reference/ReferencesPapers.aspx?ReferenceID=1418978](https://www.scirp.org/(S(i43dyn45teexjx455qlt3d2q))/reference/ReferencesPapers.aspx?ReferenceID=1418978)
- Raymond, L., & St-Pierre, J. (2011). Strategic capability configurations for the internationalization of SMEs: A study in equifinality. *International Small Business Journal*, 31(1), 82-102. <http://Dx-Doi.Ez33.Periodicos.Capes.Gov.Br/10.1177/0266242610391325>
- Reynolds, P. D. (1997). New and Small Firms in Expanding Markets. *Small Business Economics*, 9(1), 79-84. <http://dx.doi.org/10.1023/A:1007916217140>
- Rodríguez-Serrano, M. Á., & Martín-Armario, E. (2019). Born-Global SMEs, Performance, and Dynamic Absorptive Capacity: Evidence from Spanish Firms. *Journal of Small Business Management*, 57(2), 298-326. <https://doi.org/10.1111/JSBM.12319>
- Sang, M., Zhang, Y., Ye, K. & Jiang, W. (2022). Moderating Effects of Internationalization between Corporate Social Responsibility and Financial Performance: The Case of Construction Firms. *Buildings*, 12(2), 185. <https://doi.org/10.3390/buildings12020185>
- Schumpeter, J., (1961). Capitalismo, Socialismo e Democracia (R. Jungmann, Trad.), Fundo de Cultura.

- Smolarski, J., & Kut, C. (2011). The impact of venture capital financing method on SME performance and internationalization. *International Entrepreneurship and Management Journal*, 7(1), 39-55. <https://doi.org/10.1007/S11365-009-0128-1/METRICS>
- Sukaatmadja, I. P. G., Yasa, N. N. K., Rahyuda, H., Setini, M., & Dharmanegara, I. B. A. (2021). Competitive advantage to enhance internationalization and marketing performance woodcraft industry: A perspective of resource-based view theory. *Journal of Project Management*, 45-56. <https://doi.org/10.5267/j.jpm.2020.9.002>
- Surya, B., Menne, F., Sabhan, H., Suriani, S., Abubakar, H., & Idris, M. (2021). Economic Growth, Increasing Productivity of SMEs, and Open Innovation. *Journal of Open Innovation: Technology, Market, and Complexity*, 7(1), 20. <https://doi.org/10.3390/JOITMC7010020>
- Tambunan, T. (2008). SME development, economic growth, and government intervention in a developing country: The Indonesian story. *Journal of international entrepreneurship*, 6(4), 147-167. <https://doi.org/10.1007/s10843-008-0025-7>
- Tenenhaus, M., Vinzi, V. E. Chatelin, Y.-M., & Lauro, C. (2005). PLS path modeling. *Computational statistics & data analysis*, 48(1), 159-205. <https://doi.org/10.1016/j.csda.2004.03.005>
- Tomljenović, L. (2016). Upravljanje promjenama u funkciji strategijskog razvoja malih i srednjih poduzeća. [Doctoral thesis, University of Split, Faculty of economics Split], Split. <https://www.bib.irb.hr/841969>
- van Oorschot, J. A. W. H., Hofman, E. & Halman, J. I. M. (2018). A bibliometric review of the innovation adoption literature. *Technological Forecasting and Social Change*, 34, 1-21. <https://doi.org/10.1016/j.techfore.2018.04.032>
- Valentim, L., Lisboa, J. V. & Franco, M. (2016). Knowledge management practices and absorptive capacity in small and medium-sized enterprises: is there really a linkage?. *R&D Management*, 46(4), 711-725. <https://doi.org/10.1111/RADM.12108>
- van de Vrande, V., de Jong, J. P. J., Vanhaverbeke, W. & de Rochemont, M. (2009). Open innovation in SMEs: Trends, motives and management challenges. *Technovation*, 29(6-7), 423-437. <https://doi.org/10.1016/j.TECHNOVATION.2008.10.001>
- Vassolo, R. S., De Castro, J. O. & Gomez-Mejia, L. R. (2011). Managing in Latin America: Common Issues and a Research Agenda. *Academy of Management Perspectives*, 25(4). <https://doi.org/10.5465/amp.2011.0129>
- Vigliani, M. T. D., Brito, M. J. de & Calegario, C. L. L. (2020). Innovation and R&D in Latin America and the Caribbean countries: A systematic literature review. *Scientometrics*, 125(3), 2131-2167, <https://doi.org/10.1007/s11192-020-03714-z>
- Vuorio, A., Torkkeli, L. & Sainio, L.-M. (2020). Service innovation and internationalization in SMEs: Antecedents and profitability outcomes. *Journal of International Entrepreneurship*, 18(1), 92-123. <https://doi.org/10.1007/s10843-019-00266-z>
- Wellalage, N. & Thrikawala, S. (2021). Does bribery sand or grease the wheels of firm level innovation: Evidence from Latin American countries. *Journal of Evolutionary Economics*, 31, 891-929. <https://doi.org/10.1007/s00191-020-00717-0>
- World Bank. (2021, março 13). Survey Methodology for Enterprise Surveys-World Bank Group [Text/HTML]. World Bank. <https://www.enterprisesurveys.org/en/methodology>
- Yang, J. S. (2017). The governance environment and innovative SMEs. *Small Business Economics*, 48(3), 525-541. <https://doi.org/10.1007/s11187-016-9802-1>
- Zahra, S. A. (2021). International entrepreneurship in the post Covid world. *Journal of World Business*, 56(1), <https://doi.org/10.1016/j.jwb.2020.101143>
- Zahra, S. A. & George, G. (2002). Absorptive Capacity: A Review, Reconceptualization, and Extension. *The Academy of Management Review*, 27(2), 185-203. <https://doi.org/10.5465/AMR.2002.6587995>
- Zafar, A. & Mustafa, S. (2017). SMEs and its Role in Economic and Socio-Economic Development of Pakistan. *International Journal of Academic Research in Accounting, Finance and Management Sciences*, 7(4), 195-205, available at: <https://doi.org/10.6007/IJARAFMS/v7-i4/3484>
- Zucchella, A. (2021). International entrepreneurship and the internationalization phenomenon: taking stock, looking ahead. *International Business Review*, 30(2), 101800. <https://doi.org/10.1016/j.ibusrev.2021.101800>