Journal of the Knowledge Economy
https://doi.org/10.1007/s13132-025-02618-8

How Do Entrepreneurship and Corruption Relate to Innovation and Competitiveness?

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Received: 10 October 2022 / Accepted: 7 February 2025

Abstract

The literature shows a strong relationship between innovation and competitiveness. Innovation alone does not guarantee its impacts, making entrepreneurship key to converting innovations into new businesses. On the other hand, entrepreneurship is subject to corruption, and research exploring these two variables presents ambiguous or inconclusive results. Thus, studying these four variables acting concomitantly helps to achieve a deeper understanding of these relationships. This work aims to verify the role of entrepreneurship in the relationship between innovation and competitiveness and whether corruption has positive or negative effects on entrepreneurship. Secondary data from the Global Competitiveness Report and the Entrepreneurship Database project from The World Bank were used, generating a sample of 101 countries with data from both sources. The analysis adopted mediation and moderated mediation techniques. The results show the mediating role of entrepreneurship in the relationship between innovation and global competitiveness. Furthermore, the study found that corruption has a moderating effect on the relationship between entrepreneurship and competitiveness, verifying a decrease in the mediating effect of entrepreneurship on the proposed model. Counterintuitively, the findings revealed that the greater the corruption in the country, the greater the effect of innovation on competitiveness via entrepreneurship. It also shows the influence of corruption in

Highlights

- This work aims to verify the role of entrepreneurship in the relationship between innovation and competitiveness and whether corruption has positive or negative effects on entrepreneurship.
- Secondary data from the Global Competitiveness Report and the Entrepreneurship Database project from The World Bank were used, generating a sample of 101 countries with data from both sources.
- The analysis adopted mediation and moderated mediation techniques.
- The results show the mediating role of entrepreneurship in the relationship between innovation and global competitiveness.
- The study also found that corruption has a moderating effect on the relationship between entrepreneurship and competitiveness, verifying a decrease in the mediating effect of entrepreneurship on the proposed model.

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Published online: 12 March 2025

opening new businesses and increasing the countries' competitiveness. The research demonstrates the importance of measuring the level of entrepreneurship in traditional international reports to accurately analyze the countries' stage of development and the population's well-being. Furthermore, particular emphasis is given on how discussions on innovation can contribute to advancing knowledge for solutions to complex problems and issues, such as corruption.

Keywords Entrepreneurship · Innovation · Global competitiveness · Corruption · Mediation effect · Moderate-mediation effect

JEL Classification Nonadherent

Introduction

Since the first studies by Adam Smith (1723–1790), the development of nations has been attributed to the presence of raw materials, cheap labor, and capital available for investment (Feldmann et al., 2019). Based on the works of Joseph Schumpeter (1883–1950), the twentieth century witnessed the consolidation of innovation as the fourth and most crucial factor of economic growth (Schumpeter, 1934). Thus, innovation has become a crucial point for companies and countries in discussions and strategies to increase economic performance and competitiveness (Barrichello et al., 2020a, 2020b; Nelson & Winter, 1982; Pavitt, 1984; Rosenberg, 1982).

In this sense, the strong relationship between innovation and competitiveness is evident, leading to numerous studies on this topic (Barrichello et al., 2020a, 2020b; Blomstrom & Kokko, 1998; Feldmann et al., 2019; Z. Liu, 2008; Santos et al., 2021; Suyanto & Salim, 2012, 2013). However, the development of innovations alone is not enough to compete globally, and the nations' economic sectors must create businesses capable of generating impacts on global competitiveness (Beltran et al., 2024; Macpherson & Lockhart, 2017). Therefore, entrepreneurship becomes key to converting innovations into competitiveness (Angelo, 2003; Costa, 2007; Galdino, 2019).

New business can challenge established markets through innovation (Christensen, 2016). In this context, entrepreneurship is fundamental to economic growth and driven by several psychological, social, and economic factors. Such factors are subject to corruption and can discourage entrepreneurship (Anokhin & Schulze, 2009; Estrin et al., 2013; Liu et al., 2019). However, the discussion of the effects of corruption—a common phenomenon in many economies—on entrepreneurship is not exhausted since research that explores the relationship between entrepreneurship and corruption has produced ambiguous or inconclusive results (Amorós et al., 2017; Boudreaux et al., 2018; Liu et al., 2019; Mohamadi et al., 2017; Uribe-Toril et al., 2019).

Based on the research on the relationship between entrepreneurship, innovation, and competitiveness and the influence of corruption on entrepreneurship in countries, the following research questions arise: how does entrepreneurship influence the relationship between innovation and competitiveness? Does corruption influence entrepreneurship positively or negatively in this relationship? This study aims to verify how entrepreneurship influences the relationship between innovation and competitiveness and whether corruption positively or negatively affects entrepreneurship.

This research contribution lies in offering a deeper understanding of the relationships between the variables analyzed, particularly the influence of corruption as a facilitator or inhibitor of new businesses and the countries' competitiveness. The literature proposes that corruption helps entrepreneurs overcome barriers imposed by the system and makes businesses viable in places with weak institutions. However, the role of corruption is contradictory, considering that the expectation is that corruption will always threaten businesses. The aim of these subjects is to advance knowledge, especially on innovation and its relations with entrepreneurship and economic development, with particular emphasis on how discussions about innovation can contribute to providing solutions to complex problems and issues such as corruption.

It also intends to develop a complete conceptual model that jointly relates to the variables of innovation, competitiveness, entrepreneurship, and corruption. Finally, this research shows the importance of measuring the level of entrepreneurship in traditional international reports to accurately analyze the stage of development of countries and the population's well-being.

In the following sections, this paper presents the much-discussed relationship between innovation and competitiveness and how entrepreneurship fits into this relationship. It also shows how corruption affects entrepreneurship. Two hypotheses and a theoretical model were developed with the points mentioned which support the analyses and discussions to synthesize these relationships.

Theoretical Analysis and Hypothesis Development

This section presents the theoretical approach and the development of hypotheses regarding innovation, global competitiveness, and entrepreneurship addressing how discussions on these variables can contribute to advancing knowledge of solutions to complex problems and issues, such as corruption.

Innovation and Global Competitiveness Relationship

Studies show the importance of the relationship between innovation and the growth of firms' competitiveness, which is crucial for the nation's growth strategy (Nelson & Winter, 1982; Pavitt, 1984; Rosenberg, 1982; Schumpeter, 1934). Innovation has been a recurring theme in studies since Schumpeter (1934), as it is an essential factor in boosting economic development and competitiveness. It has a key role in competitiveness and in stimulating increased productivity, both in developed and developing countries (Melo et al., 2017; Osuna-Alarcón & Rodríguez-Hernández, 2020).

According to Kim (2005), innovation is a pioneering activity to develop a new product based on a company's internal competencies. In the Schumpeterian view, innovation also encompasses processes, new forms of management, new markets, and production inputs.

Investments in R&D work as a diffusion factor for innovations, as they lead to companies' performance improvements and countries' development (Bae, 2016; Ha et al., 2016; Walter et al., 2024). Foreign investments from multinational companies in their subsidiaries are also relevant as they allow knowledge spillover, increasing productivity and competitiveness (Dutta et al., 2018). External knowledge can be absorbed and applied in internal processes to develop innovative products and processes (Armstrong & Lengnick-Hall, 2013; Cohen & Levinthal, 1990; Najafi-Tavani et al., 2014; Ritala & Hurmelinna-Laukkanen, 2013).

Regarding the determinants of the firms' external competitiveness, three elements are at the forefront: cost, technology, and heterogeneities at the organizational level (Bogliacino et al., 2017; Dosi et al., 2015; Laursen & Meliciani, 2010). Reducing costs by obtaining cheaper inputs or engaging in process innovation to gain production efficiency can increase market share, facilitate penetration in international markets, and increase product and service attractiveness (Vivarelli & Pianta, 2000). However, most of the literature grounded on the Schumpeterian view of competition based on innovation considers product quality and technological factors as the most relevant elements to explain export performance.

Entrepreneurship in the Relationship Between Innovation and Global Competitiveness

Entrepreneurship is related to the willingness or ability to idealize, coordinate, and conduct projects, services, and businesses. This definition can be unfolded as the act of putting oneself at the service of someone by creating the future and putting into practice what was imagined (Galdino, 2019). In this sense, Krueger and Carsrud (1993) and Engle et al. (2010) define entrepreneurship intention as the willingness and commitment to start a new business. In line with Schumpeter (1949), the entrepreneurial role is emphasized as part of cooperative entrepreneurship in large companies, in addition to the creative work of a single entrepreneur. Such action of transforming the current reality through the implementation of actions and/or products from new businesses promotes changes that involve risks and innovation (Angelo, 2003; Galdino, 2019).

An idea may or may not result in innovation, or an innovative product may or may not convert into a promising and profitable business. There are differences between idealizing, creating, and entrepreneurship (Angelo, 2003; Zang et al., 2024). Not everyone can materialize their ideas and turn them into profitable businesses. Some inventors are good at planning but terrible at organizing teams and managing industrial processes, and some innovations are not focused on market demands, making them unfeasible (Costa, 2007).

Good innovation is not enough to promote entrepreneurship. The success of an enterprise depends on planning and developing several aspects related to business creation and management, such as the appropriate marketing strategy (Feldmann et al., 2019). Innovations alone cannot guarantee a firm's success. Entrepreneurship requires marketing and operational and financial planning (Angelo, 2003; Porter, 1990). In addition, policies to support the entrepreneurial economy, such as the Small Business Innovation Research program, can facilitate knowledge spillover and positively impact entrepreneurial activity, innovation, and economic growth (Audretsch, 2011).

Entrepreneurship works as a bridge between innovation and global competitiveness, stimulating the creation of new products and services, promoting business agility, and contributing to economic development, and is often responsible for introducing innovations to the market. Through it, solutions are developed that can transform sectors and improve the competitiveness of their companies on a global scale. It also drives the adoption of new technologies and business models. Startups and emerging companies often use cutting-edge technologies, which make them more competitive compared to established companies that may be slower to innovate (Abdinnour & Adeniji, 2023; Angelo, 2003; Audretsch, 2011; Costa, 2007).

Innovation is one of the main components of the success of organizations and countries, as businesses must remain competitive, develop, and protect market share (Barrichello et al., 2020a, 2020b; Porter, 1990). Because countries depend on sectors of their economies that can create business environments capable of innovation, entrepreneurship becomes key to converting innovations into competitiveness (Feldmann et al., 2019).

Therefore, the following research hypothesis is formulated.

H1: Entrepreneurship mediates the relationship between innovation and global competitiveness.

The Effects of Corruption On Entrepreneurship

For Svensson (2005), corruption "is the misuse of public office for private gain." The author states that "corruption is an outcome – a reflection of a country's legal, economic, cultural and political institutions." Civil servants can generate costs for entrepreneurs when seeking personal gains by soliciting bribes or creating barriers that may benefit competitors aligned with illegal procedures or requests (Bologna & Ross, 2015). However, corrupt civil servants are a reflex of governmental institutions and may, paradoxically, help firms avoid taxes and overcome inefficient regulations, reinforcing the idea of the contradictory nature of the relationship between corruption and entrepreneurship (Tonoyan et al., 2010).

Ulman (2013, 2014) analyzed whether corruption influenced countries' competitiveness and sought to show the nature of this influence. The author found a strong relationship between these two factors, with the level of national competitiveness significantly influencing the perception of corruption in a country. The study identified that less competitive countries are seen as more corrupt than more competitive countries.

Highly regulated countries have two types of corruption: expansive corruption (activities that improve competitiveness and make the market more flexible) and restrictive corruption (limits opportunities for productive and socially beneficial exchange). The bribery of judges and politicians by the private sector is an example of expansive corruption. Although it seems paradoxical, bribery can help lessen the harmful effects of excessive government regulation and improve economic participation. On the other hand, restrictive corruption implies the redistribution of income and wealth to individuals or groups and is the most widespread type of corruption in the public sector. It involves the illegal appropriation of public resources for private use or the illegal use of a person's position in government for personal enrichment. Public sector corruption jeopardizes the proper functioning of the market system and slows economic growth (Houston, 2007; Osterfeld, 1992).

Entrepreneurship is one of the mainsprings of economic growth for companies and countries, and the impact and effects of the relationship between corruption and entrepreneurship are known (Corona-Treviño, 2023; Ximei et al., 2024). However, literature offers conflicting results regarding this relationship. Some studies consider corruption unavoidable that increases economic efficiency and entrepreneurial activity (Egger & Winner, 2005). Others argue that corruption plays a restrictive role in reducing entrepreneurship (Anokhin & Schulze, 2009; Estrin et al., 2013). The literature shows the complexity of the subject and attracts the attention of academia, in part because companies from less corrupt countries engage in corruption when operating in corrupt countries or informal economic activities (Amorós et al., 2017; Boudreaux et al., 2018; J. Liu et al., 2019; Mohamadi et al., 2017).

Corruption may offer a legitimate informal institutional channel to facilitate entrepreneurship, filling the institutional gaps preventing the start of a business. However, studies point out that this relationship is only positive when there is low-level corruption facilitating informal economic activity. A more comprehensive approach shows an inverted "U" relationship between corruption and entrepreneurship, suggesting that low-level corruption is positively associated with entrepreneurship, whereas high-level corruption is negatively correlated with entrepreneurship (Liu et al., 2019).

Bologna and Ross (2015) reinforce the contradiction in the relationship between corruption and entrepreneurship. Their findings suggest that higher levels of corruption are usually associated with a reduction in the number of commercial establishments, and such effects increase over time, indicating that corruption is particularly harmful in the long term. However, they also found that the effect of corruption on businesses can be insignificant or positive as far as the quality of institutions is poor.

Research on the relationship between entrepreneurship and corruption has produced ambiguous results, with variables influenced by individual and national factors (Uribe-Toril et al., 2019). The impact of corruption on entrepreneurship depends on the countries' specific characteristics. Countries with elevated levels of corruption often face low levels of entrepreneurship. Studies show a more significant negative effect in developed countries than in developing countries, reinforcing the idea that corruption replaces the low effectiveness of regular institutions in developing economies. It is possible to infer that when formal institutions are inefficient, corruption affecting them contributes to economic development. However, corruption is harmful when formal institutions are efficient (Avnimelech et al., 2014; Kesar et al., 2024; Ngunjiri, 2010).

According to Anokhin and Schulze (2009), corruption undermines the foundations of institutional trust necessary for the development of trade and entrepreneurial and innovative activity. Additionally, Baker et al., 2005) argue that the decision to engage in an entrepreneurial or innovative opportunity depends on what the entrepreneur will gain from the value created. Therefore, the less the entrepreneur gains, the less motivation to innovate and commit to the enterprise. In this context, the incentives to invest in innovation and more complex economic activities with uncertain or long-term returns are also limited. The result is increased transaction costs and additional constraints for the entrepreneur (Anokhin & Schulze, 2009).

In the absence of confidence in the capacity of the state and governmental agencies to reliably and impartially enforce the law and rules, monitoring and other transaction costs constrain the scale and scope of trade, hampering productivity and investment in entrepreneurship in a country (Anokhin & Schulze, 2009; K. Liu et al., 2020; Sendra-Pons et al., 2022).

Literature presents corruption as an essential element in discussions about entrepreneurship. However, its influence as positive or negative is not clear or well-defined, which leaves room for further studies. Therefore, the following research hypothesis was added:

H2: Corruption moderates the relationship between Entrepreneurship and Global Competitiveness.

Methodology

This study used secondary data from two sources, the Global Competitiveness Report (GCR), issued by the World Economic Forum (Schwab, 2019), and The Entrepreneurship Database project, published by The World Bank (The World Bank, 2021).

The transversal research was conducted with data from 2019, the last year both organizations updated their databases due to the COVID-19 pandemic. The GCR has information from 141 countries, while the Entrepreneurship Database offers data from 122. Only data from countries included in both sources were considered, totalling 101 countries.

The methodology adopted in the GCR integrates statistics from international organizations and research with executives, helping countries to identify policies and practices relevant to their development. The report presents the Global Competitiveness Index (GCI) of each country. The index identifies and assesses factors supporting the processes of economic growth and human development indicators, offering parameters for policymakers to evaluate the countries' progress regarding the set of factors critical for productivity. For the present study, in addition to the GCI, variables Incidence of Corruption (item 1.13, pillar 1, Institutions, Transparency subdivision) and Capacity for Innovation (pillar 12) were also considered.

Table 1 Definition of the research variables

Variable	Definition
Global Competitiveness	Set of institutions, policies, and factors that determine an economy's productivity level. The productivity level defines the country's potential prosperity level
Innovation	Innovation capability: sufficient investment in R&D, especially private investment; the presence of high-quality scientific research institutions to generate basic knowledge to build new technology; intense collaboration for R&D between universities and industries; intellectual property protection
Entrepreneurship	New business density: The number of newly registered firms with limited liability per 1000 working-age people of a country per calendar year
Corruption	Incidence of corruption: measures perceptions of corruption in the public sector. It is a composite indicator ranging from 0 (highly corrupt) to 100 (very low or no level of corruption). Aggregates data from numerous sources that provide perceptions of business people and country experts of the level of corruption in the country's public sector

Source: Adapted from Schwab (2019) and The World Bank (2021)

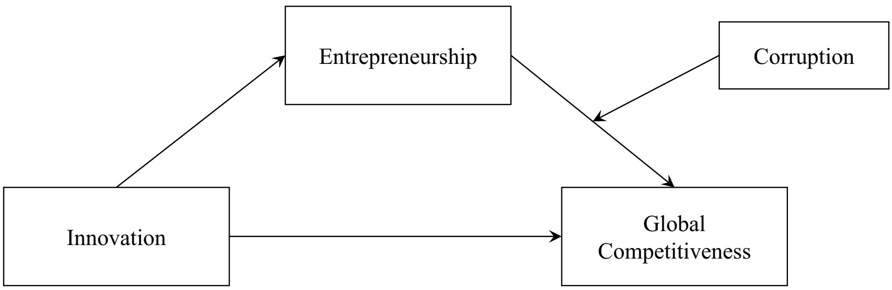

Fig. 1 Conceptual model Source: Elaborated by the authors

It is noteworthy that none of these indicators highlight the opening of new businesses, which characterizes Entrepreneurship for the World Bank.

The data collected from the Entrepreneurship Database project measures the new business density. This indicator makes it possible to understand trends in the creation of new businesses and the relationship between entrepreneurship and the business environment of each country.

Table 1 presents the definition of the research variables according to the reports used as data sources.

The conceptual model in Fig. 1 was proposed to evaluate hypotheses H1 and H2. The model presents the variable Entrepreneurship as a mediator of the relationship between Innovation and Global Competitiveness (H1). It also presents the variable Corruption moderating the role of Entrepreneurship in this relationship (H2).

Mediation analysis is a statistical method used to assess how a causal variable conveys its effect to a consequent variable through a third variable (Hayes, 2018). The main assumption is that the effect of the causal variable on the consequent variable can be seen or measured directly and indirectly through the action of the mediating variable (Baron & Kenny, 1986; Woodworth, 1926). Unlike the mediator variable, a moderator variable influences the direction or intensity of the relationship between the causal and consequent variables (Baron & Kenny, 1986).

Data was analyzed with the software IBM SPSS Statistics® 20.0. The models used were 4 (simple mediation) and 14 (moderated mediation) of PROCESS macro (Hayes, 2012, 2018), both using the ordinary least square (OLS) estimation technique.

Analysis and Discussion of Results

Mediation analyses are performed when the objective is to understand a variable's direct or indirect effect on another variable. The influence of Innovation on Global Competitiveness is known in the literature (Bae, 2016; Bogliacino et al., 2017; Dosi et al., 2015; Kim, 2005; Laursen & Meliciani, 2010; Melo et al., 2017; Nelson & Winter, 1982; Osuna-Alarcón & Rodríguez-Hernández, 2020; Schumpeter, 1934; Vivarelli & Pianta, 2000), and this study sought to verify whether Entrepreneurship would exert any indirect effect on this relationship. For this purpose, model 4 of PROCESS macro was used with 5000 bootstrapping resamples. All necessary assumptions for OLS regression, such as normality of residuals and absence of multicollinearity, were verified to ensure the validity of the analysis (Hayes, 2012, 2018).

The Innovation variable significantly increased Entrepreneurship ($B=0.096$, SE$=0.027$, $t=3{,}487$, $p=0.001$, $R^2=0.109$), which in turn increased Global Competitiveness also significantly ($B=0.402$, SE$=0.094$, $t=4.265$, $p<0.001$, $R^2=0.859$) when mediating the effect of Innovation on Global Competitiveness. The total effect (direct + indirect) between Innovation and Global Competitiveness was positive and significant ($B=0.619$, SE$=0.028$, CI$=[0.564, 0.675]$). The analysis of the partition of this total effect between direct (Innovation ➔ Global Competitiveness: $B=0.581$, SE$=0.027$, IC$=[0.527, 0.635]$) and indirect effect (Innovation ➔ Entrepreneurship ➔ Global Competitiveness: $B=0.038$, SE$=0.013$, IC$=[0.018, 0.068]$) showed that both are significant, with a prevalence of the direct effect, confirming the hypothesis of mediation (H1).

The ratio between the indirect effect and the total effect shows the level of importance of Entrepreneurship in the relationship between Innovation and Global Competitiveness. Innovation is relevant for Global Competitiveness but must count on newly registered firms, so clever ideas become businesses that generate economic growth and human development. Although Hayes (2018) has reservations regarding the relationship between these effects, Preacher and Kelley (2011) and Rucker et al. (2011) use such a relationship with the denomination of relative magnitude (6.2% in this study). Pieters (2017) recommends the totality of relationships involving the mediating variables, as shown in Table 2.

Preacher and Kelley (2011) also recommend kappa-squared as a mediation effect size measure. This indicator informs the magnitude of the indirect effect verified concerning the maximum possible indirect effect. In this study, the kappa-squared

Table 2 Relationship between direct, indirect, and total effects

Description	Value	Standard error	Confidence interval*	
			IL	UL
Total effect (TE)	0.619	0.028	0.564	0.675
Direct effect (DE)	0.581	0.027	0.527	0.635
Indirect effect (IE)	0.038	0.013	0.018	0.068
IE/TE	0.062	0.019	0.031	0.106
IE/DE	0.066	0.022	0.032	0.119

*Interval calculated with 95% confidence

Source: Elaborated by the authors

presented a value of 0.168 (SE = 0.036 [0.0982, 0.242]), which can be considered between moderate and large.

The result indicates the mediating role of Entrepreneurship in the relationship between Innovation and Global Competitiveness, showing that entrepreneurial activity not only drives innovation but turns this innovation into competitive gains. It also shows that policies to support entrepreneurship facilitate the transfer of knowledge and have a positive impact on business activity (Audretsch, 2011). Policymakers can therefore strengthen programs that support entrepreneurial activity to stimulate innovation and increase competitiveness.

Once the mediating effect of Entrepreneurship in the relationship between Innovation and Global Competitiveness was proven, the moderating effect of the country's Corruption on the relationship between Entrepreneurship and Global Competitiveness was tested (moderation of the mediation, model 14 of PROCESS macro), which is the second hypothesis (H2) of this research.

There was a negative and significant result for the interaction between Entrepreneurship and Corruption ($B = -0.015$, SE = 0.006, $t = -2.607$, $p = 0.011$), indicating the moderating effect of Corruption in the relationship between Entrepreneurship and Global Competitiveness. The negative coefficient can be explained by the fact that Corruption is measured on an inverted scale, ranging from 0 (higher corrupted) to 100 (lower corrupted).

Table 3 shows the conditional effect of Corruption on the relationship between Innovation and Global Competitiveness when mediated by Entrepreneurship. The table shows a decrease in the indirect effect of Innovation ➔ Entrepreneurship ➔ Global Competitiveness as the country is less corrupt, supporting the moderation hypothesis H2.

Although this may seem counter-intuitive (the more corrupt a country, the greater the effect of Innovation on Global Competitiveness via Entrepreneurship), it is crucial to remember the arguments of Tonoyan et al. (2010), Ulman (2013, 2014), Egger and Winner (2005), Bologna and Ross (2015), and Anokhin and Schulze (2009) for whom corruption in countries with weak institutions can be favorable for Entrepreneurship. Between waiting months for a license to open a new business, the entrepreneur, generally small and with little working capital, will prefer to bribe a

Table 3 Indirect effects of Innovation on Global Competitiveness, conditioned by Corruption numbers

Mediator	Corruption	Effect	Standard error	Confidence interval*	
				IL	UL
Entrepreneurship	31.325	0.080	0.034	0.031	0.162
Entrepreneurship	49.594	0.054	0.022	0.023	0.110
Entrepreneurship	67.863	0.029	0.013	0.009	0.062

*Interval calculated with 95% confidence

Source: Elaborated by the authors

civil servant to be able to start working and operate the business (Audretsch et al., 2022; Dreher & Gassebner, 2011).

For Santos et al. (2021), Institutions are particularly important in the relationship between Innovation and Global Competitiveness, indicating the influence the quality of the Institution has on the nation's prosperity, growth, and economic development. According to the authors, laws and regulations influence a country's ability to innovate and compete, and this study shows that corruption in public services can be an alternative to ensure that the entrepreneurial spirit is not frustrated, and new businesses can be created. This is a paradoxical situation that reveals that only agile procedures and little bureaucracy can replace the role that public corruption plays in "helping" the entrepreneur.

The statistical robustness of the tests was verified using the G*Power 3.1.9.7 software, obtaining a result > 0.99 (post hoc test) (Faul et al., 2007, 2009).

Conclusion

This article aimed to verify the role of entrepreneurship in the relationship between innovation and competitiveness since entrepreneurial activities are a pillar for economic growth and an important source for creating jobs, knowledge, and developing nations. It also verified how corruption affects entrepreneurship in the context of innovation and competitiveness.

Data related to innovation, global competitiveness, and incidence of corruption were collected from the Global Competitiveness Report, published by the World Economic Forum. Entrepreneurship data were obtained from the Entrepreneurship Database project, published by The World Bank. The study examined 101 countries that had data in the two reports. The statistical techniques involved mediation and moderated mediation models.

The results indicated a mediating effect of entrepreneurship in the relationship between innovation and global competitiveness, showing the importance of policies and strategies that help develop new businesses in the countries. They also showed, counterintuitively, that corruption moderates this mediating effect so that the greater the corruption present in the country, the greater the effect of innovation on competitiveness via entrepreneurship.

This work contributes academically by developing a conceptual model connecting the variables innovation, competitiveness, entrepreneurship, and corruption, representing how these factors act concomitantly. Also, the contradictory role of corruption is reinforced, considering that the expectation is that corruption will always represent a threat to businesses, which was not verified in this work.

The literature proposes that corruption helps entrepreneurs overcome barriers imposed by the system and makes businesses viable in places with weak institutions. So, future studies can consider separate groups of countries (developed and developing), cultural aspects, and institutional structures to verify if corruption manifests in the same way. Furthermore, the work focused on entrepreneurship and did not include entrepreneurial orientation as a study variable, a limitation that can also be addressed in other studies.

Entrepreneurship research plays a fundamental role for both public policy and individual entrepreneurs. They allow to understand the business environment and develop effective policies that support economic growth and innovation, creating a more robust ecosystem for entrepreneurs and applications of knowledge to improve productivity. For policymakers, understanding the entrepreneurship scenario is crucial to developing policies that encourage innovation, job creation, and economic growth, strengthening the argument for investments in strategic areas. Such policies can also promote tax simplification and access to financing. Furthermore, entrepreneurship can strengthen startups and emerging companies, especially in high-tech sectors. Thus, this study contributes to the assessment of the impact of entrepreneurship on the relationship between innovation and competitiveness, promoting the economic development of countries.

This research also showed the importance of entrepreneurship so it should be considered in the global competitiveness indicator calculated by the World Economic Forum, which does not currently happen. The analysis of the stage of countries' development and the well-being of their populations would become more comprehensive if entrepreneurship were considered together with the other measures that compose this indicator.

Author Contribution Contributions of each author are as listed below (names are not disclosed due to blind review reasons, but follow the order in the title page submitted separately).

1. Definition of research problem: Emerson Gomes dos Santos, Alcides Barrichello, Rogério Scabim Morano.
2. Development of hypotheses or research questions (empirical studies): Emerson Gomes dos Santos, Alcides Barrichello, Rogério Scabim Morano.
3. Development of theoretical propositions (theoretical work): Emerson Gomes dos Santos, Alcides Barrichello, Rogério Scabim Morano.
4. Theoretical foundation/literature review: Emerson Gomes dos Santos, Alcides Barrichello, Rogério Scabim Morano.
5. Definition of methodological procedures: Alcides Barrichello.
6. Data collection: Emerson Gomes dos Santos, Alcides Barrichello, Rogério Scabim Morano.
7. Statistical analysis: Alcides Barrichello.
8. Analysis and interpretation of data: Alcides Barrichello.
9. Critical revision of the manuscript: Emerson Gomes dos Santos, Rogério Scabim Morano.

10. Manuscript writing: Emerson Gomes dos Santos, Alcides Barrichello, Rogério Scabim Morano.
11. Other (please specify)—nothing specific to declare: NSD, NSD, NSD.

Data Availability Santos, Emerson Gomes dos; Barrichello, Alcides; Morano, Rogerio Scabim (2024), "How do entrepreneurship and corruption relate to innovation and competitiveness?," Mendeley Data, V1, 10.17632/mfsbjfxb9z.1—https://data.mendeley.com/datasets/mfsbjfxb9z/1.

Declarations

Ethics Approval No action, activity, or contact was made during the development of this article that did not follow ethical and responsible principles.

Conflict of Interest The authors declare no competing interests.

Research Involving Human Participants and/or Animals The present research did not involve human participants or animals.

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