

ORIGINAL ARTICLE

Fueling innovation performance through entrepreneurial leadership: Assessing the neglected mediating role of intellectual capital

Diego Norena-Chavez^{1*}, Eleftherios Thalassinos^{2,3}

¹ Escuela de Posgrado, Universidad de Lima, Lima 70001, Peru

² Faculty of Maritime and Industrial Studies, University of Piraeus, Piraeus 18533, Greece

³ Faculty of Economics, Management and Accountancy, University of Malta, Msida 4485, Malta

ABSTRACT

This study uses dynamic capability theory and a resource-based view to examine whether intellectual capital (human, relational, and structural capital) mediates entrepreneurial leadership and innovation success. Drawing on data from 422 senior-level employees working in Peruvian I.T. companies, the proposed relationships were analyzed using SmartPLS 4. Entrepreneurial leadership was found to foster employees' innovative performance through the mediating role of human capital, relational capital, and structural capital. Practically, businesses often rely on innovation for survival and growth, so they should consider entrepreneurial leadership to create intellectual capital (human capital, relational capital and structural capital) for innovation performance. Businesses should provide entrepreneurial training that emphasizes role modeling intellectual capital and encourages employees to recognize and pursue entrepreneurial opportunities. With significantly limited research, the study contributes by investigating the interrelationship of entrepreneurial leadership, intellectual capital, and innovation performance. The study contributes to the Resource Based View and Dynamic Capability Theory by demonstrating how entrepreneurial leadership contributes to innovation performance through human capital, relational capital, and structural capital.

KEYWORDS

entrepreneurial leadership; innovation performance; human capital; relational capital; structural capital

1. Introduction

In today's hyper-competitive and disruptive business climate, companies always look for employees who can help them achieve their goals (Ranjit, 2022). Leaders can facilitate an organization's attainment of competitive advantage, increasing market share and revenue

ARTICLE INFO

Received: April 10, 2022

Accepted: May 24, 2023

Available online: June 15, 2023

*CORRESPONDING AUTHOR

Diego Norena-Chavez, Escuela de Posgrado, Universidad de Lima, Lima 70001, Peru; dnorena@ulima.edu.pe

CITATION

Norena-Chavez D and Thalassinos E (2023). "Fueling innovation performance through entrepreneurial leadership: Assessing the neglected mediating role of intellectual capital". *Journal of Infrastructure, Policy and Development*, 7(1): 2020. doi: 10.24294/jipd.v7i1.2020

COPYRIGHT

Copyright © 2023 by author(s). *Journal of Infrastructure, Policy and Development* is published by EnPress Publisher LLC.

This work is licensed under the Creative Commons Attribution-NonCommercial 4.0 International License (CC BY-NC 4.0). <https://creativecommons.org/licenses/by-nc/4.0>

(Nayak et al., 2022). Entrepreneurial leadership (EL) is a new paradigm that combines business entrepreneurship and leadership in a way that helps a company seize an opportunity (Abubakar et al., 2018). As a leadership approach, EL can inspire growth and performance even in uncertain, complex, and hostile settings (Strobl et al., 2020). A growing demand for business entrepreneurs is at the helm, and more studies on EL are warranted (Latif et al., 2020). Since EL has only recently attracted the attention of academics and researchers, there is a need for a depth investigation of the relationship between entrepreneurial leadership and organizational outcomes and the underlying mechanisms for a better understanding of the nature of this relationship (Latif et al., 2020).

There are numerous leadership styles, each with its characteristics and methods. However sustainable leadership is a modern leadership style that is different for the other leadership styles. Sustainable leadership recognizes the interdependence of the organization, its constituents, and the larger ecosystem (Iqbal and Piwovar-Sulej, 2022). They attempt to strike a balance between the needs of the present and the ability of future generations to satisfy their own needs, this involves making environmentally responsible, socially just, and economically viable decisions (Piwovar-Sulej and Iqbal, 2022; Iqbal and Piwovar-Sulej, 2022).

A responsible leadership approach emphasizes ethical decision-making, sustainability, social responsibility, and accountability. It involves considering the effect of leadership actions and decisions on multiple stakeholders, such as employees, customers, communities, and the environment, in addition to the organization's success (Xuecheng et al., 2022). Ethical leadership is a style and approach to leadership that emphasizes ethical behavior, moral values, and integrity. Ethical leaders guide and influence others in accordance with the principles of honesty, fairness, respect, and duty (Xuecheng and Iqbal, 2022). Servant leadership is a leadership philosophy and approach that emphasizes the leader's duty as a servant to others, placing the needs and well-being of followers or team members above their own. Instead of focusing solely on personal power or authority, servant leaders prioritize serving the greater good and assisting the growth, development, and achievement of others (Latif et al., 2021).

Similarities and distinctions emerge when comparing responsible leadership, ethical leadership, servant leadership, sustainable leadership, and entrepreneurial leadership (Sharma et al., 2019). A positive and ethical organizational culture is the result of ethical decision-making and the upholding of high moral standards, which are emphasized by responsible and ethical leadership (Ardichvili and Jondle, 2009). Both servant leadership and sustainable leadership prioritize the welfare of others and consider long-term consequences, with servant leadership focusing on serving followers and sustainable leadership considering environmental and social repercussions (Islam et al., 2023). In contrast, entrepreneurial leadership is distinguished by its emphasis on innovation, risk-taking, and development, with a particular emphasis on seizing opportunities and fostering creativity (Mishra and Misra, 2017). While all approaches value integrity and stakeholder concern, their emphases and foci differ, offering distinctive perspectives and strategies for effective leadership in a variety of contexts.

Although, existing research has assessed the impact of entrepreneurial leadership on different innovation outcomes (Fontana and Musa, 2017: innovation management; Bagheri, Newman, and Eva, 2022: innovation work behavior; Newman et al., 2018: innovative behavior). There is still little or no research that has assessed the impact of entrepreneurial leadership on innovation performance

(IPF). Further, existing research on the relationship between EL and innovation outcomes has been found to be indirect, influenced by different intervening variables. Researchers have recommended the identification of other intervening variables that can further explain the mechanism through which EL affects innovation-related outcomes (Bagheri, 2017). To add to the explanation of the mechanism of impact of EL on IPF, the study focuses on intellectual capital (IC) as a potential mediator.

IC has been regarded as a unique asset that can enhance a firm's superior innovation performance (Cabrito and Dahms, 2020) and has also been found to be influenced by different leadership styles (Alrowwad and Abualoush, 2020: transactional leadership; Birasnav et al., 2011: transformational leadership; Laser, 2022: ambidextrous leadership). Leaders who emphasize learning and innovation can encourage employees to develop and share their knowledge and expertise continuously, creating and growing intellectual capital within an organization (Abbas et al., 2022). Leaders prioritizing collaboration and teamwork can help people share their knowledge and expertise, creating new IC and growing current intellectual capital (Cheng, 2023). The present study considers human capital (HC), relational capital (RC), and structural capital (SC) as mediators. Further, a review of existing research has identified several gaps concerning the interrelationship of (EL, HC, RC) and (SC) and (IPF).

First, with a recent surge in investigating the multiple leadership styles (Iqbal, Ahmad, and Nazir, 2022) and despite the increased interest in EL, EL remains largely underdeveloped (Latif et al., 2020). The literature on leadership has yet to permeate the field of entrepreneurship (Leitch and Volery, 2017). EL is a special kind of leadership focused on innovation, taking calculated risks, and opening new prospects. It emphasizes having an entrepreneurial mentality and having the capacity to recognize, create, and carry out new company ideas (Krueger, 2017). It is different from other modern leadership styles like Knowledge-oriented leadership, which emphasizes the leader's competence and capacity to impart and use their knowledge to address issues (Donate and de Pablo, 2015). Transformational leadership relies on leading organizations through transformation, which requires motivating and directing change and expansion (Suwanto et al., 2022). Entrepreneurial leaders exhibit traits like innovation, vision, and perseverance and can network and collaborate with others (Bagheri et al., 2013).

Second, to the best of the author's knowledge, there is little or no research that has assessed the role of EL in fostering IPF. A search for articles in both Scopus and the Web of Science based on the keywords "entrepreneurial leadership," "innovation"/"innovative" revealed only three different articles. Additionally, none of the studies found assessed the role of EL in improving IPF. This shows the limited research in entrepreneurial leadership and innovation in particular innovation performance.

Third, existing research has found a significant association between different leadership styles and intellectual capital (Alrowwad and Abualoush, 2020: transactional leadership; Asif, 2020: strategic leadership; Ullah et al., 2021: ethical leadership; Almanaseer and Matarnah, 2015: patterns leadership). To the best of the author's knowledge, there are scant research on the impact of EL on IC, it can be postulated that EL can significantly impact HC, RC, and SC. This will help in the identification of a potential modern leadership style that can help foster intellectual capital and in doing so address the calls to investigate positive outcomes of EL (Latif et al., 2020).

Finally, different leadership styles have been linked with innovation performance (Adhyke et

al., 2023: transformational leadership; Da'as, 2022: transactional leadership). Further, the impact of leadership on innovation performance is identified as not direct but mediated by other variables. The mechanism that explains the effects of EL on innovation outcomes is significantly limited and existing research has called for the identification of mediating variables that define the pathway from EL to innovation performance (IPF). The only significant work that has assessed the impact of entrepreneurial leadership on innovation performance was conducted by Hoang et al. (2022) as part of conference proceedings. Hoang et al. (2022) examined the mediating role of innovation strategies in the relationship between EL and process and product innovation and recommended future research on other variables that can mediate the relationships. This further highlights the limited research in EL and IPF. Additionally, Miao et al. (2019) have called for future research in identifying mediating variables to see whether entrepreneurial leadership is effective in enhancing performance outcomes through the mediating mechanism.

The present study utilizes the resource-based view (RBV) and the dynamic capability theory (DCT) to explain the inter-relationship of EL, HC, RC, SC, and IPF. Considering RBV, if a company needs to attain a sustainable competitive advantage, it needs to acquire and control valuable, rare, unique, and non-replaceable resources and capabilities and have an organization that can use them (Barney et al., 2001). The dynamic capacity theory defines the roles of entrepreneurial leaders in managing an organization as a dynamic system and devising innovative ways to adapt to quickly changing circumstances (Teece, 2012).

The pivotal contributions of this study to the literature are as follows. First, this study is one of the first to determine the effect of EL on IPF. Previous studies have only selected the impact of EL on innovation outcomes (Bagheri and Akbari, 2018). Also, this study is one of the first to consider EL as an essential antecedent of innovation performance. The research would enrich IC literature and help understand the role of EL in fostering IPF. Second, with little or no research on the impact of EL on IC, the study contributes by investigating whether EL can serve as an essential predictor of IC (human capital, relational capital, and structural capital). Third, the study further assesses whether HC, RC, and SC mediate the relationship between EL and IPF. This would help in providing a basis for understanding the mediating mechanism through which EL affects IPF. Understanding the mechanisms that lead to the effect of EL on IPF would help to articulate a better theoretical understanding of this relationship. Additionally, the study would provide further insights into RBV and DCT by demonstrating how EL contributes to innovation performance through human capital, relational capital, and structural capital.

2. Theoretical background and hypotheses development

2.1. Entrepreneurial leadership and innovation performance

Cunningham and Lischeron (1991) pioneered the study of entrepreneurial leadership (EL) by proposing that EL requires establishing various characteristics, including objectives, and opportunities, empowering individuals, conserving institutional knowledge, and developing human resource frameworks. Recently, Renko et al. (2015) stressed that EL comprises encouraging and directing the performance toward achieving organizational goals by discovering and capturing entrepreneurial chances. Entrepreneurial leaders are imaginative, innovative, and risk-takers, motivating their employees to engage in creative rather than routine work (Mishra and Misra, 2017;

Villaluz and Hechanova, 2019).

Innovation performance is defined as the accomplishments of businesses in terms of concepts, sketches, and prototypes of novel equipment, products, processes, and systems (Ernst, 2001). In the restricted meaning, innovative performance refers to the degree to which companies introduce inventions to the market (Hagedoorn and Cloudt, 2003).

Entrepreneurial leadership has been identified as one of the most successful leadership styles in fostering and enhancing the innovation performance of organizations (Fontana and Musa, 2017). Leaders can affect innovation within an organization by establishing explicit goals, introducing new concepts, and promoting innovation initiatives from subordinates (Nguyen et al., 2023). The relationship between EL and IPF can be further explained in light of RBV. Barney (2002) asserts that for a company to achieve a sustainable competitive advantage, it must acquire and control valuable, rare, inimitable, and non-replaceable resources. EL is a resource that creates value and directly affects on the IPF of an organization (Chen, 2007). Hence, it can be proposed that:

H1: There is a significant and positive impact of entrepreneurial leadership on Innovation performance.

2.2. The mediating role of human capital

Human capital is the value of all the money invested in an employee's training, skills, and future (Kannan and Aulbur, 2004). Human capital is a necessary resource for research and development because innovation requires the knowledge and abilities that are fundamental to human capital (Kato et al., 2014). Entrepreneurial leadership is an important area of human capital that a company should continuously develop in a fast-paced environment (Huang et al., 2002).

The relationship between entrepreneurial leadership and human capital can be explained by considering dynamic capability theory. According to dynamic capability theory, entrepreneurial leadership can mold human capital in several ways. First, entrepreneurial leaders can foster creativity and learning by promoting invention and experimentation. This can speed up product development and market response (Chen, 2007). Second, entrepreneurial leaders can encourage risk-taking and new possibilities; this can help create new skills, knowledge, and resources for competitive advantage (Cleverley-Thompson, 2016). Finally, entrepreneurial leaders can shape a firm's human capital to adapt to market changes and seize new opportunities by promoting innovation, experimentation, risk-taking, and training and development (Moustaghfir et al., 2020). Hence, it is proposed that:

H2: There is a significant and positive impact of entrepreneurial leadership on human capital.

Further, the relationship between human capital and innovation performance can be explained by considering the resource-based view. Innovation performance has been extensively linked to a company's capacity to learn and update its knowledge base; this is directly dependent on the HC (Aragón-Correa et al., 2007). As innovation performance involves generating new knowledge or new combinations of existing knowledge, it is likely to be influenced by a company's human capital (Fleming and Sorenson, 2001). With innovation, HC, with their knowledge and skills, help identify new market prospects and are eager to try and develop IPF (Cabello-Medina, 2011). Uniquely skilled employees can help firms innovate new goods and services that are hard to copy, and highly

qualified programmers can create innovative software goods that are hard to copy (Altenburg et al., 2008). Hence, it is proposed that:

H3: Human capital has a significant and positive impact on innovation performance.

The literature suggests that leadership can impact human capital (Preko, 2022), which can influence innovation performance (Fleming and Sorenson, 2001). High human capital (skills, knowledge, and talents) makes employees more likely to produce new ideas, recognize innovation possibilities, and implement innovative ideas. Human capital may turn entrepreneurial leadership can significantly improve human capital that can result in creativity and a dynamic atmosphere leading to innovative results (Prieto and Pérez-Santana, 2014). Hence, the following hypothesis is proposed:

H4: Human capital mediates the relationship between Entrepreneurial Leadership and innovation performance.

2.3. Mediating role relational capital

Relational capital (RC) is the knowledge built into the relationships with any stakeholder, whether inside or outside the organization; this knowledge affects the organization's life and ability to create value (García-Merino et al., 2014). Empirical research demonstrates that relational capital is crucial for all businesses (Corvino et al., 2019). Entrepreneurship is fundamentally a networking activity because relationships provide access to expertise, power, information, technologies, and finance (Elfring and Hulsink, 2003).

The relationship between entrepreneurial leadership and relational capital can be explained considering dynamic capability theory. According to dynamic capability theory, entrepreneurial leadership can influence a firm's social capital. First, entrepreneurial leaders can urge employees to think creatively and create new ideas for building and leveraging external stakeholder relationships by creating a culture of innovation and risk-taking (Kansikas et al., 2012). Second, entrepreneurial leaders can prioritize connections with customers, suppliers, and partners (Greenberg et al., 2013). With this firms can establish long-term innovation partnerships with these stakeholders by building trust and comprehension. Third, leaders can inspire workers to seek out new stakeholder connections; this helps the firm adapt to market and competitive shifts faster (Den Hartog et al., 1997). Hence, it is proposed that:

H5: There is a significant and positive impact of entrepreneurial leadership on relational capital.

To become more competitive, businesses must build innovative networks with clients, suppliers, rivals, universities, and research institutes (Najafi-Tavani et al., 2018). An increase in innovation performance is attributable to the external competencies shared with clients and vendors (Wu et al., 2016). Ramírez-Solis et al. (2022) found that cooperation networks can help boost innovation. The relationship between relational capital and innovation performance can be explained in light of the resource-based view theory. The business resources, such as relational capital, are used to increase the IPF of a company (Ciambotti et al., 2023). In addition, relational capital can enhance a company's reputation in the industry, increasing its stakeholders' trust and credibility (Abd-Elrahman et al., 2022). This can result in increased opportunities for collaboration and partnerships, which can further improve the organization's innovation performance. Based on the arguments, it is proposed

that:

H6: There is a significant and positive impact of relational capital on innovation performance.

The literature demonstrates that EL can influence RC (Cucculelli et al., 2019), which can impact IPF (Onofrei et al., 2020).

Consequently, entrepreneurial leadership can influence innovation performance via its effects on relational capital. The entrepreneurial leader cultivates solid relationships both within and beyond the organization. In turn, this relational capital provides access to the necessary information, resources, and opportunities for innovation (Alrowwad et al., 2020). Hence, the following hypothesis is proposed:

H7: Relational capital mediates the relationship between entrepreneurial leadership and innovation performance.

2.4. The mediating role of structural capital

Structural capital consists of all “non-human assets” represented by databases, organization charts, process manuals, strategies, procedures, and anything whose value to the corporation exceeds its material value (Bontis et al., 2000). SC is required to boost entrepreneurs’ success because it can significantly impact organizational performance since SC institutionalizes knowledge and experience based on existing structures, systems, and procedures and positively impacts business (Kang and Snell, 2009).

The relationship between entrepreneurial leadership and structural capital can be explained considering dynamic capability theory. EL is the capability that plays a strategic role in positively improving the structural capital (Hariyati et al., 2023). Following the dynamic capacity hypothesis, organizations organize their internal resources and talents, such as leadership, to respond to changes in the external environment (Helfat and Winter, 2011).

Further, Abbas et al. (2022) concluded that SC plays a significant role in IPF. It plays a crucial role in product, service, or process development for the company’s IPF (Dost et al., 2016). Having a higher level of structural capital influences the performance of a business with the development of an innovation performance culture (Ibarra-Cisneros et al., 2023). According to dynamic capacity theory, entrepreneurial leadership shapes structural capital in several ways. First, entrepreneurial leaders can foster creativity and innovation by promoting a culture of risk-taking and invention, new tools and technologies can help the company create and grow (Bagheri, Newman, and Eva, 2022). Second, entrepreneurial leaders can foster a learning-focused society, firms can boost structural capital and react to market and competitive changes by encouraging employees to learn new skills (Luo et al., 2014). Hence, the following hypothesis is proposed:

H8: There is a significant and positive impact of entrepreneurial leadership on structural capital.

The relationship between structural capital and innovation performance can be explained by considering the resource-based view theory. SC is a resource that identifies and quantifies company stakeholders, and this helps firms obtain heterogeneous information (Tsai and Hsu, 2019). Heterogeneous information flowing through these links drives innovation performance. When the connections between stakeholders are substantial, firms can increase their innovation performance

(Lyu et al., 2022). Firms can gain a competitive advantage and boost innovation by building and leveraging structural capital (Chen and Hung, 2014). According to the RBV theory, the relationship between structural capital and innovation performance is mediated by several factors. First, a firm's structural capital can support the development of new products, services, or processes, thereby providing a foundation for its innovation capabilities (Wang et al., 2014). Second, a company's structural capital can influence its capacity to access and leverage other resources crucial to innovation performance (Hsu and Wang, 2012). Hence, the following hypothesis is proposed:

H9: There is a significant and positive impact of structural capital on innovation performance.

Based on the arguments, it is proposed that:

The literature demonstrates that EL can influence SC (Chatterjee et al., 2023), which can impact innovation (Ibarra-Cisneros et al., 2023). Thus, the consequences of entrepreneurial leadership on structural capital can affect innovation performance. Entrepreneurial leaders can effectively facilitate the process of idea generation, development, and implementation by fostering an environment and instituting systems conducive to innovation. This environment and these systems—the structural capital of the organization—become the conduit through which the entrepreneurial behaviors of the leader can translate into actual innovative outcomes (Bagheri and Akbari, 2018). Hence, the following hypothesis is proposed:

H10: Structural capital mediates the relationship between Entrepreneurial Leadership and innovation performance.

The proposed model is shown in **Figure 1**.

3. Methodology

3.1. Participants and procedure

The study sample consists of senior-level employees working in Peruvian I.T. companies. Each questionnaire item was subjected to direct translation and back translation to ensure translation quality. The scales were rewritten in English with the assistance of two professors. The research consists of positivistic data collection methods. Self-reporting questionnaires were used to collect

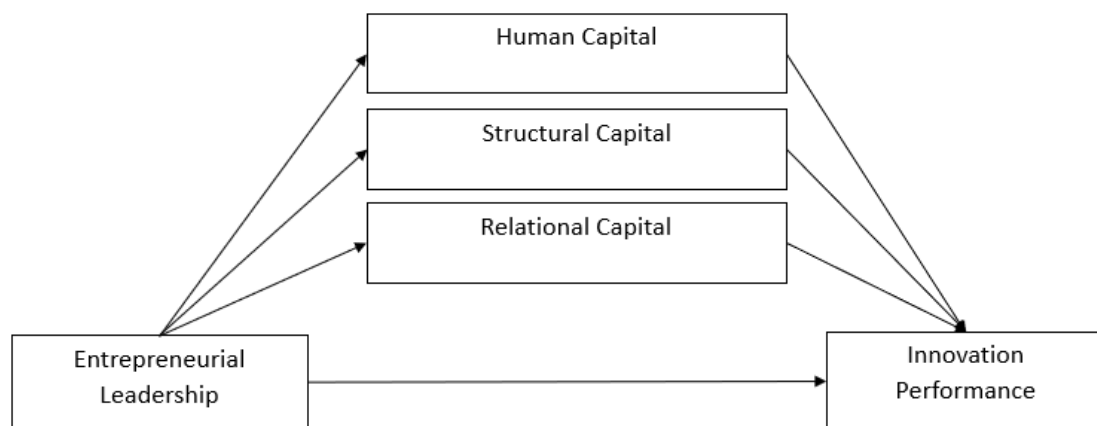


Figure 1. Research Framework.

data with a sample size of 500 respondents, chosen by non-probabilistic purposive and convenience sampling. A total of 500 questionnaires were distributed, 450 of which were returned with a response rate of 90%, and 422 were found useable. The sample consisted of 91.3% male and 8.7% female respondents. Most of the responders were 35–39 years old. Most respondents had a bachelor's degree (61.6%).

3.2. Measures

Standardized instruments were used for measuring the focal variables, entrepreneurial leadership, innovation performance, and intellectual capital, which measured the participants' responses on Likert-type scales.

Entrepreneurial leadership: It was measured by a scale developed by Renko et al. (2015). Recent studies using this scale have demonstrated strong validity and reliability (Bagheri, Newman, and Eva, 2022; Newman et al., 2018). The measure is an aggregate of eight items. (e.g., item: “My manager wants me to challenge the current ways we do business.”). Participants were asked to choose on a five-point scale (1 = not at all, 5 = most of the time).

Innovation performance was measured by a scale developed by Chang et al. (2012). The measure is an aggregate of five items that capture how innovative the organization is (e.g., “The company has improved its product/service quality by innovation.”). Participants were asked to choose on a five-point scale (1 = not at all, 5 = most of the time).

Intellectual capital: It contends three variables (human capital, relational capital, and structural capital). Human capital was measured by a scale developed by Hsu and Fang (2009), an aggregate of four items. Structural capital was measured by a scale developed by Hsu and Fang (2009), an aggregate of seven items. Relational capital was measured by a scale developed by Hsu and Fang (2009) and the measure is an aggregate of four items. Items were rated on a 5-point Likert scale (1 = “strongly disagree” and 5 = “strongly agree”).

3.3. Data analysis techniques

Structural equation modeling was used for data analysis as part of structural equation modeling measurement, and structural models were assessed, as part of measurement model assessment the quality criteria is asses through assessment of outer loadings, construct reliability (Cronbach alpha and composite reliability), and construct validity. Construct validity is established throught convergent and discriminant validity. To assess the convergent validity, every variance extracted (AVE) is evaluated. Further, to confirm the discriminant validity Fornell-Lacker criterion and Heterotrait-monotrait (HTMT) ratio of correlation were used.

4. Results

4.1. Measurement model assessment

First, factor loadings were evaluated. Although factor loadings greater than 0.70 are preferable, researchers in social science studies commonly receive outer loadings of less than 0.70. Items with outer loadings between 0.40 and 0.70 shall be removed only if deletion increases composite reliability or average variance extracted (AVE) above the suggested range (Hair et al., 2021).

In addition to the evaluation of outer loadings, the construct reliability was evaluated by Cronbach's alpha and composite reliability. All the constructs in the study demonstrated satisfactory reliability over the required threshold of 0.70 (Hair et al., 2021). Further, average variance extracted (AVE) was used to assess convergent validity. The results demonstrate satisfactory convergent validity because the AVE was greater than 0.50. **Table 1** shows the reliability and validity of the model.

The discriminant validity was determined by comparing the correlations among the latent variables to the square root of AVE and the heterotrait–monotrait correlation ratio (Henseler et al., 2015). HTMT criterion is based on the ratio of correlation and based on the ratio discriminant validity is established if HTMT values are less than 0.90. In the present study, the HTMT values were found less than 0.90, which shows that the ratio of correlations between the constructs is not high and the constructs are distinct from each other. Thus, discriminant validity is demonstrated. **Table 2** and **Table 3** show the discriminant validity results.

4.2. Structural model

Next, the structural model is assessed to substantiate the proposed relationships; considering R^2 , the results reveal that a 7.1% change in human capital, 19.4% in relational capital, and 18.3% in structural capital can be accounted for entrepreneurial leadership. The 41.8% change in innovation performance can be attributed to entrepreneurial leadership, human capital, relational capital, and structural capital. Further, Q^2 establishes predictive relevance. A Q^2 above 0 shows that the model has predictive relevance. The results show that there is significance in the prediction of the constructs (see **Table 4**).

Next, the hypotheses are tested. The results revealed that entrepreneurial leadership has an insignificant impact on innovation performance ($\beta = -0.040$, $t = 0.911$, $p = 0.181$). Hence, H1 was not supported. The results revealed that entrepreneurial leadership significantly impacts human capital ($\beta = 0.266$, $t = 5.032$, $p = 0.000$). Hence, H2 was supported. The study found that human capital significantly impacts innovation performance ($\beta = 0.409$, $t = 8.809$, $p = 0.000$). Hence, H3 was supported. The analysis results show that entrepreneurial leadership significantly impacts relational capital ($\beta = 0.441$, $t = 8.908$, $p = 0.000$). Hence, H5 was supported. The results showed that relational capital significantly impacts innovation performance ($\beta = 0.453$, $t = 8.763$, $p = 0.000$). Hence, H6 was supported. Entrepreneurial leadership significantly affects social capital ($\beta = 0.427$, $t = 8.254$, $p = 0.000$). Hence, H8 was supported. Social capital had an insignificant impact on innovation performance ($\beta = -0.094$, $t = 1.590$, $p = 0.056$). Hence, H9 was not supported. Table 4 shows the summary of hypotheses and predictive relevance.

4.3. Mediation analysis

The results revealed a significant indirect effect of entrepreneurial leadership on innovation performance through human capital ($\beta = 0.109$, $t = 4.193$, $p = 0.000$). Hence, H4 was supported. Relational capital was found to have a significant mediating role in the relationship between entrepreneurial leadership and innovation performance ($\beta = 0.200$, $t = 6.380$, $p = 0.000$). Hence, H7 was supported. Structural capital did not mediate the relationship between entrepreneurial leadership and innovation performance ($\beta = -0.040$, $t = 1.495$, $p = 0.067$). Hence, H10 was not supported. The results revealed that with the inclusion of the mediators, the direct effect was found insignificant

Table 1. Construct reliability and validity

Construct	Item	Outer loadings	Cronbach's alpha	Composite reliability (rho_c)	Average variance extracted (AVE)
Entrepreneurial leadership (EL)	EL1: My manager demonstrates a passion for my work.	0.720	0.882	0.906	0.548
	EL2: My manager has a vision of the future of our business.	0.753			
	EL3: My manager challenges and pushes me to act more innovatively.	0.699			
	EL4: My manager has creative solutions to problems.	0.777			
	EL5: My manager often comes up with radical improvement ideas for the products/services we are selling.	0.822			
	EL6: My manager often comes up with ideas of new products/services that we could sell.	0.689			
	EL7: My manager is ready to take risks.	0.758			
	EL8: My manager wants me to challenge the current ways we do business.	0.691			
Human capital (HC)	HC1: The level of employee empowerment is high in my company.	0.793	0.786	0.862	0.61
	HC2: The employees in my company possess excellent professional skills.	0.821			
	HC3: The company provides well-designed training programs.	0.798			
	HC4: The employees of my company have unique and new ideas.	0.709			
Innovation performance (IPF)	IPF1: The company has improved its product/service quality through innovation.	0.814	0.700	0.82	0.537
	IPF2: The company has accelerated the commercialization pace of new products/services through innovation.	0.785			
	IPF3: The company makes a considerable profit from its new products/services.	0.761			
	IPF4: The company develops new technology to improve the operation process.	0.539			
	IPF5: The company purchases new instruments or equipment to accelerate productivity.	0.703			
Relational capital (RC)	RC2: The company has many excellent suppliers.	0.755	0.753	0.843	0.573
	RC3: The market that my company is in has the potential to grow.	0.782			
	RC4: The company has solid strategic alliances.	0.787			
Structural capital (SC)	SC1: The company emphasizes IT investment.	0.731	0.855	0.888	0.533
	SC2: The company is willing to invest in business development.	0.736			
	SC3: The company has an easily-accessible information system.	0.745			
	SC4: The company invests a high proportion of its money in R&D.	0.717			
	SC5: The company invests a high proportion of its money in patent maintenance.	0.776			
	SC6: The company emphasizes new market development investment.	0.744			
	SC7: The company has a high proportion of R&D employees.	0.653			

Table 2. Fornell-Larcker criterion

	EL	HC	IPF	RC	SC
EL	0.740				
HC	0.266	0.781			
IPF	0.228	0.531	0.733		
RC	0.441	0.426	0.552	0.757	
SC	0.427	0.642	0.431	0.616	0.730

Table 3. Heterotrait-monotrait ratio (HTMT)

	EL	HC	IPF	RC	SC
EL					
HC	0.305				
IPF	0.28	0.720			
RC	0.536	0.558	0.755		
SC	0.463	0.804	0.559	0.751	

Table 4. Hypotheses results and predictive relevance

	β	SD	t statistics	p values
H1: EL -> IPF	-0.040	0.044	0.911	0.181
H2: EL -> HC	0.266	0.053	5.032	0.000
H3: HC -> IPF	0.409	0.046	8.809	0.000
H5: EL -> RC	0.441	0.049	8.908	0.000
H6: RC -> IPF	0.453	0.052	8.763	0.000
H8: EL -> SC	0.427	0.052	8.254	0.000
H9: SC -> IPF	-0.094	0.059	1.590	0.056
	$Q^2_{predict}$			
HC	0.062			
IPF	0.042			
RC	0.185			
SC	0.172			

Table 5. Mediation analysis

Total effect	β	t statistics	p values	Direct effect	β	t statistics	p values	Hypotheses	β	SD	t statistics	p values
EL -> IPF	0.228	4.061	0.000	EL ->IPF	-0.040	0.911	0.181	H7: EL -> RC -> IPF	0.200	0.031	6.380	0.000
								H10: EL -> SC -> IPF	-0.040	0.027	1.495	0.067
								H4: EL -> HC -> IPF	0.109	0.026	4.193	0.000

($\beta = -0.40$, $t = 0.911$, $p = 0.181$). Hence, relational capital and human capital fully mediate the relationship between entrepreneurial leadership and innovation performance. The mediation analysis

results are presented in **Table 5**.

5. Discussion

The study seeks to investigate the impact of entrepreneurial leadership on innovation performance through human capital, relational capital, and structural capital. The results revealed that the direct effect of EL on IPF (H1) was insignificant. However, the total effect was found significant. Since the objective of the study is to assess the indirect impact of entrepreneurial leadership on innovation performance through human, relational and structural capital, further to the total and direct effect mediation hypotheses were tested. The results of mediation shows that the influence of EL on IPF is indirect, passing through HC, RC, and SC. The results complemented the existing research that has found a significant impact of EL on IPF (see Tung and Yu, 2016). This indicates that a company with a leadership orientation toward risk, challenge, and enthusiasm will have a greater tendency for innovation performance. The results support the RBV core idea that for a company to be in a state of competitive advantage, it must have the resources and competencies that are valuable, rare, inimitable, and non-substitutable, such as entrepreneurial leadership and innovation performance (Barney, 2001).

The study found that entrepreneurial leadership significantly impacts human capital (H2). The results complement the existing research that has seen a significant impact of entrepreneurial leadership on (investment) human capital (Ling and Jaw, 2011). The results support the dynamic capability theory, as EL, one of the organization's differentiating capabilities, plays a strategic role in improving HC (Faridian, 2023). The results indicate that such DCT can contribute to the creation of human capital, as leaders that prioritize innovativeness, proactivity, and risk-taking can develop human capabilities such as investing in training employee's skills and investing in the generation of new ideas (Villaluz and Hechanova, 2019). Dynamic capability theory allows entrepreneurial leaders to match human capital management with the firm's innovation strategy (Teece, 2016). This can include recruiting and retaining employees with the skills and expertise to drive innovation and offering incentives and rewards that encourage creativity and risk-taking.

The study found that human capital significantly impacts innovation performance (H3). The results complemented the existing research that has found a significant impact of human capital on innovation performance (Aragón-Correa et al., 2007; Fleming and Sorenson, 2001). The results support the resource-based view (RBV), qualified human capital is a resource that improves innovation performance and generates a competitive advantage. Under the resource-based-view theory, for a firm to have a sustained competitive advantage, it must acquire and control precious, rare, unique, and irreplaceable resources such as HC (Coff and Kryscynski, 2011). RBV theory implies that human capital can significantly impact a firm's innovation performance (Singh et al., 2020). By recruiting and retaining talented workers, investing in their development, and encouraging teamwork, experimentation, and risk-taking, firms can use their human capital to gain and maintain a competitive advantage (Moustaghfir et al., 2020).

The study found that EL has a significant impact on RC (H5). The results complement the existing research that has found a significant impact of leadership on relational capital (Murray et al., 2021; Ramírez-solis et al., 2022). The results support the DCT, leadership facilitates the formation and adaption of ecosystems by resolving coordination and cooperation issues. Thus, the

activities underlying ecosystem leadership are dynamic skills that exist, are utilized for adaptation, and are advantageous under changing conditions (Foss et al., 2022).

The study found that RC significantly impacts IPF (H6). The results complement the existing research that has found a significant impact of RC on IPF (Ciambotti et al., 2023). The results support the RBV, the firms' resources, such as relational capital plays an essential role in improving innovation performance (Ramírez-Solis et al., 2022). Based on the resource-based view, the competitive advantage derives from innovation, valued, imitable, and non-substitutable resources. To get a competitive advantage, the relational capital must generate a distinctive interfirm tie and increase the innovation performance working with all the stakeholders (Welbourne and Pardo-del-Val, 2009).

Entrepreneurial leadership has a significant impact on structural capital. The results complemented the existing research that has found a significant impact of leadership on structural capital (Bontis et al., 2000; Kang and Snell, 2009). The results support the dynamic capability theory, EL as a capability plays a crucial role in improving structural capital (Hariyati et al., 2023). Organizations set up their internal resources and skills, like leadership, to respond to changes in the outside world (Helfat and Winter, 2011). The results show that such dynamic capabilities can help build SC since leaders focus on innovativeness, proactiveness, taking risks, and accepting challenges that can build structural capital capabilities like investing in business development and access to information systems (Bagheri, Newman, and Eva, 2022). Entrepreneurial leaders can build structural capital by encouraging invention and knowledge creation (Shih et al., 2010). They may promote the adoption of new technologies and tools that improve employee communication and collaboration, or they may invest in new processes and systems that will enhance the firm's knowledge generation and storage (Jones and Macpherson, 2006).

Structural capital was found to significantly impact innovation performance (H9). The results complement the existing research that has found a significant impact of SC on IPF (Ramírez-Solis et al., 2022). The results support the resource-based view theory, the firms' resources, such as structural capital which is the key link that allows intellectual capital to reach innovative performance and higher performance (Kamaluddin and Rahman, 2013). Research and development, knowledge management, product design and development, and innovation mindset are structural capital, these resources and capabilities can help a firm find new chances, produce innovative ideas, and develop new products, processes, and services (Allameh, 2018).

Next, the mediating analysis results are discussed. The results show a significant indirect effect of EL on IPF through HC (H4). This indicates that EL can be a significant influence on how HC can improve the IPF of an organization (Calabrò et al., 2021). The results are in line with DCT and RBV. The HC of a company requires EL resources to improve IPF and get a competitive advantage sustainable (Aragón-Correa et al., 2007). Entrepreneurial leadership (EL) creates a climate that encourages innovation, which indirectly impacts innovation performance (IPF) through human capital (HC) (Malibari and Bajaba, 2022). EL boosts human capital by encouraging creativity, risk-taking, and learning. Knowledge, skills, and competencies boost innovation and IPF (Bilal et al., 2021). Thus, EL leverages and develops human capital to affect IPF indirectly. The RBV and dynamic capability theories suggest that entrepreneurial leadership indirectly influences innovation performance through human capital development, enabling organizations to sustain competitive

advantage and adapt to market changes through investments in human capital development, fostering innovation performance and continuous learning (Singh et al., 2022).

Relational capital significantly mediates the relationship between entrepreneurial leadership and innovation performance (H7). This finding is in concordance with the prior research findings of (Wu et al., 2016; Hanifah et al., 2022). The results are in line with dynamic capability theory and resource-based view. RC is a strategic resource that requires leaders to develop IPF in coordination with external and internal stakeholders (Hanifah et al., 2022). Entrepreneurial leaders can improve innovation performance by building strong stakeholder relationships, encouraging collaboration, and sharing knowledge (Bagheri and Akbari, 2018; Iqbal and Piwovar-Sulej, 2023). Entrepreneurial leaders cultivate stakeholder relationships to share knowledge and resources. These partnerships enable collaboration, problem-solving, and various perspectives, boosting innovation. Thus, relational capital is essential for entrepreneurial leadership to boost creativity (Kansikas et al., 2012).

Structural capital is a partially significant mediator in the relationship between entrepreneurial leadership and innovation performance (H10). This shows that EL can significantly influence how SC can improve the IPF of an organization (Abbas et al., 2022; Tsai and Hsu, 2019; Piwovar-Sulej and Iqbal, 2022). The firm's structural capital's ability to foster innovation and success may rely on other factors, such as its human capital and knowledge management processes (Iqbal et al., 2021). The results are in line with the resource-based view and dynamic capability theory. Structural capital is a resource that requires entrepreneurial leaders to increase innovation performance (Hanifah et al., 2022). Organizations can build a sustainable competitive advantage and improve their ability to adapt to market changes by investing in efficient and effective systems and processes, protecting, and leveraging intellectual property, and fostering creativity and learning (Jahanshahi et al., 2015). Entrepreneurial leaders who can develop and utilize structural capital can boost innovation and help their companies stay competitive (Dabić et al., 2021; Iqbal, Ahmad, and Nazir, 2022). Structural capital allows organizations collaborate and innovate by providing resources, enabling information exchange and collaboration, and promoting organizational learning. However, human and social capital are also necessary for creativity (Filiari et al., 2014).

5.1. Theoretical implications

The current study offers important theoretical implications. Theoretically, the evidence of the hypothesized relationships throws insight into the contribution of EL and IC (HC, RC, and SC) to IPF considering DCT and the RBV. Given the paucity of literature on the association between EL and innovation performance, this study fills the gaps. The study examined EL's function in developing intellectual capital that can leverage capital outcomes to increase the probability of innovation performance. Understanding the direct and indirect factors that can increase the likelihood of innovation performance can help firms acquire a competitive edge. The study contributed to the RBV and DCT by examining the inter-relationship between entrepreneurial leadership, IC, and Innovation performance.

5.2. Practical implications

Practically, businesses often rely on innovation for survival and growth, they should consider EL to create IC (HC, RC, and SC) for innovation performance. They can motivate staff to spot

and seize business possibilities and serve as a role model to encourage business development in poor nations like Peru, governments should give entrepreneur training classes that emphasize role modeling intellectual capital and encouraging employees to recognize and pursue entrepreneurial opportunities at work.

5.3. Limitations and future research directions

While this study provides insightful information, it is essential to recognize its limitations. First, using a cross-sectional design limits the data to a single point in time, limiting our ability to capture dynamic changes accurately. Future research could benefit from the incorporation of longitudinal research methodologies to establish causality and investigate the dynamic impact mechanisms over time. The second focus of this research was on particular mediating variables, such as entrepreneurial self-efficacy, knowledge management systems, and innovative team behavior. However, additional potential mediating variables could influence the investigated relationship. Future research should investigate additional mediating variables to understand the phenomenon under investigation better.

In addition, the influence of potential moderating variables such as knowledge sharing and entrepreneurial zeal was not investigated. Incorporating these variables into future studies would provide a more nuanced comprehension of how they may affect the examined relationships. Due to this study's specific context and sample characteristics, the generalizability of the findings may be limited. To increase the external validity of these findings, future research should strive to replicate them in various contexts and with various samples. Despite these limitations, the findings of this study contribute to the existing corpus of knowledge and lay the groundwork for future research. Future research should resolve these limitations and investigate the investigated relationships in greater depth.

6. Conclusion

In conclusion, this study provides evidence to support the notion that entrepreneurial leadership can be a critical factor in improving innovation performance in I.T. companies in Peru. The study uses the dynamic capability theory and the resource-based view to show how important intellectual capital is in linking entrepreneurial leadership and innovation performance. In particular, the results show that human, relational, and structural capital can play important roles in making this relationship work. The study contributes to existing research by further explaining what is known about the relationship between entrepreneurial leadership, intellectual capital, and innovation performance. It does this by filling in a research gap and adding to what is known. This research adds to both the dynamic capability theory and the resource-based view by showing how the development of intellectual capital can help entrepreneurial leadership improve innovation performance. The results of this study can be helpful for managers and practitioners because they show how important it is to encourage entrepreneurial leadership and invest in the development of intellectual capital to improve innovation performance. This study gives a valuable framework for understanding the critical role of intellectual capital in driving innovation in organizations, and it can help guide future research and practice in this area.

Acknowledgements

Dr. Diego Norena-Chavez wants to thank the Universidad de Lima, Escuela de Posgrado for its support in the realization of this research. Professor Eleftherios Thalassinos wants to thank the ISMASYSTEMS NET institute for providing administrative support in the realization of this study.

Author contributions

Conceptualization, DN and ET; methodology, DN and ET; software, DN; validation, DN and ET; formal analysis, DR; investigation, DN and ET; resources, DN; data curation, DN; writing—original draft preparation, DN and ET; writing—review and editing, DN and ET; visualization, DR and ET; supervision, ET; project administration, DN; funding acquisition, DN and ET. Both authors have read and agreed to the published version of the manuscript.

Conflict of interest

The authors declare no conflict of interest.

References

- Abbas MG, Wang Z, Ullah H, et al. (2022). “Do entrepreneurial orientation and intellectual capital influence SMEs’ growth? Evidence from Pakistan”. *Environmental Science and Pollution Research*, 29(17): 25774–25789. <https://doi.org/10.1007/s11356-021-17542-y>
- Abd-Elrahman AEH and Ahmed Kamal JM (2022). “Relational capital, service quality and organizational performance in the Egyptian telecommunication sector”. *International Journal of Emerging Markets*, 17(1): 299–324. <https://doi.org/10.1108/IJOEM-11-2019-0983>
- Abubakar LS, Zainol FA and Daud WNBW (2018). “Entrepreneurial leadership and performance of small and medium-sized enterprises: A structural equation modeling approach”. *Journal for International Business and Entrepreneurship Development*, 11(2): 163–186. <https://doi.org/10.1504/JIBED.2018.091220>
- Adhyke YP, Eliyana A, Sridadi AR, et al. (2023). “Hear me out! This is my idea: Transformational leadership, proactive personality and relational identification”. *SAGE Open*, 13(1). <https://doi.org/10.1177/21582440221145869>
- Allameh SM (2018). “Antecedents and consequences of intellectual capital: The role of social capital, knowledge sharing, and innovation”. *Journal of Intellectual Capital*, 19(5): 858–874. <https://doi.org/10.1108/JIC-05-2017-0068>
- Almanaseer M and Matarneh B (2015). “The impact of leadership patterns on the development of intellectual capital in the educational sector in the Kingdom of Bahrain”. *Research Journal of Finance and Accounting*, 6(2): 156–162.
- Alrowwad AA and Abualoush SH (2020). “Innovation and intellectual capital as intermediary variables among transformational leadership, transactional leadership, and organizational performance”. *Journal of Management Development*, 39(2): 196–222. <https://doi.org/10.1108/JMD-02-2019-0062>
- Altenburg T, Schmitz H and Stamm A (2008). “Breakthrough? China’s and India’s transition from production to innovation”. *World Development*, 36(2): 325–344. <https://doi.org/10.1016/j.worlddev.2007.06.011>
- Aragón-Correa JA, García-Morales VJ and Cordón-Pozo E (2007). “Leadership and organizational learning’s role on innovation and performance: Lessons from Spain”. *Industrial Marketing Management*, 36(3): 349–359. <https://doi.org/10.1016/j.indmarman.2005.09.006>

- Ardichvili A and Jondle D (2009). “Integrative literature review: Ethical business cultures: A literature review and implications for HRD”. *Human Resource Development Review*, 8(2): 223–244. <https://doi.org/10.1177/1534484309334098>
- Asif M (2020). “Strategic leadership and ambidextrous learning: Exploring the role of dynamic capabilities and intellectual capital”. *International Journal of Quality and Service Sciences*, 12(1): 1–14. <https://doi.org/10.1108/IJQSS-03-2019-0034>
- Bagheri A (2017). “The impact of entrepreneurial leadership on innovation work behavior and opportunity recognition in high-technology SMEs”. *The Journal of High Technology Management Research*, 28(2): 159–166. <https://doi.org/10.1016/j.hitech.2017.10.003>
- Bagheri A and Akbari M (2018). “The impact of entrepreneurial leadership on nurses’ innovation behavior”. *Journal of Nursing Scholarship*, 50(1): 28–35. <https://doi.org/10.1111/jnu.12354>
- Bagheri A, Lope Pihie ZA and Krauss SE (2013). “Entrepreneurial leadership competencies among Malaysian university student entrepreneurial leaders”. *Asia Pacific Journal of Education*, 33(4): 493–508.
- Bagheri A, Newman A and Eva N (2022). “Entrepreneurial leadership of CEOs and employees’ innovative behavior in high-technology new ventures”. *Journal of Small Business Management*, 60(4): 805–827. <https://doi.org/10.1080/00472778.2020.1737094>
- Barney JB (2001). “Is the resource-based “view” a useful perspective for strategic management research? Yes”. *Academy of Management Review*, 26: 41–56. <https://doi.org/10.5465/amr.2001.4011938>
- Barney JB (2002). *Gaining and Sustaining Competitive Advantage*. Prentice Hall.
- Bilal M, Chaudhry S, Amber H, et al. (2021). “Entrepreneurial leadership and employees’ proactive behaviour: Fortifying self-determination theory”. *Journal of Open Innovation: Technology, Market, and Complexity*, 7(3): 176. <https://doi.org/10.3390/joitmc7030176>
- Birasnav M, Rangnekar S and Dalpati A (2011). “Transformational leadership and human capital benefits: The role of knowledge management”. *Leadership and Organization Development Journal*, 32(2): 106–126. <https://doi.org/10.1108/01437731111112962>
- Bontis N, Chua Chong Keow W and Richardson S (2000). “Intellectual capital and business performance in Malaysian industries”. *Journal of Intellectual Capital*, 1(1): 85–100. <https://doi.org/10.1108/14691930010324188>
- Cabello-Medina C, López-Cabrales Á and Valle-Cabrera R (2011). “Leveraging the innovative performance of human capital through HRM and social capital in Spanish firms”. *The International Journal of Human Resource Management*, 22(4): 807–828. <https://doi.org/10.1080/09585192.2011.555125>
- Cabrilo S and Dahms S (2020). “The role of multidimensional intellectual capital and organizational learning practices in innovation performance”. *European Management Review*, 17(4): 835–855. <https://doi.org/10.1111/emre.12396>
- Calabrò A, Torchia M, Jimenez DG, and Kraus S (2021). “The role of human capital on family firm innovativeness: The strategic leadership role of family board members”. *International Entrepreneurship and Management Journal*, 17(1): 261–287. <https://doi.org/10.1007/s11365-020-00657-y>
- Chang YC, Chang HT, Chi HR, et al. (2012). “How do established firms improve radical innovation performance? The organizational capabilities view”. *Technovation*, 32(7–8): 441–451. <https://doi.org/10.1016/j.technovation.2012.03.001>
- Chatterjee S, Chaudhuri R, Vrontis D, et al. (2023). “Global talent management by multinational enterprises post-COVID-19: The role of enterprise social networking and senior leadership”. *Thunderbird International Business Review*, 65(1): 77–88. <https://doi.org/10.1002/tie.22248>
- Chen MH (2007). “Entrepreneurial leadership and new ventures: Creativity in entrepreneurial teams”. *Creativity and Innovation Management*, 16(3): 239–249. <https://doi.org/10.1111/j.1467-8691.2007.00439.x>
- Chen PC and Hung SW (2014). “Collaborative green innovation in emerging countries: A social capital perspective”. *International Journal of Operations and Production Management*, 34(3): 347–363. <https://doi.org/10.1108/IJOPM-06-2012-0222>
- Cheng EC (2023). “Strategies and practices for school intellectual capital management”. In: *Managing School*

Intellectual Capital for Strategic Development, pp. 202–222. Routledge.

- Ciambotti G, Sgro F, Bontis N, et al. (2023). “Opportunity recognition and exploitation in resource-scarce contexts: The role of relational capital and bricolage in African social enterprise”. *Knowledge Management Research and Practice*, 1–13. <https://doi.org/10.1080/14778238.2023.2169204>
- Cleverley-Thompson S (2016). “The role of academic deans as entrepreneurial leaders in higher education institutions”. *Innovative Higher Education*, 41: 75–85. <https://doi.org/10.1007/s10755-015-9339-2>
- Coff R and Kryscynski D (2011). “Invited editorial: Drilling for micro-foundations of human capital-based competitive advantages”. *Journal of Management*, 37(5): 1429–1443. <https://doi.org/10.1177/0149206310397772>
- Corvino A, Caputo F, Pironti M, et al. (2019). “The moderating effect of firm size on relational capital and firm performance: Evidence from Europe”. *Journal of Intellectual Capital*, 20(4): 510–532. <https://doi.org/10.1108/JIC-03-2019-0044>
- Cucculelli M, Peruzzi V and Zazzaro A (2019). “Relational capital in lending relationships: Evidence from European family firms”. *Small Business Economics*, 52(1): 277–301. <https://doi.org/10.1007/s11187-018-0019-3>
- Cunningham JB and Lischeron J (1991). “Defining entrepreneurship”. *Journal of Small Business Management*, 29(1): 45–61.
- Da’as RA (2022). “From simple to complex: The relationship between educational leaders’ cognitive complexity and leadership-style profiles”. *Leadership and Policy in Schools*, 1–18. <https://doi.org/10.1080/15700763.2022.2081216>
- Dabić M, Stojčić N, Simić M, et al. (2021). “Intellectual agility and innovation in micro and small businesses: The mediating role of entrepreneurial leadership”. *Journal of Business Research*, 123: 683–695. <https://doi.org/10.1016/j.jbusres.2020.10.013>
- Den Hartog DN and Verburg RM (1997). “Charisma and rhetoric: Communicative techniques of international business leaders”. *The Leadership Quarterly*, 8(4): 355–391. [https://doi.org/10.1016/S1048-9843\(97\)90020-5](https://doi.org/10.1016/S1048-9843(97)90020-5)
- Donate MJ and de Pablo JDS (2015). “The role of knowledge-oriented leadership in knowledge management practices and innovation”. *Journal of Business Research*, 68(2): 360–370. <https://doi.org/10.1016/j.jbusres.2014.06.022>
- Dost M, Badir YF, Ali Z, et al. (2016). “The impact of intellectual capital on innovation generation and adoption”. *Journal of Intellectual Capital*, 17(4): 675–695. <https://doi.org/10.1108/JIC-04-2016-0047>
- Elfring T and Hulsink W (2003). “Networks in entrepreneurship: The case of high technology firms”. *Small Business Economics*, 21(4): 409–422. <https://doi.org/10.1023/A:1026180418357>
- Ernst H (2001). “Patent applications and subsequent changes of performance: Evidence from time-series cross-section analyses on the firm level”. *Research Policy*, 30(1): 143–157. [https://doi.org/10.1016/S0048-7333\(99\)00098-0](https://doi.org/10.1016/S0048-7333(99)00098-0)
- Faridian PH (2023). “Leading open innovation: The role of strategic entrepreneurial leadership in orchestration of value creation and capture in GitHub open-source communities”. *Technovation*, 119: 102546. <https://doi.org/10.1016/j.technovation.2022.102546>
- Filieri R, McNally RC, O’Dwyer M and O’Malley L (2014). “Structural social capital evolution and knowledge transfer: Evidence from an Irish pharmaceutical network”. *Industrial Marketing Management*, 43(3): 429–440. <https://doi.org/10.1016/j.indmarman.2013.12.011>
- Fleming L and Sorenson O (2001). “Technology as a complex adaptive system: Evidence from patent data”. *Research Policy*, 30(7): 1019–1039. [https://doi.org/10.1016/S0048-7333\(00\)00135-9](https://doi.org/10.1016/S0048-7333(00)00135-9)
- Fontana A and Musa S (2017). “The impact of entrepreneurial leadership on innovation management and its measurement validation”. *International Journal of Innovation Science*, 9(1): 2–19. <https://doi.org/10.1108/IJIS-05-2016-0004>
- Foss NJ, Schmidt J and Teece DJ (2022). “Ecosystem leadership as a dynamic capability”. *Long Range Planning*, 56(1): 102270. <https://doi.org/10.1016/j.lrp.2022.102270>

- García-Merino JD, García-Zambrano L and Rodríguez-Castellanos A (2014). “Impact of relational capital on business value”. *Journal of Information and Knowledge Management*, 13(1): 1450002. <https://doi.org/10.1142/S0219649214500026>
- Greenberg D, McKone-Sweet K and Wilson HJ (2013). “Entrepreneurial leaders: Creating opportunity in an unknowable world”. *Leader to Leader*, 2013(67): 56–62. <https://doi.org/10.1002/ltl.20063>
- Hagedoorn J and Cloudt M (2003). “Measuring innovative performance: Is there an advantage in using multiple indicators?”. *Research Policy*, 32(8): 1365–1379. [https://doi.org/10.1016/S0048-7333\(02\)00137-3](https://doi.org/10.1016/S0048-7333(02)00137-3)
- Hair Jr JF, Hult GTM, Ringle CM, et al. (2021). *A Primer on Partial Least Squares Structural Equation Modeling (PLS-SEM)*. Sage Publications.
- Hanifah H, Abd Halim N, Vafaei-Zadeh A, et al. (2022). “Effect of intellectual capital and entrepreneurial orientation on innovation performance of manufacturing SMEs: Mediating role of knowledge sharing”. *Journal of Intellectual Capital*, 23(6): 1175–1198. <https://doi.org/10.1108/JIC-06-2020-0186>
- Hariyati H, Nuswantara DA, Hidayat RA, and Putikadea I (2023). “Management accounting information system and intellectual capital: A way to increase SME’s business performance”. *Jurnal Siasat Bisnis*, 27(1): 61–75. <https://doi.org/10.20885/jsb.vol27.iss1.art5>
- Helfat CE and Winter SG (2011). “Untangling dynamic and operational capabilities: Strategy for the (N)ever-changing world”. *Strategic Management Journal*, 32(11): 1243–1250. <https://doi.org/10.1002/smj.955>
- Henseler J, Ringle CM and Sarstedt M (2015). “A new criterion for assessing discriminant validity in variance-based structural equation modeling”. *Journal of the Academy of Marketing Science*, 43: 115–135. <https://doi.org/10.1007/s11747-014-0403-8>
- Hoang GT, Nguyen H, Luu TT and Nguyen TT (2022). “Linking entrepreneurial leadership and innovation performance in construction firms”. *Academy of Management Proceedings*, 2022(1): 13545. <https://doi.org/10.5465/AMBPP.2022.13545>
- Hsu LC and Wang CH (2012). “Clarifying the effect of intellectual capital on performance: The mediating role of dynamic capability”. *British Journal of Management*, 23(2): 179–205. <https://doi.org/10.1111/j.1467-8551.2010.00718.x>
- Hsu YH and Fang W (2009). “Intellectual capital and new product development performance: The mediating role of organizational learning capability”. *Technological Forecasting and Social Change*, 76(5): 664–677. <https://doi.org/10.1016/j.techfore.2008.03.012>
- Huang GZD, Roy MH, Ahmed ZU, et al. (2002). “Benchmarking the human capital strategies of MNCs in Singapore”. *Benchmarking*, 9(4): 357–373. <https://doi.org/10.1108/14635770210442699>
- Ibarra-Cisneros MA, Reyna JBV and Hernández-Perlines F (2023). “Interaction between knowledge management, intellectual capital and innovation in higher education institutions”. *Education and Information Technologies*. <https://doi.org/10.1007/s10639-022-11563-x>
- Iqbal A, Ahmad MS and Nazir T (2022). “Does servant leadership predict innovative behavior above and beyond transformational leadership? Examining the role of affective commitment and creative self-efficacy”. *Leadership and Organization Development Journal*, 44 (1): 34–51. <https://doi.org/10.1108/LODJ-01-2022-0016>
- Iqbal Q and Piwovar-Sulej K (2022). “Sustainable leadership in higher education institutions: social innovation as a mechanism”. *International Journal of Sustainability in Higher Education*, 23(8): 1–20. <https://doi.org/10.1108/IJSHE-04-2021-0162>
- Iqbal Q and Piwovar-Sulej K (2023). “Sustainable leadership and heterogeneous knowledge sharing: The model for frugal innovation”. *European Journal of Innovation Management*, ahead-of-print. <https://doi.org/10.1108/EJIM-03-2022-0144>
- Iqbal S, Rasheed M, Khan H and Siddiqi A (2021). “Human resource practices and organizational innovation capability: Role of knowledge management”. *VINE Journal of Information and Knowledge Management Systems*, 51(5): 732–748. <https://doi.org/10.1108/VJIKMS-02-2020-0033>
- Jones O and Macpherson A (2006). “Inter-organizational learning and strategic renewal in SMEs: Extending the 4I

- framework". *Long Range Planning*, 39(2): 155–175. <https://doi.org/10.1016/j.lrp.2005.02.012>
- Islam T, Ahmad S and Ahmed I (2023). "Linking environment specific servant leadership with organizational environmental citizenship behavior: The roles of CSR and attachment anxiety". *Review of Managerial Science*, 17(3): 855–879. <https://doi.org/10.1007/s11846-022-00547-3>
- Jahanshahi AA, Nawaser K, Eizi N and Etemadi M (2015). "The role of real options thinking in achieving sustainable competitive advantage for SMEs". *Global Business and Organizational Excellence*, 35(1): 35–44. <https://doi.org/10.1002/joe.21643>
- Kamaluddin A and Rahman RA (2013). "The intellectual capital model: The resource-based theory application". *International Journal of Learning and Intellectual Capital*, 10(3–4): 294–313. <https://doi.org/10.1504/IJLIC.2013.057427>
- Kang SC and Snell SA (2009). "Intellectual capital architectures and ambidextrous learning: A framework for human resource management". *Journal of Management Studies*, 46(1): 65–92. <https://doi.org/10.1111/j.1467-6486.2008.00776.x>
- Kannan G and Aulbur WG (2004). "Intellectual capital: Measurement effectiveness". *Journal of Intellectual Capital*, 5(3): 389–413. <https://doi.org/10.1108/14691930410550363>
- Kansikas J, Laakkonen A, Sarpo V and Kontinen T (2012). "Entrepreneurial leadership and familiness as resources for strategic entrepreneurship". *International Journal of Entrepreneurial Behavior & Research*, 18(2): 141–158. <https://doi.org/10.1108/13552551211204193>
- Kato M, Okamuro H and Honjo Y (2014). "Does founders' human capital matter for innovation? Evidence from Japanese start-ups". *Journal of Small Business Management*, 53(1): 114–128. <https://doi.org/10.1111/jsbm.12094>
- Krueger NF (2017). "Entrepreneurial leadership". In: *Handbook of Entrepreneurial Dynamics*, pp. 35–55. Sage Publications.
- Laser J (2022). "Criteria to appraise top executives for ambidextrous leadership". *Journal of Organizational Effectiveness: People and Performance*, 9(3): 449–470. <https://doi.org/10.1108/JOEPP-06-2020-0094>
- Latif KF, Machuca MM, Marimon F and Sahibzada UF (2021). "Servant leadership, career, and life satisfaction in higher education: A cross-country study of Spain, China, and Pakistan". *Applied Research in Quality of Life*, 16: 1221–1247. <https://doi.org/10.1007/s11482-019-09809-x>
- Latif KF, Nazeer A, Shahzad F, et al. (2020). "Impact of entrepreneurial leadership on project success: Mediating role of knowledge management processes". *Leadership and Organization Development Journal*, 41(2): 237–256. <https://doi.org/10.1108/LODJ-07-2019-0323>
- Leitch CM and Volery T (2017). "Entrepreneurial leadership: Insights and directions". *International Small Business Journal*, 35(2): 147–156. <https://doi.org/10.1177/0266242616681397>
- Ling YH and Jaw BS (2011). "Entrepreneurial leadership, human capital management, and global competitiveness: An empirical study of Taiwanese MNCs". *Journal of Chinese Human Resources Management*, 2(2): 117–135. <https://doi.org/10.1108/20408001111179168>
- Luo X, Kanuri VK and Andrews M (2014). "How does CEO tenure matter? The mediating role of firm-employee and firm-customer relationships". *Strategic Management Journal*, 35(4): 492–511. <https://doi.org/10.1002/smj.2112>
- Lyu C, Peng C, Yang H, et al. (2022). "Social capital and innovation performance of digital firms: Serial mediation effect of cross-border knowledge search and absorptive capacity". *Journal of Innovation and Knowledge*, 7(2): 100187. <https://doi.org/10.1016/j.jik.2022.100187>
- Malibari MA and Bajaba S (2022). "Entrepreneurial leadership and employees' innovative behavior: A sequential mediation analysis of innovation climate and employees' intellectual agility". *Journal of Innovation & Knowledge*, 7(4): 100255. <https://doi.org/10.1016/j.jik.2022.100255>
- Mishra P and Misra RK (2017). "Entrepreneurial leadership and organizational effectiveness: A comparative study of executives and non-executives". *Procedia Computer Science*, 122: 71–78. <https://doi.org/10.1016/j.procs.2017.11.343>

- Miao Q, Eva N, Newman A and Cooper B (2019). “CEO entrepreneurial leadership and performance outcomes of top management teams in entrepreneurial ventures: The mediating effects of psychological safety”. *Journal of Small Business Management*, 57(3): 1119–1135. <https://doi.org/10.1111/jsbm.12465>
- Moustaghfir K, El Fatihi S and Benouarrek M (2020). “Human resource management practices, entrepreneurial orientation and firm performance: What is the link?”. *Measuring Business Excellence*, 24(2): 267–283. <https://doi.org/10.1108/MBE-12-2019-0119>
- Murray GF, Lewis VA and D’Aunno T (2021). “Interpersonal relationships, dynamic reinforcement, and alliance performance”. *Academy of Management Proceedings*, 2021(1): 16084. <https://doi.org/10.5465/AMBPP.2021.250>
- Najafi-Tavani S, Najafi-Tavani Z, Naudé P, et al. (2018). “How collaborative innovation networks affect new product performance: Product innovation capability, process innovation capability, and absorptive capacity”. *Industrial Marketing Management*, 73: 193–205. <https://doi.org/10.1016/j.indmarman.2018.02.009>
- Nayak B, Bhattacharyya SS and Krishnamoorthy B (2022). “Exploring the black box of competitive advantage—An integrated bibliometric and chronological literature review approach”. *Journal of Business Research*, 139: 964–982. <https://doi.org/10.1016/j.jbusres.2021.10.047>
- Newman A, Neesham C, Manville G, et al. (2018). “Examining the influence of servant and entrepreneurial leadership on the work outcomes of employees in social enterprises”. *The International Journal of Human Resource Management*, 29(20): 2905–2926. <https://doi.org/10.1080/09585192.2017.1359792>
- Nguyen NT, Hooi LW and Avvari MV (2023). “Leadership styles and organisational innovation in Vietnam: Does employee creativity matter?”. *International Journal of Productivity and Performance Management*, 72(2): 331–360. <https://doi.org/10.1108/IJPPM-10-2020-0563>
- Onofrei G, Nguyen HM, Zhang M, et al. (2020). “Building supply chain relational capital: The impact of supplier and customer leveraging on innovation performance”. *Business Strategy and the Environment*, 29(8): 3422–3434. <https://doi.org/10.1002/bse.2586>
- Piwozar-Sulej K and Iqbal Q (2022). “Leadership styles and sustainable performance: A systematic literature review”. *Journal of Cleaner Production*, 382: 134600. <https://doi.org/10.1016/j.jclepro.2022.134600>
- Preko AK (2022). “Leadership and human capital management in new public management”. In: *New Public Management in Africa*, pp. 105–131. Palgrave Macmillan, Cham. https://doi.org/10.1007/978-3-030-77181-2_5
- Prieto IM and Pérez-Santana MP (2014). “Managing innovative work behavior: The role of human resource practices”. *Personnel Review*, 43(2): 184–208. <https://doi.org/10.1108/PR-11-2012-0199>
- Ramírez-Solis ER, Llonch-Andreu J and Malpica-Romero AD (2022). “Relational capital and strategic orientations as antecedents of innovation: Evidence from Mexican SMEs”. *Journal of Innovation and Entrepreneurship*, 11(1): 42. <https://doi.org/10.1186/s13731-022-00235-2>
- Ranjit G (2022). “Organizational justice and organizational citizenship behavior: The mediating role of psychological ownership”. *Journal of Organizational Effectiveness: People and Performance*, 9(1): 1–19. <https://doi.org/10.1108/JOEPP-01-2021-0012>
- Renko M, El Tarabishy A, Carsrud AL, et al. (2015). “Understanding and measuring entrepreneurial leadership style”. *Journal of Small Business Management*, 53(1): 54–74. <https://doi.org/10.1111/jsbm.12086>
- Sharma A, Agrawal R and Khandelwal U (2019). “Developing ethical leadership for business organizations: A conceptual model of its antecedents and consequences”. *Leadership & Organization Development Journal*, 40(6): 712–734. <https://doi.org/10.1108/LODJ-10-2018-0367>
- Shih KH, Chang CJ and Lin B (2010). “Assessing knowledge creation and intellectual capital in the banking industry”. *Journal of Intellectual Capital*, 11(1): 74–89. <https://doi.org/10.1108/14691931011013343>
- Singh SK, Del Giudice M, Chiappetta Jabbour CJ, et al. (2022). “Stakeholder pressure, green innovation, and performance in small and medium-sized enterprises: The role of green dynamic capabilities”. *Business Strategy and the Environment*, 31(1): 500–514. <https://doi.org/10.1002/bse.2906>
- Singh SK, Del Giudice M, Chierici R and Graziano D (2020). “Green innovation and environmental performance:

- The role of green transformational leadership and green human resource management”. *Technological Forecasting and Social Change*, 150: 119762. <https://doi.org/10.1016/j.techfore.2019.119762>
- Strobl A, Bauer F and Matzler K (2020). “The impact of industry-wide and target market environmental hostility on entrepreneurial leadership in mergers and acquisitions”. *Journal of World Business*, 55(2): 100931. <https://doi.org/10.1016/j.jwb.2018.03.002>
- Suwanto S, Sunarsi D and Achmad W (2022). “Effect of transformational leadership, servant leadership, and digital transformation on MSMEs performance and work innovation capabilities”. *Central European Management Journal*, 30(4): 751–762. <https://doi.org/10.57030/23364890.cemj.30.4.71>
- Teece DJ (2012). “Dynamic capabilities: Routines versus entrepreneurial action”. *Journal of Management Studies*, 49(8): 1395–1401. <https://doi.org/10.1111/j.1467-6486.2012.01080.x>
- Teece DJ (2016). “Dynamic capabilities and entrepreneurial management in large organizations: Toward a theory of the (entrepreneurial) firm”. *European Economic Review*, 86: 202–216. <https://doi.org/10.1016/j.eurocorev.2015.11.006>
- Tsai FS and Hsu IC (2019). “The effects of social capital on knowledge heterogeneity”. *Management Decision*, 57(5): 1237–1253. <https://doi.org/10.1108/MD-12-2016-0909>
- Tung FC and Yu TW (2016). “Does innovation leadership enhance creativity in high-tech industries?”. *Leadership and Organization Development Journal*, 37(5): 579–592. <https://doi.org/10.1108/LODJ-09-2014-0170>
- Ullah I, Mirza B and Jamil A (2021). “The influence of ethical leadership on innovative performance: Modeling the mediating role of intellectual capital”. *Journal of Management Development*, 40(4): 273–292. <https://doi.org/10.1108/JMD-08-2020-0277>
- Villaluz VC and Hechanova MRM (2019). “Ownership and leadership in building an innovation culture”. *Leadership and Organization Development Journal*, 40(2): 138–150. <https://doi.org/10.1108/LODJ-05-2018-0184>
- Wang Z, Wang N and Liang H (2014). “Knowledge sharing, intellectual capital and firm performance”. *Management Decision*, 52(2): 230–258. <https://doi.org/10.1108/MD-02-2013-0064>
- Welbourne TM and Pardo-del-Val M (2009). “Relational capital: Strategic advantage for small and medium-size enterprises (SMEs) through negotiation and collaboration”. *Group Decision and Negotiation*, 18: 483–497. <https://doi.org/10.1007/s10726-008-9138-6>
- Wu H, Chen J and Jiao H (2016). “Dynamic capabilities as a mediator linking international diversification and innovation performance of firms in an emerging economy”. *Journal of Business Research*, 69(8): 2678–2686. <https://doi.org/10.1016/j.jbusres.2015.11.003>
- Xuecheng W and Iqbal Q (2022). “Ethical leadership, bricolage, and eco-innovation in the Chinese Manufacturing industry: A multi-theory perspective”. *Sustainability*, 14(12): 7070. <https://doi.org/10.3390/su14127070>
- Xuecheng W, Ahmad NH, Iqbal Q and Saina B (2022). “Responsible leadership and sustainable development in east Asia economic group: Application of social exchange theory”. *Sustainability*, 14(10): 6020. <https://doi.org/10.3390/su14106020>