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Entrepreneurial Strategies for Value Creation in Times of Uncertainty

Edited by

Wojciech Dyduch

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Journal of Entrepreneurship, Management and Innovation (JEMI) ([e] ISSN 2299-7326, [p] ISSN 2299-7075) is an interdisciplinary, double-blind peer-reviewed journal, emphasizing theoretical and empirical articles on entrepreneurship, management, and innovation. The journal is published in ELECTRONIC (online first) and PRINT (occasionally) formats. See our website: http://www.jemi.edu.pl.

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The pillars of entrepreneurial and managerial success in vibrant environments: Editorial

Wojciech Dyduch[1]

The break of war in Europe, high-level inflation, disturbed energy markets, worldwide political uncertainty, game changers like digital transformation, and climate-induced incentives shape the organizational environment of today, challenging the business survival and growth. As the uncertainty, hostility, complexity and dynamism of the organizational environment increase, the sources of competitive advantage become more volatile and unstable. Consequently, companies readjust their activities, and shift from looking for competitive advantages into looking for opportunities, which forces them to increase the level of entrepreneurship. Entwining entrepreneurship into corporate strategies is often seen as a remedy for organizations that - after many years of functioning - lose flexibility, responsiveness, and agility, exhibit destructive routines and inertia, which decreases the skill of building dynamic capabilities. As a result, responses to sudden and unexpected anomalies or crises are not effective. While entrepreneurship involves sensing and seizing opportunities, it also requires strategic thinking, especially in the dynamic times, to allow organizations better adapt to the environment, transform business models to exploit opportunities effectively, and eventually to create value and increase firm performance. In short, to avoid the organizational inertia, businesses are modifying or sustaining their entrepreneurial orientation by tuning the levels of innovativeness, proactiveness, risk-taking, autonomy, and competitive aggressiveness. This allows them to develop adaptability, or the capacity to create and capture value from novel and risky activities.

So far, strategic management has identified a number of various sources of value creation, e.g. (a) taking capital-related decisions based on pricing strategies and cost reduction operations; (b) commercializing innovative goods or services, either by introducing novel solutions or by imitating competitive moves, (c) offering unique selling propositions and idiosyncratic use-value for customers, (d) entering market coalitions, to access complementary resources necessary for launching high technologies; and (e) sensing and seizing opportunities, developing dynamic capabilities to better interact with the environment, orchestrating resources for efficient opportunity exploitation, and developing strategic support for unique competences or resources. The last one is probably most suitable for times of uncertainty. It, however, requires developing proper strategic potential based on valuable resources, unique managerial competences, strategic processes supporting not only opportunity-recognition, but also responsiveness to environment, and innovation abilities. Thus, strategic management has become sensitive to the dynamic relations between businesses and their environment to sense and exploit opportunities most effectively on the strategic levels.

Although scholarly discussion scrutinized the subject of strategic entrepreneurship and entrepreneurial strategies, the anomalies and uncertainties appearing in recent years, as well as their consequences, make it necessary to revise and update the theoretical propositions and empirical research in this area. This JEMI thematic issue encompasses research that offers novel insights into entrepreneurship by identifying strategies that both entrepreneurs and companies formulate and implement. The issue covers theoretically and empirically sound papers that broaden the understanding of relations

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between contextual factors (environmental characteristics), entrepreneurial variables (entrepreneurial strategies, intents, abilities), managerial variables (social capital, decision making, flexibility, managerial competences, leadership) and organizational outcomes (performance, value creation, innovativeness, organization's growth, etc.).

Through various empirical analyses, the papers in this issue answer many significant, to-date, and fascinating questions, for example:

- What are the strategic responses of firms in times of crises?
- How do organizations modify their entrepreneurial orientation in various phases of crises, and is it worth it?
- What is the role of business ecosystems and stakeholders in fostering the growth of specific forms of entrepreneurship?
- Which managerial attitudes and characteristics are required in stimulating entrepreneurship?
- How important are flexibility and agility in increasing entrepreneurship and firm performance?
- What are the current sources of entrepreneurial success, and how to avoid failures?
- What are the key organizational and leadership capabilities in times of uncertainty?
- What drives the relationship between entrepreneurship and firm performance?

The thematic issue starts with the paper by Suder (2024) and it poses an interesting problem of entrepreneurial reorientation. The study analyses whether it is worth modifying the entrepreneurial strategy in the face of crises. To answer this question, quantitative research carried out among 126 small businesses operating in Poland during three periods of the Covid-19 pandemic is demonstrated. Not only do the results indicate which dimensions of entrepreneurial orientation were modified, but they identify four types of entrepreneurial strategy modifications, and determine which of them lead to increasing firm performance when external environment changes. Which strategies were used by the researched organizations during various phases of the pandemic? Have the companies modified their entrepreneurial orientation and its dimensions along with the changes in the external environment? Has the increase in entrepreneurial orientation always led to improving firm performance? When should EO modifications be avoided? All is revealed in the first paper.

The second paper of the issue, prepared by Candelario-Moreno and Sánchez-Hernández (2024) explores a specific form of entrepreneurship, namely rural entrepreneurship. The study examines the concept of rural entrepreneurship, identifies key aspects that differentiate it from non-rural entrepreneurship, and focuses on the significance of the local entrepreneurial ecosystem in establishing and developing ventures in rural areas. The carried-out research attempts to measure the degree of rurality of companies and assesses the influence of local entrepreneurial ecosystems on rural firms. Quantitative analyses test a sample of 89 firms from Extremadura, a landlocked autonomous community of Spain. The analyses, among others, indicate, that geographical location in a rural area, or focus on primary sector activities are not necessarily the only determinants of enterprise rurality. Moreover, the article highlights the significance of local social capital, ie. building and developing relations with local stakeholders, as well as the ability of creating value by rural ventures. The added value of this paper is focusing attention on the role of business ecosystems in fostering the growth of rural entrepreneurship and offering insights for policymakers to implement effective measures in rural environments.

The third paper from Lajçi, Berisha, and Krasniqi (2024) looks at the entrepreneurship-ethics nexus and explores whether managers with stronger attitudes toward unethical behaviors, such as bribery, deception, or passing blame, demonstrate higher entrepreneurial intentions. The paper addresses the relationships between managers' attitudes toward unethical actions and the level of their entrepreneurial intention in the context of decision-making speed and risk-taking. Empirical data were collected from 214 managers employed in companies from different industries operating in Kosovo - a transitioning country with fast-growing economy in the Western Balkans. Among many intriguing results, the paper demonstrates one interesting finding: it seems that managers who are quick decision-makers and risk-takers express higher level of entrepreneurial intentions. The messages from this research are straightforward. First, if managers desire outcomes, they need to develop entrepreneurial-friendly environment in organizations that complies with ethical standards. Second, entrepreneurship needs to be taught and thought of as a process that strengthens the ethical awareness. Third, proper decision-making and risk-taking are required in fostering entrepreneurship.

The next paper from Haylemariam, Oduro, Tegegne (2024) scrutinizes the relationship between entrepreneurial agility and organizational performance of 411 companies operating in the IT sector in Italy. Authors shed light on the role of open innovation and environmental dynamism in this relationship. It is probably the first research on the interplay between entrepreneurial agility, open innovation, environmental dynamism, and firm performance in the IT sector. Interestingly, the research results suggest that the relationship between entrepreneurial agility and firm performance gets stronger in a more dynamic environment. The carried-out analyses demonstrate that in times of uncertainty companies should

develop their agility to quickly identify opportunities and respond to problems that appear. Adopting open innovation strategies, developing relationships with stakeholders, as well as building diverse and inclusive teams with employees offering various perspectives can contribute to organizational flexibility and value creation.

So far, the focus has been on success factors that translate to a higher level of entrepreneurship or firm performance, such as modifying the entrepreneurial orientation, relations with stakeholders, the ability to create value, speed of decision-making and risk-taking, or organizational agility. Not surprisingly, when researching antecedents of entrepreneurial success, learning by failures is often overlooked. The next paper in this issue tackles the problem of start-up failures and intends to assess the key components and contextual factors responsible for the unsuccessful start-ups in the context of India. As a result, Pathania and Tanwar (2024) identify, model, and categorize eleven critical failure factors of start-ups and show their interconnections through a structural framework. The model demonstrated in the study shows that lack of entrepreneurial efficiency, external environmental challenges, and poor management are the primary variables contributing to the failure of start-ups. The paper brings value to stakeholders, who – by looking into presented relations between failure factors can develop more tailored risk mitigation strategies, optimize decision making and strategically support resources that create value. But most importantly, these are management competences and entrepreneurial efficiency that matter.

Uncertain times shaped by environmental dynamism, unexpected crises, digital transformation and ecological trends put a pressure on organizations to be more flexible, adaptable, and ready to develop dynamic capabilities. The need to quickly respond to opportunities that appear and minimize environmental threats promotes agile leadership, which can improve innovativeness and performance. The next paper from Porkodi (2024) addresses the research problem of agile leadership in uncertain times. The study provides a meta-analytic review of the influence of agile leadership on various organizational outcomes; not only financial, but also social, operational, employee- team- and customer-oriented. The findings from the research, based both on bibliometric literature analysis and meta-analysis, indicate the following: first, the topic of agile leadership gains a lot of attention recently; second, it is studied on far broader terms than just financial performance - agile leadership can have a strong impact on interpersonal trust, overall firm performance, innovation management or individual career; third, agile leadership attributes such as ability to innovate, building trust, competencies, wisdom, or result orientation can contribute to business growth.

The final paper from Górska-Warsewicz (2024) seeks to find the relationship between entrepreneurial orientation, innovative co-branding partnership, and firm performance. Unlike the first paper, this study takes into consideration five elements of entrepreneurial orientation: innovativeness, proactiveness, risk-taking (c.f., the first paper of the issue), competitive aggressiveness, and autonomy. The study presented here verifies the positive influence of three EO dimensions (innovativeness, proactiveness, and competitive aggressiveness) on business performance and three EO dimensions (innovativeness, competitive aggressiveness, and autonomy) on undertaking activities within an innovative co-branding partnership. Furthermore, innovative co-branding partnership activities have been found to influence firm performance. The study suggests that entrepreneurial orientation remains a valid and promising construct in entrepreneurship research. It also points out that organizations should undertake constant efforts to increase innovativeness and competitiveness, taking into consideration creating value both for organizations and for customers.

It is not possible to synthesize all the interesting papers into one model. Nevertheless, if a framework existed that could capture the most significant constructs and variables emerging in the research presented throughout this thematic issue, it might look like in Figure 1.

For space and parsimony reasons, only three levels of variables are presented: contextual variables (environmental dynamism in uncertain times), independent variables (that reflect the pillars of entrepreneurial and managerial prerequisites that impact organizational outcomes), and the dependent variables that echo through the papers (firm performance, innovativeness, value creation, organizations' growth, the level of entrepreneurship). Naturally, the framework is not comprehensive or exhaustive. It just serves as an illustration of which key variables were covered by the articles, which can serve as an incentive to further research in this area.

Acknowledgments

I would like to thank the Authors for contributing their papers to this thematic issue of JEMI, as they expand our knowledge on entrepreneurship, management, and innovation. Thorough theoretical underpinnings, state-of-the-art research methods, compelling research results and significant implications make this issue special indeed!

I would also like to thank the reviewers for their effort, time, and continuous support during the editorial process. I firmly believe that the outcome of your commitment – seven interesting papers demonstrating novel research in entrepreneurship from various parts of the world – will inspire the readers and energize future research in the topic.

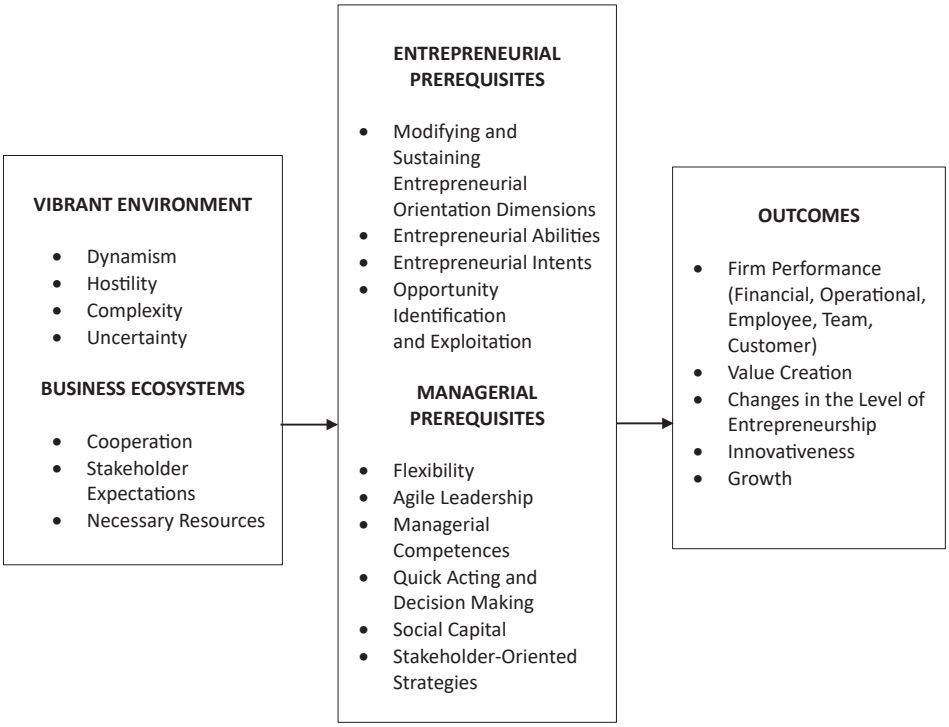

Figure 1. Entrepreneurial and managerial pillars of success in uncertain times

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Biographical note

Wojciech Dyduch, Full Professor, is a researcher in strategic management and organizational entrepreneurship at the University of Economics in Katowice, where he runs the Faculty of Management and the Department of Entrepreneurship. He is a President of the Organization and Management Sciences Committee at the Polish Academy of Sciences and a member of the Scientific Excellence Council. To the present, Professor Dyduch has researched the problems of value creation and capture in entrepreneurial organizations, creative strategy in organizations, organizational entrepreneurship measurement, as well as strategic responses to crises. His passions include visual astronomy, macrophotography, swimming, and snowboarding.

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Entrepreneurial (re)orientation in the face of crisis: Is it worth modifying entrepreneurial strategy?

Marcin Suder[1]

Abstract

PURPOSE: *This article aims to determine how companies in the SME sector modify their business strategies in response to changes in the external environment. The research focused on modifications to entrepreneurial strategies expressed through the fundamental dimensions of entrepreneurial orientation (EO): risk-taking, innovativeness, and proactiveness. Additionally, it identified which types of reactions (modifications in strategies) lead to the most favorable changes in firm performance. The external environment was determined based on the market situation that resulted from the emergence of the COVID-19 pandemic.* ***METHODOLOGY:*** *This is quantitative research. The study utilized data from 126 small printing businesses operating throughout Poland. Analyses were conducted on the data that reflected modifications in entrepreneurial behaviors and performance during three periods: the pre-crisis period, the initial phase of the crisis (the full lockdown period), and the second phase of the crisis (the period of easing the restrictions). The identification of the behavior types was carried out using cluster analysis.* ***FINDINGS:*** *The results of the research led to the conclusion that, with a change in market conditions, companies significantly change their levels of EO. In particular, the surveyed companies reduced their levels of EO during the outbreak of the COVID-19 pandemic. At the same time, this decrease was mainly due to significant decreases in risk-taking. The levels of EO increased when the conditions improved due to significant increases in innovativeness and proactiveness. Moreover, the analysis enabled the identification of four types of reactions to the emergence of the crisis as well as three types of reactions to the improvement of the external conditions that resulted from the easing of restrictions and the introduction of anti-crisis support measures for businesses. Additionally, it was demonstrated that the type of reaction had a significant impact on the changes in the performances of the examined companies. In particular, it was shown that the lowest decline in performance during the initial phase of crisis could be observed in passive enterprises, i.e., those that did not modify their entrepreneurial strategies (did not alter their levels of individual dimensions of EO). The greatest increase in performance was achieved during the period of easing restrictions by those companies that significantly enhanced their activities across all of the considered dimensions of EO.* ***IMPLICATIONS:*** *The research results provided insights for entrepreneurs in strategic management. Specifically, they learned about the modifications in entrepreneurial behaviors that could lead to the most favorable and optimal improvements in a firm's performance when market conditions change.* ***ORIGINALITY AND VALUE:*** *The study contributes to the literature concerning reactions to changes in market conditions. This innovative approach considers dynamics where the changes themselves are variables. In particular, this research identifies types of entrepreneurial reactions to market condition changes in terms of dimensions of entrepreneurial orientation. Furthermore, it provides an answer to how firm performance evolved regarding various reaction types (using the example of the printing industry).*

Keywords: *entrepreneurial orientation, crisis management strategies, strategy adaptation, strategy modification, business strategy, risk-taking, innovativeness, proactiveness, crisis, COVID-19, external environment, small businesses, firm performance, cluster analysis, entrepreneurial behavior*

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INTRODUCTION

Crisis management is well-grounded in the theory of organizational management; its purpose is to prevent crisis escalation, reduce the impact of the depletion of resources and value, and control their use. It also minimizes losses and restores stability (Zelek, 2003; Trahms, Ndofor, & Sirmon, 2013). Under crisis conditions, the main tasks of a management team are not only to use early-warning and rapid-response systems (or to prepare a crisis-action program) but also to redefine and adapt any applied strategies (Smith, 1990; Nogalski, & Marcinkiewicz, 2004). The survival of a company during a crisis often depends on managerial decisions about the choices of strategies in response to environmental changes. These are known as strategic responses.

Pearce and Robinson (2005) defined strategic responses as combinations of decisions and actions that modify an organization's plans according to situations in the business environment. Strategic responses are specific situational measures that organizations take in order to identify emerging benefits (business opportunities) that potentially threaten their survival and/or operational abilities and/or their companies' reputations (according to Lengnick-Hall, Beck, & Lengnick-Hall, 2011 and Semerciöz, Pehlivan, Sözüer, & Mert, 2015).

Identifying opportunities and searching for/leveraging opportunities under the existing market environment conditions are some of the basic features of entrepreneurship (Shane & Venkataraman, 2000), which are specific strategies of all organizations. Bratnicki (2002) highlighted the intrinsic connection between managerial strategic thinking and entrepreneurial decision-making. At the organizational level, one of the ways to measure and reflect the strength of this strategy is entrepreneurial orientation (EO). This is one of the most important and well-established concepts in entrepreneurship (which was proposed by Miller, 1983) and has been developed by many other researchers for four decades (Covin & Slevin, 1989; Lumpkin & Dess, 1996; Hughes & Morgan, 2007; Dyduch, 2008; Nogalski & Karpacz, 2011; Kraus, Rigtering, Hughes & Hosman, 2012; Kusa & Duda, 2017; Wales, Covin & Monsen, 2020).

The current economic environment is characterized by volatility and high unpredictability. Their sources are, first of all, structural changes such as shifting customer needs and institutional changes, rapid technological progress, increased competition, globalization, easy access to information, and the emergence of business cooperation networks (Ferraris, Mazzoleni, Devalle & Couturier, 2019; Orlandi, Zardini & Rossignoli, 2020; Chung, Kingshott, MacDonald & Putranta, 2021; Forliano, Orlandi, Zardini & Rossignoli, 2023). The other source of such changes is force majeure events such as a pandemic or war (Sharma, Kraus, Liguori, Bamel & Chopra, 2022; Ratten, 2023).

It is primarily due to these last factors (which have been sources of global crises over the last three years) that academia has expressed a gradual increase in crisis management, with a particular emphasis on behaviors that are related to the changes and adjustments of business strategies as responses to changing environmental conditions (Pusceddu, Moi & Cabiddu, 2022; Suder, Kusa, Duda & Dunska, 2022; Puumalainen, Sjögrén, Soininen, Syrjä & Kraus, Vonmetz, Orlandi, Zardini & Rossignoli, 2023; Lukito-Budi, Manik & Indarti, 2023). The crisis that was caused by the COVID-19 pandemic (which began in late 2019) has become a particularly appropriate context for research on entrepreneurial strategy. This crisis was undoubtedly one of the most significant factors in history that influenced firms across all sectors and industries (Sharma et al., 2022) and the business environment around the world (Krishnan, Ganesh & Rajendran, 2022), as it caused a series of cumbersome economic and social consequences and catapulted business activity to new conditions (Singha & Sivarethinamohan, 2021; Duda & Bernat, 2023).

Regardless of their origin, the emergence of new, complex, and unfavorable business environment conditions requires entrepreneurs to adjust their management processes to each situation (Li M. et al., 2021; Jedynak & Bąk, 2022) and their modifications, adjustments, and revisions of applied strategies in many cases (Zakrzewska-Bielawska, 2012; Bogatyreva, Beliaeva, Shirokova & Puffer, 2017; Cyfert & Krzakiewicz, 2020; Suder et al., 2022).

Research on crisis management and its selected issues (including redefining the strategy) has focused mainly on the corporate level (Herbane, 2010; Kraus, Moog, Schlepphorst & Raich, 2013); however, it has neglected the critical role of this process in the management of companies in the SME sector. As a result, the issue of strategic responses to changing environmental conditions in the SME sector remains an insufficiently investigated topic that requires thorough theoretical and empirical analyses (Naidoo, 2010; Kraus, Rigtering, Hughes & Hosman, 2012). Such research can play a significant role, since small businesses are the backbones of many countries' development and economic growth (including the European Union) (de Araújo Limai, Crema & Verbano, 2020). Additionally, this sector is seen as an engine of development in those countries with relatively low incomes (Poole, 2018).

In this context, it is essential to examine how small companies and entrepreneurs respond to economic turbulence and how this affects changes in their performances. An additional premise for considering the topic is that the available research ambiguously refers to how companies in the SME sector cope with the emergence of unfavorable business conditions compared to large companies. On the one hand, researchers have indicated that small businesses are the most vulnerable to such turbulence, as they are particularly susceptible to the loss of balance under unfavorable environmental conditions due to their limited financial resources (Leiva-Leon, Perez-Quiros, & Rots, 2020; Żak & Garncarz, 2020; Kozachenko, Anand & Shirokova, 2021). On the other hand, some studies (Davidsson, 2015; Thorgren & Williams, 2020) have proven that, under crisis situations, small businesses can find themselves in better situations than large firms can, as they can make modifications to their business models easier and faster by recognizing, assessing, and exploiting new opportunities. These contradictions provide an additional argument for focusing attention on the SME sector in research on the impact of market conditions on the functioning of companies. To summarize, crises become a constant element of organizational life (Wenzel, Stanske & Lieberman, 2020). Therefore, the responses of companies (especially from the SME sector) and the search for answers to the question of how managers and employees can effectively respond to changes in environmental conditions are important research areas.

Based on the identified research gaps, this article set several goals. The first was to determine how companies from the SME sector modify their entrepreneurial strategies in response to changes in the external environment. The research has focused on assessing the level and significance of the modifications of entrepreneurial strategies expressed through the basic dimensions of entrepreneurial orientation; namely, risk-taking, innovativeness, and proactiveness. The second objective was to group the surveyed enterprises according to the similarities of their reactions in terms of changes in the levels of individual dimensions of entrepreneurial orientation. The last objective of the article was to assess the changes in the performances of the surveyed enterprises and to determine how the changes in this performance were shaped in the identified groups (clusters) of enterprises.

This study focused on small businesses in the printing industry. The research was conducted during three periods in 2020: prior to the pandemic, in the initial phase of the pandemic (during full lockdown), and in the subsequent crisis phase (the period of easing the restrictions).

To the best of our knowledge, this is the first quantitative study that analyzes changes in the levels of the individual dimensions of EO as a response to changes in market conditions.

The article is divided into several sections. First, a review of the literature on the dimensions of EO and the impact of external conditions on EO is presented. Based on the above, research hypotheses were proposed. In the next part, the data and variables that were used in the research are described, and the applied methods and research procedure are outlined. The subsequent section contains the results of empirical research based on which the hypotheses were verified and the discussion was conducted. The last part of the article includes the conclusions, limitations, and recommendations.

LITERATURE REVIEW AND FORMATION OF HYPOTHESES

Strategies in the context of changing market conditions

Business strategy has been the subject of much research since the 1960s. Then, the market conditions began to change more dynamically and become difficult to predict. Numerous definitions of firm strategy that have embraced various perspectives have been proposed since that time; these have focused on different aspects (for instance, on the allocation of resources that are necessary to achieve adopted goals (Chandler, 1962), the decision patterns that relate to a company's position and identity, its ability to leverage its strengths, and its likelihood of success in the marketplace (Andrews, 1971), and the plans that define the benefits of a company in relation to the expectations and challenges of the environment (Jauch, Osborn & Glueck, 1980). In general, the concept of strategy means a dominating economic, social, or military orientation that expresses the prevailing direction of the operation of a given system in the long term (Stabryła, 2000).

Developing and implementing effective strategies that adapt a company to the environment and the environment to the company is a prerequisite for the long-term survival of the company. If the uncertainty and volatility of the environment is high, however, it is difficult (or even impossible) to implement a long-term unchanged strategy. An unstable environment requires a company to adapt to a rapidly changing market as well as the accompanying technological, competitive, and social conditions. In such a situation, "the strategy must be created in a more flexible way, taking into account constant changes" (Sopińska, 2007). Entrepreneurs analyze their resources and any changes in the environment (opportunities and

threats) on a regular basis and adjust their goals and tasks accordingly; this means that they try different strategic options depending on the situation. Under such conditions, entrepreneurs are more inclined to implement less formal strategies; these are the results of the unrestrained process of learning (Mintzberg, 2012).

Crises are likely the most challenging changes among those that occur in the external environment. Due to their characteristics, they require companies to respond (Bouncken, Kraus & de Lucas Ancillo, 2022), including modifying their operations (and sometimes their strategies as well). In the case of a long-term crisis, conditions can change during the crisis. In this case, a company needs to implement changes frequently (Williams, Gruber, Sutcliffe, Shepherd & Zhao, 2017). An effective response to a crisis can require additional resources; thus, a company's survival can be threatened during a crisis – especially in the cases of those firms that do not possess sufficient resources nor have built their resistance capabilities. This is the case for numerous small and medium-sized enterprises (SMEs) (Amankwah-Amoah, Khan & Wood, 2021; Eggers, 2020; Kraus et al., 2013). In the context of counteracting a crisis, Cater and Schwab (2008) defined the concept of turnaround strategies as a set of long-term decisions and actions that are meant to decisively and effectively counteract the crisis (which is a threat to the company). Laitinen (2000) defined this concept somewhat generally; he claimed that strategy is an action plan – the purpose of which is to respond to uncertainty and changes in the environment as well as transform threats into opportunities (especially during periods of unfavorable environmental conditions).

Companies react to and are affected by a crisis differently. Klyver and Nielsen (2021) identified three modes of enterprise reaction in the face of a crisis; namely, crisis exploiters, crisis immunes, and crisis victims. In general, companies can respond to a crisis in defensive or offensive ways (Tan & See, 2004; Manolova, Brush, Edelman & Elam, 2020). Defending can include reducing costs or renegotiating agreements, while the offensive approach is based on looking for those new opportunities that can occur during a crisis (Kuckertz & Brändle, 2022). Some of these can even be created by the crisis (Klyver & Nielsen, 2021); however, their exploitation requires the capacity of innovativeness (Clauss, Breier, Kraus, Durst & Mahto, 2022). Pusceddu et al. (2022) argued that small firms employ different strategies depending on the stage of a crisis. For example, they use flexible planning, proactiveness, financial resource equipment, and collaboration at the crisis-prevention stage, whereas the most useful strategies during the crisis-response phase are cost minimization and cash-flow protection, pivoting regarding their business model and operations, strengthening relationships with stakeholders, and improving dynamic approaches. During the crisis-recovery phase, firms reconfigure their business models and reestablish their relationships with their stakeholders and employees.

Based on a review of 13 studies that focused on previous crises (before the last pandemic crisis), Wenzel et al. (2020) identified four strategic responses to crises: retrenchment, persevering, innovating, and exit. A similar approach was used in Puumalainen et al. (2023), where three crisis-coping strategies were considered; that is, persevering, retrenchment, and pivoting. The retrenchment strategy is based on reducing business activities and cutting costs (Wenzel et al., 2020). Owing to their resource limitations, the retrenchment strategy is commonly used by small firms (Bruton, Ahlstrom & Wan, 2003); for some companies, this could be the only available way to respond to a crisis in the short run (Wenzel et al., 2020). Persevering aims to maintain business activities during times of crisis. A firm can follow this strategy if it has available resources or access to a loan (Wenzel et al., 2020). When a crisis is not long, this can be effective (Pacheco-de-Almeida, 2010; Stieglitz, Knudsen & Becker, 2016). An offensive response to a crisis can be embodied in strategic renewal or pivot. In particular, companies can implement changes in their technologies, offerings, or relationships with customers or business partners; this can result in modifications of their business models (Ries, 2011; 2017). This strategy is employed when companies decide to transform themselves in response to severe changes (Morgan, Anokhin, Ofstein & Friske, 2020) or opportunities (Leatherbee & Katila, 2017). As this approach is proactive and requires innovativeness and the readiness to take risks, this strategy can be perceived as an entrepreneurial practice (Ester & Maas, 2016). Pearce II and Robbins (1994) emphasized that companies can adopt recovery strategies during a crisis that mainly focuses on either entrepreneurship or efficiency. To describe the difference between the two approaches, the authors noted that entrepreneurship-oriented recovery strategies involve "doing things differently," while performance-oriented recovery strategies focus on "doing the same things on a smaller scale but more efficiently." Entrepreneurship-oriented recovery strategies are similar to the concept of entrepreneurial innovativeness strategies in business. They involve transforming a company's products, services, markets, or core technologies to represent a new or radically changed competitive orientation. The listed entrepreneurial behaviors indicate the importance of entrepreneurial strategies under crisis conditions; these strategies can be reflected in the entrepreneurial orientation of a company (Covin & Slevin, 1989).

Entrepreneurial orientation and market conditions

Entrepreneurial orientation (EO) is defined as the strategic intention of a company that characterizes its actions and behaviors and strives to help the organization achieve a sustainable competitive advantage and improve its results (Covin et al., 2006; Hakala, 2011). Bratnicki (2002) perceived EO as a social process that is carried out by the members of an organization. Their strategic innovativeness, proactiveness behaviors, and risk-taking transform the organization – owing to a bold departure from its previous schemes and organizational practices. Zighan et al. (2021) defined EO as the ability of business organizations to discover innovativeness, proactiveness, and growing thinking in an uncertain environment through decision-making, strategy, management philosophy, and entrepreneurial behaviors. Semrau, Ambos, and Kraus (2016) believed that EO is one of the few features that can constitute a competitive advantage in a changing environment where businesses constantly have to search for new opportunities. Finally, Rauch, Wiklund, Lumpkin, and Frese (2009) and Hernandez-Perlines (2016) noted that EO plays an important role in developing new products and services as well as in responding to unforeseen situations.

Considering the above definitions and conclusions, it becomes crucial to take into account the impact of market conditions and their changes on entrepreneurial behavior. This aspect holds significant theoretical and practical importance. As Morris (1998) claimed, entrepreneurship starts with an opportunity, and opportunities are rooted in a dynamic and ever-evolving external environment. This external environment is particularly important for companies from the SME sector, as they are usually characterized by limited resources (Aldrich & Auster, 1986; Keh, Nguyen & Ng, 2007; Simsek & Heavey, 2011; Chen & Liu, 2020) and, consequently, are largely dependent on their external environments (Park, 2018). In addition, it is essential in relation to EO, as it is perceived as a highly resource-intensive strategy in the literature (Wiklund & Shepherd, 2005).

Studies on entrepreneurship have shown that EO can be effective in responding to a crisis (Beliaeva, Shirokova, Wales & Gafforova, 2020; Puumalainen et al., 2023). In particular, EO is positively associated with opportunity-seeking (Beliaeva et al., 2020) and firm flexibility (Lekmat & Chelliah, 2011) under crisis conditions. Consequently, EO has a positive impact on firm survival (Eggers, 2020) and performance in hostile environments (Covin & Slevin, 1989; Soininen, Puumalainen, Sjögrén & Syrjä, 2012). Lukito-Budi, Manik, and Indarti (2023) analyzed the strategies that were proposed by Miles and Snow (2003) (namely, reactor, prospector, defender, and analyzer) in the context of the last pandemic crisis; they argued that the effectiveness of these strategies depends on the level of EO of a company. In their study on small businesses, Didonet, Simmons, Díaz-Villavicencio, and Palmer (2012) argued that companies with high levels of market orientation adapt better and are able to respond appropriately to turbulent environments.

In studies that linked market conditions and EO, the four dimensions of the external environment are mentioned (as proposed by Dess & Beard, 1984): environmental munificence, dynamism, hostility, and complexity. At the same time, researchers have focused on two models that describe the relationship between business environment conditions and EO. The first model concerns the impact of market environment conditions on EO (Miller & Friesen, 1982; Covin & Slevin, 1989; Jalali, 2012; Rosenbusch, Rauch & Bausch, 2013; Dele-Ijagbulu, Moos & Eresia-Eke, 2020; Suder, 2022). The second model assumes that environmental conditions play the role of moderator in the relationship between the impact of EO and a company's performance (Becherer & Maurer, 1997; Davis, 2007; Wojcik-Karpacz, Karpacz, Pavlov & Rudawska, 2018; Yoo & Kim, 2019; Onwe, Ogbo & Ameh, 2020; Kusa, Duda & Suder, 2022). The impact of changes in market conditions on the evolution of EO has been rarely discussed. The authors of this paper were able to identify only one study (a qualitative analysis by Okreglicka, Lemańska-Majdzik, Pichugina & Artemenko, 2021) that examined how Polish and Ukrainian companies modified their EO in response to the COVID-19 pandemic.

On the basis of the above considerations on the application of an EO strategy in relation to market conditions, the following hypothesis can be formulated.

H1: As market conditions change, companies modify their entrepreneurial orientation strategies.

Regardless of the adopted methodology for researching the relationship between EO and market conditions, all of the mentioned authors pointed out that the studied relationships should be considered not in the light of EO as a one-dimensional construct but its individual dimensions that were proposed by Covin and Slevin (1989) (i.e., risk-taking, innovativeness, and proactiveness) or those of Lumpkin and Dess (1996), who additionally proposed competitive aggressiveness and autonomy. This study focuses on EO as a three-dimensional construct.

Risk-taking and market conditions

Risk-taking is a dimension of EO that is identified with threats and/or opportunities that are the positive or negative consequences of various events accompanied by uncertainty (Islam, Tedford & Haemmerle, 2008). Risk is a constant element of business activities (Casualty Actuarial Society, 2003) and their characteristic features (Lumpkin & Dess, 1996). Entrepreneurial companies take controlled and calculated risks (Keh, Der Foo & Lim, 2002; Wiklund & Shepherd, 2005). Acceptance and willingness to take risks are also evident traits in SMEs (Kreiser, Anderson, Marino & Kuratko, 2013; Schachtebeck, Groenewald & Nieuwenhuizen, 2019); this is due to their limited resources (Blanc-Alquier & Lagasse-Tignol, 2006). Risk-taking refers to "the extent to which managers are willing to take on large and risky commitments" (Miller & Friesen, 1978). Risk-taking enterprises are willing to accept challenges in order to seize innovative opportunities and gain competitive advantages (Hock-Doepgen, Clauss, Kraus & Cheng, 2021).

The opinions of researchers vary regarding risk-taking and its impact on a company's performance in various market conditions, and the results of their studies have led to ambiguous conclusions. Specifically, Miles, Arnold, and Thompson (1993), Goll and Rasheed (1997), Martins and Rialp (2013) posited that a highly unfavorable environment with high dynamics and volatility is not conducive to taking greater risks. These researchers argued that, under such market conditions, companies pay more attention to protecting their resources than taking risky actions. Kreiser, Anderson, Kuratko, and Marino (2020) believed that this is consistent with the concept of threat rigidity, which states that companies will respond to threat situations by taking their focus off of risk-taking. This argument was confirmed by the results of the research that was conducted by Suder (2022).

However, Covin, and Slevin (1989), Miller (1983), and Miller and Friesen (1982) held a different opinion on this matter; they claimed that the more hostile the environment is, the more companies will be willing to undertake entrepreneurial activities (including risk-taking). Lumpkin & Dess (1996) believed that, under such conditions, companies that are risk-averse will lose market shares and will not be able to maintain strong positions in their industries against their risk-tolerant competitors. In addition, Kreiser and Davis (2010) emphasized that, under dynamic environments, enterprises must make bold and risky strategic decisions in order to cope with constant changes to improve their business results. Jalali (2012) and Dele-Ijagbulu, Moos, and Eresia-Eke (2021) presented empirical evidence of the positive impact of unfavorable and turbulent environmental conditions on the willingness of enterprises from the SME sector to take risks.

Regarding risk-taking in a moderately hostile market environment, the research by Zahra and Garvis (2000) showed that risk-taking improves the performance of companies. According to the analyses that were conducted by Suder (2022), however, the level of risk-taking is lower under such environmental conditions than it is under generous conditions. These results confirmed the thesis presented by Kreiser et al. (2020), who argued that a generous business environment can spur a company to take risks. Covin and Slevin (1989) presented a different opinion, emphasizing that entrepreneurs are not willing to take risks – even under conditions that are exceptionally favorable for their operations (good economic situations); they do so because this allows them to leverage proven (less risky) strategies that bring them their expected profits.

The research conducted by Okręglicka et al. (2021) confirmed the ambiguity of reactions in risk-taking modification in the event of deteriorating market conditions. With the emergence of the COVID-19 pandemic, three of the four surveyed Polish companies reduced their risk-taking levels, and one increased theirs. In turn, three of the surveyed Ukrainian companies significantly increased their levels of risk-taking, and one did not change. The above considerations lead to the formulation of the following hypothesis:

H2: As market conditions change, companies modify their risk-taking strategies.

Innovativeness and market conditions

Innovativeness is defined as the implementation of new creative ideas that facilitate a company's survival in intensely competitive markets (O'Reagan & Ghobadian, 2005), the tendency to experiment, use new technologies and take creative actions that result in process improvement (Dess & Lumpkin, 2005), and the tendency to introduce new products and services and implement new business models (Bratnicki, 2008). This is perceived as a source of competitive advantage (Woodward, 2009; Liao & Rice, 2010). Innovativeness plays a key role in business models, processes, and services (Mahto, Belousova & Ahluwalia, 2020). This is why some authors highlight the role of "breakthrough innovativeness," which they define as "an innovativeness that changes performance indicators or consumer expectations by introducing radically new

functionalities or technical standards" (Nagy, Schuessler & Dubinsky, 2016). Breakthrough innovativeness is strategically critical (Govindarajan & Kopalle, 2006); when mixed with EO, it leads to such innovation (Kraus et al., 2023) that can completely transform markets (e.g., Hu & Hughes, 2020).

As in the case of risk-taking, opinions are also divided regarding the impact that market conditions have on innovativeness. However, most authors agree that favorable market conditions encourage innovativeness more effectively than unfavorable ones. Specifically, Chesbrough (2020) and Wenzel et al. (2020) pointed out that introducing innovativeness during crisis conditions could be difficult due to limited resources. According to Miller and Friesen (1982), companies focus more on protecting economic resources than on implementing innovative ideas during a crisis. Zahra (1996) agreed with this point, believing that unfavorable environmental conditions tend to make entrepreneurs averse to investing funds into developing new technologies. Kreiser and David (2010) were of the same opinion; they confirmed that hostile market conditions have a negative impact on innovativeness. This was also confirmed by Khan and Manopichetwattana (1989), Wolff and Pett (2006), and Suder (2022), who investigated companies from the small and medium-sized enterprise sector. Kreiser, Marino, and Weaver (2002) showed a negative relationship between innovativeness and the hostility of the environment, which was consistent with the findings of Zahra and Bogner (2000). They posited that intensively engaging limited financial resources in innovative products is a poor strategic choice. Rosenbusch et al. (2013) wrote in a similar tone, arguing that operating in a hostile environment requires limiting experimentation and, consequently, innovativeness (which is not a desirable strategy under such conditions); in their research, they confirmed that a favorable environment positively affects innovativeness. Olaru, Dinu, Keppler, Mocan, and Mateiu (2015) and Kreiser and Davis (2010) confirmed that enterprises will be more innovative when favorable market conditions appear. This was also confirmed by the research that was conducted by Suder (2022).

Prajogo (2016) argued that companies that operate in dynamic environments are more likely to benefit from new product innovations than those that operate in stable environments. Martínez-Romána, Tamayo, and Gamero (2017) confirmed that innovativeness plays an increasingly important role in building competitive advantages and helps increase the competitiveness of companies, which is especially beneficial during times of crisis. In his research on Iranian companies, Jalali (2012) showed that both unfavorable market and dynamic conditions determine a high level of innovativeness. Li and Atuahene-Gima (2001) found that turbulence in hostile environments creates new market opportunities and promotes innovativeness; however, it also requires a shift from routine to flexibility in embracing innovativeness. This was the case with COVID-19, which was a challenge to organizations; however, many of them proved their abilities to innovate during the crisis in order to become more resilient in the future (Kusa et al., 2022). According to Heinonen and Strandvik (2021), the COVID-19 pandemic prompted even the most efficient organizations to look for new innovativeness (now known as "CoviNovations"). For example, seven out of the eight companies that were studied by Okręglicka et al. (2021) did not weaken their innovativeness strategies as responses to the COVID-19 pandemic. Based on the above considerations, we propose the following hypothesis:

H3: As market conditions change, companies modify their innovativeness strategies.

Proactiveness and market conditions

Proactiveness (another dimension in the adopted conceptualization of EO) is related to recognizing and exploiting new opportunities, developing new competencies and capabilities, and keeping vigilant in order to stay ahead of the competition and quickly adapt to changing market trends (Dess & Lumpkin, 2005, Bratnicki, 2008; Herlinawati, Ahman & Machmud, 2019). Proactiveness includes initiatives that develop the environment for one's own benefit. It should be considered in relation to its opposite (i.e., passivity), which is understood as the indifference to opportunities as well as the inability to seek and take advantage of them (Dyduch, 2008).

Researchers are unanimous when it comes to the impact of market conditions on the proactive behaviors of enterprises. Venkatraman (1989) and Bivona and Cruz (2021) posited that the proactive behavior of enterprises (i.e., anticipating and responding to future needs by searching for new opportunities) is fundamental under unfavorable conditions; therefore, companies will strive for such behaviors during a crisis. Wright, Kroll, Pray, and Lado (1995) argued that taking proactive decisions and actions allows a company to react quickly to changes in the environment (e.g., changes in demand). Covin and Slevin (1989) proposed that a proactive entrepreneurial attitude in a hostile environment can benefit small enterprises.

The results of the research that was conducted by Kurtulmuş and Warner (2015), Bogatyreva et al. (2017), and Dele-Ijagbulu et al. (2021) proved that unfavorable market conditions positively affected the levels of the proactiveness of their

surveyed enterprises. The views and research findings of the cited authors are consistent with the position of Miller (1983), who defined an entrepreneurial firm; he believed that the more unfavorable market conditions tended to be, the more proactive entrepreneurs were.

Miller and Friesen (1982) and Lumpkin and Dess (2001) expressed slightly different opinions on the impact of unfavorable conditions on the level of proactiveness. In their opinion, the hostility of the environment increases the pressure on companies to protect their resources (e.g., finances), and taking action under such conditions is risky. Such theses were confirmed by Jalali (2012), whose research results did not confirm a significant impact of unfavorable conditions and a turbulent environment on the level of proactiveness.

According to Wales (2016) and Rosenbusch et al. (2013), a dynamic business environment stimulates activities and the proactive behavior of an enterprise. As these authors argued, a dynamic environment creates opportunities in which proactive strategies can be applied. The qualitative research of eight companies by Okręglicka et al. (2021) showed that the COVID-19 pandemic prompted four of them to strengthen their proactivity strategies (two of them significantly, and three – moderately). Three of the studied companies did not change in this respect, and one company reduced its proactiveness. The above considerations allow us to formulate the following hypothesis:

H4: As market conditions change, companies modify their proactiveness strategies.

It should be noted that, based on the literature review, it is challenging to clarify the formulated hypotheses in detail and determine the direction of changes (growth or decrease) for the levels of the considered strategies that are applied.

Dimensions of EO and performance under different market conditions

The study of EO and its connection to firm performance (PERF) has been extensively addressed in the literature (Wales, Kraus, Filser, Stöckmann & Covin, 2021). In their studies, an overwhelming majority of the researchers agreed and confirmed that EO is a tool that leads to enhanced business efficiency (Bratnicki, 2011; Covin & Wales, 2012; Kraus et al., 2012; Filser, Eggers, Kraus & Málovics, 2014; Al-Ansaari, Bederr & Chen, 2015; Kallmuenzer, Strobl & Peters, 2018; Wales et al., 2021; Kusa, Suder & Duda, 2023). Most of this research was conducted under stable market conditions; however, some researchers attempted to explore the relationship between EO and firm performance under volatile environmental conditions.

Covin and Slevin (1989) were pioneers in this field, who demonstrated that firms that exhibit entrepreneurial attitudes achieve better outcomes in hostile environments than firms with low EO levels. These findings were corroborated by the research of Mac-Kingsley and Horsfall (2021), who showed that EO enhanced the likelihood of SME survival during the COVID-19 pandemic (i.e., under unfavorable market conditions). Meanwhile, Puumalainen et al. (2023) revealed that EO during the pandemic was a key factor that led to the high performance of the firms that they studied (utilizing the fsQCA method). Furthermore, their research indicated that low EO levels emerged as a significant contributor to low-performance levels. Conversely, the findings from Li Z., Anaba, Ma, and Li M. (2021) (who conducted their study on manufacturing firms in Ghana) suggested that EO positively impacted business growth during the COVID-19 pandemic. As noted by Maaodhah, Singh, Al-Juboori, Pitchy, and Ekene (2021), organizations with high levels of EO were better positioned to swiftly adapt and influence changes in the turbulent market environment, thereby enhancing their results and expanding their developmental opportunities. Similarly, the studies by Pearce II and Robbins (1994) suggested that firms that experience downturns due to external causes achieve greater success in their recovery efforts when focusing on entrepreneurial actions in response to crises.

However, not all researchers agree that the relationship between EO and firm performance is unequivocal. Lomberg, Urbig, Stöckmann, Marino, and Dickson (2017) contended that this relationship is contingent on the adopted research context. Similar sentiments were echoed by Rauch et al. (2009), Andersén (2010), and Olowofeso, Ojo, and Ajayi (2021), who also indicated that this connection is intricate and sensitive to the various operationalizations of key constructs and contexts, thus necessitating caution when generalizing conclusions. As a result, many researchers have focused on analyzing the impact of the individual dimensions of EO on performance while also considering market conditions.

Researchers have not fully confirmed the role of risk-taking in firm performance. For instance, Fairoz and Hirobami (2016) found a positive relationship between risk-taking and the performances of Japanese SMEs. Similarly, Ahmed and Brennan (2019) also observed that firms with high levels of risk-taking exhibit higher efficiency. From the research that was conducted by Suder (2023) on one- and two-star hotels in Poland during the pandemic, it can be inferred that

a significant and positive correlation between risk-taking and firm performance exists. Naldi, Nordqvist, Sjoberg, and Wiklund (2007) concluded that, among the Swedish family firms they studied, risk-taking had negative impacts on their overall performances. Similar findings were obtained by Salome et al. (2022) in their study of 385 Nigerian SMEs.

Regarded by many researchers as a significant factor, innovativeness positively influences a company's development and enhances its outcomes (Lumpkin & Dess, 1996; Rauch et al., 2009). This strategy affects the development of individual companies (Chen, 2017) and their performances (Cakar & Erturk, 2010). This has been corroborated by numerous studies that were conducted under stable market conditions (Moreno & Casillas, 2008; Dachs & Peters, 2014; Martínez-Román et al., 2017; Farinha, Ferreira & Nunes, 2018; Kusa, Duda & Suder, 2021) as well as during periods of crisis (Al-Ameedee & Abd Alzahrh, 2021; Salome et al., 2022; Kusa et al., 2022; Suder, 2023). Research by Pearce II and Michael (2006) demonstrated that innovative firms that introduce new products (especially during crises) can achieve significant success. However, there are several instances in the literature where it has been shown that innovativeness is not the primary determinant of firm performance (Buli, 2017; Akinwande & Akinola, 2021).

According to Lumpkin and Dess (1996), proactiveness is an entrepreneurial trait that pertains to the desire to lead the industry, which can consequently ensure high firm performance. This viewpoint has found support in numerous studies and works in the context of PR's influence on firm performance. In a study of Spanish SMEs, for example, Casillas and Moreno (2010) found that the proactive enterprises in their examined population exhibited more remarkable growth. The positive impact of proactiveness on firm performance was also demonstrated by Gotteland, Shock, and Sarin (2020) and Kusa et al. (2021). These studies were conducted under favorable market conditions; however, the affirmative effect of PR on firm performance has also been confirmed by scholars who conducted analyses using data from times of adverse environmental conditions. For example, Suder (2023) and Salome et al. (2022) demonstrated that proactiveness during the pandemic-induced crisis had the most significant positive impact on firm performance among the dimensions of EO.

Despite not finding studies that specifically analyzed the impact of changes in EO and its dimensions on firm performance, the authors propose the following hypothesis based on the conducted literature review:

H5: Companies that change their levels of entrepreneurial orientation alongside changing market conditions achieve more favorable shifts in their performances.

RESEARCH METHODOLOGY

Research concept

Although the analyses focus on quantitative research in this study, the entire process that was related to this research was preceded by a number of interviews and conversations with entrepreneurs. From August through November 2020, 28 semi-structured interviews were conducted with representatives (managers, directors, or owners) from SME companies that represented various industries and operated mainly in Małopolska Voivodeship, Poland. Each interview lasted from 20 to 45 minutes. The purpose of these interviews was to assess the conditions of SME enterprises during the crisis caused by the COVID-19 pandemic, to diagnose the difficulties they encountered regarding their business activities, and to identify how they dealt with them. At the same time, the entrepreneurs were asked to specify the market conditions as well as compare their situations (for example, in their business activities and performances) before and during the pandemic. An additional purpose of the interviews was to verify and evaluate the effectiveness of the proprietary questionnaire.

One of the most important conclusions of the interviews was that two phases should be distinguished during the 2020 pandemic period in terms of market conditions, and the study questions should refer to three separate periods (one before the pandemic and two periods during the pandemic). During the period of March through October 2020, the entrepreneurs indicated very high rates of changes. They pointed out that the initial two-month phase of the pandemic was a period of highly unfavorable market conditions; this resulted from the lockdowns and significant operational uncertainty. After this period, market conditions began to improve; restrictions were slowly lifted, crisis response funds appeared, and uncertainty became the new normal. The comments and suggestions of the entrepreneurs who were interviewed in this study were largely confirmed in the report that was prepared by the Polish Economic Institute (Dębkowska, Kłosiewicz-Górecka, Szymańska & Zybertowicz, 2022). The study indicated that the sentiment of the surveyed entrepreneurs changed from 52.2 points in April to 100 points at the end of June/beginning of July (where 100 points stand for a neutral level).

Sample and data collection

Meetings and interviews with entrepreneurs allowed for the identification of those business activities that were sensitive to the analyzed changes in market conditions. Additionally, the local, national, and European market positions were considered. Consequently, the printing industry was selected for the quantitative examination.

The choice of the target sample was determined by several factors. First, the Polish printing market was one of Europe's most rapidly developing markets from 2014 through 2018 according to the report prepared by the Polish Brotherhood of the Knights of Gutenberg (2018). With revenue of €3.38 billion (data from 2018), the Polish printing industry remained the largest in Central and Eastern Europe and ranked seventh among all European Union countries. Furthermore, the Polish market was experiencing a technological transformation, following the emergence of 3D technology or innovativeness in printing paper technology. An additional context for the research was provided by the fact that Polish printing enterprises were at different levels of technological advancement (Polskie Bractwo Kawalerów Gutenberga [The Polish Brotherhood of the Knights of Gutenberg], 2018). Second, the printing sector found itself in a difficult situation due to the sudden halt of the economy as a result of the COVID-19 pandemic. Some supply chains were disrupted or limited, resulting in delayed deliveries of paper and foil that were imported mainly from Italy and China (poligrafika.pl, 2020). The ethyl alcohol that is typically used in the production of packaging was also scarce, as health services had priority access to it. Due to the lockdown, there were no fairs, exhibitions, nor other industry events (which typically require the services of the printing industry). As a result, the number of orders decreased (Wydawca, 2020; Cetera, 2021).

As time passed and the pandemic continued, printing companies had the opportunity to adapt to the situation. In particular, the demand structure changed, and the companies increased their production of food packaging. Some of them started producing face masks. According to research by Cetera (2020), some companies in the industry used this form of support when crisis response funds became available, and some were planning to apply for it. A significant change in the business conditions for printing companies was the loosening of restrictions that took place in June 2020 (Suder et al., 2022). It was then that cultural and sports institutions reopened; these constitute a significant part of the customer base for printing companies.

Based on the interviews with the managers (during the qualitative stage of the study) and an analysis of the state of the art, three periods were distinguished for 2020, each characterized by different market conditions. Period I was before the COVID-19 pandemic, Period II was the first phase of the pandemic (from March through May 2020), and Period III was the second phase of the 2020 pandemic (from June through November of the same year). These periods are presented in Figure 1 according to the characteristics important to the printing industry.

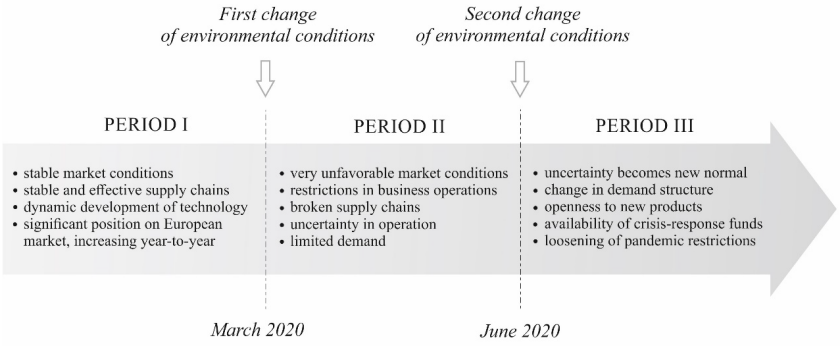

Figure 1. Characteristics of studied periods

Since the sentiment index in small enterprises was the lowest during the initial phase of the pandemic (according to the report by the Polish Economic Institute – Dębkowska et al., 2022), this research focused on small enterprises from the printing industry that operated in Poland. In addition, it was assumed that these companies had operated for a minimum of 3 years (i.e., since 2018). According to the Polish National Court Register, there were 602 such companies; this number determined the size of the target population for the research. Random sampling with drawing without replacement was used in the sampling. The data for the study was collected by a specialized research company that submitted survey questionnaires during the months of December 2020 and January 2021. The PAPI or CAPI method was used for data collection.

As a result, 150 completed questionnaires were obtained. After verification, the data from all of the questionnaires was used in further analysis; this translated as a 7% sample error with an assumed 95% confidence level. Table 1 presents the structure of the companies that participated in the research, taking the ages of the companies, their numbers of employees, and their locations into account.

Table 1. Characteristics of the studied group

No. of employees	10–19	51%
	20–29	16%
	30–39	8%
	40–49	25%
Company age	3–10 years	14%
	11–20 years	28.7%
	20+ years	57.3%
Location	Rural areas	8.7%
	Towns*	16%
	Medium-sized cities**	42%
	Large cities***	33.3%

Note: * up to 50,000 inhabitants; ** from 50,000 to 500,000 inhabitants; *** more than 500,000 inhabitants.

Variables and reliability assessment

After collecting and verifying the survey data, the starting point for the statistical analyses was to build appropriate constructs that reflected the values of the variables that were considered (both for EO and the performances of the individual enterprises). To build constructs that reflected entrepreneurial behavior in terms of risk-taking (R), innovativeness (IN), and proactiveness (PR), the measurement scale from the questionnaire that was proposed by Hughes and Morgan (2007) was used, with minor modifications as were proposed by Kusa et al. (2021). The values of the individual EO dimensions were defined as the arithmetic means of the set of indexes that were evaluated by the respondents on a five-point scale. In order to estimate the firm performance (PERF), five items were used (as were adopted from the works of Hughes & Morgan, 2007; Covin and Slevin, 1989; and Kusa et al., 2021). In total, 17 questions were used to build all the constructs analyzed in the study (see Appendix 1). The respondents assessed their entrepreneurial attitudes and performances for the three selected periods (cf., Figure. 1).

Table 2 includes the number of indexes from which the individual constructs were created. The reliability measures of the scales that were used (i.e., Cronbach's alpha, and composite reliability (Netemeyer et al., 2003) were also provided.

Table 2. Characteristics of variables

Name	**Abbreviation**	**No. of items**	**Construct reliability**					
			Period I		Period II		Period III	
			α	CR	α	CR	α	CR
Risk-taking	R	4	0.74	0.74	0.81	0.87	0.82	0.88
Innovativeness	IN	4	0.81	0.78	0.8	0.87	0.8	0.83
Proactiveness	PR	4	0.86	0.81	0.88	0.87	0.85	0.87
Performance	PERF	5	0.85	0.89	0.82	0.87	0.85	0.89

Note: α = Cronbach's alpha; CR = Composite reliability (CR).

For all of the variables in each of the analyzed periods, the values of the reliability indexes were higher than 0.7 and lower than 0.9; these results confirmed the correctness of the studied constructs (Hair, Ringle & Sarstedt, 2011).

Since the study goal was to identify any changes in EO as well as the results, the changes in the values of the constructs were analyzed. These changes were defined as the differences in the values of the constructs between consecutive periods. Therefore, those companies for which the maximum or minimum values of the variables were reached were removed from the study group. This was necessary because, in those cases of extreme values of a construct, only a one-way change would be possible due to the limited scope of the scale. Otherwise, they could significantly distort the analysis results. Ultimately, 126 cases were accepted for analysis.

Data–analysis techniques

Empirical research was carried out in several stages and covered various aspects; therefore, various statistical tools were used. All of the analyses were carried out on the changes in the values of the individual constructs between Periods I and II as well as between Periods II and III. Depending on the type of analysis, the following statistical software was used: Statgraphics 18, IBM SPSS Statistics 28, and cluster selected statistical packages of R (MASS, cluster).

During the first stage, the changes in the values of the indexes between the considered periods and their statistical significance were assessed. Due to the characteristics of the data, the non-parametric Wilcoxon signed-rank test was used to test the significance of the changes (whether they were significantly different from 0) (Corder & Foreman, 2014). Such an approach made it possible to examine the significance of the changes in the EO strategies and their dimensions, particularly to verify the H1–H4 hypotheses. In the conducted tests, the adopted statistical significance threshold was 0.05.

The next part of the analysis was to graphically present the cumulative distribution of the types of entrepreneurial behavior in relation to the individual dimensions of EO and the results. Three types of behavior were considered in the studies: decrease, no change, and growth. This part of the research complemented and deepened the previously described analyses.

The key stage of the research was the attempt to classify the enterprises according to the types and values of the changes in the scope of their entrepreneurial activities between the considered periods. This part of the empirical research was carried out using cluster analysis (Everitt, Landau & Leese, 2001). From a broad range of algorithms that are used in this clustering method, the k-means method was selected; however, the selection of the number of necessary clusters when using this method was based on the Elbow and Silhouette methods. The grouping was carried out using both types of variables: qualitative (type of change – decrease, no change, and growth), and quantitative (size of change). In addition, the Kruskal-Wallis Test (Corder & Foreman, 2014) was conducted to verify whether there were significant differences in the levels of firm performance for the identified groups. In addition, it was verified which reactions of the firms brought significant changes to their performances by using the previously mentioned Wilcoxon singed-rank test. The use of these tests in the analysis made it possible to verify the H5 hypothesis.

RESULTS

Analysis of changes in entrepreneurial orientation and its dimensions

The first stage of the research focused on an analysis of the dynamics of the changes in the EO dimensions and for the performances of the individual enterprises. Figure 2 presents time-series charts of the average values for EO, its dimensions during the three considered periods, and the given values of the changes. In addition, Table 3 presents the values of the mean changes as supplemented by the standard deviation and the results of the significance test of these changes.

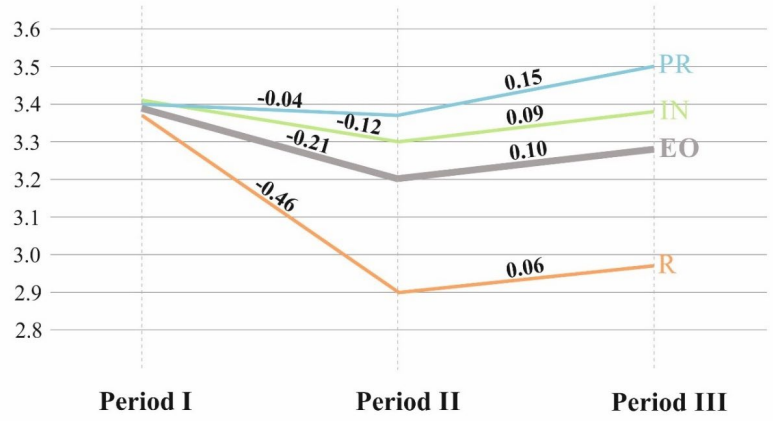

Figure 2. Changes in dimensions of entrepreneurial orientation and its dimensions during particular periods

Table 3. Statistics and test results for changes in dimensions of entrepreneurial orientation and its dimensions during particular periods

Variable	Period I–Period II			Period II–Period III		
	Average	Standard deviation	p-value	Average	Standard deviation	p-value
EO	-0.21	0.60	**0.001**	0.10	0.38	**0.027**
R	-0.46	0.85	**0.000**	0.06	0.58	0.300
IN	-0.12	0.71	0.119	0.09	0.43	**0.025**
PR	-0.04	0.68	0.621	0.15	0.45	**0.000**

Note: p-values below 0.05 are in bold.

A preliminary analysis of the dynamics of the average level of entrepreneurial dimensions allowed for the conclusion that, at the time when the crisis emerged, all of the average values of the dimensions of EO decreased. Treating EO as one-dimensional, the average change in the level of this variable was -0.21 between Periods I and II. The largest change in the mean was noticeable for the R index – the level of which decreased by nearly 0.5. This decrease was much lower for the remaining dimensions (i.e., IN and PR) and did not exceed 0.15.

An assessment of the significance of the observed changes that was carried out using the Wilcoxon signed-rank test led to the following conclusions. In the cases of EO (as unidimensional construct) and R, these changes were statistically significant (p-values less than 0.05). This meant that the H1 and H2 hypotheses were confirmed for the changes between Periods I and II. However, the changes in the levels of IN and PR were not statistically significant (p-values less than 0.05). Therefore, the hypotheses that were related to these dimensions of EO (i.e., H3 and H4) were not confirmed.

An analysis of the changes in the levels of EO and its individual dimensions between Periods II and III (cf., Figure 2, Table 2) showed that when the market conditions improved, these indexes increased. In connection with the contemplated change in the market conditions, the EO strategies increased by 0.1 (on average) in the group of surveyed companies. Based on the conducted test (see Table 2), we considered the increase in the EO level to be statistically significant; consequently, this meant that the H1 hypothesis was confirmed. Referring to each dimension of EO separately, it can be seen that the greatest average increase (0.15) was obtained for PR. This increase was statistically significant, which supported the H3 hypothesis. A slightly smaller but significant increase (0.09) was obtained for the IN variable. The risk-taking increase of 0.06 was not statistically significant.

Table 4 presents a summary of the results in relation to the verification of the H1-H4 hypotheses for the two considered changes in market conditions.

Table 4. Summary of hypothesis analysis and testing results

Hypothesis	Variable	Period I–Period II		Period II–Period III	
		Type of change	Remark	Type of change	Remark
H1	EO	decreased	confirmed	increased	confirmed
H2	R	decreased	confirmed	increased	not confirmed
H3	IN	decreased	not confirmed	increased	confirmed
H4	PR	decreased	not confirmed	increased	confirmed

The conclusion was that the emergence of the COVID-19 pandemic and the subsequent crisis had a negative impact on the entrepreneurial behavior of the studied companies. This was highlighted by significant reductions in the levels of EO, which mainly concerned one of its dimensions (i.e., risk-taking). The entrepreneurs slightly (but statistically significantly) increased their EO levels when restrictions were lifted, and opportunities for government financial support emerged. In particular, the innovativeness and proactiveness indexes increased significantly, while the index for risk-taking did not change dramatically.

Upon analyzing the EO trends during the observed periods, the crisis prompted a decrease in EO; this was primarily driven by a substantial reduction in risk-taking and slight statistically insignificant declines in proactiveness and innovativeness. Following the removal of the restrictions, enterprises conversely experienced significant EO increases, which were driven by heightened proactive and innovative behaviors while maintaining unchanged risk-taking levels.

It is important to note that examining the average changes in EO and its dimensions revealed general trends; however, individual enterprises may have exhibited diverse behaviors, and the average mean analysis did not provide a complete

picture of their reactions to the changing market conditions. Subsequently, the following analysis focused on investigating the types of changes in EO and its dimensions within each studied enterprise. Figure 2 illustrates bar charts that display cumulative distributions of the entrepreneurs' behaviors.

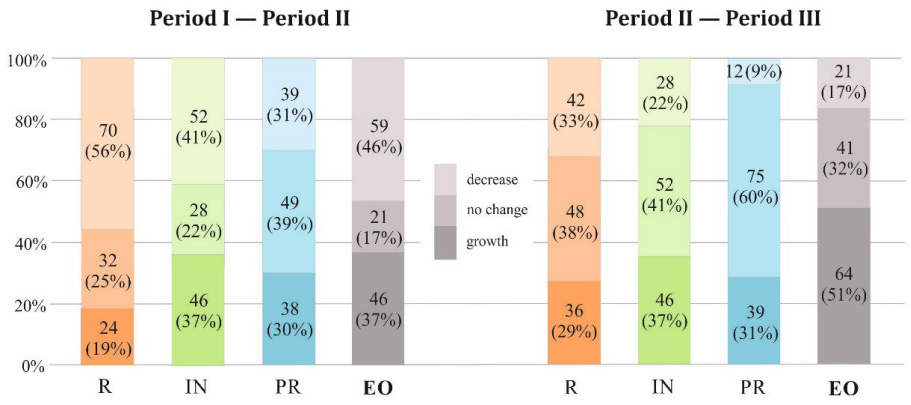

Figure 3. Cumulative distribution of changes in behavior in terms of entrepreneurial orientation and its individual dimensions

The first chart in Figure 3 indicates that COVID-19 restrictions affected 70 of the studied enterprises (56%), reducing their willingness to take risks. A quarter of the companies remained unchanged, while 19% (24 enterprises) increased their risk-taking. Innovativeness saw a different distribution, with 52 enterprises (41%) decreasing their innovativeness, while nearly 37% increased it and 22% remained unchanged. Proactiveness remained unchanged for 39% of the enterprises. In terms of EO, around 46% reduced their levels, nearly 37% increased them, and 17% remained unchanged during the crisis. Most of the companies reduced their EO – especially risk-taking and innovativeness; proactiveness remained unchanged for the majority.

Between Periods II and III, the dominant reaction for all of the EO dimensions was no change, ranging from 38% for risk-taking to more than 60% for proactiveness. In the risk-taking, around 33% of the enterprises increased and 29% decreased their index. After the COVID-19 restrictions were lifted, 37% increased their innovativeness, while fewer than 22% decreased it. About 31% increased their proactiveness, while only 9% decreased it. The most common reaction to the changes was increased EO levels (found in more than 50% of the enterprises). Every third entrepreneur noted no change, while every sixth reported a negative impact. The analysis of the behavioral reactions to the improved market conditions revealed varied responses among the surveyed entrepreneurs; this indicated no single type of reaction to such changes.

Analysis of changes in performances of studied enterprises

The analysis of the changes in EO and its individual dimensions showed that the entrepreneurs exhibited various behaviors as reactions to the changes in the market conditions. This section analyzes how the changes affected the PERF of the studied enterprises.

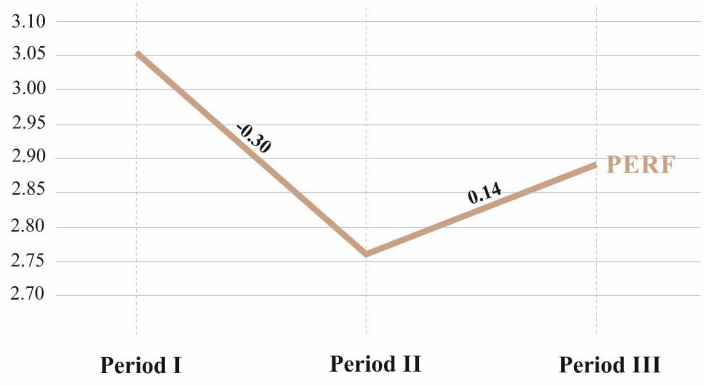

Figure 4. Changes in PERF of studied companies over particular period pairings

Table 5. Statistics and test results for changes in firm performance over particular period pairings

Variable	Period I–Period II			Period II–Period III		
	Average	Standard deviation	p-value	Average	Standard deviation	p-value
PERF	-0.30	0.59	**0.000**	0.14	0.43	**0.000**

Figure 4 and Table 5 show that the crisis induced a decrease in the value of firm performance by an average of 0.3 units of the adopted scale. The average value of the result index increased by 0.14 from Period II to Period III. Both changes were found to be statistically significant (see Table 4). Therefore, the average value of the companies' performances during the time of the crisis decreased significantly; when the restrictions were lifted, the surveyed companies recorded significant increases in performance as compared to the deep-crisis time (however, these increases did not compensate for the earlier decreases). Similarly to EO, the distributions of the types of changes in PERF in the studied companies were determined. The analysis results are shown in Figure 5.

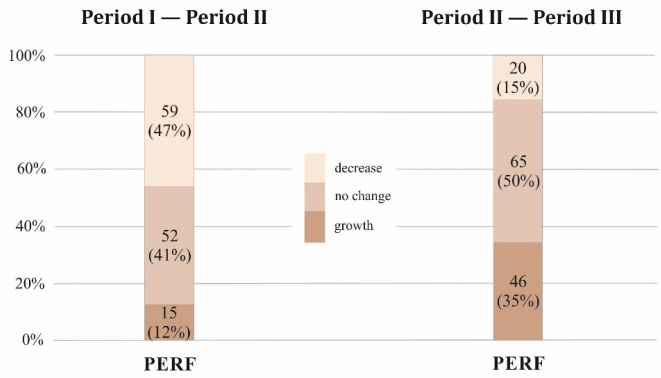

Figure 5. Cumulative distribution of changes in performance of enterprises during analyzed period pairings

The most numerous group of the surveyed companies (59 out of 126) experienced declines in performance due to the changes in the market conditions between Periods I and II. Approximately 41% of the printing companies showed no changes in performance, while only 15 companies reported increases in performance during Period II as compared to Period I. Consequently, the overall impact of the COVID-19 pandemic was negative or neutral for most of the companies. Although the average performance index increased from Periods II to III, a significant number of surveyed enterprises (almost half) reported no changes in their performance levels (cf., Figure 5). About 35% of the companies saw improvements in performance, while just over 15% indicated declines in performance.

The analysis of the average value of the change in the performance index sheds light on some general regularities related to the studied changes in market conditions. In particular, the significant deterioration of the market conditions resulted in a decrease in the value of performance and their improvement – an increase in this index. A thorough analysis of the changes in the results demonstrated that there were companies for which their changes in business performance did not follow the generally prevailing trends in the market environment.

Results of cluster analysis

Among the studied enterprises, the differences in the directions of the changes in the EO index stimulated attempts to classify certain types of reactions (including the three EO dimensions that were considered in this research). An identification of those groups with similar types of behaviors was carried out using cluster analysis. The basic assumption for this analysis was the lack of correlation between the variables; all of the determined values of Spearman's rank correlation coefficients turned out to be lower than 0.5, which meant that there was no strong collinearity between the variables that were selected as the grouping factors. An important element in the selection of variables in cluster analysis is the significant differentiation of each of them. In the case of the analyzed variables, the coefficient of variation of each of them was greater than 100%, which indicated a high level of differentiation (as is required in cluster analysis).

The analysis results for the changes between Periods I and II as well as Periods II and III, are shown in Figures 6 and 7, respectively. The figures show the number of clusters, including information about the sizes and average values of the changes in EO and its individual dimensions. The results of the analysis were supplemented with the changes in the performance index for each selected subgroup; this allowed for identifying the types of reactions that led to the most favorable changes in the performance index.

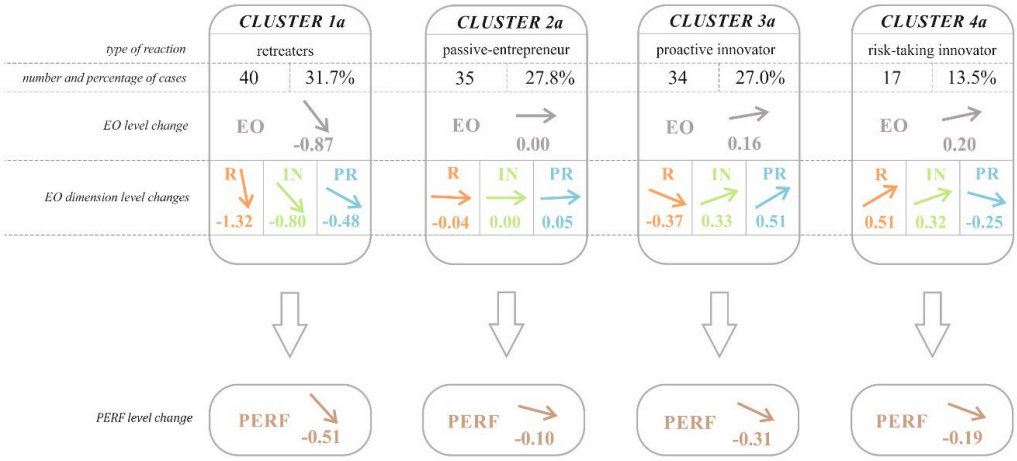

Figure 6. Results of cluster analysis for changes between Periods I and II

As shown in Figure 6, the clustering procedure yielded four groups. Those enterprises that belonged to a given group were characterized by similar behavioral reactions. The largest group (Cluster 1a) exhibited significant decreases in all of the Entrepreneurial Orientation (EO) dimensions, thus lowering their EO by 0.87 points on the scale. These enterprises (termed "retreaters") notably reduced their entrepreneurial activities during the crisis.

Another substantial group (Cluster 2a – 27.7% of the study group) displayed a lack of reactions to the market deterioration in terms of EO, thus earning them the label of "passive" or "wait-and-see" entrepreneurs. Cluster 3a, which was comprised of 34 enterprises, stood out as proactive innovators, significantly increasing their proactiveness and innovativeness while decreasing their risk-taking. The average EO for this group increased by 0.16 due to the crisis. In the smallest cluster (4a), these enterprises were identified as risk-taking innovators, showing significant increases in risk-taking and innovativeness. Notably, no cluster exhibited increases in the average values of all of the EO dimensions during the crisis. An analysis of the firm performance changes across the clusters revealed decreases in the average performance indexes for all of the subgroups. Cluster 1a experienced the steepest decline, with its performance value dropping by more than 0.5. Cluster 3a recorded a significant decrease (by 0.31), while Cluster 2a (where the average EO indexes remained unchanged) showed the lowest decrease in performance (-0.1), which was higher (by 0.09) when compared to Cluster 4a. The results of the Kruskal-Wallis Test showed that there was a significant difference between the levels of changes in the companies' performances in the designated clusters (p-value = 0.005). Moreover, it can be stated that significant changes in the performances of the companies (a significant decrease in this indicator) was confirmed for Clusters 1a *(p-value = 0.000)* and 3a *(p-value = 0.004*) on the basis of the results of the signed-rank test. This means that companies that changed their EO (in clusters 1a and 3a) decreased their performance significantly, and companies that did not change their EO did not decrease their performance significantly (clusters 2a). Thus, in the context of the changes between Periods I and II, the H5 hypothesis was not confirmed. In addition, a significant decrease in performance was observed in two clusters (1a and 3a) wherein companies decreased their risk-taking, regardless of changes in proactiveness and innovativeness. The results also showed that an increase in risk-taking combined with an increase in innovativeness had a better effect (i.e., a smaller decrease in performance) than an increase in proactiveness combined with innovativeness.

A similar analysis was carried out for changes between Periods II and III. In this case, three clusters were obtained; the characteristics of each are shown in Figure 7.

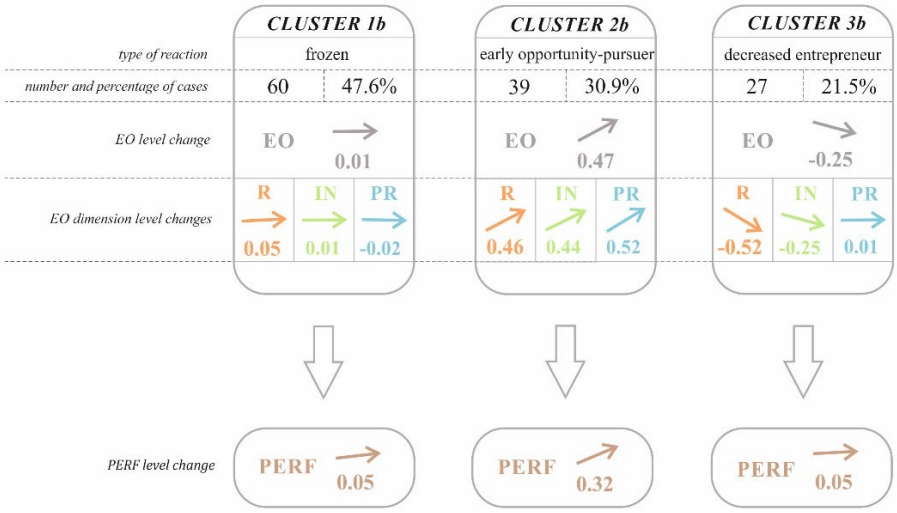

Figure 7. Results of cluster analysis for changes between Periods II and III

Almost half of the surveyed enterprises (47.6%) were assigned to one cluster (1b). As observed in Figure 7, these were the companies whose levels of all of the EO dimensions did not change as a result of the changes in market conditions. The average change in the level of EO and its individual dimensions did not exceed 0.05 (as per module). Cluster 2b, which included 39 enterprises, included those that significantly increased their levels of EO when the restrictions were lifted. In particular, the total level of EO in Period III increased by 0.47 on average as compared to Period II. The highest increase was recorded for PR (by 0.52), and the least – for IN (by 0.44). In the last group of enterprises (which consisted of 27 companies), EO decreased by 0.25, with the largest decrease recorded for R (by more than 0.5 points); in the case of innovativeness, the decrease was 0.25, and in the case of proactiveness, its average value did not change.

The changes in PERF in the selected groups of enterprises can be determined based on Figure 7. By far, the best improvements in performance between Periods II and III (c.f. Figure 7) were recorded by those companies that increased their EO in all dimensions (i.e., those that were defined as early opportunity-pursuers). The average increase in the PERF in this group was 0.32. For the enterprises from the other clusters, the average value of firm performance also increased (but only slightly), amounting to approximately 0.05 (i.e., slightly higher than 0). The statistical tests that were performed revealed two additional findings. First, there were significant differences in the levels of performance changes among the companies from the three clusters (*p-value = 0.033* in the Kruskal-Wallis test). Second, only the companies from Cluster 2b recorded a significant increase in performance (*p-value = 0.001* in the signed-rank test). An analysis of the changes between Periods II and III showed that those enterprises that became more entrepreneurial (increased their levels of all of the dimensions of EO) could count on the highest and most significant increases in their PERF levels. Thus, the H5 hypothesis was confirmed for the changes between Periods II and III.

Although the surveyed enterprises represented a single industry and belonged to a single category (small and medium-sized enterprises), there were several factors that differentiated them (see Table 1), i.e. age, number of employees, and the size of their head office locality. To assess whether the control variables affected the results of the cluster analysis for each of the listed characteristics, their distribution in the individual clusters was examined. As it turned out, there were no statistically significant differences in the determined distributions. Therefore, the sociodemographic variables did not determine their assignments to their respective clusters.

DISCUSSION

Our findings corresponded to several previous studies that focused on entrepreneurial strategies during a crisis. The results confirmed the impact of the external environment on EO, as was previously reported by Covin and Slevin (1989), Rosenbusch et al. (2013), and Dele-Ijagbulu et al. (2020) as well as a few studies that referred to Polish businesses (Wojcik-Karpacz et al., 2018; Okreglicka et al., 2021; Kusa et al., 2022; Suder, 2022).

The research allowed for the verification of the formulated hypotheses and the achievement of the set objectives. Specifically, it was demonstrated that the examined companies significantly modified their entrepreneurial orientation as a result of the changing market conditions. In the analyses, it was shown that the substantial and unexpected deterioration of the market conditions resulted in decreases in the levels of entrepreneurship within the companies in the printing industry. However, it should be noted that, regarding the individual dimensions of EO, significant decreases in the average levels could only be observed for risk-taking. This confirmed Hypothesis H2 and was consistent with the proposals of Miles et al. (1993), Goll and Rasheed (1997), Martins and Rialp (2013), and Kreiser et al. (2020), who believed that hostile market conditions do not encourage risk-taking. Conversely, the worsening of the market conditions did not lead to significant modifications of the companies' proactiveness and innovativeness; this signified lacks of confirmations for Hypotheses H3 and H4 for the changes from Period I to Period II. The fact that the surveyed companies maintained their proactiveness and innovativeness at pre-crisis levels suggested that these were the strategic dimensions that firms considered to be crucial when addressing a crisis. This conclusion aligned with the views of Chesbrough (2020), Wenzel et al. (2020), and Bivona and Cruz (2021), who noted the significant roles of these EO dimensions in countering emerging adverse market conditions.

The improvement in the market conditions that resulted from easing the pandemic restrictions and the emergence of opportunities for government support prompted companies to significantly modify their innovativeness and proactiveness strategies while maintaining their unchanged levels of risk-taking. Therefore, the firms began to seek opportunities and introduce innovations after a temporary pause due to the improved market conditions. All of this was not necessarily indicative of an increased willingness to take risks. These findings suggested that Hypothesis H2 was not confirmed for the changes between Periods II and III, while Hypotheses H3 and H4 were supported. While it cannot be claimed that the conditions for the firms were favorable during Period III, they did improve significantly as compared to Period II. In this context, the obtained results were consistent with the views of Li and Atuahene-Gima (2001), who stated that turbulence in hostile environments creates new market opportunities and promotes innovation and proactiveness.

Therefore, our analysis showed the differences among the EO dimensions in terms of their changes during the crisis, which confirmed the previous argumentation that EO should be perceived as a multidimensional construct whose individual dimensions should be considered separately (e.g., Covin & Slevin, 1989; Lumpkin & Dess, 1996).

The cluster analysis provided a slightly different perspective on the examined issue, as it considered all of the dimensions simultaneously. The observed decrease in the EO level (which reflected the entrepreneurial activities) between Periods I and II (the beginning of the crisis) indicated that the companies mainly followed retrenchment strategies (Wenzel et al., 2020). The results of the cluster analysis (four and three EO profiles could be identified in the respective period pairings) confirmed the previous observations that the entrepreneurs reacted differently to the change in the market conditions, including both defensive and offensive approaches (Manolova et al., 2020). The findings confirmed the effectiveness of the perseverance strategy (Pacheco-de-Almeida, 2010; Stieglitz et al., 2016); in our sample, those entrepreneurs who followed perseverance strategies regarding innovativeness, proactiveness, and risk-taking (Cluster 2a: passive entrepreneurs) performed the best during the first phase of the crisis. Meanwhile, those entrepreneurs who followed the retrenchment strategy during this phase (Cluster 1a: retreaters) performed the worst; however, this is the most common strategy in response to the crisis (similar to the previous evidence that was provided by Bruton et al. (2003). This somewhat confirmed the suggestion of Wenzel et al. (2020) that this strategy can be the only possible short-term action at the beginning of a crisis. Innovativeness-based strategies (Clusters 3a and 4a: proactive innovators and risk-taking innovators, respectively) confirmed that these could be more effective than retrenchment strategies. This was in line with the findings of Soininen et al. (2012) that innovativeness and proactiveness positively impact small firm performance in the face of a sudden recession; however, this contradicted their observation that risk-taking has a negative effect.

The results that showed an increase in the level of EO between Periods II and III (the second phase of the crisis) suggested that the companies mainly followed innovative strategies (Wenzel et al., 2020) or pivoted (Leatherbee & Katila, 2017). The cluster analysis provided additional arguments regarding the discussion of entrepreneurial strategies during a crisis. In our sample, those entrepreneurs who increased their activities in terms of all of the EO dimensions (Cluster 2b: early opportunity-pursuers) performed the best during this period. This confirmed previous observations (e.g., Beliaeva et al., 2020) that an entrepreneurial posture that focuses on opportunities can also be effective during a crisis and that innovativeness can help improve performance (e.g., Clauss et al., 2022). The observation regarding the early opportunity-pursuers supported the findings of Puumalainen et al. (2023) that EO is positively related to pivoting, growth, and subjective performance under crisis conditions. During the second phase of the crisis, those entrepreneurs

who behaved in persevering (Cluster 1b: frozen) or retrenching (cluster 3b: decreased) manners in terms of their entrepreneurial activities performed worse; this supported the observation from the last crisis that non-entrepreneurial firms performed poorly (Puumalainen et al., 2023).

The results of the analysis of the changes in PERF for the individual clusters between Periods I and II proved to be interesting. It turned out that the smallest decrease in the PERF values was achieved by those enterprises that did not change the values of the individual dimensions of EO but remained at pre-pandemic levels. Those companies that exhibited positive changes in their values of the EO dimensions obtained poorer results in terms of changes in PERF. It can be concluded that Hypothesis H5 was not confirmed for the changes from Period I to Period II. Interesingly, the smallest decline in performance during the initial phase of the crisis could be observed in passive enterprises, i.e. those that did not change their entrepreneurial strategies (did not alter their levels of the individual dimensions of EO); this could be associated with the extremely high level of uncertainty regarding market conditions. Consequently, all the changes were rather random and chaotic rather than analysis-based and proactive, and their efficiency was low at this stage of the crisis. The greatest increases in performance were achieved by those companies that significantly enhanced their activities across all of the considered dimensions of EO during the period of easing pandemic restrictions (early opportunity-pursuers); these improving market conditions were more suitable for entrepreneurial actions which could lead to increased performance.

The increases in performance among those companies that strengthened their entrepreneurial activities during the second phase of the crisis confirmed that EO can be effective when responding to a crisis (e.g., Covin & Slevin, 1989; Soininen et al., 2012; Beliaeva et al., 2020; Puumalainen et al., 2023). The greatest and statistically significant increase in the performances of early opportunity-pursuers supported the observation that EO is positively associated with opportunity-seeking under crisis conditions (Beliaeva et al., 2020) – especially since opportunities are rooted in the external environment (as posited by Morris (1998)). This fact confirmed the H5 hypothesis for changes in the market conditions between Periods II and III.

CONCLUSION

This study aimed to verify how small companies modified their business strategies in response to changes in their external environment. The changes were observed during two phases of the crisis caused by the COVID-19 pandemic, with a sample representing the printing industry in Poland. As a result, changes in EO and firm performance were identified, along with some patterns of entrepreneurial responses to market changes what was also the aim of the study. In particular, four types of reactions to the emergence of the crisis as well as three types of reactions to the improvement of the external conditions were found. The results showed that companies modified their EO and its dimensions along with the changes in the market conditions. As EO expresses a strategic approach to the environment, a modification of EO reflects a strategic response to the market's variability. Additionally, this study aimed to assess the changes in performance resulting in market conditions. In this regard, the results showed that changes in firm performance depend on the type of entrepreneurial response (exhibited by different configurations of changes in the EO dimensions). Thus, we can conclude that it is worth modifying an entrepreneurial strategy in the face of a crisis; changes in firm performance are associated with modifying entrepreneurial orientations – particularly changes in the configurations of the EO dimensions (however, even a lack of change matters).

Managerial implications

The findings of this study (specifically, all of the identified types of EO modifications) have meaningful managerial implications. They suggest to entrepreneurs how they should adjust their entrepreneurial behaviors depending on changes in the external environment in order to mitigate the negative impact of a crisis. Specifically, under high uncertainty caused by expected negative market changes, entrepreneurs should avoid sudden and profound modifications in their entrepreneurial behaviors, at least during the initial phase of a crisis. In particular, entrepreneurs should refrain from reducing their risk-taking. Concurently, when market conditions are improving, entrepreneurs should intensify their entrepreneurial activities (in terms of risk-taking, innovativeness, and proactiveness). It is worth noting that, in many cases, the identified patterns of modifying EO does not lead to increases in performance; their value lies in alleviating decreases in performance (which might be a condition for the very survival of a company). The observed relationships among our variables showed that

entrepreneurs need to be aware of their entrepreneurial behaviors in the context of market conditions; for example, the shift to riskier behaviors can have different consequences depending on the market conditions.

Contribution

This study contributes to the theory of organizational entrepreneurship and the literature on entrepreneurial orientation. In particular, the study's findings add value to the body of knowledge on the impact of the external environment on the EO/performance relationship. Numerous research studies have been focused on this relationship; however, they have provided ambiguous explanations. This study deepens our understanding of the impact of a crisis; specifically, modifications of EO along with changes in firm performance can be observed in two phases of a crisis, which differ significantly and have different consequences for both EO and performance. The latter findings also contribute to the crisis management literature; in this field, the observed differences between the two stages of a crisis (as well as any related responses) can be supportive. The study also contributes to the SME literature, with the observed findings being especially relevant to small firms. An additional value (as well as originality) of this study is connected with the methodology that was employed; namely, it considered those dynamics where changes in EO and its dimensions were variables that were the subject of a quantitative examination. With the last attribute, the study contributes to the research methodology in the entrepreneurship and strategic management realm (where such an approach is rare).

Limitations and future research

This study has some limitations. First, the sample represents one industry (printing), one type of company in terms of size (SMEs), and one market (Poland). The sample characteristics could have affected the results – especially in the context of the crisis. For example, small firms could have faced resource constraints that may have limited their strategies for coping with the crisis. A similar investigation in companies operating in other industries and markets is investigated in future studies; this would augment our understanding of interactions between examined variables in other contexts. Regarding age, mature firms are less flexible than new ones when considering new options (Schreyögg & Sydow, 2011); therefore, investigating the profiles of the companies that were grouped in our clusters would be valuable in future studies. For instance, the characteristics of the 'early-opportunity pursuers' that were identified in this study might be relevant when advising companies to follow this pattern of entrepreneurial changes during a crisis. Second, the examined modifications of an entrepreneurial strategy and changes in performance could be observed during the severe crisis that was caused by the pandemic. It is possible that the investigated relationships can be shaped in different ways during a crisis of another nature (e.g., a financial crisis) or during market prosperity. Therefore, conducting similar studies in the context of other types of market changes (including positive ones) is recommended. Third, the method of collecting data could be a source of bias in the answers that were gathered during our interviews; this was because the data was collected several months after the first assessed period, and the respondents described their activities in three different situations during one interview. Finally, the methodology of this study does not allow for an assessment of the strength of the examined relationships. Thus, future studies are recommended to employ other methodologies (for example, enabling quantitative cause-and-effect analyses). Such studies would allow us to deepen our knowledge about entrepreneurial strategy, EO, and its dimensions under changing market conditions.

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Appendix 1. Construct items

Construct	Item
Firm Performance (PERF)	Relative to our competitors, we achieve better results.
	Relative to competing products, our products are more successful in terms of sales.
	Relative to competing products, our products are more successful in terms of achieving and establishing market share.
	Our sales revenues are higher than those of our direct competitors.
	Our profits are higher than those of our direct competitors.
Risk-taking (R)	We can accept a high level of risk if it offers a chance for above-average profits.
	The term 'risk taker' is considered a positive attribute for the people in our organization.
	Relative to our competitors, we are more courageous in pursuing high-risk opportunities.
	We can radically change our previous plans if it could offer a chance for above-average profit.
Innovativeness (IN)	Our organization seeks out new ways to do things.
	We actively introduce improvements and innovations in our organization.
	Innovation is the source of our success.
	Relative to competing products, our products are more innovative.
Proactiveness (PR)	We analyze our external environment.
	We strive to identify future trends.
	We initiate actions to which other organizations respond.
	We always try to take the initiative in each situation.

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Biographical note

Marcin Suder is an Assistant Professor in the Faculty of Management at the AGH University of Krakow (Poland), with a Ph.D. in Economics from the Faculty of Management at the AGH University of Science and Technology in Krakow (Poland) and a Master Degree in Mathematics from the Jagiellonian University in Krakow (Poland). His research interests include organizational management, organizational entrepreneurship, application of mathematics in financial and quantitative research methods. He has been an author, co-author, and referee for several distinguished international academic journals (e.g., *Journal of Innovation and Knowledge*, *Journal of Business Research, Technological Forecasting and Social Change*).

Authorship contribution statement

Marcin Suder: Conceptualization, Data Curation, Formal Analysis, Investigation, Methodology, Project Administration, Resources, Software, Supervision, Validation, Visualization, Writing Original Draft, and Writing - Review & Editing.

Conflicts of interest

The author declares no conflict of interest.

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Redefining rural entrepreneurship: The impact of business ecosystems on the success of rural businesses in Extremadura, Spain

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Abstract

***PURPOSE**: Regarding the growth of public policies fostering rural entrepreneurship, the primary objectives of this work involve examining the concept of rural entrepreneurship, identifying key aspects that differentiate it from non-rural entrepreneurship, and assessing the role of the local entrepreneurial ecosystem in supporting the initiation and growth of rural ventures. To achieve these goals, the study adopts a novel approach by integrating an analysis of rural entrepreneurship features with an exploration of the entrepreneurial ecosystem's impact. **METHODOLOGY:** After a review of the previous academic literature, the characteristics of rural entrepreneurship have been delimited, distinguishing it from non-rural. The research results have been obtained using a questionnaire, after a descriptive analysis of the sample, and an analysis of the difference in means by contrasting hypotheses using IBM SPSS Statistics 26. **FINDINGS:** This article explores the factors that contribute to rural entrepreneurship, challenging the notion that geographic location is the sole defining characteristic. Through the conducted investigation, it has been determined that a company's classification as rural is not solely based on its geographical location in rural areas or involvement in primary sector activities. Other aspects, such as a strong connection with the local community or the ability to create value, are also essential in defining a rural enterprise. Additionally, it examines how business ecosystems can foster the growth and success of rural entrepreneurship. **IMPLICATIONS:** This study provides an analysis of how rural entrepreneurship can drive endogenous development in rural areas. It also offers insights for government entities and policymakers to implement effective support measures and strategies in business ecosystems within rural environments. This study highlights that the resources found in rural entrepreneurial ecosystems may not be sufficient to support rural entrepreneurship. It's important to acknowledge that rural entrepreneurship requires specific resources that may not currently be available in business ecosystems. To increase the number of viable rural businesses, new resources tailored to rural entrepreneurship must be created, leveraging the area's endogenous resources and growth models. **ORIGINALITY AND VALUE:** This study examines the distinctive attributes of rural entrepreneurship, with a deliberate departure from exclusive emphasis on geographical location or primary economic sector. Drawing upon empirical research conducted among a cohort of rural enterprises, the analysis reveals that neither physical location nor primary sector affiliation substantially contribute to the establishment of these rural businesses. Instead, a profound connection to, and a heightened sense of belonging within the rural milieu emerge as pivotal determinants. Furthermore, rural entrepreneurship emerges as a promising avenue for the development of the region, offering substantial growth prospects. The investigation encompasses a scrutiny of the resources within the rural business ecosystem and their capacity to stimulate rural entrepreneurial activity. This emerging focal point represents a novel field of concern for governmental bodies and political institutions operating in rural areas.*

***Keywords:** entrepreneurship, rural entrepreneurship, business ecosystems, rural business success, entrepreneurial ecosystem, rural development strategies, endogenous development, rural ventures, geographic location impact, local community engagement, policy implementation for rural areas, value creation, embeddedness*

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INTRODUCTION

Rural areas face special conditions that affect their socioeconomic development where the entrepreneurship has been seen as a potential solution to the decline experienced in these areas. It can stimulate the rural economy, create jobs, and counteract depopulation. By capitalizing on the attractive factors of the rural context, entrepreneurship can play a crucial role in revitalizing these regions. To promote entrepreneurship in rural areas, governmental entities are dedicating significant efforts to designing effective strategies. These strategies include implementing supportive measures and establishing entrepreneurial ecosystems that foster the development of these territories.

The European Union is striving to rejuvenate rural areas by encouraging entrepreneurship, as these areas constitute more than 75% of the land area of member countries (European Commission, 2020, 2021a). In Spain, rural areas make up a significant part of the territory (Bank of Spain, 2021; Ministry of Agriculture, Fisheries and Food, 2021), with over 80% of the country's land area classified as rural (Figure 1). Extremadura is one of the least developed regions in Europe (European Commission, 2021b). The region of Extremadura in Spain is mainly rural, and entrepreneurship in this area does not seem to be generating the expected outcomes in terms of promoting socio-economic development.

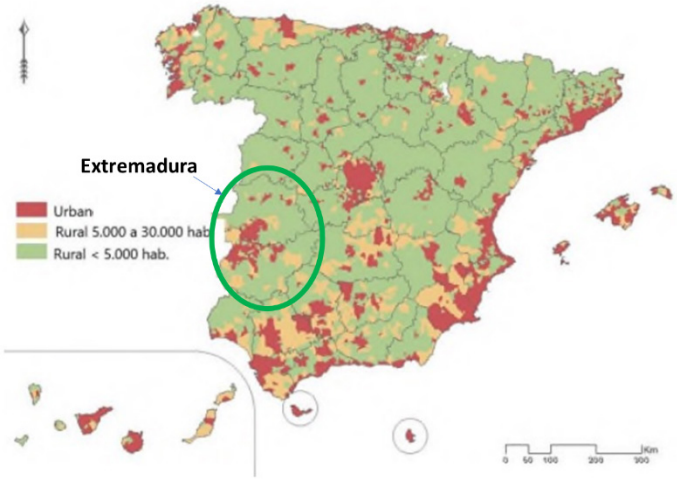

Figure 1. Rural territory in Spain and Extremadura

Source: Adapted from The Spanish Ministry of Agriculture, Fisheries, and Food (2021).

The Extremadura region's strong rural character has resulted in many entrepreneurial ventures in the area being labeled as rural entrepreneurship based solely on geographic location. However, in our oppinion this classification fails to consider other important factors specific to the rural context that can affect the creation of new businesses in these territories. Additionally, rural and urban areas within the same country can have distinct social and economic differences due to differences in lifestyle and livelihoods (Van der Ploeg et al., 2015), and this suggests that entrepreneurship may also vary depending on the location.

The definition of rural entrepreneurship is being scrutinized in light of its defining characteristics, particularly whether geographic location in rural areas is the sole factor in identifying it. It is crucial to delve deeper into the concept of rural entrepreneurship and determine a range of dimensions that go beyond physical space to establish the essential criteria for identifying an effective rural entrepreneurship venture. Additionally, it is vital to investigate the extent to which entrepreneurial ecosystems in rural areas are aware of the unique features of rural-focused entrepreneurship and provide suitable and customized support to rural entrepreneurship in these regions. These are the primary research questions presented in this research.

This research aims to determine what factors influence the degree of rurality of a venture to consider it as a rural enterprise compared to a non-rural enterprise, and if business ecosystems consider these factors to design resources and strategies that promote rural entrepreneurship in rural areas. Extremadura's rural character and lower degree of development compared to other Spanish regions make Extremadura an ideal location for research. By understanding the challenges faced by entrepreneurs in rural areas, and how ecosystems influence the generation of new companies while taking into account the unique characteristics of the rural areas, we can gain valuable insights to enhance rural

entrepreneurship as a driver of development in the region. It is worth noting that the researchers of this article are professionals based in Extremadura.

After this introduction, we present a literature review focused on the meaning of rural entrepreneurship, related concepts, and the relationship with the entrepreneurial ecosystem. Later, the method is presented, and the research developed includes a theoretical model, which is tested empirically, followed by a section on results, and a final section for conclusion.

LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

In researching entrepreneurship in rural areas, various interconnected concepts were explored in the literature. These concepts revolve around the phenomenon of entrepreneurship and are specifically relevant to the study of the concept in rural areas.

Entrepreneurship has become an important factor in a country's economic development, according to Kovanen (2021). With entrepreneurial individuals' impact on global economies, the figure of the entrepreneur has gained significant recognition in the last decades. Authors such as Gautam and Lal (2021) or the European Union have researched entrepreneurship and its economic contributions, as well as the personality and motivation required for it, whether it is driven by necessity or opportunity (Fairlie & Fossen, 2020). Economic literature has recognized the role of entrepreneurship in fostering innovation, economic growth, new technologies, job creation, and societal well-being (Crudu, 2019; Kovanen, 2021), making it a subject of study in various disciplines such as economics, sociology, and psychology.

Throughout history, the idea of entrepreneurship has developed from Cantillon´s original concept (Thornton, 2020) to the modern day. Schumpeter introduced the notion of entrepreneurship having the potential to greatly impact and change the market (Mehmood et al., 2019; Callegari & Nybakk, 2022). This has been recognized as a crucial element in the socio-economic progress of any nation. Many individuals and organizations, including OECD (1998) and the European Commission (2003a, 2003b), recognize entrepreneurship's significance and have made efforts to promote policies that encourage business creation and increase the number of entrepreneurs in their respective countries. Spain has its own law, the Law for the Support of Entrepreneurs (Law 14/2013 of September 27th), that regulates and defines various aspects that affect entrepreneurs and provides support for entrepreneurship within its borders.

In this examination of vocabulary, the European Union (EU) defines "rural areas" as places where more than half of the population resides in rural municipalities. Rural communities are further categorized by having a population density of less than 150 inhabitants per square kilometer (European Network for Rural Development, n.d.). However, there is no definitive definition of the term due to various factors that affect rural areas, such as physical, socioeconomic, environmental, and institutional factors. As a consequence, it is challenging to establish a precise definition of rural areas that applies to all member states. Also, the EU defines "rural areas" as all areas outside of urban clusters. An urban cluster is defined as a group of 1 km² with a minimum population density of 300 inhabitants per km² and a minimum population of 5,000 (Eurostat, n.d.).

Entrepreneurship in rural areas is often hindered by lower levels of development, depopulation, and a lack of infrastructure and services compared to urban areas. However, rural areas make up a significant percentage of the territory, making it crucial for global government entities to prioritize promoting entrepreneurship in these regions. This can be done by utilizing local resources, identifying strengths in the rural environment (Galvão et al., 2020), and highlighting attractive factors such as the quality of life for residents (Vaishar et al., 2018).

In Spain, the definition of rural environment is based on specific territorial criteria outlined in the Law for the Sustainable Development of the Rural Environment (Law 45/2007 of December 13th). This law defines the rural environment as a geographic space comprising a group of municipalities with fewer than 30,000 inhabitants and a population density of less than 100 inhabitants per square kilometer. Additionally, the law defines a small rural municipality as one with less than 5,000 inhabitants and integrated into the rural environment.

Regarding the term "rural entrepreneurship," the fusion of the previous meanings would suggest, in simple terms, that rural entrepreneurship is the creation of a business in a rural area. However, this may not be the correct and exact definition. The literature on this topic confirms that there is no definitive definition of rural entrepreneurship. As interest in this area grows, there are various perspectives trying to understand the different aspects and foundations of rural entrepreneurship.

Following Pato and Teixeira (2016), Wortman (1990) was the first to conceptualize rural entrepreneurship. He defined it as the process of introducing a new product or technology to the market by starting a new business in a rural area. Henry and McElwee (2014) agree with Wortman's view that rural entrepreneurship involves establishing a business in a rural setting. However, they questioned whether starting a business in a rural area differs significantly from starting one in an urban area, considering only the difference in geographic location. As a result, there is no single clear definition of rural entrepreneurship, and various perspectives exist regarding its extent and characteristics.

Korsgaard et al. (2015) differentiate between rural entrepreneurship and entrepreneurship in a rural setting, regarding them as distinct concepts. Rural entrepreneurship refers to businesses that are closely tied to the rural surroundings, utilizing rural resources to create value in entrepreneurship. Therefore, rural entrepreneurship cannot be relocated to another environment without losing some of its value proposition due to its deep ties with the rural context (Müller & Korsgaard, 2018). However, entrepreneurship in a rural setting does not necessarily imply a close connection to it. In this scenario, the rural environment is a crucial resource for generating economic activity, but creating value within the rural setting would not be the main objective of this type of entrepreneurship. According to Akgün et al. (2010), rural entrepreneurs are greatly influenced by their rural environment and have strong links with their local community. This connection to their surroundings distinguishes them from other types of entrepreneurs, as they have a unique connection to the resources and context of their rural location (Gyimah & Lussier, 2021). The location plays a significant role in shaping rural entrepreneurship beyond just its geographical aspects.

In terms of productive industries, rural entrepreneurship has traditionally been linked to primary sector pursuits like farming and raising livestock. In contrast, urban areas typically have a greater focus on service-based industries. However, according to experts like Arias-Vargas et al. (2022), entrepreneurs in rural areas are not restricted solely to agriculture-related ventures. In fact, various entrepreneurial opportunities are available in rural contexts that can be considered part of rural entrepreneurship.

Despite significant interest in rural entrepreneurship, there is still debate over what qualifies as a rural initiative. The criteria for defining rural entrepreneurship are varied, and the current literature offers multiple interpretations (Table 1). While the literature provides insight into potential dimensions of rural entrepreneurship, these interpretations may vary depending on the author. However, is there any distinction between these businesses, regardless of location?

Table 1. Characteristics of rural entrepreneurship

Authors	Elements of rural entrepreneurship
Bosworth (2012)	Located in a rural area Serve rural population Sell a rural product
Henry and McElwee (2014)	Location in a rural setting Employs local people Contribution to gross value-added
Korsgaard et al. (2015)	Space is an essential element, not relocation of the venture Contribution to the value creation of the space Sense of responsibility and commitment to the community Loyalty to the territory Endogenous resources Creation of social and economic value in the territory Localities resilient to global changes
Pato and Teixeira (2018)	Location in a rural setting Employs local people Sells a rural product Uses and provides local products
Muñoz and Kimmitt (2019)	Landscape imprinting Rural natural capital Rural built assets Social environment of rural entrepreneurship Cultural sphere of rural entrepreneurship Cultural positioning Territorial embeddedness Place-sensitive products Localized institutional support Collaborative spaces for advancing rural enterprising Place-sensitive trading

Rural entrepreneurship refers to entrepreneurial activity in a rural setting. The characteristics of the rural context play a significant role, but globalization and social/economic transformations can complicate the differences between rural and urban societies, making rural spaces multifunctional places where infrastructure has been improved, and the economy has been outsourced (Delgado-Viñas & Gómez-Moreno, 2022). It seems that rural entrepreneurship focuses on agricultural and livestock activities and yet, today, rural areas offer various economic opportunities classified as rural entrepreneurship outside of primary sector activities.

Several notable investigations have been conducted in the field of the definition of rural entrepreneurship, including the works of Bosworth (2012), Henry and McElwee (2014), Pato and Teixeira (2018), and Muñoz and Kimmitt (2019), mainly. These studies explore whether physical space is the primary distinguishing feature of rural entrepreneurship when compared to other types of entrepreneurship.

According to Bosworth's (2012) definition, a rural enterprise is characterized by three key elements: geographic location, serving a rural customer base, and selling a rural product. The author emphasizes that geographic location is particularly significant in identifying rural entrepreneurship, as it offers certain advantages for economic activities that are specific to rural areas compared to urban environments. Similarly, Henry and McElwee (2014) suggest that rural entrepreneurship is based on location in rural areas, local employment, and contribution to the creation of value of the territory. However, they also acknowledge that external elements affect both rural and urban enterprises, making the differences between the two minimal. Pato and Teixeira (2018) build upon the works of Bosworth (2012) and Henry and McElwee (2014), proposing a four-element model that includes geographic location, local employment, the sale of a rural product, and the use of local products. By combining these elements, Pato and Teixeira (2018) provide another definition of rural entrepreneurship. Muñoz and Kimmitt (2019) created a framework for rural entrepreneurship that is categorized into four sections. Each category consists of different dimensions that define rural entrepreneurship, utilizing the resources available in rural areas. The first category is based on location, including landscape imagery, biophysical resources, and rural heritage. The second category is based on social and cultural factors that drive entrepreneurship. The third category is rooted in cultural positioning, territoriality, and products that are sensitive to the location. Finally, the fourth category focuses on the business dynamics, including institutional support, collaborative spaces, and commerce that is mindful of the location.

After examining the theoretical aspects of rural entrepreneurship, it became evident that several ventures, often categorized as primarily rural, may not align with all the necessary characteristics. All the above let us set up the following hypothesis:

H1: Many of the ventures considered rural do not meet all the required characteristics to be effective rural ventures.

The idea of endogenous development is closely linked to entrepreneurship, as it is seen as a way to improve the economic and social growth of regions, particularly rural ones. Therefore, it is important to focus on this concept to determine how rural entrepreneurship can contribute to endogenous development in rural areas. The well-being of the population is largely dependent on the ability of regions to generate wealth, and endogenous development is a complex process that involves various dimensions, including economic, political, social, environmental, technological, and territorial aspects (Vázquez-Barquero, 2007).

In contrast to exogenous development, the endogenous approach aims to gain a competitive edge from local environmental resources, treating them as crucial assets for regional development (Bosworth et al., 2020). This aligns with communities collectively addressing challenges and fostering growth through local resources and efforts (Morretta, 2021). Unlike endogenous development, exogenous development requires an external element, acknowledging that not all locations have the necessary conditions for promoting internal growth (Morretta, 2021). Therefore, external companies lead entrepreneurial projects to boost economic growth in exogenous development, while endogenous development relies on internal factors for growth.

The ideas of endogenous and exogenous development are linked to the progress of local communities and have similarities with the viewpoints on rural entrepreneurship and entrepreneurship in rural areas explored in this study. Endogenous development focuses on the importance of physical space in addition to geographic location or land use. Local identity, culture, and economic factors shape initiatives in the area, giving them a unique personality and purpose. Rural entrepreneurship, as defined by Korsgaard et al. (2015), is an example of this concept. In contrast, exogenous

development is not influenced by the surrounding context. Physical space is simply a resource for businesses that choose to locate in rural areas for reasons other than creating value in the rural environment.

The pivotal role of the entrepreneurial ecosystem in fostering entrepreneurship within various contexts has prompted numerous scholars to conduct extensive research on its evolution and impact. According to Galvao et al. (2020), Moore (1993) is credited as the originator of the entrepreneurial ecosystem concept. Moore explained how various independent individuals with a common goal of creating value can collaborate to enhance innovation and entrepreneurship within a specific environment. Mazzarol (2014), along with Audretsch and Belitski (2017), and Spigel (2017), stand as notable contributors acknowledging the intricate complexities inherent within entrepreneurial ecosystems. These ecosystems play a significant role in the socio-economic development of the areas where they exist, involving a diverse range of individuals and organizations. As articulated by Mazzarol (2014), the conceptualization of an entrepreneurial ecosystem delineates a structural framework aimed at fostering economic expansion and innovation through the cultivation of entrepreneurial endeavors and facilitation of small business advancement. Similarly, Spigel (2017) suggests that entrepreneurial ecosystems arise from a combination of social, political, economic, and cultural factors coexisting in a physical space, which enables the growth of new and innovative companies. Audretsch and Belitski (2017) describe an entrepreneurial ecosystem as a complex system where interactions between different agents can result in the creation of new businesses.

Isenberg's (2011) research on entrepreneurial ecosystems is highly regarded in this field. He presents a model consisting of several domains considered as necessary for a successful entrepreneurial ecosystem. These domains include policy, human capital, finance, market, culture, and support. All the above let us set up the following hypothesis:

H2: The entrepreneurial ecosystem positively influences rural firms.

After this previous literature review, the goal of this work is twofold. First, to identify the components considered necessary for categorizing an entrepreneurship activity as rural. Second, to determine whether business ecosystems are knowledgeable about these essential factors, in order to positively influence in rural entrepreneurship.

METHODOLOGY

Method

IBM SPSS Statistics 26 has been used for descriptive statistics to describe the basic features of the data in the study and also regarding the contrast of the hypotheses. We conducted a non-parametric analysis of the difference of means, employing the Mann-Whitney U and Kruskal-Wallis H tests due to the assumed non-normality of the variables. This analysis contrasted the global indicators for the degree of rurality (referred to as RURAL) and the entrepreneurial ecosystem (referred to as ENTECO) with the sample-characterizing variables.

Instrument

We used an ad hoc questionnaire based on the literature review, which is one of the most widely used tools to collect data, especially in social science research (see Appendix). The authors of this article created a questionnaire that asked questions about the factors comprising each research construct. In order to send out a questionnaire, a database was created for both public and private entities, such as municipalities and business associations of the studied region. During July 2022, these entities were contacted by telephone and requested to participate voluntarily in the questionnaire distribution among the companies in their respective municipalities. On July 18, 2022, the research form was sent out to the contacted entities, and the process of receiving responses ended on August 1, 2022. To analyze the questionnaire effectively, we divided it into three blocks. The first block includes descriptive questions to characterize the sample, which we analyzed using Excel. In order to implement the practical component of our project through the questionnaire, we devised two constructs:

1) RURAL, that is the level of rurality of the company. In our study this term refers to the extent or degree to which a particular business or enterprise is connected to rural areas, not only a business situated in the rural area.
2) ENTECO, that is the extent to which entrepreneurs perceive the entrepreneurial ecosystem as influential on their business. This construct pertains to the entrepreneur's subjective assessment of the significance or impact of the broader entrepreneurial environment on their own business endeavors.

The RURAL construct concentrates on various dimensions of rural entrepreneurship that we have carefully considered in the theoretical section, while the ENTECO construct focuses on the characteristics of the entrepreneurial ecosystem. These constructs have been developed based on the interrelationships identified in our theoretical framework and are shown in detail in the following section.

The designed questionnaire utilizes a Likert scale to assess the degree of agreement and acceptance for each proposed dimension on a scale of 1 to 5, with 1 being the lowest and 5 being the highest. The first block contains questions aimed at obtaining a general description of the companies participating in the research, asking for aspects such as gender, business and birth location among the municipalities in the region, age of the business, activity sector, rural business perception, main reason for creating a business, employed people in the business and annual income level. The second block contains questions related to items that compose RURAL, to analyze the degree of rurality in the sample. The third block devoted to ENTECO contains several questions related to items used to examine how much the region's business ecosystem affects the surveyed companies.

Measures

Based on the analysis of previous works on the field, the RURAL construct has been developed by combining seven dimensions that align with the previous approaches which are described in Table 2. These seven dimensions are value creation, feeling of emdeddedness, rural customers, rural suppliers, endogenous resources, location in rural areas and employ local people. The ENTECO construct has been developed focusing on five of the six domains defined in Isenberg's (2011) ecosystem model, namely politics, finance, market, culture, and support (Table 3).

Table 2. RURAL scale

Items
Degree of importance of value creation and contribution to the socioeconomic development of the community to start a business (RURAL1)
Degree of importance of roots and links with the community to start a business (RURAL2)
Degree of belonging of clients to the local community (RURAL3)
Degree of belonging of providers and supports to the local community (RURAL4)
Degree of importance of the endogenous resources of the territory in the development of business activity (RURAL5)
Degree of importance of the location in the rural environment for the viability of the business (RURAL6)
Degree of belonging of employees to the local community (RURAL7)

Table 3. ENTECO scale

Items
Perception of public policies in the ecosystem (ENTECO1)
Use of public policies of the ecosystem in the creation of its own business (ENTECO2)
Perception of the creation of new companies in the ecosystem (ENTECO3)
Influence of the ecosystem in the creation of its own business (ENTECO4)
Perception of the disposition of the market in the ecosystem (ENTECO5)
Influence of the disposition of the market in the creation of its own business (ENTECO6)
Perception of the existence of financial resources in the ecosystem (ENTECO7)
Use of financial resources of the ecosystem in the creation of its own business (ENTECO8)
Use of own financial resources in the creation of its own business (ENTECO9)
Use of external financial resources (banks) in the creation of its own business (ENTECO10)
Use of external financial resources (family and friends) in the creation of its own business(ENTECO11)
Use of aid and subsidies in the creation of its own business (ENTECO12)
Use of other types of financial resources (ENTECO13)
Perception of entrepreneurial culture and values in the ecosystem (ENTECO14)
Individual perception of entrepreneurial culture and values (ENTECO15)
Perception of other public and private aid for entrepreneurship in the ecosystem (ENTECO16)

Sample

After developing the research constructs, we proceeded with the empirical phase of the study by selecting a region in rural Extremadura and choosing a sample of companies to test our hypotheses. Our research was based on the results of a questionnaire sent to 200 companies located in the region of Extremadura, and only 89 companies answered the questionnaire. The research takes place in the Zafra-Río Bodión region (Figure 2) located in the province of Badajoz (Extremadura, Spain). This region comprises 15 municipalities over 1,100 square kilometers and is home to approximately 46,000 inhabitants (IEEX, 2022). The characteristics of the sample population are shown in Table 4.

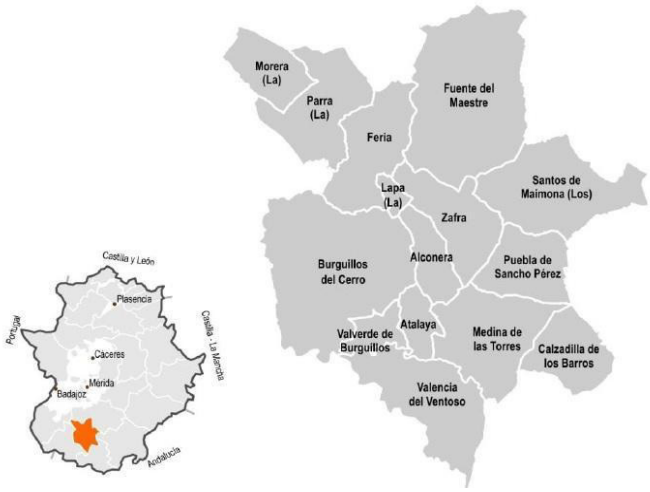

Figure 2. Map of municipalities in the Zafra - Río Bodión region.
Source: Extremadura Rural Development Network (2015).

Table 4. Characteristics of the sample population

Category	Groups	Total of 89
Gender	Male	37
	Female	52
Location	In the region	82
	Other region	7
Age	Less than 2 years old	21
	Between 2 and 5 years old	19
	Between 5 and 10 years old	15
	More than 10 years old	34
Economic Sector	Agriculture and livestock sector	4
	Industrial sector	5
	Construction sector	4
	People services sector (retail trade, hospitality and catering, health and well-being...)	42
	Business services sector (wholesale trade, consulting, advertising...)	13
	Other	21
Percepcion of rurality	Yes	47
	No	42
Reason to create a new venture	Have autonomy and independence at work	29
	Achieve a personal challenge	26
	Means of subsistence (need to have a job)	7
	Other (put entrepreneurial skills into practice, commercially exploit their knowledge and personal experiencie...)	27
Employment generation	Yes	42
	No	47
Annual Income	Less than €50,000	52
	Between €50,000 and €150,000	18
	Between €150,000 and €300,000	9
	Between €300,000 and €500,000	2
	More than €500,000	5

Around 80% of the municipalities have less than 5,000 residents, and this population makes up 31.12% of the region. It is a region predominantly rural where the population has experienced a decline over the last decade, decreasing by 3.5% overall (INE, 2022). This is a common trend in all municipalities except Zafra, the main urban center of the territory, with over 16,000 inhabitants. Although Zafra's population has slightly increased, it does not justify the decrease seen in the rest of the region. To this must be added the fact that the territory has a low population density (25 inhabitants per km^2), which is below the Spanish average (94 inhabitants per km^2).

There are around 5,785 companies in the region (8,71% of the total companies in Extremadura) with representation of the three economic sectors. Apart from the town of Zafra, where the services sector dominates (commerce, hospitality, transportation), the primary economic activity in the municipalities of the region is the services sector (59,63%). In second place, activities within the secondary sector, mainly agriculture and livestock, are prominent. The majority of businesses are small, one-person enterprises.

In the region's entrepreneurial ecosystem, there are public policies and measures in place to support entrepreneurship. Additionally, there are public and private resources available to promote business growth, including various financial resources for the creation and support of companies in the area. However, most companies rely on traditional businesses and lack innovation and internationalization in their activities. According to INE and IEEX (2022), the level of entrepreneurial culture in Extremadura is lower than the national average, although there are enough resources available for training and supporting the establishment of micro-enterprises.

RESULTS

In this study, which comprised 89 cases, it was observed that female participation was higher (58.43%) than male participation (41.57%). The majority of the companies in the sample belonged to the studied region (92.13%), but there were also responses from companies located in adjacent municipalities to Zafra - Río Bodión. Most participating individuals were born, raised, and developed their businesses in the studied region. Only a small percentage of individuals (19.10%) came from other territories outside the region and chose to establish their livelihood in this rural context. These findings suggest that most participants preferred to start their businesses in their own territory, emphasizing the importance of roots as a dimension in studying the degree of rurality of a company. The study included a diverse range of companies with varying degrees of age. Young and established companies were equally represented, with 23.60% of the companies being active for less than two years, 21.30% active for two to five years, 16.90% active for five to ten years, and 38.20% active for over ten years. Although the participating companies represented different sectors, the majority (47.20%) belonged to the personal services sector. For the perception of rurality, 52.80% of the companies identified themselves as rural enterprises, and 47.20% declined to answer the question. The primary reason for companies choosing to establish themselves in a particular area is to attain autonomy and independence in their work. In addition, a personal challenge was also a motivating factor. However, contributing to the well-being of the local community or generating employment were not cited as reasons for starting a business in the area. Out of the participating companies, 52.81% have employed workers within their organization, and most of these companies are small businesses with an annual turnover of less than €50,000.

After this characterization of the sample, main descriptive statistics are shown in Table 5, for RURAL, and in Table 6 for ENTECO.

Table 5. Descriptive statistics of RURAL

	Minimun	Maximun	Average	Standard deviation
R1	1	5	3.80	0.890
R2	1	5	3.90	1.069
R3	1	5	3.70	1.668
R4	1	5	3.11	1.624
R5	1	5	3.12	1.519
R6	1	5	2.37	1.191
R7	1	5	2.85	3.763
RURAL	1.14	4.57	3.2651	0.455

Table 6. Descriptive statistics of ENTECO

	Minimun	Maximun	Average	Standard deviation
E1	1	5	2.44	1.272
E2	1	5	2.33	1.154
E3	1	5	3.18	1.104
E4	1	5	2.74	0.921
E5	1	5	2.78	1.176
E6	1	5	2.57	1.179
E7	1	5	2.88	1.041
E8	1	5	2.73	0.836
E9	1	5	3.08	1.346
E10	1	5	3.67	0.859
E11	1	5	3.07	1.154
E12	1	5	3.17	2.324
E13	1	5	1.74	1.353
E14	1	5	1.49	0.935
E15	1	5	1.69	1.036
E16	1	5	1.22	0.563
ENTECO	1.44	3.50	2.5500	0.203

Upon statistical analysis of the degree of rurality of companies in the sample, it was discovered that all participating companies have some level of rurality (mean of 3.26 out of 5). However, none meet the criteria to be classified as completely rural. Some companies showed a high level of rurality (maximum values of 4.57 out of 5). The lowest average was found in the item RURAL6, which refers to geographical location in rural areas, while the highest average was related to roots and connection to the territory (RURAL2). Therefore, RURAL2 is an important dimension to analyze the degree of rurality in the sample.

For RURAL1, which relates to creating value and promoting socioeconomic development, more than half of the companies surveyed rated it as important (48.31%) or very important (21.35%), with a high mean in the analysis. As indicated, RURAL2, which pertains to connection to the local community, was found to be extremely relevant for the companies surveyed. This factor strongly influenced the business decisions of entrepreneurs in the region, with the highest average rating in the analysis (46.07% important and 29.21% very important). This dimension may be the deciding factor for a company's level of rurality, based on the emotional connection and sense of belonging the project (and its people) have towards their local environment. Ultimately, this generates economic and social wealth for the community by valuing the different elements that contribute to the rural environment.

Based on rural customers in the RURAL3 item, the companies in the sample seem to focus on local customers. According to the survey, most of the respondents (33.71% totally agree and 31.46% agree) agree with this opinion. When it comes to the RURAL4 item, which deals with suppliers from the local community, there are more diverse responses. The companies that were surveyed have suppliers from both local and non-local areas, with only a small percentage (14.61% of the sample) preferring local suppliers.

After analyzing the level of rurality among the companies in this study, it appears that utilizing local resources (reflected in RURAL5) in the area does not play a significant role. The findings regarding dimension RURAL4 (suppliers) are comparable, suggesting a potential correlation between the two. A small percentage (14.61%) of the surveyed companies exclusively rely on local resources for their operations, indicating that they do not depend heavily on these resources.

It is important to analyze the level of rurality of a company, especially for those located in rural areas. Based on the RURAL6 item, which refers to geographic location, only 5% of companies in the sample think that operating in a rural environment is advantageous for their business. Conversely, most of the companies surveyed believe that moving to a non-rural environment could improve their business without interrupting operations (62.92% of surveyed companies). The correlation between RURAL6 and other items suggests that personal and non-professional reasons may be the primary factors that influence attachment to the territory (RURAL2).

Additionally, the resources within the region (known as RURAL5) may not be sufficient or available to support the integration of business activities. Companies that can easily relocate may not fulfill the needs of the local community, lack necessary raw materials that are only obtainable within the area, or function in a way that does not benefit the environment. As a result, they cannot be classified as successful rural enterprises, but rather as entrepreneurship within rural zones.

According to the RURAL7 item, which assesses local employment, most of the individuals employed by the companies in the sample are part of the community (77.55% of the surveyed companies). This helps create job opportunities within the area and improves the social and economic environment of rural communities.

The second part of the data analysis aims to examine how much the region's business ecosystem affects the surveyed companies. For that purpose, the ENTECO construct encompasses five dimensions, namely politics, finance, market, culture, and support—elements previously examined in Isenberg's (2011) ecosystem model.

Table 6 provides a descriptive analysis of the data. All the companies that were surveyed have some level of knowledge about the resources available in the region's entrepreneurial ecosystem. The average score for this understanding was 2.55 out of 5. However, it's crucial to mention that this knowledge doesn't always result in tangible benefits for the companies that took part in the survey.

The survey results indicate that a majority of companies do not support public policies and measures that aim to aid entrepreneurship. Specifically, 32.58% of respondents disagree and 23.60% completely disagree with the effectiveness of these measures. Moreover, only 15% of respondents reported benefiting from these policies. Interestingly, more than half of the surveyed companies stated that they have not utilized these measures to enhance their businesses. Despite this, the ecosystem of the region appears to be generating new ventures to some extent, with 38.20% of respondents agreeing and 6.74% completely agreeing with this statement. A significant portion of the companies surveyed have benefited from the resources of the region's ecosystem at some point in their business careers, with 21.35% experiencing quite a bit of benefit and 39.33% experiencing some benefit. However, only 1.12% of companies consider the influence of the ecosystem to be relevant to their venture.

Many companies participating in the study believe there are insufficient financial resources to establish and grow ventures in the region. The results show a notable degree of dissatisfaction with this aspect of their operations, with 32.58% disagreeing and 11.24% completely disagreeing. This could be due to a lack of awareness of the resources available in the ecosystem, or because the resources are not aligned with their business needs. Surprisingly, over half of the companies surveyed have used these resources little or not in their business careers. According to the research, the most common way of financing a new business in the region is self-financing, even though other external funding sources are available. More than 60% of the businesses in the study have used at least 60% of their own funds to create their business. In the region, there is a debate surrounding the market with differing opinions. According to a survey, 33.71% of companies believed that the market had little impact on their business, despite receiving support from customers and suppliers who contribute to the rural economy.

In the second part of the statistical analysis for RURAL and ENTECO constructs, we performed a difference in means analysis. Since the variables were not normally distributed, we used non-parametric tests. RURAL and ENTECO constructs were compared to categorical variables used to characterize the sample (Table 7). Consequently, the second hypothesis H2 has been divided into sub-hypotheses from H2a to H2h.

Table 7. Analysis of difference in means of RURAL and ENTECO

		RURAL	**ENTECO**
Hypothesis H2 (sub-hypotheses)	Test	p	p
H2a - Gender	Man-Witney	0.655	0.983
H2b - Location	Kruskal-Wallis	0.380	0.545
H2c - Age	Kruskal-Wallis	0.316	**0.010**
H2d - Economic Sector	Kruskal-Wallis	0.299	0.863
H2e - Perception of rurality	Man-Witney	**0.000**	0.254
H2f - Reason	Kruskal-Wallis	0.381	0.392
H2g - Employment generation	Man-Witney	**0.000**	0.814
H2h - Annual income	Kruskal-Wallis	0.610	0.827

The distribution of RURAL is the same between the categories of gender, location, age, economic sector, reason for starting a business, employment generation, and annual income. However, the distribution of RURAL is different for the perception of rurality (H2e), where the mean of "yes" (3,54) is higher than that of "no" (2,98). Therefore, those who perceive themselves as rural actually have a higher degree of rurality than those who do not perceive themselves as such. The distribution of RURAL is different for the employment generation categories (H2g), where the average of the first category is 3.52 and that of the second category is 3.08. Therefore, those with a higher degree of rurality are those who create jobs. The data shows that rural enterprises tend to create more employment opportunities than non-rural counterparts. This indicates that rural businesses indirectly contribute more to the overall wealth generation in the area, despite not having it as their main focus.

Regarding the distribution of ECOEMP, we can say that it is the same between the categories of all the variables considered except those of age. The ECOEMP distribution is different for the age categories (H2c). The average for each category is the following: category 1 (less than 2 years old) has 2,78, category 2 (between 2 and 5 years old) has 2,62, category 3 (between 5 and 10 years old) has 2,51, and finally, category 4 (more than 10 years old) has 2,38. Thus, the entrepreneurial ecosystem in Zafra - Río Bodión benefits companies equally. The only significant difference was found in the age of the companies, with younger companies benefiting more from the ecosystem than older ones. This indicates that the ecosystem is successful in generating new companies, but may not provide enough support for more mature ones.

DISCUSSION AND CONCLUSION

This work has aimed to examine the meaning of rural entrepreneurship, to determine what key aspects define and differentiate it from entrepreneurship in non-rural areas, and to know weather the local entrepreneurial ecosystem is aware of the own characteristics of rural ventures fostering their development. For that purposes, this work has incorporated a novel approach by combining the analysis of the characteristics of rural entrepreneurship and the influence of the entrepreneurial ecosystem. Based on the analysis of the academic literature, we conclude that the characteristics of rural entrepreneurship are the following: (i) Resource Utilization: Rural entrepreneurs often leverage local resources such as agriculture, natural landscapes, and traditional skills to start and sustain their businesses. (ii) Community Focus: Rural entrepreneurs may have a strong sense of community and may tailor their businesses to meet local needs. They might engage in community-oriented projects and contribute to local development. (iii) Challenges: Rural entrepreneurs may face unique challenges, such as limited access to markets, infrastructure, and financial resources. Overcoming these challenges often requires creativity and adaptability. (iv) Employment: Rural entrepreneurs involve the local community in their projects, leading to employment opportunities.

Many companies in the region studied are not aware of the differences between a rural enterprise and other types of enterprises. They are perceived as rural solely based on their geographical location in the rural environment, without any other parameters. This may be due to the fact that they are located in Extremadura, which is traditionally considered an eminently rural environment. However, it has been shown that the location in a rural environment and engaging in primary sector activities are not sufficient variables to measure the rurality of an enterprise. It leads to confusion when considering businesses located in small rural municipalities and/or focused on primary sector activities as purely rural companies.

Based on the analysis of the data, it was found that the companies located in the Zafra Río Bodión region exhibit some level of rurality. However, they are not completely rural, even though the region they are situated in could be characterized as such.

The connection a company has to its territory plays a significant role in determining its level of rurality. This connection includes emotional ties and a sense of rootedness. Interestingly, a company's purpose and focus on creating wealth in the region also influence its level of rurality. This is evident in the fact that rural companies tend to generate more employment opportunities in their region. However, it's important to note that a company's geographical location alone doesn't determine its level of rurality. Other factors must also be considered.

Rural entrepreneurship can be seen as part of the fourth sector, where the goal is to contribute to the development of the community beyond just making money, according to Sánchez-Hernández et al. (2021). This type of enterprise is focused on the local area and aims to have a positive impact on both the social and economic aspects of the community. It is important to recognize that rural entrepreneurship is a development model that arises from within the community itself, and it complements external development models. In today's globalized society, it is crucial to appreciate the significance

of rural entrepreneurship as a source of internal development for a community. The people who live in the area can take advantage of their local strengths and resources to enhance and rejuvenate their surroundings.

The region of Extremadura boasts a diverse entrepreneurial ecosystem that spans across all its regions. It comprises both public and private agents, covering the domains of Isenberg (2011), creating an environment that fosters entrepreneurship. However, there appears to be a disconnect with the business community, which can be solid at the start of a company's establishment but tends to break down as the business grows. This could be due to a lack of resources to support the growth or innovation of more experienced companies.

Although the setting is rural, the current ecosystem for promoting entrepreneurship is not tailored to the specific needs and resources unique to rural areas. The ecosystem treats all businesses, regardless of their location, in the same way, and provides the same resources. This overlooks the importance of understanding the differences between rural and non-rural businesses and the value that rural areas bring to business development. Although these resources can ensure the success and profitability of new businesses, it is possible that they are not being used optimally for community or territorial development. It is important to recognize the importance of rooting in rural areas and creating value for the local community when developing new business initiatives.

Based on the analysis of several companies, it seems that the entrepreneurial ecosystem has a greater impact on new companies than on established ones. This impact remains the same regardless of factors such as gender, economic sector, location, or income level. The age of the company seems to be the only variable affected by the ecosystem, being more beneficial for young companies and less favorable for older ones. These findings raise concerns about whether the business ecosystem is truly aware of the needs and circumstances of the region's business community for its long-term sustainability. It is not clear if the current resources are aligned with the socioeconomic reality of the area. The existing resources provided by the entrepreneurial ecosystem are not specific to rural companies since they do not affect the perception of companies as rural, the geographical criteria of rural municipalities, or the activity sectors of business initiatives. Therefore, the use of the term rural in entrepreneurship programs and measures would not be an effective reference to the description of rural entrepreneurship proposed in this research.

As a final conclusion, in order to fully understand rural entrepreneurship, it is important to consider the connection between the people who start a business initiative and the area in which they are located. This goes beyond the specific industry or the size of the rural community. Our research has shown that a sense of connection and belonging to the community is a crucial factor in the success of rural businesses, even when the region's socioeconomic conditions may not be ideal for viability.

It's important to assess the usefulness and impact of business ecosystem resources and allocate some of those resources to identifying and promoting authentic rural enterprises. The use of specific resources cannot be generalized for both rural and non-rural enterprises because their missions are different. This is especially important to promote and distinguish rural enterprises.

The research conducted has some limitations due to the size and scope of the sample. The sample size is relatively small, with only 89 companies being studied, which is not representative of all the companies in the region (5,785). Additionally, the research was conducted only in certain municipalities of the region under study and hence cannot be generalized to represent the entire region. However, the results of the study can be used to test the proposed hypotheses in other regions as well. For future research, it is planned to use a larger and more representative sample from other areas of the Extremadura region. We propose to further investigate each of the factors that constitute the global indicator, using RURAL as a measure to determine the extent of rurality of companies operating in rural areas. We will conduct a case analysis to identify and consolidate the unique characteristics that define rural entrepreneurship and expand our research to other rural regions in the Extremadura area. This approach will help us not only to reinforce the model but also to measure the level of rurality of various rural zones within the same region. We will analyze the factors that have the most significant influence, based on the area under consideration.

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Appendix

Questionnaire used in the research

1. Gender:

Male	Female

2. Location of the venture:

3. What town are you originally from?

4. Age (business):

< 2 years old	2-5 years old	5-10 years old	> 10 years old

5. Economic sector:

Agriculture and livestock sector	Industrial sector	Construction sector	People services sector	Business services sector	Other

6. Do you consider your business to be a rural business (perception of rurality)?

Yes	No

7. Indicate the (main) reason why you decided to create your venture:

8. To what extent has creating value and contributing to the socioeconomic development of your local community been a factor in your decision to start a business?

Not important	Less important	Neutral	Important	Very important

9. To what extent did your ties and roots with your local community influence the start of your business?

Not important	Less important	Neutral	Important	Very important

10. Could you say that a high percentage of your customers are from your local community?

Totally disagree	In disagreement	Neutral	In agreement	Totally agree

11. Could you say that a high percentage of your providers and supports are from your local community?

Totally disagree	In disagreement	Neutral	In agreement	Totally agree

12. Could you say that the resources of the place you use (tangible such as raw materials or intangible such as the landscape) are essential to develop your activity, and that it could not move forward without them?

Totally disagree	In disagreement	Neutral	In agreement	Totally agree

13. Do you think your business would do well if you moved to an urban location?

Totally disagree	In disagreement	Neutral	In agreement	Totally agree

14. Do you have any employees on your work team?

Yes	No

15. If you have employees where do those people come from?

All people are from outside the region	More than 50% of the people are not from the region	50% is from the region and 50% is from outside the region	More than 50% of the people are from the region	All people are the region

16. Do you think there are sufficient public policies and measures to support small and medium-sized businesses in your local community?

Totally disagree	In disagreement	Neutral	In agreement	Totally agree

17. Compared to other companies in your municipality or region, to what extent have these policies driven your business from the beginning to today?

Nothing	Bit	Something	Quite	A lot

18. Do you consider that the entrepreneurial ecosystem favors the emergence of new ventures in your local community?

Totally disagree	In disagreement	Neutral	In agreement	Totally agree

19. Compared to other companies in your municipality or region, to what extent has the entrepreneurial ecosystem favored your business to date?

Nothing	Bit	Something	Quite	A lot

20. Do you consider that there are sufficient financial resources (aid, credits, bonuses...) to support the creation and consolidation of small and medium-sized businesses in your local community?

Totally disagree	In disagreement	Neutral	In agreement	Totally agree

21. Comparing your company with other companies in the municipality or region, to what extent has your business used, or does it use, these resources to boost its activity to this day?

Nothing	Bit	Something	Quite	A lot

22. Do you consider that the market layout (customers, suppliers, local community...) in your region favors the creation of new small and medium-sized businesses, and consolidates existing ones?

Totally disagree	In disagreement	Neutral	In agreement	Totally agree

23. Making a comparison with other companies in your municipality or region, to what extent has the market in your region favored your business to date?

Nothing	Bit	Something	Quite	A lot

24. Do you consider that entrepreneurial values and culture exist in your local community?

Totally disagree	In disagreement	Neutral	In agreement	Totally agree

25. En comparación con otros/as empresarios/as de su municipio o región, ¿hasta qué punto considera usted que cuenta con valores y cultura emprendedora?

Nothing	Bit	Something	Quite	A lot

26. Do you think there is enough public and private support (incubators, consultancies, business groups...) in your local community to start a business and/or consolidate a business in operation?

Totally disagree	In disagreement	Neutral	In agreement	Totally agree

27. Regarding initial financing for starting your business, what type of financing did you use to create your company?
Own resources:

Less than 20%	20% - 40%	40% - 60%	60% - 80%	More than 80%

External resources from financial entities in the region (bank loans):

Less than 20%	20% - 40%	40% - 60%	60% - 80%	More than 80%

External resources from family, friends or others in the region:

Less than 20%	20% - 40%	40% - 60%	60% - 80%	More than 80%

Municipal, regional or regional aid and/or subsidies:

Less than 20%	20% - 40%	40% - 60%	60% - 80%	More than 80%

Other financial resources:

Less than 20%	20% - 40%	40% - 60%	60% - 80%	More than 80%

28. Today, what is the approximate annual income of your business?

<€50,000	€50,000 and €150,000	€150,000 and €300,000	€300,000 and €500,000	>€500,000

Biographical notes

Cristina Candelario-Moreno, MSc, Project Manager at Fundación Maimona, (Extremadura, Spain). Lecturer and a junior researcher specializing in entrepreneurship and rural development, with extensive professional experience in developing regional entrepreneurship and social innovation projects in Extremadura. Additionally, she advises entrepreneurs working in the rural sector. She is an approved lecturer by the Government of Extremadura and has participated in the expert panel of the Global Entrepreneurship Monitor of Extremadura for several years. Her research interests are focused on rural entrepreneurship and the entrepreneurial capacity of people in rural environments.

María Isabel Sánchez-Hernández, Ph.D., Economist, lecturer and researcher, specializing in Corporate Social Responsibility and Sustainability for Regional Development. Her research interests range across several key areas within Applied Economics and Business Organization. She has published in first position top-journals indexed in Web of Science (WOS) and has taken part in numerous research projects related to her areas of interest. She has wide professional experience in an international context and is former member of the Advisory Committee of Science and Technology of the Government of Extremadura and the Observatory of Entrepreneurship Culture (Extremadura, Spain). In addition, she is former member of the Iberdrola Chair in Economic and Business Ethics at the Comillas Pontifical University (Madrid, Spain), and leads the international expansion of the International Association of Public and Non-profit Marketing (IAPNM). She has an extensive background in the cooperative field, being a member of the Researcher Register of CIRIEC (International Centre for Research and Information on the Public, Social and Cooperative Economy).

Authorship contribution statement

Cristina Candelario-Moreno: Conceptualization, Data Curation, Investigation, Methodology, Resources, Supervision, Validation, Writing – Original Draft. **María Isabel Sánchez-Hernández:** Conceptualization, Formal Analysis, Investigation, Methodology, Resources, Supervision, Validation, Writing – Review & Editing.

Conflicts of interest

The authors declare no conflict of interest.

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Making of intrapreneurial managers: Investigating unethical behavior, risk-taking, and decision-making speed as antecedents

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Abstract

PURPOSE: *The entrepreneurship-ethics nexus draws considerable interest from researchers and practitioners with little resolution. Our purpose with this paper is to contribute to the debate by shedding light on the relationship between managers' attitudes toward unethical behavior and their subsequent entrepreneurial intention (EI) in an emerging economy context. Given the complex and multifaceted interplay between unethical behavior and EI, we extend our investigation by including decision-making speed and attitude toward risk to explain the relationship further. We take a granular approach to facets of unethical behavior to gain deeper insights into the specificity of influences they pose on subsequent behavioral intentions.* ***METHODOLOGY:*** *Primary data were collected from 214 Kosovan managers employed in companies from different industries. Hypothesized relationships were tested by conducting hierarchical regression analyses.* ***FINDINGS:*** *Our results indicate that managers with higher EI are not necessarily unethical overall. We did not find support for the hypothesis that managers with stronger attitudes toward unethical behavior demonstrate higher entrepreneurial intentions. Focusing on dimensions of unethical behavior, we find that managers who favor bribery are more entrepreneurially inclined. Furthermore, we find that managers who are quick decision-makers and risk-takers express higher EI.* ***IMPLICATIONS:*** *Theoretically, we add to the existing body of research on ethics and entrepreneurship by empirically examining the relationship between attitude toward unethical behavior and EI and the viability of the Theory of Planned Behavior as a framework for integrating unethical behavior in entrepreneurship research. Our study affirms the extension of the theoretical and empirical underpinnings concerning ethics and entrepreneurship, contemplating that they are pervasive across contexts. We provide important practical implications for managers, especially in the corporate entrepreneurship and training context. Managers are encouraged to foster an entrepreneurial-friendly environment that abides by ethical standards. Our study also informs policymakers of the importance of formal education on entrepreneurship as a mechanism to enforce ethical awareness in future entrepreneurs and intrapreneurs.* ***ORIGINALITY AND VALUE:*** *This study is among the first attempts to test the relationship between unethical behavior and EI in a managerial sample and non-western context.*

Keywords: *entrepreneurial intention, unethical behavior, bribery, risk-taking, decision-making speed, intrapreneurial managers, entrepreneurship-ethics nexus, hierarchic regression analysis, corporate entrepreneurship, theory of planned behavior, ethical standards, entrepreneurship*

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INTRODUCTION

Ever since McClelland (1961) contemplated what determines the ethical behavior of entrepreneurs, the topic of ethics has appeared recurrently in entrepreneurship research. In the early days of entrepreneurship, when entrepreneurs were considered solely profit-driven risk-takers (Brockhaus, 1987), entrepreneurship and ethics were oxymoronic (Blockson, 2012). However, the move toward a ‚more-than-economic' interpretation of entrepreneurship (Dey & Steyaert, 2015) has laid the riverbed for these two research streams to unite. Lately, there has been growing interest in bridging the fields of entrepreneurship and business ethics (for reviews, see Hannafey, 2003; Harris, Sapienza, & Bowie, 2009; Vallaster, Kraus, Lindahl, & Nielsen, 2019). There is a growing consensus that the entrepreneurship-ethics liaison has moved from an intense love-hate relationship (Fisscher, Frenkel, Lurie, & Nijhof, 2005) into a consolidated one.

Research has predominantly focused on examining entrepreneurs' inclinations and their involvement in unethical behaviors (for a review, see Vallaster et al., 2019). However, the converse perspective, or how unethical behaviors may influence individuals' propensity to become entrepreneurs, has largely been overlooked. Unethical behaviors can impact an individual's reputation, prompting them to consider entrepreneurship a viable alternative to traditional employment, where a stained reputation could limit opportunities. Our study builds upon Bird's (1988, 2015) work on EI. By revisiting her intention model of entrepreneurship, Bird (2015) emphasizes the need for future research to incorporate patterns prevalent in today's world that shape EI. According to the author, investigating temporal tensions and urgencies stemming from competition or financial pressure that might push individuals to act in unethical ways in their entrepreneurial endeavors might be a promising research avenue.

The business ethics literature has been deprived of a theoretical grounding to guide research on unethical behaviors (Grover, 1993). Several underpinnings have been proposed; however, most studies are conducted without any theoretical grounding. The theoretical underpinning of this study is situated at the confluence of the scholarly discourse on unethical behavior and entrepreneurial decision-making and intentions. For this research, we dwell on the theory of planned behavior (TPB), which has been used considerably in unethical behavior literature (Kantor & Weisberg, 2002).

The TPB model has been attested as useful in explaining the attitude-intention-unethical behavior relationship (Chang, 1998). We include attitude toward unethical behavior as the attitude in our TBP framework, which has been previously evidenced in research (Kantor & Weisberg, 2002). As we rely on the theory rather than the model, we tread the established practice in research of modifying TPB (Sparks & Guthrie, 1998). Namely, we use attitude toward risk and a measure of decision-making speed as a facet of self-efficacy as drivers of entrepreneurship as well. TBP guides most studies concerning entrepreneurial intention (EI), the independent variable in our model (Rueda, Moriano, & Liñán, 2015). Following TPB, we can expect individuals to choose to engage in unethical behaviors based on their beliefs about the behaviors and their expectation of a positive outcome after engaging in such behavior (Harding, Mayhew, Finelli, & Carpenter, 2007).

Thompson (2009, p. 676) delineates EI as a "self-acknowledged conviction by a person who intends to set up a new business venture and consciously plans to do so at some point in the future." Nevertheless, besides new venture creation, EI also involves new value creation in existing ventures (Bird, 1988), known as corporate entrepreneurship and intrapreneurship (Kuratko, Ireland, & Hornsby, 2004).

Corporate entrepreneurship and intrapreneurship are prevailing concepts employed in the literature to describe entrepreneurial undertakings within existing organizations (Blanka, 2019). Unlike corporate entrepreneurship or pursuing new endeavors from an organizational perspective, intrapreneurship is a bottom-up process initiated at the individual level (Sinha & Srivastava, 2013).

Concerning our independent variables, unethical behavior is defined as individuals' attitude toward engaging in morally unacceptable or illegal actions to the larger community (Jones, 1991). Following Forbes (2005), we refer to decision-making speed as how quickly managers make decisions inherent in their individual characteristics. Whereas attitude toward risk-taking represents individuals' preference toward engaging in highly uncertain activities (Dohmen et al., 2011).

An extended body of knowledge on entrepreneurship has been developed by focusing on intention as a proxy for subsequent behaviors (Ajzen, 1991). Nonetheless, only a few studies focus on the intentions of managers to act entrepreneurially as corporate entrepreneurs/intrapreneurs. The first endeavor to reconcile ethical behavior and corporate entrepreneurship is that of Chau and Siu (2000). The authors purport that organizational characteristics of the entrepreneurial environment temper the environmental adversity toward unethical behavior. This firm-level approach has prevailed in successive studies concerning ethical aspects of corporate entrepreneurship. Vallaster et al. (2019) find no

occurrence of corporate entrepreneurship or intrapreneurship in their bibliometric analysis of ethics in entrepreneurship research. This suggests that corporate entrepreneurship/intrapreneurship and ethics are largely unexplored in research. The first-ever review on the entrepreneurship-ethics nexus calls for further research on the ethics constructs and intrapreneurship (Hannafey, 2003). We respond to this call by examining the EI of managers associated with individual unethical workplace behaviors in a non-Western context.

Our study is particularly important given the context in which it is placed. Post-socialist emerging economies differ from other contexts in the sense that the borders between the private and the public spheres are blurred (Takacs Haynes & Rašković, 2021). The institutional environment in non-Western, emerging economies provides more opportunities for organizational misconduct and unethical behavior (Anand, Rottig, Parameswar, & Zwerg-Villegas, 2023). When employees perceive an inefficient and bureaucratic institutional environment, corruption or bribery become circumventing mechanisms to bring intrapreneurial or entrepreneurial ideas to life (Sánchez-Vidal, Ramón-Llorens, & La Rocca, 2024).

This paper purports a fivefold distinctive contribution to the existing body of research. First, we investigate how ethical behavior affects the EI of managers. Prior theorization and research considered ethical or moral aspects as dependent variables influenced by entrepreneurship constructs (Chau & Siu, 2000). Second, we assess the entrepreneurial intention instead of social entrepreneurial intention, which has dominated the intention-based studies of entrepreneurial ethics (Choi et al., 2021). Third, we conducted the study with a managerial sample, assessing how their ethical behavior affects their intrapreneurialism. Most studies relating personal values to entrepreneurship use student samples (Hueso, Jaén, & Liñán, 2021), making the representativeness and comparisons questionable. Fourth, our study evades the overwhelming normative and descriptive approach to studying ethics at the individual level (Alzola, 2011). Instead, we take a more applied ethics approach, explaining how attitude toward unethical behavior influences intentions. Attitudes have strong predictive power due to their nature as less stable, changing across time and situations, and being more domain-specific (Robinson, Stimpson, Huefner, & Hunt, 1991). Through attitudes (toward unethical behavior, toward decision speed, toward risk), we purport to predict (entrepreneurial) intentions, which in turn are considered the best predictors of (entrepreneurial/intrapreneurial) behavior (Krueger Jr, Reilly, & Carsrud, 2000). Fifth, we investigate the ethical behavior-EI nexus in the developing economy context of Kosovo, an Eastern European country. Entrepreneurship and ethics research has been largely inattentive to the emerging economies context (Ahmad & Ramayah, 2012).

LITERATURE REVIEW

Entrepreneurship and ethics are two of the most discussed issues in business nowadays (Kuratko & Goldsby, 2004). Management scholars have found an unequivocal resemblance between ethics and entrepreneurship. Solymossy and Masters (2002) find striking similarities between the characteristics of entrepreneurs that distinguish them from non-entrepreneurs and ethical behaviors concerning moral issues individuals face. Similarly, Buchholz and Rosenthal (2005) posit that entrepreneurial and ethical behavior require the same qualities: imagination, creativity, novelty, and sensitivity. According to Brenkert (2002), ethical aspects of entrepreneurship are studied at the micro, meso, and macro levels. Notwithstanding, ethical entrepreneurship research has little theoretical and conceptual robustness (Vallaster et al., 2019). While theoretical underpinnings from both fields have been transcended to explain the phenomena in ethical entrepreneurship research (Chau & Siu, 2000), theoretical and empirical contributions twining EI and ethics are scarce (Tipu & Ryan, 2016). Harris et al. (2009) purport that most of the research focuses on the micro-level, with considerable attention devoted to individual differences that influence ethical behavior differences among entrepreneurs and non-entrepreneurs. One line of research focuses on differences between entrepreneurs and managers concerning ethical values, attitudes, and behaviors (Bucar, Glas, & Hisrich, 2003; Bucar & Hisrich, 2001; Carland III, Carland Jr, Carland, & Pearce, 1995).

Managers are the main bearers of corporate entrepreneurial activities, coordinating resources, interacting with customers, and creating new markets (Kuratko, 2017). Entrepreneurially-oriented managers are also an important resource for firms seeking to survive in dynamic environments (Clark, Pidduck, Lumpkin, & Covin, 2024). Building on the independent entrepreneurship literature, researchers have identified demographic and personal characteristics as key individual factors for engagement in entrepreneurship within organizations as well. Specifically, the review by Urbano, Turro, Wright, and Zahra (2022) emphasizes attitudes and emotional factors, including risk-taking, willingness to change, and self-evaluation, as central for inbound entrepreneurship. This is also mirrored in the measurement of entrepreneurship within existing organizations; risk-taking, proactiveness, and innovativeness are considered the three main components of intrapreneurship at the individual level (Rigtering & Weitzel, 2013).

Focusing on organizational characteristics, Sebora and Theerapatvong (2010) show that managerial risk-taking is associated with firm size and organizational support for entrepreneurial initiatives. In the same vein, Hornsby, Kuratko, and Zahra (2002) postulate that the availability of resources and a supportive environment for innovation foster managers' attitudes towards risk-taking and intrapreneurship. Carland III et al. (1995) found that small business owners and managers have similar attitudes toward risk-taking.

Although risk is usually calculated and shared in intrapreneurship (Antoncic & Hisrich, 2001), managers still have to anticipate changes, acquire funding quickly, and secure support for their ideas (De Jong & Wennekers, 2008). Hence, decision speed and risk-taking are key features that enable managers to have the first-mover advantage in the workplace, identifying and capitalizing on good opportunities long before others can.

Exerting EI implies promptness and precariousness in seizing opportunities, which inherently raises moral dilemmas. The existing literature exemplifies a close relationship between EI, decision-making speed, and risk-taking, as they all share a cognitive base (Barbosa, Gerhardt, & Kickul, 2007; Bommer, Gratto, Gravander, & Tuttle, 1987; Brigham, De Castro, & Shepherd, 2007). Entrepreneurship constructs like EI have been tested with decision speed and risk-taking variables (Talaulicar, Grundei, & Werder, 2005). However, to the best of our knowledge, ours is the first instance that these variables are jointly tested in a model.

Decision-making speed has been considered the culprit of unethical behavior (Jenni & Lewis, 2019). Authors consider that in the current environment characterized by turbulence and rapid changes, leaders are required to make decisions on the spot. This, in turn, requires self-awareness and strong values as the foundation to rely on when speedy decisions are required without compromising values (Jenni & Lewis, 2019). On a similar note, Evans and Rand (2019) postulate that decision speed can be used to understand the underlying processes of human cooperation in confronting the challenges of unethical behavior and corruption.

Numerous studies have shown that people facing time limitations make riskier decisions (Chandler & Pronin, 2012). Kirchler et al. (2017) have tested the decision-making speed-risk-taking hypothesis in a gain-and-loss domain setting experiment. Their results suggest that speedy decision-making leads to less risk-taking in the gain domain and more in the loss domain.

In the following sections, the literature is analyzed, and hypotheses are developed. Our principal research focus lies in answering whether attitude toward unethical behavior influences EI. However, based on the argument below, we complement our central hypothesis and propose that decision-making speed and risk-taking influence EI in the same direction as unethical behavior.

Entrepreneurial intention and decision-making speed

Decision-making speed and other related constructs have found traction in career development literature (Gadassi, Gati, & Dayan, 2012; Lent & Brown, 2020). Decision speed has been primarily used to operationalize self-efficacy (Chuang, Lee, & Kwok, 2020). Drawing from vocational research, organizational scientists have imported decision-making speed construct, making it a significant topic of interest in strategic decision-making and entrepreneurship research (Talaulicar et al., 2005). Entrepreneurship results from the synergy between an individual and a project (Fayolle, 2004), and it depends on individuals' decisions on how to undertake that project (Shane, Locke, & Collins, 2003). Previous empirical research shows that self-efficacy is indeed related to both entrepreneurial and intrapreneurial intentions (Douglas & Fitzsimmons, 2013). According to Adam and Fayolle (2015), even individuals with strong intentions will only act entrepreneurially if they recognize the opportunity and act at the right time, confirming the role of decision-making speed in the entrepreneurial process. Notwithstanding, the relationship between decision-making speed and entrepreneurial venture creation is poorly understood (Capelleras, Greene, Kantis, & Rabetino, 2010). Therefore, we respond to the call for further understanding of how decision-making speed operates in the emergence of EI.

Eisenhardt (2008) reports that rapid decision-making is associated with higher opportunity attainment and effective firm performance. Whereas focusing on the individual level, Forbes (2005) investigated how managers' characteristics influence strategic entrepreneurial decision-making. The author found that managers of older cohorts with prior entrepreneurial experience make faster decisions.

In their pursuit to elucidate the interplay between decision-making speed and EI, Shepherd, Williams, and Patzelt (2015) hold that the uncertainty associated with entrepreneurship and the lack of adequate information induces entrepreneurs in faster decision-making to respond to emerging challenges or opportunities. Along the same line, Wang, Li, Zhou, and Lan (2020) confirm that opportunity identification is an essential characteristic that induces entrepreneurs to make quick

decisions. Specifically, uncertainty and ambiguity promote the use of heuristics (Bryant, 2006) and intuition (Alvarez & Busenitz, 2001), which allows entrepreneurs to act quickly and capitalize on novel opportunities. Consequently, time pressure, which propels speedy decisions, negatively influences ethical behaviors (Bellé & Cantarelli, 2017).

To sum up, rapid decision-making and risk-taking are distinguished as the most salient characteristics of managers who need to make quick decisions on a tight schedule (Adams, 1974). Specifically, entrepreneurs take risks and make quicker decisions to seize emerging opportunities (Busenitz, 1999). Supporting these views, Wally and Baum (1994) also found that CEOs who use intuition have high cognitive abilities, tolerance for risk, propensity to act, and make speedy decisions. Previous theorization and research have relied on TBP as the theoretical underpinning in explaining the relationship between decision speed and outcomes (Meng & Choi, 2016). Dwelling on the self-efficacy component of TPB as an antecedent of intentions and its confluence with decision-making speed, the following hypothesis is posited:

H1: Decision-making speed is positively related to managers' entrepreneurial intention.

Entrepreneurial intention and attitude toward risk-taking

Attitude toward risk-taking is contemplated as the single-most differentiating characteristic of entrepreneurs (Brockhaus Sr, 1980) and a significant predictor of EI (Barbosa et al., 2007). Employing student samples, previous research (Ang & Hong, 2000; Gürol & Atsan, 2006) revealed that participants with stronger attitudes toward risk-taking are more entrepreneurially inclined. Further empirical work has confirmed the positive association between risk-taking propensity and EI among intrapreneurial managers (Lajçi, Berisha, & Krasniqi, 2022).

Extant research has shown that risk-taking is also a significant determinant of intrapreneurship (Antoncic, 2003). Douglas and Fitzsimmons (2013) found that attitudes toward income, ownership, and autonomy relate to EI, whereas risk-taking relates to intrapreneurial intentions. Entrepreneurs consider risk as given; therefore, they focus on controlling the outcomes regardless of the level of risk by assuming greater personal responsibility (Sarasvathy, Simon, & Lave, 1998). Compared to entrepreneurs, intrapreneurs tend to share the risk with their firms (Razavi & Ab Aziz, 2017) and take calculated risks (Kuratko & Hodgetts, 2001).

Further empirical work confirms this proposition (Hornsby et al., 2002; Sebora & Theerapatvong, 2010), outlining the importance of individual and organizational characteristics that nurture risk-taking-entrepreneurship nexus. For instance, Li and Liu (2008) found that individuals with a higher level of intuition are more risk seekers, implying an association between decision-making speed and risk-taking. Whereas P. Zhang, Wang, and Owen (2015) attest that individuals with a short-time risk-taking preference value passion-driven over rational long-term planning to avoid the possibility of ‚missing the boat.'

To sum up, in an entrepreneurial setting, comprehensive analysis of the consequences and risk probabilities is generally too time-consuming; therefore, individuals act quickly and accept a greater risk (Busenitz, 1999). Given that risk-taking attitude is the single-most used attribute of entrepreneurial individuals and attitude is a factor predicting behavioral intention according to TPB, we rely on this theoretical underpinning to inform our following hypothesis:

H2: Attitude toward risk-taking is positively related to managers' entrepreneurial intention.

Entrepreneurial intention and attitude toward unethical behavior

The central hypotheses in the entrepreneurial ethics scholarship are that entrepreneurs possess characteristics that are crucial to ethical behaviors (Buchholz & Rosenthal, 2005) and place a greater emphasis on ethical behavior (Bucar & Hisrich, 2001) or that entrepreneurs are action-oriented and, therefore, fail to consider ethical issues adequately (Bhide, 1996). Previous research pertaining to the second perspective (Brenkert, 2009; Z. Zhang & Arvey, 2009) depicts entrepreneurs as rule breakers and examines ethical tensions generated by entrepreneurial rule-breaking. We examine the role of unethical behavior among managers while pursuing entrepreneurial activities in the organization. Following the established practice of operationalizing the attitude toward unethical behavior of managers with dimensions of workplace ethics, we utilize Newstrom and Ruch's (1975) scale. Attitude-based models are the best predictors of individual-level behavioral intentions and outcomes in organizational research (Woznyj, Banks, Whelpley, Batchelor, & Bosco, 2022). Attitudes are the most valuable constructs for understanding entrepreneurship and intrapreneurship (Douglas & Shepherd,

2002; Neessen, Caniëls, Vos, & de Jong, 2019). Hence, we rely on an attitude toward unethical behavior construct to operationalize individual unethical behavior (Kantor & Weisberg, 2002).

Lundmark and Westelius (2012) purport that entrepreneurship is associated with challenging the status quo, which implies misbehavior at the individual level and risk-bearing at the firm level. Drawing from entrepreneurial success stories that spurred from some misbehavior, authors conclude that defiance of norms has given life to many innovations by corporate entrepreneurs. In the face of resistance, they will either cease or exit.

According to Peixoto, Gouveia, Sousa, Faria, and Almeida (2023), entrepreneurs are more tolerant of unethical behaviors than non-entrepreneurs. Yu, Wang, Zheng, and Shi (2020) portray entrepreneurs as narcissists who tend to behave unethically in order to benefit their firms and achieve self-fulfillment. Given the limited resources and dynamic environment in which new ventures operate, entrepreneurs must adapt, act quickly, and ‚cut corners,' which in turn encourages unethical manifestations (Baron, Zhao, & Miao, 2015). They will not hesitate to act unethically to save their business, provided they remain undiscovered (Gurău, 2020). Moreover, entrepreneurs are pragmatic and success-driven, which explains their tendency to act opportunistically, striving for personal success (Fassin, 2005). Entrepreneurs are focused on direct financial gain (Hannafey, 2003), even if it comes at the expense of others (Longenecker, McKinney, & Moore, 1988).

Previous research has investigated the interplay between ethical attitude/behavior and creativity and innovation as two of the most salient characteristics of entrepreneurs (Zhang & Arvey, 2009). Mai, Zhang, and Wang (2019) investigated the effect of entrepreneurs' ethicality concerning product innovation of new ventures. The authors discovered that entrepreneurs with low levels of moral awareness tend to be more individually creative, whereas entrepreneurs with high levels of ethical behavior can make founding teams more creative. Comparing entrepreneurs' and managers' ethical attitudes and standards, Bucar and Hisrich (2001) found that entrepreneurs place a greater emphasis on ethical behavior due to higher equity stakes and risk assumed. As employees shift towards intrapreneurship or entrepreneurship, the relationships with different stakeholders encounter dilemmas that can have ethical ramifications (Dees & Starr, 1992). Considering the attitude towards unethical behavior as an attitudinal factor of our modified TBP framework and drawing on the literature review on unethical attitudes and behavior, the following hypothesis is formulated:

H3: Attitude toward unethical behavior is positively related to managers' entrepreneurial intention.

Six predictors are used as subscales of unethical behavior: personal use, passing blame, bribery, falsification, padding expenses, and deception. *Personal use* refers to using company resources or time for personal purposes; *Passing blame* is defined as shifting responsibility for errors onto others to avoid consequences; *Bribery* involves giving gifts or favors in exchange for preferential treatment or accepting such benefits to gain an advantage; *Falsification* refers to the act of falsifying time, quality, or quantity reports and authorizing subordinates to violate company rules; *Padding expenses* is the act of inflating expenses to claim higher reimbursements; *Deception* encompasses actions like taking longer than necessary to complete a job, divulging confidential information, and failing to report violations of company policies. As a summary, the conceptual framework incorporating all study variables is presented below (Figure 1). Subsequently, a finer-grained literature analysis is provided on the role of different unethical behavior aspects on EI.

We posit that each of the six unethical behavior dimensions, as measured by the Newstrom and Ruch (1975) scale, could affect the EI of managers differently. Given the struggles to initiate new ventures due to difficulty obtaining external funding, the entrepreneurial ecosystem becomes a breeding ground for unethical behaviors (Peixoto et al., 2023). This holds especially for the Eastern European context, where individuals have been associated with a higher propensity to cheat (Teixeira & Rocha, 2010), building fortune quickly without considering ethical considerations in the absence of regulations (Fassin, 2005), even accepting bribery and corruption as a norm in doing business (Soulsby, Remišová, & Steger, 2021). Especially in the Western Balkan context, unethical practices are considered business-as-usual. A report by UNODC (2013) reiterates that in the Western Balkans, only 1.5 percent of bribes are reported to authorities. Meanwhile, in 43 percent of bribery cases, business representatives offer bribes without or before being asked or implied to do so. Narrowing the focus in Kosovo, the Western Balkan country with the highest level of informality, a study by Krasniqi and Williams (2020) reports that entrepreneurs operating informally perceive a higher likelihood of achieving desired growth.

Indeed, the link between bribery and EI has been propounded by Liñán (Heuer & Liñán, 2013), the author of the EI measure used in our study (Liñán & Chen, 2009). Moreover, individuals with EI might have a positive attitude toward misbehaving in situations, given that they can obtain some advantage (Cruz, Sousa, & Wilks, 2015). Wu (2002) found that

padding expenses is a more accepted ethical behavior among general small and medium enterprises (SMEs), compared to the study-focus outstanding SMEs (top 20 Taiwanese SMEs with high ethical depth). In a study of Jordanian business managers, Al-Shaikh (2003) unveils that padding expenses is the least acceptable practice.

Overwhelmingly, studies relating entrepreneurship with unethical behavior operationalize and refer to the latter in general terms. We endeavor to understand the interplay between EI and different dimensions of unethical behavior. Therefore, the following hypotheses are developed:

H3a: Personal use is positively related to managers' entrepreneurial intention.
H3b: Passing blame is positively related to managers' entrepreneurial intention.
H3c: Bribery is positively related to managers' entrepreneurial intention.
H3d: Falsification is positively related to managers' entrepreneurial intention.
H3e: Padding expenses is positively related to managers' entrepreneurial intention.
H3f: Deception is positively related to managers' entrepreneurial intention.

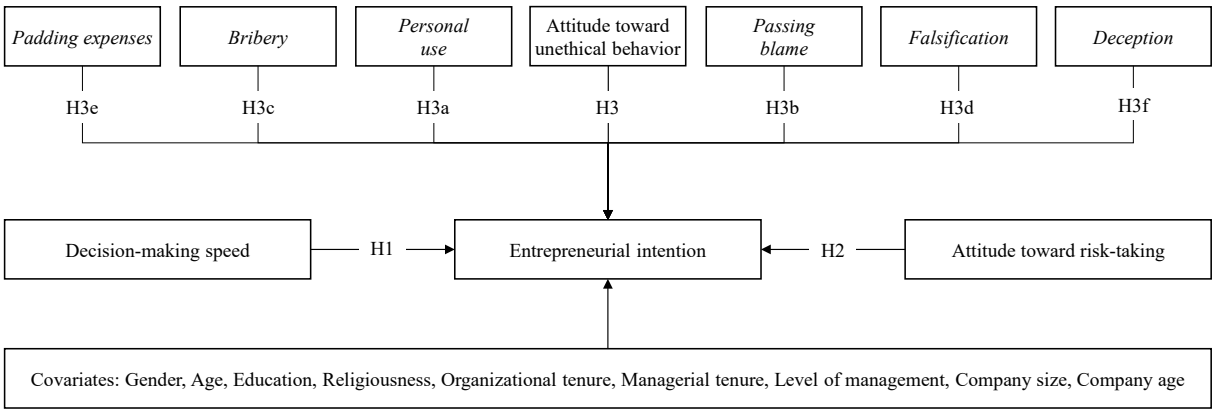

Figure 1. Conceptual model

METHODOLOGY

Data collection and participants

In conducting this research, we aimed to investigate managers' entrepreneurialism in a context where it is important for both the country's development and individuals' career paths. Kosovo, an economically and culturally transitioning country with one of the fastest-growing economies in the Western Balkans (Mara, 2020) and one of the youngest populations in Europe (World Bank, 2019), was a population suited to test our hypotheses. Within this environment, managers emerge as central figures and are often considered the ‚usual suspects' in exerting innovation and intrapreneurship (Kör, Wakkee, & van der Sijde, 2021). Following these arguments, we addressed managers as our survey's target informants.

The present research is part of a larger study of individual differences as predictors of organizational practices of managers. Primary data is collected through self-report questionnaires, and the respondents were managers of Kosovan companies varying in size and industry. Using a database or a membership list provided by Kosovo's Chamber of Commerce, we targeted 256 companies randomly, and 140 responded positively, permitting us to contact and survey managers. Since our study focused on individual instead of firm level, our inquiry implied that we wanted to survey individuals in managerial positions. Because no sampling frame for managers exists in Kosovo, non-probability sampling is used (Cumming, 1990).

To avoid biases and the dominance of a handful number of companies, we targeted surveying up to a maximum of ten participants per company. Upon acceptance by the HR managers or CEOs of companies participating in the study, questionnaires were dropped off to managers personally. Nevertheless, the maximum threshold of ten respondents per company was not always reached. This happened because some of the participating companies had less than ten employees in managerial roles. From 140 companies responding positively to participate in the study, we were able to distribute 400 questionnaires.

The survey consisted of demographic questions and self-report measures adopted by previous research. A back-translation procedure was followed to ensure the appropriate translation of the items into Albanian (Brislin, 1970). Out of 400 distributed questionnaires, 261 responses were received (65.3% return rate). Forty-seven questionnaires were discarded due to missing data, resulting in 214 valid questionnaires. This means that the number of respondents from 140 companies participating in the study ranged from 1 to 10. On average, this is translated as less than two respondents per company, underscoring our commitment to ensuring a diverse and representative sample in our study.

Table 1 presents the demographic characteristics of the respondents. The sample comprised 214 respondents (76.2% male; 23.8% female). Almost the majority of respondents (48.1%) are between 18 and 34 years old, followed by age 35-44 (29.0%), age 45-54 (18.2%), and age 55+ (4.7%). Concerning education, managers in possession of a university degree (Bachelor's, Master's, PhD) make up 83.2% of the sample, followed by those with an associate degree (9.3%) and high school diploma (7.5%).

Table 1. Demographic characteristics

	N=214	%
Gender		
Female	51	23.8
Male	163	76.2
Age		
18-24 years old	23	10.7
25-34 years old	80	37.4
35-44 years old	62	29.0
45-54 years old	39	18.2
55+ years old	10	4.7
Education		
High School	16	7.5
Associate degree	20	9.3
Undergraduate (BA; BSc)	102	47.7
Graduate (MA; MSc)	66	30.8
Doctorate (PhD)	10	4.7
Organizational tenure		
Less than 1 year	21	9.8
1-3 years	44	20.6
4-6 years	39	18.2
7-9 years	29	13.6
10+ years	81	37.9
Managerial tenure		
Less than 1 year	12	5.6
1-3 years	44	20.6
4-6 years	49	22.9
7-9 years	34	15.9
10+ years	75	35.0
Level of management		
Low-level management	23	10.7
Middle-level management	63	29.4
Top-level management	128	59.8

Measurement of variables

Entrepreneurial intention. The EI of managers was measured using six items from the Entrepreneurial Intention Questionnaire (EIQ) developed by Liñán and Chen (2009). A sample item is *"My professional goal is to become an entrepreneur"* (1=strongly disagree to 5=strongly agree). The coefficient alpha (α) of the scale in this study was 0.88. The complete item list of EI is represented in the Appendix (Table 1a).

Decision-making speed. The decision-making speed of managers was assessed using one item from Casey's Decision-making Speed Scale (CDMSS; Casey, 2006). The item was "*I consider myself a quick decision maker*." The respondents were asked to report their level of agreement with the statement using a five-point Likert scale (1=strongly disagree to 5=strongly agree).

Attitude toward risk-taking. Five items from Dahlbäck's (1990) scale measured managers' attitudes toward risk-taking. This is among the only scales measuring attitude toward risk-taking as an individual difference. However, due to its low reliability (α=0.53), the scale was considered a potentially faulty index. This led to the use of only one item, which is reasonably close to the general risk-taking question developed by Dohmen et al. (2011). The item was *"I often dare to do risky things which other people are reluctant to do ."*Each respondent was asked to self-report the pertinency of this statement (false=1 point; true=2 points) (Palmer et al., 2013).

Attitude toward unethical behavior. Newstrom and Ruch's (1975) Ethical Behavior Scale (NREBS) was used to assess the manager's attitude toward unethical behavior. The instrument consists of 17 common unethical behaviors that managers engage in. The measure comprises of the following six dimensions: personal use (e.g., *"Using company services for personal use"*), passing blame (e.g., *"Passing blame for errors to an innocent co-worker"*), bribery (e.g., *"Giving gifts/favors in exchange for preferential treatment"*), falsification (e.g., *"Falsifying time/quality/quantity reports"*), padding expenses (e.g., *"Padding an expense account more than 10%"*), and deception (e.g., *"Divulging confidential information"*). Respondents indicated their evaluation of their ethical behavior in terms of a five-point Likert scale with descriptive anchors (1=very unethical; 5=very ethical). An average score was generated from the 17 items to depict the likelihood of engaging in unethical behavior. The higher the score, the stronger the attitude toward unethical behavior is reported. As for the goal of this study, we employed both the composite NREBS score and its composing dimensions. The Cronbach's alpha (α) was 0.87 in the current study. Whereas for the six dimensions, alpha coefficients were 0.69 (personal use), 0.51 (passing blame), 0.88 (bribery), 0.63 (falsification), 0.73 (padding expenses), and 0.74 (deception). The complete item list of NREBS is represented in the Appendix (Table 1a).

Control variables. Drawing from the previous literature (Balog, Baker, & Walker, 2014; De Jong, Parker, Wennekers, & Wu, 2011; Hornsby, Kuratko, Shepherd, & Bott, 2009; Lajçi et al., 2022), we control for several individual and organizational characteristics that might explain the EI of managers. Namely, gender (0=female, 1=male), age (1=age 18-24, 2=age 25-34, 3=age 35-44, 4= age 45-54, 5=age 55+), education (0=non-university education, 1=university education), religiousness (1=not at all important, 5=very important), organizational and managerial tenure (1=0-3 years, 2=4-9 years, 3=10+ years), level of management (0=low/middle management, 2=top management), as well as company size (number of employees) and age (in years) were controlled for in this study.

Data analysis

As mentioned above, a non-probability sampling technique is used since no sampling frame for managers exists in Kosovo (Cumming, 1990). As is usual with non-random sampling, such methods can be prone to selection bias (Forster, 2001). Nevertheless, several ex-ante and ex-post remedies were performed to deal with this drawback and ensure data quality.

Our sample comes from 140 companies participating in the study, which, on average, means less than two respondents per company. The relatively large number of companies participating in the study indicates a diverse and representative sample in our study. Additionally, the response rate in our study (65.3%) is also a positive aspect. According to Galloway (2005), a well-constructed study using non-probability methods is comparably more valuable than a probability survey to which only 10% of the sample responded.

Further, to address the issue of common method variance, we assured respondents verbally and with a cover letter that the survey was anonymous and that the measures were independent (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). Moreover, the questionnaire sections were organized in such a way as to create psychological and sequential separation. After data collection, we performed Herman's single factor test, which showed that the percentage of variance was 20.43%, lower than the 50% threshold, implying that there is no common method bias (Fuller, Simmering, Atinc, Atinc, & Babin, 2016). In addition, we tested for multicollinearity using the variable inflated factor (VIF) in SPSS. The ratios range between 1.05 and 2.68, thus meeting the <4 cut-offs (Hair Jr, Page, & Brunsveld, 2019), which suggests that multicollinearity was not a problem in our estimation. Additional tests showed that our estimated models did not suffer from heteroscedasticity either.

Proceeding with further analyses, initially means, standard deviations, and correlations were calculated. Subsequently, hierarchical linear regression analysis was conducted to test our hypotheses. SPSS v29 was used for data analysis. To explore the association between control variables and EI, gender, age, education, religiousness, organizational tenure, managerial

tenure, level of management, company size, and company age are entered in the first step. In the second and third steps, managers' decision-making speed and risk-taking were entered, respectively. The fourth model included the total NREBS scale. Finally, in the fifth model, we exclude NREBS and analyze the six subscales of Enstrom and Ruch's (1975) instrument (personal use, passing blame, bribery, falsification, padding expenses, deception) to better understand their impact on EI.

In addition to control variables and unethical behavior measures, we include decision-making speed and risk-taking as two antecedents of EI to increase the model's explanatory power.

RESULTS

Table 2 includes the measured variables' means and standard deviations. Whereas Table 3 reports Pearson's correlation scores and reliability coefficients.

Table 2. Means and standard deviations

Variables	Mean	Standard deviation
Religiousness	3.30	1.18
Company size (number of employees)	172.88	54.53
Company age (in years)	13.76	10.24
Decision-making speed	2.34	1.13
Risk-taking	1.68	0.47
NREBS	1.56	0.50
Personal use	1.60	0.62
Passing blame	1.48	0.57
Bribery	1.74	1.09
Falsification	1.45	0.62
Padding expenses	1.27	0.53
Deception	1.77	0.80
Entrepreneurial intention	3.79	0.88

The correlation analysis reveals that EI is positively correlated with decision-making speed ($r=0.16$, $p<0.05$) and risk-taking ($r=0.14$, $p<0.05$). Meanwhile, the correlation between EI and NREBS shows no statistical significance. Of the correlations between the dependent variable and unethical behavior dimensions, EI positively correlates with personal use, bribery, and padding expenses. In contrast, it negatively correlates with passing blame, falsification, and deception. However, the correlation coefficients show no statistical significance.

Table 3. Pearson's correlations

Variables	1	2	3	4	5	6	7	8	9	10
1. Decision-making speed	–									
2. Risk-taking	-0.03	–								
3. NREBS	0.26**	-0.16*	(0.87)							
4. Personal use	0.14*	-0.04	0.74**	(0.69)						
5. Passing blame	0.16*	-0.09	0.72**	0.46**	(0.51)					
6. Bribery	0.33**	-0.12	0.69**	0.33**	0.33**	(0.88)				
7. Falsification	0.20**	-0.15*	0.79**	0.48**	0.61**	0.37**	(0.63)			
8. Padding expenses	0.10	-0.18**	0.64**	0.42**	0.48**	0.27**	0.59**	(0.73)		
9. Deception	0.18**	-0.17*	0.77**	0.41**	0.38**	0.55**	0.50**	0.34**	(0.74)	
10. Entrepreneurial intention	0.16*	0.14*	0.02	0.06	-0.01	0.08	-0.07	0.03	-0.01	(0.88)

Note: Internal consistency is provided along the diagonal; *p<0.05; **p<0.01.

Table 4 presents the hierarchical regression analysis results for managers' EI. As is usually the case with this type of analysis, control variables are included first. In model 1, age (β=-0.217, p<0.05), level of management (β=0.191, p<0.01), and company size (β=-0.136, p<0.05) significantly predicted EI, and it explains approximately 11% of the variability in the response variable (R^2=0.108, F (2.753), p<0.01). In the following two models, two important antecedents of EI are added. In the second model, decision-making speed (β=0.150, p<0.05) was entered, which is a statistically significant predictor of EI. The model explains 12.8% of the variance, which represents a modest improvement relative to model 1 (R^2=0.12.8, F (2.987), p<0.01). Additionally, model 3 included risk-taking. Managers' attitude towards risk-taking (β=0.331, p<0.05) yields a significant influence on EI, and the model explains 15.2% of the variance (R^2=0.152, F (3.302), p<0.01). In model 4, the composite NREBS scale is added. However, the total NREBS shows no statistical significance, and the predicting power of the model shows no meaningful increase (R^2=0.153, F (3.031), p<0.01). Consequently, we excluded the composite NREBS score from the final model to understand the influence of its subscales. In the fifth model, in addition to gender, age, education, religiousness, organizational tenure, managerial tenure, management level, company size, company age, decision-making speed, and risk-taking, we added the six subscales of NREBS. The predictive power of the model is significantly higher (23%) than in model 4 (R^2=0.230, F (3.449), p<0.01). In model 5, out of six unethical behavior dimensions, only bribery significantly influences EI (β=0.253, p<0.01).

Of the demographic variables, age shows a negative (Models 1-5), whereas level of management (Models 1-4) has a positive significant impact on the outcome variable. Concerning organizational-level control variables, both the company size (Models 1 and 2) and age (Models 3 and 4) show a negative significant influence on managers' EI. However, there is no significant effect of gender, religiousness, education, company, and managerial tenure on EI.

Finally, in the last regression analysis, we estimated a model including only significant variables (at p-value <5%) across previous models. Level of management (β=0.153, p<0.05), decision-making speed (β=0.130, p<0.05), and bribery (β=0.224, p<0.01) still significantly predicted EI. Risk-taking also positively influences EI, and the statistical significance was at the limit of the 5% level (β=0.131, p=0.051). In total, model 6 explained approximately 18% of the variability in the response variable (R^2=0.178, F (6.387), p<0.01).

Table 4. Results of hierarchical regression analysis

Variables	Entrepreneurial intention																	
	Model 1			Model 2			Model 3			Model 4			Model 5			Model 6		
	B	SE	Beta	B	SE	Beta	B	SE	Beta	B	SE	Beta	B	SE	Beta	B	SE	Beta
Control variables																		
Gender	0.083	0.146	0.040	0.178	0.151	0.086	0.171	0.150	0.083	0.172	0.150	0.083	0.246	0.148	0.119*			
Age	-0.185	0.078	-0.217**	-0.177	0.077	-0.208**	-0.154	0.077	-0.181**	-0.159	0.078	-0.186**	-0.156	0.076	-0.183**	-0.104	0.062	-0.122*
Education	0.073	0.162	0.031	0.103	0.161	0.044	0.072	0.160	0.030	0.060	0.163	0.025	0.203	0.162	0.086			
Religiousness	0.020	0.051	0.026	0.012	0.051	0.016	0.009	0.050	0.012	0.009	0.050	0.012	0.021	0.050	0.028			
Organizational tenure	-0.013	0.106	-0.012	-0.016	0.105	-0.015	0.007	0.104	0.007	0.015	0.106	0.014	-0.051	0.104	-0.048			
Managerial tenure	0.165	0.121	0.145	0.159	0.120	0.140	0.164	0.119	0.145	0.167	0.119	0.147	0.145	0.116	0.128			
Level of management	0.345	0.126	0.191***	0.307	0.126	0.171**	0.285	0.125	0.158**	0.294	0.127	0.163**	0.205	0.125	0.114	0.276	0.120	0.153**
Company size	0.000	0.000	-0.136**	0.000	0.000	-0.156**	0.000	0.000	-0.122*	0.000	0.000	-0.117*	0.000	0.000	-0.127*	0.000	0.000	-0.118*
Company age	-0.012	0.007	-0.136*	-0.011	0.007	-0.131*	-0.014	0.007	-0.165**	-0.015	0.007	-0.168**	-0.010	0.007	-0.114	-0.009	0.006	-0.109
Independent variables																		
Decision-making speed				0.124	0.057	0.150**	0.111	0.057	0.135*	0.110	0.057	0.134*	0.144	0.056	0.175**	0.106	0.053	0.130**
Risk-taking							0.331	0.138	0.165**	0.326	0.139	0.162**	0.282	0.137	0.141**	0.262	0.134	0.131*
NREBS										0.054	0.124	0.031						
Personal use													0.203	0.112	0.142*			
Passing blame													-0.159	0.133	-0.102			
Bribery													0.055	0.015	0.253***	0.049	0.014	0.224***
Falsification													-0.209	0.139	-0.145			
Padding expenses													0.114	0.137	0.069			
Deception													0.020	0.088	0.018			
R^2	0.108			0.128			0.152			0.153			0.230			0.178		
Adjusted R^2	0.069			0.085			0.106			0.103			0.164			0.150		
ΔR^2	0.108			0.020			0.024			0.001			0.077			-0.052		
ΔF	2.753***			4.650**			5.758**			0.193			3.449***			6.387***		
df. (regression, residual)	(9, 204)			(10, 203)			(11, 202)			(12, 201)			(17, 196)			(7, 206)		
F	2.753***			2.987***			3.302***			3.031***			3.449***			6.387***		

Note: *** p<0.01, ** p<0.05, * p<0.10; SE-Standard error.

Given the nature of cross-sectional data, regression analyses using these data can suffer from heteroscedasticity or the situation where error terms are not equally spread across independent variable values, violating the basic assumption for linear regression. Therefore, we tested for heteroscedasticity in our estimated regression models using the Heteroskedasticity V3 SPSS macro developed by Daryanto (2020). Following Daryanto (2020), we report the results of two statistical tests commonly used to examine the homoskedasticity assumption, namely the Breusch-Pagan and Koenker tests. Full results for all estimated models are presented in Table 5. The results show that for all models, the significance values were less than 0.05, indicating that the null hypotheses were rejected and heteroscedasticity was absent.

Table 5. Heteroscedasticity tests

Models	**Model 1**		**Model 2**		**Model 3**		**Model 4**		**Model 5**		**Model 6**	
Tests	LM	Sig.	LM	Sig.	LM	Sig.	LM	Sig.	LM	Sig.	LM	Sig.
Breusch-Pagan	8.263	0.508	10.856	0.369	11.975	0.366	16.176	0.183	26.984	0.058	7.748	0.355
Koenker	6.309	0.709	8.448	0.585	9.933	0.536	13.764	0.316	20.217	0.263	6.548	0.477

Note: LM- Lagrange multiplier; Sig-Significance.

Robustness test

As shown above, the regression analysis revealed a significant positive impact of bribery in managers' EI. As a further check, we analyzed median differences in bribery scores within our sample. We estimated the median differences by conducting the non-parametric Wilcoxon test to examine if values of bribery and other independent variables score differently among managers. As is usual when conducting similar analysis, we grouped our respondents into two groups. Given that the average EI score ranges from 1 to 5, we distinguished managers with "low" (≤2.5) and "high" (>2.5) EI levels. By and large, results were qualitatively similar to those reported in Table 3 and confirmed the differences revealed by the regression analysis. In particular, the Wilcoxon rank sum tests results show that the bribery's median scores among "high" and "low" EI managers differ and this difference between the two groups is statistically significant: W=1533, Z=-2.17, p=0.030. Full results can be found in Table 2a in the Appendix.

DISCUSSION

This paper aimed to shed light on the role of attitude toward unethical behavior on managers' EI. Additionally, we purported to reveal how the attitudes toward decision-making speed and risk-taking are associated with EI in the context of unethical behavior. The empirical results indicate that attitude toward unethical behaviors does not necessarily translate into higher EI. Notwithstanding, bribery, a particular type of unethical behavior, decision-making speed, and risk-taking are positively associated with EI. However, such effects are limited as they derive from a non-random sample in a specific context (Kosovo), hence suggesting a limited possibility to generalize *sic et simpliciter* the results. Moreover, although the empirical exercise yields a significant positive relationship between dependent and interdependent variables, the cross-sectional nature of our data does not allow us to infer any conclusion about the causality between them. Our findings are interpreted and contextualized in more detail below.

Hypothesis 1 argues a positive relationship between decision-making and EI. Hypothesis 1 is confirmed. A possible explanation for this positive relationship might be that rapid decision-makers often rely on limited information and must act quickly to seize emerging opportunities (Shepherd et al., 2015). Managers are expected to respond rapidly to organizational and environmental changes; therefore, quick decision-making should be a tool as they exploit opportunities and take advantage of the competitive environment (Guven, 2020). Under time pressure, they use information better and develop more alternatives (Eisenhardt, 1989). Furthermore, fast decision-makers gather real-time information and seek the advice of experienced counselors (Eisenhardt, 2008), which in turn grows the awareness of new entrepreneurial opportunities. This aligns with Krasniqi, Berisha, and Pula (2019), who prove that spontaneous managers making fast decisions will be more entrepreneurially inclined.

Hypothesis 2 posited that risk-taking is positively related to EI. The analysis yields a significant positive relationship, thereby supporting the hypothesis. This finding is intuitive and self-evident, as extant research and practice show that entrepreneurship is inherently grounded in risk-taking (Stewart Jr & Roth, 2001; Tipu, 2017). Entrepreneurial initiatives

are based on the risk of loss, and managers cannot predict every scenario affected by organizational uncertainties (Antoncic, 2003). Therefore, managers with stronger risk-taking attitudes are more willing to make large and risky resource commitments to novel business endeavors (Lumpkin & Dess, 1996).

Focusing on the context of the present study, Kosovo firms operate in a highly uncertain business environment (Conahan, Deichmann, Krasniqi, & Peci, 2021). Moreover, Kosovan managers are opportunity-focused and tend to use every opportunity to increase business performance (Sadiku-Dushi, Dana, & Ramadani, 2019). Based on these views, we contemplate that managers with stronger attitudes toward risk-taking are more likely to have EI and subsequently behave entrepreneurially within their organizations to face uncertainties through opportunity exploitation.

Hypothesis 3 tested the effect of unethical behavior on managers' EI. This hypothesis is not supported. The effect of the composite score of unethical behavior on EI is not significant. The insignificant relationship between NREBS and EI might be explained by the former being more workplace-related. This aligns with findings from several contributions on a special issue in the Journal of Business Ethics (Soulsby et al., 2021), demonstrating that only specific dimensions of unethical behavior are important in informing EI.

Considering that the overall unethical behavior does not relate to subsequent EI, we analyzed each dimension. Hypotheses 3a-3f proposed the influence of unethical behavior subscales on EI. Of six hypotheses, only hypothesis 3c is supported, implying that bribery significantly predicts EI. Namely, the findings indicate that in our sample, managers' EI is influenced by their attitude toward bribing, whereas the relationship with other ethical dimensions is insignificant. This finding is consistent with the results from the study by Chadee, Roxas, and Kouznetsov (2021) with firms in Central and Eastern Europe, which suggest that bribery enables firm managers to exploit the environment of corruption to innovate.

It is conceivable that the context influences whether behaviors are perceived as ethical (Schneider & Enste, 2013). In the Western Balkan economies, building social capital through exchanging favors for preferential treatment is common (Džunić & Golubović, 2016). In this context, as is the case of Kosovo, social networks can prove helpful in identifying where, when, and to whom bribes need to be given to get things done more efficiently (Bozovic, 2017). The primary reason for bribery in Kosovo is to speed up the procedures (Zabyelina & Arsovska, 2013). This suggests that taking part in bribes is a means to gain an advantage and get things done quickly. This is in line with our hypothesized relationship between decision-making speed and EI.

As a fraction, the mechanism of bribery has been evidenced to work somewhat differently than corruption or unethical behavior as the overarching instances (Lee, Oh, & Eden, 2010; Ufere, Gaskin, Perelli, Somers, & Boland Jr, 2020), especially in the Kosovo context (Uberti, 2020). Previous reports (UNODC, 2013) on business practices of Kosovan entrepreneurs/owners show a slight prevalence of bribery, whereas other aspects of illicit or unethical behaviors are rare. This was reflected in our sample as well, as we note that the score value of the bribery scale in our study is ($\bar{x}$=1.74) is higher compared to other studies, such as Akaah (1996) ($\bar{x}$=1.42) and Liu and Ren (2017) ($\bar{x}$=1.66). Contrary to other dimensions, we contemplate that the rationale behind bribery's positive and significant influence on EI is that the latter is more workplace-related, whereas bribery is associated with stakeholder interactions.

Additionally, our study operationalized the bribery dimension as "giving and accepting gifts/favors in exchange for preferential treatment." Based on this, the nature of these actions may not have been inherently perceived as negative by the respondents. In developing contexts like Kosovo, gifts and favors are commonly regarded as normal means to secure more favorable treatment in the workplace (Džunić & Golubović, 2016).

Bribery has barely been studied in the intrapreneurial context. Walter and Block (2016) purport that firms offer fewer intrapreneurship-like jobs in corruption-plagued countries. This, in turn, could mean that they will shift from intrapreneurship to new venture creation, given their growing network. We contemplate that the proclivity of managers to give/accept bribes could mean exerting it with external stakeholders to increase their social capital. According to a study of Kosovan business owners, roughly 45 percent consider using relationships and personal contacts acceptable for speeding up business-related procedures (UNODC, 2013). This demonstrates a widespread pattern of behavior that embodies bribery as a means to facilitate operations and achieve personal gain (Aupperle & Camarata, 2007; G. De Jong, Tu, & van Ees, 2012). Individuals who pay bribes do so to speed up bureaucratic processes. Personal ties compensate for institutional imperfections in transition economies (Tu, 2012). This is especially true for poorer developing countries, where high levels of corruption permeate individuals to engage in bribery to make it easier for them to materialize their EI (Nakara, Laouiti, Chavez, & Gharbi, 2020). This explains why managers who make quick decisions are also prone to bribes and have a higher intention to act entrepreneurially. Ergo, making quick decisions (H1) and paying bribes (H3c) are both associated with high EI in our study.

Kosovo has transformed from a communist to a transition economy, characterized by firms with informal practices, a deteriorating work environment, a lack of strategic orientation, and a lack of employee involvement (Prouska, Psychogios, & Rexhepi, 2016). Companies in Eastern European countries such as Kosovo are inherently bureaucratic and centralized (Svetlik et al., 2010). For firm managers in Central Eastern European countries like Kosovo, bribery can easily bypass the bureaucracy when applying for permits, securing government contracts, or ‚getting things done' (Chadee et al., 2021).

Like other Western Balkan countries, Kosovo scores high on power distance. The evidence from this context suggests that high power distance enacts EI among individuals (Rajković, Nikolić, Ćoćkalo, Stojanović, & Kovačić, 2020). Also, high power distance discourages ethical behavior as managers who exert power have less sense of accountability toward employees and stakeholders (Nasierowski & Mikula, 1998).

Nevertheless, one has to be cautious when interpreting the positive variances in our dependent variable. The present study is based on self-report data, which might explain individuals' high self-assessment concerning their EI. We purport that the high self-regard of EI could occur due to the self-serving bias inherent in cross-sectional survey studies (Friedrich, 1996). Additionally, the explanation for the higher evaluations of EI could be attributed to the unique characteristics of the context and our sample. First, Kosovo has one of Europe's youngest populations, averaging 30.2 years (World Bank, 2019), which was also reflected in our sample (almost half of the respondents were between 18-34 years old). Hence, this youthful presence might explain the higher levels of entrepreneurial inclination, as demonstrated in previous research (Hisrich, 1990). Second, our sample indicates a high level of education (over 80% possess a university degree). This educational background could influence their self-evaluation of EI. Some managers may be employed in positions below their qualifications, potentially leading to increased self-perception (Krasniqi & Mustafa, 2016).

Of the demographic variables, age and management level were significantly associated with EI. In our study, age is negatively associated with EI. This aligns with previous research indicating that as individuals age, their openness to new experiences decreases; therefore, they regard time as a constraint and prefer to maintain the status quo (Adachi & Hisada, 2017; J. P. De Jong et al., 2011). At the same time, managers in higher hierarchical levels were found to be more entrepreneurially inclined. At upper hierarchical levels, managers have more opportunities to recognize and implement entrepreneurial ideas (Hornsby et al., 2009).

Regarding organizational-level characteristics, company age, and size are negatively associated with EI. Based on the findings, managers in more mature and larger companies perceive fewer opportunities to innovate and take risks, possibly due to a preference for maintaining career stability. This is supported by Global Entrepreneurship Monitor data (GEM, 2015), showing that Kosovan employees, especially in larger companies, show the lowest level of employee entrepreneurship. In other words, as large established firms need to be more specialized and bureaucratic (Kacperczyk, 2012), this, in turn, hinders employees' entrepreneurialism.

CONCLUSION

Using a sample of managers situated in an emerging economy context, the set goals for this study were achieved, and the formulated hypotheses were confirmed (except for hypothesis 3). Based on the findings, our paper renders several important theoretical implications. Nevertheless, the present study focuses on a single country (Kosovo) and is based on cross-sectional data stemming from non-random sampling, which suggests caution in drawing conclusions. In the following paragraphs, the implications and limitations of this study are outlined.

We contribute to entrepreneurship and ethics research by empirically examining the relationship between unethical behavior and the EI of managers. In this light, our findings support TPB as a valuable framework to study unethical behavior in an entrepreneurial context. We extend the body of research and theorization in ethics and entrepreneurship by demonstrating the interrelatedness of ethical behavior and intrapreneurship as two inter-organizational individual manifestations. This paper presents a peculiar attempt to reconcile unethical behavior and EI in research using a manager sample. Moreover, we confirm the risk-taking hypothesis and, more importantly, declaim the positive relationship between decision-making speed, unethical behavior, and EI.

The overriding contribution of this study is to extend the theoretical and empirical underpinnings concerning ethics and entrepreneurship, upholding that they are pervasive across contexts. This implies that research on unethical behavior and EI as a subset of ethics and entrepreneurship research is as context-specific as the separate study of these constructs.

On a methodological plan, we attest that the unethical behavior measure (NREBS) is not unidimensional, indicating a lack of nomological validity. Instead, people differ across dimensions, supporting the issue-related moral intensity hypothesis (Morris & McDonald, 1995).

In addition to the theoretical implications, this paper provides relevant managerial implications. Our findings indicate the multifaceted nature of unethical behavior's influence on EI. The EI of managers is likely to be influenced by their bribery behavior. Managers who are more positive towards giving and receiving bribes exert more EI. This knowledge should be used for corporate entrepreneurship and training purposes. Entrepreneurship within organizations is encouraged; however, it should be stimulated by the right reasons, not bribery. Senior managers should set the stage for intrapreneurial employees to thrive but also set the tone for their ethical conduct. It is recommendable for organizational training programs in general and corporate entrepreneurship programs to include ethical components (Kuratko, 2007). Organizations should strive to achieve both business ethics and corporate entrepreneurship simultaneously (Chau & Siu, 2000).

Our paper purports an important policy implication for entrepreneurship education. As we evidence in our study in a transition and emerging economy, education does not influence the ethical behavior of individuals, which has been evidenced in other studies focused on non-western contexts (Béchard & Grégoire, 2005; Berisha, Oliveira, & Humolli, 2023). We contemplate that entrepreneurship education should not be reduced to business venturing but should integrate ethical reasoning and behavior (Heinrichs, Minnameier, & Beck, 2014). Given the formal education system's shortcomings in providing ethical prescriptions for managers and entrepreneurs (G. De Jong et al., 2012), organizations should focus on training programs to enact entrepreneurialism and ethical behavior. Non-formal education in the form of training helps reduce bribery incidence among entrepreneurs in an emerging economy context (Tu, 2012).

Despite our original and interesting findings, several avenues for further research remain. To gain a more comprehensive understanding of the intricate interplay between ethics and entrepreneurship, future research should explore additional factors that may influence unethical behaviors in entrepreneurial contexts. A promising research avenue would involve examining the impact of country-level, industry-level, and firm-level factors that leverage the moral compass of the individuals. This multi-level approach could provide a more nuanced understanding of the ethical dynamics of entrepreneurship, fostering a more holistic understanding.

Moreover, future studies might also consider adopting alternative analytical approaches to explore further the relationship between various factors influencing managers' EI. For instance, there is a need for further exploration of mediating and moderating factors that influence the relationship between unethical behavior and EI. Additionally, it would be worthwhile to consider the variables used in this study, namely decision-making speed and risk-taking, and examine their potential moderating effects on the nexus between unethical behavior and EI. Scrutinizing these factors could provide valuable insights, contributing to a more nuanced understanding of the intricacies involved.

Additionally, future focuses on specific industries or sectors might provide a more nuanced understanding of the role of (un)ethical behavior and EI. By honing in on particular domains, future research can uncover industry-specific challenges and opportunities for promoting ethical entrepreneurship, yielding valuable insights for practitioners and policymakers alike. The insights from such focused studies can potentially inform strategies for cultivating ethical business practices and leadership qualities in specific professional contexts.

Finally, measuring ethical behavior raises the social desirability bias issue as there is a conscious tendency to over-report desirable behaviors (Randall & Fernandes, 1991). Thus, future research should control for social desirability bias by employing indirect questioning and observer rating to measure ethical behavior (Zuber & Kaptein, 2014).

Although the study provides some interesting and original insights, some limitations should be acknowledged. First, the present research is grounded on cross-sectional data. Thus, future research might consider employing longitudinal data through randomized sampling techniques to explore causal relationships between variables and increase the generalization of the findings.

Second, the sample consists of Kosovan respondents, which may pose a bias in the work experiences of managers driven by an Eastern geographic context. Therefore, future studies should include cross-cultural samples and compare characteristics of different cultures to explore generalizability.

Third, the empirical data is collected using self-report measures, which are subject to biases as respondents make judgments about themselves (Chan, 2010). Specifically, future research should control for self-serving bias by adopting neutral measures concerning their self/other focus. On a similar note, it is crucial to recognize a potential limitation of our single-item measure of decision-making speed. However, given the scale of the research project in which the current study is situated and the limited resources, our goal was to employ an efficient and economically usable scale. Nonetheless,

future research might consider using an experiment to capture decision-making speed (i.e., ask the participants to make a decision as a part of the survey and then either monitor how long it took them to decide or ask them to report the length themselves).Fourth, although our study controls for several individual and organizational attributes, future research should consider other control variables that might play a role. In this light, the information about managers' previous start-up experience might provide important insights by comparing the attitudes towards ethical concerns and entrepreneurship in two contexts, namely in a new venture versus in a matured company.

Finally, the unethical behavior of managers was measured using Newstrom and Ruch's instrument, which was developed in 1975. This might posit an inherent limitation considering the past context in which the measure was conceptualized. Therefore, future studies on ethical behavior and intrapreneurship should include context-specific measures that include ethical dilemmas in today's workplace and management.

Appendix

Table 1a. Measures

Attitude toward unethical behavior	
Personal use	1 = Very unethical 5 = Very ethical
Using company services for personal use	
Doing personal business on company time	
Pilfering company materials and supplies	
Taking extra personal time (lunch hour, breaks, early departure)	
Passing blame	
Concealing one's error	
Passing blame for errors to an innocent co-worker	
Claiming credit for someone else's work	
Bribery	
Giving gifts/favors in exchange for preferential treatment	
Accepting gifts/favor in exchange for preferential treatment	
Falsification	
Falsifying time/quality/quantity reports	
Calling in sick to take a day off	
Authorizing a subordinate to violate company rules	
Padding expenses	
Padding an expense account up to 10%	
Padding an expense account more than 10%	
Deception	
Taking longer than necessary to do a job	
Divulging confidential information	
Not reporting others' violations of company policies and rules	
Entrepreneurial intention	
I am ready to do anything to be an entrepreneur	1 = Strongly disagree 5 = Strongly agree
My professional goal is to become an entrepreneur	
I will make every effort to start and run my own firm	
I am determined to create a firm in the future	
I have very seriously thought of starting a firm	
I have the firm intention to start a firm some day	

Table 2a. Wilcoxon rank sum tests comparing medians of independent variables across two groups of managers (low versus high entrepreneurial intention)

	Low entrepreneurial intention		High entrepreneurial intention		Test statistics		
	Mean rank	Sum of ranks	Mean rank	Sum of ranks	Wilcoxon	Z	p
Decision-making speed	92.42	1,756.00	108.97	21,249.00	1756.00	-1.16	0.245
Risk-taking	96.95	1,842.00	108.53	21,163.00	1842.00	-0.96	0.336
NREBS	84.03	1,596.50	109.79	21,408.50	1596.50	-1.73	0.083
Personal use	96.61	1,835.50	108.56	21,169.50	1835.50	-0.82	0.412
Passing blame	91.55	1,739.50	109.05	21,265.50	1739.50	-1.22	0.222
Bribery	80.68	1,533.00	110.11	21,472.00	1533.00	-2.17	0.030
Falsification	87.08	1,654.50	109.49	21,350.50	1654.50	-1.59	0.113
Padding expenses	76.50	1,453.50	110.52	21,551.50	1453.50	-2.86	0.004
Deception	101.68	1,932.00	108.07	21,073.00	1932.00	-0.44	0.663

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Authorship contribution statement

Rrezon Lajçi: Data Analysis and Results, Discussion and Implications. **Gentrit Berisha:** Literature Review, Discussion and Implications. **Besnik Krasniqi**: Conceptualization, Discussion and Implications.

Conflicts of interest

The authors declare no conflict of interest.

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Entrepreneurial agility and organizational performance of IT firms: A mediated moderation model

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Abstract

PURPOSE: *The Information and Communication Technology (ICT) sector is playing an important role in the growth of the world`s economy. However, limited knowledge exists concerning the underlying mechanisms and boundary-spanning conditions under which entrepreneurial agility (EA) affects the organizational performance (OP) of IT firms. This study draws on the Dynamic Capability Theory (DCT) to examine the effect of entrepreneurial agility (EA) on the organizational performance (OP) of Italian IT firms with the mediating role of open innovation (OI) and the moderating role of environmental dynamism (ED).* **METHODOLOGY:** *Employing an explanatory research design and convenience sampling technique via an online survey to gather data from a sample of 411 Italian IT firms, the study tested the formulated hypotheses using the structural equation modeling technique in AMOS statistical software.* **FINDINGS:** *The results revealed that EA, directly and indirectly, influences OP of IT firms. Moreover, the mediation analysis unveils that OI plays a complementary, partial mediation role in the EA—OP nexus. Finally, ED moderates this focal relationship, such that in the presence of high environmental dynamism, the relationship between EA and OP gets stronger compared to low environmental dynamism.* **IMPLICATIONS:** *The findings imply that IT firms should emphasize adopting agile procedures and structures that allow them to react to new problems and opportunities swiftly by building a culture of innovation through the adoption of OI strategies (inbound, outbound, and coupled) to tap into the broader range of expertise and resources in the business environment. To improve the link between OI and OP, managers should prioritize building relationships with external partners, such as customers, suppliers, and academic institutions. IT firms should also prioritize building a diverse and inclusive workforce that can bring diverse perspectives and experiences to the innovation process to enhance their innovation capabilities and create products and services that better meet the needs of customers.* **ORIGINALITY AND VALUE***: The study´s value lies in extending the ongoing scholarly discussion on the nexus between EA and OP by exploring OI as an intermediary mechanism that connects EA, OP, and ED as a boundary-spanning condition that moderates the focal relationship. This research highlights the interplay between EA, OI, ED, and OP, using the DCT as a theoretical foundation. It is the first to examine such interrelationships in the IT sector. In addition, the study provides new insight for researchers focusing on the information technology (IT) sector.*

Keywords: *entrepreneurial agility, organizational performance, IT firms, dynamic capability theory, open innovation, environmental dynamism, mediated moderation model, structural equation modeling, information and communication, technology sector, innovation management*

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INTRODUCTION

Since the global economy and competitiveness cause quick changes, and intense competition shortens product life cycles, it is evident that conventional management strategies cannot react adequately to these shifts or constantly changing market circumstances (Tajeddini & Mueller, 2018). Scholars suggest that firms should incorporate innovation and entrepreneurial spirit for business success (Etemad, 2015; Tajeddini, Altinay, & Ratten, 2017). Furthermore, academics in strategic management have asserted that entrepreneurial behaviors are crucial to modern businesses' survival, profitability, and growth (Shan, Song, & Ju, 2016).

However, the path to success or failure in entrepreneurial company operations is determined by the decisions made by entrepreneurs (Aujirapongpan, Ru-zhe, & Jutidharabongse, 2020; Robbins, 2003). The most innovative and successful entrepreneurs will maintain Entrepreneurial Agility (EA, hereafter) and outstanding performance (Karimi & Walter, 2021) because firms lacking agility find it challenging to adapt to change in the modern business environment. They will ultimately fall behind their rivals, unable to adapt to market demands and lacking knowledge of emerging business patterns (Wairimu, Liao, & Zhang, 2022; Hindrawati, Dhewanto, & Dellyana, 2022). The term "agility" was coined in 1991 by a committee at the Iacocca Institute, Lehigh University (PA), to explore the US industry's deficiency of international competitiveness (Yusuf, Sarhadi, & Gunasekaran, 1999). Since then, agility has evolved into a paradigm for how institutions should design for digital innovation that prioritizes efficiency and speed (Goncalves et al., 2020). According to Florek, Ujwary, and Godlewska (2021), agility allows firms to persist and overcome tremendous hindrances, such as the global crisis of the COVID-19 pandemic. In this telling, since firms' survival and growth depend primarily on their ability to adapt to the dynamic changes in the business environment, and open innovation (OI, hereafter) involves opening the innovation box to incorporate inside and outside ideas and technologies, the more agile a firm is, the more likely that it will adopt OI (Wang & Kim, 2017). OI represents a company's efforts to develop new resources, ideas, and applications outside its borders (Brown, Davidsson, & Wiklund, 2001; Ireland, Hitt, & Sirmon, 2003).

Chesbrough and Bogers (2014) define OI as "a distributed innovation process which includes purposefully managed knowledge flows across the organizational boundary." It highlights firms` adopting outside-produced ideas and technology in their enterprises while allowing others to exploit unneeded internal ideas and technologies (McPhillips, 2020). Furthermore, a dynamic environment promotes business development by improving organizational flexibility or agility to push across networks by shifting circumstances (Khouroh et al., 2020). When confronted with an environment that is constantly shifting, the capability of the management or owner becomes critical in developing strategies to increase performance.

According to Sharmelly (2017), top firms continue their OI initiatives by enabling agility in organizational culture, while Naqshbandi, Kaur, and Ma (2015) note that corporate culture significantly impacts OI. The EA of high-tech firms is successfully coupled with organizational stability (Jurevicius et al., 2016). EA may serve as a bridge between essential employees and help teams adjust unfavorable attitudes towards outside knowledge to boost collaboration for the OI process (Weissenberger & Hampel, 2021). Yet current scholars are more focused on Organizational Agility (OA) (i.e., Harraf et al., 2015; Trinh et al., 2012), strategic agility (SA) (i.e., Sahid, Maleh, & Belaissaoui, 2020; Doz, 2020), and Marketing Agility (MA) (i.e., Golgeci et al., 2023; Khan, 2020) with minimal attention to EA.

Despite enormous efforts in understanding EA, four critical areas need more attention in this stream of research. First, research on the relationship between entrepreneurship and organization has shown conflicting and inconsistent results. Some researchers have established a positive connection between EA and business success (e.g., Karimi & Walter, 2021; Wairimu et al., 2022). Others have found no or even a negative relationship (i.e., Zulganef et al., 2023). This controversy highlights managers' tensions regarding the trade-off between opportunity foresight, systemic insight, and entrepreneurial mindset dimensions (i.e., Karimi & Walter, 2021). This association may be more illusory than the research suggests. Conflicts in any sector may indicate a promising topic for investigation (Strand, 2011). One area worth investigating is opening the 'black box' in the EA — OP connection to allow for a complete understanding of the relationship.

Second, although some research has been conducted on the impact of EA on OP, more must be done to uncover the intermediary mechanism that connects EA and performance. OI is a strategic instrument that may be a significant source of long-term competitive advantage. Surprisingly, OI has received little attention in this field of study, with few studies examining its impact on OP. Since previous research has assumed chiefly a direct relationship between EA and OP, investigating the mediating role of OI helps us understand the intermediate process by which EA affects OP.

Finally, while the term 'entrepreneurial agility EA' is frequently used to describe the managerial cognitive ability to anticipate, visualize, and exploit entrepreneurial opportunities, little evidence exists to show how much environmental

dynamism (ED), which "refers to the rate of change in environmental factors over time, including technologies, markets, competitors, suppliers, and customers," plays a role in EA. If a company uses EA to obtain a competitive advantage, it may need to meet the dynamic changes in the environment brought about by the Fourth Industrial Revolution (Seo et al., 2020). What role does ED play in this case? Little has been studied on how ED influences the link between EA and OP in the IT industry.

Because of these research gaps, this study investigates the direct link between EA and OP, the mediating role of OI, and the moderating influence of ED. It does so among IT companies in Italy. The data was gathered from 411 Italian IT firms through an online questionnaire generated by Google Forms. Saracco (2022) claims that Italy has often shown remarkable resilience and ability to adjust to changing market dynamics. Nonetheless, many industries operate in mature marketplaces with low-to-medium levels of innovation. Furthermore, digitalization has been a more prominent focus of European business strategies in recent years. Therefore, we posit the dynamic capacities framework as an effective lens for studying firm performance in IT enterprises. IT firms must have solid dynamic capabilities to remain relevant in the growing digital economy (Teece & Linden, 2017; Karimi & Walter, 2016; Velu, 2017; Teece, 2018).

The study's specific objectives are examining (1) the main effect path of EA → OI → OP; and (2) the moderating effect path of ED moderating the EA→ OP relationship (see Figure 1). In doing so, we contribute to the ongoing scholarly research on the strategic role of entrepreneurial agility (EA), open innovation (OI), and environmental dynamism (ED) in enhancing organizational performance (OP). Furthermore, the study's results will likely provide managers and practitioners with helpful insight into how EA affects the success of information technology IT firms through opportunity foresight, systemic insight, and an entrepreneurial mindset. Focusing on Italian IT companies opens new avenues and provides vital information to managers and entrepreneurs seeking to perform better in a volatile industry (Tahmasebifard, Zangoueinezhad, & Jafari, 2017).

The rest of the paper is structured as follows: Section 2 offers a literature review and hypothesis development related to the research topic. Section 3 provides the research focus and methodology adopted. Section 4 presents the analysis of the result, and finally, section 5 provides a discussion and conclusion.

LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

Dynamic capability view (DCV)

A firm's ability to "integrate, build, and reconfigure its internal and external competencies for dealing with rapidly changing environments" is called dynamic capability (Teece, Pisano, & Shuen, 1997). Warner and Wäger (2019) have recently conceptualized and explained the scope and digital transformation process. Digital sensing abilities imply the capability to detect new customer-centric tendencies and the relevance of digitalization trends like artificial intelligence, blockchain, and big data analytics in providing excellent customer service. Digital seizing capabilities need strategic agility to develop. "Digital innovation laboratories" gather consumer input and respond to emerging customer-centric trends via digitalization transformation. Lastly, the digital transforming abilities imply constructing a digital ecosystem to engage with new collaborative stakeholders, which necessitates co-opetition and co-creation practices that enhance the pace of business model renewal (Warner & Wäger, 2019). According to Teece, Peteraf, and Leih (2016), entrepreneurial managers who decide to develop solid dynamic capabilities within their firm become better at sensing emerging developments and making more efficient use of their EA. As a result, they will be more potent at sensing, seizing, and transforming. DC and OI have many shared characteristics, including organizational and management implications that complement one another. Implementing OI could expand management's views on sensing seizing. Páez, Pinho, and Prange (2022) revealed that DC influenced technological capabilities and marketing performance. Similarly, a solid DC will boost the success of OI activities (Teece, 2020). Therefore, the DCT can help us understand the interplay between a firm´s EA, OI, and OP in the IT context in a developed country, Italy.

Teece et al. (1997) emphasize that dynamic capability refers to a firm's ability to respond to changes in its external environment and integrate and reconfigure its internal and external competencies proactively. Warner and Wäger (2019) expand on this concept by highlighting the importance of digital transformation processes in enhancing dynamic capabilities. They argue that digital sensing enables firms to identify emerging customer-centric trends and leverage digitalization trends like artificial intelligence, blockchain, and big data analytics to improve customer service. Digital seizing capabilities, on the other hand, involve strategic agility to develop innovative solutions based on the insights gained

through digital sensing. The authors also mention the significance of digital transforming capabilities, which involve the construction of digital ecosystems to engage with collaborative stakeholders through co-opetition and co-creation practices, facilitating business model renewal. The theoretical link between dynamic capabilities (DC) and open innovation (OI) is further explored by Páez et al. (2022), who find that DC positively influences a firm's technological capabilities and marketing performance. Similarly, Teece (2020) argues that dynamic solid capabilities can enhance the success of open innovation activities, emphasizing the complementary nature of DC and OI in and improving a firm's overall innovation performance. In this study, we aim to examine how entrepreneurial agility (EA) interacts with open innovation (OI) and organizational performance (OP) within the context of the IT industry in Italy, building on the dynamic capability view.

Entrepreneurial agility (EA) and organizational performance (OP)

EA is the cognitive management capability to predict, visualize, and utilize entrepreneurial opportunities (Karimi & Walter, 2021). These cognitive abilities relate to opportunity foresight, systematic insight, and an entrepreneurial mindset, which become managerial cognitive capabilities and mental models for influencing entrepreneurial thinking rather than actual participation (Karimi & Walter, 2021). They differ conceptually from sequential entrepreneurial measures to create and execute opportunities (Valliere, 2013). The ability to notice and act on weak signals and poor information is called opportunity foresight (Hajizadeh & Valliere, 2022; Rego et al., 2012). Foresight may assist managers in thinking outside the box (Spaniol et al., 2019). Systemic insight refers to an entrepreneurial cognitive ability to visualize technology-enabled business opportunities and associated risks when designing aggressive actions for new products or services and anticipating possible competitor countermoves (Karimi & Walter, 2021). The entrepreneurial mindset is a sentiment and conviction with a distinct method of looking for opportunities and challenges (Nabi et al., 2017; Solesvik et al., 2013). From the DCT perspective, firms adopt new strategies to mirror changing market situations by integrating and transforming available resources in novel ways (Morgan, Vorhies & Mason, 2009; Wang & Kim, 2017; Teece et al., 1997). Various investigations have examined how EA might help IT firms improve their performance. For example, Karimi and Walter (2021) found that EA directly influences the development of digital platform capacities for the business model and product innovation. The findings of Werder et al. (2021) show that EA may greatly enhance process and product performance. The results of Hosseini, Alizadeh, and Abedi (2019) revealed that EA was positively and significantly linked with human resources management. According to Khan and Rehman (2023), the degree of EA increases investors' confidence and interest in investing in the enterprise. Thus, we expect EA to influence OP, leading to the study's first hypothesis.

H1: Entrepreneurial agility (EA) is positively related to the organizational performance (OP) of IT firms.

Entrepreneurial agility (EA) and open innovation (OI)

As mentioned earlier, EA displays itself via three primary comments: opportunity foresight, systemic insight, and an entrepreneurial mindset. In this vein, Calof, Meissner, and Razheva (2018) found that foresight could help improve OI by offering analysis that examines critical OI concerns such as technology selection, diagnosing future consumer demands, and monitoring for disruptions. Foresight can support OI in dealing with some constraints to implementing OI. Similarly, OI necessitates a more entrepreneurial mindset, a broader opportunity-seeking behavior, and a solid strategic alignment with innovation (Mantas & Soderquist, 2010). The basic idea behind OI is to open the innovation process (Huizingh, 2011). It indicates that IT firms that want to improve their technology may and should use internal and external knowledge (Arvaniti et al., 2022). OI transforms a company into an entity that participates in creative activities open to the public. OI should ensure the accomplishment and continuous replication of high levels of innovation and, hence, the long-term and stable development of firms that respond to environmental concerns feasibly and flexibly (Panwar, Ober, & Pinkse, 2022). EA dimensions like opportunity foresight and systemic insight require management to think outside the box (Spaniol et al., 2019) and to visualize technology-enabled business opportunities outside its own business models (Karimi & Walter, 2021). Moreover, because firms' survival and growth depend primarily on their ability to adapt to the dynamic changes in the business environment, and OI involves opening the innovation box to incorporate inside and outside ideas and technologies, the more agile a firm is, the more likely that it will adopt OI (Wang & Kim, 2017). This alignment between EA and OI is supported by the idea that agile firms are more likely to embrace open innovation practices, which facilitate incorporating novel ideas and technologies from inside and outside the organization. Thus, we hypothesize that:

H2: Entrepreneurial agility (EA) is positively related to open innovation (OI).

Open innovation (OI) and organizational performance (OP)

OI represents a firm's efforts to develop new resources, ideas, and applications outside its borders (Edelbroek, Peters, & Blomme, 2019; Ireland et al., 2003). The primary principle of OI is to open the innovation process (Cheng & Huizingh, 2014). The most comprehensive definition of open innovation is using information inflow and outflow to review innovation internally and market expansion for the invention's external use (Chesbrough, 2003). It also suggests that enterprises that want to boost their technology may and should use internal and external ideas (Arvaniti et al., 2022; Kafetzopoulos et al., 2023). Bogers et al. (2019) argued that the DC framework clusters might assist firms in reaping the full advantages of OI (Bogers et al., 2019; Cirjevskis, 2022). There are several perspectives and definitions of organizational performance (OP). OP is often characterized as the capacity to accomplish administrative duties via effectively and efficiently managing resources (Uljanati et al., 2021; Wanasida et al., 2021). When archival financial data is available, an OP may often be evaluated through Return on Equity (ROE), Return on Investment (ROI), and Return on Assets (ROA) (Dibrell, Craig, & Neubaum, 2014). Some studies have examined how OI affects IT organizational performance, although the results are mixed. For example, in their meta-analysis, Oduro et al. (2021) revealed that OI is positively related to firms' financial and non-financial performance. Also, Wang et al. (2021) found that inbound and outbound OI improves OP. Kang and Kang's (2010) finding revealed that informal network knowledge transmission and technology adoption positively link technological innovation performance. Harif, Nawaz, and Hameed (2022) state that OI combines ICT and innovation and boosts OP by raising ROI, ROA, and ROE. However, Davoudi et al. (2018) found no significant association between OI and intellectual property rights. Despite the conflicting findings, we draw on the DCT to theorize that OI can boost a firm´s performance dynamics of IT firms by incorporating ideas and technologies from outside the company. Therefore, we suggest the following hypothesis:

H3: Open innovation (OI) is positively related to the organizational performance (OP) of IT firms.

Open innovation (OI) as a mediator in EA-OP relationships

EA is a managerial cognitive skill that allows individuals to predict, visualize, and take advantage of opportunities for entrepreneurship (Kohtamäki et al., 2020). Teece et al. (2016) contend that OI could improve agility by enhancing and hastening new product development to address emerging market opportunities. By offering access to diverse and complementary knowledge, inbound OI decreases the risks associated with experimenting, stimulates a firm's innovation engine, and offers excellent flexibility when attempting high levels of innovation performance (Bianchi et al., 2016). Furthermore, organizations with outward OI must often examine a larger spectrum of technical breakthroughs for possible internal uses (Hu, McNamara, & McLoughlin, 2015). Much research demonstrates that OI benefits OP indicators (Popa, Soto & Martinez, 2017; Carayannis & Grigoroudis, 2014; Chiang & Hung, 2010). For example, Oduro et al. (2021) found a positive, significant connection between OI and the company's overall performance. In this telling, OI can secure the accomplishment and continuous replication of high levels of innovation and, hence, the long-term and stable development of firms that respond to environmental concerns feasibly and flexibly (Ober, 2022). Thus, in line with the theoretical proposition of the DCT, the more agile a firm is, the more likely it will adopt open innovation (Wang & Kim, 2017). Therefore, it can be reasonably expected that an agile, entrepreneurial orientation will lead to more innovation openness, which, in turn, can enhance OP. Thus, we propose the following hypothesis:

H4: Organizational innovation (OI) positively mediates the relationship between entrepreneurial agility (EA) and organizational performance (OP) of IT firms.

Moderating role of environmental dynamism (ED)

Nowadays, firms compete in a highly dynamic business environment. Rapidly evolving technology, the fast entrance of new rivals, and the growing commoditization of goods and services all contribute to this dynamic (Zupic, 2014; Marek, 2016). Environmental dynamism (ED) is a shift in the competitive environment that affects how organizations compete and react to customer needs. Drnevich and Kriauciunas (2011) argue that since EA is a manager's capacity to predict, visualize,

and execute entrepreneurial opportunities, firms need an agility position in a dynamic business environment without agility. They will need help managing change and fulfilling the ever-changing requirements of their customers. ED may provide a window of opportunity for new technologies and markets, encouraging firms to constantly assess their knowledge and understanding from external information sources and be flexible in accepting the environment to increase OP (Zhang & Zhu, 2021). However, according to Zulganef, Pratminingsih, and Rianawati (2023), ED negatively mediates the relationship between EA and OP. Despite the varied results, we anticipate ED to play an essential moderating role between EA and OP relations. Thus, we suggested the following hypothesis:

H5: Environmental dynamism (ED) positively moderates the relationship between entrepreneurial agility (EA) and organizational performance (OP) of IT firms.

Conceptual framework

Figure1 demonstrates the conceptual framework of the study. The study predicts a positive, direct relationship between EA (i.e., opportunity foresight, systemic foresight, and entrepreneurial mindset) and organizational performance. Moreover, we expect this direct relationship to be positively mediated by open innovation and moderated by environmental dynamism.

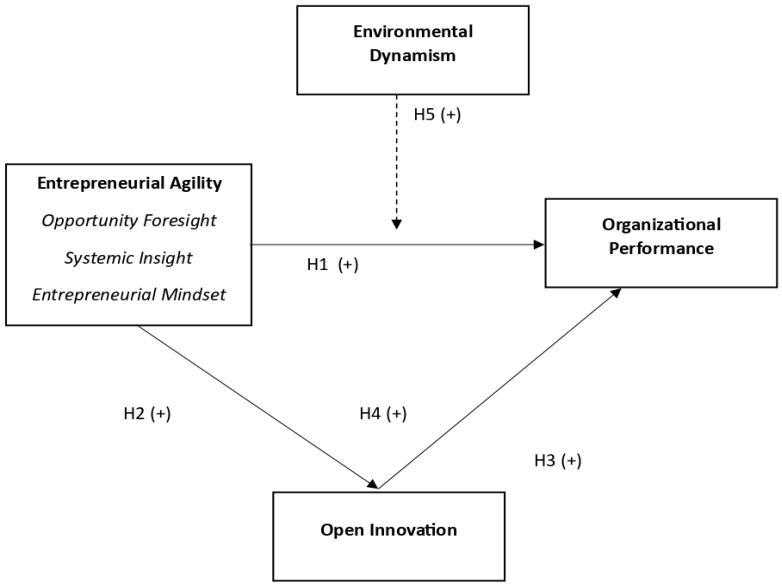

Figure 1. Conceptual framework of hypothesized relationships

METHODOLOGY

Study design

This research examined the effect of EA on the OP of IT firms. Moreover, it analyses the influence of OI as a mediator and environmental dynamism as a moderator between the abovementioned relationships. An online survey was used to gather the data for this research. To minimize the problem of unintended bias in the survey, we prepared the survey with one order of questions in sections, then we made copies of that section of questions so that the same questions exist in the design form more than once, and re-ordered the copied sections of fields so that they appear in different orders. More specifically, through the support of an IT expert, we programmed Section A, Section B, and Section C and then replicated the sections but in diverse orders, like ABC, BCA, or CAB.

Thus, we used an explanatory research design. According to Grembowski (1985), the survey technique can help researchers collect data in a minimal period. The items of every construct used in the questionnaire were adapted from

prior studies (i.e., Karimi & Walter, 2021; Van de et al., 2009; Horton, Macve, & Struyven, 2004). The final questionnaire was developed online to gather the data quickly. The adopted research methodology best fits the proximity, cost, and time constraints during the study. A detailed overview of the research methodology is shown in the subheadings given below.

Measures and measurements

The instrument developed in the study was adapted from prior studies. In addition, everything was examined on a five-point Likert scale, i.e., "1 (strongly disagree) to 5 (strongly agree). The study has adopted a 10-item scale of EA from Karimi and Walter (2021). The open innovation instrument was established on 10 items adopted from (Fu, Liu, & Zhou, 2019). The OP variable was measured using the five items adapted from Lin and Chen (2007). The ED was measured with a four-item scale adopted by Li and Liu (2014).

Sampling and data collection

The target population of the study was Italian IT firms. There are about 59,160 IT firms in Italy (Bold Data, 2021), and collecting data from every firm is impossible. Therefore, the convenience sampling technique was used, which identifies respondents who are available and easily accessible. Italy was explicitly targeted due to its status as a population experiencing a higher degree of emerging IT industry as entrepreneurial ventures. To accomplish the study's main objective, the authors conducted a primary survey during the second and third quarters (May–July) of 2022. The first step in this process involved preparing the questionnaire on Google Forms, which allows for the digital collection of data. A cover letter was included alongside the study to provide the necessary context and information for the participants to make informed decisions regarding their participation. The survey also featured a cover page emphasizing the potential for participant contribution as voluntary and anonymous. The online questionnaire was sent to 502 managers of IT firms out of which 411 were returned. Upon data collection completion, 411 comprehensive responses were obtained via the survey and subsequently utilized for further analysis.

Analytical strategy

While descriptive statistics provide a summary of collected data, inferential statistical analysis aids researchers in making informed conclusions about a studied population based on the study sample. The objective is to understand the research topic in the context of measured outcomes. To evaluate both our measurement and structural models, we utilized structural equation modeling techniques, employing software packages such as SPSS Statistics® (version 26.0) and SPSS AMOS® (version 24.0), as previously recommended within the scholarly literature (Dai & Adel, 2020). The normality of the collected data was assessed using the correlation coefficient approach.

RESULTS

Sample characteristics

The sample characteristics of the firms are shown in Table 1. The majority of respondents (managers) (71.19%) were men. Most respondents (55.69%) were university graduates, and 42.37% of firms had operated for more than 11 years. 63.75% were service-based firms, and 43.37% were firms limited by share. The data also showed that the majority of the firms were large firms (50.12%).

Data normality

As suggested by Kline (2015), Skewness and Kurtosis statistics were used to determine data normality. Table 2 presents the data normality results. According to Kline (2015), Kurtosis values should be less than 10 for data normality, and Skewness values must be less than 3. The data results indicated that all Skewness values ranged between -1.128 to 0.631, while the range of Kurtosis values was between -0.526 to 1.027, confirming data normality. Furthermore, mean values are also shown in Table 1, which reveals that all mean values are above 3 on a five-point Likert scale, indicating respondents´ trend towards the agreement side.

Table1. Sample characteristics

Gender		
Male	82	71.19
Female	31	26.17
Other	03	2.64
Education		
College (3 years)	29	18.12
Elementary school (8 grades)	-	-
High school (4 grades)	31	26.19
University (4 years or more)	63	55.69
Number of years in operation		
2-5 years	46	35.81
6-10 years	27	15.69
Above 11 years	51	42.38
Less than 1 year	11	6.12
Sector		
Agriculture and Fisheries	21	10.39
Manufacturing	36	25.86
Services	72	63.75
Legal status of firms		
Limited by guarantee	23	13.31
Limited by shares	41	43.37
Partnership	14	6.82
Sole Proprietorship	47	36.0
Firm size		
Large	205	49.47
Small/medium	206	50.12

Table 2. Descriptive statistics and data normality test

	N	Minimum	Maximum	Mean	Std. Dev.	Skewness	Kurtosis
1-Entrepreneurial Agility	411	1.00	5.00	3.5226	0.91997	-0.807	-0.178
2-Open Innovation	411	1.20	4.90	3.7270	0.74972	-0.668	-0.205
3-Environmental Dynamism	411	1.25	5.00	3.0255	0.86194	0.631	-0.526
4-Organizational Performance	411	1.00	5.00	3.8681	0.79892	-1.128	1.027

Sampling adequacy

Kaiser-Meyer-Olkin (KMO) and Bartlett's Test of Sphericity were used to test the sampling adequacy of the current study. Hair et al. (1998) recommended that the value of the KMO index should be 0.80 or higher for excellent sampling adequacy. KMO results shown in Table 3 indicated that the value of the KMO index of 0.848 is higher than the recommended sampling adequacy criteria by Hair et al. (1998). In addition, significant results of Bartlett's Test of Sphericity (X^2=7359.193; df = 0.171; P<0.000) confirm the sampling analysis' suitability (Henseler & Sarstedt, 2015).

Table 3. KMO and Bartlett's Test

Kaiser-Meyer-Olkin measure of sampling adequacy		0.848
Bartlett's Test of Sphericity	Approx. Chi-Square	7359.193
	Df	171
	Sig.	0.000

Measurement model

Confirmatory factor analysis (CFA)

CFA was used to test the reliability and validity of the measurement model using AMOS-24. Table 4 shows the CFA results. CR (composite reliability) values were used to measure the reliability. Nunnally and Bernstein's criteria (1994, pp. 186-193) were followed in the current study. CR values above 0.70 confirm construct reliability (Nunnally & Bernstein, 1994, pp. 186-193). The data results of the present study show that all CR values are higher than the recommended threshold of 0.70. Moreover, Hair et al. (2010) recommended testing both convergent and discriminant validities for construct validity. Bagozzi and Yi (1988) suggested that for convergent validity, the values of Average Variance Extracted (AVE) should be greater than 0.50, and the current study AVE, values of all constructs, are well above the recommended criteria of 0.50, which confirms convergent validity (see Table 4). Moreover, for discriminant validity, Fornell and Larcker (1981) suggested that the square root of AVE values should be higher than the constructs' correlation values. Furthermore, Henseler et al. (2015) recommended that Heterotrait-Monotrait Ratio (HTMT) values (Table 5) should be less than 0.90 for discriminant validity. The current study results shown in Table 4 and Table 5 confirm convergent and discriminant validities. Moreover, when all items were loaded in a single factor, the total variance by extracting the sum of the square of loadings was 34.977, which is less than 50%, as Podsakoff et al. (2003) suggested for common method bias.

Table 4. Confirmatory Factor Analysis

	CR	AVE	MSV	1	2	3	4
1-Entrepreneurial Agility	0.93	0.56	0.29	**0.747**			
2-Open Innovation	0.92	0.54	0.24	0.491***	**0.737**		
3-Environmental Dynamism	0.88	0.66	0.02	-0.084	0.053	**0.810**	
4-Organizational Performance	0.84	0.55	0.29	0.534***	0.304***	0.124**	**0.738**

Table 5. HTMT analysis

Variables	1	2	3	4
1-Entrepreneurial Agility	-			
2-Open Innovation	0.778	-		
3-Environmental Dynamism	0.675	0.786	-	
4-Organizational Performance	0.644	0.656	0.879	-

Note: N=411.

Hypotheses testing

We used the structural equation modeling (SEM) technique to test the study`s hypotheses since it allows comprehensive analysis by showing both direct and indirect effects. In addition, we employed a slope test through the Hayes process macro to test the moderation effect. We assessed the structural model by examining the beta, t-values, effect sizes, and confidence intervals (Sarstedt et al., 2022). For the mediating effect, we used Preacher and Hayes (2008) methods with subsamples of 5,000 bootstrapping procedures to evaluate t-values and confidence intervals for the mediating hypothesis.

Direct effect

Table 6 presents the direct effect results, which showed a significant impact of EA on OP ($\boldsymbol{\beta}$=0.573; P<0.001). Moreover, EA significantly affects OI ($\boldsymbol{\beta}$=0.436; P<0.001). OI also significantly and positively impacts OP (β=0.344; P<0.001). Hypotheses H1, H2, and H3 are accepted based on these significant results.

Table 6. Test of hypotheses (direct effect)

Relationships	Estimate	T	P
H1: Entrepreneurial Agility → Organizational Performance	0.573	14.15	***
H2: Entrepreneurial Agility → Open Innovation	0.436	9.79	***
H3: Open Innovation → Organizational Performance	0.463	10.53	***

Note: ***P<.001; N=411.

Indirect effect

The mediating effect of OI on the relationship between EA and OP is tested, and the results are shown in Table 7. The results revealed that OI has a *complementary, partial* mediation effect on the EA—OP relationship (β=0.105; LLCI=0.050; ULCI=0.151) since the direct relationship between EA and OP was still significant after introducing the mediator variable into the model. Hence, hypothesis H4 is also accepted.

Table 7. Test of hypotheses (indirect effect)

Relationship	Total effect		Direct effect		Relationship	Indirect effect		95% Confidence Interval	
	β-value	S.E	β-value	S.E		Beta	S.E	LLCI	ULCI
EA → OI	0.37***	0.035	0.28***	0.044	H_4-EA → OI → OP	0.105	0.025	0.050	0.151

Note: N=411;EA= Entrepreneurial Agility; OI=Open Innovation; OP=Organizational Performance LLCI= Lower Limit Confidence Interval: ULCI= Upper Level Confidence Interval.

Moderation effect

The current study tested environmental dynamism as a potential moderator in the relationship between EA and OP and found that in the presence of high environmental dynamism, the relationship between EA and OP gets stronger compared to low environmental dynamism. The conditional effect of EA on OP in the presence of environmental dynamism is shown in Table 8. In addition, the slope of the relationship is shown in the moderation graph in Figure 2.

Table 8. Conditional effects of the focal predictor (Entrepreneurial Agility) at values of the moderator (Environmental Dynamism)

DV: Organizational Performance				
Test(s) of highest order unconditional interaction: (X*W)				
R^2 -change = 0.091***				
F Statistics = 51.01				
Moderator: Environmental Dynamism	β	P	95% CI	
-1 SD	0.121	0.13	-0.054	0.431
Mean	0.344	<.001	0.142	0.552
+1 SD	0.674	<.001	0.418	0.930

Note: *** p<0.001; CI= confidence interval.

The results indicate a significant moderation effect with a significant R2 (0.091) change and significant F statistics (51.01; P<0.05). Moreover, the slope of the relationship, as presented in the mod graph, indicates that in the presence of high environmental dynamism, even with low EA, OP is high. On the other hand, in the presence of high environmental dynamism and high OP, OP will be the highest, as the study hypothesized in H5. As a result, hypothesis H5 is also accepted.

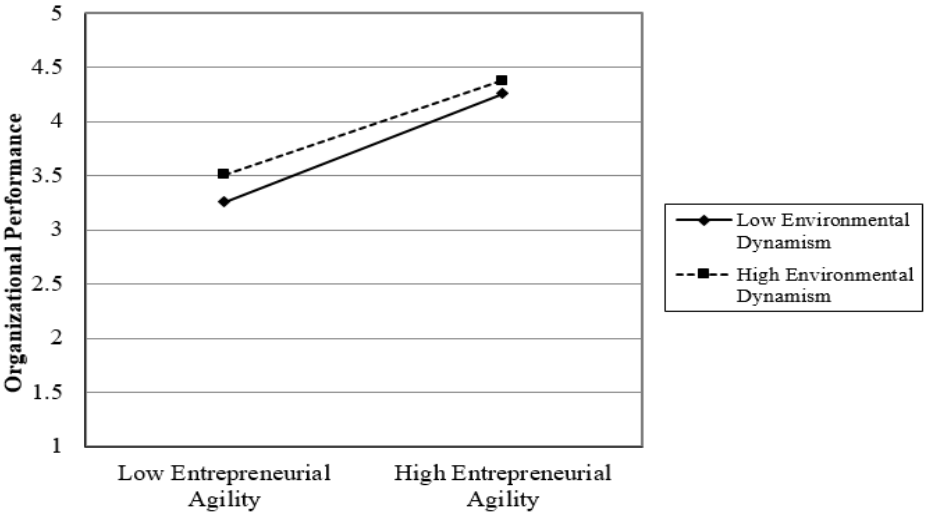

Figure 2. The moderation graph

DISCUSSION AND CONCLUSIONS

The Information and Communication Technologies (ICT) sector is playing an important role in the growth of the European economy (Maryska, Doucek, Kunstova, 2012). However, in Italy, the entrepreneurs of ICTs are facing many challenges, including limited access to finance, governmental policies, and knowledge/ability to explore international markets (Corno et al., 2014). In addition to the external environmental factors, several internal conditions influence the performance of IT firms in Italy. Therefore, this research has focused on factors that can lead to performance. First, this research, building upon the DCT, has examined the role of EA on OP in the IT sector in Italy. Secondly, it highlighted the relationship between EA and OI. In this current digital era, EA can help organizations achieve better performance and competitiveness (Kuratko & Audretsch, 2013). Thirdly, it identified the mediating effect of OI in the EA—OP relationships. Fourthly, the study has revealed the moderation of ED between EA and OP.

The first hypothesis of this research proposed a positive relationship between EA and the OP of IT companies in Italy. Our results confirm this hypothesis, indicating that EA can enhance companies' performance. The results, furthermore, theorize the prior claim that a firm's ability to predict, visualize, and utilize entrepreneurial opportunities (Karimi & Walter, 2021) can positively affect its performance (Chakravarty, Grewal, & Sambamurthy, 2013). Thus, firms that implement EA achieve higher organizational performance. This finding is in line with the DCT. Furthermore, it advances its claims in the IT companies in Italy that entrepreneurial managers who decide to establish solid dynamic capabilities within their firm become better at sensing emerging developments and making more efficient use of their EA, which, in turn, enhances performance (Warner & Wäger, 2019; Teece et al., 2016).

The second hypothesis focused on analyzing the nexus between EA and OI. Supportively, our findings indicate that EA is positively related to OI. Put another way, the more capable a firm is in terms of opportunity foresight, systematic insight, and entrepreneurial mindset, the more efficient and effective it becomes in exploiting internal and external knowledge. Thus, EA can be a strategic tool for firms to leverage the opportunities of OI. Some studies have highlighted the influence of different agility strategies on innovativeness, innovation capabilities, and open innovation. For example, Dabic et al. (2021) mentioned the positive relationship between intellectual agility and innovativeness. Similarly, Zhou, Mavondo, and Saunders (2019) explained that marketing agility positively influences innovation capabilities.

The third hypothesis examines the relationship between OI and OP. The findings supported this hypothesis and revealed that OI could significantly enhance the performance of IT companies. Thus, our result advances the theoretical propositions of the DCT that DC framework clusters (sensing, seizing, and transforming capabilities) might assist firms in reaping the full advantages of OI (Bogers et al., 2019; Cirjevskis, 2022), thereby enhancing firm performance. Previous studies (i.e., Bigliardi et al., 2020; Hung & Chou, 2013; Caputo et al., 2016; Rass et al., 2013) have indicated positive effects of OI on OP. On the other hand, our findings disagree with the studies that found a negative nexus between OI and OP

(i.e., Davoudi et al., 2018). Furthermore, the analysis of the present study reveals that the more open a firm´s innovation, the greater its performance. Therefore, more openness leads to superior firm performance.

The fourth hypothesis of this research proposed that OI positively mediates the relationship between EA and OP. The results highlight that OI is a significant mediator that better explains the relationship of EA with OP. EA directly and indirectly (i.e., in the presence of open innovation) influence the OP of IT companies. The result of the study shows that OI partially mediates the association between EA and OP. Partial mediation implies that some effects of predictors pass through mediator variables while others pass directly from independent to dependent variables and have *p*-values of 0.005. This result demonstrates that EA is a dynamic capability that can be leveraged to enhance OI in a firm, improving firm performance. In other words, OI can secure the accomplishment and continuous replication of high levels of innovation and, hence, the long-term and stable development of firms that respond to environmental concerns feasibly and flexibly (Ober, 2022). Thus, in line with the theoretical proposition of the DCT, the more agile a firm is, the more likely it will adopt OI (Wang & Kim, 2017).

The fifth hypothesis was proposed to investigate the moderation of ED on the relationship between EA and OP. The findings support this hypothesis by claiming that ED is a significant moderator between EA and OP. This finding indicates that ED may provide a window of opportunity for new technologies and markets, encouraging firms to constantly assess their knowledge and understanding from external information sources and be flexible in accepting the environment to increase OP (Zhang & Zhu, 2021). Thus, our findings confirm previous research like Chakravarty et al. (2013), who found that ED significantly moderates the relationship between EA and OP. At the same time, it disagrees with the findings of Zulganef et al. (2023), who observed that environmental dynamism is negatively related to the link between EA and performance. Contrarily, the current research results highlight that high ED and high EA can lead to high OP in Italian IT companies. The implications of these findings from theoretical and managerial perspectives are in order.

Theoretical implications

Agility and dynamic capabilities have remained a hot debate among researchers for the last decade. However, many studies still focus on different approaches/strategies of skill that can influence performance. EA is an emerging domain, and analyses in this area have highlighted several theoretical, practical, and managerial implications. Similarly, this research has shown the implications for practitioners and researchers. Regarding theoretical implications, the study has contributed to the limited literature on EA, OI, ED, and OP. Previously, many studies have focused on different types of agility, including organizational agility (OA) (Chakravarty et al., 2013), supply chain agility (SCA) (DeGroote and Marx, 2013), marketing agility (MA) (Li et al., 2021), and strategic agility (SA) (Ahammad et al., 2021). However, we depart from this line of research by focusing on EA, as there needs to be more literature on EA. Therefore, this research has highlighted the interplay between EA, OI, ED, and OP, using the DCT as a theoretical foundation. It is the first study to examine such interrelationships in the IT sector. In addition, this research provides new insight for researchers focusing on the IT sector.

Managerial implications

Our study findings are of much value to managers and practitioners. EA is vital for enhancing organizational performance. Thus, to respond effectively to ever-changing market conditions, IT firms must continuously update their EA as a DC. Building an innovative culture requires an atmosphere that encourages experimentation and the willingness to take risks. Employees must be given an environment that promotes empowerment, allowing them to generate and test new ideas without fear of negative repercussions. Investing in staff training and development cannot be overstated to foster and sustain this organizational culture. Through the development of EA, IT firms may maintain a competitive advantage and effectively respond to dynamic market situations.

Furthermore, IT firms can cultivate an environment conducive to OI by actively promoting and supporting employee experimentation and the willingness to take risks. It entails providing workers with vital resources, allocated time, and requisite support to explore new ideas and innovations actively. IT firms have the potential to motivate and acknowledge their workers who actively participate in the process of OI, therefore fostering a feeling of ownership and responsibility within the workforce. An innovative culture has the potential to cultivate creativity, enhance employee engagement, and facilitate the development of novel products and services.

The correlation between EA and OP also has significant practical implications for managers within the IT sector. Considering the nature of EA, which incorporates the capacity to adapt to dynamic market circumstances promptly, IT

firms need to prioritize the implementation of agile methodologies and frameworks that enable them to respond quickly to emerging challenges and potential opportunities. Moreover, managers must cultivate a corporate environment that fosters OI and experimentation, motivating staff to embrace risk-taking and go into uncharted territories of thought. Managers can use OI processes to strengthen the connection between EA and OP. These practices include collaborating with external partners and accessing various skills and resources. Through the use of external knowledge and skills, IT firms have the potential to augment their innovative capabilities, hence fostering long-term success.

The positive relationship between EA and OI also has important practical implications for managers of organizations. Firms prioritizing EA are more likely to possess the DC required to adapt quickly to changing market conditions and respond to new challenges and opportunities. In turn, it enables them to leverage the benefits of OI, which involves collaborating with external partners to access a broader range of knowledge, expertise, and resources. Managers should create a culture encouraging experimentation, risk-taking, and continuous learning to enhance the link between EA and OI. It can be achieved by investing in employee training and development, promoting open communication and collaboration, and fostering an environment that rewards creativity and innovation.

OI involves collaborating with external partners to access broader knowledge, expertise, and resources, enhancing an organization's ability to innovate and create new customer value. To improve the link between OI and OP, managers should prioritize building relationships with external partners, such as customers, suppliers, and academic institutions. By collaborating with external partners, IT firms can leverage their strengths and resources to drive innovation and improve their OP. Moreover, IT firms should regularly evaluate their OI strategies to identify areas for improvement and adjust their approaches accordingly. It can involve assessing the effectiveness of existing partnerships, exploring new collaboration opportunities, and investing in technologies that enable more effective communication and knowledge sharing. Finally, managers should prioritize building a diverse and inclusive workforce that can bring various perspectives and experiences to the innovation process. By promoting diversity and inclusivity, IT firms can enhance their innovation capabilities and create products and services that better meet the needs of their customers.

The finding that OI is a positive mediator in the link between EA and OP of IT firms has significant practical implications for managers. The results indicate that IT firms seeking to enhance their technological capabilities have the opportunity and should consider using both internal and external knowledge sources (Arvaniti et al., 2022). It is recommended that managers prioritize the development of EA and OI capabilities of OP to capitalize on the mediated effect of OI; it is also essential for managers to prioritize developing an organizational culture that nurtures EA. OI encompasses cultivating a conducive atmosphere that fosters ongoing learning. Through this approach, IT firms have the potential to produce an entrepreneurial attitude, enabling them to effectively recognize and capitalize on emerging prospects while also adjusting their strategies to accommodate dynamic market circumstances.

Moreover, it is crucial for managers to consistently assess the effectiveness of their OI methods and make necessary adjustments as deemed appropriate. The process includes:

- identification and resolution of obstacles to collaboration with external partners.
- exploration of novel collaboration prospects; and
- allocation of resources towards technologies that enhance communication and knowledge exchange.

The findings that ED plays a supportive role in the association between EA and OP within IT firms have significant practical implications for managerial decision-making. To optimize OP, managers must prioritize the cultivation of EA while also considering the ever-changing nature of the external environment in which their business operates. To capitalize on the moderating influence of ED, managers need to emphasize establishing a highly adaptable organizational culture sensitive to external fluctuations. The process includes constantly monitoring the surroundings for potential opportunities and challenges and demonstrating adaptability in addressing changes in the marketplace. Furthermore, managers need to develop plans adapted to the unique ED under which their firm functions. In a context characterized by significant volatility, managers should emphasize the cultivation of capabilities that facilitate OI and the ability to effectively respond to changing market dynamics.

Limitations and recommendations

This research has highlighted several implications and focused on the broad context, but it still possesses some limitations that future researchers can consider. First, the research has merely focused on Italy's IT companies; future studies can gather

data from the manufacturing sector. Secondly, the conceptual framework of this study has considered open innovation as a mediator, and future studies can extend the framework by including innovation capabilities as a mediator. Moreover, *future research can replicate our conceptual framework in emerging economies to allow for cross-cultural validation and verification.*

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Authorship contribution statement

Leul Girma Haylemariam: Introduction, Literature Review, Methodology, Analysis, Discussion. **Stephen Oduro:** Literature Review, Introduction, Methodology, Discussion, Editing & Proofreading. **Zewdu Lake Tegegne**: Survey Questionnaire, Data Collection, Data Analysis, References.

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The authors declare no conflict of interest.

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Decoding start-up failures in Indian start-ups: Insights from Interpretive Structural Modeling and Cross-Impact Matrix Multiplication Applied to Classification

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Abstract

PURPOSE: *Start-ups are widely acknowledged as crucial catalysts for innovation and drivers of economic progress. However, their vulnerability to failure continues to pose a persistent and significant obstacle. In light of this, the study intends to ascertain the various elements responsible for the elevated incidence of start-up failures and examine their contextual associations. It further aims to establish the hierarchical structure and identify the crucial factors of start-up failure.* ***METHODOLOGY:*** *The paper uses the Interpretive Structural Modeling (ISM) approach to determine the structural hierarchy and interconnections among the causes of start-up failures identified through the comprehensive analysis of existing literature and experts' opinions. MICMAC (Cross-Impact Matrix Multiplication Applied to Classification) analysis is also being utilized to categorize these identified failure causes into autonomous, independent, dependent, and linking factors by their driving and dependency powers.* ***FINDINGS:*** *A structural framework depicting the interrelationships among the factors has been derived, showing the failure factor, 'poor market positioning' factor at the highest level, and the 'lack of entrepreneurial efficiency' at the lowest level of the model. The results also revealed that lack of entrepreneurial efficiency, poor management, and external environmental issues are the most significant independent factors upon which all other failure factors rely. It also categorizes 'poor market positioning' as the dependent factor, signifying its passive role in the failure of start-ups.* ***IMPLICATIONS:*** *As previous literature has discussed the various factors responsible for the failure of start-ups in isolation, the current study fills out the gap in the literature by establishing linkages among those factors. The study's insights emphasize the value of effective management teams and entrepreneurial skills in averting start-up failures. It highlights the importance of skill development and mentorship to enhance the capabilities of entrepreneurs and their teams. Furthermore, the research indicates that policymakers and support groups can create focus initiatives addressing issues like market validation, team dynamics, and financial management to enhance the start-up environment. These initiatives may encompass entrepreneurship training, financial assistance, and mentorship through the 'Start-up India' Program, Bharat Fund platform, etc.*
ORIGINALITY AND VALUE: *Previous studies on entrepreneurial failure are based on AHP (Analytical Hierarchical Process), content analysis, and quality management methodologies. This is potentially the first study using the ISM-MICMAC approach that explores the complex world of start-up failures in India and illustrates the relative influence and interdependence of various failure factors of start-ups through a hierarchical model.*

Keywords: *start-ups, failure factors, start-up failures, Interpretive Structural Modeling, ISM, Cross-Impact Matrix Multiplication Applied to Classification, MICMAC, entrepreneurial efficiency, market positioning, management competency, external environmental issues, failure prevention strategies, Indian, entrepreneurship skill development.*

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INTRODUCTION

Over the last two decades, a noticeable surge in academic research on entrepreneurship has contributed to advancing a solid theoretical foundation within the field. Entrepreneurship has significant importance in fostering economic growth and facilitating the overall development of an economy through the creation of more employment opportunities, the enhancement of national production, the attainment of international competitiveness, and the advancement of the quality of life (Arenius & Minniti, 2005; Koellinger & Thurik, 2012). Entrepreneurial start-ups can create fresh job opportunities (Singh, 2017) and serve as platforms for the exploration and application of creative potential. Start-ups are seen as human organizations that develop novel goods or services while actively seeking viable business models within very unpredictable circumstances (Blank, 2013; Ries, 2011). These companies are in their initial stages of operations and are based on innovation and creativity (Skala, 2019). They engage in the process of "technovation," combining technology and innovation capabilities (Kalyanasundaram, 2018). Technovation is the synergistic process by which organizations combine the innovative and technological capacities of their operations and produce new products, services and processes (Ndesaulwa & Kikula, 2016). Start-ups are growing rapidly all over the world. They have emerged as a significant source of innovation, creativity, job opportunities, and economic growth for developed, as well as developing economies (Franco & Haase, 2010; Liao et al., 2008).

The start-up ecosystem in India is making a drastic improvement in terms of the number of start-ups, a more conducive environment, better investment, etc. It exhibits a wide array of innovations that merge technology-centric solutions with grassroots advancements. As of May 31, 2023, India had over 99,000 DPIIT (Department for Promotion of Industry and Internal Trade)-recognized enterprises distributed over 670 districts, establishing India as the 3rd largest start-up globally (Invest India, 2022). The Indian start-up ecosystem has experienced tremendous expansion over the past few years (2015-2022), with a 15-fold increase in total funding, a 9-fold increase in investors, and a 7-fold expansion in the number of incubators (Start-upindia.gov.in, 2024). It has demonstrated its capacity to generate globally competitive firms with billion-dollar values by having more than 100 start-ups as Unicorns (BusinessToday, 2023). Unicorns are start-up companies with a valuation of more than one billion US dollars. The entry of more start-ups into the market leads to further expansion in entrepreneurship, employment, and the economy (Acs & Szerb, 2007; Decker et al., 2014). To drive economic growth, more start-ups are needed to evolve into larger enterprises (Valliere & Peterson, 2009; Wennekers et al., 2002). However, according to Kalyanasundaram (2018), the entrepreneurial path of transforming ventures into established large corporations is fraught with numerous personal, cultural, financial, and legal obstacles. It is very common for new businesses to start up everywhere, but it is also true that there are failures everywhere. According to (Pena, 2002), since start-ups often have a poor survival rate, many are vulnerable to the hardships of failure. According to a study conducted by Forbes magazine in 2015, it was noted that around 90% of start-ups experience failure within the initial five years of their establishment in the United States (Patel, 2015). This tendency is also evident in the Indian setting (Cherian, 2017; Sreekumar et al., 2022). The scenario in other economies exhibits similar characteristics (Calderón et al., 2019; DemandSage, 2024; Devece et al., 2016; Start-up Genome, 2022).

The phenomenon of entrepreneurial failure has received significant scholarly attention and has emerged as a crucial subject in recent times (Klimas et al., 2020). The substantial incidence of failure in start-up ventures, estimated to be about 90% worldwide, is a significant concern that warrants careful consideration (Bajwa et al., 2017; Cotterill, 2012; Shepherd et al., 2000). The term 'start-up failure' or 'entrepreneurial failure' is a multidimensional concept (Johnson, 2010) that typically means the discontinuation of activities or the closure of a firm, resulting from an incapacity to attain enduring expansion, profitability, or feasibility in the market (Jenkins et al., 2014; Rodrigues & Stevenson, 2013). The consequences of entrepreneurial failure transcend the boundaries of the firm and exert a significant impact on employment and the overall economy. Timely help and minimal effort might potentially rescue several failing firms from imminent collapse (Al-Alawi et al., 2023). At the macroeconomic level, the reduction of failure rates can considerably impact the success of both enterprises and entrepreneurs in their endeavors to establish and develop start-ups. At the micro level, pinpointing the reasons for failure may be useful in creating reliable procedures, minimizing the socioeconomic costs of failure, and providing future entrepreneurs with valuable insights (Singh et al., 2015).

Existing literature has extensively examined the multitude of elements contributing to the failure of start-ups. Some of the commonly identified factors include lack of financial resources, inadequate sales, insufficient market demand, poor business development strategies, and technological difficulties (Goswami et al., 2023; Pisoni et al., 2020). Studies have also mentioned the impact of inexperienced entrepreneurial teams, competition, limited resources, poor business planning,

inadequate government backing, and legal, accounting, and tax concerns (Denton, 2020; Nigbor-Drożdż & Łukasiński, 2023; Santisteban et al., 2022). Prior research has predominantly concentrated on pinpointing the specific failure elements of start-ups and studying them in isolation. It is evident that a single element is typically not solely responsible; instead, a multitude of interconnected forces are responsible for start-up failures (Al-Shami et al., 2019). However, there is a dearth of knowledge about the hierarchical connections and dependencies among those factors. Therefore, to fill these gaps, the present study examines the factors that lead to start-up failures, creates interconnecting links between them, and constructs a hierarchical theoretical framework among these contextual variables. Here, the word 'contextual' means interrelated within the particular context or environment that surrounds start-up failures rather than being distinct. The study presents a thorough structural framework that facilitates a more holistic understanding of the dynamics underlying start-up failures. The research questions (RQs) proposed for the study are:

RQ1: What are the crucial factors that explain the failure of start-ups?
RQ2: What connections exist between the factors identified by the MICMAC method?
RQ3: What is the hierarchical structure of the contextual/context-specific variables that provide strengthening levels according to dependence and driving force?

The study utilizes the ISM (Interpretive Structural Modeling) and MICMAC (Cross-Impact Matrix Multiplication Applied to Classification) techniques. The ISM approach is suitable for analyzing complex interconnections among factors and identifying their hierarchy (Thennal VenkatesaNarayanan et al., 2021). It efficiently addresses the intricate issues, making it an ideal choice for the present study (Goel, Kumar et al., 2022). Similarly, The MICMAC approach is deemed appropriate due to its ability to categorize components as independent, dependent, autonomous, or linked, identifying their impact inside intricate systems (Choudhary et al., 2022). This categorization is relevant for the study because it facilitates the comprehension of the hierarchy of components and adds to a thorough investigation of the dynamics and interactions found in entrepreneurial environments.

This research study makes a noteworthy scholarly addition to the established body of information within the realm of entrepreneurship by expanding beyond the single-variable studies found in previous studies. Outlining the interrelationships and interdependencies among the factors, the study seeks to provide a distinct viewpoint on the intricate realm of start-up failures. It identifies crucial factors of start-up failure and provides actionable information for practitioners to prioritize areas requiring attention to decrease start-up failures. The present research aims to provide entrepreneurs, investors, and policymakers with valuable insights regarding start-up failure factors, thereby, facilitating better decision-making and nurturing a supportive start-up ecosystem. Though the present study originates from within the Indian context, the observations and suggestions of the study align with common issues faced by start-ups worldwide, making the findings applicable and adjustable to the global setting. Practitioners throughout the globe may adapt the priority tactics, emphasize skill development, and utilize hierarchical connection insights to improve the success of start-ups.

The present study has been structured as follows: The next section describes and highlights the literature relevant to contextual determinants of start-up failure. Subsequently, the methodology adopted in this paper is outlined, with the following sections delving into the results and discussion part. Then, the theoretical and practical implications are elaborated upon. Lastly, the research concludes with a discussion of its limitations and future directions.

LITERATURE REVIEW

Entrepreneurial or start-up failure has emerged as a significant area of research, but there are still several uncertainties regarding understanding this field (He et al., 2018; Jenkins & McKelvie, 2016). Start-up failure does not have any standard definition in the literature, and it is defined as a multidimensional concept. In broad terms, it involves discontinuation or termination of a firm. But, in specific terms, start-up failure is defined as per three different perspectives (Lattacher & Wdowiak, 2020). First, few researchers define start-up failure as the complete withdrawal of the business from a particular market. They consider market persistence as a fundamental factor in determining business failure (Perkins, 2014). The second lens examines organizational failure, which refers to the termination of a firm (Bruno et al., 1992; He et al., 2018; Singh et al., 2015). This dimension generally encompasses financial terms such as bankruptcy, liquidity, discontinuity, and death (Jenkins et al., 2014; Rodrigues & Stevenson, 2013). It also includes cases when enterprises have not yet achieved insolvency but experience financial losses and lack economic viability (Ucbasaran et al., 2013). Lastly, the individual

perspective emphasizes failure as the failure to meet objectives subjectively recognized by the entrepreneur, irrespective of the company's survival (Chermack et al., 2007; Jenkins et al., 2014; Ucbasaran et al., 2013). The present study considers the viewpoint of the second group and describes start-up failure as the closure or discontinuance of a firm due to failure to meet financial or economic viability (Lattacher & Wdowiak, 2020).

Existing literature shows that there are multiple reasons responsible for the failure of new firms known as start-ups. Research has studied and classified these factors from different perspectives. For instance, some studies have classified failure reasons as objective-subjective elements (Jenkins & McKelvie, 2016), while others have highlighted environmental issues (Franco et al., 2021; Khelil, 2016) or individual (Rahman et al., 2020) and organizational viewpoints (García-Ramos et al., 2017; Klimas et al., 2021). Some scholars have classified them as deterministic-nondeterministic-emotional (Khelil, 2016; Mellahi & Wilkinson, 2004) and controllable-uncontrollable categories (Kasema, 2021). However, these failure factors are majorly categorized as internal and external elements (Klimas et al., 2021; Zacharakis et al., 1999), where internal causes are under the direct control of the firm, and external causes are beyond the firm's control (Atsan, 2016). The absence of a clear goal and competent entrepreneurial education, insufficient institutional funds, flaws in the business model, lack of marketing expertise and managerial experience, poor management, low-quality employees, etc., are a few examples of internal causes of start-up failure (Gaskill et al., 1993; Lussier, 1995; Omorede, 2021; Wagner, 2013). External causes of failure include economic conditions, shifts in government policies, and unforeseen events (Cardon et al., 2011; Gaskill et al., 1993).

According to the extant body of knowledge, many aspects of start-up failure exist, as explained above. However, the primary factors attributing to the failure of start-ups in India may be listed below (refer to Table 1):

Table 1. Failure factors of start-ups

Code	Failure factors	References
S1	Poor management	Bruno and Leidecker (1988), Gaskill et al. (1993), Arasti et al. (2014), Ooghe and De Sofie (2008), Bednár and Tarišková (2017), Franco and Haase (2010), Ihua (2009), Al-Shami et al. (2019), Lukason and Hoffman (2015), Giardino et al. (2015)
S2	Poor market positioning	Akter and Iqbal (2020), Triebel et al. (2018), Calderón et al. (2019), Franco and Haase (2010), Cantamessa et al. (2018), Theng and Boon (1996)
S3	Fierce market conditions	Akter and Iqbal (2020), Triebel et al. (2018), Franco and Haase (2010), Ihua (2009), Kasema (2021), Vesper (1990), Lukason and Hoffman, (2015)
S4	Financial issues	Akter and Iqbal (2020), Triebel et al. (2018), Calderón et al. (2019), Franco and Haase (2010), Lussier (1995), CB Insights (2021)
S5	Inefficient human capital	Akter and Iqbal (2020), Calderón et al. (2019), Sheldon (1994), de Winne and Sels (2010), Amankwah-Amoah (2016), Phaladi and Wellington (2008)
S6	Lack of institutional support	Franco and Haase (2010), Arasti et al. (2014), Ghobadian and Gallear (1996)
S7	Poor networking	Akter and Iqbal (2020), Franco and Haase (2010), Atsan (2016), Baum et al. (2000), Cennamo and Santaló (2015)
S8	Lack of innovation	Franco and Haase (2010), Cantamessa et al. (2018), CB Insights (2021) Fu et al. (2017), Dokko and Wu (2017)
S9	Lack of entrepreneurial efficiency	Theng & Boon (1996), Calderón et al. (2019), Franco and Haase (2010), Kasema (2021), Arasti et al. (2014), Duchesneau and Gartner (1990), Phaladi and Wellington (2008)
S10	Poor business model	Cantamessa et al. (2018), Bajwa et al. (2017), Kasema (2021), Doganova and Eyquem-Renault (2009), Cennamo and Santaló (2015), Baecker (2023)
S11	External environmental issues	Theng and Boon (1996), Akter and Iqbal (2020), Calderón et al. (2019), Ihua (2009), Kasema (2021), Arasti et al. (2014), Liao (2004), Gaskill et al. (1993), Strotmann (2007), Nigbor-Drożdż and Łukasiński (2023)

S1. Poor management: A management team has always been an important part of a business. It is vital for deciding the success or failure of a firm. A management team with a lack of clear vision and strategy can leave start-ups directionless, resulting in resource wastage, confusion among stakeholders, and poor performance (Franco & Haase, 2010; Nobel, 2011; Safari & Das, 2023). Lack of managerial skills and expertise (Al-Shami et al., 2019) results in ineffective decision-making, absence of a business model, and financial mismanagement, finally leading to the failure of firms (Al-Shami et al., 2019; Cantamessa et al., 2018; Larson & Clute, 1979; Mantere et al., 2013). There is a need for strong passion and commitment in the management team (Arasti et al., 2014) to prevent start-up failure.

S2. Poor market positioning: When a start-up lacks knowledge of its target market (Franco & Haase, 2010) and launches its product at the wrong time (Bruno et al., 1992; CB Insights, 2021; Vesper, 1990) without analyzing the market needs (Cardon et al., 2011; Lukason & Hoffman, 2015), the problem of market-product misfit arises (Bruno et al., 1992). Failure to implement proper marketing and sales strategies (CB Insights, 2021) results in poor product positioning, causing product failure and, eventually, failure of a start-up because of reduced revenue and competitiveness (Feinleib, 2012; Klotins et al., 2019).

S3. Fierce market conditions: The success or failure of a company can be significantly impacted by prevailing market circumstances. Start-ups often enter markets crowded with established players (Almakenzi et al., 2015; Lukason & Hoffman, 2015), and competing with them can be highly challenging, making it tough for new participants to gain a foothold. The high entry rate of new start-ups in the market makes it even tougher for them to survive (CB Insights, 2021; Skeldon, 2019). Low customer demand leads to low sales and revenue, forcing start-ups to slow down their operations (Choshin & Ghaffari, 2017; Long et al., 2018; Pisoni et al., 2020). These fierce market conditions demand adaptability, innovation, and resilience from start-ups, otherwise, they will fail.

S4. Financial issues: Financial issues for start-ups encompass challenges related to initial funding, securing external investment, mismanagement of funds, excessive spending, and the consequential cash burn situation (Stice et al., 2023). Many start-ups suffer from inadequate initial funding as they only utilize their own funds or family and relatives' money to launch a venture (Safari & Das, 2023). The inability to secure funding from external sources like venture capital, investors, etc., makes it difficult for them to innovate and scale up their businesses (Lussier, 1995). Also, the rapid depletion of limited funds due to mismanagement of funds (Cooper et al., 1994; Giardino et al., 2015) and excessive spending on unnecessary expenses (Cardon et al., 2011) may lead to a cash burn situation (CB Insights, 2021; Krishna et al., 2016) causing wasted capital and missed growth opportunities. All these financial issues can impede a start-up's ability to operate effectively, grow, and adapt in a competitive market, leading them toward failure.

S5. Inefficient human capital: Existing literature recognizes the significance of human capital in determining the achievement or downfall of firms (Semadeni et al., 2008). Since recruiting, maintaining, and motivating staff members is essential to any company's success, effective administration of human resources plays a pivotal role in determining the sustainability of a start-up (Bruderl et al., 1992; Priyanka et al., 2023). Employees might provide a competitive edge (de Winne & Sels, 2010), therefore, they should be involved in the decision-making along with higher authorities and managed properly (Sheldon, 1994). Inefficient human capital, such as a lack of knowledge and capabilities of employees, leads to poor market positioning, lack of innovation, and poor networking (de Winne & Sels, 2010). In light of evolving workplace demands, there is a need for skill updation and upgrading to be competitive and minimize the risk of failure (Amankwah-Amoah, 2016).

S6. Lack of institutional support: Institutional support plays a pivotal role in nurturing start-ups, providing them with essential resources, guidance, and funding, but their absence may contribute to failure. Businesses are normally skeptical about external support (Ghobadian & Gallear, 1996). Insufficient institutional support, coupled with a lack of relevant information about the support and time to benefit from them, hinder businesses' survival and development (Arasti et al., 2014). The absence of institutional support can have a detrimental effect on entrepreneurial activity that may potentially hinder the success of businesses (Chambers & Munemo, 2019).

S7. Poor networking: Effective networking supports start-ups with access to valuable resources like mentors, investors, suppliers, and potential customers (Baum et al., 2000) and valuable social, technical, and economic competitive advantages that often need significant operational experience to obtain (Ahuja, 2000). It provides new opportunities, partnerships, collaborations, and market insights to the start-ups and complements their internal management capabilities (Safari & Das, 2023). Issues like conflict among partners (Cennamo & Santaló, 2015), inadequate social capital, and weak investor connections hinder the flow of decision-making (Atsan, 2016), resulting in a lack of cooperation and contracts. Poor networking poses the risk of lack of funding, limited market reach, and missed opportunities for start-ups, forcing them to go alone and increasing the risk of failure (Ferreira et al., 2022).

S8. Lack of innovation: Innovation has the potential to provide novel market prospects (Mehralizadeh et al., 2006) and improve the performance of start-ups (Aminova & Marchi, 2021). Creating a sustainable business model is vital in a start-up's early stages (Dokko & Wu, 2017). Start-up products and services can stagnate without innovation, losing market attractiveness that may reduce their market relevance and customer interest (Cantamessa et al., 2018; CB Insights, 2021). Therefore, innovation in products, processes, and business models is important for companies to survive and succeed (Akter & Iqbal, 2020; Fu et al., 2017; Long et al., 2018).

S9. Lack of entrepreneurial efficiency: Entrepreneurial efficiency, sometimes referred to as entrepreneurial competence, encompasses the skills, expertise, and personality traits of an entrepreneur (Barazandeh et al., 2015). It generally pertains to the capacity of entrepreneurs to efficiently employ resources and make optimal choices in pursuing entrepreneurial objectives (Takii, 2011). Eunice Abdul (2018) stated that entrepreneurial skills and expertise are necessary for enterprises as they generate revenue and scale up the venture by predicting the probable risks. New businesses fail because the founder may lack the entrepreneurial skills to take it from conception to rapid expansion (Nair & Blomquist, 2019). Lack of business experience, entrepreneurial abilities, and lack of readiness, imitation, poor judgment, inventiveness, and tenacity are the main reasons for start-up failure (Bushe, 2019). Sometimes, entrepreneurs are overconfident (Hayward et al., 2006; Mantere et al., 2013), lack commitment (Cennamo & Santaló, 2015; Van Gelderen et al., 2006), and show unwillingness to take advice from professional experts advice (Kalyanasundaram, 2018; Khelil, 2016), that also pose the risk of failure for new ventures.

S10. Poor business model: The business model elucidates how a firm generates and provides value to consumers (Seddon et al., 2004). Business models have the potential to drive innovation and provide a competitive edge to start-ups (Zott & Amit, 2008), the absence of which might impede innovators (Doganova & Eyquem-Renault, 2009) from successfully implementing and extracting value from their inventions (Teece, 2010). A poor business model usually denotes shortcomings or errors in the planning (Kasema, 2021) and implementation of crucial elements, which cause operational inefficiencies and make success more difficult. It encompasses insufficiencies in the identification of target markets, revenue streams, cost structures, or overall viability (Baecker, 2023; Bajwa et al., 2017). A poor business model can hinder a company's capacity to make money, stand out from the competition, and adjust to changing market conditions which in turn leads to start-up failure (Cantamessa et al., 2018).

S11. External environmental issues: The survival of start-ups, especially for businesses with low resources, is significantly impacted by external factors, including unfavorable economic conditions and inadequate infrastructure (Ooghe & Prijcker, 2008; Oparanma et al., 2010), excessive restrictions and insufficient legislation (Arasti et al., 2014; Bushe, 2019). Government support is essential for any new business to thrive outside (Garg & Shivam, 2017; Gaskill et al., 1993; Khelil, 2016). Studies have identified three key environmental factors that affect the outcomes of small enterprises: lending rates, taxes, and the absence of government support (Ibrahim & Goodwin, 1986; Nigbor-Drożdż & Łukasiński, 2023). Any changes in government policies and unexpected events would affect a firm's business model and management and disrupt operations, thereby increasing the chances of business failure. As their external environment evolves, start-ups need to monitor it and adjust accordingly to be viable and competitive.

METHODOLOGY

The present study adopts a qualitative and exploratory research design. This study employs a thorough examination of existing literature in conjunction with interviews conducted with experts in the field to figure out and verify the factors contributing to the failure of start-ups. Brainstorming sessions with 18 experts, involving academicians, industry experts, and entrepreneurs, were conducted to identify the relationships among the failure factors. These selected experts' profiles are mentioned in Annexure I. Purposive sampling was used to select initial participants based on their expertise and skills. After that, snowball sampling was applied due to a lack of awareness about the experts in this area. The snowball sampling approach was also used in other studies that followed the ISM methodology (Gan et al., 2018; Goel et al., 2022). ISM technique requires a brainstorming session with selected experts from the respective field (Goel et al., 2022). The data was collected from a self-structured questionnaire comprising factors contributing to start-up failure. Statements explaining the research objective and the factors based on the literature review were broadly explained along with the questionnaire to ensure the clarity of the context. In the questionnaire, the failure factors were listed in the rows and columns and labeled as S1, S2 ... S11, as shown in Annexure II. Experts were asked to complete a pairwise comparison of the 11 failure factors based on the type of relationships among factors. The experts were briefed to compare the row statement to the column statement for each cell on the questionnaire and to select an appropriate symbol from symbol sets V, A, X, and O (as explained in Annexure II). Experts were asked questions separately to mitigate the potential influence of one's personal views on others. Consensus analysis was applied to eliminate experts' subjectivity and validate the data (Ma et al., 2019). Subsequently, all the responses were reviewed, and the opinion-receiving experts' consensus was used to formulate interpretive structural modeling.

Then, the factors identified were examined using the ISM methodology, which facilitates the construction of a visual representation illustrating the relationships and dependencies among them. It involves the transformation of disorganized and unstructured system models into systematic and hierarchal models (Attri et al., 2013). Finally, MICMAC analysis was conducted to categorize identified failure causes into autonomous, independent, dependent, and linking factors based on their dependency and driving power. The study has used the ISM-MICMAC approach because it provides a nuanced understanding of complex relationships in situations requiring a holistic and comprehensive decision-making approach (Sarvari et al., 2023; Sreenivasan et al., 2023).

Interpretive Structural Modeling (ISM)

ISM is a well-recognized qualitative technique that makes the investigation and comprehension of intricate connections between diverse components of a system easier. The notion of ISM was initially introduced by Warfield (1974) as a scientific implementation of graph theory (Sindhu et al., 2016). This modeling technique involves organizing a collection of many aspects that are both directly and indirectly connected into a complete and systematic model (Sage & Smith, 1977; Warfield, 1974). The technique uses experts in the relevant subject to break down a complicated structure into various components and construct a hierarchical conceptual framework (Mannan et al., 2016). This model aids in comprehending the interdependencies of a complicated set of factors and examining the impact of an element on other elements (Mandal & Deshmukh, 1994; Shitika et al., 2013; Singh et al., 2003). The levels of hierarchy symbolize the magnitude and direction of connections among those identified factors. The ISM approach involves many steps listed below:

1) ISM process begins by identifying the variables relevant to the study objective or problem by conducting an extensive assessment of the available literature in the field.
2) After identifying a set of variables, contextual links among the variables are established by relying on experts' opinions. Then, a structural self-interaction matrix (SSIM) representing the pair-wise connections between the variables identified is constructed (Mandal & Deshmukh, 1994; Singh & Samuel, 2018).
3) The results obtained from the SSIM are then converted into binary values (0, 1) to get the initial reachability matrix. Subsequently, the transitivity rule is employed to generate the final reachability matrix (FRM).
4) After that, the FRM is partitioned into multiple tiers through level partitioning.
5) Then, a conical matrix is formed by organizing elements at the identical level throughout the rows and columns of the FRM.
6) Using the conical matrix, an initial digraph is prepared, which includes transitivity relationships, and then the final digraph, excluding these transitive links, is prepared.
7) Finally, the digraph undergoes a transformation process in which nodes are replaced with phrases, resulting in the formation of an ISM structure. This ISM framework shows a hierarchical structure that is established by organizing factors into several levels, which indicates the nature of the interaction between them.

Cross-Impact Matrix Multiplication Applied to Classification (MICMAC)

MICMAC, abbreviated from "Matrice d'Impacts Croisés-Multiplication Appliquée à un Classement" in French, also translated as "Cross-Impact Matrix Multiplication Applied to Classification" in English, is a method for classifying and analyzing the relationships between variables in a system or problem. It is frequently employed as an addition to the ISM technique to further comprehend the functions and significance of ISM-identified factors. It is a prominent methodology devised by Duperrin and Godet (1973) that employs the features of matrix multiplication (Nandal et al., 2019). MICMAC analyses variable driving and dependent power to find and classify important variables into four distinct groups-autonomous, independent, dependent, and linkage factors (Choudhary et al., 2022).

RESULTS

The current section presents the research findings based on the data collected and analyzed using the ISM and MICMAC approaches. First, the ISM approach is utilized to construct a hierarchical model that represents the interconnections between various failure factors of start-ups as a directed graph. Based on existing literature and brainstorming sessions with esteemed professionals and experts, eleven factors leading to the start-up failure were found. These factors were coded as S1 for poor management, S2 for poor market positioning, S3 for fierce market conditioning, and so on (refer to Table 1).

Structural Self-Interaction Matrix (SSIM)

SSIM is employed to ascertain the contextual associations between specified elements through the utilization of expert judgments. The SSIM is developed to analyze the pairwise correlations among already identified failure factors by assigning a code based on the predetermined set (V, A, X, O). These four possible pairings between variable p and variable q are as follows:

- V: variable p leads to variable q;
- A: variable q leads to variable p;
- X: variable p and q mutually impact each other;
- O: variable p and q do not influence each other.

The overall amount of pairwise comparisons in the creation of SSIM is represented as ((N)*(N-1)/2), where N represents the number of essential elements (Choudhary et al., 2022). Based on the above relationship, SSIM for failure factors of start-ups is drawn as given in Table 2. The value O for (S1, S11) factors shows that failure factors S1 and S11 have no relation with each other, value A for (S2, S11) indicates the influence of failure factor S11 on S2, and so on.

Table 2. Structural Self-Interaction Matrix (SSIM)

Failure factors	S11	S10	S9	S8	S7	S6	S5	S4	S3	S2	S1
S1	O	V	A	V	V	V	V	V	O	V	
S2	A	A	A	A	A	A	A	A	A		
S3	A	V	O	A	O	O	O	V			
S4	A	A	A	V	A	A	A				
S5	O	A	A	V	X	A					
S6	A	V	A	V	X						
S7	A	X	A	O							
S8	A	A	A								
S9	O	V									
S10	A										
S11											

Initial Reachability Matrix (IRM)

Following the formation of the SSIM, the next stage entails converting the SSIM into the IRM matrix. This conversion involves substituting the V, A, X, and O with the binary values 1 and 0, respectively, following the provided conditions (Table 3). For instance, the code for (S1, S11) is O in SSIM, and it will be transformed into 0 for both the entries (S1, S11) and (S11, S1) in the IRM matrix.

- if the value of (p, q) pair in SSIM is V, then (p, q) will be coded as 1, and (q, p) will be coded as 0 in IRM;
- if the value of (p, q) is A, then (p, q) will be coded as 0, and (q, p) will be coded as 1 in IRM;
- if the value of (p, q) is X, then both (p, q) and (q, p) relations will be coded as 1 in IRM;
- if the value of (p, q) is O, then both (p, q) and (q, p) relations will be coded as 0 in IRM.

Table 3. Initial Reachability Matrix (IRM)

Failure factors	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11
S1	1	1	0	1	1	1	1	1	0	1	0
S2	0	1	0	0	0	0	0	0	0	0	0
S3	0	1	1	1	0	0	0	0	0	1	0
S4	0	1	0	1	0	0	0	1	0	0	0
S5	0	1	0	1	1	0	1	1	0	0	0
S6	0	1	0	1	1	1	1	1	0	1	0
S7	0	1	0	1	1	1	1	0	0	1	0
S8	0	1	1	0	0	0	0	1	0	0	0
S9	1	1	0	1	1	1	1	1	1	1	0
S10	0	1	0	1	1	0	1	1	0	1	0
S11	0	1	1	1	0	1	1	1	0	1	1

Final Reachability Matrix (FRM):

After transforming the SSIM into IRM, the subsequent step includes the development of the FRM matrix by taking into consideration all possible transitivity links (Attri et al., 2013). According to the transitivity rule, if M causes N, N causes O, then M will automatically cause O. For example, in the present case, since S1 influences S8 and S8 influences S3, it implies that S1 will influence S3 as per the rule of transitivity. Therefore, entry (S1, S3) is marked as 1* in the FRM. The idea of transitivity is employed to address any potential gaps in the opinions gathered throughout the construction of SSIM (Attri et al., 2013). The symbol "*" in Table 4 shows the presence of transitivity. This final reachability matrix (FRM) assists in allocating the ranks to the factors through level partitioning. In FRM, the total number of rows and columns reflects each factor's driving and dependence power, respectively, which further helps cluster the elements into independent, dependent, autonomous, and linkage factors through MICMAC analysis.

Table 4. Final Reachability Matrix (FRM)

Failure factors	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	Driving power
S1	1	1	1*	1	1	1	1	1	0	1	0	9
S2	0	1	0	0	0	0	0	0	0	0	0	1
S3	0	1	1	1	1*	1*	1*	1*	0	1	0	8
S4	0	1	1*	1	1*	1*	1*	1	0	1*	0	8
S5	0	1	1*	1	1	1*	1	1	0	1	0	8
S6	0	1	1*	1	1	1	1	1	0	1	0	8
S7	0	1	1*	1	1	1	1	1*	0	1	0	8
S8	0	1	1	1*	1*	1*	1*	1	0	1*	0	8
S9	1	1	1*	1	1	1	1	1	1	1	0	10
S10	0	1	1*	1	1	1*	1	1	0	1	0	8
S11	0	1	1	1	1*	1	1	1	0	1	1	9
Dependence power	2	11	10	10	10	10	10	10	1	10	1	

Level partitioning

The FRM enables the derivation of reachability and antecedent groups for individual factors, as Warfield (1974) discussed. The reachability set encompasses the focal element as well as any other elements that it has the potential to impact, while the antecedent set is a collection of the focal element itself plus any other components that could potentially cause the occurrence of that particular element (Attri et al., 2013). Thus, in FRM, all the factors for which there is a '1' in the row

referring to the factor in the consideration will be part of the reachability set, and factors for which there is a '1' in the column referring to the factor in the consideration will come under the antecedent set. For instance, for factor S1 in the study, the reachability set comprises S1, S2, S3, S4, S5, S6, S7, S8, and S10, whereas the antecedent set comprises S1 and S9. Thereafter, an intersection set for each element is derived, which comprises the common elements in the reachability and antecedent sets. The elements exhibiting similar reachability and intersection sets are marked as 'level I' while level partitioning. These elements classified as 'level I' in the ISM model are regarded as high-level factors and include all those elements that do not cause the emergence of other variables but will be influenced by others. After the identification of 'level I' factors, they are eliminated from the table, and the procedure is iteratively repeated to ascertain components at subsequent levels of the hierarchy. For example, in partitioning iteration 1 (see Table 5), factor S2, which has identical reachability and intersection set, is marked as 'level I' and is removed to perform the remaining iterations.

Table 5. Level Partitioning Iteration 1

Failure factors	Reachability set	Antecedent set	Intersection set	Level
S1	1,2,3,4,5,6,7,8,10	1,9	1	
S2	2	1,2,3,4,5,6,7,8,9,10,11	2	I
S3	2,3,4,5,6,7,8,10	1,3,4,5,6,7,8,9,10,11	3,4,5,6,7,8,10	
S4	2,3,4,5,6,7,8,10	1,3,4,5,6,7,8,9,10,11	3,4,5,6,7,8,10	
S5	2,3,4,5,6,7,8,10	1,3,4,5,6,7,8,9,10,11	3,4,5,6,7,8,10	
S6	2,3,4,5,6,7,8,10	1,3,4,5,6,7,8,9,10,11	3,4,5,6,7,8,10	
S7	2,3,4,5,6,7,8,10	1,3,4,5,6,7,8,9,10,11	3,4,5,6,7,8,10	
S8	2,3,4,5,6,7,8,10	1,3,4,5,6,7,8,9,10,11	3,4,5,6,7,8,10	
S9	1,2,3,4,5,6,7,8,9,10	9	9	
S10	2,3,4,5,6,7,8,10	1,3,4,5,6,7,8,9,10,11	3,4,5,6,7,8,10	
S11	2,3,4,5,6,7,8,10,11	11	11	

After removing the 'level I' factor from the table, that is, S2 factor, the intersection set is determined for all the remaining factors in the abovementioned manner. At this stage, factors having the same reachability and intersection set are classified as 'level II' factors (see Table 6). For example, in the present study S3, S4, S5, S6, S6, S7, S8, and S10 factors fall into 'level II' category.

Table 6. Level Partitioning Iteration 2

Failure factors	Reachability set	Antecedent set	Intersection set	Level
S1	1,3,4,5,6,7,8,10	1,9	1	
S2		1,3,4,5,6,7,8,9,10,11		I
S3	3,4,5,6,7,8,10	1,3,4,5,6,7,8,9,10,11	3,4,5,6,7,8,10	II
S4	3,4,5,6,7,8,10	1,3,4,5,6,7,8,9,10,11	3,4,5,6,7,8,10	II
S5	3,4,5,6,7,8,10	1,3,4,5,6,7,8,9,10,11	3,4,5,6,7,8,10	II
S6	3,4,5,6,7,8,10	1,3,4,5,6,7,8,9,10,11	3,4,5,6,7,8,10	II
S7	3,4,5,6,7,8,10	1,3,4,5,6,7,8,9,10,11	3,4,5,6,7,8,10	II
S8	3,4,5,6,7,8,10	1,3,4,5,6,7,8,9,10,11	3,4,5,6,7,8,10	II
S9	1,3,4,5,6,7,8,9,10	9	9	
S10	3,4,5,6,7,8,10	1,3,4,5,6,7,8,9,10,11	3,4,5,6,7,8,10	II
S11	3,4,5,6,7,8,10,11	11	11	

After the identification of 'level II' factors, they are removed from the model, and the same iteration process is followed again. Factors with identical reachability and intersection sets, such as S1 and S11, are ranked as level III (see Table 7) and removed from the further process.

Table 7. Level Partitioning Iteration 3

Failure factors	Reachability set	Antecedent set	Intersection set	Level
S1	1	1,9	1	III
S2		1,9,11		I
S3		1,9,11		II
S4		1,9,11		II
S5		1,9,11		II
S6		1,9,11		II
S7		1,9,11		II
S8		1,9,11		II
S9	1,9	9	9	
S10		1,9,11		II
S11	11	11	11	III

Now, only one factor, S9, remains with identical reachability and intersection sets. Therefore, the S9 factor will be assigned the 'level IV' as shown in Table 8. Once all the factors are assigned to the different levels, this partitioning process comes to an end.

Table 8. Level Partitioning Iteration 4

Failure factors	Reachability set	Antecedent set	Intersection set	Level
S1		9		III
S2		9		I
S3		9		II
S4		9		II
S5		9		II
S6		9		II
S7		9		II
S8		9		II
S9	9	9	9	IV
S10		9		II
S11				III

In this research, a series of four level partitioning rounds have been performed (as shown in tables 5, 6, 7, and 8), and the failure factor S2 has been given level I, factors S3, S4, S5, S6, S7, S8, and S10 have been ranked II, factors S1, S11 has been ranked III, and factor S9 has been ranked last at level IV. This helps in deciding the hierarchy of factors in the structural model, where 'level I' factors will appear at the top and 'level IV' factors at the bottom of the model.

Conical matrix

A conical matrix is created using FRM and iteration levels to ascertain the causal and dependent influence of the various factors. It is constructed by grouping variables from the identical level along both rows and columns of FRM (refer to Table 9). The driving magnitude of a variable is determined by aggregating the count of 1s horizontally, while its dependency magnitude is determined by totaling up the count of 1s vertically (Raj et al., 2008). For instance, Table 9 shows that factor S2 alone is at level I and has been written first. Then, failure factors S3, S4, S4, S5, S6, S7, S8 and S10 have been grouped at level II and written after S2. Subsequently, a similar grouping of factors was done for level III and IV failure factors. The conical matrix exhibits similarities to the FRM matrix, with the notable distinction that the elements in the conical matrix are positioned along the rows and columns according to their respective levels.

Table 9. Conical matrix

Failure Factors	S2	S3	S4	S5	S6	S7	S8	S10	S1	S11	S9	Driving power	Level
S2	1	0	0	0	0	0	0	0	0	0	0	1	I
S3	1	1	1	1*	1*	1*	1*	1	0	0	0	8	II
S4	1	1*	1	1*	1*	1*	1	1*	0	0	0	8	II
S5	1	1*	1	1	1*	1	1	1	0	0	0	8	II
S6	1	1*	1	1	1	1	1	1	0	0	0	8	II
S7	1	1*	1	1	1	1	1*	1	0	0	0	8	II
S8	1	1	1*	1*	1*	1*	1	1*	0	0	0	8	II
S10	1	1*	1	1	1*	1	1	1	0	0	0	8	II
S1	1	1*	1	1	1	1	1	1	1	0	0	9	III
S11	1	1	1	1*	1	1	1	1	0	1	0	9	III
S9	1	1	1*	1	1	1	1	1	1	0	1	10	IV
Dependence power	11	10	10	10	10	10	10	10	2	1	1		
Level	I	II	II	II	II	II	II	II	III	III	IV		

Digraph

A digraph is a graphical representation of factors drawn based on level partitioning (Figure 1). It is a visual depiction of the hierarchical relationships and interdependencies among various factors or variables within a complex system in terms of nodes and edges after removing the transitivity (Thakkar, 2021). In this, the first-level failure factors are put at the highest level of the digraph, followed by the subsequent levels of factors. This procedure is continued until all factors have been positioned in an initial digraph. The initial digraph is transformed into the final digraph by removing all the transitivity links (Raj et al., 2008).

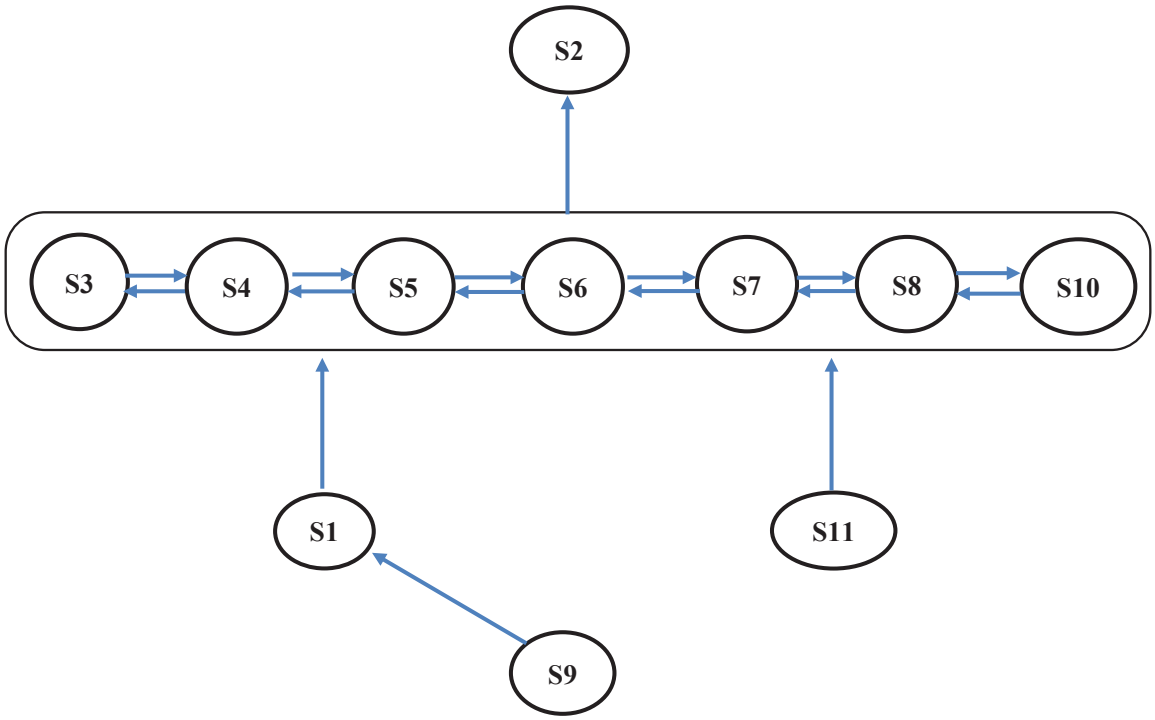

Figure 1. Final digraph indicating the interrelationships among the failure factors

Structural model of ISM

ISM model is prepared by replacing the nodes representing factors in diagraph with the statements (Attri et al., 2013). The ISM framework facilitates the comprehension of the structural hierarchy of failure factors and the interconnectedness that exists among them (refer to Figure 2). This allows decision-makers to strategically plan their start-up activities in the most suitable path.

The ISM model derived in the present study shows that lack of entrepreneurial efficiency, external environmental issues, and poor management are the primary variables significantly contributing to the failure of start-ups. Poor market positioning appearing on the top of the model contributes least to the model as its driving power is lowest and it is dependent on other factors. The study finds that all other remaining factors like fierce market conditions, financial issues, poor networking, lack of innovation, poor business model, etc., are acting as the linkage between the other factors.

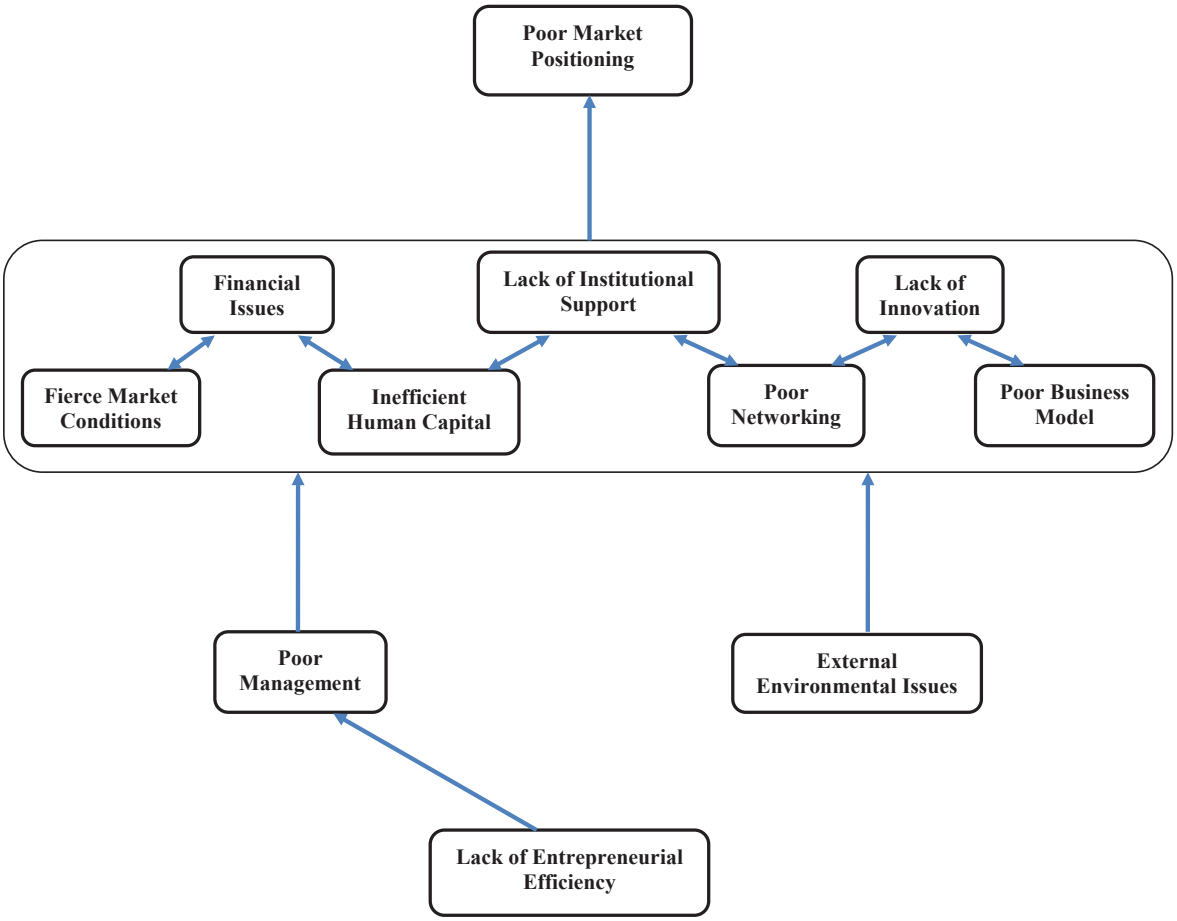

Figure 2. Structural model for critical failure factors of start-ups

MICMAC analysis

Once the structural framework has been derived using ISM, the MICMAC methodology is utilized for analyzing the driving and dependent values of factors, aiding in the determination and categorization of key variables into four categories. It presents the driving values on the y-axis and dependence values on the x-axis and then classifies the failure factors of start-ups identified through ISM into four clusters, answering the second research question of the study (refer to Figure 3):

1) **Autonomous Factors**: These variables have low driving and dependency values, indicating minimal influence and reliance on other factors. Because of the weak linking power, they share with other barriers, these factors have relatively no connection with the overall model. In the present study, no autonomous failure factor is identified.

2) **Independent Factors:** These are the key determinants that exert a significant impact on several other variables. These factors possess a strong driving force and exhibit limited dependency power. In the study, failure factors S9, S11, and S1, such as lack of entrepreneurial efficiency, external environmental issues, and poor management, fall into this cluster. These are the important elements that control how the system functions and greatly influence other variables. If not given adequate attention, these factors will lead to the failure of start-ups.
3) **Dependent Factors:** These elements have a modest driving force but a substantial dependency. These are dependent on others having a minimal influence on the remaining parts of the system. Only the S2 factor, i.e., poor market positioning, is found to fall under this category, signifying that all other factors lead to poor market positioning, and therefore, the S2 factor requires extra focus.
4) **Linkage Factors:** These elements serve as a link between independent and dependent parameters of the model and aid in the transmission of impacts. They have a strong driving force in addition to high dependency. Any change in them will influence other factors, or vice-versa may also happen. In the study, S3, S4, S5, S6, S7, S8, and S10 all these factors are found to be part of this cluster depicting the interconnection between the other remaining failure factors.

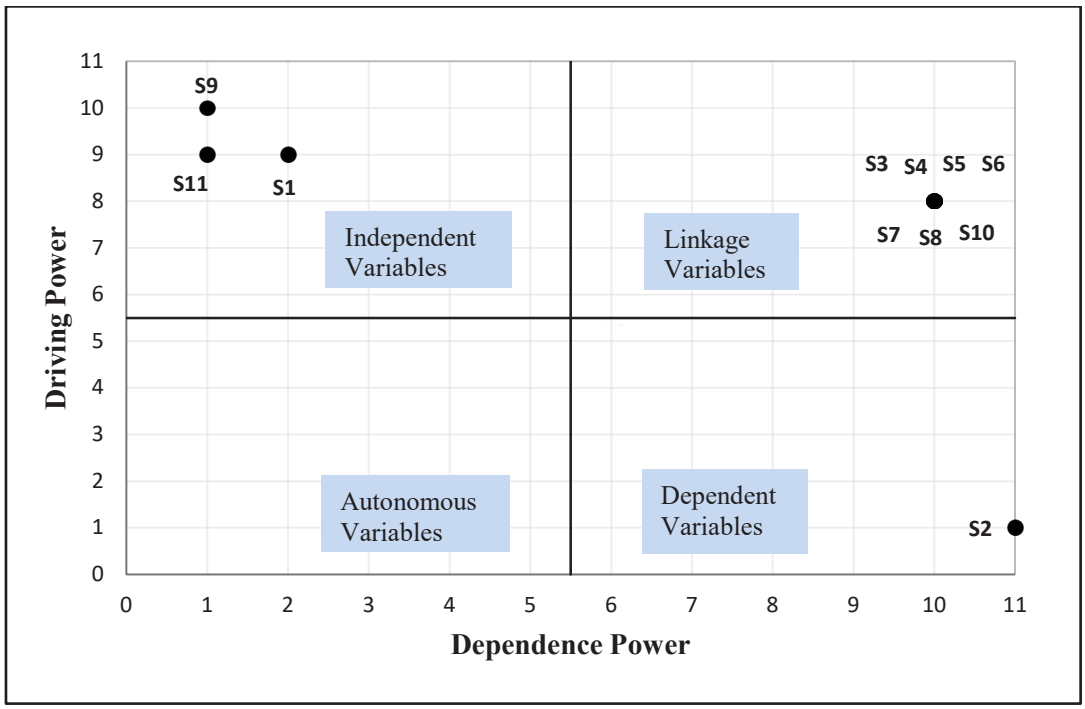

Figure 3. MICMAC analysis

DISCUSSION

The current study identifies the critical elements that lead to start-up failure and establishes the interconnections among them. Start-ups act as an engine of economic growth for India's economy by creating more jobs, enhancing productivity, and increasing GDP (Liao et al., 2008), thus making India a more developed and self-reliant economy. While the global start-up count is on the rise, the rate of their failure remains about the same. Over 9 in 10 *start-ups* globally encounter failure within the initial five years of their existence (Start-up Genome, 2022), which is true in the context of India. Considering the substantial role played by start-ups, it becomes crucial to determine the potential causes of start-up failures in India so that proper action can be taken to mitigate their risk of failure. The current study identifies the factors contributing to the failure of start-ups in India and defines the inter-links among them through the ISM technique. Researchers frequently employ the ISM method to convert a complicated, unorganized model into an organized one (Mannan et al., 2016).

To begin with, based on existing literature and brainstorming discussions with related professionals, eleven start-up failure factors were identified and labeled as S1, S2, S3, … . Then, contextual links among the variables were identified with the assistance of professional judgments, and an SSIM matrix was prepared. Using the ISM technique, a structural

model representing the interconnections among the variables was formed where all variables were partitioned into four levels. This answered the third research question of the study relating to the hierarchical structure of the variables that provide strengthening levels according to dependence and driving force. In the model, lack of entrepreneurial efficiency appears at the lowest level, signifying that it is the primary determinant of start-up failures. The findings align with prior scholarly research that shows the importance of a well-qualified and competent entrepreneur in making a business successful (Barazandeh et al., 2015; Mitchelmore & Rowley, 2010). According to studies by Bruderl et al. (1992) and Alvarez and Busenitz (2001), entrepreneurs exert a direct influence on business operations, assuming a crucial position in the firm's achievement and growth.

ISM technique was supported with MICMAC analysis that was applied to gain a more profound comprehension of the roles and significance of components defined by the ISM. It answered the second research question of the study and classified the identified 11 failure factors into different clusters. The failure factors were divided into four groups, namely autonomous, independent, dependent, and linkage factors, considering their driving and dependence power, mentioned in the final reachability matrix (Table 4) (Attri et al., 2013). Autonomous variables are the ones that have low driving and dependent values. In the findings, not a single factor appears as an autonomous variable. This observation demonstrates that every variable contributes to the model. Therefore, all 11 identified factors that have been discovered substantially impact the failure of new ventures. Lack of entrepreneurial efficiency, poor management, and external environmental issues are part of independent variables. Independent variables are characterized by their strong influence and low level of reliance on other factors. This answers the very first research question of the study and suggests that all these three factors are crucial failure factors on which all other factors depend. Previous research shows that entrepreneurs are the principal players in a business. Their skills and abilities matter (Chowdhury et al., 2015; Hsieh et al., 2019). Studies suggest that a high rate of small business failures is usually attributed to inadequate management, often rooted in a lack of necessary expertise in owners and management teams (Rauch & Rijsdijk, 2013; Shepherd & Wiklund, 2006). Few authors suggest that the general/external environment poses challenges like unanticipated changes in the market, government and legal restrictions, high taxes, etc., and influences entrepreneurs as well as firms (Ibrahim & Goodwin, 1986; Mayr et al., 2017). Sometimes, owners and managers exhibit a lack of foresight in identifying these potential dangers (Amankwah-Amoah, 2015) and fail to develop effective corporate strategies. Consequently, this may result in the mismanagement, financial insolvency, and ultimate demise of these firms (Ooghe & Prijcker, 2008). These researches have further determined that the convergence of deficient management practices, the personal characteristics of owner-managers, and external circumstances together contribute to business failure (Berryman, 1983; Yacoub & Harb, 2023).

MICMAC analysis further classifies 'poor market positioning' as a dependent variable with low driving potential and a high level of dependent power. It means that the other factors influence market positioning. Poor market positioning is characterized by failure to launch products on time, poor marketing mix strategies, failure to have a proper product-market fit, a lack of market research, etc. (CB Insights, 2021). It is the failure of entrepreneurs and managers who lack vision and mission and fail to implement proper strategies (Franco & Haase, 2010; Mukhamad et al., 2020). Due to their inabilities, inexperience, and lack of knowledge, firms fail to build a strong network in the market and lack institutional support. The firms usually sought support in recruiting staff, purchasing equipment, and handling bureaucratic processes (Franco & Haase, 2010). They face the problem of insufficient financial, human, and social capital, which further leads to a lack of business innovation (de Winne & Sels, 2010; Mannan et al., 2016). As a result, firms get outcompeted in the market due to their inability to bring new innovative products and services, face fierce competition from rival firms, and build a strong business model (Cantamessa et al., 2018). Since all these variables are strongly influenced by the driving factors while influencing the dependent variable, i.e., poor market positioning of products, they fall into the linkage factor category (refer to Figure 2).

In sum, the findings of the study help in understanding the complicated web of failure factors in a more simplified and hierarchical manner with the help of ISM and MICMAC approaches. Findings suggest that the abovementioned failure causes are mainly attributed to the venture owner, i.e., the entrepreneur, who lacks the required skill, expertise, and efficiency needed to determine the reasons for the low performance and ultimate collapse of start-up firms (Franco & Haase, 2010). This is the most crucial failure factor out of the three independent factors (i.e., lack of entrepreneurial efficiency, poor management, and external environment issues), as it appears at the bottom of the hierarchical model (level IV). These failure factors altogether influence the market positioning of the start-up firm, which further impacts its performance, lowers sales and revenue, brings the problem of a cash crunch, and finally leads to bankruptcy. These findings are in contrast to the study of Calderón et al. (2019), who identified human capital, organizational, and market

factors as the most important, while personal, financial, and external factors as less significant for the start-up failure in the city of Morelia Michoacán. This research helps broaden the knowledge of existing and potential entrepreneurs, policymakers, and other stakeholders and provides some sound theoretical as well as practical implications discussed in subsequent sections.

Theoretical implications

The present study explores the complex world of start-up failures and uses Interpretive Structural Modeling (ISM) to reveal the structural linkages between several factors that contribute to these failures. Rather than offering widely interpreted ideas, the study offers context-specific factors. The incorporation of qualitative data derived from the literature review and expert interviews, followed by quantitative analysis using the ISM approach, enhances the theoretical foundation of the research. The present study found several key factors that are responsible for start-up failures in India, such as lack of entrepreneurial efficiency, poor management, fierce market conditions, poor business models, external environment issues, etc. It explores the connections between these factors and classifies them into four distinct levels. It identifies lack of entrepreneurial efficiency as the main factor at the lowest level, highlighting the crucial role of highly skilled and capable entrepreneurs in the success of a firm (Barazandeh et al., 2015).

Earlier studies have assessed the main factors of entrepreneurial failure using AHP (Calderón et al., 2019), content analysis against real failure cases, and quality management methodologies (Safari & Das, 2023). This is potentially the first research using ISM, to the best of researchers' knowledge, that illustrates the relative influence and interdependence of various failure factors of start-ups through a hierarchical model. The use of MICMAC analysis along with ISM provides more valuable insights into the classification of elements as autonomous, dependent, linked, or independent and their impact on the ecosystem of start-up failures. The fact that none of the elements seems autonomous emphasizes the interconnected nature of every identified factor and their significant contribution to start-up failure. The present study improves our understanding of challenges that business ventures confront and offers a solid framework for future studies as well as useful suggestions for mitigating and preventing failure. It allows for a more comprehensive knowledge of how these factors interact and cascade to affect failure outcomes, expanding the theoretical understanding of start-up failure beyond single variables.

Practical implications

The research provides an insightful analysis of the complex factors contributing to the start-up failure. The findings have substantial practical implications for entrepreneurs, investors, policymakers, and other start-up ecosystem stakeholders. By comprehending the hierarchical relationships between failure factors, stakeholders can identify the critical failure drivers. This knowledge can contribute to the development of more precise risk mitigation strategies and more informed decision-making. The discovered failure variables and their linkages might help start-up founders and management deploy their resources more strategically. The present study shows the significance of having a good management team and entrepreneurial efficiency in preventing start-up failure. Entrepreneurs should indulge in different mentorship and skill enhancement programs to boost their skills and abilities and train their management team (Theng & Boon, 1996). They can collaborate with industry experts and experienced entrepreneurs to organize frequent workshops on proficient leadership, strategic decision-making, and inventive problem-solving. Training modules encompassing the areas of strategic planning, team dynamics, and successful communication, specifically tailored to enhance management teams' competencies, can also be conducted. For instance, the National Entrepreneurship Network (NEN) may organise skill enhancement programmes in India.

The findings suggest that policymakers and support groups within the start-up ecosystem, such as TiE (The Indus Entrepreneurs), may develop focused programs and efforts (Arasti et al., 2014) that establish a more favorable environment for start-up development by addressing the systemic concerns raised in the research, such as market validation, team relationships, and financial management. This might include providing training in vital entrepreneurship skills, offering financial incentives for start-ups, and connecting experienced mentors with emerging entrepreneurs through mentorship programs. Incubators and accelerators like the Indian Angel Network, Sequoia Capital India, etc., may introduce programs to guide start-ups in conducting market research, ensuring product-market fit, and having better market positioning. Entrepreneurship institutions like the Indian School of Business (ISB) can incorporate the research results in their entrepreneurship curriculum by showing them the hierarchical correlations between reasons for failure. Universities and

colleges can have an entrepreneurship cell within their campus to help budding entrepreneurs grasp their obstacles and avoid pitfalls. In conclusion, all stakeholders can make informed decisions, encourage innovation, and contribute to a more resilient and vibrant start-up ecosystem.

CONCLUSION

Start-ups have emerged as a crucial catalyst for fostering innovation, driving economic expansion, and generating employment opportunities in India (Venkatanarayana, 2016). India is 3rd largest start-up ecosystem worldwide, with more than 99,000 DPIIT-recognised start-ups and 108 unicorns as of May 2023 (Invest India, 2022). It is anticipated that by 2025, there will be over 200 unicorns in India. Despite the prevalent optimism around Indian entrepreneurs, it is projected that over 90 percent of these ventures are expected to experience failure within the initial five-year period (Sreekumar et al., 2022). The research indicates that a significant proportion of newly established businesses encounter substantial difficulties during their first phases, resulting in their ultimate failure. Therefore, understanding the underlying causes of company failure becomes crucial for formulating effective policies and initiatives that foster entrepreneurial endeavors and enhance the viability of these emerging enterprises.

Though there has been much research regarding entrepreneurial failure, there remains a dearth of comprehension regarding the interrelationships among these elements. The current investigation uses the interpretive structural modeling approach to ascertain the interrelationships among the 11 failure variables that have been discovered through an exhaustive analysis of relevant literature and the incorporation of expert viewpoints. The hierarchical model derived using ISM divides the failure factors into four levels (refer to Figure 2). It shows the factor 'lack of entrepreneurial efficiency' (S9) positioned at the lowermost part, indicating the significant influence of an entrepreneur in determining the viability of a firm, upon which all other identified failure factors rely. Poor market positioning (S2) forms the topmost level of the model showing its dependency on all other failure factors. The ISM technique was complemented by MICMAC analysis that categorized all the failure drivers into four distinctive groups by their driving and dependence power. Out of a total of eleven failure factors, S9, S11, and S1, that is, lack of entrepreneurial efficiency (S9), external environmental issues (S11), and poor management (S1) are grouped as independent factors, and only one factor, that is, poor market positioning (S2) falls under the category of dependent factor. All remaining seven factors, fierce market conditions (S3), financial issues (S4), inefficient human capital (S5), lack of institutional support (S6), poor networking (S7), lack of innovation (S8), and poor business model (S10) are classified as linkage factors. No factor was found to fall under the autonomous group, meaning that there is no single factor that does not lead to start-up failures in India.

Thus, the present article provides an insightful analysis of the failure factors and highlights the role of entrepreneurial inefficiency, poor management, external environmental forces, etc. in the failure. By delineating the interrelationships and interdependencies among the factors, this research suggests theoretical and practical implications and helps entrepreneurs, policymakers, academicians, etc. make better decisions, facilitating a supportive start-up ecosystem.

Limitations and future research directions

Despite insightful findings and recommendations, the present study contains a few limitations. First, the formulation of the ISM framework necessitates the opinion of experts in both the technique and the domain under study, which might add subjectivity and bias to the process. This might unintentionally reshape the framework in accordance with their personal viewpoints and experiences, influencing the results. Therefore, one should acknowledge the inherent biases and remain cautious while making broad generalizations based on the findings obtained. Second, despite the comprehensive literature analysis and expert consultation employed in this study, certain variables like socio-cultural shifts, national and international political instability, failure to pivot, etc., may have been inadvertently omitted. Therefore, it is recommended that those potentially neglected elements be incorporated into future studies. Furthermore, this research does not guarantee the statistical validity of the suggested model.

These limitations provide guidelines for further studies. They highlight the need for conducting quantitative research to complement and validate the ISM results so that the biases of experts can be removed. Subsequent investigations might expand on the model's identification and validate it using structural equation modeling (SEM) (Thakkar, 2008). The analytical network process (ANP) and analytical hierarchy process (AHP) may also be utilized to determine the degree of correlation between the variables included in this investigation. Since the current study explores the interconnections

among the reasons for start-up failure in India, the results cannot be generalized in other countries like the U.S. and China, which have different start-up ecosystems. This means that future studies may be conducted beyond national borders in diverse ecosystems to get more insightful findings. Future studies may focus on the following proposed research questions (RQs) to further the understanding of start-up failure:

RQ1: Do certain industries exhibit distinct patterns in the reasons for start-up failures, and how do these patterns differ across sectors?
RQ2: How have the patterns of failed start-ups changed over time, and what external factors have caused these changes?
RQ3: What is the long-term effect of making entrepreneurs more efficient on the growth and survival of start-ups?
RQ4: How does government support (including both financial assistance and regulatory measures) help in minimizing the occurrence of start-up failures?
RQ5: How could diverse start-up ecosystems in different nations impact the frequency and nature of start-up failures?

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ANNEXURE - I

Profiles of 18 experts selected for the study:

Experts	Number (total=18)	Gender	Age	Details	Experience
Academicians	11	Female- 5 Male - 6	38 to 60 years	6 Associate Professors and 5 Professors from reputed Universities and Colleges	More than 10 years of teaching experience in the field of entrepreneurship and management
Industrialists and Entrepreneurs	7	Female – 2 Male- 5	30 to 45 years	3 Industrialists and 4 Entrepreneurs	More than 5 years of business experience

ANNEXURE- II

The following table is intended to document the opinions of academics and professionals working in the fields of entrepreneurship and management regarding the causes of start-up failure. The table reflects the contextual relationship among the factors contributing to the failure of start-ups.

Kindly fill in the table based on the type of relationship between the failure factors. You need to compare the row statement to the column statement for each cell in the table and select an appropriate symbol from symbol sets V, A, X, and O

V: If factor p will influence factor q.
A: If factor p will influence factor q.
X: If factors p and q will influence each other.
O: If factors p and q will not influence each other.

Failure factors	S11	S10	S9	S8	S7	S6	S5	S4	S3	S2	S1
S1											
S2											
S3											
S4											
S5											
S6											
S7											
S8											
S9											
S10											
S11											

Where:
S1 = Poor management, S2 = Poor market positioning, S3 = Fierce market conditions,
S4 = Financial issues, S5 = Inefficient human capital, S6 = Lack of institutional support,
S7 = Poor networking, S8 = Lack of innovation, S9 = Lack of entrepreneurial efficiency,
S10 = Poor business model, S11= External environmental issues.

Biographical notes

Amita Pathania is currently a Research Scholar pursuing her Ph.D. from the Department of Management Studies, Central University of Haryana, India. She has teaching experience in Business Statistics, Financial Management, Entrepreneurship Development, and Accounting. She completed her Master's degree in Commerce in 2017 from Hindu College and her Bachelor's degree in Commerce in 2015 from Deen Dayal Upadhyaya College, University of Delhi, India. She holds meritorious awards for securing the top position in the college during her post-graduation and achieving the highest marks during her undergraduate semesters. Her areas of research interest include entrepreneurial finance, entrepreneurship, and start-ups.

Sunita Tanwar, Ph.D, presently holds the esteemed position of Head of the Department and Associate Professor in the Department of Management Studies at Central University of Haryana, India. She is an expert in organizational behavior, human resource analytics, cross-cultural management, training and development, and entrepreneurship, with 17 years of extensive teaching and research experience. She has earned her Ph.D. in Management from MLSU, Rajasthan, India. She has supervised 7 Ph.D. theses and has published more than 27 research articles in national and international journals. Dr. Tanwar has conducted 5 MHRD-funded programs under the Global Initiative for Academic Networks (GIAN) scheme in collaboration with international faculties from MEXICO, the US, and Spain. She was nominated as a representative from India for the International Training Programme on STI Policy and Management for Developing Countries organized by

ISTIC under the auspices of UNESCO in collaboration with MESTECC, Malaysia, and NAM S&T Centre, India, in 2021. She has also been a Visiting Professor at Technology de Monterrey University, San Luis Potosi, Mexico. She is a certified entrepreneurship educator from the National Entrepreneurship Network (NEN) in association with DST, NSTEDB, and Wadhwani Foundation. She is a lifetime member of the Indian Society for Training and Development, the American Society for Quality, and the National Entrepreneurship Network. Her primary research areas include organizational behavior, human resource management, entrepreneurship, and start-ups.

Authorship contribution statement

Amita Pathania: Conceptualization, Data Curation, Formal Analysis, Investigation, Methodology, Software, Validation, Visualization, Writing Original Draft, Writing – Review & Editing. **Sunita Tanwar:** Formal Analysis, Methodology, Project Administration, Validation, Supervision, Writing – Review**.**

Conflicts of interest

The authors declare no conflict of interest.

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The effectiveness of agile leadership in practice: A comprehensive meta-analysis of empirical studies on organizational outcomes

***S. Porkodi*[1]**

Abstract

PURPOSE: *The COVID-19 pandemic and the digital transformation have hastened the demand for enterprises to be more flexible and adaptive in a fast-changing environment, making agile leadership a prominent business trend. Agile leadership improves innovation efficiency, employee performance, and team effectiveness. However, there is limited research on agile leadership's effects on organizational outcomes. Thus, this study provides a meta-analytic review of the impact of agile leadership on organizational outcomes that cover various common dimensions like operational, employee, customer, financial, and social environments.* ***METHODOLOGY:*** *The study has two phases: the first phase performs bibliometric literature analysis, and the second phase performs meta-analysis. In the bibliometric literature analysis, 74 articles that were published between 2004 and 2023 were identified from Scopus and Google Scholar, and their type of publication, year of publication, countries involved in agile leadership research, keywords involved, and their association are examined. For the meta-analysis, 24 articles that performed empirical research were chosen from which the various independent and dependent variables studies, along with their standard regression coefficients (β) and correlation coefficients (γ) that represent the relationship between agile leadership or agile leaders and that of other factors, were extracted and examined.* ***FINDINGS:*** *The study found that there was a significant rise in publications on agile leadership after 2020, and Turkey, the United States, and Indonesia were involved more than other countries. Moreover, agile leadership is studied more in terms of operational outcomes and employee outcomes. The results of the meta-analysis indicate that agile leadership has a strong relationship with factors like interpersonal trust (β=0.93), organizational performance (β=0.90), organizational effectiveness (β=0.89), individual career success (β=0.89) and innovation management (β=0.81). Thus, it is clear that agile leadership has a stronger impact on operational outcomes than employee outcomes. Agile leadership characteristics such as digital innovation, trust, competency, result orientation, and wisdom are significant for organizational growth, team collaboration, team effectiveness, and organizational innovation.* ***IMPLICATIONS:*** *Identifying agile leadership concepts helps assess the progress of empirical research, improve leadership theories and models, and identify potential growth opportunities. The success of agile leadership depends on factors like a company's culture, industry, and size, and this can be studied further. Furthermore, organizations may need to adjust their strategies on customer service, financial management, and investment so that they better reflect the values of agile leadership.* ***ORIGINALITY AND VALUE:*** *This study classifies numerous different research models that shed light on the efficiency of agile leadership based on a comprehensive literature review that serves as the basis for this study. In addition, this study identifies potential problem areas that need to be fixed, and as a result, it makes a contribution to the research on agile leadership.*

Keywords: *agile leadership, organizational outcomes, operational outcome, employee outcome, interpersonal trust, leadership practice, organizational performance, meta-analysis, digital transformation, innovation management, employee performance, interpersonal trust, team effectiveness, COVID-19, strategic flexibility*

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INTRODUCTION

Leaders are an essential asset for the enterprise because they greatly influence organizational performance (Porkodi, 2022a) and employee engagement (Porkodi & Tabash, 2022; Porkodi, 2022b). Specifically, an agile leadership team that applies agility techniques and concepts is required for responding to change, staying competitive, and sustaining growth in the ever-changing business world. In today's fast-paced business world, companies need to be flexible and able to adapt to changing market conditions to stay competitive. In addition, the COVID-19 outbreak has brought forth uncommon situations in a global environment that is already dynamic, which need leaders to adopt fresh approaches to their leadership methods as the traditional styles are already insufficient (Aftab, Waheed, Khalid, Aftab, & Adnan, 2022; Edmondson, 2021; Lenart-Gansiniec, Sypniewska, & Chen, 2023). However, the COVID-19 pandemic has shown that traditional HRMPs are already insufficient, which entails the need to rethink and reformulate them in the direction of more effective innovation while also allowing organizations to survive COVID-19-like crises.

The term "agile leadership" is a method of administration that places an emphasis on collaboration, flexibility, and adaptability in managing teams and organizations (Ribeiro & Fernandes, 2010). An organization's leadership goals under an agile framework are to foster creativity, flexibility, and steady progress. Also, agile leadership focuses on developing the skills and mindsets essential to an organization's successful transition to a new operating model. Agile leaders may establish guiding principles, create strategies, and create procedures that will facilitate an orderly transition to organizational agility (Attar & Abdul-Kareem, 2020). The agile methodology, which was created for software development but has subsequently been adapted to many other fields, is strongly related to this practice. The Agile Manifesto, developed by a group of software engineers in 2001, emphasizes four core values: people and interactions, working software, customer collaboration, and adapting to change, and serves as the foundation for this methodology (Gren & Ralph, 2022). Consequently, agile leadership entails fostering an atmosphere where teams can react quickly to changing conditions and client demands (Horney, Pasmore, & O'Shea, 2010).

According to earlier studies, businesses that use agile leadership techniques are better equipped to accelerate innovation efficiency (Chen, Tee, & Chang, 2022b), improve employee performance (Ahmed & Elali, 2021), and achieve team effectiveness (Akkaya & Bagieńska, 2022). It was also reported that agile leaders with strategy flexibility play a crucial role in the success of digital transformation (Fachrunnisa, Adhiatma, Lukman, & Ab Majid, 2020). Agile leadership has been shown to have a positive impact on organizational performance (Akkaya & Sever, 2022), business resilience (Indiarti & Lantu, 2022), and business sustainability (Anggadwita, Suganda, Azis, & Profityo, 2021). Besides, Akkaya, and Üstgörül (2020) reported that in contemporary models of leadership, women exhibit more of the attributes of agile leadership. Challengingly, agile leaders must be able to act swiftly in times of crisis, even when information is lacking, and the potential for harm is high, and must be combined with other leadership styles based on the organization type and leaders' position (Foote, 2013; Grzesik & Piwowar-Sulej, 2018).

Very little study has been done on the efficacy of agile leadership on the outcomes of organizations in a variety of circumstances. This literature review aims to summarize all the evidence reported so far about the effectiveness of agile leadership. In this study, organizational outcomes have been broken down into different dimensions for a better and more in-depth analysis of an organization's performance and success. These dimensions include 1) *financial outcomes* that focus on the organization's financial performance, such as revenue and return on investment (ROI); 2) *customer outcomes* that measure how successfully the firm meets customer requirements and expectations, such as customer satisfaction and retention; 3) *operational outcomes* that focus on how efficiently the organization works, such as productivity and innovation; 4) *employee outcomes* that focus on how well the organization engages and supports its employees, such as employee satisfaction, retention, and performance; 5) *social and environmental outcomes* that focus on how an organization affects society and the environment, such as corporate social responsibility and community involvement. Assessing the impact of agile leadership on an organization's outcomes across these dimensions helps to provide a comprehensive understanding of the organization's overall success and areas for improvement.

Thus, the main objective of this meta-analytic review is to assess the effectiveness of agile leadership in achieving organizational outcomes. It seeks to identify the factors significantly influenced by agile leadership and categorize the dimensions of organizational outcomes improved through meta-analysis. To fulfill this research objective, this study addresses the following research questions (RQs):

RQ1: What are the various components and dimensions of organizational outcomes influenced by agile leadership and how are they categorized?
RQ2: How does agile leadership impact organizational outcomes?
RQ3: To what extent does agile leadership affect various dimensions of organizational outcomes?
RQ4: What recommendations can be made to improve the effectiveness of agile leadership and what topics should be explored in future research?
RQ5: How can the mediation and moderation model be developed to understand better the role and impact of agile leadership in organizations?

The paper is structured as follows: Section 2 discusses the various literature reports on agile leadership. Section 3 presents the research methodology and discusses the steps followed in study selection. Section 4 discusses the bibliometric analysis for the synthesis. The meta-analysis performed for the selected articles is explained in Section 5. Section 6 discusses the findings from the study, the novel conceptual model proposed for agile leadership, the theoretical and practical implications, and the limitations of the study. Section 7 concludes the research work.

RELATED WORKS

According to existing studies, agile leadership must be applied in an organization to achieve the best results and organizational agility (Hauhia, 2018; Joiner, 2019; Joiner, 2017). Though "agile leadership" is the primary term used by many researchers, other similar leadership styles are described in the literature. Greineder and Leicht (2020) revealed that servant leadership, transformational leadership, shared leadership, emergent leadership, and visionary leadership are classified as pertinent agile leadership styles. The results of various research studies indicate that agile leadership has a significant positive impact on employees' high involvement and performance (Jassmy & Katea, 2022a; Örnek & Camcı, 2021), work motivation (Setiawan, Goesmania, Riyanti, & Prasetyaningtyas, 2021), customer services (Kraume, Voormanns, & Zhong, 2019), faster ROI (O'Connor & Duchonova, 2014), and improving productivity (Parker, Holesgrove, & Pathak, 2015). Thus, developing agile leaders is a primary responsibility of the organization for its organizational sustainability (Hooi & Tan, 2021), sustainable growth (Johnson & Kruse, 2019; Joiner & Josephs, 2007), navigating unprecedented change (Patel, 2020) and in handling crises (Rigby, Elk, & Berez, 2020). Also, organizations in all industries need to develop a high level of agility to survive unprecedented change and complexity (Joiner, 2009).

Moreover, it was revealed that agile leadership has a greater impact on responsive innovation (Klopper & Pendergast, 2017) and sustainable business performance (Yazıcı, 2020). Avery (2004) said that agile workplaces are the best places to develop a sense of responsibility as a way to lead and work with others. Due to its significance, agile leadership has been a necessary curriculum in military education (Gehler, 2005). Thus, the key to making an agile transition work is to keep a constant balance between old work principles and new work principles (Gren & Lindman, 2020). Several authors reported that in the future, businesses that are better able to find and use leaders who can adapt to different cultures will have an edge over their competitors (Caligiuri, 2013; Cleveland & Cleveland, 2020). Also, according to the findings of the study, there is evidence to suggest that the socio-economic intervention was responsible for providing the techniques and tools necessary to strengthen the dynamic capacities of the organization (Haddad, Bonnet, & Tabchoury, 2020).

Several studies have insisted that trust, result orientation, flexibility, collaboration, and individual responsibility are the significant characteristics of agile leaders (Taş, 2022). The significance of the CEO's network effect on digital transformation and agile leadership was examined by Chen, Chang, Baudier, and Tee (2022a). Both for-profit and nonprofit sectors need flexible and agile leaders (McPherson, 2016). The significance of agile leadership in various sectors like hotel management (Lundqvist, Wallo, Coetzer, & Kock, 2022), healthcare (Şahin & Alp, 2020), and education (Özdemir, 2023) were also studied in the literature. Bäcklander (2019) reported that the flexibility of an agile leader helps to balance autonomy and alignment in software development organizations. According to Breakspear (2017), agile leadership will be necessary for future school-leadership success as it provides optimism and a dynamic approach to educational development. Fang, Armstrong, and Nguyen (2017) said that tourist spots should focus on building strong, flexible leadership to get an edge over their competitors. Ibrahim, Ebraheem, and Mahfouz (2022) reported that agile leadership has a greater impact on job reputation in hospital management. Education reforms rely on educators' ability to drive learning progress and innovation, with leadership development being a priority but not as much as teacher reform (Awad & Al Adwan, 2023). The study on agile leadership in the educational sector revealed that school administrators' agile leadership traits significantly

predicted the effectiveness of the school. Wibowo et al. (2023) reported that both agile leadership and job satisfaction positively impact employee performance in the VUCA era. Though, there are several positive impacts on organizational performance in a wide range of sectors, agile leadership also negatively impacts work–family conflicts (Adnan, Idris, Agustang, & Ahmad, 2020). Accordingly, many review studies on agile leadership are available in the literature. Table 1 is a listing of important studies that are in some way comparable to this study on agile leadership.

Table 1. Existing research reviews that are relevant to this study

Study	Focus	Methodology	Result	Advantage	Limitation
(Susanto, Wiguna & Tukiran, 2023)	To assess the impact of agile leadership, and organizational agility on organizational performance	Descriptive qualitative review	Agile leadership and organizational agility improved telecommunications profits and performance.	Results show the effect of agile leadership, and organizational agility on organizational performance.	Lacks detailed analysis and outcomes
(Delioğlu & Uysal, 2022)	To assess agile leadership's impact on digitalization.	Empirical Reviews	Leadership agility helps digital-age firms shift quickly.	Result shows how the digital space is forcing firms to embrace digitalization	No supporting evidence Focuses only on digital transformation
(Putra, Pasek, & Arsawan, 2022)	To evaluate agile leadership and digital transformation	Bibliometrics Analysis	Digital transformation benefits from agile leadership	Gives guidance on digitalization for organizational agility and resilience.	No evidence for the study result Focus only on digital transformation
(Theobald, Prenner, Krieg & Schneider, 2020)	To evaluate agile leadership and management.	Systematic Literature Review	Defines and motivates agile leadership and management	Helps agile transformation and improvements	No new findings Lacks precise analysis and results
(Akkaya & Yazıcı, 2020)	To connect agile leadership with biomimicry via a new grey wolf concept.	Empirical Reviews	Wolves and agile leadership share traits	Helps understand leadership's influence and competence.	No quantitative analysis Self-biased outcomes
(Attar & Abdul-Kareem, 2020)	To establish agile leadership's role in organizational agility	Empirical Reviews	Demonstrates agile leadership's impact on organizational agility.	Demands for corporate investments in agile capacity building and frameworks for agile leadership	No quantification Lacks precise analysis and outcomes
(Nurhaeni, Nurdin, Wiratama & Kurniawan, 2022)	To evaluate gender-responsive agile leadership	Systematic Literature Review	Assessed gendered agile leadership in the COVID-19 period	Addresses the agile leadership gender gap	Uses qualitative approach Fewer studies are examined.
(Greineder & Leicht, 2020)	To summarize agile leadership studies.	Systematic Literature Analysis	Leadership styles similar to agile leadership were identified	Overlaps in the styles were found in the studies	A simple qualitative method with fewer studies
(Joiner, 2019)	To emphasize leadership agility's importance in agile organizations	Empirical Reviews	Provides a leadership agility framework	Executives must focus on strategic agility, operational agility and leadership agility.	Approaches qualitatively Lack of support for research result

Despite increasing interest in agile leadership, it is evident from the table that a significant research gap exists regarding its relationship with organizational outcomes, requiring further investigation. Also, when the diverse environments in which businesses operate are properly considered, the gap expands even more. Thus, there is an obvious need to understand agile leadership's applications across diverse industries, cultures, and organizational sizes, which is crucial in today's rapidly evolving business environment characterized by technological advancements and global interconnectivity. Furthermore, the growing focus on sustainability, ethics, and social responsibility necessitates thoroughly examining how agile leadership can effectively align with these contemporary organizational objectives. Further, the existing literature on agile leadership lacks practical guidance, necessitating the need to fill this gap, and offers insights to help organizations navigate complex challenges and seize opportunities efficiently. Thus, a comprehensive review that could help researchers and practitioners learn more about the pros and cons of using an agile leadership style in different organizational settings and situations is paramount. As such, this study contributes to the growing body of research on agile leadership and fills

a research gap by addressing unexplored aspects, providing actionable insights for organizations striving to excel in today's multifaceted business environment. This review examines the key components of agile leadership, their contribution to an organization's success, and their influence on the significant components. This might make it easier for organizations to develop methods to enhance productivity and maintain competitiveness.

RESEARCH METHODOLOGY

Systematic literature and meta-analytic review were adopted in this study by collecting the articles related to agile leadership and its impact on organizational outcomes. To perform the systematic analysis of content and results, the Scopus database was used, which covers a rich set of articles from engineering and management disciplines in the form of journals, conferences, thesis dissertations, and book chapters (Kumar, Kar, & Ilavarasan, 2021). Additionally, the database was expanded by a manual collecting procedure using Google Scholar (GS), so as not to miss any important input for our research (Massaro, Dumay, & Guthrie, 2016). No time limits were put on getting the articles through Scopus and GS so that all relevant materials published on the subject under study could be found. Thus, we included all scholarly publications on the agile leadership theme published between 2000 and 2023.

The research was performed in two phases. The first phase focused on performing a bibliometric study on agile leadership, whereas the second phase focused on a detailed meta-analytic review of the effect of agile leadership on organizational outcomes. In order to download the relevant articles for the study, search terms such as "agile leader," "agile leadership," "agile coach," and "agile manager" were used along with Boolean operators. This study used PRISMA principles to undertake an open, evidence-based, systematic evaluation of the literature (Page et al., 2021). Initially, the 1084 articles with search terms in the title and keywords were identified. However, the count was reduced to 554 after removing duplicate articles. Further screening was performed by assessing the title and abstract of the articles, which focused on business and management disciplines, were written in English, and were relevant to the study. Thus, 104 articles were selected in this step, which were further assessed for eligibility, and reduced to 70 after removing the studies that were not relevant after assessing the entire content of the articles. Moreover, four articles were selected from the reference lists of the selected studies. Thus, 74 articles were used in the bibliometric analysis of agile leadership. However, only 24 articles were chosen for the meta-analysis that performed quantitative analysis. The detailed workflow of the various study selection phases is depicted in Figure 1.

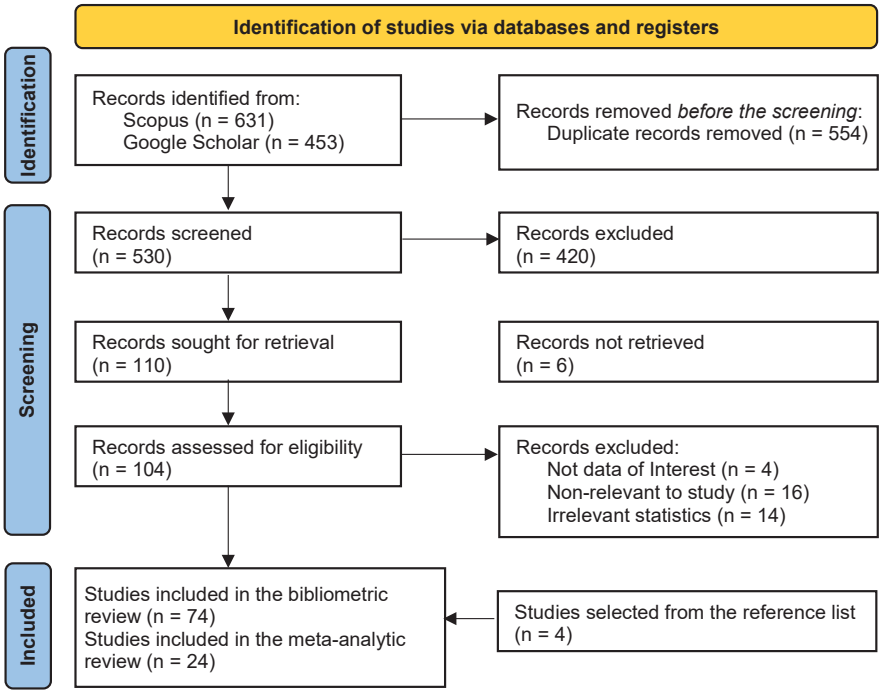

Figure 1. Overview of the study selection process

Synthesis analysis

For performing bibliometric analysis on the selected articles, the various attributes, including the type of publication, published year, authors' country, titles and keywords of the articles, type of research methodology used, and type of organizational outcomes analyzed under agile leadership, have been extracted (see Figures 2 and 3). The analysis found that the selected 74 papers were published between 2004 and 2023, with a significant rise in publishing after 2020. These articles are from a variety of publications, including 78% from journals, 12% from conferences, 8% from theses and dissertations, and 1% from book chapters. The detailed statistics are presented in Figures 2 and 3. Most selected studies are published by standard publishers such as Atlantis Press, Elsevier, Emerald Publishing, Frontiers, IGI Global, John Wiley & Sons, SAGE Publishing, Springer, Taylor & Francis Group, and more.

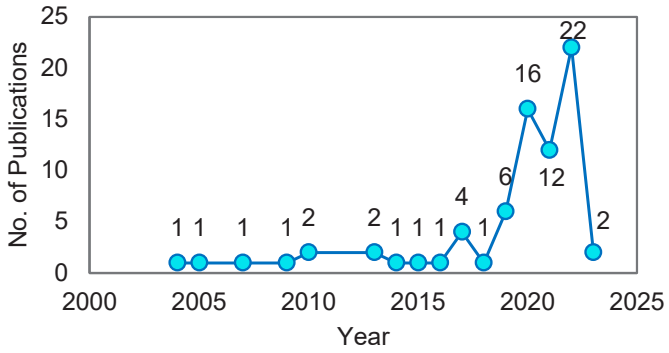

Figure 2. Year distribution of selected studies

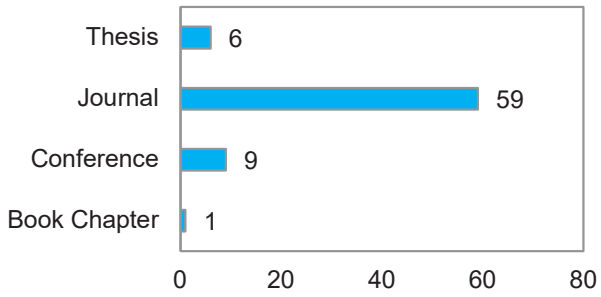

Figure 3. Types of publications

The distribution of countries involved in the research on agile leadership reveals that 25% of the research is carried out in Turkey, 19% in the United States, and 11% in Indonesia. Other significant countries involved in the research on this topic are China, Australia, Germany, Iraq, Sweden, and more. The diagrammatic representation is presented in Figure 4.

Figure 4. Distribution of countries involved in agile leadership research

The text analysis has been applied to the title and keywords of the selected articles to visualize and explore the patterns and relationships between words and terms in a given text document. A network diagram is generated, a graphical representation of the relationships between different keywords in a selected article. This association diagram helps to identify the associations of keywords and to analyze the themes and topics of selected studies. The association of all

keywords, including authors' and indexed keywords, was initially examined, as shown in Figure 5, using the VOSviewer. The result indicates that "agile eldership," "leadership" and "agility" are the most frequently occurring keywords in most of the documents.

The association between the author-indexed keywords is shown in Figure 6. The keywords "agile" and "leadership" have occurred in almost all articles. Other frequently occurring keywords include "organization," "agility," "leaders," "management," "job," "development," "innovation," and "performance." Moreover, the word cloud has been formed from the titles of the selected articles, with the most common terms being more prominent and more noticeable, as shown in Figure 6. This diagram shows the most prevalent terms in a title and may be used to find trends, themes, and patterns. The terms "agile," "leadership," "leaders," "organization," "role," "development," and "innovation" have occurred more frequently among the titles of the selected articles. Moreover, the various terms associated with the keyword "agile" have been examined, in which "leaders," "leadership," "leader performance," "managers," and "management" have a higher association with the term "agile" than others.

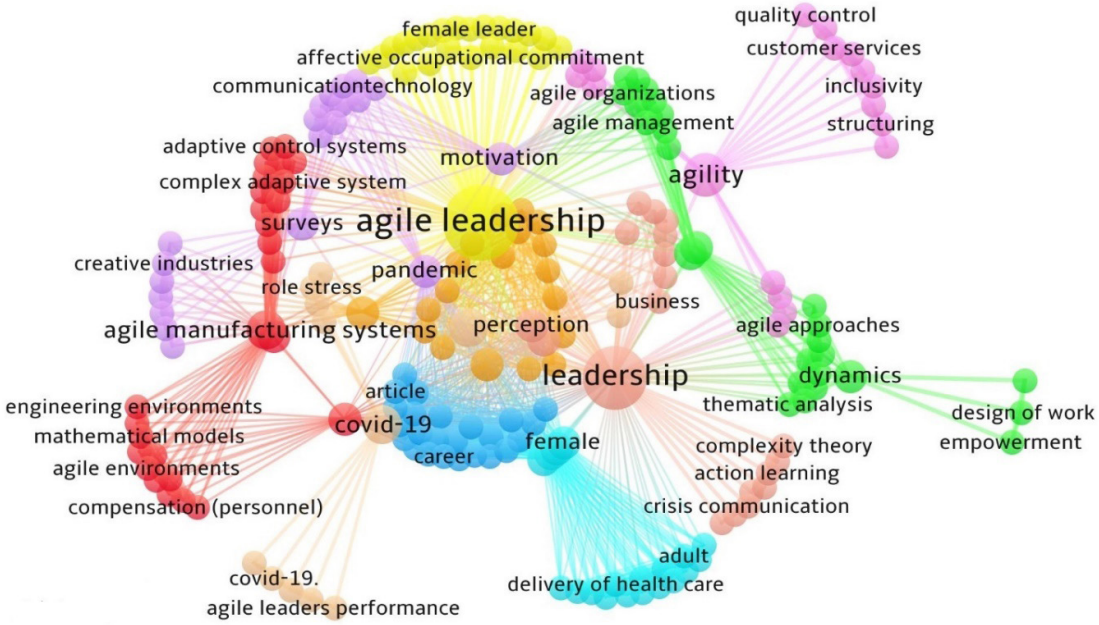

Figure 5. Association of all keywords from the selected articles

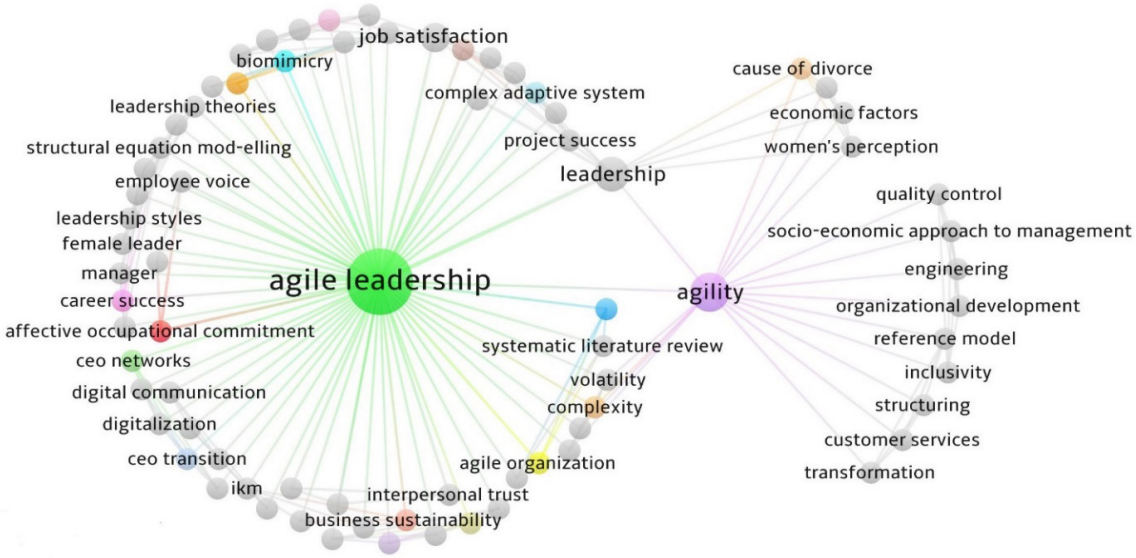

Figure 6. Association of author-indexed keywords from the selected articles

It has been found that around 58% of the selected studies used qualitative research methods such as empirical reviews, observational analysis, case studies, conceptual assessment, surveys and interviews, experimental analysis, and narrative inquiry. The remaining 42% covers quantitative research using various approaches such as structural equation modeling, confirmatory factor analysis, correlation analysis, multiple regression analysis, ANOVA, partial least squares, and descriptive statistics. The detailed analysis shows that 30% of the selected articles are general, focusing on agile leadership, 34% are focused on operational outcomes, 28% on employee outcomes, 5% on social and environmental outcomes, and less than one percent on financial outcomes (return on investment (ROI)) and customer outcomes (customer service). Moreover, the various subfields examined in the selected articles on the impact of agile leadership on organizational outcomes are depicted in Figure 7.

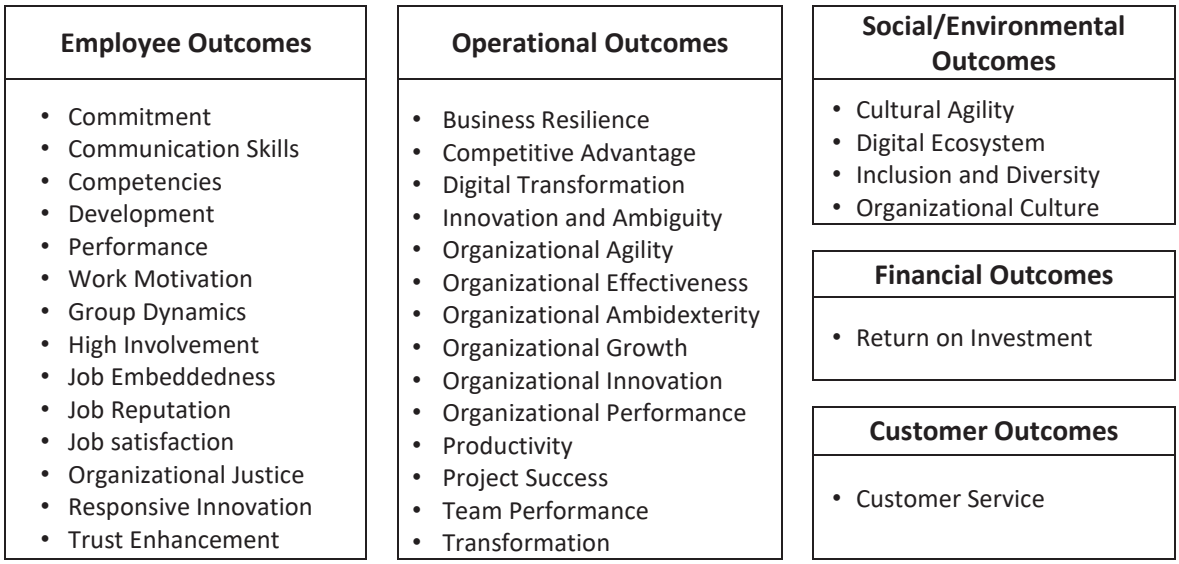

Figure 7. Subfields related to the organizational outcome dimensions of agile leadership

Meta-analysis

A meta-analysis facilitates the integration of quantitative results in the form of correlation or regression coefficients reported by the selected articles under review (Cooper, Hedges, & Valentine, 2009). Much evidence shows that standardized regression and correlation coefficients are quite similar and may be used interchangeably (Bowman, 2012; Zolotov, Oliveira, & Casteleyn, 2018). To perform the meta-analysis, independent and dependent variables and their standard regression coefficients (β) and correlation coefficients (γ) that represent the relationship between agile leadership or agile leaders with that of other factors have been extracted from all the selected studies. Though the relationship that occurred more than five times seemed well utilized, the lower count also depicts the promising relationship in the meta-analysis (Jeyaraj, Rottman, & Lacity, 2006; Zolotov et al., 2018). The R programming software was used to analyze the relationship that was extracted from the existing studies. The studies used in the meta-analysis are listed in Table 2.

Among the 74 selected studies used for review, 24 articles were further selected for the meta-analysis. The analysis was performed with results obtained from 24 datasets involving 21353 samples. Initially, 49 regression constructs were identified, of which 26 involved agile leadership as a predictor. The random effect model was used on the regression coefficients in these studies for 26 relationships from 16 studies involving agile leadership. The study's identification, organizational outcome category, number of samples, dependent variable, coefficient values, and their significance with agile leadership as the predictor are presented in Table 3.

Table 2. Studies selected for meta-analysis

Authors	Focus	Org. Outcome Category	Sub Field	# Samples	Country
(Aftab et al., 2022)	To assess the role of agile leadership in job and life satisfaction.	Employee Outcome	Job Satisfaction	362	Pakistan; United Kingdom
(Fachrunnisa et al., 2020)	To assess the role of agile leadership and strategic flexibility in digital transformation.	Operational Outcome	Digital Transformation	519	Indonesia; Malaysia
(Özdemir, 2023)	To examine the relationship between agile leadership and innovation management competencies.	Operational Outcome	Innovation Management Competencies	375	Turkey
(Rozak, Adhiatma, & Fitriati, 2021)	To enhance the digital environment using agile leadership.	Social and Environmental Outcome	Digital Ecosystem	250	Indonesia
(Yazici, Yildiz, & Ozgenel, 2022)	To assess agile leadership characteristics using employee perception.	Employee Outcome	Leadership Characteristics	1067	Turkey
(Setiawati, 2021)	To assess the impact of agile leadership on employee performance.	Employee Outcome	Employees' Performance	60	Indonesia
(Murugan & Natarajan, 2022)	To assess agile leaders' digital innovations and emotional resiliency in business transitions.	Operational Outcome	Organizational Growth	129	India
(Chen et al., 2022a)	To analyse the effect of the CEO's network on digitalization and agile leadership.	Operational Outcome	Innovation Efficiency	13516	China
(Akkaya, 2022)	To examine the impact of trust and agile practices in a dynamic environment.	Employee Outcome	Trust Enhancement	269	Turkey
(Kamal & Ul Hassan, 2022)	To study the effect of agile leadership on career success with interpersonal trust as a mediator.	Employee Outcome	Success and trust	114	Sweden
(Yılmaz & Özgenel, 2023)	To examine agile leadership as antecedent of organization effectiveness.	Operational Outcome	Organizational Effectiveness	605	Turkey
(Özgenel, Yazıcı, & Asmaz, 2022)	To inspect the relationship of agile leadership and job satisfaction with organizational justice as a mediator.	Employee Outcome	Organizational Justice & Job satisfaction	409	Turkey
(Shamani & Abbas, 2020)	To evaluate the impact of agile leadership in minimizing work pressure.	Employee Outcome	Work satisfaction	50	Iraq
(Yalçin, & Özgenel, 2021)	To assess the role of agile leadership on the professional development and performance of the employees.	Employee Outcome	Development and Performance	575	Turkey
(Jassmy & Katea, 2022b)	To assess the impact of agile leadership on organizational innovation.	Operational Outcome	Organizational Innovation	375	Iraq
(Önalan, Yildiran, & Önalan 2022)	To assess the impact of agile leadership on firm performance.	Operational Outcome	Firm Performance	103	Turkey
(Subramaniam, 2021)	To examine the impact of agile leadership on organizational performance through organizational culture as a mediator.	Operational Outcome	Organizational Performance	63	Malaysia
(Ibrahim, et al., 2022)	To assess the impact of agile leadership on workplace spirituality and job reputation.	Employee Outcome	Job Reputation	390	Egypt
(Yazıcı et al., 2022)	To evaluate the impact of agile leadership on occupational commitment.	Employee Outcome	Job Commitment	354	Turkey
(Akkaya, Panait, Apostu, & Kaya, 2022)	To assess the role of agile leadership and career success on job embeddedness.	Employee Outcome	Job Embeddedness	581	Turkey; Romania
(Akkaya & Bagieńska, 2022)	To study the role of agile leadership on team effectiveness through trust.	Operational Outcome	Team Performance	269	Turkey; Poland
(Shah, Jintian, Sukamani, & Kusi, 2022)	To study the effect of agile leadership on career success.	Operational Outcome	Career Success	286	China; Nepal
(Anggadwita et al., 2021)	To improve enterprise sustainability through agile leadership and innovation, ambidexterity.	Operational Outcome	Innovation and Ambiguity	400	Indonesia
(Rozak & Fachrunnisa, 2021)	To improve enterprise ambidexterity through agile leadership and knowledge management capability.	Operational Outcome	Organizational ambidexterity	232	Indonesia

Table 3. List of regression relationships analyzed

Author	Org. Outcome Category	# Samples	Dependent	Beta	Significant
(Yazıcı et al., 2022)	Employee Outcome	354	Occupational Commitment	0.284	Yes
(Anggadwita et al., 2021)	Operational Outcome	400	Business Sustainability	0.634	Yes
(Akkaya et al., 2022b)	Employee Outcome	581	Career Success	0.579	Yes
(Rozak et al., 2021)	Social and Environmental Outcomes	250	Dynamic Capabilities	0.529	Yes
(Yazıcı et al., 2022)	Employee Outcome	354	Employee Silence	0.225	Yes
(Setiawati, 2021)	Employee Outcome	60	Employees Performance	0.334	Yes
(Özgenel et al., 2022)	Employee Outcome	409	External Job Satisfaction	0.140	Yes
(Aftab et al., 2022)	Employee Outcome	362	Family–Work Conflict	-0.454	Yes
(Jassmy & Katea, 2022b)	Operational Outcome	375	High Involvement	0.661	Yes
(Kamal & Ul Hassan, 2022)	Employee Outcome	114	Individual Career Success	0.894	Yes
(Anggadwita et al., 2021)	Operational Outcome	400	Innovation Ambidexterity	0.171	Yes
(Özdemİr, 2023)	Operational Outcome	375	Innovation Management	0.805	Yes
(Özgenel et al., 2022)	Employee Outcome	409	Internal Job Satisfaction	0.110	No
(Akkaya & Bagieńska, 2022)	Operational Outcome	269	Interpersonal Trust	0.926	Yes
(Kamal & Ul Hassan, 2022)	Employee Outcome	114	Interpersonal Trust Proposal	0.678	Yes
(Akkaya et al., 2022b)	Employee Outcome	581	Job Embeddedness	0.892	Yes
(Yılmaz & Özgenel, 2023)	Operational Outcome	605	Organization Effectiveness	0.612	Yes
(Rozak & Fachrunnisa, 2021	Operational Outcome	232	Organizational Ambidexterity	0.172	Yes
(Subramaniam, 2021)	Operational Outcome	63	Organizational Culture	0.483	Yes
(Özgenel et al., 2022)	Employee Outcome	409	Organizational Justice	0.780	Yes
(Subramaniam, 2021)	Operational Outcome	63	Organizational Performance	0.898	Yes
(Yalçin & Özgenel, 2021)	Employee Outcome	575	Employee Performance	0.373	Yes
(Yalçin & Özgenel, 2021)	Employee Outcome	575	Professional Development	0.162	Yes
(Shah et al., 2022)	Operational Outcome	286	Project success	0.150	Yes
(Akkaya & Bagieńska, 2022)	Operational Outcome	269	Team Effectiveness	0.073	No
(Aftab et al., 2022)	Employee Outcome	362	Work–Family Conflict	-0.554	Yes

From Table 3, it is found that agile leadership has a strong relationship with factors like *interpersonal trust* (0.93), *organizational performance* (0.90), *organization effectiveness* (0.89), *individual career success* (0.89), and *innovation management* (0.81). It also has a moderately negative impact on *work–family* (-0.55) and *family–work conflicts* (-0.45). Moreover, agile leadership has no significant impact on factors such as internal job satisfaction and team effectiveness and a weaker impact on *professional development* (0.16), *project success* (0.15), *organizational ambidexterity* (0.17), *occupational commitment* (0.28), *employee silence* (0.23), and *external job satisfaction* (0.14).

Assuming a random effect model with a 95% confidence level, the analysis is made using the free software tool Meta-Essentials (van Rhee, Suurmond, & Hak, 2015; Suurmond, van Rhee, & Hak, 2017). The results obtained from the meta-analysis using the estimate and sample size given in Table 3 are presented in Figure 8. In the graph, the x-axis represents the estimated effect size and the y-axis represents the individual relationships, the blue dots represent the beta values, and the line across the blue dots shows the confidence intervals (CIs). The CI lines that fall on the value 0 indicate a non-significant relationship, whereas when they fall on the negative or positive side, they show positive and negative significance, respectively. The green dot at the end indicates the combined effect of agile leadership on various other factors analysed in the study. Moreover, the study follows the interpretation of correlation values as given by Hopkins (2000), in which values≥9 indicate a perfect relationship, 0.7–0.9 shows a very high association, 0.5–0.7 shows a high association, 0.3–0.5 indicates a moderate relationship, 0.1–0.3 indicates a smaller association, and≤1 indicates a very small and negligible association (Gogan, Artene, Sarca, & Draghici, 2016).

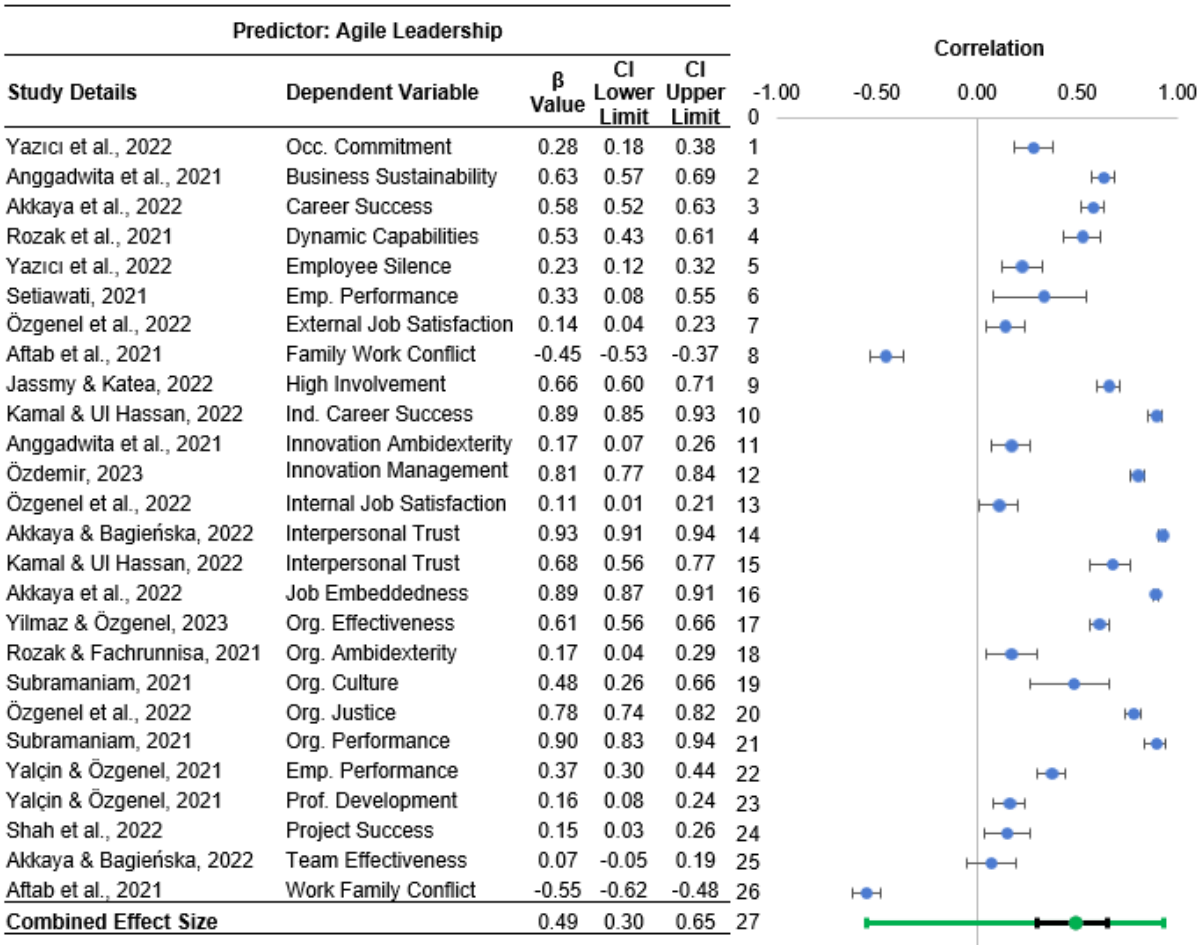

Figure 8. Forest plot for al and organizational outcomes

Thus, from the estimated combined analysis, it is clear that the effect of agile leadership has a moderately positive impact on *overall organizational outcomes* (0.49). Moreover, the I^2 statistics are 99.02% for the combined effect size, which signifies a higher level of heterogeneity.

The publication bias for the chosen articles is examined, since the degree of the association varies across studies, and is reflected in the findings of the meta-analysis. Egger regression, which is used for more accurate findings of publication bias analysis, shows that the results are not significant for asymmetry ($p = 0.26 > 0.05$), indicating no evidence for publication bias (Egger, Smith, Schneider & Minder, 1997). These results suggest that publication bias does not affect the effect size estimates and that the findings are robust. Table 4 displays the findings of the Egger regression. In addition, the normality test is included in the meta-analysis to evaluate the suitability of the random effect model (Choi, Yu, Kim, & Yoo, 2003). Figure 9 shows a normal quantile plot, and the results of the normality test show that the data follow a normal distribution. This is evidenced by the fact that the majority of the points on the plot show a straight line, indicating that the values are normally distributed.

Table 4. Egger regression for asymmetry analysis on publication bias

Egger Regression	Estimate	Std. Error	Confidence Interval (95%)		Test results
			Lower Level	Upper Level	
Intercept	31.13	26.71	-23.87	86.14	t-test = 1.17
Slope	-16.71	14.80	-47.19	13.77	p-value = 0.26

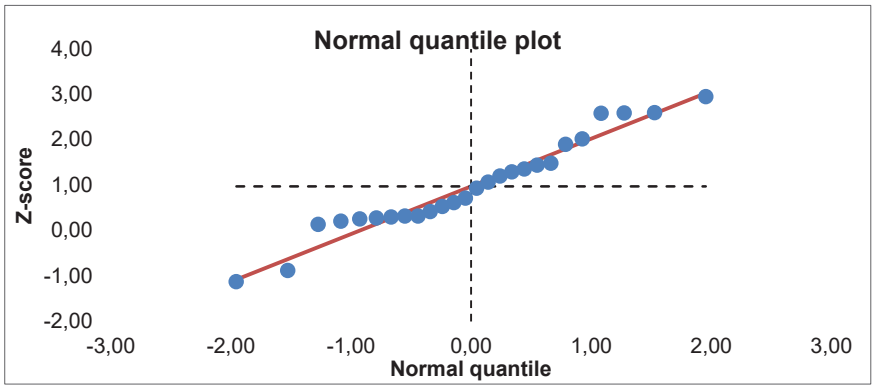

Figure 9. Normal quantile plot for the relationship between al and organizational outcome

The 26 relationships used in the above meta-analysis consider agile leadership as the predictor, with other factors of the organizational outcomes as the dependent variables. However, 41 unique relationships have been identified from the 24 studies in which the average correlation values have been identified and used for the analysis. The overall interpretation of the various associations studied in the 24 articles is presented in Figure 10.

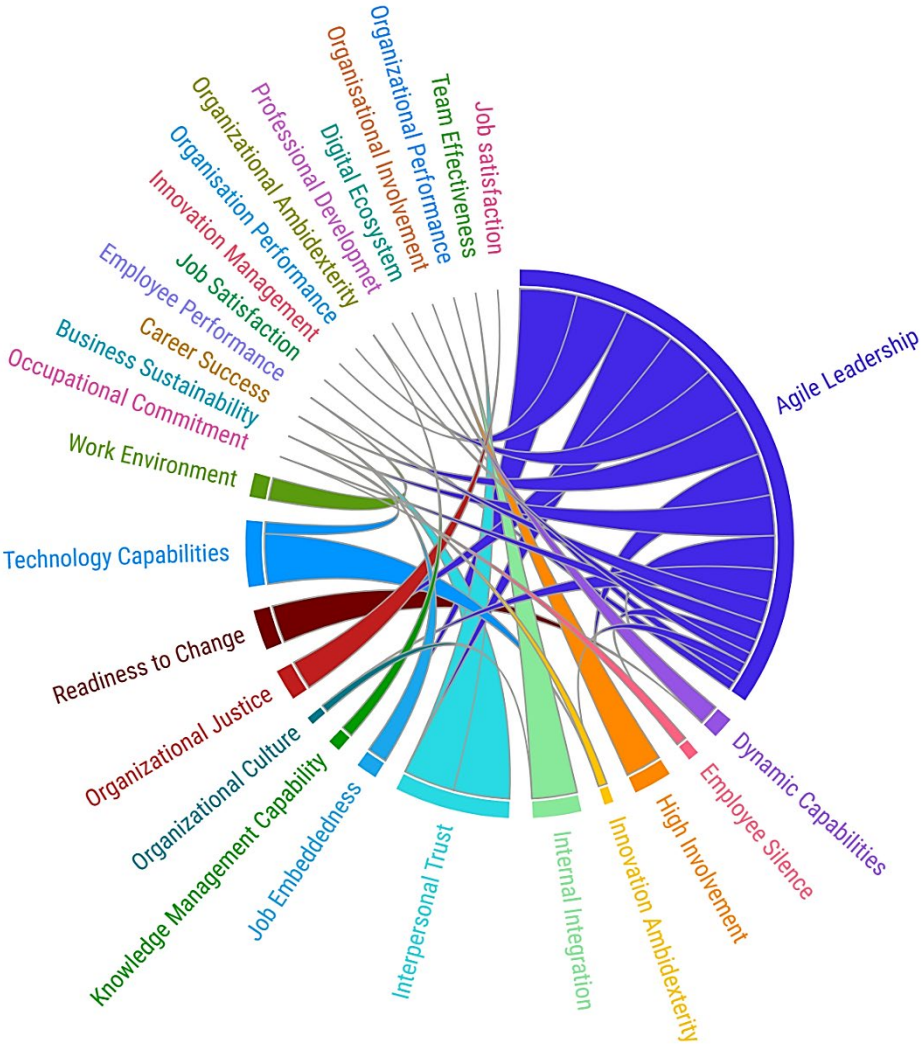

Figure 10. Overall interpretation of the various associations studied

Although the influence of agile leadership on organizational outcomes as a whole has been analyzed using regression coefficients derived from the selected publications, the influence of agile leadership on the various dimensions of organizational outcomes has been evaluated for further analysis. Moreover, though the organizational outcomes are categorized as employee, operational, financial, customer, and social and environmental, most studies focused either on employee or operational outcomes.

Thus, the correlation values between agile leadership and various factors affecting employee outcomes were examined for the detailed analysis. The 16 relationships from 7 studies were used to assess agile leadership employee outcomes. The *metacor* function using the meta package in R programming was employed for analysis. The factors that influence employee outcomes, such as *leadership practice* (0.84), *interpersonal trust* (0.83), *organizational justice* (0.78), and *workplace spirituality* (0.71), have a very high association with agile leadership. *Employee voice* (0.22), *occupational commitment* (0.21), and *professional development* (0.162) are not influenced by agile leadership due to a weak association.

Figure 11 depicts a forest plot as a graphical representation of the meta-analysis performed for the estimate and sample size to measure the influence of agile leadership on employee outcomes. Since all the points on the graph fall on the positive side, the graph plot indicates that all the relationships are statistically significant. The combined effect size of the analysis using the random effect model is 0.48 (95% CI: 0.38, 0.59, p<0.01), which indicates that agile leadership has a highly moderate association with the factors of *employee outcomes* (0.48). Moreover, the I^2 statistics of the overall analysis are at 98%, which indicates a high level of heterogeneity between studies.

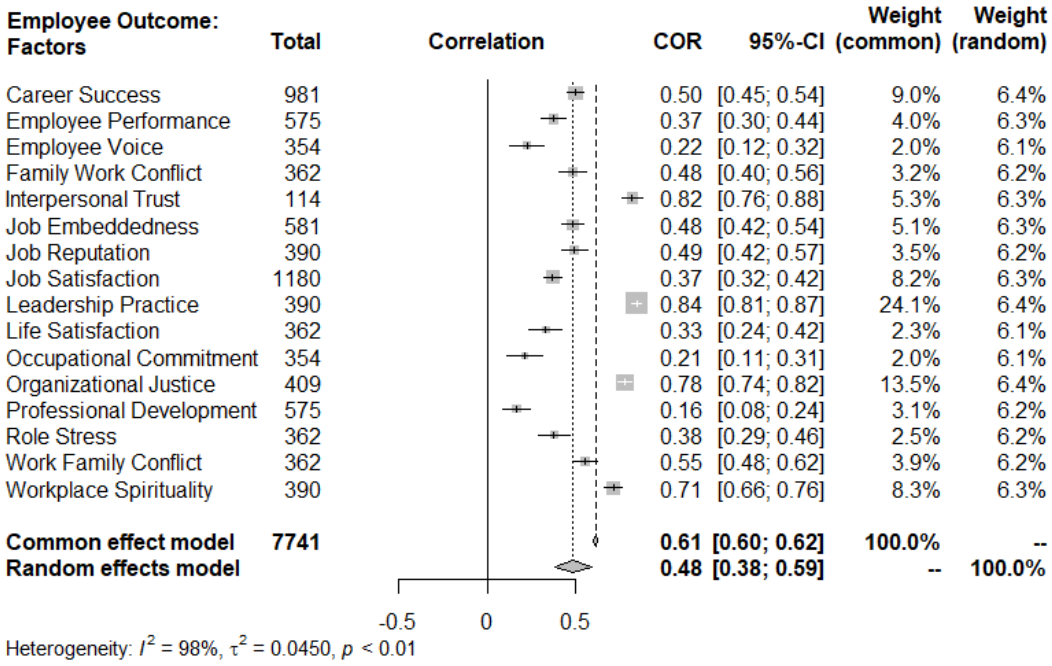

Figure 11. Forest plot for the relationship between al and employee outcome

Similar to employee outcomes, the correlation values between agile leadership and various factors of operational outcomes were also assessed. The 15 relationships from 6 studies were used for evaluating the impact of agile leadership on operational outcomes. The results show that the factors of operational outcomes, such as *business sustainability* (0.75), *management innovation* (0.83), and *workforce transformation* (0.67), have a high association with agile leadership. Moreover, all the other factors affecting operational outcomes have a moderate association with agile leadership. Surprisingly, no factors seem to have a weak association with agile leadership.

Figure 12 is a forest plot depicting the results of the meta-analysis performed on the estimate and sample size for determining the impact of agile leadership on operational outcomes. Since all the points on the graph fall on the positive side, the graph plot indicates that all the relationships are statistically significant. The combined effect size of the analysis using the random effect model is 0.58 (95% CI: 0.51, 0.66, p<0.01), which indicates that agile leadership has a high association with the factors of *operational outcomes* (0.58). Moreover, the I2 statistics of the overall analysis are at 92%, which indicates a high level of heterogeneity between studies.

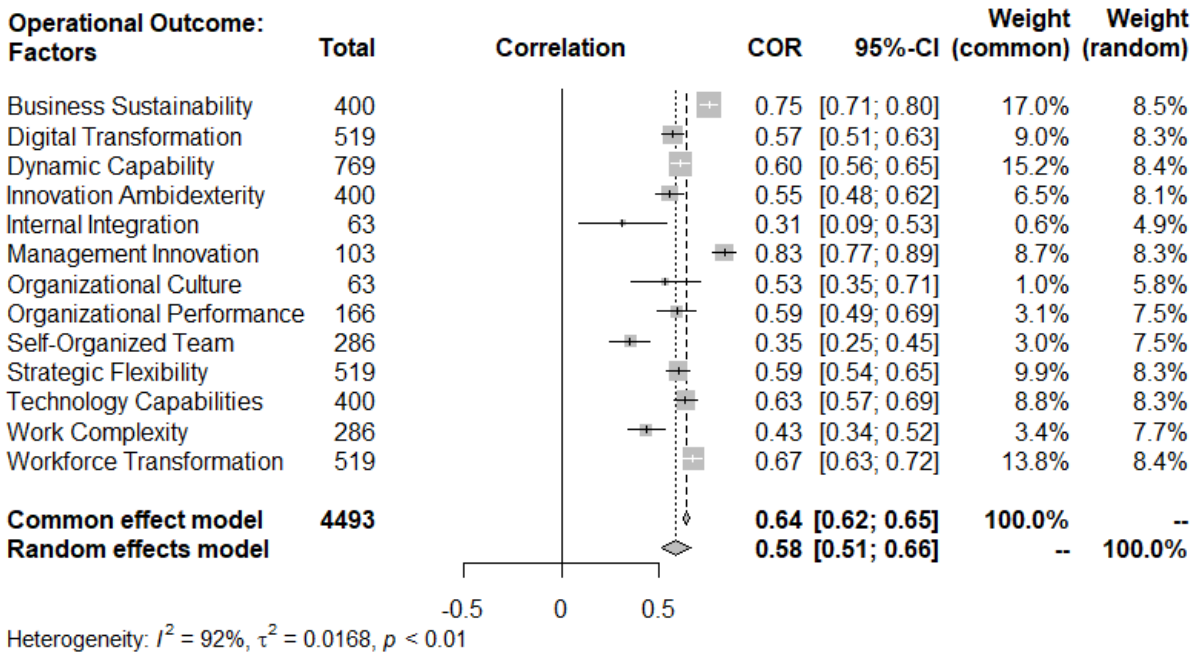

Figure 12. Forest plot for the relationship between al and operational outcome

The meta-analysis of agile leadership and its impact on organizational outcomes indicates that no study has focused on financial and customer outcomes. However, only a single study by Rozak et al. (2021) focuses on the digital ecosystem under social and environmental outcomes. This study indicates that agile leadership has a high association with *readiness to change* (0.65), *dynamic capabilities* (0.64), and a moderate association with the *digital ecosystem* (0.42). Moreover, *dynamic capabilities* have a strong association with the *digital ecosystem* (0.59).

Additionally, five studies assessed the various significant characteristics of agile leaders that positively impact organizational outcomes. It is found that *digital innovation* positively impacts *organizational growth* (0.84) (Murugan & Natarajan, 2022). It was proved that trust has a high impact on *team effectiveness* (0.75), *competency* (0.76), and *cognition-based trust* (0.77) has a high impact on *team collaboration* (Akkaya & Bagieńsk, 2022). The *result-oriented* characteristics of agile leaders have a significant impact on *team collaboration* (0.90) and *trust in managers* (0.816) (Akkaya, 2022). Moreover, characteristics such as *quietness, trust, wisdom*, and *modesty* are highly correlated (Shamani & Abbas, 2020).

DISCUSSION

A respectable amount of research on agile leadership and its impact on enterprises or organizations using qualitative and quantitative analysis is available in the literature (Prasongko & Adianto, 2019; Fachrunnisa et al., 2020). This systematic and meta-analytic literature review studies the effectiveness of agile leadership and leaders in promoting organizational performance and various other outcomes. It integrates the findings of several different investigations in order to discover the research gap and broaden the investigation (Glass, 1976). A detailed review has been conducted on the impact of agile leadership on the different dimensions of organizational outcomes (employee, customer, finance, operational, and social environments). After a thorough search of various repositories, 74 articles were selected for systematic literature review.

The results obtained are multi-fold. The publication of articles related to agile leadership has increased drastically after COVID-19 (see Figure 2). Specifically, 70% of the articles were published after 2019. Agile leadership emphasizes adaptation, flexibility, and reactivity, which are needed following pandemics or crises that bring uncertainty and quick change (Aftab et al., 2022; Fernandes, Wong, & Noonan, 2023; Wilson, 2021). With these articles, Turkey, the United States, and Indonesia are the countries that participate in the most research. To visualize and explore the patterns and relationships between words and terms in a selected article, networks of keywords (see Figures 5 and 6) have been created. While analyzing the impact of agile leadership on various dimensions of organizational outcomes, it has been found

that many qualitative studies were general and discussed the role of agile leadership in the enterprise (Rothman, 2010; Akkaya & Yazıcı, 2020). However, more studies focused on operational outcomes (26 articles) and employee outcomes (21 articles). Only a few articles discussed the impact of agile leadership on social and environmental outcomes (4 articles) and financial outcomes (1 study on the return on investment) (see Figure 7 for variables identified for each dimension of organizational outcomes).

In the second phase of the research, 24 quantitative studies involving 21,353 samples that focus on agile leadership and any of the dimensions of organizational outcome were selected from 74 articles for meta-analysis. A random effect model was applied to analyse the relationships between agile leadership and the factors affecting organizational outcomes identified from the studies.

First, 26 relationships, with agile leadership as a predictor, were extracted and assessed using regression coefficients from 16 studies. The findings show that agile leadership has a very high association with *interpersonal trust* (0.93), *organizational performance* (0.90), *organization effectiveness* (0.89), *individual career success* (0.89), and *innovation management* (0.81). This result supports the findings reported in various existing works (Akkaya & Bagieńska, 2022; Yılmaz & Özgenel, 2023; Özdemir, 2023). Agile leadership has no or a weak effect on *job satisfaction, team effectiveness, professional development* (0.16), *organizational ambidexterity* (0.17), *occupational commitment* (0.28), and *employee silence* (0.23). This result supports the findings reported in various existing works (Özgenel et al., 2022; Akkaya & Bagieńska, 2022; Yalçin & Özgenel, 2021). The analysis's estimated combined effect size shows that agile leadership has a moderately positive impact on overall *organizational outcomes* (0.49) (see Figure 8). The I^2 statistics of 99.02% indicate that the results of the meta-analysis have higher heterogeneity. The results of the Eggers test and normal quantile plot indicate that there is no evidence of publication bias (see Table 4).

Second, the effects of agile leadership on different dimensions of organizational outcomes were evaluated. The 16 relationships from 7 studies were used for assessing employee outcomes in agile leadership. The results show that *leadership practice* (0.84), *interpersonal trust* (0.83), *organizational justice* (0.78), and *workplace spirituality* (0.71) have a very high association with agile leadership. On the other hand, employee voice (0.22), occupational commitment (0.21), and *professional development* (0.162) are not influenced by agile leadership due to a weak association. This finding supports the evidence reported by Ibrahim et al. (2022), Kamal and Ul Hassan (2022), and Özgenel et al. (2022). The combined effect size of the analysis using a random effect model for agile leadership and *employee outcomes* is 0.48 (95% CI: 0.38, 0.59, $p<0.01$), which indicates that agile leadership has a highly moderate association with employee outcomes with a higher level of heterogeneity of 98% (see Figure 11).

Third, the 15 relationships from 6 studies were used to evaluate the impact of agile leadership on operational outcomes. The results show that the factors of operational outcomes, such as *business sustainability* (0.75), *management innovation* (0.83), and *workforce transformation* (0.67), have a high association with agile leadership. Moreover, all the other factors affecting operational outcomes have a moderate association with agile leadership. Surprisingly, no factor of operational outcomes seems to have a weak association with agile leadership. The finding is consistent with the findings of the existing studies, including Anggadwita et al. (2021), Özdemir (2023), and Fachrunnisa et al. (2020). The combined effect size of the analysis using the random effect model for agile leadership and the *operational outcomes* is 0.58 (95% CI: 0.51, 0.66, $p<0.01$). The results indicate that agile leadership has a high association with operational outcomes with high heterogeneity (92%) between studies (see Figure 12).

Finally, various significant characteristics of agile leaders were assessed from 5 studies. A positive relationship exists among variables like *digital innovation* with *organizational growth*, *trust* with *team effectiveness*, *team collaboration* with *competency* and *cognition-based trust*, *result orientation* with *team collaboration,* and *trust in managers*. These findings of the review substantiate the empirical evidence revealed by various other researchers (Murugan & Natarajan, 2022; Akkaya & Bagieńska, 2022; Akkaya, 2023; Shamani & Abbas, 2020). The consistent results in this review support the validity and robustness of the observed effects and the conclusions drawn. Overall, agile leadership has more effect and a greater influence on the operational outcomes of the enterprise than on employee outcomes.

However, the effectiveness of agile leadership on organizational outcomes may vary due to various mediating and moderating variables. Thus, from the information and knowledge gained on agile leadership from this review study, a new mediation and moderation conceptual model for agile leadership and its impact on organizational outcomes has been proposed, as depicted in Figure 13.

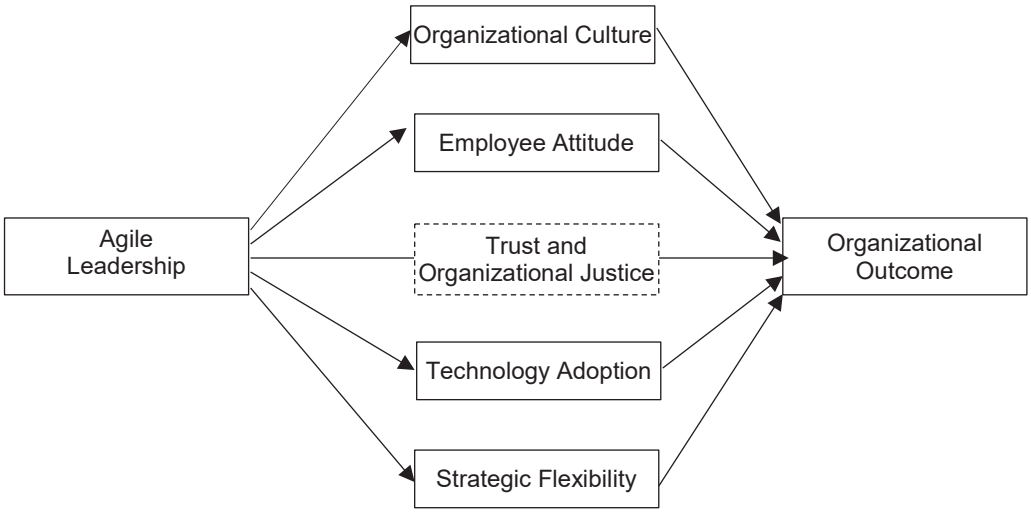

Figure 13. Proposed mediation moderation conceptual model for the agile leadership

This model contans various components: agile leadership, organizational outcome, mediating variables, and moderating variables. The mediating variables explain the process through which agile leadership influences organizational outcomes. The mediating variables include organizational culture, employee attitude, technology adoption, and strategic flexibility. The degree and direction of the association between agile leadership and organizational results are influenced by moderating factors, including trust and organizational justice. Thus, the proposed conceptual model indicates that agile leadership directly affects organizational outcomes and that this relationship is mediated by factors such as organizational culture, employee attitude, technology adoption, and strategic flexibility. The model also describes the relationship between agile leadership and organizational outcomes, which is moderated by factors such as trust and organizational justice, with organizational type and size as control variables. Thus, the future study aims at analyzing the proposed model by collecting samples and applying regression analysis and structural equation modeling to test these relationships.

In summary, the study examines the effectiveness of agile leadership on various organizational outcomes, including financial outcomes, customer outcomes, operational outcomes, employee outcomes, and social and environmental outcomes. The result revealed that more empirical studies focused on employee and operational outcomes, whereas the research lacked customer, financial, social, and environmental outcomes. Though agile leadership was shown to have a moderately positive influence on overall organizational outcomes, it had a negative correlation with work–family conflicts. Further, agile leadership exhibited a stronger influence on the operational outcome dimension, with factors like business sustainability, management innovation, and workforce transformation showing high associations compared to the employee outcome dimension, with a strong correlation with leadership practice, interpersonal trust, organizational justice, and workplace spirituality. Furthermore, the study highlighted significant correlations between agile leadership characteristics and various organizational factors, emphasizing its multifaceted impact. Moreover, the study proposed a new mediation and moderation conceptual model for agile leadership to assess the potential impact of agile leadership on organizational outcomes due to various mediating and moderating variables.

Theoretical implications

The consequences of this research on the impact of agile leadership on business results may be substantial. First, the study of agile leadership has the potential to contribute to the growth and improvement of leadership theories and models. Researchers can determine the main qualities and behaviors of agile leaders as well as the situational aspects that affect their success by examining the efficacy of agile leadership in attaining organizational outcomes. This may contribute to the expansion of previously established theories of leadership and give insights into how leadership can be adapted to various organizational contexts. Moreover, researchers may contribute to developing theoretical frameworks that can explain the mechanisms through which agile leadership practices affect organizational outcomes and the conditions under which they are most effective. Second, researchers can contribute to the development of theories and models that can guide organizations in navigating complex and dynamic environments if they investigate the effectiveness of agile leadership

in driving organizational change and innovation. This type of research can help organizations better adapt to changing environments. Third, the success of agile leadership may vary depending on circumstances, such as the company's culture, the nature of the industry in which it operates, and the organization's size. When these situational aspects are understood, overcoming the potential challenges associated with their implementation is possible. Fourth, agile leaders are known for their ability to adapt quickly to changing customer needs and preferences and to implement customer feedback into their decision-making processes. Researchers can determine the leadership behaviors most important in driving positive customer outcomes by studying the impact that effective, agile leadership has on customer outcomes. Fifth, agile leadership can help organizations make more effective financial decisions by fostering a culture of financial responsibility and innovation. Researchers may aid in the creation of theories and models that explain how businesses might increase their financial performance and longevity by examining the impact of agile leadership on these outcomes.

Practical implications

Agile leadership is crucial in today's fast-changing business environment. They are the assets of the organization that avoid the negative effects of crises (Çobanoğlu & Demir, 2022). Every company must stay competitive. Here are some practical implications for agile leaders in an organization. Agile leaders must create a clear vision and share it with all employees so that everyone is working toward the same goals. Agile leaders should create a culture that encourages people to work as a team and enables employees to work together to solve problems and innovate. They should empower their staff by providing the necessary tools, resources, and support, encompassing training and development, autonomy, and worker ownership. Agile leaders must be flexible. They must be willing to try, fail quickly, and pivot. This allows the company to adapt swiftly to market and consumer demands. They should urge their teams to develop continuously. They should evaluate procedures, identify areas for improvement, and make adjustments to boost efficiency and effectiveness. Agile leaders should model their beliefs and principles, like transparency, collaboration, and adaptability. The pandemic has also shown how important it is for leaders to communicate, work together, build trust, show empathy, and have emotional intelligence.

However, creating an agile leader requires a combination of training, coaching, hands-on experience, and a supportive organizational culture that values experimentation, collaboration, and continuous learning. Thus, for agile leadership to be more effective, an organization needs to change its culture and way of thinking and commit to learning and growing all the time. Moreover, organizations must provide leadership development programs that focus on agile principles and practices by conducting workshops, training sessions, and coaching sessions (Fielitz & Hug, 2019). They can also include opportunities for leaders to work on real-world projects and apply agile practices in their work. If leaders are encouraged to take risks, test new ideas, and learn from their failures, it helps them become more comfortable with uncertainty and ambiguity, and develop the mindset needed to succeed in an agile environment. Additionally, organizations may need to revise their strategies on customer experience, financial management, and investment to align with agile leadership principles.

Study limitations

Since the review study is focused on agile leadership, which is an emergent topic, not many related studies can be used for meta-analysis. This is because the papers being reviewed are written in English, which restricts the knowledge and information that may be learned. Considering that there is very little research for each relationship, each uses a distinct methodology, and each uniquely presents its findings, the results obtained from a combined analysis could not be statistically significant. Moreover, the majority of research relies on self-reported data from leaders and workers, which might be biased. People could exaggerate their efficacy or feel compelled to provide favorable evaluations. Also, the analysis of agile leadership is carried out on the direct relationships, though the strength of the relationships may vary due to the presence of mediators or moderators. Moreover, the industrial sector, organizational culture, and firm size have an impact on the effectiveness of agile leadership. Thus, the results derived may not be applicable to all contexts. For evaluating agile leadership, there are no standardized measuring techniques available (Akkaya, Kayalidere, Aktaş, & Karğin, 2022a). As a result, comparing the findings of various studies becomes difficult. Therefore, a subsequent study can evaluate the efficacy of agile leadership while considering these limitations.

CONCLUSION

Leadership that is truly agile goes beyond the mere adoption of a new management technique and into the establishment of a company-wide mindset and culture that values responsiveness to change, open communication, and attention to the needs of the customer. When properly implemented, agile leadership may profoundly affect an organization's responsiveness to change, creativity, and customer service, all of which contribute to better business performance. Despite numerous studies on agile leadership, there is a significant research gap in evaluating its impact on organizational outcomes, necessitating further investigation and considering diverse business environments. Thus, owing to the significance of agile leadership and the research gap that exists in assessing the impact of organizational performance, this study intends to examine the impact of agile leadership on various dimensions of organizational outcomes, including operational, employee, customer, financial, and social-environmental outcomes. The study employed a two-phase methodology comprising a bibliometric literature analysis involving 74 articles and a meta-analysis with 24 articles encompassing 21,353 samples. The bibliometric analysis indicates that agile leadership has gained more attention after the COVID-19 pandemic, which accelerated the adoption of digital transformation and an intensified focus on employee well-being.

The meta-analysis results reaffirmed that agile leadership has a strong relationship with trust (β=0.93), organizational performance and effectiveness (β=0.90), career success (β=0.89) and innovation management (β=0.81). Additionally, the results of the analysis using a random effect model between agile leadership and overall organizational outcomes (β=0.49) show a moderately positive association, indicating its comprehensive impact. However, the detailed analysis indicates that agile leadership shows a high, moderate association with employee outcomes (γ=0.48, 95% CI: 0.38, 0.59, p<0.01) and a high association with operational outcomes (γ=0.58, 95% CI: 0.51, 0.66, p<0.01). Further, while positively impacting organizational performance across various sectors, agile leadership can also negatively affect work–family conflicts. It is evident from the Eggers test that the obtained results have no evidence of publication bias, reinforcing the robustness of the findings. This makes it quite evident that agile leadership has a stronger effect on operational outcomes than employee outcomes. This research helps professionals and academics comprehensively understand the potential benefits and problems posed by agile leadership in varied business environments. It offers information on the dimensions of organizational outcome that agile leadership has the most impact on, which might help firms develop plans for enhancing their performance and sustainability.

Considering the limitations of the existing and proposed studies, future studies should explore potential mediators and moderators influencing the relationship between agile leadership and organizational outcomes for a more detailed understanding. Longitudinal studies can be adapted, as they offer valuable insights into the long-term impact of agile leadership on organizational outcomes, guiding organizations in developing strategies for sustained success. Further, cross-cultural studies can enhance our understanding of agile leadership by examining its effectiveness in different cultural contexts. Case studies on successful agile leadership organizations can be adapted to provide practical insights and best practices for others considering adapting this leadership style. Further, the influence of agile leadership practices on the sustainability initiatives of organizations, focusing on social and environmental aspects, can be promoted.

The study of agile leadership offers an opportunity to enhance and expand leadership theories. Future research can identify the core qualities and behaviours of agile leaders, as well as situational factors that affect their effectiveness. This has the potential to assist in adapting leadership models to diverse organizational contexts. Research on agile leadership and its impact on organizational change and innovation can contribute to the development of practical theories and models, guiding organizations in adapting to complex, dynamic settings. Future studies should also assess situational factors, such as organizational culture, industry context, and firm size, to help organizations overcome potential implementation challenges related to agile leadership. Further, exploring the influence of agile leadership on customer outcomes can reveal leadership practices that improve customer experiences, directing organizations toward customer-centric initiatives. The role of agile leadership in fostering financial responsibility and innovation presents an opportunity for research to develop theories and models aimed at improving business performance and longevity.

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S. Porkodi: Conceptualization, Formal Analysis, Investigation, Methodology, Validation, Visualization, Writing - Original Draft, Writing - Review & Editing.

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Relationship between entrepreneurial orientation, innovative co-branding partnership, and business performance

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Abstract

PURPOSE: *This study aimed to determine the relationship between entrepreneurial orientation (EO), innovative co-branding partnership, and business performance. EO was analyzed through five dimensions: innovativeness, proactiveness, risk-taking, competitive aggressiveness, and autonomy.* ***METHODOLOGY:*** *As part of the first phase of brand management research, the quantitative survey was conducted in June 2023 among managers of companies operating in Poland using an online questionnaire. 280 responses were obtained, of which 266 questionnaires were qualified for further calculations. Incomplete questionnaires were eliminated. Hypotheses were formulated regarding the positive impact of the five dimensions of EO (innovation, proactivity, risk-taking, competitive aggressiveness, and autonomy) on business performance and innovative co-branding partnership, and the positive impact of innovative co-branding partnership on business performance. Structural equation modeling using partial least squares (PLS-SEM) was applied to support the conceptual framework and proposed hypotheses. The calculations were performed in Smart PLS version 4.0.9.5.* ***FINDINGS:*** *The results indicate that three EO dimensions (innovativeness, proactiveness, and competitive aggressiveness) influence business performance. There was no effect of risk-taking and autonomy on business performance. In addition, three EO dimensions (innovativeness, competitive aggressiveness, and autonomy) influence innovative co-branding partnership. No effect of risk-taking and proactivity was found on innovative co-branding partnership. This means that two EO dimensions (innovativeness and competitive aggressiveness) positively influence innovative co-branding partnership and business performance. Furthermore, innovative co-branding partnership was proven to influence business performance.* ***IMPLICATIONS*** *for theory and practice: The results of the study point to theoretical implications for further exploration of entrepreneurial orientation and its dimensions. The practical implications relate to recommendations for managers. Managers should make efforts to increase innovation, market activity, and competitiveness of the market offer. It is necessary to monitor the actions taken in the context of their impact on selected market, consumer, product, and brand performance. In addition, managers should analyze the possibilities of undertaking cooperation of this nature to increase business performance.* ***ORIGINALITY AND VALUE:*** *This study provides a better understanding of the impact of entrepreneurial orientation on business performance using innovative co-branding. Compared to previous studies, it has an advantage in research by introducing the issue of innovative co-branding, which can be used for the development of new business activities. In addition, this study focuses on several areas of business performance, including product, brand, consumer, and financial performance.*

Keywords: *entrepreneurial orientation, innovativeness, proactiveness, risk-taking, competitive aggressiveness, autonomy, innovative co-branding partnership, business performance, Structural Equation Modeling (SEM), brand management, market performance*

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INTRODUCTION

Over the years, the issue of entrepreneurial orientation (EO) has been analyzed in the context of business performance, additionally considering external factors related to changes in the environment (Buli, 2017; Clausen & Korneliussen, 2012; Fairoz et al., 2010; Ferreras-Méndez et al., 2021; Jia et al., 2014; Pratono et al., 2019; Radipere, 2014; Rauch et al., 2009), including those associated with crises (Boers & Henschel, 2022; Laskovaia et al., 2018; Lukito-Budi et al., 2023; Soininen et al., 2012). In recent years, there has been an intensification of research on entrepreneurship, entrepreneurial orientation, and entrepreneurial aspects (Gala et al., 2024; Huang et al., 2023; Xia et al., 2024), including value creation in the context of entrepreneurial strategy (Dyduch, 2019) and resource, entrepreneurial, and relational perspectives (Dyduch et al., 2023). Entrepreneurial orientation was analyzed in the areas of export (Hizarci et al., 2023; İpek et al., 2023), knowledge management (Shehzad et al., 2023), and creating competitive advantage (Chen et al., 2023). Moreover, entrepreneurial orientation was studied for family businesses (Upadhyay et al., 2023), public firms (Kindermann et al., 2023), green activities (Wang et al., 2023), international companies (Bouguerra et al., 2023), and small and medium-sized enterprises (Atikur Rahaman et al., 2021; Loan et al., 2023).

Entrepreneurship researchers are interested in identifying EO dimensions, including proactiveness, innovativeness, risk-taking (Al-Mamary & Alshallaqi, 2022; Atikur Rahaman et al., 2021; Diaz & Sensini, 2020; Loan et al., 2023), competitive aggressiveness, and autonomy (Al-Mamary & Alshallaqi, 2022; Diaz & Sensini, 2020; Ibrahim & Abu, 2020). These dimensions were studied from the point of view of their impact on business performance (Al-Mamary & Alshallaqi, 2022; Diaz & Sensini, 2020; Ibrahim & Abu, 2020), market share growth (Stambaugh et al., 2020), and export performance (Hossain et al., 2022).

Similarly, an intensification of research on co-branding has been observed in the brand management literature. These included consumer evaluation of co-branding as a result of cooperation between new and well-known brands (Zhang & Guo, 2023) and between mass and luxury brands (Quamina et al., 2023; Rao & Wang, 2023). The impact of co-branding activities on business performance was also analyzed (Nygaard & Dahlstrom, 2023). Co-branding strategies were studied not only in the context of producer-to-producer coopetition strategies, but also in relation to platform-based supply chains (Ma et al., 2023). In addition, co-branding success factors and drivers were analyzed. For example, one study analyzed 19 drivers of co-branding in four groups, such as brand management (with drivers like brand identity, brand image, brand equity, brand value, knowledge and experience of partner brands), partner relationships (including product reliability, innovative strategies, common interest, commitment, satisfaction, and mutual trust), marketing factors (for example drivers like market position, competitive advantage, and marketing mix), and supporting factors (including social media, contracts, and copyrights) (Abdolmaleki et al., 2023).

The development of co-branding activities makes a differentiation between their different types, including innovative co-branding. The interest in innovative co-branding stems from two facts. First, there is a growing interest in co-branding (Quamina et al., 2023; Rao & Wang, 2023). Second, innovativeness is being analyzed as a success factor for companies (Dash, 2023; Kiiru et al., 2023). In addition, the search for innovativeness as a dimension of EO has been the subject of academic discussion and empirical research depending on the dynamics of the changing environment, resources, organizational structure, and other factors (Asad et al., 2024; Huang et al., 2023; Loan et al., 2023; Musthofa et al., 2017).

Considering the intensification of research on EO and co-branding in various aspects, it should be concluded that there is a lack of research on the relationship between EO and co-branding. This generates a research gap in two aspects. First, the research gap relates to indicating whether there is a relationship between EO dimensions and innovative co-branding. Second, it is essential to identify the relationship between innovative co-branding and business performance in the context of product, brand, customer, and financial performance. Therefore, the purpose of this study was to explore the relationship between EO, innovative co-branding partnership, and business performance based on quantitative empirical research. EO was analyzed through five dimensions: innovativeness, proactiveness, risk-taking, competitive aggressiveness, and autonomy.

This study contributes to the literature on entrepreneurship and co-branding. First, it tests hypotheses about the impact of EO and its five dimensions on business performance. Second, it tests hypotheses about the impact of EO and its dimensions on co-branding. This is achieved by selecting one form of co-branding, which is innovative co-branding. Third, it provides arguments and empirical evidence for the relationship between innovative co-branding and business performance. In this case, the contribution to the literature is the relationship between innovative co-branding and business performance.

The structure of this article is as follows. First, a state-of-the-art literature review is presented, divided into three sections: EO and its dimensions, business performance, and innovative co-branding partnership. Based on the state-of-the-art literature review, research hypotheses were proposed following the arguments presented. The methodological section presents the study design, variable measurement, and data analysis. The section describing the results is divided into the following subsections: measurement model, discriminant validity, variance inflation factor, hypotheses testing, mediating effects, and structural model. The article is completed with a discussion of the results and conclusions, including limitations, implications, and suggested directions for future research.

LITERATURE REVIEW

Entrepreneurial orientation and its dimensions

EO topic has been present in academic discussion since the 1970s. One of the most commonly cited definitions refers to EO in the context of engaging in product market innovation, taking risks, and being first understood as 'proactively' introducing innovations compared to the actions of competitors (Miller, 1983). Another definition is derived from the most cited publication in the Scopus database. A distinction between EO and entrepreneurship has been identified, indicating EO in the context of the processes, practices, and decision-making activities leading to entry into a new market. Entrepreneurship has been defined as new market access by entering new or existing markets with new or known goods or services (Lumpkin & Dess, 1996). In this sense, EO represents entrepreneurial processes, indicating how new ventures are undertaken, while entrepreneurship refers to the content of entrepreneurial decisions undertaken (Lumpkin & Dess, 2001). In the following years, definitions have been cited to the extent defined by these two terms. For example, EO has been defined as the strategic orientation of the company, involving specific aspects of entrepreneurship in terms of decision-making styles, methods, and practices (Wiklund & Shepherd, 2005).

Three EO components were derived from the EO definition proposed by Miller (1983), including risk-taking, innovativeness, and proactiveness (Chadwick et al., 2008; Rauch et al., 2009). Modifications of this concept (1983) are available in the literature. One publication added a fourth component, i.e., competitive aggressiveness (Covin & Covin, 1990). Entrepreneurship is described as a dimension of strategic attitude represented by a company's willingness to take risks, the tendency to act aggressively and proactively, and reliance on frequent and extensive product innovation (Covin & Slevin, 1991). In the following years, a fourth component was added and/or three existing components were modified. For example, four EO components were distinguished in one case, including creativity and innovativeness as one component, proactiveness, risk-taking, and autonomy (Al Mamun et al., 2017). Another study also considered four components, including innovativeness, proactiveness, new business venturing, and strategic renewal. New business venturing was analyzed in the context of redefining existing products and creating new markets, while strategic renewal was used for strategic change, corporate entrepreneurship, and organizational design (Karimi et al., 2021).

One of the most cited publications proposed five EO dimensions (Lumpkin & Dess, 1996), which were then studied in more detail to develop a measurement tool. Five multidimensional constructs were proposed, including risk-taking, innovativeness, proactiveness, competitive aggressiveness, and autonomy (Hughes & Morgan, 2007; Lumpkin & Dess, 1996, 2001). Risk-taking refers to making decisions and taking action in situations of uncertainty and risk. Risk and uncertainty relate to core business and involve the commitment of significant corporate resources to achieve uncertain results. Innovativeness indicates the tendency to undertake and support creative processes and experimentation, to provide technological leadership, to introduce novelty, and to undertake research and development activities. This is performed for the development of new products, services, and processes. Proactivity is related to the type of future actions resulting from the ability to exploit opportunities and possibilities in the environment for the introduction of new products. The result can be the achievement of a competitive advantage and an advantage related to setting new trends and shaping the direction of changes in the environment. Autonomy is perceived as independent decision-making and action to implement adopted strategies and propose new business concepts. Competitive aggressiveness, on the other hand, refers to the intensity of actions taken during competitive interaction. It is associated with a sudden and aggressive reaction to improve market position, leverage opportunities and chances, and overcome disadvantages and threats in a competitive market (Lumpkin & Dess, 1996). This concept of five EO dimensions has been subject to numerous empirical studies in many countries and for different economic areas (Al-Mamary & Alshallaqi, 2022; Asad et al., 2024; Atikur Rahaman et al., 2021; Diaz & Sensini, 2020; Loan et al., 2023). Over the years, modifications have been made to the dimensions, such as the inclusion of

a desire for entrepreneurship, innovativeness, proactiveness, risk-taking, and networking capability. In this approach, the entrepreneurial desire was understood in the context of the entrepreneur and the achievement of something entrepreneurial. Networking capability indicates the ability to collaborate, share resources among partners, help each other enter the market, and gain access to new technologies that a company cannot achieve in isolation (Ranasinghe et al., 2018).

Business performance

Many studies have analyzed the business performance resulting from EO (Buli, 2017; Fairoz et al., 2010; Radipere, 2014; Rauch et al., 2009). Business performance is viewed as a measure of a company's success based on financial, marketing, operational, and human resource performance (Musthofa et al., 2017).

Since business performance is a multi-component concept, many measures and indicators were considered, dividing them primarily into financial and non-financial measures (Ranasinghe et al., 2018; Rauch et al., 2009). Business performance was also analyzed as subjective and objective performance. Subjective performance was studied from the perspectives of customers and employees using indicators depicting customer satisfaction, service quality, and employee job satisfaction. Financial and marketing indicators such as profitability and market share were used to measure objective performance (Agarwal et al., 2003). The research also analyzed indicators related to total business performance, considering parameters such as profitability, sales growth, market share growth, market share, and return on investment. Indicators related to the performance of the new product were also analyzed, among them the success rate of the new product and the turnover of the new product (Lee & Tsai, 2005). In addition, three types of business performance in the context of EO were analyzed, including perceived non-financial performance, perceived financial performance, and archived financial performance. Indicators relating to perceived non-financial performance included satisfaction, goal achievement, or evaluation of success. Measures of financial performance refer to growth, such as sales growth and financial ratios measuring return on investment and assets. Changes in sales revenue, financial performance, employment, and profitability were analyzed against archived financial results (Rauch et al., 2009). A meta-analysis of 53 samples from 51 studies involving 14,259 companies indicated that the correlation of EO with performance was moderately high (adjusted r = 0.242). The highest correlation between EO and business performance was obtained for perceived financial measures (adjusted r = 0.250), followed by perceived non-financial performance measures (adjusted r = .240), and the lowest for archival financial performance measures (adjusted r = 0.213) (Rauch et al., 2009).

The study analyzed different sets of indicators. For example, in one study, various indicators were adopted, including revenue, profit, market share, return on investment, number of employees, and product lines. Growth was also analyzed as a measure of business performance that is more relevant to financial measures (Radipere, 2014). Another set of indicators concerned four groups of measures from a financial perspective (sales growth rate and operating profit growth rate), a customer perspective (customer retention rate and level of customer acquisition), an internal business process perspective (level of efficiency in the company's operations and level of change in product development), and learning and growth perspectives (level of change in employee specific skills and employee performance growth rate) (Herlinawati et al., 2019). In the category of indicators depicting growth, the impact of EO on company growth (Karimi et al., 2021), export performance (Hossain et al., 2022), sales growth (Wiklund, 1999), and market share growth (Fairoz et al., 2010) have been analyzed.

However, the positive influence of EO on business performance has not always been confirmed, nor has the influence been proven under specific conditions. For example, one study identified a positive relationship between EO and business performance when a dynamic environment is combined with high access to financial capital and when a stable environment is combined with low access to financial capital (Frank et al., 2017).

The impact of EO on business performance presents a relationship that is not only a direct one but is modified by various variables. Various organizational and environmental factors introduced as variables moderate and mediate the relationship between EO and business outcomes. In particular, these are contingent factors, including organizational factors such as strategy, company size, support, resources, etc., and environmental factors such as the dynamics of change in the environment, industry regulations, and turbulence, etc. (Vij & Bedi, 2019). Other variables have also been considered, including market orientation (Buli, 2017; Karimi et al., 2021; Pratono et al., 2019), business model innovation and new product development (Ferreras-Méndez et al., 2021), competitive advantage (Pratono et al., 2019), and entrepreneurial leadership (Karimi et al., 2021). Organizational learning has also been proven to partially mediate the relationship between EO and business performance (Real et al., 2014). It was proven that green innovation and resource acquisition mediate the relationship between green EO and entrepreneurial business performance (Asad et al., 2024).

In addition to analyzing the influence of EO on business performance, the impact of individual dimensions was also studied. The arguments for each EO dimension, which allowed the formulation of five research hypotheses, are presented below.

Proactiveness has been widely analyzed in the world literature as an element of the EO dimension because of its importance for business performance. A study in a group of small and medium-sized companies in Sri Lanka found that proactiveness was statistically significantly correlated with an increase in market share and business performance (Fairoz et al., 2010). A positive correlation between proactiveness and business performance was found in companies in Vietnam (Loan et al., 2023), Bangladesh (Atikur Rahaman et al., 2021), Argentina (Diaz & Sensini, 2020), Saudi Arabia (Al-Mamary & Alshallaqi, 2022), and Nigeria (Ibrahim & Abu, 2020). Proactiveness also influences export performance at a strategic and financial level in one developing country (Hossain et al., 2022).

The literature also cites studies indicating that there is no relationship between proactiveness and business performance. These include, for example, studies conducted in Indonesia (Musthofa et al., 2017). Based on these arguments, the following hypothesis was formulated:

H1: Proactiveness positively influences business performance.

In empirical studies, innovativeness has been proven to be a determinant of business performance. For example, in a study of small and medium-sized enterprises in Sri Lanka, innovativeness was significantly correlated with an increase in market share (Fairoz et al., 2010). In contrast, a study in Indonesia identified that innovative EO had a significant influence on business performance (Musthofa et al., 2017). A positive impact of innovation on business performance was also found in companies in Vietnam (Loan et al., 2023), Bangladesh (Atikur Rahaman et al., 2021), Saudi Arabia (Al-Mamary & Alshallaqi, 2022), and Argentina (Diaz & Sensini, 2020). A study in Pakistan proved the positive impact of green innovation on the performance of entrepreneurial companies (Asad et al., 2024). In contrast, a study of export companies in Bangladesh found that innovation affects business performance (Hossain et al., 2022).

The impact of innovation on high or low performance was analyzed for UK companies using the Financial Analysis Made Easy database. It proved that innovation is more important for low-tech companies due to, among other things, the greater stability of low-tech sectors and the lower frequency of innovative product launches (Huang et al., 2023). Considering the above arguments, the following hypothesis was formulated:

H2: Innovativeness positively influences business performance.

A third dimension of EO is risk-taking, which is analyzed in empirical studies in terms of its impact on business performance. For example, a study conducted in Indonesia concluded that risk-taking EO had a significant influence on business performance (Musthofa et al., 2017). Another study of small and medium-sized companies in Sri Lanka found that risk-taking was significantly correlated with an increase in market share (Fairoz et al., 2010). Also, a survey of small and medium-sized enterprises in Bangladesh shows a positive relationship between risk-taking and business performance (Atikur Rahaman et al., 2021). A similar relationship was found in a study conducted in Argentina (Diaz & Sensini, 2020), Saudi Arabia (Al-Mamary & Alshallaqi, 2022), and Nigeria (Ibrahim & Abu, 2020).

The literature also cites studies indicating that there is no relationship between risk-taking and business performance. For example, these are studies conducted among female entrepreneurs in small and medium-sized enterprises in Vietnam (Loan et al., 2023). Analyzing the arguments presented, a hypothesis was formulated:

H3: Risk-taking positively influences business performance.

Studies cited in the literature indicate a relationship between competitive aggressiveness and business performance. For example, a study on private universities in Indonesia proved that competitive aggressiveness determines business performance. At the same time, business performance was influenced by knowledge creation and network capability (Panjaitan et al., 2021). A study conducted in Taiwan also found the impact of competitive aggressiveness on business performance (Luo & Lin, 2022). In contrast, a study of banks in the southwestern US indicated that motivation, awareness, and capability determine competitive aggressiveness, affecting market share growth and profitability (Stambaugh et al., 2020). In contrast, a study conducted in Nigeria found a positive effect of competitive aggressiveness on business performance, but it was statistically insignificant (Ibrahim & Abu, 2020).

The literature also cites studies that do not confirm the impact of competitive aggressiveness on business performance. These are, for example, studies conducted in Argentina (Diaz & Sensini, 2020) and Saudi Arabia (Al-Mamary & Alshallaqi, 2022). Based on these arguments, the following hypothesis was formulated:

H4: Competitive aggressiveness positively influences business performance.

Another dimension of EO affecting business performance confirmed by empirical studies is autonomy. For example, such an impact was statistically confirmed in studies conducted in Nigeria (Ibrahim & Abu, 2020). Similar results were obtained in a study conducted in Saudi Arabia (Al-Mamary & Alshallaqi, 2022). In contrast, a study in Argentina did not confirm the impact of autonomy on business performance (Diaz & Sensini, 2020). Moreover, a study conducted in Albania excluded autonomy from the EO dimensions model due to multicollinearity (Kruja, 2020). Presenting the above research and findings, a hypothesis was formulated:

H5: Autonomy positively influences business performance.

Co-branding partnership concept

Co-branding is a form of inter-organizational relationship (Parmigiani & Rivera-Santos, 2011), cooperation alliance (Tutan, 2021), and brand alliance (Gammoh & Voss, 2011). Co-branding is defined as a long-term brand alliance strategy in which one product is branded and identified simultaneously by two brands (Helmig et al., 2008). Co-branding represents a brand partnership tactic that connects two or more brands in a short- or long-term arrangement and involves the use of multiple brand names, logos, or features for the same product (H. Y. Yu et al., 2021). It is perceived as a form of cooperation between two or more brands characterized by significant recognition among customers if the brands remain retained (Blackett & Russell, 1999). Co-branding is derived from signal theory and refers to a brand, its logo, and its symbol being a signal to consumers in terms of promises, quality, and brand information (H. Y. Yu et al., 2021).

There are several types of co-branding partnerships. Awareness co-branding (Oeppen & Jamal, 2014), also known as reach-awareness co-branding (Blackett & Russell, 1999), is based on activities that increase awareness of one brand among another brand's target audience. Ingredient co-branding (Blackett & Russell, 1999) describes the vertical integration of ingredients and raw materials into a manufactured product by producers at different value chain stages (Helmig et al., 2008). There is also value endorsement co-branding or value-supportive co-branding, which refers to collaboration that supports analogous identities and the creation of shared values (Blackett & Russell, 1999; Oeppen & Jamal, 2014). This co-branding type is also known as value-chain co-branding and occurs as product-service co-branding, supplier-retailer co-branding, and alliance co-branding (Nunes et al., 2003). Horizontal co-branding is less frequently mentioned as a type of co-branding associated with the production and distribution of a product under multiple brands by producers at the same stage of the value chain (Helmig et al., 2008). Complementary competence co-branding, on the other hand, describes a situation in which two companies with two well-known brands collaborate in a joint effort to develop, design, and manufacture a product whose added value is greater than the sum of the experience of the cooperating companies (Blackett & Russell, 1999; Oeppen & Jamal, 2014).

Various success factors for co-branding are analyzed in the literature. These concern brand-related aspects pointing to brand image, brand equity, perceived quality attitude, involvement, uniqueness, and consciousness. Factors related to the type of business (service industry, manufacturing) or the specifics of the business area are also considered (Paydas Turan, 2021). In contrast, there is a lack of research relating to whether EO influences co-branding activities. Due to the nature of innovative co-branding partnerships and the lack of research on the impact of proactiveness on co-branding, the following hypothesis was formulated:

H6: Proactiveness positively influences innovative co-branding partnership.

A form of complementary competence co-branding is innovative co-branding associated with the development of a new, innovative product. It is associated with innovative co-branding alliances (Dudko, 2022). The literature analyzes innovative co-branding in the context of new product development with cultural references (Sun et al., 2022), a long-term perspective (Ströbel et al., 2020), and value creation potential (Nunes et al., 2003). Innovative co-branding is also referred

to as innovation-based co-branding and points to the collaboration of two companies to co-create a completely new market offering that increases value for customers and businesses. This results in the development of an existing market or the creation of a new one. The risk is greater than for other forms of co-branding because of the effort involved in co-creating an innovative solution (Nunes et al., 2003). Considering the above arguments, the following hypothesis was formulated:

H7: Innovativeness positively influences innovative co-branding partnership.

Risk in branding and co-branding is analyzed in various aspects in the literature. Four types of risk in brand management are identified: brand dilution risk, brand reputation risk, brand stretch risk, and brand cannibalization risk (Fournier & Srinivasan, 2018). One study on co-branding points out risks when luxury and fast-fashion brands collaborate (Zhang et al., 2022). This is due to the inappropriate selection of co-branding brands (Abdolmaleki et al., 2023).

In addition, the literature extensively examines the issue of risk and risk management in the context of innovation in various economic industries (Hock-Doepgen et al., 2021; Li & Li, 2021; Liu et al., 2023; Williams et al., 2020). However, there are no studies identifying the relationship between risk-taking and innovative co-branding. Analyzing the arguments presented, a hypothesis was formulated:

H8: Risk-taking positively influences innovative co-branding partnership.

The literature analyzes co-branding success factors in the context of brands undertaking co-branding. One such factor is the perception of the co-branding brand more favorably than of competing brands. This is related to appropriate communication to show consumers a distinctive and attractive image (Hemzo, 2023). In addition, when entering local markets, international brands need to demonstrate strategic orientation, resulting in the co-evolution of global strategies that combine international and local companies (Cherbib et al., 2023). At the same time, there is a lack of research indicating whether competitive aggressiveness affects the effectiveness of co-branding. Based on these arguments, the following hypothesis was formulated:

H9: Competitive aggressiveness positively influences innovative co-branding partnership.

Autonomy in the context of branding is not often analyzed in the literature. For example, a single study addresses attitudes toward hotel brands due to their perceived autonomy (Chen et al., 2021). Autonomy has also been analyzed concerning consumer need satisfaction and luxury brand influencers in the context of self-brand connection (Yu et al., 2023). Other than that, there are no studies on autonomy in relation to branding, nor are there any studies analyzing autonomy for co-branding. Presenting the above research and findings, a hypothesis was formulated:

H10: Autonomy positively influences innovative co-branding partnership.

The benefits of a co-branding partnership can be divided into financial and non-financial benefits. Among the financial benefits are an increase in sales revenue, improved profitability, and an increase in return on investment. At the same time, lower investments are observed in the implementation of business ventures (Boad, 1999). Non-financial benefits include increased credibility and brand awareness (McCarthy & Von Hoene, 2014), increased consumer interest, collaboration with stakeholders, and the ability to offer special promotions (Boad, 1999). In this sense, the following hypothesis was proposed:

H11: Innovative co-branding partnerships positively influence business performance (product/brand, customer, and financial performance).

Figure 1 presents the conceptual framework of the study applied to the entrepreneurial orientation of companies, innovative co-branding partnership, and business performance.

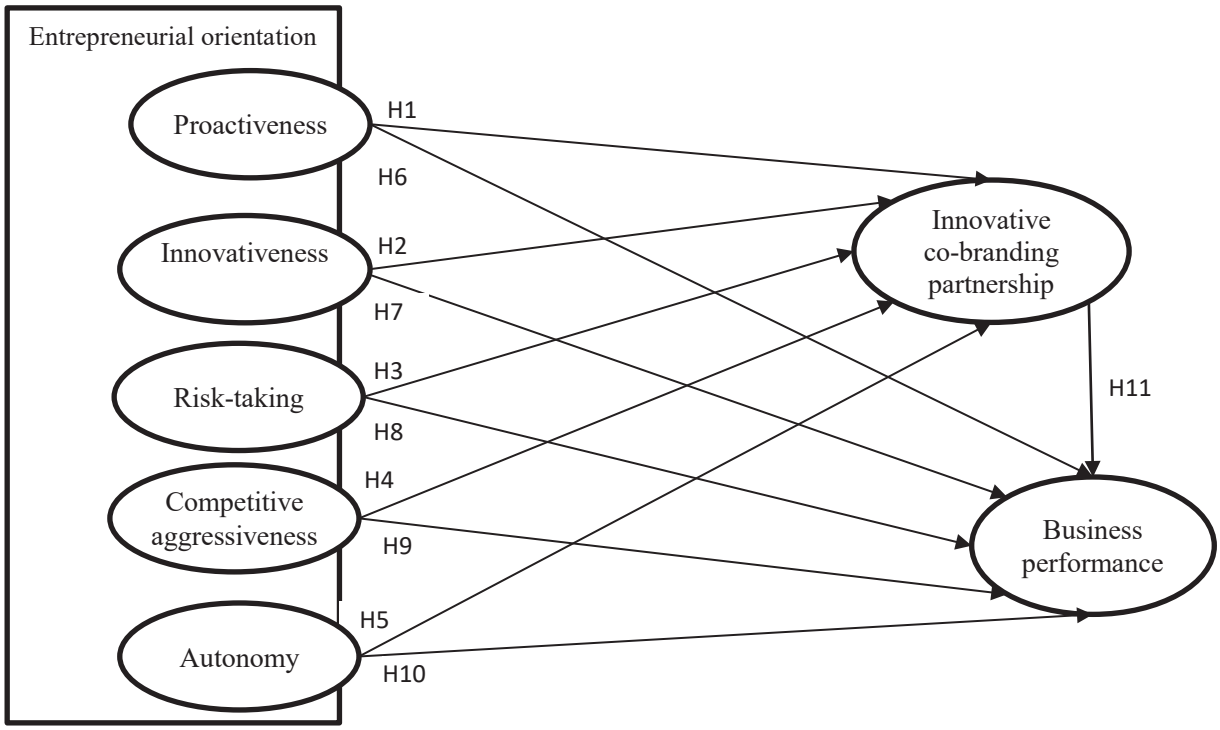

Figure 1. Research model

METHODOLOGY

Study design

This study analyzes the relationship between EO, innovative co-branding partnership, and business performance in companies operating in Poland. The quantitative survey, as a part of the first phase of brand management research, was conducted in June 2023 among managers using an online questionnaire. Partial least squares structural equation modeling (PLS-SEM) was used to support the conceptual framework and proposed hypotheses. A sample-to-item ratio rule of no less than 5-to-1 was adopted to determine the sample size, indicating 5 observations per observable variable (Memon et al., 2020). For this study, a double rule was adopted. Using purposive sampling, 280 online responses were obtained, of which 266 online questionnaires were qualified for further calculations. Incomplete online questionnaires were eliminated.

Variable measurement

The research model was developed based on a state-of-the-art literature review of EO dimensions and previous replication studies. The scales for assessing innovation, proactivity, risk-taking, competitive aggressiveness, and autonomy as EO dimensions were derived from earlier research (Hughes & Morgan, 2007), with replication studies (Zhang et al., 2014). A total of 28 items were used, including 17 items for assessing EO dimensions in the following order: 3 items for assessing innovativeness, 4 items – for proactiveness, 3 items – for risk-taking, 3 items – for competitive aggressiveness, and 4 items – for autonomy. In addition, 7 items were used for assessing business performance, and 4 items were used for innovative co-branding partnership (Table 1). Individual items were rated according to a 7-point Likert scale from 1 (strongly disagree) to 7 (strongly agree).

Table 1. Measurement scales

Measurement scale	Items	Adopted from
Entrepreneurial orientation		
Innovativeness	EO_INNV-1. Our company is currently introducing several improvements and innovations EO_INNV-2. Our company is creative in its methods of operation. EO_INNV-3. Our company seeks new approaches to business.	(Hughes & Morgan, 2007) (H. Zhang et al., 2014)
Proactiveness	EO_PROA-1. Our company always tries to take the lead in any situation. (e.g., against competitors, in projects and when working with others). EO_PROA-2. Our company is excellent at identifying upcoming opportunities. EO_PROA-3. Our company initiates actions to which other companies respond. EO_PROA-4. Our company tries to take the initiative in difficult situations (e.g., high inflation, pandemic, outbreak of war in Europe).	(Hughes & Morgan, 2007) (H. Zhang et al., 2014)
Risk-taking	EO_RISK-1. In our company, the term 'risk-taker' is considered a positive human attribute. EO_RISK-2. Our company's employees are encouraged to take calculated risks associated with new ideas. EO_RISK-3. Our company emphasizes both exploration and experimentation in search of opportunities.	(Hughes & Morgan, 2007) (H. Zhang et al., 2014)
Competitive aggressiveness	EO_COMP-1. Our company is highly competitive. EO_COMP-2. In general, our company takes a bold or aggressive approach to competing with others. EO_COMP-3. Our company tries to beat the competition as best it can.	(Hughes & Morgan, 2007) (H. Zhang et al., 2014)
Autonomy	EO_AUTO-1. Employees in our company can act and think without interference. EO_AUTO-2. Employees do work that allows them to make and initiate changes in the way they perform their task-related objectives. EO_AUTO-3. Employees have the freedom and independence to make decisions about how they do their work. EO_AUTO-4. Employees have the right and responsibility to act independently if they believe it is in the best interest of the company.	(Hughes & Morgan, 2007) (H. Zhang et al., 2014)
Business performance		
Product and brand performance	PERF-1. Compared with competing products and brands, our products and brands have been more successful in terms of sales. PERF-2. Compared with competing products and brands, our products and brands have been more successful in terms of achieving and increasing market share.	(Hughes & Morgan, 2007); modified
Customer performance	PERF-3. This year our company has gained new customers. PERF-4. This year, our company succeeded in expanding its existing customer base. PERF-5. Our company has succeeded in maintaining its customer base and obtaining repeat orders.	(Hughes & Morgan, 2007)
Financial performance	PERF-6. There has been an increase in sales in our company. PERF-7. There has been an increase in profit in our company.	(Fairoz et al., 2010)
Innovative co-branding partnership		
Innovative co-branding partnership	CO_BR-1. We undertake innovative co-branding partnerships to increase recognition among consumers. CO_BR-2. We undertake innovative co-branding partnerships for value creation. CO_BR-3. We undertake innovative co-branding partnerships for new product development. CO_BR-4. We undertake innovative co-branding partnerships to improve business performance.	Based on (Boad, 1999).

Data analysis

To test the model, PLS-SEM modeling was used as Partial Least Squares Path Modeling (Sarstedt et al., 2014). The calculations were performed in Smart PLS version 4.0.9.5 (Ringle et al., 2022). Cronbach's alpha index was applied to assess the internal test consistency. Composite reliability was calculated using Dijkstra-Henseler's rho_a and Dillon-Goldstein's rho_c indices. In addition, the average variance extracted (AVE) was applied (dos Santos & Cirillo, 2021; J. Hair et al., 2010; Haji-Othman & Yusuff, 2022).

RESULTS

Measurement model

Table 2 presents the factor loadings, construct reliability, and validity for the measurement model. For the individual EO dimensions, factor loadings reached values that ranged from 0.775 to 0.816 for innovativeness, from 0.708 to 0.817 for proactiveness, from 0.816 to 0.866 for risk-taking, from 0.680 to 0.810 for competitive aggressiveness, and from 0.724 to 0.786 for autonomy. For innovative co-branding partnership, factor loadings range from 0.692 to 0.837, while business performance ranges from 0.710 to 0.815.

Table 2. Factor loadings, construct reliability and validity

Constructs	Items	Factor loadings	Cronbach's alpha	Average variance extracted (AVE)	Composite reliability (rho_a)	Composite reliability (rho_c)
Innovativeness (EO_INNV)	EO_INNV-1	0.755	0.808	0.635	0.810	0.874
	EO_INNV-2	0.805				
	EO_INNV-3	0.810				
	EO_INNV-4	0.816				
Proactiveness (EO_PROA)	EO_PROA-1	0.737	0.771	0.594	0.770	0.854
	EO_PROA-2	0.816				
	EO_PROA-3	0.817				
	EO_PROA-4	0.708				
Risk-taking (EO_RISK)	EO_RISK-1	0.836	0.797	0.705	0.824	0.878
	EO_RISK-2	0.866				
	EO_RISK-3	0.816				
Competitive aggressiveness (EO_COMP)	EO_COMP-1	0.810	0.761	0.582	0.774	0.847
	EO_COMP-2	0.759				
	EO_COMP-3	0.797				
	EO_COMP-4	0.680				
Autonomy (EO_AUTO)	EO_AUTO-1	0.731	0.740	0.559	0.746	0.835
	EO_AUTO-2	0.786				
	EO_AUTO-3	0.724				
	EO_AUTO-4	0.747				
Innovative co-branding partnership (CO_BR)	CO_BR-1	0.774	0.784	0.606	0.798	0.860
	CO_BR-2	0.837				
	CO_BR-3	0.803				
	CO_BR-4	0.692				
Business performance (PERF)	PERF-1	0.745	0.887	0.597	0.891	0.912
	PERF-2	0.815				
	PERF-3	0.814				
	PERF-4	0.710				
	PERF-5	0.733				
	PERF-6	0.792				
	PERF-7	0.796				

As an indicator for assessing construct reliability, the Cronbach's alpha index determines internal consistency. It was calculated for all surveyed constructs, including EO dimensions, innovative co-branding partnerships, and business performance. The value of Cronbach's alpha ranged from 0.740 for autonomy as an EO dimension to 0.887 for business performance. Such values are in accordance with acceptable values, which are considered appropriate (Taber, 2018; Tavakol & Dennick, 2011).

The average variance extracted (AVE) as an index to validate constructs (dos Santos & Cirillo, 2021) ranged from 0.559 for autonomy to 0.705 for risk-taking. Both constructs are EO dimensions. A satisfactory value above 0.5 was achieved for all constructs (Hair et al., 2010; Haji-Othman & Yusuff, 2022)

The Dijkstra-Henseler rho_a and Dillon-Goldstein rho_c indices were used to assess the reliability of the constructs. Both indices obtained satisfactory values above 0.7 for the constructs tested. The rho_a index ranged from 0.746 for autonomy to 0.891 for business performance, while the rho_c index reached a value from 0.835 to 0.912 for the same constructs.

Discriminant validity

To assess discriminant validity (Table 3), the Fornell-Larcker criterion was used (Fornell & Larcker, 1981). A comparison was made between the AVE square root value and the inter-construct correlations. AVE values greater than the between-construct coefficients were obtained. In Table 4, the Heterotrait-Monotrait ratio of correlations (HTMT) were calculated, obtaining satisfactory values below 0.85 (Henseler et al., 2015).

Table 3. Discriminant validity – the Fornell-Larcker criterion

	CO_BR	EO_AUTO	EO_COMP	EO_INNV	EO_PROA	EO_RISK	PERF
CO_BR	**0.778**						
EO_AUTO	0.492	**0.747**					
EO_COMP	0.454	0.584	**0.763**				
EO_INNV	0.533	0.627	0.506	**0.797**			
EO_PROA	0.297	0.303	0.282	0.297	**0.771**		
EO_RISK	0.358	0.457	0.408	0.410	0.223	**0.840**	
PERF	0.636	0.464	0.463	0.626	0.352	0.352	**0.773**

Table 4. Discriminant validity – the Heterotrait-Monotrait ratio (HTMT)

	CO_BR	EO_AUTO	EO_COMP	EO_INNV	EO_PROA	EO_RISK	PERF
CO_BR							
EO_AUTO	0.642						
EO_COMP	0.566	0.760					
EO_INNV	0.663	0.799	0.635				
EO_PROA	0.377	0.391	0.350	0.373			
EO_RISK	0.439	0.580	0.511	0.494	0.269		
PERF	0.731	0.549	0.550	0.734	0.416	0.397	

Variance inflation factor

The variance inflation factor (VIF) was used to assess collinearity between constructs and items. This index should reach a value of less than 5.00 (Hair et al., 2013). Table 5 shows the VIF results for the studied CO_BR, EO_AUTO, EO_COMP, EO_INNV, EO_PROA, EO_RISK, and PERF constructs with VIF coefficients below 5.00. Table 6 shows the VIF results for all items tested. In each case, a VIF value below 0.5 was obtained, indicating no collinearity.

Table 5. Collinearity statistics of constructs – Variance inflation factor (VIF)

	CO_BR	EO_AUTO	EO_COMP	EO_INNV	EO_PROA	EO_RISK	PERF
CO_BR							1.566
EO_AUTO	2.056						2.089
EO_COMP	1.654						1.692
EO_INNV	1.789						1.930
EO_PROA	1.142						1.158
EO_RISK	1.346						1.356
PERF							

Table 6. Collinearity statistics of items – Variance inflation factor (VIF)

Items	VIF value	Items	VIF value	Items	VIF value	Items	VIF value
EO_PROA-1	1.406	EO_COMP-1	1.628	EO_AUTO-1	1.393	PERF-1	1.812
EO_PROA-2	2.091	EO_COMP-2	1.473	EO_AUTO-2	1.521	PERF-2	2.250
EO_PROA-3	2.045	EO_COMP-3	1.560	EO_AUTO-3	1.514	PERF-3	2.304
EO_PROA-4	1.247	EO_COMP-4	1.404	EO_AUTO-4	1.294	PERF-4	1.691
EO_INNV-1	1.860	EO_RISK-1	1.407	CO_BR-1	1.475	PERF-5	1.634
EO_INNV-2	1.567	EO_RISK-2	2.371	CO_BR-2	1.829	PERF-6	2.519
EO_INNV-3	1.744	EO_RISK-3	2.128	CO_BR-3	1.817	PERF-6	2.578
EO_INNV-4	1.866			CO_BR-4	1.513		

Hypotheses testing

Table 7 presents the statistical results for the proposed hypotheses. Three hypotheses were confirmed with p = 0.000. There are H2 (ß = 0.364), H7 (ß = 0.299), and H11 (ß = 0.382), indicating the influence of innovativeness on business performance and innovative co-branding partnerships and the influence of innovative co-branding partnerships on business performance. Two hypotheses were accepted with p-values below 0.05. These are H1 (ß = 0.114, p = 0.045) and H9 (ß = 0.156, p = 0.011), indicating the influence of proactiveness on business performance and the influence of competitive aggressiveness on innovative co-branding performance. Two hypotheses were accepted with p-values below 0.1. These are H4 (ß = 0.094, p = 0.052) and H10 (ß = 0.145, p = 0.067), indicating a positive influence of competitive aggressiveness on business performance and autonomy on innovative co-branding performance. Four hypotheses (H3, H5, H6, and H8) were not confirmed.

Table 7. Path coefficients

	Hypotheses	Beta	SE	T-value	P-values	Supported
H1	EO_PROA → PERF	0.114	0.057	2.003	0.045	Yes
H2	EO_INNV → PERF	0.364	0.057	6.333	0.000	Yes
H3	EO_RISK → PERF	0.027	0.056	0.486	0.627	No
H4	EO_COMP → PERF	0.094	0.048	1.941	0.052	Yes
H5	EO_AUTO → PERF	-0.054	0.062	0.869	0.385	No
H6	EO_PROA → CO_BR	0.102	0.069	1.483	0.138	No
H7	EO_INNV → CO_BR	0.299	0.072	4.177	0.000	Yes
H8	EO_RISK → CO_BR	0.082	0.057	1.446	0.148	No
H9	EO_COMP → CO_BR	0.156	0.061	2.533	0.011	Yes
H10	EO_AUTO → CO_BR	0.145	0.079	1.831	0.067	Yes
H11	CO_BR → PERF	0.382	0.060	6.349	0.000	Yes

Mediating estimation

Testing specific indirect effects, only one path was identified with p-values 0.001 (Table 8). This is the path: EO_INNV → CO_BR → PERF (ß = 0.114, p = 0.000). For two paths, the p-value ranged between 0.01 and 0.1. These were as follows: EO_COMP → CO_BR → PERF (ß = 0.059, p = 0.021) and EO_AUTO → CO_BR → PERF (ß = 0.055, p = 0.061). For the other two paths, the p-value was above 0.1

Table 8. Specific indirect effects

Paths	Beta	SE	T-value	P-values
EO_INNV → CO_BR → PERF	0.114	0.034	3.317	0.001
EO_PROA → CO_BR → PERF	0.039	0.027	1.431	0.152
EO_AUTO → CO_BR → PERF	0.055	0.030	1.877	0.061
EO_COMP → CO_BR → PERF	0.059	0.026	2.309	0.021
EO_RISK → CO_BR → PERF	0.031	0.023	1.370	0.171

Structural model

The relationships and indirect effects found will allow a structural model to be developed, as shown in Figure 2.

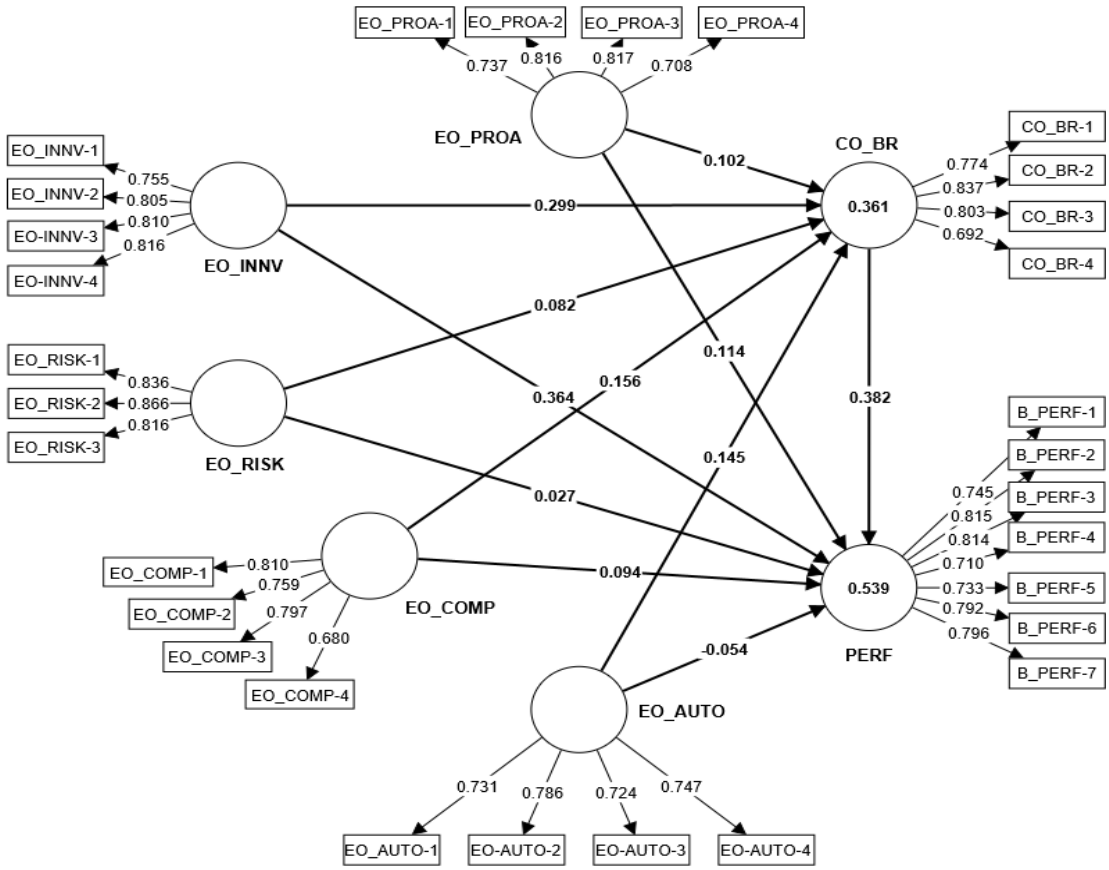

Figure 2. Structural model

DISCUSSION

The purpose of the study was to explore the relationship between EO, innovative co-branding partnership and business performance. EO was analyzed through five dimensions, including innovativeness, proactiveness, risk-taking, competitive aggressiveness, and autonomy. Business performance was examined as a single construct composed of product and brand performance, customer performance, and finance performance. This empirical study analyzed the impact of individual dimensions on business performance. Two approaches are used in the literature. The first approach is analogous to this study, i.e., examining the impact of individual dimensions separately on business performance (Atikur Rahaman et al., 2021; Loan et al., 2023). The second approach used in the literature refers to the use of individual dimensions within a single construct. This approach examines the impact of a single construct, such as EO, on business performance (Ferreras-Méndez et al., 2021; Pratono et al., 2019).

This study proved the positive impact of innovativeness on business performance. There are many studies published in the literature on the outcomes of innovativeness in different countries and different economic sectors (Boisvert & Khan, 2020; Golgeci & Ponomarov, 2013; Hollebeek & Rather, 2019; Kalyar et al., 2020; E. Kim et al., 2021; Stock & Zacharias, 2011; Williams & van Triest, 2021). The literature discussion in this study refers to innovativeness only in the context of treating innovativeness as an EO dimension. The present study referred to innovativeness as an EO dimension and confirmed the positive relationship between innovativeness and business performance. A similar relationship has been confirmed by other studies published in the literature (Al-Mamary & Alshallaqi, 2022; Asad et al., 2024; Atikur Rahaman et al., 2021; Diaz & Sensini, 2020; Loan et al., 2023). Another study analyzed innovation in the context of market and entrepreneurial orientation for different types of technological innovations in small and medium-sized companies in South Korea. It proved that market orientation stimulates the creation of innovations new to companies, while EO determines the creation of innovations new to the industry (Kim & Hur, 2024). Another study indicated a relationship between radical and incremental innovations and business performance among construction companies in Malaysia (Yusof et al., 2023). In contrast, a study conducted in micro, small, and medium-sized companies in Peru and Colombia in the apparel sector analyzed the impact of innovation on four types of performance, including organizational, economic, commercial, and productive performance. It was proven that there is a moderating effect of investment on the relationship between product innovation, business process innovation, and business performance for organizational and productive performance. The significant role of collaboration in achieving business performance has also been pointed out (Larios-Francia & Ferasso, 2023). In addition, a study of small and medium-sized companies in Portugal and the UK proved that product/process eco-innovations and green innovation systems determine sustainable business performance (Almeida & Wasim, 2023).

Other studies have confirmed that business performance was determined by innovation, transformational leadership (Cuevas-Vargas et al., 2023), and innovation-oriented culture (Barjak & Heimsch, 2023). A study on small and medium-sized Swiss companies distinguished between an innovation culture and a culture of openness (Barjak & Heimsch, 2023). The study also found that organizational commitment and innovative work behavior positively influenced business performance, including increased profits, sales, market shares, employee loyalty, and low employee rotation (Muhamad et al., 2023). However, studies from years earlier than 2010 are available in the literature, stating that entrepreneurial and market orientation do not influence product innovation. For example, this refers to biotech start-ups in the United States, Finland, and Sweden in the context of introducing disruptive and radical innovative solutions. In contrast, the relationship between technological capabilities and product innovation has been confirmed (Renko et al., 2009).

This research has proven the impact of competitive aggressiveness on business performance. This relationship has been confirmed in other empirical studies (Al-Mamary & Alshallaqi, 2022) (Luo & Lin, 2022). In addition, a study of 203 large companies in Spain found that IT infrastructure capabilities and competitive aggressiveness influence company performance through green supply chain management (Ajamieh et al., 2016). In contrast, a study including data on 773 companies from 74 industries from Standard & Poor's Compustat Research Insight and IBIS World Industry Reports databases found a relationship between strategic aggressiveness and firm-level performance. Furthermore, such a relationship was stronger in small firms than in large ones (Weinzimmer et al., 2023). Also, a study in Nigeria proved that there is a statistically positive relationship between competitive aggressiveness and business performance, particularly profitability, market share, and customer satisfaction (Barinua & Chiedozie, 2022). In addition, competitiveness has been proven to affect the performance of large retail stores in Nairobi (Ngetich, 2023), and export performance of small and medium companies in Tanzania (Ringo et al., 2023).

In the case of the two dimensions of EO described above (innovativeness and competitive aggressiveness), confirmation of their positive influence on co-branding activities was obtained in this study. For proactiveness and autonomy, different results were obtained regarding the influence on business performance and co-branding activities. Proactiveness as an EO dimension positively influenced business performance, while no such influence was found for co-branding. In contrast, autonomy had a positive influence on co-branding decisions and no impact on business performance. Some published studies in the literature report varying proactiveness influences on business performance (Al-Mamary & Alshallaqi, 2022; Hossain et al., 2022; Loan et al., 2023). Previous studies also confirm this relationship (Fairoz et al., 2010; Kraus et al., 2012). In the literature, proactiveness is also analyzed in a broader sense. For example, a study conducted in Spain proved that proactivity is an antecedent of entrepreneurial intentions (Martín-Navarro et al., 2023). In turn, the proactiveness of one of the world's most recognizable brands influenced employee performance and satisfaction in Nigeria (Ikebujo et al., 2023).

Issues of risk-taking are widely analyzed in the literature in the context of strategic management (Burkhard et al., 2023; Roberts & Hamilton Edwards, 2023) and the influence on business performance (Al-Mamary & Alshallaqi, 2022;

Atikur Rahaman et al., 2021). A study of 100 owners/managers of small and medium-sized companies in Kenya found a positive relationship between risk-taking and business performance. This is because committing business resources to ventures in uncertain and unfamiliar environments can increase profits and market share (Kitigin, 2017). In contrast, a study of Indonesian owner-managers of small and medium-sized enterprises found no impact of risk-taking behavior on firm performance. Furthermore, the impact of risky behavior on firm performance was proven to be more effective at low information technology turbulence than at high turbulence (Pratono, 2018). In contrast, a study of female entrepreneurs in small and medium-sized enterprises in Vietnam found no effect of risk-taking on business performance (Loan et al., 2023).

Issues of risk-taking are also explored in detail in the context of innovation management. For example, using the example of a group operating in more than 70 countries, it was proven that risk-taking has an impact on innovation performance. It was further indicated that clearly defined innovation goals, cooperation, innovation support activities, and availability of organizational resources positively determine risk-taking (Giaccone & Magnusson, 2022). A study of Chinese companies found that risk-taking indirectly affects the relationship between digital transformation and innovation (Liu et al., 2023). In recent years, an important area of research has been risk-taking in the context of innovation risk (Bigliardi et al., 2023), and green innovation (Pan et al., 2023; Wu et al., 2023; Zheng et al., 2023).

The present study proved the positive influence of co-branding on business performance. Several results of co-branding are cited in the literature, confirming the results obtained in this study. For example, a study conducted in the US proved that co-branding resulted in significant returns from the increase in share prices of companies listed on the stock exchange. The high integration of co-branding and the long duration of co-branding generated much higher returns (Miao et al., 2021). In the literature, co-branding is analyzed as a brand leveraging strategy (Quamina et al., 2023) to create value, uniqueness, and competitiveness (Hjalager & Konu, 2011), to achieve competitive advantage (Gręboszc, 2013) and to improve a company's competitive power (Zuhdi et al., 2020). Studies have highlighted innovation's impact on co-branding effectiveness (Dudko, 2022). For example, innovative co-branding between a popular shoe brand and a well-known food brand allowed for the creation of additional value, which attracted attention and increased consumer engagement. As a result, it increased the market share of both brands (Artagnan & Alam, 2023). In another study, it was proven that high ratings of a new co-branded product translate into improved ratings for brands undertaking co-branding cooperation (Zhang & Guo, 2023). In addition, co-branding has an impact on both companies' operations at the retail level (Nygaard & Dahlstrom, 2022).

In conclusion, it is essential to point out the relationship found between the selected EO dimensions, innovative co-branding partnership, and business performance. This is particularly important today, with turbulent environmental and crisis changes. At the same time, the high cost of developing new goods and services influences the search for new opportunities for cooperation to create value for the company and its stakeholders. Innovative co-branding partnerships are such an opportunity, as analyzed in this study.

CONCLUSION

The presented study proved a positive influence of three EO dimensions (innovativeness, proactiveness, and competitive aggressiveness) on business performance and three EO dimensions (innovativeness, competitive aggressiveness, and autonomy) on undertaking activities within an innovative co-branding partnership. Furthermore, innovative co-branding partnership activities have been proven to influence business performance.

The results of this empirical study have several implications. First, the influence of individual EO dimensions on business performance was analyzed, and the positive influence of innovativeness, proactiveness, and competitive aggressiveness on business performance was identified. Managers should make efforts to increase innovativeness, market activity and take intensive actions to increase the competitiveness of the market offer. It is necessary to monitor the actions taken in the context of their influence on selected market, consumer, product, and brand performance. Secondly, the positive influence of three EO dimensions (innovativeness, competitive aggressiveness, and autonomy) on undertaking innovative co-branding partnership has been proven. This means there is a need to monitor the influence of the actions taken on business performance. Thirdly, the positive influence of innovative co-branding partnership activities on business performance was found. Managers should analyze the possibilities of undertaking cooperation of this nature to increase business performance.

This study contributed to exploring the relationship between EO, innovative co-branding partnership and business performance, but it has some limitations. First, the study was conducted among companies operating in Poland.

Secondly, selected aspects related to business performance were analyzed, with two statements related to product and brand performance, two to customer performance, and three to financial performance. Other financial factors, e.g., those relating to operational efficiency and return on investment, were not taken into account.

The direction of future research should be the analysis of the relationship between EO, co-branding partnership, and business performance. In addition, it is worth examining what factors determine EO and co-branding partnership. It would also be interesting to take into account the specifics of the industry, including the division into production, service, and trade companies.

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Authorship contribution statement

Hanna Górska-Warsewicz: Conceptualization, Data Curation, Formal Analysis, Investigation, Methodology, Project Administration, Resources, Software, Supervision, Validation, Visualization, Writing – Original Draft, and Writing – Review & Editing.

Conflicts of interest

The author declares no conflict of interest.

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