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

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## 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

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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; Puomalainen, 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 & Sivarethnamohan, 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, Schlepfforst & 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; Źak & 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; Soinen, 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 & Málóvics, 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 & Zybortowicz, 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).

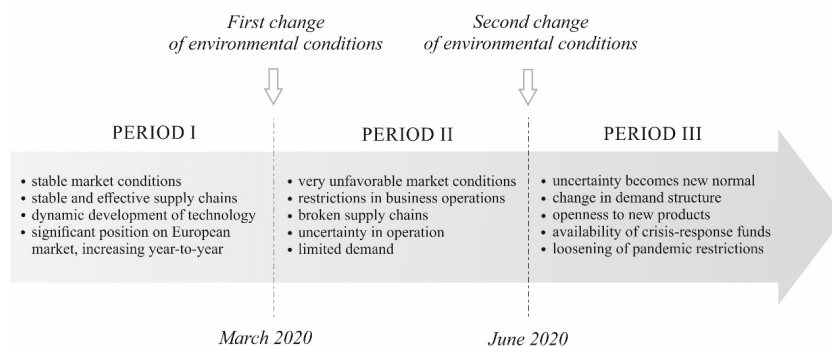
## Sample and data collection

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 – Dębowska 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 signed-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.

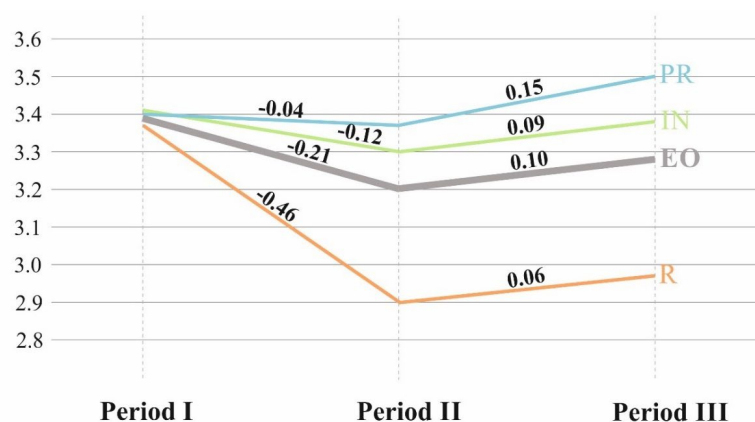


Figure 2. Changes in dimensions of entrepreneurial orientation and its dimensions during particular periods

**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	<b>0.001</b>	0.10	0.38	<b>0.027</b>
R	-0.46	0.85	<b>0.000</b>	0.06	0.58	0.300
IN	-0.12	0.71	0.119	0.09	0.43	<b>0.025</b>
PR	-0.04	0.68	0.621	0.15	0.45	<b>0.000</b>

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.

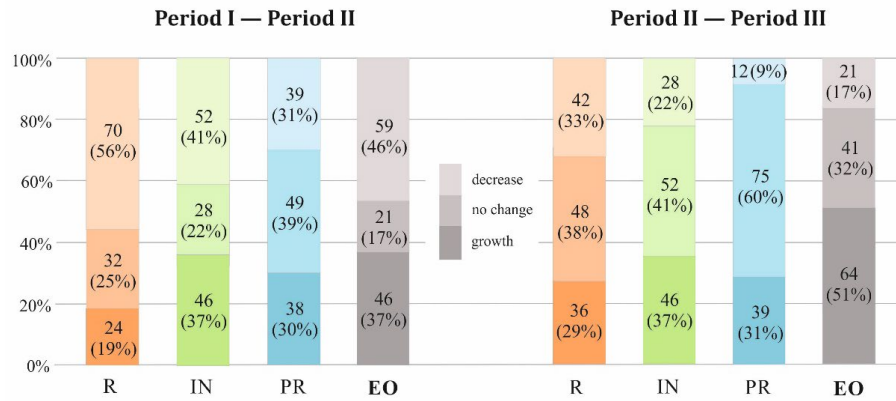


Figure 3. Cumulative distribution of changes in behavior in terms of entrepreneurial orientation and its individual dimensions

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.

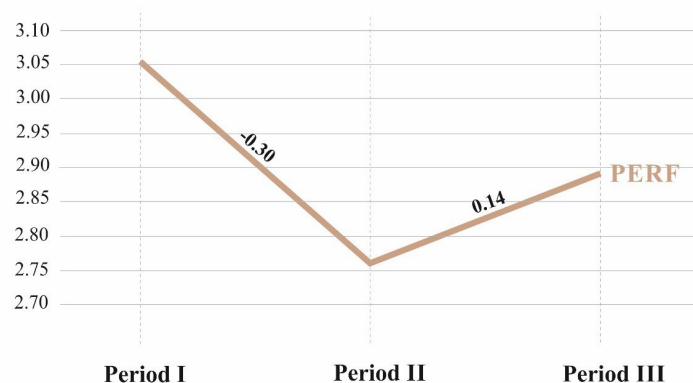
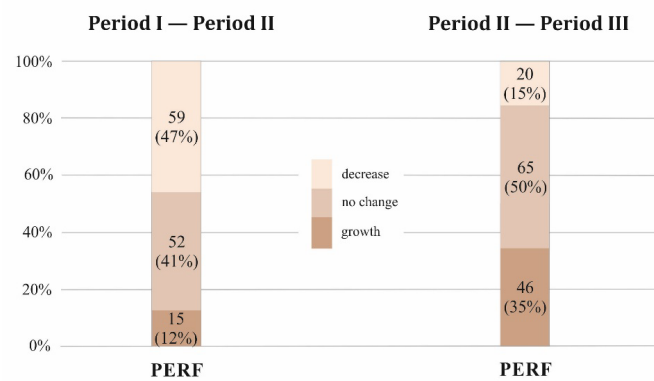


Figure 4. Changes in PERF of studied companies over particular period pairings

**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	<b>0.000</b>	0.14	0.43	<b>0.000</b>

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.

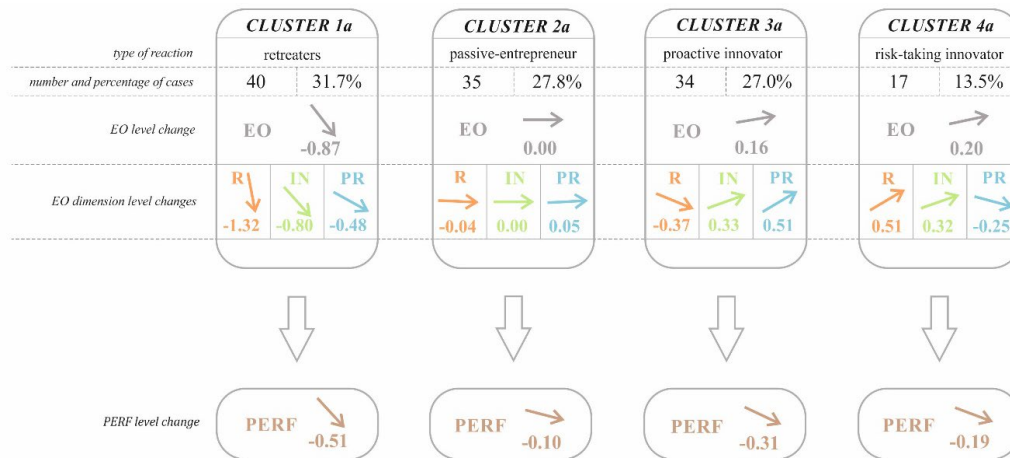


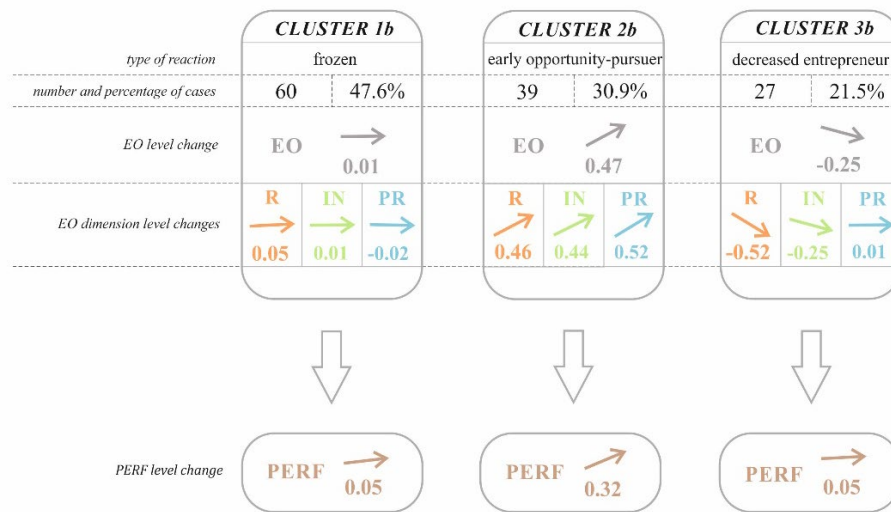
Figure 6. Results of cluster analysis for changes between Periods I and II

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 ( $p\text{-value} = 0.033$  in the Kruskal-Wallis test). Second, only the companies from Cluster 2b recorded a significant increase in performance ( $p\text{-value} = 0.001$  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. Interestingly, 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.

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## 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. Concurrently, 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.
Innovativeness (IN)	We can radically change our previous plans if it could offer a chance for above-average profit.
	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.
Proactiveness (PR)	Relative to competing products, our products are more innovative.
	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

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## 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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