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Marketing determinants of innovation ambidexterity in small and medium-sized manufacturers

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ABSTRACT

Objective: The study aimed to identify the marketing determinants of SMEs' innovation ambidexterity and explore this phenomenon in the firms from a post-transition Polish market. Specifically, market-sensing capability, entrepreneurial marketing orientation, and marketing strategies were considered the possible determinants of innovation ambidexterity. The comparative character of the study enabled examining if these relationships have changed comparing 2019 to the time of pandemic crisis in 2021.

Research Design & Methods: The study includes a sample of 240 Polish manufacturing SMEs contacted with the CATI/CAWI method in May 2019 and 219 firms selected and surveyed according to the same method between January-February 2021. The results were obtained with factor analysis and logistic regression.

Findings: Innovation ambidexterity was related to market sensing, opportunity focus, proactive orientation, and adaptation strategy applied by manufacturing SMEs in the B2B markets. However, during the pandemic crisis, the different determinants replaced those identified during the less turbulent time.

Implications & Recommendations: Entrepreneurial marketing accompanies innovation ambidexterity. Including employees in the sensing process and concentrating on market opportunities are especially stimulating for exploratory and exploitative innovations. The significant influence of firm size and high-tech industry on ambidexterity points to the role of SMEs' strategic agility in a turbulent environment.

Contribution & Value Added: The study explored in detail the marketing determinants of an important SME capability: innovation ambidexterity. Comparing data from the span of two years enabled taking into account the pandemic crisis. In addition, the study verified the measurement tool for analyzing SME ambidexterity.

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INTRODUCTION

Small and medium-sized manufacturers (SMEs) constitute essential part of economies worldwide, and especially in post-transition and emerging markets, they contribute significantly to economic growth. In Poland, the SMEs create 49.1% of GDP, and in 2021, the post-pandemic recovery period, the Polish GDP grew by 5.7% (GUS, 2022).This growth resulted mainly from the increase in manufacturing and exports (*Europe and Central Asia Economic Update, Fall 2021: Competition and Firm Recovery Post COVID-19*, 2021; Frączyk, 2021). However, Polish SMEs have problems introducing organizational or marketing innovations (ZPP, 2021). New or substantially improved products or processes were introduced by only 11.2% of small Polish firms and 34.3% of medium-sized SMEs in the 2017-2019 period (PARP, 2021).

The SMEs' management and marketing capabilities (Kaleka & Morgan, 2019; Cui *et al.*, 2014; Lin & Si, 2019) are still understudied. Among them, especially learning and informal market sensing are the characteristic attributes of small and medium-sized enterprises which make them succeed against the competition (Bruneel *et al.*, 2010; Pellegrino & McNaughton, 2015). Such firms develop specialized marketing capabilities helping them to maintain customer intensity, including cooperation in preparing innovations for the foreign markets (Kowalik *et al.*, 2020). They display an ambidextrous attitude towards innovations, which can be the critical input for performance enhancement (Martin *et al.*, 2017), all the more critical at turbulent times. Innovation ambidexterity includes companies' engagement in perfecting the 'old' tried-out product offering (exploitative innovations) and looking for completely new solutions (exploratory innovations). According to the literature, ambidexterity concerning innovations is the organizational capability to manage both radical exploratory innovation and exploitative incremental innovation simultaneously (Kang & Hwang, 2019).

As O'Reilly & Tushman (2004) suggest, firms need to balance exploration and exploitation to achieve superior performance. In this way, they can exploit the existing competencies and explore new opportunities with equal dexterity (Gibson & Birkinshaw, 2004). Numerous studies have provided evidence of the significant role of ambidexterity for firm performance (Ahmadi *et al.*, 2020; Jansen *et al.*, 2006; Yan *et al.*, 2021). Although this is an important capability, it has not been examined in post-transition market SMEs, and especially the determinants of innovation ambidexterity in SMEs are still not adequately explored (Chang & Hughes, 2012; Clercq *et al.*, 2014). The earlier studies deal mainly with the antecedents of ambidexterity of strategic management in organizations (Raisch & Birkinshaw, 2008). Among them, the centralization of decision-making, the role of formal procedures (Jansen *et al.*, 2006), internal rivalry and knowledge accessibility (Clercq *et al.*, 2014) were found. Ambidexterity antecedents including the human resources management (Cao *et al.*, 2009; Junni *et al.*, 2015) were also broadly explored. Nevertheless, the studies on innovation ambidexterity antecedents in SMEs are scarce (Yan *et al.*, 2021; Lin & McDonough, 2011; Martin *et al.,* 2017), which makes it an important research gap.

Managers of SMEs from post-transition markets are very flexible in adjusting their offering to market changes; it has been proven that the exporting firms from Central and Eastern Europe base their success on the corporate flexibility and high quality of products (Caputo *et al.*, 2016; Danik & Kowalik, 2015). Moreover, studies provide evidence supporting the existence of developed capabilities of learning and market sensing and the application of diverse knowledge sources by such SMEs during the consequent stages of their growth (Ciszewska-Mlinarič *et al.*, 2020; Głodowska *et al.*, 2019; Kowalik *et al.*, 2021; Maciejewski & Wach, 2019). They apply an entrepreneurial approach to marketing, displaying high proactiveness and opportunity focus in their relations with the market (Kowalik *et al.*, 2017). Additionally, the marketing strategies of such firms are idiosyncratic and adjusted to the dynamic environment (Baranowska-Prokop & Sikora, 2014). Therefore, considering the role of marketing for such firms (Govindarajan *et al.*, 2011; Hagen *et al.*, 2019), we aim at finding out how its elements, including the market-sensing capability, firm orientation, and strategies, may influence innovation ambidexterity. Moreover, we want to examine if these relationships have changed from 2019 to the time of pandemic crisis in 2021.

We decided to analyse the relations among marketing and innovation ambidexterity in two samples of SMEs selected according to the same criteria before and during the pandemic crisis in a post-transition Polish market. This Central-European context offered the possibility to verify the existing concepts and uncover new relationships between them in a new setting, which may fill an essential gap in the literature on entrepreneurship.

The study is structured as follows. Firstly, the literature background concerning the small firms' new product development capabilities and ambidexterity determinants will be provided. Next, we will describe the methodology, including sample characteristics. Further, we will present the analysis of hypotheses concerning the relationships between variables and a discussion of the study outcomes with available literature. Finally, we will provide the implications for future studies.

LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

Small Firms' Capability of New Product development

According to the resource-based view (Hughes *et al.*, 2010; Kozlenkova *et al.*, 2014), the capability of innovation introduction belongs to the subset of resources whose purpose is to improve the productivity of the other resources in the firm. In light of the dynamic capabilities view, closely connected with the resource-based view (Al-Aali & Teece, 2014), new product development is a higher-order capability that enables reconfiguring other resources in an organization. Especially in an export context, this capability is likely to be further necessitated due to the dynamic nature of the environment (Efrat *et al.*, 2018). Those exporters who can display new ways of thinking and operating are more likely to derive lasting competitive advantages. In the words of Boso *et al.*, (2013, p. 62), 'from a resource-based perspective, innovativeness is valuable and idiosyncratic to firms, an intangible asset that may provide businesses with a competitive advantage by being too costly for rival firms to replicate.' Innovation capability is based on knowledge and enables firms to respond to the market by exploiting knowledge in the form of different innovation outputs associated with developing new products or variants of existing ones (Monferrer *et al.*, 2021). To conduct, coordinate, and balance the conflicting modes of exploitative and exploratory innovation and learning, firms need an organizational capability of ambidexterity (Cantarello *et al.*, 2012; Nosella *et al.*, 2012). Referring to innovations' introduction, one can talk about innovation ambidexterity (Cabeza-Pullés *et al.*, 2020). Jansen *et al.* define it as the ability to simultaneously pursue exploratory and exploitative innovation (Jansen *et al.*, 2005). The combined ambidexterity in new product development means that high numbers of both exploratory and exploitative innovations are introduced and valued by the organization (Mehrabi *et al.*, 2019). In response to the market needs or internal company goals of ambidextrous firms, the existing products are improved (exploitative innovations), but an exploration of new product ideas also takes place. Exploratory innovation can be measured by the extent to which the firm departs from existing knowledge and skills or existing customers, markets, and products (Benner & Tushman, 2003) by commercializing products and services entirely new to its market. On the contrary, as Benner and Tushman claim, exploitative innovation is expressed by how firms build on existing knowledge and skills or existing customers, markets, and products, by adding minor adaptations to existing products.

Ambidexterity is considered to be a dynamic capability, which an organization can exhibit at different levels (Carter, 2015). First-order ambidexterity considers shifting the ratio of exploitation and exploration to support new strategies (O'Reilly & Tushman, 2008). Second-order ambidexterity involves dynamically shifting the dominant logic to adapt top management thinking, behaviour, and processes to manage the organizational system (Carter, 2015). In our study, we concentrate on the first-order dynamic capability of innovation ambidexterity. The capability view suggests that the effective deployment of such valuable and idiosyncratic capabilities leads to the competitive advantage and superior performance in the target markets (Kaleka & Morgan, 2019; Zhou *et al.*, 2010). The literature suggests synergistic effects of exploration and exploitation, and hence there is a need for firms to manage the balance between them (Raisch & Birkinshaw, 2008). As some studies show, combining both exploration and exploitation at high levels is more important than maintaining these dimensions at a balance, *i.e.*, equally pursuing exploration and innovation but on moderate levels (Junni *et al.*, 2013).

In an extensive review of studies, Jansen *et al.* (2006) show that organizational ambidexterity is important for better performance, particularly in nonmanufacturing industries, and this relationship is moderated by contextual factors. Martin *et al.* (2017) have demonstrated that ambidextrous innovation moderates the relationship between international venture marketing capabilities and the companies' positional advantage. It has also been proved empirically that capabilities of exploration and exploitation in new product development contribute jointly to the improved performance of multinational firms from emerging markets (Wu & Chen, 2020). Moreover, exploration and exploitation in new product development have been shown to impact the rate of international entrepreneurship (Lin & Si, 2019). The literature, however, provides limited evidence on the SMEs' ambidextrous innovation antecedents (Chang & Hughes, 2012). So far, there have been mostly studies of its consequences. In addition, as studies show,

SMEs' marketing is essential to their success (Hagen *et al.*, 2019), so it is worth discussing what marketing factors may influence innovation ambidexterity, as it may lead to favourable outcomes.

Determinants of Ambidexterity

Based on an extensive literature review, Turner *et al.* (2013, p. 326) defined that ambidexterity is the capability to both use and refine the existing knowledge (exploitation) while also creating new knowledge to overcome knowledge deficiencies or absences identified within the execution of the work. As studies show, ambidexterity of strategic management in organizations has various internal antecedents and influencing factors in the environment (Raisch & Birkinshaw, 2008). Among the studied determinants, Clercq *et al.* (2014) point to internal rivalry and knowledge accessibility. Within the external determinants Raisch and Birkinshaw (2008) mention the moderating role of environmental dynamism in the relationship between exploratory innovations and financial performance, while Clercq *et al.* (2014) mention external competitive rivalry. Moreover Cao *et al.* (2009) and Junni *et al.* (2015) explored the role of human resources management and organizational factors in developing ambidexterity and built an integrated model of these factors based on a literature review.

Few studies have focused on the specific innovation ambidexterity antecedents. Jansen *et al.* (2006) include among them the centralization of decision making in companies, and the role of rules and formal procedures. Lin & McDonough (2011) examined the impact of leadership style and organizational culture on innovation ambidexterity. Its antecedents were also explored by Yan *et al.* (2021), who examined the effects of investment in infrastructure on the ambidexterity-performance relationship, and the influence of investments on both exploration and exploitation strategies. The marketing determinants of ambidextrous innovation in SME-exporters were analysed by Martin *et al.* (2017) and Kauppila (2010) who found that organizational culture centred on customers promotes ambidexterity.

The small number of studies regarding the marketing determinants of innovation ambidexterity is surprising, because the essential supply-side marketing capabilities include information gathering and its use to guide the development of new products or improvement of existing ones (Kaleka, 2011). Moreover, the ability to understand the target market with associated institutional factors and effectively transfer the developed knowledge home to inform, enrich, or transform the product development process constitutes the basis of market orientation (Jaworski *et al.*, 2000; Kaleka & Morgan, 2019).

The capability of market sensing is defined as a firm's propensity to actively and purposefully monitor the customers, competition, technology, and general environment (Miocevic & Morgan, 2018), but also by the concrete 'routines' needed for acquiring valuable knowledge about and from the foreign markets (Salojärvi *et al.*, 2015; p. 7).

The market sensing concept proposed in previous studies involves both the assessment of the current environment and forecasting the future stage of the market (Day, 1994). Day identifies the following types of market sensing: (1) sensing activities, (2) interpreting sensed information, and (3) evaluating activities, related to monitoring and assessment (Ardyan, 2016; Day, 2002). Therefore, the sensing process must be concentrated not only on gathering information, but also on drawing the insights from this information by the staff who uses them in everyday decisions.

Thus, market sensing belongs to the higher-order dynamic capabilities of firms that should accompany flexibility in new product development, understood as the propensity to both explore the new knowledge and make adaptations in the old, functioning concepts (Salojärvi *et al.*, 2015). A study of Spanish firms (Monferrer *et al.*, 2021) supported the hypothesis that firms which can absorb the outside knowledge are also superior in introducing innovations. A similar relationship was found by (Cabeza-Pullés *et al.*, 2020) who showed that knowledge absorption impacted innovation ambidexterity. Moreover, based on the comprehensive dataset from the Community Innovation Survey, Santos *et al.* (2021) found that companies which promote knowledge creation, innovate significantly more. In a large study of SMEs from leather and furniture industry, Ardyan (2016) showed that their market-sensing capability had a significant effect on their product innovativeness' success. Therefore, the capabilities of sensing may be the antecedents of ambidexterity in innovation, and it is worth exploring the following hypothesis:

H1: Market sensing is positively related to innovation ambidexterity.

There have also been studies examining the influence of strategic company orientations on innovativeness. Among them Hult *et al.* (2004) and Zortea-Johnston *et al.* (2012) observed an effect of entrepreneurial orientation (EO) and marketing orientation (MO) on innovativeness. Bhattacharya *et al.* (2019) have recently studied the influence of combined EO and MO on innovation performance. Zortea-Johnston *et al.* (2012) found that an EO offers a more balanced approach than an MO, because it promotes both market-driving and market-driven innovation. According to Zortea-Johnston *et al.* (2012, p. 157), 'entrepreneurially oriented firms actively search for and pursue new opportunities, focus on long-term R&D, empower employees to contribute to the innovative process of the firm, acquire new resources, and expand into new markets to grow.' Moreover, this study shows that an MO does not lead to market-driving innovations and does affect market-driven innovations but to a lesser extent than an EO. In the quoted study, the effect of an EO on market-driven innovations was significantly more pronounced than the impact of an MO. However, we argue that both these orientations (EO and MO) may increase innovation capabilities if a firm displays them simultaneously. The EO and MO form the theoretical foundation of entrepreneurial marketing (EM) (Whalen *et al.*, 2016). Consistent with the resource-advantage theory (Mayasari *et al.,* 2009), marketing can facilitate the ability of firms to create new resources and enhance the productivity of current resources through leveraging and championing innovation in the form of unique combinations of resources. Studies show that entrepreneurially oriented firms or individuals can explore new and creative ideas that may help them change the market dynamics and anticipate future demands ahead of competitors (Hakala, 2011). Lin and MacDonough (2011) found that entrepreneurial culture of an organization is crucial to exhibit innovation ambidexterity. Atuahene-Gima and Ko (2001) show that the firms with a combination of entrepreneurial and market orientations have a better new product performance than others. However, the nature of the relation of entrepreneurial marketing with the exploration/exploitation capabilities is still unknown. Entrepreneurial marketing's characteristic features include proactive orientation (P); opportunity focus (OP); customer orientation (CO); low-risk marketing (RM) and value creation (VC) (Fiore *et al.*, 2013). Entrepreneurial orientation encourages learning, as the characteristic proactiveness and opportunity focus are connected with gathering new knowledge (Nasution *et al.*, 2011). On the one hand, proactiveness as a particular characteristic of entrepreneurs, seems to particularly contribute to exploratory, radical innovations, because the new knowledge can be included in the new value offerings for the customers. On the other hand, customer responsiveness, an element of MO, can stimulate exploitative innovation when replying to the changing customer needs. Value creation, a typical feature of entrepreneurial marketing (Morris *et al.,* 2002), should contribute to exploratory and exploitative innovations. As studies show, value creation could be concentrated on both augmenting the existing products and service offerings, as well as providing new solutions according to client demand (Shanmugathas, 2022). In addition, the opportunity focus, characteristic for entrepreneurial marketing, helps in locating market niches, which present the possibility for new product launches, thus stimulating various innovation types. Finally, a characteristic feature of EM, low-risk marketing, includes pursuing low cost and low-risk marketing activities. As Chang and Hughes (2012) have shown, the risk-taking tolerance of managers favours innovation ambidexterity. Thus, we expect low-risk marketing to be negatively related to innovation ambidexterity. Summing up, it is reasonable to expect the following relationships concerning the EM dimensions:

H2a: Entrepreneurial marketing dimensions of proactive orientation, opportunity focus, customer orientation and value creation are positively related to innovation ambidexterity.

H2b: Entrepreneurial marketing dimension of low-risk marketing is negatively related to innovation ambidexterity.

Firms engaged in entrepreneurial marketing develop specific strategies stemming from their characteristic proactiveness and customer orientation. Mort *et al.* (2012) outline four basic EM strategies, including opportunity creation, customer intimacy-based innovative products, resource enhancement, and legitimacy. Hallbäck and Gabrielsson (2013) describe product adaptation and

innovation introduction as the entrepreneurial marketing strategies that help born global firms to develop abroad. Kumar and Yakhlef (2011) mention customer relationship quality management, customer-relationship proactiveness, and customer-focused innovativeness as the EM strategies leading to competitive sustenance and growth of born-global firms. Whalen *et al.* (2016) propose that in entrepreneurial marketing, the co-creation with customers becomes the essential strategy of the firm. This type of strategy was also mentioned by Yang (2018) who adds accelerating customer value and international expansion based on regional market leadership, value innovation, marketing co-creation, and low-cost marketing as typical international EM strategies.

Therefore, adaptation to customer needs, including introducing constant changes in products tailored to the expectations of their recipients, seems to be the EM strategy promoting innovation. According to a study of 234 Scottish SMEs (Chang & Hughes, 2012) the more top managers' leadership is characterized by risk-taking tolerance and adaptability, the higher the ambidexterity of such firms. Adaptation involves both incremental changes and radical ones, which incorporate new technologies or patented solutions demanded by the clients. Therefore, promoting adaptation in products and processes might also help create the capability to carry out ambidextrous innovation.

Entrepreneurial approach includes adaptation of the products and services to client needs and the differentiation of the offering compared to the competition (Gabrielsson *et al.*, 2012). The literature treats the focus on the appearing new product opportunities as the crucial factor enabling the growth of young entrepreneurs (Whalen & Akaka, 2016). Making the offering standing out from the competing products requires continuous innovations as well. Furthermore, the constant perfecting of existing offering may contribute to quality differentiation. Thus, it is reasonable to expect firms which engage in differentiation of product offering to adopt an ambidextrous attitude towards innovations. Therefore, we propose to verify the following hypotheses (Figure 1):

H3a: Adaptation strategy application is positively related to innovation ambidexterity.

H3b: Differentiation strategy application is positively related to innovation ambidexterity.

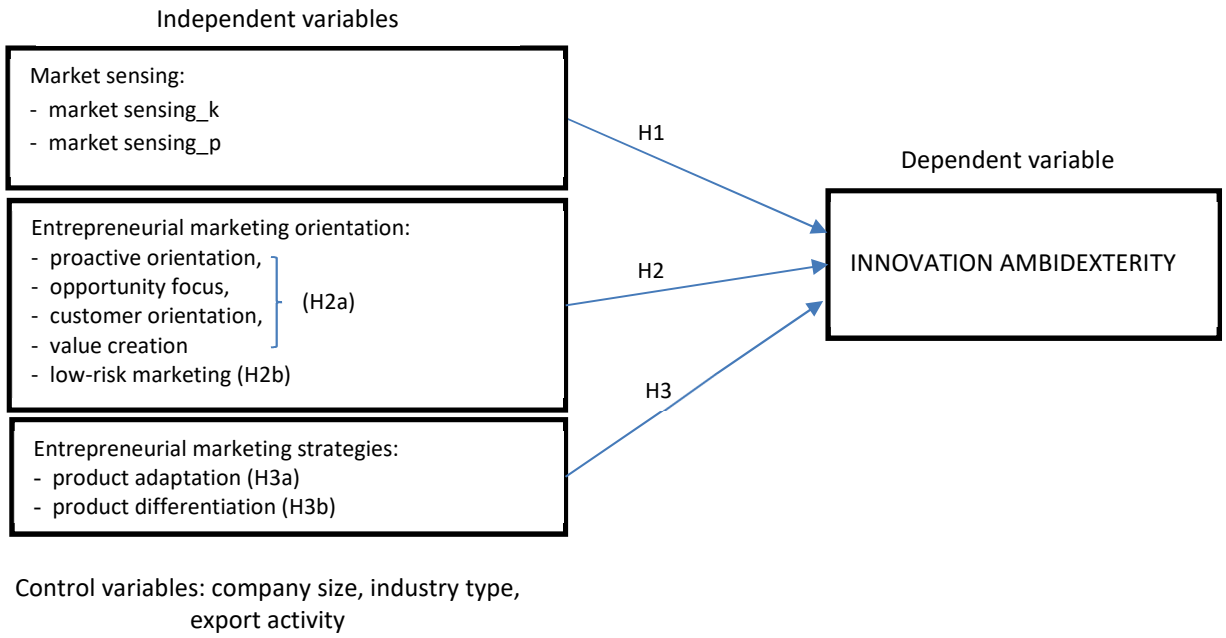

Figure 1. Conceptual model summary
Source: own elaboration.

RESEARCH METHODOLOGY

Sample and Data Gathering

The data for the first part of the study were collected in May 2019 using the mixed-mode method, *i.e.*, 207 interviews were obtained with the CATI and 33 – with CAWI technique. The studied population was drawn from a Bisnode database comprising 2969 Polish manufacturing SMEs, of which the final sample fulfilled the following criteria: manufacturing firms with 10-249 employees, established after 2003 and not being a result of a merger or takeover, never being a subsidiary of a foreign company. One hundred twenty companies were strongly internationalized, having at least 25% export share in total sales; the other 120 companies were active mainly locally (further referred to as non-exporters). The respondents were primarily sales/export/marketing directors or firm owners.

Almost 67% of the sample were small companies with 10-49 employees (Table 1). Most of the companies under study (c.a. 59%) did not reach the yearly turnover of 2 million Eur; 29% of the companies declared the total sales value between 2 and 10 million Eur and 12% – of 10-50 million Eur. In the sample, 44.2% of the companies served both the B2B and B2C markets; 25.4% operated exclusively on the B2B market, and 30.5% served B2C clients only. Later, we eliminated the firms that did not serve B2B clients from the analysis, to make the sample from 2019 comparable with the second one.

Table 1. Sample composition

Company characteristics		2019 (n=167)	2021 (n=219)
B2B	B2B	36.5%	67.6%
	B2B2C	63.5%	32.4%
Size	small (10-49 employees)	66.5%	62.1%
	large (50-249 employees)	33.5%	37.9%
Hitech	No	73.1%	78.5%
	Yes	26.9%	21.5%
Exporters	No	52.1%	50.2%
	Yes	47.9%	49.8%

Note: 'B2B' denotes firms serving only businesses; 'B2B2C' denotes firms serving both businesses and individual customers.
Source: own study.

In 2021, we surveyed 219 Polish SMEs with a CATI/CAWI mixed-mode method as a second subsample. They had similar characteristics as those surveyed in 2019 – namely, they belonged to the manufacturing industry, they had to be established not earlier than 1995 (80% of them were established in 2004 or later), not as a result of a merger of other firms, not as a branch of a foreign-based company, with a foreign ownership share of 0-45% (172 firms had less than 30% of foreign capital share). All firms had to serve B2B clients. The population meeting the above criteria in the purchased Bisnode database was 1395, of which 807 firms were drawn by a randomized algorithm, giving each of the firms an equal chance to participate in the study. Out of this group, 211 firms refused to participate, 46 stopped answering the questionnaire without finishing, 228 firms agreed to participate, but at times beyond the study, 75 did not meet the other selection criteria.

Measurements

To find out about the actual innovation-introducing activities, a screening question was asked (Appendix 5) (*Oslo Manual 2018*, 2019). Later, only the companies who answered this question positively were analyzed concerning innovation ambidexterity.

Exploratory innovation relates to the generation of new products, an extension of product range, penetration into new technology fields, and opening new markets. Exploitative innovation involves improving existing product quality, production flexibility, and reduced production cost. Using the translated ambidextrous innovation scale proposed by Martin *et al.* (2017) and He and Wong (2004), we checked the respondents' perception of the importance of these innovation types for their firms. In-

novation ambidexterity was a second-order construct consisting of two first-order reflective constructs, *i.e.*, INN1 – exploitative innovations and INN2 – exploratory innovations (Appendix 5).

The innovation ambidexterity scale was evaluated using factor analysis, applying the principal component extraction method and Promax rotation. It led to identifying two dimensions of innovativeness: exploitative innovations (INN1) and exploratory innovations (INN2), which explained 73% of the variation of the data in the sample (Table 2). In 2019, these dimensions retained the descriptors present in the original model (Martin *et al.*, 2017). The reliability level of both subscales was satisfactory (Cronbach's ά of INN1=0.852; INN2=0.830). Communalities showed that the two-dimensional solution reflected well all items' variances.

Table 2. Innovation ambidexterity: results of factor analysis (Pattern Matrix)[a]

Item name	Scale component		Communalities
	INN1	INN2	
INN1_1 [perfecting the quality of current products]	0.823	–	0.721
INN1_2 [improving production flexibility]	0.953	–	0.817
INN1_3 [lowering production costs]	0.898	–	0.720
INN2_1 [introducing new product generations]	–	0.917	0.775
INN2_2 [extending the product range]	–	0.966	0.806
INN2_3 [entering the new markets]	0.420	0.481	0.610
INN2_4 [penetration into new technology/manufacturing fields]	0.430	0.514	0.671

Note: scale items adapted from Martin *et al.* (2017). Extraction method: Principal Component analysis. Rotation method: Promax with Kaiser normalization. a. Rotation converged in three iterations. Sample n=240 firms (2019).
Source: own study.

As mentioned, we assumed that firms displayed innovation ambidexterity if they showed high levels of both exploitation (INN_1) and exploration (INN_2) (Junni *et al.*, 2013) (Mehrabi *et al.,* 2019). To select such firms in both years, we used the median level of summary exploration construct and the median level of summary exploitation construct as a cut-off value. Only the firms that scored equal to or higher than the cut-off value on both these dimensions were assigned as ambidextrous.

Among the independent variables, the entrepreneurial marketing orientation (EMO), was measured with a multidimensional construct, adapted from the study of Fiore *et al.* (2013). Entrepreneurial marketing orientation, which encompasses the features of both entrepreneurial and market orientations, has been conceptualized in a few recent studies. The basic conceptualization holds that EMO is based on entrepreneurial, market, innovation, and customer orientations (Jones & Rowley, 2011). More recently, based on a vast quantitative study, EMO has been conceptualized as including entrepreneurial orientation, and customer orientation, but also market driving, and resource-leveraging (Eggers *et al.*, 2020). The scale elaborated by Fiore *et al.* (2013) has the advantage of undergoing validation procedures and included the dimensions important for our study's viewpoint (Kowalik & Pleśniak, 2020). The applied EMO construct consisted of the following first-order reflective constructs: proactive orientation, opportunity focus, customer orientation, value creation, and low-risk marketing. Each construct comprised variables based on questionnaire items using seven-point Likert scales (Appendix 2). The reliability and validity of EMO dimensions were assessed based on F-L criteria (Fornell & Larcker, 1981) (Table 3).

As can be seen in Table 3, the constructs making up the EMO model presented satisfactory reliability and validity levels in 2019 (Nunnally & Bernstein, 2008). The measurement model showed an acceptable fit ($\chi 2$; 140.975; df 55; p<0.000) NFI =0.939; TLI =0.946; CFI =0. 962, RMSEA = 0.081; 90% CI for RMSEA [0.065; 0.097]). However, in 2021, the CO and VC dimensions could not be reflected in the same way as in 2019 due to a limited item set. Therefore, we used a construct which comprised item 1. from the original CO construct and items 1. and 2. from the original Value Creation construct. The average levels of items making up the EMO scale are shown in Appendix 3. We entered the EM dimensions in the regression model as separate variables because it was not possible to replicate the summary EMO construct in both analysed years. In addition, the hypothesized relations between Low-risk marketing and INN had an opposite direction compared to the remaining EMO dimensions.

Table 3. Reliability and validity assessment of the EMO scale

Construct	2019		2021	
	AVE	CR	AVE	CR
Proactive orientation (P)	0.777	0.913	0.811	0.928
Opportunity focus (OP)	0.692	0.818	0.780	0.914
Customer Orientation (CO)	0.669	0.858	0.311	0.566
Value Creation (VC)	0.907	0.951	n.a.	n.a.
Low-risk marketing (RM)	0.555	0.789	0.599	0.740
Discriminant validity	$\max\|r_{ij}\| = 0.827$, maxMSV = 0.684, ASV = 0.433		$\max\|r_{ij}\| = 0.887$, maxMSV = 0.674, ASV = 0.314	

Note: CR – Composite reliability, AVE – Average variance extracted, max|rij| - maximum inter-construct correlation, MSV - maximum shared variance, ASV-average shared variance.
Source: own study.

The other independent variables were:

- Market sensing – measured with two statements based on (Sinkula *et al.*, 1997) and (Salojärvi *et al.*, 2015)(Appendix 5). To keep the number of categories small for the purpose of logistic regression analysis, both variables were dichotomized. Answers from one to four were recoded into zero (*no*), and five to seven into one (*yes*).
- Entrepreneurial marketing strategies, *i.e.*, product adaptation and product differentiation – assessed with the statements using semantic scales derived from (Baranowska-Prokop & Sikora, 2014) (Appendix 5). To keep the number of categories small for the purpose of logistic regression analysis, the two variables expressing entrepreneurial marketing strategies were dichotomized. Answers from one to two were recoded into zero (not using the strategy), and from three to five into one (yes).

Moreover, there were three control variables: company size (small from 10 up to 49 employees; medium 50-249 employees); technology level, measured using the classification of Eurostat (2018), which led to dividing the sample into two groups of SMEs (low-tech/high-tech); and export activity (yes/no).

RESULTS AND DISCUSSION

Innovation Ambidexterity Level

The innovativeness level in the sample of 2021 was lower than in 2019, which might have been due to the pandemic crisis. In 2019, 67% of firms confirmed they introduced innovations of any type, while in 2021, only 28% of firms did. In both years, the most popular innovations concerned the products (80.1% of all innovating firms in 2019 and 45.9% in 2021) and processes (63.6% in 2019 and 34.4% in 2021).

As for the innovation ambidexterity, descriptive statistics related to this construct's components are shown in Appendix 1. The statistics showed a considerable negative asymmetry in 2019; that is, most respondents chose values of statements above the mean level, and there was a tendency to agree with them. The kurtosis value was the highest for three statements (INN1_1, INN2_2, INN2_3). Thus, in 2019, respondents paid much attention to perfecting the new product quality, broadening the product range, and entering new markets. In 2021, levels of innovation ambidexterity measures were lower than in 2019. The differences were significant for six out of seven items, as assessed based on the Mann-Whitney U test (Appendix 1). The asymmetry was positive but not strong. That is, respondents tended to somewhat disagree with the statements. Compared to 2019, 'lowering of production costs' and 'extending the product range' were the activities that showed the most considerable decrease of mean levels.

The distributions of firms displaying innovation ambidexterity (high levels of both exploitation and exploration) in both years are included in Table 4.

Table 4. The distributions of firms displaying innovation ambidexterity in 2019 and in 2021

Dimension		2019 (n=116)		total	2021 (n=61)		total
		exploreQ2			exploreQ2		
		no	yes		no	yes	
exploitQ2	no	31.9%	17.2%	49,1%	19.7%	21.3%	41.0%
	yes	17.2%	**33.7%**	50,9%	14.8%	**44.3%**	59.0%
total		49.1%	50.9%	100%	34.4%	65.6%	100.0%

Note: exploitQ2 – number of firms with values of exploitation on or above the median; explorQ2 – number of firms with values of exploration on or above the median.
Source: own study.

As table 4 shows, in 2019, there were 33.7% firms displaying combined ambidexterity, and in 2021 there were 44.3% such firms among those introducing innovations. However, the proportion of ambidextrous firms in 2019 and in 2021 was not significantly different for the two samples as assessed based on a z-test for proportions (Z=1.391, p=0.164).

Determinants of ambidexterity

We used a logistic regression method to analyze the data because the dependent variable, *i.e.* innovation ambidexterity, was dichotomous. The correlation analysis was conducted before running the regression models (Appendix 4). As it showed, in 2019, there was a significant correlation of innovation types with all entrepreneurial marketing dimensions. The EMO dimensions were more strongly correlated with exploratory innovations than with the exploitative ones. However, in 2021 there was a significant correlation of proactive orientation with exploration only, indicating that the more entrepreneurial firms were in their marketing activity, the more they perceived exploratory innovations as necessary.

Next, a logistic regression model including the innovation ambidexterity indicator as a dependent variable and the earlier-described independent variables was prepared. In 2019 (Table 5), the regression analysis evidenced a significant relationship of innovation ambidexterity with:

- market sensing (sensing_p), p=0.030; Exp (B) =3.331;
- opportunity focus, p=0.000; Exp (B)= 3.361;
- proactive orientation (Model 1), p=0.061; Exp (B)=0.299;
- adaptation strategy, p=0.060; Exp (B)=2.703.

The assessment of the estimated models was based on a goodness-of-fit test and pseudo-R-squared measures, *i.e.*, Cox and Snell R Square and Nagelkerke R Square. The models showed an acceptable level of fit, and Hosmer and Lemeshow's test showed no reason to reject any of them.

The analogous model was built for the 2021 sample (Table 5). It showed the following predictors of innovation ambidexterity:

- belonging to a high-tech industry, p=0.017; Exp (B)=3.367
- being a medium company, p=0.029; Exp(B)=0.340 which means that for small firms Exp(B)=1/0.340 = 2.94.

DISCUSSION

The study aimed to find out the determinants of innovation ambidexterity within the SMEs' marketing and to explore this phenomenon in the firms from a post-transition Polish market. We also intended to examine if the relationships between the studied variables have changed during the time from 2019 to the pandemic crisis. Ambidexterity in innovations is an important phenomenon representing the willingness of firms to both improve the existing offering, and to explore the new ideas and market opportunities. Balance and coordination of exploration and exploitation enable firms to avoid the risk of relying on only one type of these activities (Wu &Chen, 2020). As we have proved, the innovation ambidexterity construct which had been previously applied in firms from the mature economies (Martin *et al.* 2017) was reliable and valid when used in SMEs from the Polish post-transformation market.

Table 5. Determinants of ambidexterity in 2019 and 2021 (logistic regression model)

Dependent variable: innovation ambidexterity	2019[a]		2021[b]		Hypothesis
	B	Exp(B)	B	Exp(B)	
Model 1 (all variables entered)					
Market sensing_k	1.691	5.424	-0.218	0.804	H1
Market sensing_p	0.856	2.354	-0.265	0.768	
Proactive orientation (P)	-1.208 *	**0.299**	-0.269	0.764	H2a
Opportunity focus (OP)	2.127 **	**8.391**	-0.410	0.664	
Customer Orientation (CO)	0.020	1.021	-0.339	0.713	
Value Creation (VC)	0.076	1.079	n.a.	n.a.	
Low-risk marketing (RM)	0.424	1.528	-0.427	0.652	H2b
Adaptation strategy	0.858	2.358	0.236	1.266	H3a
Differentiation strategy	-0.093	0.911	-0.532	0.587	H3b
Export activity (EXP)	-0.760	0.468	1.082	2.950	Controls
Technology level (Hitech)	0.497	1.644	1.135 **	3.112	
Company size (medium)	0.600	1.823	-0.760	0.468	
Constant	-4.086 **	0.017	-0.600	0.549	
No_innovating	n.a.	n.a.	-3.040 **	0.048	
Model 2 (backward stepwise logistic regression)					
Market sensing_p	**1.203 ** **	**3.331**			H1
Opportunity focus (OP)	**1.212 ** **	**3.361**			H2
Adaptation strategy	**0.994 ***	**2.703**			H3a
Technology level (Hitech)			**1.214 ** **	**3.367**	Controls
Company size (medium)			**-1.078 ** **	**0.340**	
Constant	**-2.591 ** **	**0.075**	-0.030	0.971	
No_innovating			**-3.054 ** **	**0.047**	
Model fit	**Model 1**	**Model 2**	**Model 1**	**Model 2**	
-2 Log-likelihood	103.386	113.271	131.908	135.686	
Cox & Snell R Square	0.299	0.233	0.242	0.228	
Nagelkerke R Square	0.411	0.320	0.413	0.390	
Hosmer and Lemeshow Test sig.	7.208(8) 0.514	9.009(8) 0.342	7.652(8) 0.468	0.128(4) 0.998	

Note: a. Variables entered on step 1: EMO dimensions: P, OP, VC, CO, RM; market sensing: sensing_k, sensing_p; entrepreneurial marketing strategies: adaptation strategy, differentiation strategy; control variables: export activity, technology level, company size. b. Variables entered on step 1: P, OP, CO, RM, sensing_k, sensing_p, adaptation strategy, differentiation strategy, export activity, technology level, company size, No_innovating. No_innovating – indicates no innovation introduced in 2021. As the reference group was the innovating one, EXP(B) for No_innovating shows the odds ratio of ambidexterity of non-innovating relative to innovating firms; **significant at 0.05 level, *significant at 0.1 level.Source: own study.

Furthermore, among the innovators in the studied two groups of Polish SMEs, a considerable part could be called ambidextrous. They put above-average emphasis on exploitation and exploration (33% of studied firms in 2019 and 44% in 2021). Despite a much lower number of innovations introduced during the crisis, still considerable numbers of firms were ambidextrous. They most strongly agreed to statements concerning entering the new markets and perfecting the quality of current products in 2021. Breaking of the foreign market distribution chains in the pandemic (particularly those stemming from Asia), leading to Polish firms replacing foreign value chain members quickly, was probably conducive to ambidexterity in innovations (Wedziuk, 2020). Those firms who were able to succeed before the changes in the turbulent environment might have retained the dynamic capability of ambidexterity, which made them resistant to shocks.

As some earlier studies suggest, the economic crisis can be accompanied by an increase in exploration activities (Alcalde-Heras *et al.*, 2019), and the turbulence in the environment stimulates innovation orientation (Niazi *et al.*, 2019). Despite that, the share of ambidextrous firms in our sample did not change significantly despite the crisis. On the one hand, we showed that innovation ambidexterity

was still important for firms during the market turbulences, but on the other, there was no support for radical (exploratory) innovations gaining relative importance. It might have been connected with the early phase of the crisis (January 2021) when there was the need for studied SMEs to maintain customer responsiveness (flexible supply, continuous customer support), instead of offering new products. Eggers and Kraus (2011) who studied the behaviour of SMEs from Silicon Valley during the economic crisis showed that the surveyed firms concentrated on customer responsiveness and not innovativeness at that time. Thus, also in the studied Polish firms, customer orientation might have dominated their activity, which did not allow for high levels of innovativeness.

Referring to the proposed hypotheses, our study has shown on samples of the post-transition market firms that the determinants of ambidexterity could be found within their marketing. Market sensing, opportunity focus, and product adaptation strategy stimulated innovation ambidexterity in the more stable pre-crisis period. Our study found that market sensing is directly related to ambidexterity, thus supporting hypothesis 1. Market sensing helps the SMEs 'generate valuable knowledge that is essential in initial stages of value creation' (Miocevic & Morgan, 2018). As the regression analysis confirmed, including employees in discussing the effects of market trends and new products increased the odds of being ambidextrous by over 2.3 times in 2019. Thus, by generating knowledge about the opportunities, market sensing enabled these firms to become more willing to introduce exploratory and exploitative innovations. As Alcalde-Heras *et al.* (2019) also indicated, the market-sensing capabilities accompanied ambidexterity in Spanish firms. This is explained by the fact that market sensing is an absorptive capability (Miocevic & Morgan, 2018), which collaborates with customer responsiveness in implementing the gathered knowledge and stimulates innovation. Similar results were obtained by Kyriakopoulos & Moorman (2004) who showed that firms' market orientation, involving gathering data on customers, enabled an effective combination of marketing exploitation and exploration strategies. Market sensing served as a dynamic market-linking capability, which allowed the ambidextrous new product development processes to improve new product financial performance. Unfortunately, our study did not support these findings in 2021, at crisis time. It may be due to the selection effect. In the times of the crisis, only highly innovative companies managed to introduce both exploratory and exploitative innovations, and the number of ambidextrous companies was small as well. As a result, the variance among them was too small to find the relationship with market-sensing significant.

Concerning hypotheses 2a and 2b and the connection between entrepreneurial marketing and innovation ambidexterity, we obtained mixed results concerning different EMO dimensions. The regression analysis supported the existence of the most robust relationship between opportunity focus and ambidexterity. Being focused on opportunities increased the odds of introducing both types of innovations by over 2.3 times. Such a result is in-line with the significant relationship between market-sensing and innovation ambidexterity. Some authors claim that opportunity recognition depends on market sensing (Andersson & Evers, 2015). In our sample focusing on opportunities and 'reacting to them quickly, regardless of the budgetary constraints' led to ambidextrous innovations. This finding supports other studies concerning the role of informal information gathering for SME's marketing (Schwens & Kabst, 2011).

What's surprising, in 2019, the regression model showed a negative relation of proactive orientation with innovation ambidexterity. There were lower odds for the proactively-oriented firms to be ambidextrous. The explanation may be that they were so concentrated on exploratory innovations that the exploitative innovations' level was too low to be classified as 'ambidextrous.' Proactiveness enables internationalized SMEs to develop technologically advanced products ahead of the competition and is connected with faster adoption of the new technologies (Brouthers *et al.,* 2015; Jin & Cho, 2018). It is supported by the positive correlation of proactive orientation with exploratory innovations in our study both in 2019 and 2021 (Appendix 4). In 2019, all the entrepreneurial marketing dimensions were significantly more strongly correlated with exploration than with exploitation. Thus, we demonstrated that entrepreneurial marketing accompanies introducing radical innovations (Hage & Meeus, 2006) and thus, hypothesis 2a was partially supported.

As for hypothesis 2b, low-risk marketing did not influence innovation ambidexterity in our study. This result indicates that low-cost, step-by-step promotional activities of studied SMEs have no connection with their innovation efforts. Many smaller firms in Poland, especially in the B2B markets, still prioritize the superior quality of products, developed in contact with clients, and treat promotion as an insignificant element of their activities. Constant customer communication and co-production may enable information transfer without emphasizing the formal promotional efforts (Gilmore, 2011).

As the study showed, at the time of crisis, entrepreneurial marketing dimensions were not related to innovation ambidexterity. An explanation for this result might stem from the nature of entrepreneurial orientation. It accompanies innovation development (Sanz Valle *et al.*, 2020), but during a crisis, the environment factors may change the actual innovation-introducing activities of entrepreneurs while their attitudes remain unchanged (Bagozzi, 1981).

Finally, Hypothesis 3a was supported in 2019, when engaging in the adaptation of products to the market needs increased the odds of being ambidextrous by over 1.7 times. Such a mix of the earlier-mentioned opportunity focus, with an adaptation strategy, means that the SMEs which were alert to opportunities could offer rapid developments in their existing products and explore new ideas at that time. This can indicate following the Kirznerian approach to exploring market opportunities in a relatively stable environment (Sadiku-Dushi *et al.*, 2019). The studied firms were all active primarily on B2B markets, so this finding also confirms a vital role of customer focus in the industrial marketing relationships.

Hypothesis 3b considering the second examined marketing strategy was not supported, as the differentiation of products did not increase the odds of becoming ambidextrous in 2019, nor 2021. One possible explanation can be that the studied SMEs engaged more strongly in price differentiation, than in quality differentiation. They concentrated on making the products accessible at lower prices than the competitors, which made the differentiation strategy unrelated to innovation ambidexterity.

In fact, during the crisis, in 2021, following any of the entrepreneurial marketing strategies did not increase the odds of being ambidextrous. This result is difficult to explain, but some earlier studies shed light on it. For example, an analysis by Mehrabi *et al.* (2019) reveals that entrepreneurship has reverse relationships with ambidexterity and performance under different environmental conditions. Mehrabi *et al.* explain the interaction of the firm's strategic posture and environmental context with the contingency theory regarding the choice between exploration and exploitation strategies in different environments (Smith & Lewis, 2011). Thus, assuming the adaptation strategy in a turbulent environment may lead to lower levels of exploration and exploitation than at peaceful times. The reason might be that the firms which focus on adapting their offering in stable environments withdraw from new product exploration at the turbulent time, and concentrate only on exploitation, as they are unwilling to take the additional risk and cost of new products development.

Finally, according to the current study, being a small company and operating in a high-tech industry increased the odds of innovation ambidexterity at the times of crisis. The explanation for this may come from the greater agility and flexibility of the smaller firms than the medium-sized ones, which is especially useful during the crisis (Hagen *et al.,* 2019). This finding is also supported by a study covering 2 150 Spanish firms from 2009 to 2013 during the previous economic crisis. The authors found that smaller firms were more ambidextrous than larger ones (Alcalde-Heras *et al.*, 2019). Thus, our findings add up on theory concerning the organizational determinants of innovation ambidexterity (Junni *et al.*, 2015).

CONCLUSIONS

The study explored in detail the marketing determinants of an important SME capability which is ambidextrous innovation. By comparing data from two years, it enabled taking into account the pandemic crisis and showed that at that time, the identified relationships between variables lost their significance while the new organizational determinants of Innovation ambidexterity appeared. In addition, the study adapted and verified the ambidexterity measurement tool to the post-transition Polish market.

As a result of the study, three hypotheses concerning the marketing determinants of innovation ambidexterity in manufacturing SMEs have been supported in 2019 (Figure 2). To be specific, such elements of entrepreneurial marketing as systematic market sensing (H1), focus on market opportunities (H2a),

and product adaptation (H3a) are the determinants that make the small and medium-sized firms likely to strongly engage both in exploitation and exploration of new products. However, an evident change was noticed when comparing the pre-crisis and in-crisis determinants of innovation ambidexterity.

Thus, we may draw a conclusion that there were other determinants of this capability at crisis time, or the influence of the environment turbulence made the discovered relationships insignificant. This suggestion is supported by the earlier studies, which evidenced the environment's role as a determinant of ambidexterity (Jansen *et al.*, 2006; De Clercq *et al.*, 2014).

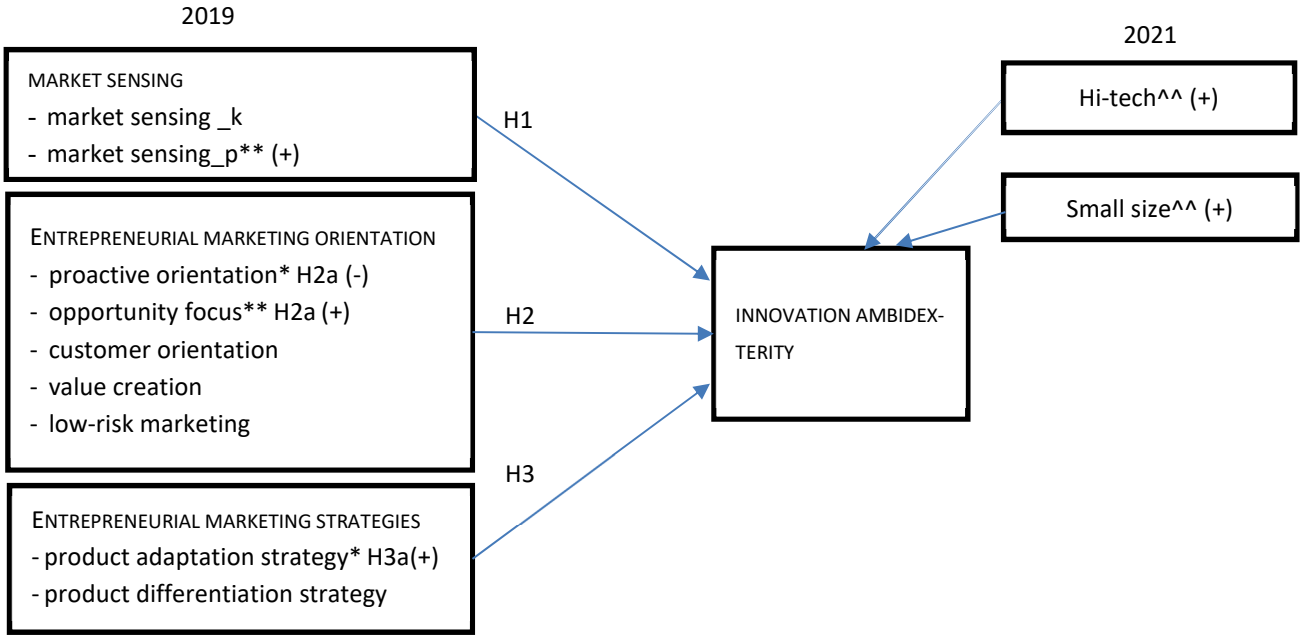

Figure 2. Verification of hypotheses
Note: **significant relationships in 2019, ^^significant relationships in 2021.
Source: own elaboration.

Furthermore, our study showed that innovation ambidexterity is a phenomenon characteristic for considerable numbers of the Polish manufacturing SMEs. Thus, the practical implications, directed at SME managers, relate to:

1. The role of market sensing and mainly of including employees in the sensing process in inducing ambidexterity.
2. The need to pursue entrepreneurial marketing, including an adaptation strategy, because it enhances the dynamic capability of innovation ambidexterity.
3. The importance of size and industry type for ambidexterity, as it becomes easier for smaller firms with more advanced technologies to maintain this capability at challenging times.

Another, more general implication of this study concerns the role of innovation ambidexterity in dynamic markets. As Sundqvist *et al.* (2012) showed, the Schumpeterian approach to entrepreneurship should be emphasized at crisis times. According to their study, risk-taking and innovativeness (contrary to competitive aggressiveness and autonomy) have stronger positive relationships with profits when markets are more dynamic. Therefore, both exporters and locally active firms should invest in the development of both exploratory and exploitative innovation capabilities when market turbulence increases. Our findings concerning the relative popularity of innovation ambidexterity in 2021 support such a recommendation.

The limitation of the study is that the findings apply mainly to SMEs from post-transition markets and the CEE region. Moreover, it has included mainly companies from low- and medium-tech industry branches. Therefore, it is worth extending the study among the other markets, with a different business environment and managers' characteristics, to confirm the applicability of measurement tools

and make the study's implications more universal. Furthermore, it would be worth exploring the influence of the particular external factors, such as different types of environmental turbulence, on the ambidexterity of SME. Finally, as innovation ambidexterity is the important capability of SME, more qualitative research on its development is needed. It should include the recently recommended expanded concept of 'multidexterity' (Robbins *et al.*, 2021), as it is appropriate for dynamic environment.

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Appendix:

Appendix 1. Descriptive statistics: innovation ambidexterity

Item	2019				2021				Mann-Whitney test
	Mean	Std. Deviation	Skewness	Kurtosis	Mean	Std. Deviation	Skewness	Kurtosis	
INN 1_1 [perfecting the quality of current products]	**6.15**	1.176	-1.548	2.222	**5.0**	0.967	0.552	-0.134	-2.058*
INN 1_2 [improving production flexibility]	**5.94**	1.310	-1.272	1.290	**4.57**	1.022	0.809	0.301	-3.664*
INN 1_3[lowering production costs]	**5.85**	1.394	-1.102	0.376	**4.39**	1.170	0.166	-0.964	-7.198*
INN 2_1 [introducing new product generations]	**5.70**	1.337	-1.100	1.303	**4.76**	1.044	0.465	-0.370	-0.224
INN 2_2 [extending the product range]	**5.86**	1.375	-1.500	2.334	**4.37**	0.921	0.229	-0.438	-5.901*
INN 2_3 [entering the new markets]	**5.81**	1.417	-1.432	1.837	**5.31**	0.762	0.111	-0.339	-2.705*
INN 2_4 [penetration into new technology/manufacturing fields]	**5.50**	1.596	-0.984	0.429	**4.37**	1.047	0.483	-0.424	-2.829*

Note: the standardized statistics are presented, *significant at 0.05 (Asymp. Sig.,2-tailed).
Source: own study.

Appendix 2. Correlation of EMO dimensions with innovation types

Dependent variables	Pearson correlation			
	2019 (n=176)		2021 (n=219)	
	exploration	exploitation	exploration	exploitation
P	0.267**	0.170*	0.132*	0.050
OP	0.308**	0.210**	0.021	-0.059
CO	0.365**	0.270**	0.063	-0.001
VC	0.287**	0.245**	n.a.	n.a.
RM	0.130*	0.062	-0.046	0.028

Note: **Correlation is significant at the 0.01 level (1-tailed), *Correlation is significant at the 0.05 level. EMO dimensions: P-proactive orientation, OP-opportunity focus, CO-customer orientation, VC-value creation, RM- low-risk marketing. In 2019 exploration and exploitation were measured only in firms introducing innovations (n=176).
Source: own study.

Appendix 3. Entrepreneurial marketing orientation: scale items

Dimensions	Scale items
Proactive Orientation (P)	- We continually engage in changing the way products/services are marketed by our business (P_1). - Our business is frequently one of the first among competitors to alter its marketing methods (P_2). - We consistently improve the approach to marketing our business (P_3).
Opportunity Focus (OP)	- We pursue untapped market opportunities regardless of budgetary or staff constraints (OP_1). - When new market opportunities arise, our business very quickly acts on them (OP_2). - Our business excels at identifying marketing opportunities (OP_3).
Customer orientation (CO)	- Our business' marketing efforts reflect knowledge of what our customers really want from our products/service (CO_1). - We spend considerable resources trying to learn more about our customers. ** - Communicating with customers is a great way to identify innovation opportunities (CO_2).* - Innovation is the key to achieving a competitive advantage in our business (CO_3).*
Value Creation (VC)	- We expect that every employee will create more value for customers (VC_1) *(item in CO construct in 2021).* - In our business, employees contribute ideas to create value for customers (VC_2) *(item in CO construct in 2021).*
Low-risk marketing (RM)	- When we decide to pursue a new marketing direction, we do so in stages rather than all at once to reduce the risk involved (RM_1). - Our marketing efforts tend to have a low level of risk for our business (RM_2). - Our business typically incurs low costs in connection with new marketing activities (RM_3).

Note: the responses were provided on 7-point Likert-type scales, starting from '1' – 'I entirely disagree' – to '7' – 'I entirely agree with the statement;' *Items used only in 2019; **Item deleted from the CO construct due to low correlation with other items.
Source: Own elaboration of Fiore *et al.*, 2013.

Appendix 4. Descriptive statistics of the EMO scale items (full samples)

EMO dimension	Mean	Std. dev.	Skewness	Kurtosis	Mean	Std.dev	Skewness	Kurtosis
	n=240; 2019				n=219; 2021			
P_1	4.27	1.746	-0.220	-0.692	4.79	0.999	-0.273	-0.589
P_2	3.85	1.688	-0.078	-0.809	3.79	1.169	0.738	0.103
P_3	4.14	1.701	-0.234	-0.736	4.64	1.154	0.096	-0.979
OP_1	3.97	1.617	-0.252	-0.828	4.14	1.033	0.091	-0.488
OP_2	4.41	1.595	-0.415	-0.420	4.86	1.085	0.002	-0.093
OP_3	4.31	1.505	-0.544	-0.348	4.68	1.000	-0.396	-0.428
CO_1	4.75	1.527	-0.646	-0.007	5.59	0.775	-0.092	0.271
CO_2	5.04	1.710	-0.763	-0.182	n.a.	n.a.	n.a.	n.a.
CO_3	4.75	1.707	-0.492	-0.518				
VC_1	4.45	1.730	-0.499	-0.580	4.60	1.041	-0.129	-0.574
VC_2	4.43	1.720	-0.511	-0.566	4.25	1.029	0.051	-0.704
RM_1	4.70	1.595	-0.667	-0.059	4.87	0.879	-0.565	0.885
RM_2	4.61	1.591	-0.702	-0.050	4.50	1.155	-0.409	-0.745
RM_3	4.50	1.571	-0.566	-0.281	3.85	1.251	0.450	-1.046

Note: EMO (entrepreneurial marketing orientation) dimensions: P-proactive orientation, OP-opportunity focus, CO-customer orientation, VC-value creation, RM- low-risk marketing.
Source: own study.

Appendix 5. Questionnaire items used in this study

Innovation activity (filtering question):
Please tell if your company introduces innovations concerning new product development, introducing new manufacturing processes/technologies, or marketing innovations?
Yes – coded as 'innovating'
No – 'no-innovating'

'INN_1' exploitative innovations:
In our company:
'INN1_1' *improving existing product quality*
'INN1_2' *improving production flexibility*
'INN1_3' *reducing production cost*
is: '1' *not important* to '7' - *very important*.

'INN_2' – exploratory innovations:
In our company:
'INN2_1' *introducing new generations of products*
'INN2_2' *extending the product range*
'INN2_3' *entering new markets*
'INN2_4' *entering new technology (manufacturing) fields*
is: '1' *not important* to '7' - *very important*.

Market sensing:
'sensing_k' *We quickly analyse and interpret changes taking place in market demand*
'sensing_p' *Our employees regularly discuss the effect of market trends and new products on our activities*

Product adaptation strategy:
Does the company offer any products standardized or adapted to the needs of customers on the foreign markets? (from '*1' - 'whole product range standardized*' to *'5' – 'whole product range adapted to the client needs*')

Product differentiation strategy:
To what degree do the company's products differ from the products offered by the closest competitors? (from '1' – '*whole product range similar to competitive products*' to '5' – '*whole product range different from the competitive products*').

Authors

The contribution share of authors is equal and amounted to 50% for each of them. Izabela Kowalik – conceptualisation, literature writing, discussion of results, conclusions, implications; Agnieszka Pleśniak – conceptualisation, methodology, specification and estimation of models, results presentation.

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Conflict of Interest

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