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A configurational analysis of internationalization, absorptive capacity, and resource-based factors explaining firms' innovation performance

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ABSTRACT

This study adopts a configurational approach to examine how firm internationalization leads to innovation through the learning-by-exporting (LBE) effect. It investigates how combinations of internationalization dimensions—earliness, market scope, and intensity—along with absorptive capacity and resource-based factors, influence innovation outcomes. Drawing on the dynamic capabilities perspective, we argue that LBE necessitates all three elements but recognize that simultaneously pursuing early exports, broad market scope, and innovation may strain resources and impede LBE. Through a qualitative comparative analysis of 2748 manufacturing firms from 2007 to 2014, this study captures the causal complexity of LBE factors, including possible equifinal and asymmetric relationships. Our findings provide valuable insights for researchers, particularly highlighting the significance of internationalization dimensions in the context of LBE. They also offer practical implications for managers regarding the need to enhance exporters' absorptive capacity and secure resources for these various activities, as well as for export- and innovation-promotion organizations to align their efforts.

1. Introduction

International markets are widely recognized as an important source of valuable knowledge (Golovko, Lopes-Bento, & Sofka, 2022; Golovko & Valentini, 2014; Kafourous, Buckley, Sharp, & Wang, 2008). Exporters have access to technological information not available in their domestic markets which, when identified and absorbed, can enhance their subsequent innovation outcomes, a phenomenon referred to as 'learning-by-exporting' (LBE) (Rhee et al., 1984; Salomon and Shaver, 2005). The vast and growing interest in this topic in management research reflects the crucial role of internationalization and innovation in today's globalized, dynamic economy with shortened product and technology life cycles (Chiva, Ghauri, & Alegre, 2014; Freixanet & Federo, 2022). As global customers continually demand better and more affordable products (Hollensen, 2020), an exporter's sustainable competitive advantage may depend, at least in part, on its ability to develop new and improved products and processes (Hitt et al., 1997).

Extensive research has demonstrated the LBE effect and, more importantly from a strategic perspective, has begun to investigate the conditions and factors that may favor or deter this effect. Prior studies have examined, *inter alia*, the role of key variables such as technological capabilities (e.g., Juergensen et al., 2024; Salomon & Jin, 2008; 2010),

firm size (Albornoz & Ercolani, 2007; Freixanet, Rialp, & Churakova, 2020; Golovko & Valentini, 2014), intensity and post-entry speed of exporting activities (D'Angelo et al., 2020; Kafourous et al., 2008), and scope of international markets (Freixanet & Rialp, 2022; Hitt et al., 1997). However, these factors have typically been considered in isolation and analyzed using multivariate methods, which limit the understanding of interdependent attributes and can produce inconsistent results (Fiss, 2011; Freixanet & Federo, 2022). For instance, Albornoz and Ercolani (2007) and Damijan et al. (2017) report that small firms learn more from exporting in terms of product innovation than larger firms, whereas Golovko and Valentini (2014) find that only large firms benefit. Additionally, Freixanet et al. (2020) suggest that small exporters struggle with radical innovation due to limited resources.

The effect of technological capabilities on LBE also remains inconsistent. Some argue that high technological capabilities may weaken the LBE effect, as technologically advanced exporters may struggle to find superior knowledge abroad (Salomon & Jin, 2008). Others suggest these capabilities enhance LBE by enabling firms to identify, assimilate, and exploit useful information (Freixanet & Federo, 2022; Salomon & Jin, 2010). The impact of exporting activities on innovation also varies with internationalization strategies. While greater market scope often boosts innovation (e.g., Filipescu et al., 2013; Zahra et al., 2009), scholars

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caution against possible negative effects, such as increased costs related to logistics and market adaptation, which may detract from innovation (Sanna-Randaccio & Veugelers, 2007), especially beyond an optimal level (Freixanet & Rialp, 2022). Likewise, some studies highlight the benefits of knowledge diversity gained by entering culturally or knowledge-distant countries (Azar & Drogendijk, 2014; Scaringella, 2016), while others warn that knowledge distance may hinder the full absorption of foreign knowledge (Thakur-Wernz & Samant, 2019; Xie & Li, 2018).

This study directly addresses these identified gaps by exploring the complex interdependencies among the various factors driving LBE, thus filling the theoretical and empirical void regarding how LBE-related factors combine in configurations to drive innovation. We contend that the unresolved debate on LBE drivers stems from the intricate interactions among causal variables, and consequently investigate the following questions: How do different export dimensions, absorptive capacity, and resource-based factors interact to drive innovation? How do these factors complement or substitute one another to foster LBE? How can exporters enhance their innovation output?

To examine these interdependencies, we draw on the dynamic capabilities perspective to link these various elements theoretically and conduct a fuzzy-set qualitative comparative analysis (fsQCA) on a sample of 2748 manufacturers from 2007 to 2014, identifying possible equifinal relationships (c.f., Fainshmidt et al., 2020; Furnari et al., 2021). This approach enables us to respond to calls for a configurational perspective and fsQCA to analyze international business issues, particularly LBE, which is characterized by competing theoretical explanations (e.g., Brenes, Ciravegna, & Pichardo, 2019; Kan et al., 2016). Our results indicate that the drivers of innovation identified in the learning literature are context-dependent, influenced by the organizational environment and internationalization strategies. For example, high international market scope fosters LBE for firms with strong technological capabilities and large networks. Additionally, early internationalization can substitute for the other two internationalization facets in driving

LBE, underscoring the challenges in capability development and resource requirements linked to early entry (Freixanet & Renart, 2020; Sapienza et al., 2006).

This study yields several relevant contributions for researchers, managers, and policy makers. First, our paper responds to frequent calls to adopt a configurational perspective and fsQCA to analyze international business issues (Fainshmidt et al., 2020; Hughes et al., 2019), particularly topics such as LBE, in which there are competing theoretical explanations for the same phenomenon (e.g., Brenes, Ciravegna, & Pichardo, 2019; Kan et al., 2016). By adopting this perspective, our study contributes to LBE research by identifying combinations of three key elements that drive innovation: internationalization, absorptive capacity, and resource-based factors. This approach reveals that factors previously considered independent antecedents of firm innovation, such as exports (Salomon & Jin, 2010), R&D (Baumann & Kritikos, 2016), and international networks (Kafourous et al., 2020), may actually be complementary or substitutable, thus uncovering mechanisms involved in the process of learning from foreign markets that were missing from the literature (Hedström & Wennberg, 2017).

Second, our fine-grained analysis offers a more nuanced picture of the internationalization-innovation link that considers the interplay of different internationalization facets (i.e., export depth, breadth, and earliness) with the other two attributes. This helps explain the above-mentioned contradictions regarding the role of the three export dimensions (Freixanet & Rialp, 2022; Scaringella, 2016), as each may drive innovation only when the other two dimensions are absent. Third, our paper introduces two key antecedents from the international entrepreneurship literature that have been overlooked in earlier empirical LBE research, namely internationalization earliness and international networks (Freixanet & Federo, 2023; Bembom & Schwens, 2018). Thus, our study reveals that, under certain circumstances, the speed of internationalization at the pre-entry stage and the access to foreign networks play an important role in enhancing innovation performance among exporters. Finally, this study offers implications for

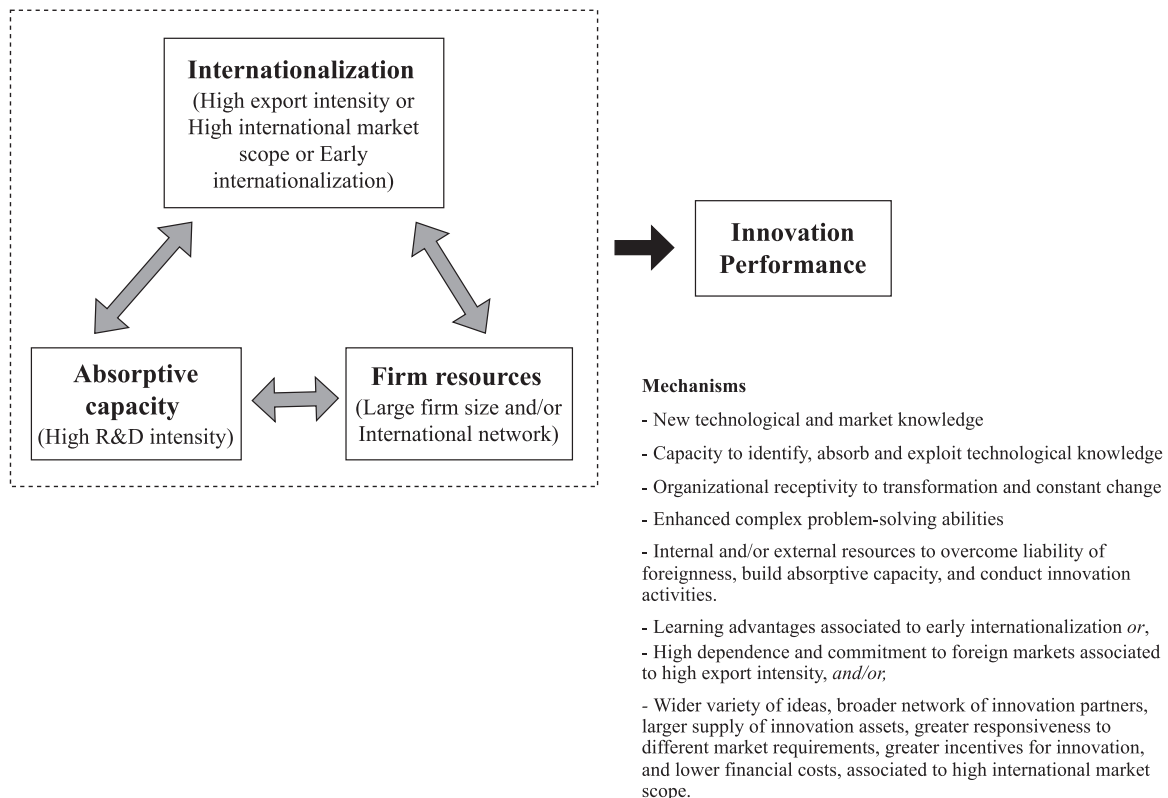


Fig. 1. Relationship between internationalization, absorptive capacity and resource-based factors, and innovation performance.

managers regarding the establishment of a learning agenda in their exporting activities, and for policy makers regarding the design of innovation and export promotion programs (Freixanet, 2022).

2. Theoretical framework

2.1. LBE and absorptive capacity

Empirical research has increasingly sought to clarify the mechanisms and conditions that drive post-entry increases in exporters' innovation through the learning-by-exporting (LBE) effect (e.g., D'Angelo et al., 2020; Freixanet & Rialp, 2022; Galbreath, 2019). Studies in this field argue that exporters gain access to novel technological and market knowledge from foreign markets, which they can use to improve their products and production processes (Salomon & Shaver, 2005; Golovko & Valentini, 2014). Additionally, foreign agents and clients, seeking better or more affordable products, often assist exporters and provide feedback that enhances their innovation activities (Rhee et al., 1984). Given the heightened competitive pressure in international markets, exporters are likely to use this new knowledge and support to boost their innovation performance (Freixanet & Federo, 2022).

Moreover, entering international markets enables firms to develop organizational capabilities that further strengthen their innovation capacity (Freixanet & Rialp, 2022; Sapienza et al., 2006). Internationalization exposes companies to diverse internal and external stimuli, including unfamiliar economic contexts, shifts in competition, and evolving resource demands. Exporters respond by adapting their resources to support cross-border expansion, creating an organizational environment receptive to transformation and continuous change (Greve, 1998; Zahra et al., 2000). As a result, firms may build marketing and managerial capabilities that facilitate knowledge integration, exploitation, and complex problem-solving abilities—often termed dynamic capabilities—that enhance their capacity to learn from exporting (Kunisch et al., 2017; Freixanet & Renart, 2020; Teece, Pisano, & Shuen, 1997).

Beyond developing dynamic capabilities through export activities, exporters may also invest deliberately in building technological capabilities. Research underscores the importance of such organizational capacities in the LBE effect, showing both positive and negative outcomes. On one side, learning and economic convergence theories, supported by empirical evidence at the industry and country levels (e.g., Salomon & Jin, 2008; Van Biesebroeck, 2005), suggest that less technologically advanced firms (or industries/countries) have more to gain from exporting than technological leaders. This perspective argues that firms approaching the technological productivity frontier experience diminishing marginal returns to learning (Chung & Alcácer, 2002; Dutton & Thomas, 1984), meaning technological laggards have greater potential to acquire valuable knowledge from foreign markets. Thus, scholars aligned with learning or convergence theories propose that highly capable exporters learn less from international markets, as the technological knowledge they obtain may be less advanced than their own (cf., Freixanet & Federo, 2023; Salomon & Jin, 2008; 2010).

Conversely, the capabilities literature posits that more technologically capable firms are better equipped to identify, assimilate, and utilize relevant information for business purposes. This would allow technologically advanced exporters to learn more from foreign markets than their less capable peers (Freixanet, Monreal, & Sánchez-Marín, 2018; 2021). Supporters of this view highlight the value of dynamic technological capabilities, particularly absorptive capacity (Cohen & Levinthal, 1990), which refers to a firm's ability to recognize, absorb, and exploit new knowledge (Laaksonen & Peltoniemi, 2018). Researchers suggest that dynamic capabilities are especially valuable in uncertain and competitive environments (e.g., Teece et al., 1997), such as those encountered in international markets. Furthermore, dynamic capabilities are evident in routines for new product development, where managers draw on diverse backgrounds and competencies to launch new

products (Eisenhardt & Martin, 2000), making these capabilities critical to exporters' ability to innovate. Therefore, aligning with the capabilities perspective and research by Garcia et al. (2012) and Salomon and Jin (2010), we propose that absorptive capacity is a key enabler for exporters to transform new knowledge from abroad into innovation outputs. However, we also contend that developing and applying this capability effectively will require exporters to invest considerable organizational resources, as discussed next.

2.2. Firm resources

Although previous paragraphs highlight the potential positive impact of internationalization on innovation, some studies suggest that firms should not pursue both simultaneously, at least in the short term (e.g., Kumar, 2009; Roper & Love, 2002). This reasoning is based on the resource-intensive nature of international expansion, which may divert resources from innovation efforts, making it difficult for firms to focus on both effectively. Thus, the learning-by-exporting (LBE) and opposing hypotheses might be compatible when considering an additional factor: the tangible and intangible resources available to a firm. Below, we discuss the link between export capabilities and resources.

While international expansion enables firms to develop dynamic capabilities and growth prospects, it also requires significant resource commitment. As firms expand internationally, they must coordinate activities across managers and employees and establish relationships with other firms (Sapienza et al., 2006). Exporters in particular face liabilities of foreignness—challenges that arise from limited knowledge of the host market and potential discrimination from local stakeholders (Zaheer & Mosakowski, 1997). For example, local clients may undervalue products from foreign companies (Elliot & Cameron, 1994). Managing these internal and external challenges often requires substantial managerial commitment or hiring new employees with specialized skills, such as adaptability, international marketing, negotiation, and communication (Freixanet & Renart, 2020). These activities typically require substantial resources specific to export, adding to the resources needed for R&D and innovation activities.

The LBE literature identifies several resources that enhance exporters' innovation output, such as social knowledge of the host market (Zahra et al., 2009) and freedom from credit constraints (Motta, 2020). Many studies in this field use firm size as an indicator of available resources; larger firms typically have better access to essential resources, including employees, economies of scale, and capital (Golovko & Valentini, 2014; Nooteboom, 1994). Consequently, management literature suggests that smaller firms may face the liability of smallness, limiting their ability to invest in internationalization and innovation and manage associated risks (Haddoud et al., 2021; Voss & Brettel, 2014). Golovko and Valentini (2014), for instance, find that only large firms gain innovation benefits from exporting, while Freixanet, Rialp, and Churakova (2020) show that small exporters face significant obstacles in pursuing radical innovations due to resource constraints.

Nonetheless, some small exporters succeed in innovating. For example, Damijan et al. (2017) find that small businesses learn from exporting in ways that enhance product innovation more than larger firms do. However, the literature cautions that due to their lower financial reserves and less diversified portfolios, small businesses may struggle to withstand the strategic risks associated with internationalization and innovation (Sapienza et al., 2006). Therefore, for small exporters to innovate effectively while managing risks, they may need to find ways to enhance their resource availability.

A plethora of studies emphasizes the importance of international networks in providing small firms with valuable knowledge and resources. Such networks can help firms identify and assess international opportunities (Hughes et al., 2019), facilitate entry into multiple export markets (Felzensztein et al., 2015), provide legitimacy (Coviello & Munro, 1997), and mitigate the liabilities of small size and foreign market entry (Musteen, Francis, & Datta, 2010). Collaboration with

foreign partners grants access to critical and diverse knowledge—not just from the partner but also about the country—valuable for innovation (Bembom & Schwens, 2018; Kafouros et al., 2020). Firms with sufficient absorptive capacity can better assimilate this knowledge, transforming it into innovation outputs (Kafouros et al., 2020). Thus, access to foreign market networks can complement small exporters' absorptive capacity to drive innovation.

2.3. Dimensions of Internationalization

We have argued above that export activity, absorptive capacity and resource availability are likely to complement each other in promoting innovation. However, exporting itself is multifaceted; export intensity, export breadth, and internationalization earliness each may influence the LBE effect differently, develop specific capabilities, and require different levels of resources. Some of these facets may be mutually incompatible in driving innovation outputs, requiring certain facets to be absent when others are present. A more detailed analysis follows.

2.3.1. Export intensity

Export activity will reflect first among the internationalization dimensions, in export intensity, defined as the ratio of exports to total sales (Katsikeas, Leonidou, & Morgan, 2000). High export intensity reflects a strong dependence on international markets for growth and profitability, prompting exporters to be attentive to foreign clients' preferences (Freixanet & Rialp, 2022) and embedded within innovation networks abroad (Elia, Kafouros & Buckley, 2020). Additionally, higher international sales involve accessing larger markets, which typically also have the potential for larger returns, thus offering financial incentives for conducting innovation activities targeting those markets (Hitt et al., 1997). Hence, we expect a high export intensity to exert a double motivation impact on innovation activities, and thus to be a factor enhancing the LBE effect. Some earlier research even concludes that export intensity often needs to exceed a certain threshold (20–69 %, depending on the sector) to support innovation activities (Kafouros et al., 2008).

Once an export department and routines are established, however, increasing international sales may not significantly increase resource demands, suggesting compatibility and complementarity with other internationalization facets in driving innovation.

2.3.2. International market scope

Broad international market scope provides specific advantages for innovation. First, a higher international market scope enables a firm to access a wider variety of ideas from different cultural backgrounds (D'Angelo et al., 2020), a broader network of innovation collaboration with partners, clients and research centers, from the countries in which it is present (Phene & Almeida, 2008), and access to a larger supply of innovation assets, such as laboratories and research materials (Kafouros et al., 2008). Second, higher export breadth may help firms to benefit from a higher volume of differentiated knowledge reservoirs, and provide access to distinctive technological and scientific domains that each country specializes in (Elia et al., 2020). Third, reacting to stimuli from a broader variety of competitive environments may render exporters more responsive to different market requirements, an organizational capability that facilitates innovation (Hitt et al., 1997). Fourth, geographical diversification may also add incentives to innovation by allowing firms to commercialize their new products across a larger number of export markets, thus improving their prospects of recouping their investments (Elia, Kafouros & Buckley, 2020). Finally, market diversification provides companies with the potential to reduce financial costs by lowering the risks of demand variations due to market-specific factors such as economic downturns or governmental restrictions (Patel et al., 2018).

At the same time, a high international market scope may be a particularly resource-consuming strategy. First, developing the dynamic capabilities necessary to attend to the needs of diverse markets is likely

to require specific dedication from the R&D department, and lower the potential for economies of scale in this activity (Barlett & Beamish, 2018). Second, higher export breadth may increase the costs of logistics, obtaining information, and adapting the marketing strategies to each market (Lu & Beamish, 2004; Patel et al., 2018). Third, dispersed operations and innovation inputs may demand increased investments in terms of coordination and integration (Elia, et al., 2020). This may include, for example, international trips by managers to obtain tacit knowledge from partners, customers, or research centers (Freixanet & Rialp, 2022). In sum, high international market scope can foster innovation but requires substantial resources to be effective.

2.3.3. Early internationalization

The international entrepreneurship literature provides evidence that companies are increasingly able to expand abroad shortly after their establishment (e.g., Hughes et al., 2019; Sadeghi, Rose, & Chetti, 2018), and that such strategy involves learning advantages compared to firms following a sequential or gradualist model (Freixanet & Renart, 2020). However, internationalization process theory argues that firms need time to prepare for foreign markets by building resources and absorptive capacity, and consequently being able to reduce the potential shock caused by their foreign market entry (Johanson & Vahlne, 1977; Tan, Brewer, & Liesch, 2007). Venturing abroad without such a preparation period renders early internationalization a particularly demanding endeavor. Additionally, early internationalizers must confront the liabilities of foreignness and newness, which involve a scarcity of business goodwill, history of excellence, consolidated routines, and domestic and foreign market knowledge (Sapienza et al., 2006; Yang & Aldrich, 2017; Zaheer & Mosakowski, 1997). These firms, therefore, must simultaneously build new routines and relationships for both their local and foreign markets, which is likely to put significant pressure on their resources (Lee et al., 2012). Consequently, early internationalization places high resource demands that can conflict with innovation efforts, particularly when firms also expand to multiple markets.

2.4. A system-based summary

To summarize, we posit that the variables examined in this study form a system of elements that, properly combined, bring innovation. Like any system, the LBE system comprises inputs (foreign market knowledge and resources), transformation processes conducted by putting to work specific organizational capabilities – we emphasize the importance of absorptive capacity, and international business strategies, and system outputs (innovation outcomes). We argue that, consistent with system properties such as congruence and equifinality (Nadler & Tushman, 1980), there are different configurations of interdependent, complementary, or substitute elements that enable the conversion of new knowledge from abroad into innovation outcomes.

More specifically, we anticipate that all of our three key attributes are interdependent to bring LBE, though none of these elements by themselves will be sufficient to produce innovation. Having resources without having enough organizational routines to combine and alter them to generate new products and processes is unlikely to lead to innovation. Possessing technological capabilities without new knowledge inputs from abroad, or without enough resources to support them, is not likely to drive innovation. Finally, among internationalization facets, we do not expect the average firm to be able to effectively develop innovation outputs while internationalizing early and expanding to multiple international markets. In sum, theory points to these factors to constitute a system formed by different bundles of conditions associated with firm innovation. However, given the inductive nature of our study, we refrain from advancing hypotheses but, instead, develop new theory from our empirical findings (c.f., Campbell, Sirmon, & Schijven, 2016; Federo & Saz-Carranza, 2018; Haxhi & Aguilera, 2017).

3. Methods

3.1. Sample and data

We obtained our data from the Survey on Business Strategies (SBS), an institutional survey on Spanish manufacturing firms with at least 10 employees. The SBS database is suitable for our analysis, given that many firms included in the list are innovators and/or exporters that do not have foreign production subsidiaries (i.e., more than 99.7 % of all firms), thus mitigating any confounding effects of foreign direct investments on innovation performance. Our sample consists of 2784 firms over the period 2007–2014, resulting in an unbalanced panel of 16,537 firm-year observations. Roughly 83 % of the sample are SMEs, while the rest are large firms. 39.6 % of the observations have either product or process innovation (see Appendix 1 for the descriptive statistics of the dataset).

3.2. Qualitative comparative analysis

We perform an inductive fuzzy set QCA, given that some of our conditions are continuous variables with more finely grained degrees of membership than crisp variables (Ragin, 2000). The use of QCA allows us to capture the three features of causal complexity: conjunction, equifinality, and asymmetry (Ragin, 2008) that characterize the influence of internationalization strategies, technological capabilities, and firm resources on innovation performance of firms. In that, as argued above, the three sets of factors are jointly related to innovation (i.e., conjunction); there is likelihood of multiple configurations (or combinations of conditions) resulting in the same innovation performance (i.e., equifinality); the configurations related to innovative firms do not reflect the inverse of the configurations associated with non-innovative firms (i.e., asymmetry). QCA is the widely-accepted approach for empirically analyzing configurations in organization and management research (Fainshmidt et al., 2020; Misangyi et al., 2017; Parente & Federo, 2019).

To determine the configurations that are sufficient to the occurrence of our outcomes (presence and absence of firm innovation), we use the fsQCA software. We first analyze the necessity of individual conditions in the configurations associated with the outcomes of interest of our study. We then construct the truth tables of all the possible combinations of the conditions (see Appendices 2 and 3), showing whether the combinations are observed (at least 1 case has the configuration). With six conditions, 61 out of the 64 (2^k , where k is the number of conditions) possible combinations are observed. Given our high sample size, we establish a frequency threshold of 4, thus retaining more than 99 % of the cases in our sample.

Afterwards, to conduct the sufficiency analysis of the configurations, we minimize the truth tables using a consistency threshold based on the natural split in raw consistency scores of the configurations in the truth tables (Rubinson, Gerrits, Rutten, & Greckhamer, 2019; Schneider & Wagemann, 2012). Our consistency threshold is 0.76 and 0.77 for the presence and absence of the outcome, respectively. Although these thresholds are below the typical 0.80 cut-off point, they are above the acceptable consistency threshold for large-N analysis (Ragin, 2000; Schneider & Wagemann, 2012). During our minimization of the truth table, the PRI consistency threshold is also set at the recommended minimum of 0.65. Finally, we lagged the explanatory conditions by one year to establish precedence and account for the reverse direction.

3.3. Measurement and calibration of the outcome and conditions

In conducting fsQCA, the outcome and the conditions need to be calibrated according to set membership on a given condition, ranging from 1 (presence or full membership of a condition) to 0 (absence or full non-membership of a condition). Our calibration for most variables is theoretically driven. However, in some conditions where the literature

lacks precedence to inform the calibration criteria for set membership, we use the features of the empirical data to identify the thresholds for ‘fully in,’ ‘fully out,’ and ‘crossover point’ (i.e., neither fully in nor fully out) (Greckhamer, 2016; Parente & Federo, 2019). Table 1 summarizes the measurement and calibration of the outcome and conditions.

3.3.1. Firm innovation

We operationalize the outcome of our study by coding a crisp-set condition that takes the value of 1 if the firm attained product or process innovation, while 0 if otherwise.

3.3.2. Internationalization

As discussed above, there are three facets of internationalization that we consider. First, we operationalize *export intensity* using the percentage of export sales to total sales (Kafourous et al., 2008; Freixanet & Rialp, 2022). Given that there is no theoretical basis for the calibration of what constitutes high level of export intensity, we draw on previous studies (e.g., Fiss, 2011; Freixanet & Federo, 2022; Lewellyn & Muller-Kahle, 2024; Yang, Lander, Turturea, & Heugens, 2023) to code a fuzzy-set condition showing high export intensity using the direct calibration method by adopting thresholds for full-membership at the 75th percentile, full non-membership at the 25th percentile, and crossover point using the midpoint.

Second, we captured *international market scope* using the number of international markets according to geographic areas (Hitt, Hoskisson, & Kim, 1997; Patel, Criaco, & Naldi, 2018). We thus coded a fuzzy-set condition in which firms with presence in at least five international markets are considered with high international market scope and coded as 1, while those that only operate locally are coded as 0. Firms with one and two international markets are ‘more out’ and coded as 0.33, while firms with three to four international markets are ‘more in’ and coded 0.67.

Third, we operationalized pre-entry *internationalization speed* by considering whether a firm has internationalized shortly after inception (c.f., Autio, 2017; Hashai, 2011). We followed previous research arguing that early internationalization occurs within three years of establishment (e.g., Li, Qian, & Qian, 2015; Zhou, 2007). Thus we coded a crisp-set condition, whether the firm has internationalized within three years (1) or not (0).

3.3.3. Absorptive capacity

Absorptive capacity and technological capabilities have mostly been proxied by using R&D intensity (e.g., Cohen & Levinthal, 1990; Jeréz-Gómez, Céspedes-Lorente, & Valle-Cabrera, 2005), measured using the total R&D investment over total sales. LBE research in particular, considers that this measure best reflects firms’ capacity to identify, assimilate and exploit the new knowledge from foreign markets (e.g., Freixanet, Monreal & Sánchez-Marín, 2021; Freixanet & Rialp, 2022; García, Avella, & Fernández, 2012). Furthermore, based on Laaksonen and Peltoniemi (2018)’s review on the measurement of dynamic capabilities, we consider R&D intensity as a variable depicting a firm’s dynamic capability. Similar to our calibration of export intensity, we converted this variable into a fuzzy-set condition using direct calibration, where the full membership threshold for high R&D intensity is at the 75th percentile while the full non-membership threshold is at the 25th percentile. The cross-over point is pegged at the midpoint.

3.3.4. Firm resources

We measure the potential for firms to access resources using two conditions, firm size and the presence of foreign shareholders. *Firm size*, other than providing information on a firm’s structure and demographic classification, has been widely used as an indicator of the availability of internal resources, such as personnel, capital, and economies of scale (e.g., Brenes, Ciravegna & Pichardo, 2019; Federo & Parente, 2023; Golovko & Valentini, 2014; Nooteboom, 1994). We use firm size by coding a crisp-set condition whether a firm is a large firm or not,

Table 1

Measurement and calibration of outcome and conditions.

Variable	Condition	Type	Calibration		
			Membership degree	Criteria	Threshold/Code
Outcome	Firm innovation	Crisp	Fully in	Presence of product or process innovation	1
			Fully out	Absence of product or process innovation	0
Internationalization	High export intensity	Fuzzy	Fully in	75th percentile	0.42
			Crossover	Midpoint	0.21
			Fully out	25th percentile	0.00
	High international market scope	Fuzzy	Fully in	≥ 5 countries	1
			More in	3–4 countries	0.67
			More out	1–2 countries	0.33
	High pre-entry internationalization speed	Crisp	Fully out	0 country	0
			Fully in	Internationalized within 3 years of inception	1
			Fully out	Internationalized after 3 years of inception	0
Absorptive capacity	High R&D investment	Fuzzy	Fully in	75th percentile	0.46
			Crossover	Midpoint	0.23
			Fully out	25th percentile	0.00
Firm resources	Large firm	Crisp	Fully in	≥ 250 employees	1
			Fully out	< 250 employees	0
	With international network	Crisp	Fully in	With foreign shareholders	1
			Fully out	Without foreign shareholders	0

according to the OECD's definition, whereby large firms have at least 250 employees and are coded as 1 and SMEs have less than 250 employees and are coded as 0. In turn, a plethora of studies consider *foreign shareholders* as constituting international networks that typically bring to the organization key tangible and intangible resources, such as working capital, technology and information (e.g., Carney et al., 2019; Filatotchev, Stephan, & Jindra, 2008; Kabongo & Okpara, 2019). We create a crisp-set condition that takes a value of 1 for the presence of foreign shareholders and 0 otherwise.

4. Findings

Following best practices for conducting QCA, we perform a necessity analysis of individual conditions. We do not find any necessary condition for the presence or absence of firm innovation, given that none of the conditions have reached a minimum consistency score of 0.90 (see Appendix 1) (Schneider & Wagemann, 2012). Moreover, since none of the condition is sufficient by itself that would lead to the presence or absence of firm innovation, our findings confirm the conjunction principle, in that the conditions are interrelated for producing the outcome of interest of this study.

4.1. Configurations sufficient for the presence and absence of firm innovation

We present in Table 2 the configurations that emerged from our

analyses. We report the findings using the following notations: solid circles (●) as present; crossed circles (⊗) as absent; and blank spaces as “don't care” conditions, i.e., those that may be present or absent in the configurations (Ragin & Fiss, 2008). Although intermediate solutions (those that account for easy counterfactuals) are typically presented after conducting QCA (Fiss, 2011), we have decided to report the complex solutions, given that our analysis involves a large sample size covering almost all the possible combinations of conditions. Thus, a counterfactual analysis may no longer be needed because limited diversity is not a concern in our large-N analyses (Ragin, 2008). Moreover, our decision to report the complex solution resulted in configurations as close as possible to our dataset (e.g., García-Castro, Aguilera, & Ariño, 2013; Ponomareva, Federo, Aguilera, & Collin, 2022). In addition, following Furnari et al. (2021), we name the resulting configurations to evoke their orchestrating themes, thereby simplifying our understanding of the bundles. The themes seem to converge into the types of firms according to the interplay of their internationalization strategies.

We find four configurations that are sufficient for the presence of firm innovation, with an overall consistency of 0.768 and overall coverage of 0.100. Configurations 1 (consistency: 0.829; coverage: 0.005) and 2 (consistency: 0.784; coverage: 0.003) show the same conditions for internationalization and absorptive capacity. These configurations are exemplified by firms that are early internationalizers investing in R&D intensively, but low in both international market scope and export intensity. We label these firms as *geographically focused early internationalizers*, i.e., those firms that began their internationalization

Table 2

Configurations for the presence and absence of firm innovation.

Configurations	With innovation	With innovation	With innovation	With innovation	Without innovation	Without innovation
Conditions	1	2	3	4	5	6
Internationalization						
- High export intensity	⊗	⊗	●		⊗	
- High international market scope	⊗	⊗		●	⊗	⊗
- Early internationalization	●	●	⊗	⊗	⊗	●
Absorptive capacity						
- High R&D intensity	●	●	●	●	⊗	⊗
Firm resources						
- Large firm	●	⊗	●	●	⊗	⊗
- With international network	⊗	●	⊗	●	⊗	●
Consistency	0.829	0.784	0.769	0.753	0.776	0.877
Raw coverage	0.005	0.003	0.068	0.024	0.534	0.002
Unique coverage	0.005	0.003	0.068	0.024	0.534	0.002
Solution consistency	0.768				0.777	
Solution coverage	0.100				0.536	

Note: ● - presence of condition; ⊗ - absence of condition; blank space - “don't care” condition

process no later than three years after their creation. They compensate the requirements stemming from their early internationalization by focusing on a few markets, among which the domestic market remains the most important. Their high investment in absorptive capacity enables them to obtain, process, and exploit information from local and foreign markets, and thus enhance their innovation output. They probably follow a dual growth path sustained by both their moderate international expansion and their growth through new products (Ansoff, 1965). Interestingly, we find a substitution between the two conditions for firm resources in that firms may leverage either being large or having foreign shareholders to produce innovation.

The international entrepreneurship literature offers various examples of companies that conform to this second configuration. For example, the qualitative study by Freixanet, Rialp, and Churakova (2020) includes the case of CV SECURITY-IMAGES, an SME located in Barcelona that specializes in software for surveillance devices. CVS invested a large portion of its turnover in R&D, which enabled the company to develop what it described as 'a new 3D Visualization Platform for security control rooms.' The firm built an international network comprising various surveillance multinationals, which enabled it to gather the technological knowledge necessary to develop the product, as well as having partners to help the firm expand internationally. Although the initial plans were to expand globally, the CEO soon realized the difficulty of combining the investments and organizational changes necessary for this endeavor with those needed for the indispensable product updates and adaptations to the various markets. Hence, the company remained focused on its home market and expanded only to the few markets it had initially entered.

Alternatively, configuration 3 (consistency: 0.769; coverage: 0.068) shows that innovative firms are large, do not have foreign shareholders, and do not internationalize early, but invest significantly in R&D, while having high export intensity. Thus, considering configuration 3 vis-à-vis configuration 1 suggests that high export intensity may substitute for early internationalization to drive innovation. We label these firms *large exporters* that pursue a gradual internationalization process. Such firms take longer to initiate their exports, allowing them to build export readiness before starting their cross-border expansion. This also gives them more time to properly nest inside their organizations the routines and resource requirements pertaining to a high level of internationalization and innovation. Furthermore, the firms are likely to be particularly motivated to develop new products and processes to conform to the needs and preferences of their foreign clients, given that most of their business depends on them; consequently, they invest heavily in R&D. These investments add to those pertaining to their international expansion, thus requiring substantial resources that would be open mainly to large firms. These companies may leverage the benefits of their size, which may include economies of scale in manufacturing, sourcing, and R&D activities – for example, larger laboratories, better or cheaper research materials, and highly qualified researchers.

The fourth configuration (consistency: 0.769; coverage: 0.068) shows that firms that do not internationalize early will need to have high international market scope, invest in R&D, and have a substantial amount of resources to become innovative. The configuration is exemplified by what we refer to as *large and geographically diversified exporters* that have numerous opportunities to gather a variety of ideas and technological knowledge from different locations in which they are present. These firms may also be particularly motivated to adapt products and develop more efficient processes, given that they hold a large scope of markets where they may commercialize their improved or more affordable products. At the same time, the capabilities and resource requirements of these firms are particularly high in terms of the complexity and cost of operations, transportation, adaptation of marketing variables, and building absorptive capacity. The scale and scope of these requirements might be fulfilled only by large firms that have access to external resources—i.e., information and tangible assets—in their international networks.

The general management and case-based literature provide numerous examples of configurations 3 and 4. In the context of our sample, we can name Roca Sanitarios SA, a leading international sanitaryware firm based in Gavà (Barcelona). This is a large firm that started expanding abroad 73 years after it was created, and it currently has a presence in over 170 countries. As described in Sharma (2016), the company has an extensive network of international partners with whom it constitutes joint ventures that are key for its expansion. Besides, the firm is constantly investing to 'meet the changing needs of customers by introducing innovative products in the market' (p. 1). Further examples in the context of our sample are provided by Guillén and García-Canal (2010), who discuss various cross-industry cases that fit these configurations. Their article highlights several "late bloomers"—Spanish companies that ventured into international markets long after their founding but have since achieved global presence. These firms, characterized by their intensive use of alliances with foreign partners and their focus on innovation, include Acciona, the largest developer of wind farms; Freixenet, a major player in sparkling wine; Pronovias, described as "the planet's largest bridal wear designer and manufacturer" (p. 4); and Gamesa, a leading company in wind turbines, which particularly exemplifies firm learning and capability development through international networking.

Although our intention is to analyze the combinations of factors associated with the presence of firm innovation, we also present in Table 2 the configurations that are associated with the absence of firm innovation. Noticeably, we find that the configurations for the absence of innovation do not reflect the inverse of the conditions in the configurations for the presence of innovation, thus confirming the asymmetry principle.

Our findings show two configurations that are sufficient for the absence of firm innovation, with an overall consistency of 0.777 and overall coverage of 0.536. On the one hand, configuration 5 (consistency: 0.776; coverage: 0.534) shows the absence or low value of all the conditions, thus confirming our theoretical expectations that firms operating in local markets, lacking in R&D activities, and restricted in resources are less likely to innovate (e.g., Hadjimanolis, 2000; Hobday, Rush, & Bessant, 2004; Maietta, 2015). The firms could be called *domestic business*, characterized by low or no internationalization, lack of absorptive capacity and inadequate resources. This demonstrates the importance of absorptive capacity to convert any information or knowledge from the internationalization activity to produce innovation (Bertrand & Mol, 2013; Fabrizio, 2009; Lau & Lo, 2015). However, it is important to note that high R&D investment is not sufficient by itself to become innovative.

On the other hand, configuration 6 (consistency: 0.877; coverage: 0.002) closely mirrors configuration 2, but it differs only with a condition showing low R&D intensity and shows that export intensity is not relevant in the configuration. We label these firms as *early internationalizers without absorptive capacity*. These are firms that may have shown entrepreneurial capabilities by expanding abroad shortly after their inception. However, despite having access to new knowledge from foreign markets and to international networks from their foreign shareholders, they have not been able to build absorptive capacity, thus not attaining innovation output.

4.2. Robustness checks

To test the robustness of our findings, we performed additional explorations. First, we used two alternative measures of firm size according to the OECD (i.e., turnover and income). Second, instead of a crisp set, we converted into fuzzy set the number of employees as our measure of firm size. Third, we included firm age as a condition in the model, given that prior research argues that firms tend to become innovative as they expand their markets when they mature (Filatotchev & Piesse, 2009). Fourth, we expect changes in products and processes attributable to the independent variables to take place in the year after. However, we

believe it is also interesting to ascertain whether the configurations change when lagging the independent variables one and two years, so we conducted such analyses.

These post-hoc analyses were conducted independently and have produced more configurations, but they are logically equivalent to the ones presented here, meaning that the configurations emerging from the analyses do not contradict those initially observed (Ragin & Sonnett, 2005; Schneider & Wagemann, 2010). Moreover, the resulting configurations of the robustness checks have lower consistency and coverage scores. Thus, for the sake of parsimony and to have interpretable results (c.f., Furnari et al., 2021), we have kept the presented configurations to maximize the number of observations included in our analysis.

In addition, given our panel dataset that spans ten years, we divided the sample to run QCA separately for each year. In the QCA for the subsamples, we have kept the frequency threshold of two to capture more than 90 % of the observations in a given year and used a similar consistency score threshold that accounts for the natural split of consistency scores in the truth tables. Following previous studies to identify consistent configurations in a panel dataset (c.f., Aversa, Furnari, & Haefliger, 2015; Fainshmidt, Smith, & Guldiken, 2017; Witt, Fainshmidt, & Aguilera, 2022), we have kept the configurations observed in at least six solutions, which is more than 50 % of the analyses (one for the full sample and ten for each sample year). Using the full sample solution as the base models, while bearing in mind the logical equivalence of the bundles, we derive the same configurations presented in Table 2, thus further confirming our findings.

5. Discussion and conclusion

This study adopts a configurational approach to examine how various facets of internationalization—export intensity, market scope, and earliness—along with absorptive capacity and resource-based factors, combine to explain innovation. It contributes to the ongoing scholarly debate on how firm exports drive innovation, a phenomenon known as learning-by-exporting (LBE) (Golovko et al., 2022; Rhee et al., 1984; Salomon & Jin, 2010). Our analysis of the complex relationships among these strategic activities, along with selected capabilities and resource-based factors, yields several key insights.

First, while prior research has explored many LBE antecedents included in this study, our findings introduce a novel perspective by demonstrating that their effects differ significantly across various types of firms when examined in configurations. Unlike existing studies, we uncover that no single factor—be it export intensity, export breadth, internationalization precocity, or technological capabilities—independently drives innovation in manufacturing firms. Instead, our study reveals a groundbreaking insight: these variables function as interconnected and substitutable conditions, where different combinations of factors collectively generate LBE. This discovery potentially resolves conflicting findings in previous research on the subject. Below, we provide specific insights on each antecedent and its associated variables (see Table 3 for a summary of the results' contribution to literature and theory).

- *Export intensity * resources * absorptive capacity*: Some research shows that a high commitment to international markets drives innovation (e.g., Kafourous et al., 2008), while others justify negative effects claiming that firms' resources may be spread too thinly to undertake jointly both activities (Freixanet & Rialp, 2022; Kumar, 2009; Roper & Love, 2002). Our findings reconcile these views by showing that high export intensity fosters innovation only when combined with abundant resources and strong absorptive capacity (Configuration 3).
- *International market scope * resources (firm size and networks) * absorptive capacity*: Several studies find that broad market scope enhances innovation by providing critical inputs and incentives (e.g., Filipescu et al., 2013; Yang, 2018; Zahra et al., 2009). However,

Table 3

Configurations and contributions to literature and theory.

Configuration Literature/Theory	Implications
<i>All configurations as a whole – General LBE literature</i>	• No single factor independently drives exporters' innovation. • There are no 'best practices' to gain innovation, such as intensively investing in R&D, if not properly combined with specific organizational contexts, namely internationalization and firm size. • LBE is generated from the interconnection of multiple conditions in a configuration. There are different configurations that are equifinal in driving innovation. • Three distinct firm types result in innovation: geographically focused early internationalizers, large exporters, and large geographically diversified exporters. • Our findings challenge the assumption of a linear relationship between dynamic capabilities and performance improvements. Excessive capability building may deplete resources and reduce performance.
<i>All configurations – Dynamic capabilities theory</i>	• High export intensity fosters innovation only when combined with abundant resources and strong absorptive capacity.
<i>Export intensity * RR† * AC‡ LBE literature</i>	• High export breadth requires to be paired with strong absorptive capacity and resources from both internal and external sources to lead to positive innovation outcomes.
<i>International market scope * RR (firm size and networks) * AC LBE literature</i>	• Early internationalization can substitute for other internationalization facets in driving innovation, suggesting that resource pressures may limit simultaneous engagement in early and broad internationalization, and innovation activities.
<i>International earliness * export breadth and depth * RR * AC International Entrepreneurship literature</i>	• Early internationalization substitutes for high export intensity, suggesting a substantial commitment of resources along with greater export involvement.
<i>International earliness * export breadth and depth * RR * AC Internationalization process – born global theories</i>	• Both theories emphasize learning from internationalization, but neither has addressed the effects on organizational processes. We argue that early internationalization imposes significant resource strain, compelling firms to develop capabilities that target both domestic and foreign markets.
<i>AC * RR * export intensity Technological capabilities and LBE</i>	• In terms of innovation, technological leaders actually benefit more from exporting than technological laggards, but these gains depend on resource-based factors. • High R&D intensity alone does not drive innovation. • This condition is also not necessary; so other capabilities may replace absorptive capacity in driving LBE.
<i>RR * International market scope * export intensity * AC Networks and LBE</i>	• International networks contribute to innovation outcomes for both SMEs and large firms. • Internal and external resource providers are essential for firms with diversified geographic presence to develop the absorptive capacity needed for innovation.

(†) RR = Resources; (‡) AC = Absorptive Capacity

others argue that expanding too broadly raises logistical costs and hinders innovation (Hitt et al., 1997; Lu & Beamish, 2004; Patel et al., 2018). Our results align both views by showing that broad market scope drives innovation when coupled with resource-based factors, such as large firm size and international networks

- (Configuration 4). This finding qualifies D'Angelo et al. (2020) who conclude that a rapid increase in export breadth reduces a firm's innovation outputs, though absorptive capacity lessens this negative impact. Our findings suggest that high export breadth requires to be paired with strong absorptive capacity and resources from both internal and external sources to lead to positive innovation outcomes.
- *Internationalization earliness * export breadth and depth * resources * absorptive capacity*: To our knowledge, this is the first study to examine the link between early internationalization and LBE. Our findings show that early internationalization promotes innovation, consistent with prior research on international entrepreneurship (Cavusgil & Knight, 2015; Jiang et al., 2020). At the same time, early internationalization can substitute for other internationalization facets in driving innovation (Configurations 1 and 2). This illustrates the equifinality of LBE drivers (c.f., Misangyi et al., 2017) and suggests that firms face resource pressures that may limit simultaneous engagement in early and widespread international expansion, together with innovation activities (Sapienza et al., 2006; Freixanet & Renart, 2020; Mudambi & Zahra, 2007). Furthermore, in Configurations 1 and 2, firm size and foreign shareholders substitute for early internationalizers' resources, consistent with research on the importance of international networks (Bembom & Schwens, 2018; Kafourous et al., 2020). Additionally, high pre-entry internationalization speed also substitutes for high export intensity, suggesting a substantial commitment of resources along with greater export involvement (Freixanet & Rialp, 2022). These results are consistent with Juergensen et al. (2024) and Massini et al. (2023) who conclude that LBE is not an automatic process and requires exporters to develop firm capabilities. We extend these studies by showing that the combination of these two elements (exports and capabilities) is not enough for LBE, and that the mix of export strategies and the availability of resources also matter.
 - *Absorptive capacity * resources * export intensity*: Our findings contribute to the ongoing debate about the role of technological capabilities in LBE. In terms of innovation, while some argue that technological laggards learn more from exporting (Salomon & Jin, 2008; Van Biesebebroeck, 2005; Xie & Li, 2017), we find the opposite, in which technological leaders actually benefit more from exporting (e.g., Bahl et al., 2021; Garcia et al., 2012; Ren et al., 2015; Salomon & Jin, 2010; Vlačić et al., 2019). However, these gains depend on resource-based factors. Consequently, the results also challenge the assumption that high R&D intensity alone drives innovation (Baumann & Kritikos, 2016; Hall & Bagchi-Sen, 2002) by showing that this condition is not sufficient, nor necessary, to obtain innovation, in that other capabilities may replace absorptive capacity in driving LBE (Bahl et al., 2021; Marjit et al., 2019; Tse et al., 2017).
 - *Resources * international market scope * export intensity * absorptive capacity*: Prior research has examined the influence of firm resources in the LBE effect, mainly proxied through firm size (Albornoz & Ercolani, 2007; Freixanet, Rialp, & Churakova, 2020; Golovko & Valentini, 2014). Our results expand this view by considering the role of networks, showing that international networks contribute to innovation outcomes for both SMEs and large firms (Configurations 2 and 4). This suggests that internal and external resource providers are essential for firms with diversified geographic presence to develop the absorptive capacity needed for innovation.

Second, we identify three distinct firm types that result in innovation: geographically focused early internationalizers, large exporters, and large geographically diversified exporters. This classification provides a theoretical foundation for understanding how different manufacturers achieve ex-post innovation outcomes. Third, our analysis contributes to several theoretical frameworks, including the internationalization process (Johanson & Vahlne, 1977), born-global (Knight & Cavusgil, 1996), and dynamic capabilities (Teece et al., 1997) theories. While both the internationalization process and born-global theories

emphasize learning from internationalization, neither addresses its effects on organizational processes (Freixanet & Renart, 2020). We argue that early internationalization imposes significant resource strain, compelling firms to develop capabilities that target both domestic and foreign markets. Our findings also challenge the assumption of a linear relationship between dynamic capabilities and performance improvements, suggesting that excessive capability building may deplete resources and reduce performance.

5.1. Implications for management and public policy

This paper uncovers important managerial implications. The four configurations of LBE antecedents lay a foundation for actionable dialogue with managers of exporting firms, on the various tools necessary to attain innovation. The resulting configurations suggest that while export markets enable access to valuable technological knowledge, identifying, assimilating, and exploiting such knowledge should not be an automatic process and do not come free. Hence, other than increasing sales, firms may add a learning agenda to their export endeavors, foster their absorptive capacity, and secure the resources that enable them to conduct these various activities. At the same time, managers should be aware of the need to make strategic choices when deciding whether to pursue a path of growth through fast internationalization, broad scope of international market penetration, export intensity, and innovation. It is unlikely all these strategies may be undertaken jointly in an effective manner. The results also show that for SMEs, internationalizing early and securing resources through international networks may be an avenue for innovation, thus bringing to the fore the importance for small businesses to be entrepreneurial and resort to external resources. Finally, the substitutability between factors and among configurations in driving LBE informs us on the general applicability of so-called 'best practices' to gain innovation, such as intensively investing in R&D, by showing the need for them to be combined with specific organizational contexts, including internationalization and firm size.

The study also has implications for public policy. Most governments, both at a regional and country level, offer export- and innovation-promotion programs to provide support for firms conducting these activities (Freixanet, 2022). The results point to the need for both agencies to combine their efforts. For example, innovation-promotion programs should help companies to build absorptive capacity (such as subsidies or expertise in R&D) and give preference to exporters, who appear to be better suited to achieve innovation performance. In parallel, innovation-promotion agencies should inform exporters about the challenges of investing in innovation, while jointly pursuing early internationalization, a highly intense export activity and/or a geographically dispersed expansion.

5.2. Limitations and directions for further research

While the findings offer valuable insights, this paper has several limitations that suggest relevant avenues for future research. First, it would be important to deepen our understanding of the business context of LBE. For instance, the role of technological capabilities in the LBE effect likely varies depending on contextual factors such as whether the industry is operating below or above the technological frontier (Smith, 2014). Spain, a developed though middle-income country, has firms that generally lag behind the global technological frontier (Salomon & Jin, 2010). As discussed in the theory section, this may influence the advantages and benefits these companies can gain from foreign technological knowledge. Consequently, conducting similar research in other regions, particularly in contexts where firms are technological leaders or in emerging markets where firms are further behind technologically, would be valuable. Furthermore, like nearly 90 % of LBE research (Freixanet & Federo, 2023), our study focuses on manufacturing firms. Expanding research to include service-sector companies would be highly beneficial, as these key players in international business have

demonstrated distinctive characteristics, such as the ability to experience LBE effects on innovation at an earlier stage than manufacturing firms (Love & Mansury, 2009).

Second, our paper responds to calls for research on the complementarity of factors linking exports to innovation (e.g., Freixanet & Federo, 2023). Future studies could further contribute to this field by using more nuanced measures of these factors, and by examining other facets of innovation (e.g., incremental vs. radical innovation) and internationalization (e.g., post-entry speed), as well as the role of managerial capabilities in this regard. Furthermore, although prior research in the LBE domain has frequently employed R&D-based measurements to proxy absorptive capacity (e.g., Bahl et al., 2021; D'Angelo et al., 2020; Freixanet et al., 2021), further research could bring more empirical accuracy and test the robustness of our estimates by using other, possibly more comprehensive measures, such as purposefully built scales. Similarly, although firm size has been used widely to account for the availability of organizational resources (Brenes, Ciravegna, & Pichardo, 2019; Freixanet, Rialp, & Churakova, 2020), future studies could enhance our understanding of which specific resources – e.g.,

technological vs. physical and financial resources, intellectual capital – better complement absorptive capacity and export activities in bringing innovation.

Third, our use of QCA in a relatively large-N sample has an inherent limitation with regard to case comparability. However, our secondary data comes from a database that ensures the representativeness of its sample from a single country, thus reducing the likelihood of other confounding factors that can influence the resulting configurations. In addition, the data-driven calibration technique when conducting QCA is sensitive to changes in the threshold applied during the conversion of set memberships. We performed additional tests by changing the calibration thresholds to different percentiles for fully in and fully out set memberships, and we found no differences in the presented results in Table 2, thus confirming the robustness of our findings.

Finally, further research could identify alternative paths or combinations of components leading to LBE by examining other relevant factors such as knowledge distance between the home and host countries (Thakur-Wernz & Samant, 2019) or firm characteristics such as family ownership (Freixanet, Monreal, & Sanchez-Marín, 2018, 2021).

Appendix

Descriptive statistics

Variables	Mean	s.d.	Min	Max
Presence of firm innovation	0.396	0.489	0	1
Export intensity	23.179	29.360	0	100
Number of international markets	0.849	1.066	0	5
Early internationalizer (within 3 years)	0.094	0.292	0	1
R&D intensity	1.758	9.298	0	414.461
Number of employees	204.917	700.092	1	14,400
Percentage of foreign shareholding	14.215	34.180	0	100

Data availability

Data will be made available on request.

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