
The role of exploitative and exploratory innovation in export performance: an analysis of plastics industry SMEs

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Abstract: Innovation capabilities are important for firms to compete in the market. However, the literature has rarely examined how exploitative and exploratory innovation influences the export performance of small and medium-sized firms (SMEs). As exploitative and exploratory innovation plays different roles in sustaining SMEs' competitive advantages, this article presents an analysis of how four specific firms' innovation capabilities (i.e. marketing, strategy, research and development and manufacturing capabilities) impact these SMEs' export performance. Moreover, this study analysed how exploitative and exploratory innovation capabilities mediate the relationship of the four firms' internal innovation capabilities and export performance. The results indicate that exploitative innovation positively influences SMEs' export performance, but exploratory innovation does not. Another interesting finding is that strategy and manufacturing capabilities are important antecedents of both exploratory and exploitative innovation. Furthermore, the results reveal that only manufacturing capabilities have a direct impact on export performance, whereas strategy and manufacturing capabilities are the antecedents that most influence exploitative innovation and export performance.

Keywords: SMEs; export performance; innovation capabilities; exploratory innovation; exploitative innovation.

Reference to this paper should be made as follows: Ribau, C.P., Moreira, A.C. and Raposo, M. (2019) 'The role of exploitative and exploratory innovation in export performance: an analysis of plastics industry SMEs', *European J. International Management*, Vol. 13, No. 2, pp.224–246.

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1 Introduction

Internationalisation and export performance are critical issues for both entrepreneurs and government authorities (Papadopoulos and Martín, 2010; Xie et al., 2009). However, few studies have analysed the factors affecting firms' performance in emerging economies (Xie et al., 2009), and the patterns of firms' internationalisation in these economies vary (Mockaitis et al., 2006; Zhou et al., 2007). At the same time, not only do researchers know little about how innovation affects the performance of small and medium-sized firms (SMEs) but also studies analysing firms' performance tend to focus on firms' profitability, thereby neglecting other important subjective aspects (e.g. Pattnaik and Elango, 2009; Xie et al., 2009).

Although SMEs do not have abundant resources, they represent a large share of the world's businesses (IFC, 2016). Contrary to large firms, SMEs have lean, flexible and organic structures that allow them to adapt more easily to foreign markets (Abidi et al., 2011; Lubatkin et al., 2006; Toulouva et al., 2015). SME managers and owners play a crucial role during innovation processes (Grazzini et al., 2017; Sousa et al., 2009). Unlike what happens among large firms, SME managers and/or owners accumulate the role of operational managers, staying quite close to day-to-day operations and extremely familiar with their firms' internal capabilities, as well as being aware of when to exploit these internal capabilities (Kontinen and Ojala, 2012). Moreover, these firms are also close to the market, which allows them to discover and evaluate new market opportunities more directly and play a strategic role by improving exploratory activities (Bougrain and Haudeville, 2002; Lubatkin et al., 2006). Chandler (1990) argues that the competitiveness of firms depends on two sets of capabilities: strategic and functional or operations capabilities. However, firms might lose innovation capabilities if they are too focused on

market-oriented competences (Im and Workman, 2004), or they may lose their market focus if they are too wholeheartedly focused on technological capabilities (Zhou et al., 2005).

If a trade-off between internal capabilities and market-focused activities is sometimes necessary, the same applies to short-term and long-term innovation capabilities, as the balance between exploratory and exploitative innovation capabilities is of key importance for firms' long-term competitiveness (Gupta et al., 2006; Jansen et al., 2006). When firms have resources available – beyond those needed to maintain their existing technology, which are used to meet current market needs and serve current customers – firms have to decide how to allocate resources between exploitation and exploration activities (Brady and Davies, 2004).

According to Gupta et al. (2006) and Jansen et al. (2006), few studies have examined exploration and exploitation innovation capabilities. Moreover, even though SMEs in the manufacturing sector contribute significantly to economic growth, most research on innovation in the manufacturing sector has focused on large firms (Terziovski, 2010). Exploration and exploitation innovation competences enhance firms' ability to gain and sustain competitive advantages, and these capabilities are directly influenced by the marketing, strategy, research and development (R&D) and manufacturing capabilities of each firm (Danneels, 2002; Zhou and Wu, 2010). As such, it is important to understand: (a) how SMEs' internal capabilities influence their performance, (b) what impact each of these four internal capabilities has on firms' exploitative and exploratory innovation and (c) how they can leverage SMEs' export performance. Thus, we proposed a model and tested 14 hypotheses, thereby exploring the capabilities of SMEs and filling a gap in the literature on how internal innovation capabilities of SMEs influence export performance and what specific role exploratory and exploitative innovation plays in this relationship.

Many models of firm-level innovation have attempted to improve the consistency of research results. These models have been shaped by a variety of theoretical positions. Starting from the premise that a strong relationship exists between SMEs' internal innovation capabilities and performance, the present study's approach was based on resource-based theories. It focused on export performance and capability-building and organisational learning and strategy (Brady and Davies, 2004; Jansen et al., 2006; Rhee et al., 2010; Wang and Rafiq, 2009), innovation (e.g. Jansen et al., 2006; Lawson and Samson, 2001; Rosenbusch et al., 2011) and entrepreneurship (Avlonitis and Salavou, 2007; Varis and Littunen, 2010). This approach was mainly shaped by the concepts of exploration and exploitation innovation (March, 1991).

The present study extends the literature on SME internationalisation by providing an answer to the following research questions:

- How important are each of the internal innovation capabilities of SMEs for export performance?
- How important is exploratory and exploitative innovation as a mediator of the relationship between internal innovation capabilities and export performance?

This paper makes several other contributions. On an academic level, the study sought to analyse the direct and indirect effect of four internal innovation capabilities (i.e. marketing, strategic, R&D and manufacturing capabilities) on SMEs' export performance. Moreover, regarding the mediating effect of exploratory and exploitative innovation between the aforementioned internal capabilities and export performance, the

results help to explain how specific firms' innovation capabilities affect SMEs' export performance. This paper also fills a gap in exploratory and exploitative studies on SMEs.

The article is divided into six sections. After this introduction, section two reviews the relevant literature along with the hypotheses development, in which we examine the relationships between manufacturing, strategy, R&D and manufacturing capabilities and exploratory and exploitative innovation and export performance. The research methodology and the model are discussed in section three. Section four reveals the most significant results. After section five presents the discussion and implications of results, section six details the main conclusions, limitations and future lines of research.

2 Literature review and hypotheses

In order to achieve competitiveness, especially in international contexts, SMEs need to develop unique firm-specific assets that arise from distinctive resources and capabilities – a strategy rooted in a resource-based paradigm that sees firms as unique and heterogeneous collections of tangible and intangible resources (Barney, 1991). In general, it is a challenge for SMEs that lack the resources to compete in areas such as marketing, production, innovation and internationalisation strategies (Villar et al., 2014).

Innovation represents one of the main routes to building firm-specific advantages (Zucchella and Siano, 2014), and it is critical to firms' growth and success (Guan and Ma, 2003; Oura et al., 2016; Vicente et al., 2015). Innovative resources and capabilities are recognised as major drivers of firm growth in both domestic and international markets, but these drivers have seldom been explored in the literature on internationalisation (Lisboa et al., 2011; Oura et al., 2016). Businesses' growth and success depend on the joint effects of internationalisation and innovation (Onetti et al., 2010). Moreover, not only the internationalisation process among SMEs follows a multifaceted perspective (Ribau et al., 2018) but also the academic community has accepted that a strong positive relationship exists between sales growth abroad and innovation (European Commission, 2010; Golovko and Valentini, 2011).

New product development (NPD) activities involve R&D, manufacturing, strategic and marketing capabilities, which will be analysed in this article. NPD activities involve the capacity to understand and forecast foreign customers' needs, and to effectively link the firms' offering to customers' needs and wants. For industrial SMEs that compete in international contexts, NPD activities are very important because they have to be tuned to the competitive advantage firms are striving for. On one hand, if firms are following a cost leadership strategy product standardisation is an interesting option to achieve economies of scale and to increase performance impact. On the other hand, differentiating firms need to adapt their marketing programmes and customise their offering, which might be detrimental to firm performance, as product adaptation involves important R&D, marketing and strategic investments and innovation intrinsic resources (Theodosiou and Leonidou, 2003; Vicente et al., 2015).

Although performance is an essential indicator by which firms analyse their level of success, the international marketing literature defines performance in different ways, either conceptually or operationally. Moreover, perhaps no other concept in international marketing literature has been so resistant to a consensus on a definition that can be broadly accepted and implemented (Lages, 2000; Lages and Montgomery, 2004).

Performance is a complex construct (Greve, 1998; Lages, 2000; Lages and Montgomery, 2004). As it has proven extremely difficult to develop an unanimously accepted financial measure to assess performance, the use of multiple measures is advisable (Aulakh et al., 2000; Jantunen et al., 2005; Kuivalainen et al., 2007; Lu and Beamish, 2006; Mathyssens and Pauwels, 1996; Westhead et al., 2004; Zou et al., 1998).

A subjective approach to export performance has frequently been used, especially when export performance is subject to management decisions (Katsikeas et al., 2000). In addition, a variety of performance measures have been proposed and evaluated in the literature on export performance (Durmuşoğlu et al., 2012; Ribau et al., 2017). A common finding in most research is that multiple results are needed to account for the various facets of export performance (Katsikeas et al., 2000; Shoham, 1998; Zou et al., 1998).

Internal innovation capabilities are the basis of SMEs' uniqueness, as these capabilities underpin firms' competitiveness and help them to stand out in the market. Although internal innovation capabilities are important, firms need to not only to be market-oriented but also integrate and utilise market knowledge to thrive in the market (Guan and Ma, 2003; Lisboa et al., 2013; Morgan et al., 2003; Oura et al., 2016). As such, these internal capabilities need to be explored and exploited in the market (Levinthal and March, 1993). Exploitation and exploration are interdependent and complementary, as firms have to find a balanced combination of both factors in order to achieve short-term efficiency and long-term success, as well as superior performance (Floyd and Lane, 2000; Katila and Ahuja, 2002; Lisboa et al., 2013; Lubatkin et al., 2006). As exploitative and exploratory innovation have a positive effect on performance (Lubatkin et al., 2006), firms must combine the experimentation implicit in exploration with the potential for results through exploitation (Lubatkin et al., 2006; Wang and Li, 2008). This is particularly important when supporting SMEs' export teams seeking to increase their firms' international presence in a globalised world in which the competition is extremely intense.

On the one hand, exploitation strategies seek to respond to current environmental conditions by adapting firms' current level of experience and technologies to satisfy the needs and demands of existing customers (Harry and Schroeder, 2000). Firms must incrementally refine their existing technological or marketing trajectories (Nonaka, 1994), which leads to incremental innovation (Hortinha et al., 2011). Exploitation refers to routine behaviours involved in refining firms' current innovation capabilities and improving the performance of existing routines (March, 1991).

On the other hand, exploration strategies seek to respond to latent environmental trends by creating innovative technologies and new markets (Lubatkin et al., 2006). That is, new technological or marketing trajectories are developed (Nonaka, 1994), including innovative behaviours that involve risk-taking and experimenting with unfamiliar new technologies (March, 1991). Exploring new ideas, markets, relationships and technologies brings longer-term rewards, but it has more uncertain outcomes and diffuse effects than the further development of existing capabilities does, since the latter exploits firms' current innovation capabilities (i.e. shorter-term returns) that may appear to be unprofitable (March, 1991). Market exploitation strategies allow firms to seek greater efficiency and short-term success, whereas market exploration strategies enable firms to adapt and review their portfolio of products and competences in their quest for a long-term market perspective (Garcia et al., 2003; Lisboa et al., 2013). As a result, we hypothesised that:

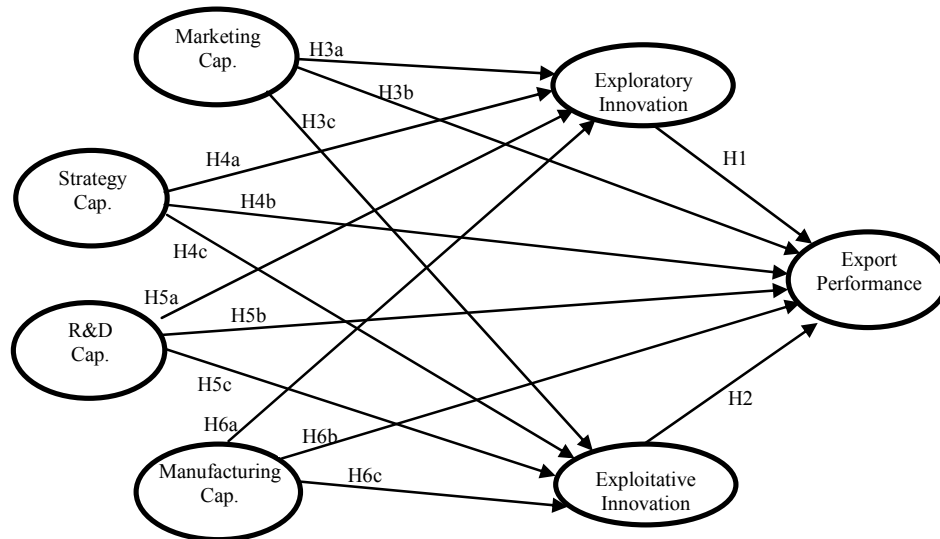
H1: Firms' exploratory capability has a positive impact on their export performance.

H2: Firms' exploitative capability has a positive impact on their export performance.

According to the resource-based view, firms' capabilities are the bedrock of their competitive strategy (Barney, 1991) as these capabilities are valuable, rare and difficult to imitate and substitute. Based on Adler and Shenbar's (1990) approach to innovation capabilities, Guan and Ma (2003) and Oura et al. (2016) proposed dividing innovation capabilities into the following seven dimensions: learning, R&D, manufacturing, marketing, organisational and strategic.

The literature tends to distinguish between core innovation assets (i.e. R&D, manufacturing and marketing capabilities) and supplementary innovation assets (i.e. learning, organisational and strategic capabilities) (Adler and Shenbar, 1990). However, in the present study, manufacturing, marketing, R&D and strategic capabilities were used independently since the objective was to address how a combination of these competences affects exploratory and exploitative innovation and export performance, as can be seen in Figure 1.

Figure 1 Research model



SMEs' marketing activities tend to be more pragmatic, practical and reactive rather than proactive in terms of responding to customers' needs (Carson and Gilmore, 2000). Zou et al. (2003) found a positive relationship between export marketing capabilities and export ventures' financial performance. However, SMEs still rely on traditional marketing strategies because of these firms' reduced financial resources, and SMEs tend to have limited marketing resources, incentive and reward programmes, as well as well-recognised brands (Hayami, 2009; Jasra et al., 2011). Although these factors are essential for the growth of SMEs and their long-term success, a short-term operational perspective is more common, and these firms tend towards a more exploitative orientation.

Although the relationship between marketing and performance is well grounded in empirical research done in the context of domestic markets, the results reported in the international literature are fragmented (Cavusgil and Zou, 1994). Nonetheless, several studies show a positive relationship between marketing and performance in specific dimensions. For example, Berthon et al. (2008) conclude that brand management practices are associated with business performance. Homburg et al. (2010) report that brand awareness significantly drives market performance in firms in business-to-business contexts. Shilke et al. (2009) analysed how market standardisation strategies influence firm performance and conclude that cost leadership strategies are more capable of using standardisation to enhance process improvement and to increase efficiency. Moreover, it is the participation in many global markets that enhance the link between international marketing and firm performance. They also conclude that marketing standardisation has a greater impact on the performance of larger firms, as a result of their resource availability. On a different vein, Kaleka and Morgan (2017) conclude that firms with strong product development capabilities tend to pursue efficiency as differentiated exporters may see efficiency as the preferred strategy as further product differentiation may jeopardise their future. As such, efficiency-seeking strategies based on customised products need flexible and adaptable product development processes. Thus, based on the gap existing in the literature on SME marketing and the definition of marketing capability as the ability to publicise, adapt and sell products while accessing and understanding consumers' current and future needs and competitors' knowledge (Guan and Ma, 2003), we hypothesised that:

H3a: Firms' marketing capability has a positive impact on their exploratory innovation.

H3b: Firms' marketing capability has a positive impact on their export performance.

H3c: Firms' marketing capability has a positive impact on their exploitative innovation.

In many SMEs, strategic planning is often limited (Gilmore et al., 1999; Huang et al., 2002; Orser et al., 2000), resulting in SME owner-managers performing not only the key process of decision making but also a broader set of activities within their firms, such as banking, advertising and human resources management (Berthon et al., 2008). However, a globalised world requires that firms change their strategy in order to adapt to new realities and foreign markets (Kaleka and Morgan, 2017; Shilke et al., 2009). Strategic capabilities do not directly lead to better performance (Hortinha et al., 2011), but they have an important impact on both the exploratory and exploitative innovation activities of SMEs.

In the present study, strategic capabilities were seen as enabling firms to adopt different types of strategies, thereby allowing SMEs to adapt to rapid changes in highly competitive environments (Guan and Ma, 2003). Based on Guan and Ma (2003), Hortinha et al. (2011), Lisboa et al. (2013) and Oura et al. (2016), we hypothesised that:

H4a: Firms' strategic capability has a positive impact on their exploratory innovation.

H4b: Firms' strategic capability has a positive impact on their export performance.

H4c: Firms' strategic capability has a positive impact on their exploitative innovation.

Evidence has been found that indicates R&D, innovation and exportation are mutually reinforcing (e.g. Barrios et al., 2003; Cho and Pucik, 2005; Harris and Li, 2009; Harris and Moffatt, 2011). Moreover, foreign markets may provide grounds for the exploitation

of firms' innovations in order to enhance their performance (Filipescu et al., 2009; Hortinha et al., 2011). Innovative firms have a greater tendency towards entering international markets in order to increase sales and spread these firms' fixed costs over a larger number of markets (Pla-Baber and Alegre, 2007; Zahra et al., 2000). Although SMEs have limited funds for R&D or new product development activities (Jasra et al., 2011), these initiatives can help firms to adopt new technological assets (Guan and Ma, 2003). Based on Guan and Ma (2003), Hortinha et al. (2011), Lisboa et al. (2013) and Oura et al. (2016), our fifth hypothesis was developed as follows:

H5a: Firms' R&D capability has a positive impact on their exploratory innovation.

H5b: Firms' R&D capability has a positive impact on their export performance.

H5c: Firms' R&D capability has a positive impact on their exploitative innovation.

A positive relationship exists between firms' technological innovation and internationalisation, more particularly in exporting activities (e.g. Basile, 2001; Filipescu et al., 2009; Filipescu et al., 2013; López and García, 2005). Investment in technological resources enhances firms' knowledge and learning capabilities, which in turn are critical for firms' ability to develop cost- and differentiation-based international competitive advantages and international expansion (Eriksson et al., 1997; Filatotchev and Piesse, 2009; López and García, 2005;). Despite their limited resources, SMEs investing in new technologies increase their production capacity and efficiency and stimulate the growth of exports. Previous research has found a positive correlation between new technologies and business success (Jasra et al., 2011).

In the present study, manufacturing capability is defined as firms' capacity to transform R&D results into products based on market needs and, thereby, provide economies of scale (Guan and Ma, 2003). Thus, based on Guan and Ma (2003), Hortinha et al. (2011) and Lisboa et al. (2013), we proposed the following hypothesis:

H6a: Firms' manufacturing capability has a positive impact on their exploratory innovation.

H6b: Firms' manufacturing capability has a positive impact on their export performance.

H6c: Firms' manufacturing capability has a positive impact through their exploitative innovation.

3 Methodology

Two important constructs involving exploratory and exploitative innovation were based on Hortinha et al.'s (2011) and Lubatkin et al.'s (2006) research. The set of independent variables of marketing, manufacturing, R&D and strategic capabilities were drawn from Guan and Ma (2003).

The data were collected with a questionnaire consisting of adapted scales validated in previous research, as shown in Appendix A. One of the difficulties of carrying out empirical research involving the analysis of firms' performance is obtaining information disclosed in firms' financial statements, as noted by Guan and Ma (2003). We, therefore, implemented a Likert-type scale in order to circumvent the need to analyse export performance and used three items for objective and subjective indicators based on measures used in previous research (i.e. Aulakh et al., 2000; Kuivalainen et al., 2007; Mathysens and Pauwels, 1996; Zou et al., 1998). Innovation capabilities were measured

with a multidimensional scale developed by Guan and Ma (2003) comprising three items for marketing capability (MKT_Cap), three items for manufacturing capability (Manuf_Cap), three items for R&D capability (R&D_Cap), four items for strategic capability (Strag_Cap), three items for exploratory innovation (Exploratory_Innov) and three items for exploitative innovation (Exploitative_Innov). All constructs were measured based on a five-point Likert scale, ranging from 'totally disagree' to 'totally agree'.

The questionnaire was subjected to a pre-test conducted with a convenience sample of 30 people in order to verify the questionnaire's organisation and formatting, proper wording, the ways respondents understood questions and response time needed, as well as to eliminate errors. As a result of the pre-test, some changes were made in the terminology to facilitate respondents' understanding. Moreover, the number of items per variable was reduced to a minimum to keep the questionnaire to a manageable size.

The questionnaire's final version was made available online via a Google Drive LimeSurvey for four months. Respondents were asked to fill it out through emailed messages and social networks.

The target population of this study consisted of SMEs in the plastic manufacturing industry, constituting a universe of 650 firms based in Portugal. The plastic industry was selected as it is a highly competitive industrial sector involving SMEs, which has been continuously growing by an average of around 9% per year (Plastics, 2010). Moreover, innovation plays a key role in this sector involving strong interactions between SMEs and their customers and end users, with consequences for firms product performance, as new solutions and product adaptations need to be tuned to the firms' marketing and strategic options (CAVIRC, 2016).

The sample was composed of 362 surveyed firms. We excluded 116 non-exporting firms, from our database, as well as incomplete questionnaires. However, only exporting firms with more than 15 workers were analysed, for a total of 165 firms representing 25.4% of the entire industry population of manufacturing SMEs that export. The main reason for setting aside firms with less than 15 workers was that small firms in the plastic industry lack the competences and size to compete in international markets.

The statistical data analysis was carried out using the partial least squares method of structural equation modelling using the SmartPLS 2.0 software. This methodology was justified by its robust results when non-normal data is used and when research is at an early stage of theoretical development, that is, when researchers seek to test and validate an exploratory model (Chin, 1998; Henseler and Chin, 2010).

4 Results

The measurement model was evaluated in terms of reliability, convergent validity and discriminant validity. Table 1 presents the items' loadings and t-values. The t-values were obtained by bootstrapping with 2,000 iterations, indicating that all loadings are statistically significant at the 1% level of significance ($|t\text{-values}| \geq 3.291$). With the exception of the item OSI2, all other items have higher loadings than the minimum recommended threshold of 0.7 (Götz et al., 2010). However, we decided not to eliminate this item because it is quite near the cut-off value and, without it, the export performance scale would be in jeopardy. The results support the reliability of the measurement indicators. Table 2 shows the average variance extracted (AVE), composite reliability (CR) and correlations of each latent variable. The CR values are higher than the recommended minimum of 0.6 (Götz et al., 2010), indicating that all constructs have

adequate internal consistency. Moreover, the AVE of each construct is greater than the expected minimum threshold of 0.5 (Götz et al., 2010), which confirms their convergent validity. Finally, discriminant validity was verified for each construct, as the square root of their AVE is greater than the absolute value of all correlations with other constructs. Furthermore, as shown in Table 1, the cross-loadings are lower than loadings on all the metrics, which reinforces the constructs' discriminant validity (Götz et al., 2010). We dropped items MC3, MKTC3, SC3, RDC3, SC3, SC4, OSI3, and ERYI3 due to the outer loadings being below 0.7.

Table 1 Loadings and cross-loadings

| Scale items | t-values | Loadings (bold) and cross-loadings | | | | | | |
|-------------|----------|------------------------------------|-------------------|--------------|--------------|--------------|--------------|--------------|
| | | Exploitative Innov | Exploratory Innov | Manuf Cap | MKT Cap | Performance | R&D Cap | Strag Cap |
| EryI1 | 4.423 | 0.246 | 0.718 | 0.258 | 0.279 | 0.117 | 0.216 | 0.219 |
| EryI2 | 11.015 | 0.177 | 0.836 | 0.351 | 0.188 | 0.217 | 0.204 | 0.324 |
| EveI1 | 8.119 | 0.718 | 0.164 | 0.244 | 0.125 | 0.313 | 0.104 | 0.287 |
| EveI2 | 9.551 | 0.725 | 0.266 | 0.301 | 0.158 | 0.264 | 0.051 | 0.231 |
| EveI3 | 9.093 | 0.749 | 0.147 | 0.294 | 0.061 | 0.200 | 0.101 | 0.268 |
| MC1 | 10.085 | 0.317 | 0.295 | 0.814 | 0.220 | 0.362 | 0.193 | 0.291 |
| MC2 | 6.912 | 0.283 | 0.330 | 0.759 | 0.112 | 0.255 | 0.062 | 0.262 |
| MKTC1 | 5.494 | 0.149 | 0.255 | 0.152 | 0.830 | 0.131 | 0.462 | 0.149 |
| MKTC2 | 3.855 | 0.098 | 0.200 | 0.191 | 0.743 | 0.153 | 0.313 | 0.084 |
| OSI1 | 9.343 | 0.280 | 0.154 | 0.337 | 0.144 | 0.813 | 0.164 | 0.239 |
| OSI2 | 5.998 | 0.263 | 0.183 | 0.256 | 0.126 | 0.693 | 0.117 | 0.174 |
| RDC1 | 4.894 | 0.093 | 0.176 | 0.197 | 0.399 | 0.171 | 0.763 | 0.027 |
| RDC2 | 4.293 | 0.090 | 0.239 | 0.070 | 0.384 | 0.126 | 0.804 | 0.124 |
| SC1 | 9.797 | 0.270 | 0.226 | 0.235 | 0.066 | 0.220 | 0.024 | 0.766 |
| SC2 | 18.234 | 0.311 | 0.339 | 0.329 | 0.170 | 0.229 | 0.126 | 0.856 |

Table 2 Average variance extracted, composite reliability and correlations among latent variables

| | AVE | CR | Correlations | | | | | | | |
|-----------------------|-------|-------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--|
| | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | |
| 1. Explorative Innov | 0.534 | 0.775 | 0.731 | | | | | | | |
| 2. Exploratory Innov | 0.608 | 0.755 | 0.264 | 0.780 | | | | | | |
| 3. Manuf Cap | 0.619 | 0.765 | 0.381 | 0.395 | 0.787 | | | | | |
| 4. MKT Cap | 0.621 | 0.765 | 0.159 | 0.291 | 0.214 | 0.788 | | | | |
| 5. Export Performance | 0.571 | 0.726 | 0.358 | 0.220 | 0.396 | 0.179 | 0.756 | | | |
| 6. R&D Cap | 0.614 | 0.761 | 0.117 | 0.266 | 0.167 | 0.499 | 0.189 | 0.784 | | |
| 7. Strag Cap | 0.660 | 0.775 | 0.359 | 0.354 | 0.352 | 0.151 | 0.276 | 0.099 | 0.812 | |

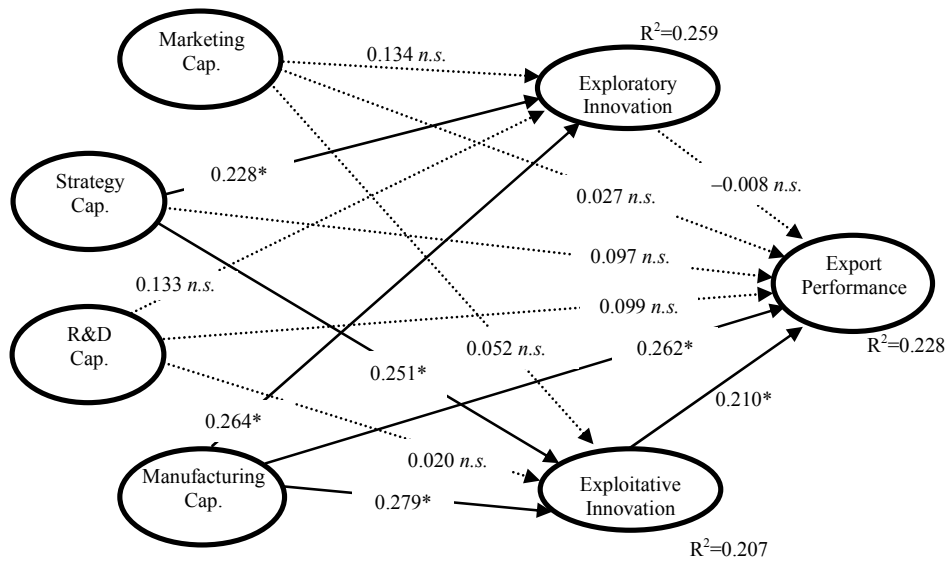
Note: The values of the diagonal (in bold) are the square root of AVE.

The structural model shown in Figure 2 was evaluated, first, by the sign, magnitude and statistical significance of the parameters of structural relations and, second, by the explained variance (R²) of the endogenous latent variables (Götz et al., 2010). The results

reveal that not all structural relationships have parameters compatible with the assumptions made in the research model, with values ranging between -0.008 and 0.279 . Moreover, the relationships of manufacturing capabilities with explorative and exploitative innovation, as well as with export performance, are all significant at the 5% level, which confirms Hypotheses 6a, 6b and 6c. In contrast, the relationships of marketing and R&D capabilities with explorative and exploitative innovation, as well as with export performance, are not statistically significant. The relationships between strategic capabilities and explorative and exploitative innovation are statistically significant at a 5% level, thereby confirming Hypotheses 4a and 4c. Finally, the relationship between exploitative innovation and performance is statistically significant, validating Hypothesis 2, whereas the relationship between exploratory innovation and export performance is not significant, which fails to support Hypothesis 1.

The results also indicate that exploratory innovation explains 25.9% of the variation of manufacturing, marketing, strategic and R&D capabilities. In contrast, these capabilities only explain 20.7% of the variation of exploitative innovation. Finally, 22.8% of the variation of export performance is explained by all its antecedents, among which manufacturing capabilities and exploitative innovation are the most important.

Figure 2 Structural model



Note: * p -value < 0.05 ; n.s. – non-significant.

The results show that, among the direct relationships between capabilities and export performance, manufacturing capabilities are the only ones with a statistically significant impact ($\beta = 0.262$). However, when the direct relationship between capabilities and exploitative innovation is analysed, strategic capabilities ($\beta = 0.251$) and manufacturing capabilities ($\beta = 0.279$) are shown to be statistically significant. This also holds true when analysing the direct relationship between capabilities and exploratory innovation, although less strongly.

Table 3 Direct, indirect and total effects

| | Direct effects | | Indirect effects | | Total effects | | Hypotheses | |
|--------------------------------|----------------|------------------------|------------------|------------------------|---------------|------------------------|------------|-----------|
| | Loadings | T-values (p-values) | Loadings | T-values (p-values) | Loadings | T-values (p-values) | References | Validated |
| Exploitation Innov → Perform | 0.210 | 2.343 (0.019) | | | 0.210 | 2.343 (0.019) | H2 | ✓ |
| Exploratory Innov → Perform | -0.008 | 0.082 (0.935) | | | -0.008 | 0.082 (0.935) | H1 | |
| Manuf Cap → Exploitation Innov | 0.279 | 2.766 (0.006) | | | 0.279 | 2.766 (0.006) | H6c | ✓ |
| Manuf Cap → Exploratory Innov | 0.264 | 2.821 (0.005) | | | 0.264 | 2.821 (0.005) | H6a | ✓ |
| Manuf Cap → Perform | 0.262 | 2.879 (0.004) | 0.056 | 1.459 (0.145) | 0.318 | 3.606 (0.000) | H6b | ✓ |
| MKT Cap → Exploitation Innov | 0.052 | 0.511 (0.609) | | | 0.052 | 0.511 (0.609) | H3c | |
| MKT Cap → Exploratory Innov | 0.134 | 1.395 (0.163) | | | 0.134 | 1.395 (0.163) | H3a | |
| MKT Cap → Perform | 0.027 | 0.277 (0.782) | 0.010 | 0.339 (0.734) | 0.037 | 0.383 (0.701) | H3b | |
| R&D Cap → Exploitation Innov | 0.020 | 0.199 (0.842) | | | 0.020 | 0.199 (0.842) | H5c | |
| R&D Cap → Exploratory Innov | 0.133 | 1.447 (0.148) | | | 0.133 | 1.447 (0.148) | H5a | |
| R&D Cap → Perform | 0.099 | 1.1470 (0.242) | 0.003 | 0.116 (0.907) | 0.103 | 1.193 (0.233) | H5b | |

Marketing and R&D capabilities do not directly influence exploratory and exploitative innovation or export performance, which was an unexpected result. As shown in Table 3, support was found for the conclusion that the indirect effects between manufacturing, marketing, R&D and strategic capabilities are not statistically significant, which might be explained by the statistically non-significant relationship between exploratory innovation and export performance. However, when the total effects are analysed, the situation changes. First, the total effect of manufacturing capabilities on export performance is statistically significant ($\beta = 0.318$) at 0.001, which shows the important mediating effect of exploitative innovation among plastic industry SMEs. Second, the total effect of strategic capabilities on export performance is statistically significant ($\beta = 0.148$) at a level of significance of 10%, which reflects the importance of the mediating effect strategic capabilities have on explorative and exploitative innovation.

Finally, neither marketing capabilities nor R&D capabilities are directly or indirectly statistically significant on their relationship with exploratory and exploitative innovation and export performance. Thus, the total effect of marketing capabilities is the least important of the four types of capabilities analysed ($\beta = 0.037$), as shown in Table 3.

5 Discussion of results and implications

Resources and capabilities have been found to be extremely important for exporters. However, little attention has been paid to the relationship between resources and explorative and exploitative innovation and export performance. Although innovative firms are known to be able to use their capabilities to improve their competitive advantage, this study contributes to the literature on international marketing by addressing how capabilities directly influence export performance and how explorative and exploitative innovation mediates the relationship between capabilities and export performance.

This study was developed based on the premise that internal capabilities are important for the competitiveness of SMEs and exploratory and exploitative innovation has different outcomes among SMEs – although their antecedents and consequences remain rather unclear. An analysis of the present results supports the conclusion that SMEs focus much more on exploitative innovation than on exploratory innovation, which differs from previous research results. For example, March (1991) advocates that entrepreneurial firms have to balance exploration and exploitation innovation. Abidi et al. (2011), in turn, assume that global SMEs start creating knowledge by undertaking more exploitative activities than exploratory ones.

According to Table 3, of the 14 hypotheses, only six were validated. Strategy capabilities impact both exploratory and exploitative innovation, and, as such, they have an indirect effect on the export performance of SMEs. This confirms what Hortinha et al. (2011) report, namely, that strategic capabilities do not directly lead to better performance. Manufacturing capabilities are the only ones with both a direct and indirect positive impact – through exploitative and exploratory innovation – on export performance.

As predicted, our findings demonstrate that manufacturing capabilities have the most important effects, among all the proposed antecedents, on exploratory innovation, exploitative innovation and export performance. In contrast, marketing and R&D capabilities do not influence explorative and exploitative innovation or export performance. The literature proposes that manufacturing and marketing capabilities are often the key to firms' success – with organisational processes built around stability,

efficiency and profitability in order to generate cash-flows (Lawson and Samson, 2001). However, our results show that plastic industry SMEs in Portugal are not oriented towards marketing but instead are much more focused on production processes, seeking to respond to current market conditions in order to adjust firms and their existing technology to the immediate needs of current customers. This reflects a short-term perspective. One possible explanation for this result is that the plastics industry is composed of specialised industrial firms more focused on economies of scale than on new product development skills. Therefore, plastic manufacturing SMEs in Portugal are increasingly dependent on external sources of technical, R&D activities since the generation of new technologies is becoming an increasingly complex process (Bougrain and Haudeville, 2002). These firms also rely on relationships with international clients to circumvent their lack of marketing capabilities.

These results are clearly different to Guan and Ma (2003) and Hortinha et al.'s (2011) findings, which can be explained by the type of industry. Hortinha et al. (2011) studied manufacturing exporters in the AICEP Portugal Global database, while Guan and Ma (2003) analysed the main manufacturing exporters based in Beijing, China. However, our analysis included only manufacturing SMEs from the Portuguese plastic industry, do not providing a multi-sectoral perspective of a wide range of firms that export, as is the case of Guan and Ma (2003) and Hortinha et al. (2011). When the size of the firms involved in these studies is compared, the average size of the firms we sampled is clearly smaller than the average size of the two cited studies.

Innovative firms are able to link their core technology strategies with innovation and business strategies. This alignment generates a powerful mechanism for developing competitive advantages (Lawson and Samson, 2001; Shilke et al., 2009). In our research, significant differences exist between core innovation assets (e.g. R&D, marketing and manufacturing capabilities) and supplementary innovation assets (e.g. strategic capabilities).

This contrasting result could be explained by several factors. The first is the small size of plastic manufacturing firms compared to the size of the firms studied by Guan and Ma (2003) and Hortinha et al. (2011). The second factor, based on our experience, is the history of manufacturing specialisation of plastic manufacturing firms that tend to focus their activities on process improvements in order to reduce costs. Third, the typical supplier-customer relationship of plastic manufacturers within supply chains is restricted by large multinational firms as suppliers and customers, which compels plastic producers to be extremely focused on activities that enhance manufacturing competence, in which product adaptation plays an important role, particularly when we are dealing with industrial SMEs competing in international context.

Contrary to our predictions and the extant literature, marketing and R&D capabilities do not significantly impact either export performance or exploitative and explorative innovation. It appears that the plastic industry also has to focus on R&D and marketing and even more on strategy in order to thrive in international markets.

One possible explanation for those differences might be the fact that, as SMEs of the plastic industry need to adapt their products to their international clients and to end customers, they face a huge challenge in pursuing cost leadership strategies, and thus adopt standard marketing practices across international markets to improve performance. However, some firms may need to deploy their product development capabilities to customise their products to their international markets, following a clear differentiation strategy and exploring their innovation capabilities. As such, taking into account the

strong competitive market structure, SMEs need to differentiate their offerings when exporting in order to remain competitive. However, based on their manufacturing capabilities, they try not to weaken their standardisation strategy and, at the same time, they try not to weaken their product adaptation strategy as their offerings need to be adapted across different markets. Under these circumstances, as referred by Shilke et al. (2009) and Kaleka and Morgan (2017), they try to follow a non-standardised marketing approach to take advantage of their manufacturing capabilities and to maintain the integrity of the differentiation strategy.

An analysis of the plastic industry reveals that, in upstream and downstream relationships in value chains, large multinational firms affect the competences and capabilities of plastic manufacturing SMEs. This includes their relationships with: (a) raw-materials suppliers – affecting, for example, new product development; (b) capital equipment manufacturers – affecting technological innovation and process improvement innovations and (c) customers – normally large original equipment manufacturers or distributors that constrain the development of new products. As such, external relationships, including both upstream and downstream activities in supply chains, give the plastic industry a continual capacity for learning and innovation focused on products, based on economies of scale and a cumulative capacity for progress and commercialisation, as noted by Cesaroni et al. (2004) and Montobbio (2004).

For SMEs, the lack of expertise, specialisation, R&D resources and internal innovation capabilities has been seen as the main barrier to innovation. The present study's results suggest that SME managers need to coordinate daily mainstream operations while also cultivating innovation and change within their firms, that is, their ability to pursue both types of innovation (i.e. exploration and exploitation) simultaneously. As such, in their quest for competitiveness in international markets, plastic manufacturing firms have to embark on a journey that prioritises exploitative innovation, allowing exportation to current markets through efficiency and short-term success, as opposed to exploratory innovation that may result in portfolio renewal and long-term survival. As referred above, this is the result of a compromise SMEs face trying to use their resources efficiently but trying to explore new markets.

6 Conclusions, limitations and future research

SMEs currently have to use a variety of innovation capabilities, deploying innovation not just as a way to use scarce resources to achieve uncertain outcomes but rather as a mechanism for creating new products and technologies tuned to new markets in order to sustain these firms' competitive advantage. This paper describes a proposed model relating six internal innovation capabilities (i.e. marketing capabilities, strategy, R&D, manufacturing and exploratory and exploitative innovation) to export performance. This study fills a gap in the literature on how internal innovation capabilities of SMEs influence export performance and what role exploratory and exploitative innovation plays in this relationship.

We found an essentially positive relationship between manufacturing capability, exploitative innovation and export performance, thereby confirming six hypotheses. However, contrary to our predictions, we found no relationship between marketing, R&D, strategy and exploratory innovation and export performance. Strategic capabilities have an indirect impact on export performance through exploitative innovation.

Dissimilar to research reported in the literature in which both exploitative and exploratory innovation has a positive effect on firms' performance, the present study found that only exploitative innovation has a positive impact.

Evidently, marketing and R&D activities are not as relevant as manufacturing activities among SMEs of the plastic industry, which are able to operate successfully in foreign markets by expanding current products and defending existing markets and technology through exploitative innovation, such as new operational roles. However, in order to balance the importance of both exploitative and exploratory innovation activities so that firms are able to sustain their competitive advantages, plastic industry firms in Portugal need to develop a more long-term perspective as a way to fine tune their R&D and marketing capabilities. This will enable them to explore innovation so that they can develop new products and diversify their technologies to stimulate a greater capacity to compete in international markets.

Previous research has found that explorative and exploitative innovation has an important role in the success and even in the survival of firms (e.g. Gupta et al., 2006; Jansen et al., 2006; Lawson and Samson, 2001; Rosenbusch et al., 2011). The present study's findings complement other research focused on innovation capabilities and provide support for viewing exploitative innovation as a mediating variable between capabilities and export performance.

These results also have managerial implications in terms of how exploitative innovation can positively affect SMEs' export performance. More specifically, the present findings suggest that manufacturing SMEs of the plastic industry can increase their export performance by pursuing exploitative innovation in existing products, markets and technologies despite studies in the literature that support the view that both exploitative and exploratory innovation capabilities have a positive effect on performance. In addition, although strategic capabilities positively influence exploratory and exploitative innovation, they do not directly support export performance as previously predicted. Taking into account the different roles identified for exploratory and exploitative innovation, plastic manufacturers appear to be more reactive than proactive in their new product development processes and quest for technology, as well as when seeking to identify new technological trends.

To understand fully the relationships between the aforementioned six internal innovation capabilities, future research needs to examine whether these capabilities vary across industries, including a comparative study with several manufacturing firms at the international level to generalise the present findings further. This would provide a fuller picture of innovation within SMEs and develop a better understanding of core and supplementary innovation capabilities and the ways they underpin export performance among SMEs.

Future research could also consider the diversification of export performance scales, as well as their adaptation to new industrial sectors. By extending the present study to other industrial sectors and including a comparison between large and small firms, researchers can discover whether the focus on exploitation innovation activities identified in the present study is restricted to the plastics industry or common to other industrial sectors – or whether this focus is more common among SMEs or it also involves large firms. Moreover, introducing product standardisation/adaptation metrics, as well as cost leadership/differentiation metrics would be important for not only cross industry comparisons, but also to realise how SMEs and large firms differ when exploring/exploiting their innovation capabilities.

Although the present research provides new insights into exploratory and exploitative innovation antecedents and consequences, it has not addressed how SMEs' administrators manage and coordinate exploratory and exploitative innovation. It would therefore be useful to conduct further in-depth studies to understand better how these processes happen and how they affect export performance.

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Appendix A: Scales items

| <i>Constructs</i> | <i>Variables and Items</i> | <i>Adapted from</i> | |
|--------------------|---|--|---------------------------|
| Export Performance | <p>Objective and subjective indicators on export performance (financial – objective - and strategic export performance - subjective)</p> <p>Five-point Likert scale: 1 = ‘totally disagree’ and 5 = ‘totally agree’</p> <p>(OSI1) Exporting has contributed to the sales growth of our firm</p> <p>(OSI2) Our export activity has strengthened our strategic position</p> <p>(OSI3) The export venture has achieved rapid growth</p> | <p>Kuivalainen et al. (2007), Mathysens and Pauwels (1996), Aulakh et al. (2000) and Zou et al. (1998)</p> | |
| | <p>Five-point Likert scale: 1 = ‘totally disagree’ and 5 = ‘totally agree’</p> <p>R&D capability</p> <p>(RDC1) Choosing special personnel or building organisation to collect various innovation ideas</p> <p>(RDC2) Facilitating communication among R&D personals</p> <p>(RDC3) Communication between R&D department and marketing department</p> <p>Manufacturing capability</p> <p>(MC1) Production regulations and system</p> <p>(MC2) Total quality management</p> <p>(MC3) Technological level of manufacturing equipment</p> <p>Marketing capability</p> <p>(MKTC1) Controlling and managing distribution network</p> <p>(MKTC2) After service and technological assistance</p> <p>(MKTC3) Long-term customer relationship for understanding diverse customer requirements</p> <p>Strategic capability</p> <p>(SC1) Support from top management</p> <p>(SC2) Connection between technological strategy and business strategy</p> <p>(SC3) Advanced decision system</p> <p>(SC4) Adjusting innovation strategy accordingly</p> | | <p>Guan and Ma (2003)</p> |
| | <p>Innovation capabilities</p> | | |
| | | | |

Appendix A: Scales items (continued)

| <i>Constructs</i> | <i>Variables and Items</i> | <i>Adapted from</i> |
|---|--|--|
| Exploratory and Exploitative Innovation | Exploratory innovation | |
| | (EryI1) We look for novel technological ideas by thinking 'outside the box' | |
| | (EryI2) We create products or services that are innovative to the firm | |
| | (EryI3) We base our success on our ability to explore new technologies | Hortinha et al. (2011) and Lubatkin et al. (2006) |
| | Exploitative innovation | |
| | (EveI1) We commit to improve quality and lower cost | |
| | (EveI2) We continuously improve the reliability of our products and services | |
| | (EveI3) We fine-tune what we offer to keep our current customers satisfied | |