# Product innovation capability, export scope and export experience

## Quadratic and moderating effects in firms from developing countries

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## Abstract

**Purpose** – By applying the logic of the resource-based view and process-based internationalisation theory, this study aims to provide a better understanding of the effects of product innovation capability on the export scope of firms based in developing countries and the role of export experience as a facilitating mechanism.

**Design/methodology/approach** – Using survey data obtained from three developing countries, two main research hypotheses were empirically tested: a quadratic relationship exists between product innovation capability and export scope and export experience has a moderating effect in this relationship.

**Findings** – Product innovation capability and export scope have a U-shaped relationship, and export experience exerts a moderating effect. The greater the export experience is, the more the relationship between product innovation and export scope changes, taking on a more inverted U-shaped form.

**Practical implications** – Firms based in developing countries need to catch-up on innovation capabilities before being able to succeed in international markets. Managers must be aware that initial investments in product innovation could not pay off immediately and that significant additional efforts might be needed to obtain noteworthy results in terms of international expansion.

**Originality/value** – This study is among the first to focus on the curvilinear relationship between product innovation capability and export scope for firms based in developing countries while accounting for the moderating role of firms' export experience.

**Keywords** Developing countries, Export experience, Export scope, Product innovation capability

**Paper type** Research paper

# 1. Introduction

The debate over the relationship between innovation and internationalisation resembles the classic chicken-and-egg dilemma. Findings about "what causes what" are rich and mixed in both the economic (Filippetti *et al.*, 2011) and managerial (Kafouros *et al.*, 2008; Golovko and Valentini, 2011) literature studies. Valid argumentations can be found for supporting both the view that by innovating, firms develop some sort of competitive advantage that they can then exploit in foreign markets (Pla-Barber and Alegre, 2007) and the opposite view that by exporting in multiple markets, firms learn how to improve their products and processes (Love and Roper, 2015). Current research runs more in favour of the impact of the outcome of the innovation process, especially in terms of product innovation performance on export (Kafouros *et al.*, 2008), and there are numerous studies that confirm the solidity of such relationship (Basile, 2001; Cassiman *et al.*, 2010; Lewandowska *et al.*, 2016).

While most previous studies focus on mature economies, a limited number of studies consider developing countries as a test-bank (Guan and Ma, 2003; Ren *et al.*, 2015). In general, the academic literature seems to hold an outdated view of the innovation occurring in developing countries. In this view, only a handful of large multinationals (like Huawei, Cemex and Tata Motors, to mention a few) can compete with firms in more developed countries based on their innovation and technological capabilities (Contractor *et al.*, 2003; Kumar *et al.*, 2013), while the remaining firms simply act as copycat innovators of products conceived in more technologically advanced markets (Agnihotri, 2015; Ernst *et al.*, 2015). However, practitioner-oriented literature (*The Economist*, 2010; Markides, 2012) tells a different story in which firms based in developing countries – of any size and sector – increasingly play leading roles in the global innovation arena (Amal *et al.*, 2013; Belderbos *et al.*, 2013) even if the path ahead towards global competitiveness is still long for the great majority of them.

Indeed, firms based in developing countries are in a peculiar situation because they have engaged in limited activity in technological innovation and international markets in recent decades. For example, firms from former communist countries, which are the object of this research, have not been previously active owing to political isolation and limited economic integration with the communist and capitalist economies of the neighbouring countries (Frieden, 2006; Dyker and Vejvoda, 2014; Hobsbawm, 1994). Although after the fall of the Berlin Wall, development occurred quite rapidly in many of such countries, political and economic gaps towards the neighbouring regions still persist (Buck *et al.*, 2000; Radas and Božić, 2009). Unfortunately, empirical research on firms based in a similar (i.e. former communist) context is pretty scarce (Bitzenis, 2004; Gelbuda *et al.*, 2008; Lewandowska *et al.*, 2016). A second gap in the literature is related to the scarcity of knowledge about the capabilities and the mechanisms that provide support to the active internationalisation process of such firms. To the best of our knowledge, among the very few studies on this subject, the work of Lyles *et al.* (2004), which shows that rapid internationalisation can have a negative effect on Central and Eastern European (CEE) firms' likelihood of survival, remains quite isolated.

This paper is aimed at contributing to closing those gaps by combining two theoretical perspectives: the resource-based view of firms (Barney, 1991) and process-based internationalisation theory (Johanson and Vahlne, 1977). Our aim is to better understand *if* and *under which conditions* firms' product innovation capability supports the international expansion of firms based in developing countries and, in particular, in three post-communist countries.

In this study, we challenge the prevailing assumption that connects innovation to a firm's internationalisation in a linear way (Cassiman and Golovko, 2011; Lages *et al.*, 2009;

Uner *et al.*, 2013), and posit that, in the context of developing countries, firms may benefit just marginally in terms of internationalisation from low or moderate levels of product innovation capability, while firms having high product innovation capability will easily expand internationally.

The logic behind our argumentation is that firms based in developing countries suffer from an initial innovation handicap. Thus, they will need first to make some investments to fill the gap and to reach a level of competitive parity with more capable innovative international competitors. Only after that, these firms would be able to fully exploit their product innovation potential to expand internationally. As a consequence, we expect the relationship between product innovation capability and internationalisation to be non-linear and U-shaped.

Further, we posit that this relationship is moderated by a third factor that remains at the very core of the process-based theory of firm internationalisation: (accumulated) export experience. While we recognise that the internationalisation of firms is gradual and depends on the accumulation of prior export experience (Johanson and Vahlne, 1977, 1990), we are also aware that many firms based in developing countries have just recently begun to accumulate export experience. What we can realistically expect is that, for these firms, export experience will be more an auxiliary driver than the main driving force of their internationalisation process. In particular, we theorise that innovative firms that have more export experience will be more effective in exploiting internationally their product innovation potential.

The rest of the paper is organised as follows. First, we discuss the current literature that supports the development of the research hypotheses in Section 2. In Section 3, the research methodology is explained, and the results are presented. Section 4 discusses the contributions of the paper to the current theoretical debate, while Section 5 offers the conclusions, managerial implications and limitations of the study.

## 2. Hypotheses development
### 2.1. Product innovation capability as a driver of internationalisation
Product innovation capability refers to the firm's capacity of developing and adapting new products able to satisfy market needs (Adler and Shenbar, 1990). It has been frequently used as a proxy variable for the degree of a firm's overall innovativeness (Boso *et al.*, 2013). Whereas the relationship between a product innovation and internationalisation is one of the most studied and controversial topics in the process-based internationalisation literature (Cassiman and Golovko, 2011; Chiva *et al.*, 2014; Pugliese *et al.*, 2016), scant attention has been devoted to the relationship between product innovation capability and international performance (Chen *et al.*, 2016). Despite conflicting results from empirical studies carried out so far, the prevailing opinion among scholars is that product innovativeness positively affects the ability of a firm to expand abroad (Guan and Ma, 2003; Pla-Barber and Alegre, 2007).

Furthermore, product innovation capability represents a socially complex and imperfectly imitable organisational capability that generates competitive advantage and better performance (Tsai and Yang, 2013). In this way, and in line with the resource-based view (RBV) perspective, the ability to combine resources into innovative products can help firms in market expansion through gaining the advantages into new markets (Kozlenkova *et al.*, 2014, Lages *et al.*, 2009).

What remains unclear is whether the firm's specific location exerts an influence on this relationship. Indeed, the great majority of studies suffer from a common perspective bias: they were conceived and carried out almost exclusively in developed economies

(Kumar *et al.*, 2013; Boso *et al.*, 2013). However, for innovation and competition, context matters. In particular, the specific, internal conditions that characterise former-communist contexts challenge even the most well-established managerial preconceptions of innovation (Prahalad, 2012; Ernst *et al.*, 2015), internationalisation (Khanna *et al.*, 2005) and marketing (Sheth, 2011). For instance, Damijan *et al.* (2010), in their empirical work based on Slovenian firms, found no evidence that product innovation outcomes increased the likelihood to accelerate their foreign market entries. Likewise, Özçelik and Taymaz, (2004) found similar results for Turkish firms, where product innovativeness was not significant in explaining their export propensity. On the contrary, Estrada and Heijs (2006) found that product innovation strategy had a negative effect on Mexican firms' export propensity.

These empirical results point out how firms internationalising from developing regions have to face additional challenges in comparison to firms based in more developed ones (Cirera *et al.*, 2015). Indeed, internationalisation is a process based on prior accumulation or resources, market knowledge and international experience in particular (Johanson and Vahlne, 1977), resources that firms based in developing regions frequently miss. This is especially true for firms based in the regions, like the ones included in our study, that have remained at the margins of international trade for several decades and that had go through transitional process (i.e. going from planned to market-driven economy).

In general, firms based in developing countries tend to suffer from a resource and capabilities gap compared with their counterparts based in developed countries (Ren *et al.*, 2010). That gap makes such firms initially less competitive in international markets. However, as long as they fill this gap, by developing new skills and capabilities, they could become the most dangerous "enemies" for established incumbents based in mature markets (Christensen, 1997; Markides, 2012).

Consequences for the innovation–internationalisation theory could be intriguing. Previous studies have frequently assumed that a linear relationship links innovation with internationalisation and thus that at an increase to the first will correspond a proportional increase to the second (Wakelin, 1998; Guan and Ma, 2003; Ruzzier *et al.*, 2006). Or, at best, innovation and technology can modify the speed of the international expansion process (Ramos *et al.*, 2011).

However, we have reasons to expect that the behaviour of firms based in developing countries will be different. In particular, we expect that at low levels of product innovativeness, firms based in developing countries could benefit more in terms of international expansion than firms based in more developed markets (Cirera *et al.*, 2015). For example, firms could expand in other developing markets or, if pulled by international buyers (Balboni *et al.*, 2014), also in more developed countries, even if in the niche of cheap and technologically poor products. The competitive position of such firms is anything but strong and could be jeopardised at any time by cheaper competitors. Firms that start investing in the development of their resources and capabilities are, in our opinion, in the most critical position for expanding abroad. Indeed, such firms will need time to learn what more sophisticated foreign customers might want (beyond cheapness) and to adapt their products and their technologies accordingly. This parallel process of market knowledge acquisition and technology development could be long and initially unfruitful. However, by doing so, firms will start closing the innovation gap that separates them from more innovative competitors. When the gap will be narrowed enough, the "disruptive" power of these firms will start producing its effects. Indeed, such firms will be able to offer good enough products at prices barely reachable by competitors based in more developed countries and will be able to significantly expand internationally.

This process is already evident in the white good sector, where the Turkish brand Beko has been able to scale up market positions in the European markets and is now expanding towards North America (Euromonitor, 2015). The same is not happening in the car industry, where cars produced in developing countries are still perceived as not innovative and not reliable enough by Western consumers (The Economist, 2012).

Thus, in this study, we posit that product innovation capability has a non-linear effect on the export scope of firms based in developing countries. Here, export scope refers to an aspect of export activity related to the number of foreign markets in which an exporting firm is present (Cavusgil, Zou and Naidu, 1993; Qian and Delios, 2008). Export scope is not merely a measure of the geographical dispersion of a firm's international sales. It is also a variable that allows capturing the process of international knowledge accumulation. Indeed, by serving multiple markets with intrinsic diversities embedded in – for instance, their institutional conditions, demand structure and distribution channels – firms accumulate relevant knowledge that can be usefully applied to develop products that better meet the specific needs and wants of globally scattered customers (Hultman *et al.*, 2011).

In particular, based on previous argumentations, we posit that a U-shaped relationship exists between product innovativeness and export scope, and therefore, we formulate our first hypothesis as follows:

*H1.* There is a U-shaped relationship between product innovation capability and export scope in firms based in developing countries.

## 2.2. Moderating effect of the export experience

Since the Uppsala model (Johanson and Vahlne, 1977, 1990) was brought to the attention of the international business scholars' community, accumulated knowledge (also expressed as international experience) has played a primary role in explanations of the internationalisation paths of both small and large firms (Eriksson *et al.*, 1997). However, the Uppsala model was conceived in a world characterised by completely different market and competitive dynamics. In relation to market dynamics, the model was designed around the typical internationalisation path of a firm based in a developed country, which typically internationalises, at least initially, towards other similar developed countries. This assumption has already been challenged by the literature on born-global firms, which claims that, in today's highly globalised scenario, firms based in both developed and developing countries are likely to internationalise quickly in multiple markets, no matter what the physical distance (Moen, 2002; Lyles *et al.*, 2004).

Regarding competitive dynamics, the Uppsala model does not take into account that firms increasingly compete in hyper-competitive environments today (Cadogan *et al.*, 2003). In these environments, firms' innovativeness lies at the very foundation of their survival chances and is, without a doubt, a key prerequisite of attempts to expand into new markets (Lages *et al.*, 2009).

In this context, we should consider that most firms from developing countries do not have extensive export experience to apply in their expansion attempts. Therefore, we cannot expect that these firms can only (or chiefly) leverage their accumulated export experience to expand abroad. It is more reasonable to expect that a firm's export experience provides some support to another driving force of the internationalisation process. If seen under this perspective, export experience represents an intangible resource for the firm (Fang *et al.*, 2011) that should enable new expansion paths and improve on-going ones. In our study, we hypothesise that export experience plays a moderating role in connecting the firm's product

innovation capability to its international expansion process. In other words, we claim export experience to act as a moderator for the quadratic effect of product innovativeness on export scope. Consequently, we expect that higher international experience enables a firm's product innovation to effectively enlarge its export scope. Starting from such premises, we formulate our second hypothesis as follows:

*H2.* Export experience negatively moderates the U-shaped relationship between product innovation capabilities and export scope in firms based in developing countries.

## 3. Methodology
### 3.1 Data collection and measures
To empirically test theory-driven hypotheses, we conducted a quantitative study, using a survey as a tool. Survey data were collected from active, anonymous small- and medium-sized exporters (SMEs) based in three developing countries: Bosnia-Herzegovina, Serbia and Slovenia. Despite internal economic differences, Bosnia-Herzegovina, Serbia and Slovenia share some important features. First, all these countries have been characterised from a rapid economic upsurge in terms of GPD starting from the earlier 2000 (i.e. the post-war renaissance). After 2007, the three economies entered a swinging period, characterised by GDP fluctuation, till the recent positive downturn in 2015. Second, these countries also share similar foreign trade dynamics, and they are heavily dependent on exports to generate wealth.

In all countries, surveys were administrated in the same manner by a team of researchers, with pre-defined definitions and research goals. The definition of the European Commission (2005) was used as a starting point for classifying firms by size. It classifies firms that employ fewer than 10 persons as micro, firms employing fewer than 50 persons as small and firms employing fewer than 250 persons as medium. Publicly available databases of active exporters in each studied country were used as a sampling frame (Slovenia: Import Export Directory; Serbia: Agency for Foreign Investments and Export Promotion; Bosnia-Herzegovina: national firm registries of firms – AFIP and APIF). Random samples (500 firms from each country) were extracted from registers of exports in every country. In accordance to export literature (Obadia and Vida, 2011), the study relied on single respondents and therefore, a survey was e-mailed to the key export decision-makers identified at each selected firm.

Sample size and response rate were determined after excluding survey responses, in which more than 10 per cent of the values were missing or respondents did not satisfy the active exporter criterion (at least 10 per cent of their total revenues is from export activities). The final sample consisted of 164 exporting firms: 79 from Bosnia-Herzegovina (48 per cent of the sample), 39 from Serbia (24 per cent) and 46 from Slovenia (28 per cent). The response rates for the surveyed firms in all three countries are comparable to those reported in other export surveys (Mysen, 2013). Our respondents' firms came from variety of industries, such as wood and wood products (1 per cent in Slovenia, 12 per cent in Bosnia and Herzegovina), information and communication technology (20 per cent in Bosnia-Herzegovina, 44 per cent in Serbia), construction (3 per cent in Serbia, 11 per cent in Slovenia) and professional services (7 per cent in Serbia, 11 per cent in Bosnia and Herzegovina). The average number of employees in the responding firms by country ranged from a minimum of 29.1 (Bosnia-Herzegovina) to a maximum of 71.8 (Serbia). The average number of years of firms' export experience was 7.2 (Serbia), 9.7 (Bosnia-Herzegovina) and 13.2 (Slovenia), confirming

the assumption about the limited export experience of firms based in this region. Further information about the sampled firms is shown in Table I.

After the data were obtained, we assessed non-response following the approach proposed by Mentzer *et al.*, (2001). We compared the applicable demographics of the responding firms in each country with the remaining non-responding firms listed in the sampling framework database of that particular country. No significant differences were found. We also compared the study constructs of the early and late respondents and found no significant differences (Armstrong and Overton, 1987). Therefore, we believe that non-response bias does not influence the study findings.

The same measurement instrument was used in all countries. Product innovation capability was assessed using the three-item scale adapted from Škerlavaj *et al.*, (2010) and Wang and Ahmed (2004). This scale reflects firms' ability to design, develop and effectively deliver new products/services. Differently from product innovation intensity's measurements, focused on the number of new products (or services), this measurement is not affected by the breadth of firms' product (or service) portfolio that can vary substantially among developing market SMEs. Export scope was estimated based on a single item measuring the number of different geographical markets served. Export experience was also measured with single item indicating the number of years a firm has been involved in exporting activities (Diamantopoulos and Winklhofer, 1999).

### 3.2 Measurement assessment and invariance
Confirmatory factor analysis (CFA) with maximum likelihood estimation were used to examine the measurement model in all three samples. To do so, LISREL version 8.7 software was used, and all items were entered into a single CFA model (using the correlation matrix as an input) for each country. The results are reported in Table II. By inspecting the fit indices that are relatively less sensitive to sample size, it can be seen that fit heuristic are within the cut-off ranges (Bagozzi and Yi, 2012) taking into account the sample size used. Next, an assessment of measurement invariance was conducted to prove the transferability of the measurement model and to establish its generalisability. A hierarchical test for configural measurement variance and metric invariance was conducted (Steenkamp and Baumgartner, 1998).

As testing invariance across three groups would require a much larger sample for every group, compared to ones available in this study, we created two groups of countries that "share a similar cultural and economic background", in line with prior international research (Hohenberg and Homburg, 2015; Tellis *et al.*, 2009, p. 18). Group 1 consisted of

| Firmographics | B&H (%) | Slovenia (%) | Serbia (%) | Merged sample (%) |
|---|---|---|---|---|
| *Export* | | | | |
| Export sales (% of total sales) | 30.18 | 37.92 | 40.81 | 36.30 |
| Export experience (average years) | 9.70 | 13.20 | 7.20 | 10.03 |
| *Innovativeness* | | | | |
| HighTech (high-tech, medium/high-tech) | 60.55 | 88.89 | 65.71 | 71.38 |
| LowTech (low-tech, medium/low-tech) | 39.45 | 11.11 | 34.29 | 28.62 |
| *Industry sector* | | | | |
| Secondary | 42.20 | 11.96 | 39.44 | 31.25 |
| Tertiary | 57.80 | 88.04 | 60.56 | 68.75 |

**Table I.**
Firmographics of the sample

| Product innovation capability | BH | | SLO | | SRB | | Merged sample | |
|---|---|---|---|---|---|---|---|---|
| | $\lambda$ | t-value | $\lambda$ | t-value | $\lambda$ | t-value | $\lambda$ | t-value |
| We constantly emphasize development of particular products and services. | 0.697 | 4.49 | 0.883 | 4.16 | 0.661 | 2.58 | 0.881 | 7.60 |
| We continuously modify design of our products and services and rapidly enter new markets. | 0.526 | 3.81 | 0.960 | 10.73 | 0.500 | 2.30 | 0.599 | 9.60 |
| Our firm manages to deliver special products/services flexibly according to customers' orders. | 0.989 | Fixed | 0.970 | Fixed | 0.913 | Fixed | 0.859 | Fixed |
| Composite reliability (CR) | 0.80 | | 0.96 | | 0.74 | | 0.83 | |
| Average variance extracted (AVE) | 0.58 | | 0.88 | | 0.51 | | 0.62 | |
| Cronbach's alpha ($\alpha$) | 0.84 | | 0.96 | | 0.75 | | 0.81 | |
| $\chi^2$/df | 1.53 | | 0.48 | | 0.17 | | 1.50 | |
| Tucker–Lewis index (TLI) | 0.95 | | 0.99 | | 0.99 | | 0.96 | |
| Incremental fit index (IFI) | 0.98 | | 0.99 | | 0.99 | | 0.98 | |
| Comparative fit index (CFI) | 0.98 | | 0.99 | | 0.99 | | 0.97 | |
| Standardized root mean square residual (SRMR) | 0.03 | | 0.01 | | 0.02 | | 0.04 | |

**Table II.**
CFA results

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Bosnia-Herzegovina and Serbia (non-European Union [EU] countries that share a joint history), while Group 2 consisted of Slovenia, an EU country with its own language different than that spoken in the countries in Group 1. After obtaining a good model fit that shows that configural invariance is achieved, results of multi-group confirmatory factor analysis reveal that additional restrictions in measurement models did not influence the change in CFI. Change in CFI was less than 0.01 which is a recommended threshold as per Cheung and Rensvold (2002). This confirms, the presence of configural and metric invariance across groups, indicating that the items were equally reliable across all samples and that these measures could be used for hypotheses testing. Thus, we merged the data sets and performed the final CFA on a single merged data set (see the last column in Table II). Fit indices for the merged sample correspond to the suggested cut-off ranges (Bagozzi and Yi, 2012): $\chi^2 = 34.50$; df = 23; RMSEA = 0.05; NNFI = 0.96; CFI = 0.97; GFI = 0.95; and SRMR = 0.04.

To evaluate the reliability of the constructs, we assessed both convergent and discriminant validity. The factor loadings were high and significant, in all of the three countries and in the merged sample, and satisfied criteria for convergent validity. The average variance extracted (AVE) values were higher than the recommended 0.5 threshold (Fornell and Larcker, 1981), supporting the convergent validity of the examined constructs (Table III). The composite reliability (CR) values surpassed the critical threshold of 0.60 (Bagozzi and Yi, 1988). To examine discriminant validity, we compared the AVE scores with the shared variances (i.e. the square of all the construct correlations), as shown in Table III (Fornell and Larcker, 1981). All the AVE estimates were greater than the shared variance estimates, implying that discriminant validity was achieved.

Although data were collected in different countries, for statistical control of common method variance, a Harman one-factor test was applied to the merged data. All the study items were constrained to load on a single factor in CFA (Podsakoff et al., 2012). The fit statistics of the single factor model was much worse than those of the CFA ($\chi^2 = 379.249$; df = 44; RMSEA = 0.24; NNFI = 0.36; CFI = 0.48; SRMR = 0.20, GFI = 0.67).

## 4. Results and discussion

The hypotheses were tested in SPSS 22 using hierarchical multiple regression analysis to estimate three nested models. In Model 1, controls (country, group membership and industry) and linear effects (product innovation, export experience) were estimated for their influence on the export scope. A quadratic effect (product innovation capability squared) and a lower-order interaction term (a product between the export experience and product innovation capability) were added in Model 2, and a higher-order interaction term (a product between the export experience and product innovation capability squared) are added in

| | BH | | | SRB | | | SLO | | | MERGED SAMPLE | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| # Construct | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 |
| 1 Product innovation capability | *0.58* | 0.00 | 0.03 | *0.88* | 0.02 | 0.19 | *0.51* | 0.01 | 0.01 | *0.62* | 0.03 | 0.01 |
| 2 Export experience | −0.02 | N/a | 0.01 | 0.13 | N/a | 0.00 | 0.07 | N/a | 0.23 | 0.17** | N/a | 0.24 |
| 3 Export scope | 0.17 | −0.10 | N/a | 0.43** | 0.04 | N/a | 0.10 | 0.48** | N/a | 0.49** | 0.10 | N/a |

**Table III.**
Correlation matrix and discriminant validity

**Notes:** **$p < 0.05$; AVE is on the diagonal; correlation coefficients are below the diagonal; squared correlations coefficients are above the diagonal

Model 3. To test the hypotheses, traditional product term analysis was used. Therefore, following Ping's (1995, 1996) approach, product terms were created from the aggregated scores and entered into the regression equation. All of the product terms were orthogonalised because the presence of product terms may cause issues associated with multicollinearity in model testing (Little *et al.*, 2006).

As shown in Table IV, moving from Model 1 to Model 3, we could observe changes in the $R^2$ value as new variables were added. Thus, we found that Model 3 (the higher-order nested model) explained the largest percentage of the variance (based on the $R^2$ value). Therefore, we relied on Model 3 to interpret our hypotheses.

In *H1*, we theorised the existence of a quadratic relationship between product innovation capability and export scope. The findings reported in Table IV provide full confirmation of *H1* (B = 0.117; $t$ = 2.891), thus supporting our view that firms based in developing markets could not benefit immediately (and proportionally) in terms of international market expansion from additional efforts made in product innovation. On the contrary, results support our theory that returns will come only after the initial gap has been filled. The managerial consequences of such results are not negligible and will be duly discussed in the Section 5.

In *H2*, we speculated that export experience moderates a quadratic relationship between product innovation capability and export scope. Again, the findings obtained from the statistical analysis fully align with *H2* (B = −0.231; $t$ = −1.900). These findings support the view that the linkage between developing market firms' innovation capabilities and international expansion process is not straightforward. Indeed, firms can achieve satisfactory levels of internationalisation by either reducing their innovation efforts to the minimum (for example, by competing on production costs or by offering no-frills solutions) or by investing significantly – and not merely opportunistically – in innovation. In-between strategies do not seem to pay off.

| | Model 1 | | Model 2 | | Model 3 | |
|---|---|---|---|---|---|---|
| | Estimate | $t$-value | Estimate | $t$-value | Estimate | $t$-value |
| *Controls* | | | | | | |
| Country  Export scope | 0.038[NS] | 1.244 | 0.033[NS] | 1.071 | 0.037[NS] | 1.217 |
| Group membership → Export scope | 0.118[NS] | 0.695 | 0.082[NS] | 0.486 | 0.104[NS] | 0.621 |
| Industry → Export scope | −0.237[NS] | 1.504 | −0.237[NS] | 1.514 | −0.238[NS] | 1.537 |
| *Linear effects* | | | | | | |
| Product innovation capability → Export scope | 0.136*** | 2.278 | 0.133*** | 2.219 | 0.080[NS] | 1.220 |
| Export experience → Export scope | 0.016[NS] | 1.525 | 0.015[NS] | 1.398 | 0.013[NS] | 1.216 |
| *Product terms* | | | | | | |
| Product innovation capability × Export experience → Export scope | | | 0.093[NS] | 0.451 | 0.267[NS] | 1.186 |
| *H1*. Product innovation capability squared  → Export scope | | | 0.081*** | 2.246 | 0.117*** | 2.891 |
| *H2*. Product innovation capability squared × Export experience → Export scope | | | | | −0.231** | −1.900 |
| $R^2$ export scope | 0.075 | | 0.105 | | 0.126 | |

**Notes:** ***$p < 0.01$; **$p < 0.05$; NS = not significant (one-tailed $t$-test, with the cut-off $t$-values 1.645)

**Table IV.**
Hypotheses testing

With the aim to obtain better insights into the influence exerted by export experience, we plotted its moderating effect, in line with the suggestions by Aiken and West (1991) (Figure 1).

As shown in Figure 1, when the export experience ($y$-axis) accumulated by developing market firms is moderate or low, product innovation capability ($x$-axis) and export scope ($z$-axis) have a U-shaped relationship. Thus, only higher levels of product innovation capability correspond to higher levels of export scope. Firms that suffer the most from limited export scope are those stuck in the middle: these firms have a medium level of innovation capabilities, but that level appears to be insufficient. As firms accumulate export experience, the relationship between product innovation capability and export scope changes, taking on a more inverted U-shaped form. Thus, an experienced firm's return on investments in developing its innovation capabilities comes first from export scope, but after a certain tipping point, the returns start to decrease marginally.

As long as the international scope of a firm increases, it can expand its internationalisation knowledge, becoming able to conceive and manage the development of more innovative solutions that meet the expectations of customers in multiple foreign markets. Once this direction is set, it is unlikely that a firm would return to a no-frills strategy. More likely, the evolution of a firm will continue in a strategic direction that makes innovation compulsory and demands conceiving of new products to meet the expectations of global customers.

## 5. Conclusion, implications and further research
This study contributes to the debate on the internationalisation process of firms based in developing countries, in particular in the former communist countries, in several ways. First, it provides a theoretical advancement, corroborated by empirical confirmation, on the relationship that links innovation to internationalisation in the peculiar context of developing countries. In particular, by showing the existence of a quadratic effect between the product innovation capabilities of firms and the export scope, we were able to confirm that for firms based in such markets, the benefits in terms of international expansion could not follow immediately and proportionally the efforts made in terms of product innovativeness as commonly assumed in the literature (Ruzzier *et al.*, 2006; Halilem *et al.*, 2014). Our paper complements also the study by Ramos *et al.* (2011) that showed how in advanced countries, the innovation capabilities of the firm have a significant impact on the
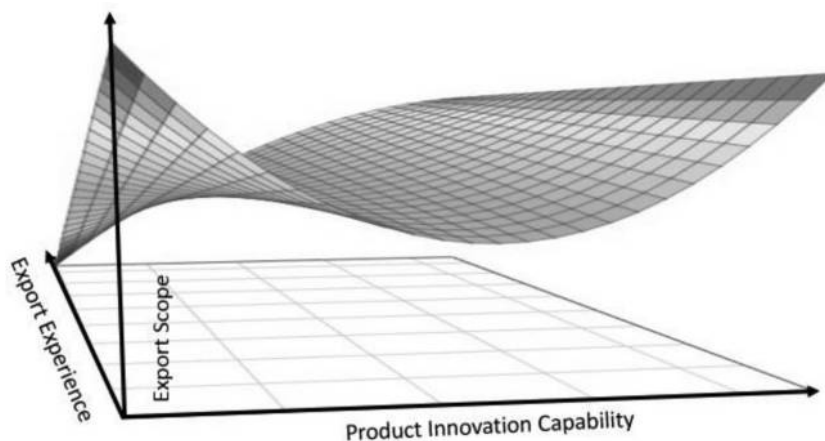


**Figure 1.**
Surface plot of interaction effect of export experience

speed of its international expansion process. In our study, we found a similar influence on the intensity of the process of international expansion. With little doubt, the relationship between innovation and internationalisation will deserve further and deeper consideration by scholars in the near future.

Second, our paper contributes to the discussion of the stepwise internationalisation process of firms (Johanson and Vahlne, 1977, 1990, 2009) by highlighting how accumulated international experience can reshape the effect that product innovation capability has on the export expansion of firms based in developing countries (Cadogan *et al.*, 2009). Thus, in addition to the mainstream literature, the present model indicates that the accumulation of export experience can provide both direct and indirect support to the firm's internationalisation process.

The findings of our study also have relevant managerial implications for firms based in developing countries. In particular, managers should understand that product innovativeness can both boost and hinder firms' internationalisation (Kleinschmidt and Cooper, 1991; Lewandowska *et al.*, 2016). At the low end of the innovation continuum, further investments in innovation could have a negative impact on the ability to expand internationally. This obstacle could arise from the need to invest in new-to-the-firm technologies and products to meet the needs of different market segments. This stage is typical of firms moving from the production of no-frills products to more technologically advanced solutions (Eyring *et al.*, 2011). For these firms, the development of product innovation capability can act as an internationalisation *detractor*.

Indeed, it is debatable whether firms based in developing countries should continue pursuing low-cost strategies. We argue whether a strategy based on the development of innovation capabilities and in the further internationalisation process is more sustainable. This is the strategy that, in our sample, characterises firms moving from moderate- to high-innovative products. For those firms, product innovation acts as a *facilitator* factor of the international expansion.

We see also implications for policymakers in our study. In particular, policymakers in developing countries should take the theme of supporting the technological evolution of firms seriously and they should adopt long-term policies in this direction. This would create a desirable environment for firms to develop product innovation and further motivate them to export and grow.

This study is not without limitations. First, it is geographically focused on a group of firms from countries that share a common history, culture and certain institutional features. Further studies could expand the scope of the research by considering additional developing countries that have different levels of economic and technological under development. In addition to that, it would be worthwhile to control the model for firm age, as not doing so is obviously one of the limitations of this study. Second, researchers could consider additional aspects of firms' internationalisation strategy. This study makes no distinction between exporters and firms internationalising through additional or different modes, such as joint ventures and foreign direct investments. Third, the present study uses cross-sectional data. Future studies should obtain longitudinal data and examine whether the effects found in this study hold over time.

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