Journal of Business Research xxx (2016) xxx–xxx

Contents lists available at ScienceDirect

Journal of Business Research

Innovation complementarity, cooperation partners, and new product export: Evidence from Poland☆

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ARTICLE INFO

Article history:
Received 1 June 2015
Received in revised form 1 January 2016
Accepted 1 February 2016
Available online xxxx

Keywords:
Innovations complementarity
Innovation cooperation partners
New product export intensity
Transition economy
Community innovation survey
Classification tree algorithm AID

ABSTRACT

The network approach to innovation and internationalization has been developing since the early 1990s (Johanson & Mattsson, 1988; Rothwell, 1992) and dominates the recent models of innovation and internationalization of firms. Nevertheless, the extensive literature referring to these models has not yet inspired comprehensive studies combining these two research streams. This paper addresses the gap by linking innovation, innovation cooperation, and export in one study. The findings are based on firm-level empirical data collected by the Community Innovation Survey for Poland in 2011, embracing the sample of 6855 medium and large industrial firms. The quantitative analysis is conducted with the use of the classification tree AID algorithm. The examination of complementarities between various types of innovation—product, process, and marketing innovations—shows that combining product and process innovation increases new product export intensity. The analysis of the relationship between various types of innovation cooperation partners and new product export identifies foreign partners as conducive to increased export intensity. The findings may be specific to firms from transition and emerging economies indicating their path to international competitiveness in more mature markets. However, the study also offers a more universal contribution both to innovation and internationalization theory. It affirms the need for a more holistic view of innovation and confirms the necessity to apply the network approach to research on interrelationships between innovation and internationalization of firms.

1. Introduction

The process of transition of the Central and Eastern European (CEE) economies has positively influenced the innovativeness and internationalization of firms in the region. Although their level of innovativeness and internationalization is still low, the increasing involvement of firms in innovation and international activities enhances international competitiveness of the CEE economies, the Polish economy among them (Szymura-Tyc, 2015; Weresa, 2015). Innovativeness and internationalization of both entire economies and individual firms are considered as interrelated phenomena. For example, Filippetti, Frenz and Ietto-Gillies in their empirical cross-country study of 32 European economies demonstrate that innovativeness and internationalization of European economies are correlated and conclude that at the firm-level, the association creates "a virtuous (or vicious) circle: innovative firms are more successful in competing internationally and the exposure to alternative business and innovation contexts leads to innovation" (Filippetti, Frenz, & Ietto-Gillies, 2011, p. 1).

Numerous empirical studies conducted at the firm-level confirm the positive relationship between innovation and internationalization, particularly—innovation and export (e.g. Basile, 2001; Cassiman, Golovko, & Martínez-Ros, 2010; Roper & Love, 2002). A very small number of studies examine also the reverse causality: the influence of internationalization or export on innovation (e.g. Damijan, Kostevc, & Polanec, 2010). Most surveys focus on the relationship between product or process innovations and export in mature market economies. A limited number of studies take into consideration wider sets of innovation types and relationships between them (e.g. Becker & Egger, 2013) or refer to the context of transition or emerging economies (e.g. Ren, Eisingerich, & Tsai, 2015).

A review of the relevant literature reveals that innovativeness and internationalization of firms may be enhanced by cooperation with

☆ The authors are grateful to the four anonymous reviewers at the 2014 Katowice EMAC Regional Conference, and 2015 Warsaw 2nd CEE Chapter AIB Conference for their insightful and constructive comments to the earlier versions of the paper. The authors are particularly indebted to Małgorzata Rószkiewicz and Łukasz Gradowski for the support concerning the statistical analysis.

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http://dx.doi.org/10.1016/j.jbusres.2016.03.028
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various partners within networks. Empirical research provides evidence of the positive influence of innovation cooperation on the innovativeness of firms. Similar results occur in the studies on the internationalization process of firms, which is supported and accelerated by cooperation in inter-organizational networks.

Extensive literature referring to the network approach to innovation and equally rich sources on the network approach to internationalization have not yet inspired comprehensive studies combining these two streams. Despite the existence of vast empirical research into relationships between innovation and export, innovation and cooperation, as well as internationalization and networks, studies that investigate linkages between innovation, cooperation/networks, and export/internationalization are nascent (Chetty & Stangl, 2010; Leonidou, Katsikeas, & Coudounaris, 2010).

The paper addresses the abovementioned research gaps by linking innovation, innovation cooperation, and export in one study. In particular, the complementarities between various types of innovation—product, process, and marketing innovations—are tested in the export context. Next, the relationship between innovation cooperation with domestic and international partners and export intensity is explored. Additionally, the moderating effect of innovation cooperation on the relationship between the combination of various innovation types and export is under examination. Last but not least, the study concerns the relationships between innovation, innovation cooperation, and export of firms in Poland, a transition economy setting.

Research results are based on firm-level empirical data collected in 2011 by the Community Innovation Survey (CIS) for Poland. The representative research sample embraces 6855 medium and large industrial firms (census). The quantitative analyses are conducted with the use of the classification tree AID algorithm.

The paper starts with a literature review concerning the relationships between innovation, cooperation, and export, which leads to the development of hypotheses constituting the research model. The subsequent part proceeds to the operationalization of the variables, presents the characteristics of the research sample, and describes the statistical method of analysis applied to test the model. The next part elaborates on the findings, while the final section contains discussion and conclusions.

2. Theoretical background and hypothesis formulation

Research on relationships between innovation and export has been present in economic and management literature for a few decades, attracting much attention since these links are recognized as conducive to building the competitive advantage of nations and firms. The extant literature is very extensive and research approaches vary greatly, which generates a problem involving the selection of the most relevant sources. Despite the fact that the findings of most studies generally confirm the positive relationships between innovation, cooperation, and export, some cognitive gaps still exist giving grounds for the current study.

2.1. Innovation complementarity and export

Although the Schumpeterian view of innovation and complementarity between different types of innovation is widely accepted and widespread both in academia and in practice, the review of pertinent literature reveals that research on the linkages between innovation and export focuses on technological innovations (product and process), leaving aside non-technological innovation. The dominant view is that it is new products and technologies that contribute to the competitive advantage of firms in international markets (e.g. Basile, 2001; Dhanaraj & Beamish, 2003; Roper & Love, 2002). Empirical studies indicate that causality runs from R&D and innovation to export, and suggest that both the propensity to export and export intensity are positively influenced by R&D and successful innovations (e.g. Ganotakis & Love, 2011). Similarly, Cassiman et al. (2010) conclude that engagement in product innovation drives the propensity of firms to export, whereas Lim, Sharkey, & Heinrichs (2006) argue that the capability of a firm to develop new products is a prerequisite for export involvement and allows it to achieve a global market position through its differentiation-based advantage.

While product innovations create a differentiation effect focused on capturing new markets, process innovations are more oriented towards productivity increases and cost reduction. Hence, process innovation may support a firm's decision to engage in export activity by exploiting the cost-based advantage. The majority of firm-level studies conducted in mature economies suggest that product innovation, rather than process innovation, plays an important role in promoting the export orientation of firms (e.g. Becker & Egger, 2013; Cassiman et al., 2010). As a result, in the long term, the differentiation-related factors (e.g. product innovation) are more consequential for building competitive advantage in international markets than the cost-related factors (e.g. process innovation) (Verspagen & Wakelin, 1997). However, in transition economies, characterized by low levels of innovation and internationalization, process innovation seems to be more conducive to exporting, as it leads to productivity improvements (Damijan et al., 2010).

In search of competitive advantages, a firm may also combine product and process innovations. For example, Percival & Cozzarin (2008) and Martinez-Ros & Labeaga (2009) argue that the manufacturing of a new product is often possible only if a new technological process is applied and, consequently, firms engaging in process innovation are more likely to engage in product innovation. Despite the fact that the complementarity of product and process innovations is demonstrated in empirical studies, research on complementarities between these innovations in the context of export is not advanced. Only a limited number of surveys indicate that both the propensity to export and export intensity are positively influenced by R&D and related product and process innovations. For example, Higón & Driffield (2011) propose that both product and process innovations have a favorable effect on the propensity of firms to export, while Di Maria & Ganau (2013) suggest that even though the decision to enter new foreign markets (propensity to export) is driven by new products or products adapted to target markets, export intensity is more influenced by process innovation.

Comprehensive studies on innovation complementarity show that the overall innovation performance of a firm depends not only on successful product and process innovation but also on accompanying novel non-technological solutions (e.g. Doran, 2012; Mothe & Uyen Nguyen Thi, 2010). A number of empirical studies provide the evidence that marketing competencies, an explicit marketing strategy, and marketing innovations exert a positive influence on the performance of firms (e.g. Day, 1994; Song, Droge, Hanvanich, & Calantone, 2005). Marketing activities in foreign markets build up the market knowledge of firms and increase their ability to successfully anticipate and adapt to a diversified and changing market environment. These adjustments involve changes in product features and the adaptation of the entire offering of a firm to the specific conditions of a particular foreign market.

Marketing innovations (e.g. repositioning of a brand or leveraging it to new markets, creating new distribution channels, redesigning market communication, and interactions with customers) support new product sales in host markets. Marketing innovation may be considered complementary to product innovation, increasing a firm's capability to explore new markets (e.g. Hurley & Hult, 1998; Kotabe, Srinivasan, & Aulakh, 2002; Wang & Lestari, 2013). Mothe & Uyen Nguyen Thi (2010) suggest that if a firm introduces marketing innovations in addition to product innovations, the share of products new to the market in its turnover increases significantly. Di Maria & Ganau (2013) state that, apart from product and process dynamism, the explicit marketing strategy of a firm and its export commitment have a positive impact on export intensity. Additionally, Ren et al. (2015) argue that marketing