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Learning by outward and inward internationalization and the outward/inward innovativeness of firms in Poland

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Empirical Paper

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Learning by outward and inward internationalization and the outward/inward innovativeness of firms in Poland

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Abstract: Many studies raise the issue of relationships between internationalization and innovativeness, linking them with firms' international competitiveness. However, very few of these studies focus on the influence of internationalization on innovativeness and regard the multifaceted nature of these two concepts. The study presented in this paper is based on a holistic approach to internationalization and innovativeness. It explores the influence of the outward (e.g. exporting, outward FDI) and inward (e.g. importing, inward FDI) internationalization on the outward (product and marketing) and inward (process and organizational) innovativeness of 274 firms in Poland, adopting formative variables and a correlations analysis. The key contribution of the research is that the outward internationalization is conducive to both the outward and inward innovativeness, while the inward internationalization supports only the inward innovativeness. It shows that learning by outward and inward internationalization supports innovativeness of firms, responsible for their international competitiveness. The findings might be unique for transition and emerging economies characterized with a low degree of internationalization and innovativeness, while the holistic approach is more universal, and might bring interesting results when applied to the research of highly advanced economies.

Keywords: outward-inward internationalization, outward-inward innovativeness, learning by internationalization, international competitiveness, transition economy

JEL Classification: M16, O30, L25

1 Introduction

The majority of studies on relationships between internationalization and innovativeness focus exclusively on the outward forms of internationalization (e.g. exporting, outward foreign direct investments) and selected types of firms' innovativeness (e.g. product or process). Inward internationalization (e.g. importing, inward foreign direct investments) and other types of innovations (e.g. marketing or organizational) are rarely studied, though, in many firms, the outward internationalization is accompanied by inward internationalization and different types of innovation are introduced simultaneously or interchangeably as complementary or alternative types of firms' innovative activity [Welch and Luostarinen, 1988, 1993; Korhonen, 1999; Fletcher, 2001].

The study goes beyond such a narrow focus by adopting a holistic approach to the concepts of internationalization and innovativeness of firms. This approach is based on an assumption that these

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concepts should embrace all of their constituting forms and types that are relevant to the studied relationships. Hence, the study recognizes the multidimensional nature of internationalization and innovativeness of firms by including both the outward and inward internationalization and the outward and inward innovativeness of firms, and their various manifestations.

The concepts of outward and inward internationalization applied in this study have been present in the international business literature for a long time [Welch and Luostarinen, 1988, 1993]. The outward internationalization relates to exporting and other outward internationalization forms, whereas the inward internationalization focuses on importing and other inward internationalization forms. From the perspective of organizational learning, the main difference between these two concepts of internationalization is based on an assumption that different forms of firms' international involvement give them access to specific types of knowledge. The outward internationalization enables the development of foreign market and technological knowledge [Johanson and Vahlne, 1977; Grossman and Helpman, 1991; Clerides et al., 1998; Salomon and Shaver, 2005; Salomon, 2006], while the inward internationalization gives access to technological, managerial, and business knowledge from abroad [Mathews, 2006; Luo and Tung, 2007; Şeker, 2012]. The idea of differentiating between the outward and inward innovativeness introduced in the paper by the author is based on an assumption that these two types of innovativeness require different types of knowledge necessary to implement specific types of innovations. The concept of outward innovativeness refers to product and marketing innovations which are market-oriented (external focus), whereas the inward innovativeness involves process and organizational innovations which are firm-oriented (internal focus). The outward innovativeness calls for technological knowledge supported by market and marketing knowledge, while the inward innovativeness requires technological knowledge combined with organizational knowledge [Rothwell, 1992; Sammarra and Biggero, 2008].

The lack of research on the relationship between both forms of internationalization and innovativeness in one study indicates the existence of a knowledge gap. The main purpose of the study is to determine whether both the outward and the inward internationalization are related to firms' outward and inward innovativeness, and which relationships are stronger. The secondary aim is to find out whether the strength of these relationships differs based on the sector in which firms operate, their size, affiliation to a capital group and foreign capital share. The outcomes of the research should enable the recognition and understanding of the relative importance of learning by outward/inward internationalization for the outward/inward innovativeness of firms.

The study presented in this paper is part of a larger research project on the relationships between internationalization, innovativeness and networking of firms in Poland. It is based on the assumption that these three phenomena are interrelated and jointly responsible for the international competitiveness of firms [Chetty and Stangl, 2010; Leonidou et al., 2010; Lewandowska et al., 2016]. The research project of the author on relationships between internationalization, innovativeness, and networking resulted in several publications of her work [e.g. Szymura-Tyc, 2015; Szymura-Tyc, 2018; Szymura-Tyc and Rollins, 2020]. All these studies share the same data set, similar conceptualization, and operationalization of research variables and research methodology. The holistic approach employed in these studies is reflected in the use of complex measures based on formative variables, and a correlations analysis is applied for testing the relationships between the research variables.

The first most comprehensive study presented in a monograph, is based on the holistic approach to internationalization and innovativeness of firms regarding their outward and inward forms [Szymura-Tyc, 2015]. The findings show that the outward and inward internationalizations are strongly correlated, as well as the outward and inward innovativeness, which justifies the necessity to consider their both forms in the study. The research also refers to the network model of internationalization [Johanson and Mattsson, 1988; Johanson and Vahlne, 2009] and the network model of innovation [Rothwell, 1992] to examine the relationships of networking with the internationalization and innovativeness of firms. The results indicate that the strongest positive relationship links the overall internationalization with the overall innovativeness, and that the networking is conducive to both the overall internationalization and the overall innovativeness, supporting stronger the innovativeness, than internationalization.

The network model of internationalization and the network model of innovation are used again as a theoretical framework for the recent study on learning by networking as a driver of innovativeness and internationalization of firms [Szymura-Tyc and Rollins, 2020]. The outcomes indicate that networking contributes to both the outward and inward innovativeness of firms. They show stronger relationship of networking with the inward than with the outward innovativeness and confirm support for the outward internationalization only. Furthermore, the strength of the studied relationships depends on the firms' sector, size, capital group affiliation, and origin of capital.

The *learning by networking* is also confronted with the other type of learning, i.e. *learning by internationalization* in a study that links the overall internationalization and the networking with the product and process innovativeness [Szymura-Tyc, 2018]. It focuses on the most frequently examined types of innovativeness in the context of learning, neglecting the marketing and organizational innovations, which are present in other studies. The results of the analyses show that learning by internationalization is positively related both to the product and process innovativeness, supporting much stronger the process one. Learning by networking is only conducive to the process innovativeness and the relationship is found to be weak.

The above described studies prove that the relationships between internationalization, innovativeness, and networking depend on the research variables selected for the study, giving different but to a large extent, consistent results for the overall and partial constructs used. Generally, they indicate that the overall internationalization is more conducive to the overall innovativeness as well as both product and process innovativeness than networking, and that the support for the process innovativeness is stronger than for product innovativeness. The current study undertakes the issue of relationship between the outward and inward internationalization and innovativeness of firms, describing the effect of learning by internationalization on innovativeness with regard to its outward and inward types.

The key contribution of the research presented in the paper to the studies on relationships between internationalization and innovativeness of firms is that the outward internationalization is conducive to both the outward and inward innovativeness, while the inward internationalization supports only the inward innovativeness. The significance and strength of these relationships differ depending on the firms' sector, size, capital group affiliation, and origin of capital. The findings of the study may be distinctive for Poland's emerging economy, which is characterized by rather low internationalization and innovativeness of firms [Szymura-Tyc, 2015]. However, the unique, holistic approach to study firms' internationalization and innovativeness by combining both their outward and inward forms may lead to interesting results, when applied to research in other types of economies. Furthermore, the outcome of the comparative analysis for firms grouped by sector, size, capital group affiliation, and capital origin may remain true for other economy settings.

2 Conceptual foundations and research model

Figure 1 presents the research model with the hypotheses on relationships of outward/inward internationalization with outward/inward innovativeness.

2.1 Outward/inward internationalization concept

Welch and Luostarinen define internationalization as “the process of increasing involvement in international operations” [1988, p. 36]. This definition includes different types and forms of firm's internationalization. It includes both the *outward internationalization* and the *inward internationalization*. The outward internationalization is defined by different forms of foreign expansion of a firm (e.g. exporting, licensing-out, franchising-out, outward FDI), while the inward internationalization is defined by international operations related to activities conducted by a firm on the home market (e.g. importing, licensing-in, franchising-in, inward FDI) [Welch and Luostarinen, 1988, 1993].

The research projects on firm's internationalization mainly focus on the outward internationalization. The dominance of outward internationalization studies is so strong that the term “internationalization”

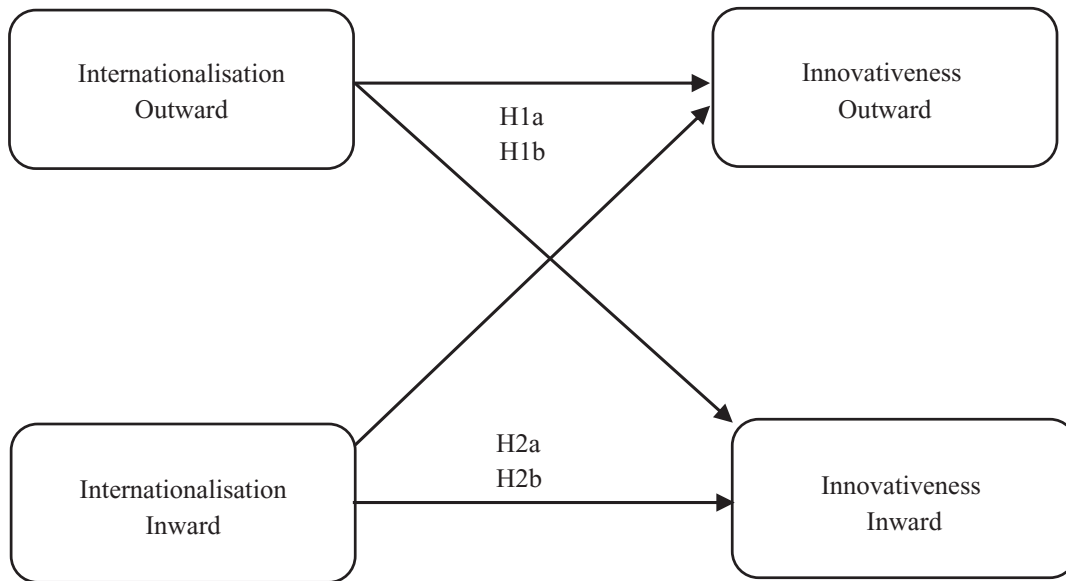


Figure 1. Research model and hypotheses.

is often used as a synonym of “outward internationalization.” These studies concern different aspects of outward internationalizations of firms, e.g. factors [Cavusgil and Naor, 1987; Zou and Stan, 1998], dimensions, and forms [Bilkey and Tesar, 1977; Reid, 1981] or degree of internationalization [Sullivan, 1994; Dörrenbächer, 2000]. However, the most influential studies in this field revolve around the mechanism of firm’s internationalization process described from the individual firm perspective, like in the Uppsala model of firm’s internationalization [Johanson and Wiedersheim-Paul, 1975; Johanson and Vahlne, 1977], or apply the network approach, as presented by the network model of firm’s internationalization [Johanson and Mattsson, 1988; Johanson and Vahlne, 2009].

Much less attention is given to the inward internationalization of firms [Welch and Luostarinen, 1988, 1993; Fletcher, 2001] despite the increasing importance of international operations in firms’ domestic activities related to the development of international supply chains [Welch and Luostarinen, 1988, 1993; Fletcher, 2001], and strong, multifaceted relationships between the inward and outward internationalization [Luostarinen and Welch, 1990; Luostarinen and Hellman, 1993; Welch and Luostarinen, 1993]. The few studies existing in this field show that the inward internationalization usually precedes the outward internationalization [Welch and Luostarinen, 1988, 1993; Jones, 1999, 2001; Korhonen, 1999; Karlsen et al., 2003], and that the outward internationalization forms tend to mirror the preceding inward internationalization forms (e.g. exporting follows importing, licensing-out results from prior experience with licensing-in) [Carstairs and Welch, 1982; Welch and Luostarinen, 1993; Korhonen, 1999; Fletcher, 2001]. Moreover, the studies also indicate that the majority of firms involved in international operations conduct both import and export activities [Welch and Luostarinen, 1993; Korhonen et al., 1996; Jones, 1999, 2001; Fletcher, 2001, 2008], or more generally—combine the inward internationalization with the outward internationalization. Nevertheless, the deficiency of comprehension and recognition for the inward internationalization is evident, and results in deficiency of studies and empirical research on factors, forms and process of the inward internationalization of firms [Carstairs and Welch, 1982; Welch and Luostarinen, 1993; Korhonen, 1999; Fletcher, 2001].

This study adopts a holistic approach to internationalization to describe the internationalization as a state resulting from firm’s past and current involvement in international operations both abroad—the outward internationalization and at home—the inward internationalization. Additionally, the outward and inward internationalization concepts applied in the study are holistic as they encompass all forms of internationalization (transactional, contractual and capital), intensity of internationalization (e.g. exports/imports share in sale), scope of international operations (number and distance of foreign markets), as well as international experience of firm.

2.2 The development of knowledge in internationalization process

As mentioned above, the dominant stream of research on firms' internationalization is related to the mechanism of the internationalization process. The studies on the mechanism of the internationalization process are present both in the Uppsala model of firm's internationalization and network model of internationalization.

The Uppsala model of firm's internationalization describes the (outward) internationalization as a learning process (*internationalization by learning*), leading to the development of knowledge, necessary for firm's growing commitment to international operations [Johanson and Wiedersheim-Paul, 1975; Johanson and Vahlne, 1977]. Johanson, Wiedersheim-Paul and Vahlne describe the process of internationalization as gradual, cumulative or incremental, sequential, and evolutionary. These terms are supposed to reflect the increase in the volume and share of foreign operations (exporting, production abroad) in the overall firm's operations, geographical scope of foreign expansion, and degree of advancement in internationalization of forms. The basis for transition to the subsequent higher stage of the evolutionary process of internationalization is the acquisition of market knowledge and the binding of the firm's resources effectively to conducting activities on a given market [Johanson and Vahlne, 1977]. As a result, the increase in resource-based involvement of the firm related to the more advanced forms of internationalization, progresses with the process of gaining market knowledge developed on the basis of experience resulting from conducting interactional operations on a given market (*experiential market-specific knowledge*). In addition to the knowledge specific to a given market, a firm also obtains *experiential general knowledge* about conducting business operations internationally. This type of knowledge is usually transferable, making it easier for a firm to expand to other foreign markets [Johanson and Vahlne, 1977]. The more international experience a firm has, the easier it is to enter new foreign markets, including markets that are more and more distant in terms of the psychic distance, which separate them from the home market [Johanson and Wiedersheim-Paul, 1975].

The work by Johanson and Mattsson [1988], which gave rise to the development of the network-based model of firm's internationalization, refers to the knowledge development as well. It shows how network ties help firms' internationalization by learning from both the internal and external knowledge sources. In addition, the network model of internationalization includes the inward internationalization of a firm carrying out activities on the domestic market. It states that such a firm may learn to operate internationally from its foreign business partners involved in importing, contractual agreements, (e.g. licensing-in, franchising-in) or inward direct investments (joint ventures).

Later studies of other researchers proved that the firm's increased resource commitment in the international market follows the development of knowledge acquired by experiential learning and learning through networks [Sharma and Blomstermo, 2003; Blomstermo et al., 2004; Coviello, 2006]. As a result, the network model of internationalization became the dominant model of the internationalization of firms nowadays [Johanson and Vahlne, 2009]. The model encompasses both the internal and external sources of knowledge and describes the firm's process of internationalization as a process of learning—both experiential and network-based. This model perceives the *liability of outsidership* as a lack of access to a relevant international network and a larger burden for an internationalizing firm than the *liability of foreignness*, when related with the distance to the foreign markets and a lack of international experience. It is assumed that *knowledge exploitation* enables the firm to expand only on familiar paths of development and reduces the risk of increased resource commitment in foreign markets. The *exploration of knowledge* from external sources, i.e. partners in the network, allows for experimentation with new possibilities carrying higher risk, yet potentially leading to higher profits in the longer term [March, 1991; Forsgren, 2002; Sharma and Blomstermo, 2003].

2.3 Outward/inward innovativeness concept

The literature on innovation is not very consistent in conceptualizing the term “innovativeness” related to a firm [Damanpour, 1991; Subramanian and Nilakanta, 1996; Garcia and Calantone, 2002; Armbruster

et al., 2008; Crossan and Apaydin, 2010]. The innovativeness of a firm may be defined from a behavioral perspective [e.g. Wang and Ahmed, 2004], and then operationalized by reflective variables of firm's attitude or behavior leading to the implementation of different types of innovation (product, process, marketing and organizational). On the other hand, the innovativeness of a firm may be described as its ability to conduct, or the consequence of performing innovation activities, and operationalized by formative variables related to their antecedents (e.g. R&D expenditure) or results (e.g. innovations implemented) [Hollenstein, 1996; Hagedoorn and Cloudt, 2003]. The existing empirical research on organizational innovativeness mainly focuses on formative variables related to R&D spending, types, number or newness of innovations introduced, sometimes moderated by firms' characteristics (e.g. sector, size, type of organization) [Damanpour, 1991; Wolfe, 1994]. Most researchers focus on selected variables only adhering to a given aspect of firms' innovativeness (e.g. R&D expenditure as a measure of innovation propensity, number of innovations representing innovation intensity, or share of innovative products in sales as a measure of innovation performance) [Kleinknecht et al., 2002]. However, some authors recommend a more holistic approach to the multifaceted concept of firm's innovativeness by embracing variables related to all of the above mentioned measures [Damanpour, 1991; Hollenstein, 1996; Adams et al., 2006]. They argue that this approach allows the study of firm's innovativeness as its attribute persisting over longer time and relating to the future, present, and past firm's engagement in innovation processes.

Firms introduce different types of innovations, most frequently described as product, process, marketing and organizational innovations [Oslo Manual, 2018]. The majority of firms focus on a single type of innovations, or combine product with process innovations, termed technological innovations [Utterback and Abernathy, 1975; Kraft, 1990; Teece, 1996; Percival and Cozzarin, 2008; Martínez-Ros and Labeaga, 2009]. Many firms also introduce marketing and organizational innovations, called non-technological innovations [Mothe and Uyen, 2010; Wang and Lestari, 2013], which may accompany or replace the technological innovations. The "co-existence" of different types of innovations in firms results from the fact that in many situations product, process, marketing, and organizational innovations are related with each other because of their complementarity, not exclusiveness [Evangelista and Vezzani, 2010; Lewandowska and Gołębiowski, 2012a, 2012b; Geldes et al., 2017]. Nevertheless, a vast number of studies on the innovativeness of firms focus on product or process innovations only [Utterback and Abernathy, 1975; Kraft, 1990; Percival and Cozzarin, 2008; Martínez-Ros and Labeaga, 2009], leaving aside the marketing and organizational innovations. The studies dealing with marketing or organizational innovations are rare [Hurley and Hult, 1998; Mothe and Uyen, 2010; Wang and Lestari, 2013], though those which raise the issue confirm the positive influence of marketing and organizational innovations on the performance of firms [Som et al., 2012] or their internationalization [Lewandowska et al., 2016, 2017].

The division of innovations into technological and non-technological is based on the assumption that the development of technological (product and process) innovations requires R&D, while non-technological (marketing and organizational) innovations do not [Schmidt and Rammer, 2007; Mothe and Uyen, 2010, 2012]. The distinction is also related to the type of knowledge necessary to develop specific types of innovations. The technological knowledge matters most in the case of technological innovations, while in the case non-technological innovations—market and marketing knowledge, as well as managerial or business knowledge are indispensable [Rothwell, 1992; Sammarra and Biggero, 2008].

Based on the assumption that both firms' R&D and non-R&D expenditure, as well technological and non-technological knowledge are recognized as enablers of firms' innovativeness, a novel concept of innovativeness that differentiate the *outward innovativeness* from the *inward innovativeness* is proposed in the study. The typology goes across the so far established concepts in the sense that it includes all types of innovations (product, process, marketing, and organizational), all types of innovation expenditure (R&D and non-R&D), and refers to all types of knowledge necessary for innovation processes. It is based on a holistic approach to firm's innovativeness as it embraces all types of innovations introduced and the multifaceted nature of firm's innovativeness developed in the longer term.

The concept of outward innovativeness and inward innovativeness applied in the study also refers to the sources of firm's competitive advantage. The outward innovativeness related to product, and marketing innovations is responsible for the differentiation advantage of a firm, while the inward innovativeness

based on process and organizational innovations is accountable for the cost-based advantage. Both outward and inward innovativeness require R&D and non-R&D expenditure as their enabler. Hence, the additional strength of this typology is its better adjustment to studying innovativeness of firms varying by sector and size which differentiate their R&D spending and technological development.

The concept of *outward innovativeness* and *inward innovativeness* used in the study is based on the assumption that the outward innovativeness is market-oriented and, in addition to technological knowledge, it also requires market and marketing knowledge, while the inward innovativeness is firm-oriented and requires technological knowledge which is combined with managerial and business knowledge. It also refers to the sources of firm's competitive advantage. Product and marketing innovations (i.e. outward innovations) are responsible for the differentiation advantage of a firm, while the inward innovativeness related to process and organizational innovations is accountable for the cost-based advantage.

2.4 Relationships between outward/inward internationalization and outward/inward innovativeness

The relationships between the internationalization and innovativeness of firms have been widely discussed for a long time in the international business literature because of their increasing interconnectedness and strong influence on international competitiveness of firms [Cantwell, 2017]. First, frequently raised issue is whether the internationalization of a firm influences its innovativeness or *vice versa* or both [Bernard and Jensen, 1999; Damijan et al., 2010; Cassiman and Golovko, 2011; Golovko and Valentini, 2011; Monreal-Pérez et al., 2012]. Most of the studies on these relationships assume that firms' (outward) internationalization is a result of their innovation activity or, more generally, it depends on their innovativeness. Empirical firm-level studies conducted in numerous countries and sectors generally confirm a positive link between innovations and exporting [e.g. Basile, 2001; Roper and Love, 2002; Cassiman et al., 2010; Cassiman and Golovko, 2011; Golovko and Valentini, 2011; Monreal-Pérez et al., 2012; Becker and Egger, 2013; Azar and Ciabuschi, 2017; Cieřlik et al., 2018; Bodlaj et al., 2020; D'Angelo et al., 2020] or between R&D and foreign direct investments (FDI) of large international firms (MNEs, TNCs) [e.g. Dunning and Lundan, 1998; Penner-Hahn and Shaver, 2005; Song and Shin, 2008; Filippetti et al. 2011].

The other stream of research focuses on the opposite dependence, presuming that the internationalization can stimulate the innovativeness of firms. Most of the studies on internationalization consider internationalization as a driver of firms innovativeness focusing on the outward internationalization forms, such as exporting among them [e.g. Salomon and Shaver, 2005; Salomon and Jin, 2010], outward FDI [Zahra et al., 2000; García et al., 2013; Jin et al., 2019], different foreign operation modes, [e.g. Boermans and Roelfsema, 2015; Thakur-Wernz et al., 2019; Villar et al., 2020] or just refer to the multinationality of a firm [e.g. Dunning and Lundan, 1998; Frenz and Ietto-Gillies, 2007; Kafourous et al., 2008]. They are based on an assumption that (outward) internationalization offers a firm access to new knowledge, more demanding customers, and challenges of the international competitiveness [Dunning, 1996; Dunning and Lundan, 1998; Gupta and Govindarajan, 2000; Zahra et al., 2000]. Therefore, the innovativeness of a firm may be the outcome of firm's earlier involvement in the international market by exporting, and *learning by exporting* is considered as a factor leading to the increased innovativeness of a firm [Salomon and Shaver, 2005; Greenaway and Kneller, 2007; Salomon and Jin, 2008]. Consequently, the term *learning by outward internationalization* may be used to describe the influence of more advanced or multiple forms of outward internationalization on the innovativeness of firms.

Very few studies on learning by internationalization take into account both the outward and inward forms of internationalization. As Liang and Parkhe [1997] stated, most researchers ignore the fact that exporting firms are also importing, and further a small number of researchers include both forms of international exchange in their studies on the relationship with firm's performance or innovativeness. Researchers studying the outward and inward forms of international trade (exporting/importing) usually connect them with a specific type of innovations only, most often with the product or process innovations [e.g. Seker, 2012]. Very few studies combine exporting or importing with outward or inward FDI [e.g. Olabisi, 2017; Wu et al., 2017], or additionally embrace the contractual forms of internationalization

(e.g. outsourcing) [e.g. Boermans and Roelfsema, 2015]. In all of these mentioned cases, the innovativeness of firms is measured not only by innovations, but also by data on R&D expenditures, patent applications or citations, available at firm or country-level [e.g. Boermans and Roelfsema, 2015; Filippetti et al., 2017; Wu et al., 2017].

The least recognized issue in the research on influence of internationalization on innovativeness of firms is the relationship between the inward internationalization exclusively (e.g. imports, inward FDI) and innovativeness of firms. The majority of studies in this field focus on the inward FDI [e.g. García et al., 2013; Jin et al., 2019] and international joint ventures or alliances serving as a platform of mutual learning by internationalization for business partners [e.g. Inkpen, 1998; Lane et al., 2001; Tsang, 2002].

To summarize, *learning by outward internationalization* has rich literature sources and empirical support related with this form of internationalization solely. *Learning by inward internationalization* requires a more extensive literature review, because very few studies are devoted to this form of internationalization separately, usually referring to the inward and outward internationalization together. Nevertheless, the theoretical foundations presented below, link separately the outward and inward internationalizations with firms' innovativeness to formulate the four hypotheses constituting the research model.

2.4.1 Outward internationalization and innovativeness

Grossman and Helpman [1991] state that exporting firms gain knowledge through interaction and competition on foreign markets, which is not accessible to firms whose operations are limited only to the domestic market. Therefore, according to their opinion, exporting, facilitate the accumulation of knowledge that enables innovation. Through exporting, firms gain access to two types of knowledge: market knowledge and technological knowledge [Salomon and Shaver, 2005]. Market knowledge concerns customers, their expectations and preferences as well as local customs, leading to understanding of customers' behaviors in a given market environment. Technological knowledge refers to operational processes, methods and techniques, related to scientific understanding of the principles of the functioning of material things and physical phenomena. Studies on learning by exporting prove that international diversification of business activity positively influences the acquisition of market knowledge. It may however cause difficulties in transferring technological knowledge, especially when the internationalization of a firm takes place through exporting, which is not conducive to the control of knowledge flows [Yeoh, 2004; Villar et al., 2020].

Firms that export products obtain information which may be used to adapt their products to international differences in needs and expectations of customers [Clerides et al., 1998]. As a result, exported products mostly differ from what the company previously offered on the domestic market, and this means the necessity of introducing product and marketing innovations, and sometimes also processes that are behind those adjustments. This way, in addition to accumulating market knowledge, firms that export also expand their technological knowledge, using the knowledge and experience of their buyers [Clerides et al., 1998]. Learning by exporting is not just about simple modification of products by responding to the needs of foreign customers, but it is also learning about the possibilities of offering better and new products [Salomon and Shaver, 2005; Salomon, 2006]. Foreign buyers often provide exporters feedback on how to improve existing products, and sometimes also offer their technical or operational support for product development [Evenson and Westphal, 1995]. In addition, exporters are confronted in host markets with competitors that they do not meet in the home market and can use them as an operational benchmark to redesign products to meet the technological standards of foreign competition. Empirical research shows that the emergence of the effect of learning by exporting is favored by the direct involvement of a firm in export activities without the participation of intermediaries and exporting to more developed countries [Salomon, 2006]. D'Angelo et al. [2020] prove that the innovativeness of firms depends on the dynamics of exporting and that foreign collaboration agreements moderate the negative effect of rapid changes in exporting on innovativeness. The role of foreign equity is also raised by Zhou et al. [2020] who report that foreign equity positively moderates the effects of exporting on innovativeness of firms when related to local R&D effort.

Some researchers address the type of innovation that results from learning by exporting. Damijan and Kostevc [2006], who conducted research of Slovenian firms, prove that exports have a positive effect on process innovations implemented by medium and large enterprises, but have no impact on product innovations. At the same time, they state that medium and large firms increase their efficiency as a result of starting exporting for the first time. This may indicate an increase in efficiency resulting from process innovations, strengthening the technical efficiency of the firms. They also note that this type of relationship does not appear in small firms which may be due to their small-scale activities and this may inhibit benefiting from implemented process innovations. Very few studies link the exporting with more types of innovations. For example, Shearmur et al. [2015] show that the Canadian exporters significantly more willingly than non-exporters introduce product, process and management innovations, while for marketing innovations the research results are not clear. The strongest relation is observed for large exporters and does not exist for ad-hoc exporters.

Monreal-Pérez et al. [2012] studied Spanish firms and confirm the *hypothesis of autoselection*, which state that innovative firms are more likely to start exporting. At the same time, they do not notice any effects of learning by exporting in the form of implementations of process and product innovations, even though exporting firms introduce more innovations than non-exporters. Based on the results obtained, they state that firms are not able to take a full advantage of the possibilities of learning by exporting when they export into a limited number of markets, mainly to the European Union countries. These markets seem to be very similar to the Spanish market; therefore they do not provide new knowledge about products or processes, which could be used in the innovation process. As a result, these firms apply similar strategies as they have in the local market, which does not bring satisfactory results. The authors also point out that the ability to learn by exporting requires parallel running of own R&D which increases the ability to absorb knowledge (*knowledge absorptive capacity*) [Cohen and Levinthal, 1990]. They believe that this is facilitated by the participation in international joint ventures, as it gives access to the distinctive knowledge of foreign partners [Park, 2011]. The low ability of Spanish firms to learn by exporting is also a result of the low intensity of their exports, which have not yet reached the minimum threshold required to strengthen firms' innovativeness by international activities [Kafourous et al., 2008]. In addition, they note that the difficulty in learning by exporting and other forms of internationalization is related to a low level of knowledge of foreign languages and the lack of international experience of Spanish managers. They indicate finally that another study including more advanced forms of internationalization might show the effects of learning by internationalization apart from exporting.

As Salomon and Jin [2010] write that the main focus of extant research on relations between internationalization and innovativeness of firms is the possibility of using distinctive resources and abilities developed by the parent company to expand and compete successfully on foreign markets. Later studies begin to notice that an alternative motivation for firms' international involvement is the access to resources and valuable knowledge in the host country. This approach is particularly visible in the case of firms from emerging economies, i.e. late and new entrants (*latecomers, newcomers*) that consider entering the markets abroad as a springboard giving them access to strategic resources on foreign markets, allowing them to free themselves from constraints on the home market [Mathews, 2006; Luo and Tung, 2007; Lou and Tung, 2017]. Moreover, it has been found that firms internationalize their activities not only to exploit the knowledge already available (*knowledge exploitation*), but also to acquire it (*knowledge exploration*) [Martin and Salomon, 2003; Penner-Hahn and Shaver, 2005; Park, 2011; Tang et al., 2020]. Support for the thesis on influence of internationalization on the innovativeness of firms is provided today by empirical research on both newly created, small firms (international new ventures, start-ups) as well as large international firms investing abroad. It is proved that both international new ventures, as well as subsidiaries of transnational corporations allow transferring knowledge not only from the home country to foreign subsidiaries (*exploit knowledge*), but also transfer it from the host country to the home country (*acquire knowledge*). The additional issue that is discussed here is the ability to transfer knowledge (*knowledge transfer*) and the ability to integrate knowledge (*knowledge integration*) on an international scale, so that the knowledge from different sources can be effectively used to increase innovativeness and competitiveness of a firm [Almeida, 1996; Zahra et al., 2000; Penner-Hahn and Shaver, 2005; Park, 2011; Lou and Tung, 2017; Tang et al., 2020].

As mentioned above, learning by internationalization of a firm adopting more advanced forms than exports is studied in the context of early-internationalized firms, the so-called international new ventures [Zahra et al., 2000]. Zahra et al. have investigated the influence of international business diversification and foreign entry strategies on the ability of technological learning by internationalization. The results of their research show that international diversity and entry strategy have a very strong influence on the extent and depth of acquired knowledge and the speed of technological learning of firms, and hence—also on their performance. Greater diversity of markets means exposure to more diverse knowledge that can be acquired and used in the innovation processes. However, the sooner the firm increases the spatial extent of the activity, the more difficult for it is to assimilate knowledge, unless the psychic distance between the markets is not significant.

The study by Dunning [1996] on the role of mode of entry for the ability to enhance competitive advantage of transnational corporations at country level indicates that the FDI and non-equity cooperation agreements are more favorable than arm's length transactions (e.g. exporting). This finding has greater significance nowadays since the most often used forms of entry into foreign markets are FDI in newly created firms (start-ups) or acquisitions of local firms, which are a way to acquire new knowledge. Research shows that forms of internationalization based on greater control of knowledge flows, i.e. foreign investments, are positively related to technological learning, while forms with a lower degree of control, e.g. exporting have a negative impact on the learning outcomes. The ability to integrate knowledge (*knowledge integration*) possessed and acquired by a firm in the course of internationalization is a very important factor influencing the learning process of the surveyed firms [Zahra et al., 2000].

The studies on international entry and operation modes as a path to innovativeness of firms are also conducted by Thakur-Wernz et al. [2019] and Villar et al. [2020]. Research of Indian firms by Thakur-Wernz et al. [2019] showed that the mode of entry and location choices influence the type and nature of innovation activity. The green-field FDI foster innovation in core technologies, whereas brown-field FDI (mergers and acquisitions) support non-core technologies. Subsidiaries located in high income countries encourage product innovation, while subsidiaries in low income countries are conducive to process innovations. Villar et al. [2020] studied Spanish firms' foreign operation modes and link them with technological and organizational innovations. They differentiate resource-exploiting modes (exporting) from resource-augmenting modes (foreign joint venture, subsidiary, or acquisition). They have found that the resource-augmenting modes are favorable to organizational innovation, but the resource-exploiting modes do not support technological innovations as assumed. This leads to the conclusion that the effect of learning by internationalization depends strongly on the foreign operation mode and the choice of activity locations. Not only is it related with the innovativeness *per se*, but also with the type of innovations.

Very strong support for the thesis about firms' learning by internationalization is provided by research on international joint ventures and international strategic alliances, which are considered the most effective way of learning or acquiring technology and hidden knowledge embedded in other companies. It is believed that international joint ventures and strategic alliances facilitate transferring critical skills and abilities of firms that vary according to the national origin [Inkpen, 1998; Park, 2011]. In research on the international learning of firms participating in joint ventures and alliances, the attention of researchers is not limited to the transfer of knowledge from the host country to the home country. They analyze bilateral and multilateral flows of knowledge related to the exploitation and exploration of knowledge carried out between various entities that participate in these flows on an international scale. The subject of research is international, inter-organizational learning, including the ability to transfer knowledge, absorb it, and integrate it within an emerging network [e.g. Lane et al., 2001; Tsang, 2002; Tang et al., 2020].

The impact of learning by international joint ventures or strategic alliances on firms' innovativeness is quite difficult to investigate using quantitative analysis methods because of the fact that its effects are shared by many involved entities and it can be evaluated from different perspectives. It is easier to explore the relationship of innovation with the international involvement of transnational corporations (TNCs), which operate worldwide in various forms, including joint ventures and strategic alliances. The international involvement of multinational enterprises (MNEs) is usually expressed through exports and foreign direct investment (FDI) and by the spatial extent of markets. It is noted that firms differ in terms of

forms of international engagement, combining exporting with foreign direct investments related to their subsidiaries and foreign firms [Greenaway and Kneller, 2007]. These studies are part of a wider context regarding the influence of internationalization on the performance of firms [Kotabe et al., 2002; Greenaway & Kneller, 2007; Kafouros et al., 2008].

In the studies of relationships between the internationalization and innovativeness of international firms (TNCs, MNEs), the most frequently used measures are based on formative variables. For example the internationalization is expressed by FDI, number and distance to foreign markets, whereas the innovativeness is described by R&D expenditure, number of patents or number of patents' citations. Researchers associated with this issue indicate that the strength of the relationship between internationalization and innovativeness of firms depends on the degree of internationalization achieved, i.e. the degree of firm's international involvement determined by various forms of internationalization such as exporting and foreign investments, spatial scope of firm activity, and its international experience [Kotabe et al., 2002; Kafouros et al., 2008; Shearmur et al., 2015; Thakur-Wernz and Samant, 2017]. So, in all these cases, one cannot discuss any more about *learning by exporting*, but about *learning by internationalization*.

Kafouros et al. [2008] prove that only the most internationalized firms achieve positive results from their expenditure on innovations, and the size of the firm does not matter significantly. Furthermore, Frenz and Ietto-Gillies [2007] in their research on international firms in the UK confirm that the degree of internationalization affects the innovativeness of firms. Firms that are part of multinational networks, both domestic and foreign, are more innovative. Not only are all these firms characterized by greater innovativeness, but also by constant conduct of innovative activities. Castellani and Zanfei [2007] investigate the influence of the internationalization on innovativeness of firms manufacturing abroad. They indicate that international Italian firms which have manufacturing subsidiaries in foreign countries are more innovative than those that produce in their home country only. This is interpreted as evidence that access to more diversified knowledge related to production activities is a source of innovativeness.

Shearmur et al. [2015] link the product, process, management, and marketing innovations with the degree of internationalization, which is measured by export intensity of Canadian firms, proving that the exporters are more innovative than non-exporters. Thakur-Wernz and Samant [2017] indicate the influence of international experience of Indian firms on innovation performance and observe the moderating role of knowledge distance between the home and host country on this relationship. Xie and Li [2018] link the relationship between exporting and innovativeness with the distance in the institutional development of home and host countries. They state that, for exporters in emerging economies, stronger support for R&D and better-developed market intermediaries at home enhance the positive effect of exporting on firms' innovation, while market openness in the home region tends to dampen it. At the same time, exporters exporting mainly to other emerging economies tend to be more innovative than those exporting mostly to advanced markets.

The analysis of the literature review on the relationship of outward internationalization with innovativeness of firms is concluded with following hypotheses posited:

H1a: Outward internationalization is positively related with outward innovativeness.

H1b: Outward internationalization is positively related with inward innovativeness.

2.4.2 Inward internationalization and innovativeness

The theoretical foundations for the existence of relationships between the inward internationalization and innovativeness of firms can be traced both in the literature on outward/inward internationalization as well as in the one that deals with inward forms of internationalization only and their linkages with performance of firms. Because the coexistence and interdependence of outward and inward internationalization in a firm is not widely comprehended [Welch and Luostarinen, 1993; Korhonen, 1999; Fletcher, 2001], the relationships between both the outward and inward internationalization and innovativeness of firms

are rarely tested in empirical research. There are few researchers who address the issue of the influence of exporting and importing or outward and inward FDI on the performance or innovativeness of firms [Bernard et al., 2007; Şeker, 2012; Filippetti et al., 2017; Olabisi, 2017]. The conclusion of research by Bernard et al. is the existence of a positive influence of international openness on the performance of firms, both from developed economies and developing ones. Exporting and importing firms have a greater ability to survive and grow, especially when they also trade internationally with foreign firms or as the transnational corporations do—conduct internal transactions with their subsidiaries [Bernard et al., 2007]. Despite the positive influence of international business openness on firms' performance, research on the influence of both types of international exchange on firms' innovativeness is rare. Şeker [2012] in his study proves that both exporting and importing firms are not only growing faster, but are also more innovative than any other group. Exporters occupy the second place, and at the end of the list are firms which are not involved in international exchange [Şeker, 2012]. Research on firms from less developed economies, including the Polish one, also shows that firms that simultaneously export and import grow in the fastest pace and are most effective, followed by those who only export, then by only importing firms, and finally firms that do not participate in international exchange [Hagemeyer and Kolasa, 2011]. Şeker also indicates that firms with foreign capital are not more innovative than others. However, the international capital cooperation has a positive influence on the development of firms, as firms with foreign capital are developing faster than local firms [Şeker, 2012].

In a comprehensive study on the impact of internationalization on innovativeness of firms at countries' level, Filippetti et al. [2017] associate the relationship with an absorptive capacity of a country. Internationalization is represented by outward/inward FDI and exports/imports, while innovativeness is described by patent applications. They show that outward FDI is positively related with patenting, but the countries with high absorptive capacity (high-AC) benefit more. There is also a positive relationship between inward FDI and patenting in high-AC countries, but a negative association in low-AC countries, where inward FDI is supposed to replace innovation activity of local firms. They also indicate that only the low-AC countries benefit from both importing and exporting in terms of knowledge and innovation acquisition.

Last but not least, it is important to mention the results of two previous studies conducted by the author that are based on the same data set, research concept, and methodology. In the first study [Szymura-Tyc, 2015] the subject of analysis is the relationship between the overall internationalization (embracing both the outward and inward forms) with the overall innovativeness (including its outward and inward types). The holistic approach to internationalization and innovativeness revealed a positive relationship between the internationalization and innovativeness of firms with some differences existing by sector and size – stronger for industrial than service firms, and for large and small firms. The second study [Szymura-Tyc, 2018] abandons the holistic approach to innovativeness, linking the overall internationalization with most commonly studied types of innovativeness, i.e. product and process innovativeness. The outcomes of the research show that the overall internationalization contributes more to the process innovativeness than the product innovativeness. The context of these studies is the Polish transition and emerging economy, which may have an influence on the results and conclusions.

As it has been mentioned earlier, the smallest group of researchers focuses only on the inward forms of internationalization and performance of firms, finding that forms such as importing or inward foreign direct investments also support the innovativeness of firms [Greenaway et al., 2004; Salomon, 2006; Şeker, 2012; García et al., 2013; Jin et al., 2019]. However, in the research on relationships between inward internationalization and firms' innovativeness, it is the inward FDI which attracts significantly more attention than importing. These studies are very often conducted in a broader context (e.g. influence of inward FDI on the effectiveness of local firms) [Haskel et al., 2007] and bring diverse conclusions—from those pointing to their positive impact [Greenaway et al., 2004; Haskel et al., 2007]—to others showing the negative influence of inward FDI on innovativeness of local firms, but positive influence on their efficiency [García et al., 2013]. It is assumed that the type of economy, determined by the degree of its economic development is highly relevant to these results [Greenaway and Kneller, 2007; Şeker, 2012].

The outcomes of these studies are also related to the type of inward foreign investments and forms of activity of foreign firms in the host economy. For example, Greenaway et al. [2004] argue that in a developed

economy, such as the UK economy, inward FDI supports exporting of local businesses if the multinational firms carry on R&D locally and conduct exporting activities by themselves too. In turn, García et al. [2013] indicate that FDI coming to Spanish firms and industries has a negative influence on the innovativeness of local firms. They suggest that multinational companies do not rely on the innovations of their Spanish subsidiaries, but instead replace them with innovations coming from their own country or transfer the responsibility for innovations to the parent company. A similar negative effect on the innovativeness of local firms may result from FDI at the industry level, pushing out local innovations and forcing local firms to operate in less profitable niches. However, these researchers emphasize that foreign investments, both at firm and industry level, positively influence the effectiveness of local firms. As a result of a certain combination of competition and side effects related to knowledge flows, local firms introduce more effective production methods or—taken over by foreign partners—use their distinctive competences in the field of leading production methods on the local market. García et al. [2013] assume that inward FDI may be beneficial for local firms increasing their efficiency and helping them modernize production. However, the inward FDI have a detrimental effect on their innovative potential, because although foreign firms bring distinctive technological competences, they can reduce the ability of local firms to implement their own innovations.

In a later study on Spanish firms, Jin et al. [2019] consider the moderating role of technological capabilities on the relationship between inward FDI and local firm innovativeness. They assumed that domestic firms with existing technological capabilities are able to learn better from foreign entrants. Surprisingly, they have found that the local technological leaders apply for patents and introduce new products than the technological laggards. These results reveal that technological capabilities do not protect domestic firms from negative consequences of innovativeness of local firms subsequent to increased competition related with inward FDI.

Based on the literature review on the relationship between inward internationalization and innovativeness of firms, the following hypotheses are formulated:

H2a: Inward internationalization is positively related with outward innovativeness.

H2b: Inward internationalization is positively related with inward innovativeness.

3 Research methodology

The methodology of the research is based on the holistic approach to internationalization and innovativeness distinguishing their outward and inward forms, which is a unique feature of the study. It corresponds with calls for creating more multifaceted measures of internationalization and innovativeness of firms, which could be better adjusted to different firms' characteristics and settings (firm size, industry, economy, or such). Most of the previous studies on relationships between firms' internationalization and innovativeness used individual structural variables, such as, export share, a share of employment, or capital abroad, or the number of foreign markets, R&D expenditure, the type and number of innovations. The selection of variables was usually justified by a specific, narrow focus of a given study or data available in the secondary sources.

The study attempts to cover a vast spectrum of variables constituting the research concepts using a set of complex formative measures. The measures are built on the relevant conceptual assumptions founded in the theory of internationalization and the theory of innovation. They also refer to some already existing measurement practices. The conceptualization, operationalization, and measurement concepts of outward/inward internationalization and outward/inward innovativeness are discussed further.

3.1 The degree of outward and inward internationalization

The *degree of internationalization* refers to the firm's overall involvement in the international market with regard to the number and distance of markets. This research considers both the outward and the inward internationalization separately. The *degree of outward internationalization* embraces variables connected

to the outward forms of internationalization, whereas the *degree of inward internationalization* includes the indicators related to the inward forms of internationalization.

The idea of measuring both outward and inward internationalization responds to the call for a more holistic approach to the internationalization of firms [Welch and Luostarinen, 1993; Korhonen et al., 1996; Jones, 1999, 2001; Fletcher, 2001, 2008]. The underlying assumption is that the outward and inward forms of internationalization usually coexist and support each other in a way challenging their separate examination.

The measurement of the degree of internationalization is built based on the experience of UNCTAD in the use of composite indices of the degree of (outward) internationalization in transnational corporations (e.g. the transnationality index—TNI, and the geographical spread index—GSI) [Ietto-Gillies, 1998; Ietto-Gillies and London, 2009]. It also refers to the degree of (outward) internationalization (DOI) scale constructed by Sullivan [1994] combining variables of different nature (i.e. structural, performance-related and attitudinal/behavioral) to measure the degree of the firm's internationalization [Sullivan, 1994; Dörrenbächer, 2000].

The firm's internationalization is a state achieved after rather long-term, incremental, gradual, and evolutionary process, related to the firm's past and current involvement in international operations. Hence, in this study, the degree of the outward/inward internationalization plays a role of the variable independent from the firm's innovativeness.

Table 1 shows the formative indicators and weights used for the construction of the measure of the degree of the firm's outward and inward internationalization.

The outward/inward internationalization indices developed for the study cover multiple forms of firms' internationalization. Unlike the measures adopted for transnational corporations, they do not employ only the variables representing exporting/importing and outward/inward foreign direct investments (FDI), but also contractual forms (e.g. licensing-out/in, franchising-out/in). This is based on the assumption that the contractual forms of internationalization (*NEMs—non-equity modes*) are nowadays the fastest developing network forms of conducting international operations and especially useful for less internationally experienced firms [WIR, 2011].

Similarly to the DOI index, the internationalization indices comprise the firm's international experience as well as the scope and spread of internationalization reflected by the number of foreign markets and their physical and psychic distance from the Polish market. Hence, the measurement concept considered should be adjusted to the context of the emerging Polish economy, which generally represents a low degree of internationalization, i.e. low intensity of international activity, a rare use of capital forms of internationalization, and a relatively narrow scope and spread of foreign activity of firms.

3.2 The degree of outward and inward innovativeness

The *degree of innovativeness* is defined here as the firm's overall product, process, marketing, and organizational innovativeness, which embraces the propensity to innovate (innovation spending) and

Table 1. Formative indicators constituting the outward and inward internationalization indices

Outward internationalization index	
Formative indicators	Weight
Outward internationalization forms and markets	0.40
Export share in sales and markets	0.40
Firm's international experience and markets	0.20
Inward internationalization index	
Formative indicators	Weight
Inward internationalization forms and markets	0.40
Import share in sales and markets	0.40
Firm's international experience and markets	0.20

the intensity of innovation (the number and newness of innovations). Two types of innovativeness are considered in the study: *outward innovativeness* that comprises variables related to product and marketing innovations, and *inward innovativeness* that includes process and organizational innovations variables.

The idea of using complex measures of innovativeness is aligned with the findings of many researchers, who called for a more holistic approach to the innovativeness of firms, and proved the need to use more comprehensive sets of innovation variables. It is especially important in more comprehensive studies on relationships between innovativeness and performance of firms varying in size and industry [e.g. Hollenstein, 1996; Kleinknecht et al., 2002; Hagedoorn and Cloudt, 2003; Adams et al., 2006].

The concept of measuring innovativeness by complex indices also refers to the innovativeness measures developed and used by OECD and the European Commission. For example, the Summary Innovation Index (SII) comprises seven factors from three areas: enablers, firm activities, and outputs, considered to constitute the overall innovativeness of the European economies [IUS, 2013].

In this study, the firm's innovativeness is considered as a state resulting from innovation activities conducted by a firm in a given period of time. The innovativeness of a firm as a state must be renewed periodically. The enablers (e.g. R&D spending) and the outcomes (e.g. innovations) must be continuously undertaken to sustain the innovativeness of a firm over a longer period of time. Hence, the degree of the firm's innovativeness stands here for the variable dependent on internationalization.

The formative indicators along with their weights used for the construction of the indices measuring the degree of the outward and inward innovativeness are presented in Table 2.

The indices measuring the degree of the outward and inward innovativeness include innovation newness (new to a firm, new to a domestic market, or new to an international market) and the number of implemented outward (product and marketing) and inward (process and organizational) innovations. These indicators represent innovation intensity. Propensity to innovate is represented by the share of innovation-related expenditure in total expenditure (by product, process, marketing, and organizational innovations) and R&D spending on innovation (by innovation type: product—outward, process—inward). Because of the potential impact of the industry specificity on the number of innovations implemented and R&D spending, individual variables are referred to their level achieved by competitors.

3.3 Data collection and sampling

The empirical data were collected through direct interviews conducted in 274 Polish firms. A structured questionnaire was used. Purposive sampling was applied to select firms demonstrating an innovative activity irrespective of or simultaneously with their innovativeness, involved in international markets through the outward internationalization forms (e.g. exporting) or the inward internationalization forms (e.g. importing). The research sample is heterogeneous, with the exception of ownership – almost all the

Table 2. Formative indicators constituting the outward and inward innovativeness indices

Outward innovativeness index	
Formative indicators	Weight
The degree of newness of product and marketing innovations	0.35
Number of product and marketing innovations against competitors	0.20
The share of product innovation expenditure in total expenditure	0.25
R&D product innovation expenditure against competitors	0.20
Inward innovativeness index	
Formative indicators	Weight
The degree of newness of process and organizational innovations	0.35
Number of process and organizational innovations against competitors	0.20
The share of process innovation expenditure in total expenditure	0.25
R&D process innovation expenditure against competitors	0.20

firms (96%) are privately owned companies. The sample embraces firms operating both in the industry (54%) and services (46%) sectors. Small and medium firms each constitute approximately 40% of the sample, while large firms account for 20%. Most of the firms (67%) do not belong to any capital group. Firms with solely Polish capital constitute 68% of the sample, whereas the remaining firms have foreign equity—exclusively or partially. The heterogeneity of the sample is intentional as it gives an opportunity to create and test more universal measures to study the related phenomena in different types of firms. A firm's sector, size, capital origin, and affiliation to a capital group are considered control variables in this study.

4 Research results

Table 3 summarizes descriptive statistics of the key constructs of the research. The final values of the indices are normalized to take the value from 0 to 1. The normalization of the value of the indices facilitated their

Table 3. Descriptive statistics for internationalization and innovativeness indices (N=274)

Index	Mean	Tests	Range	Standard deviation
Outward internationalization	0.125		0.713	0.125
Industry	0.162	Statistically significant differences – test U MW		
Services	0.089			
Small	0.111	Statistically insignificant differences		
Medium	0.136			
Large	0.127			
Affiliated	0.125	Statistically insignificant differences		
Non-affiliated	0.124			
Inward internationalization	0.123		0.663	0.118
Industry	0.139	Statistically significant differences – test U MW		
Services	0.109			
Small	0.119	Statistically insignificant differences		
medium	0.127			
Large	0.121			
Affiliated	0.121	Statistically insignificant differences		
Non-affiliated	0.128			
Outward Innovativeness	0.319		0.910	0.154
Industry	0.329	Statistically insignificant differences		
Services	0.310			
Small	0.296	Statistically insignificant differences		
Medium	0.335			
Large	0.309			
Affiliated	0.315	Statistically insignificant differences		
Non-affiliated	0.328			
Inward Innovativeness	0.281		0.800	0.148
Industry	0.305	Statistically significant differences – test U MW		
Services	0.258			
Small	0.252	Statistically significant differences for small and large firms – Kruskal-Wallis test		
Medium	0.290			
Large	0.309			
Affiliated	0.269	Statistically significant differences – test U MW		
Non-affiliated	0.306			

comparisons within the intended value range. The normalized values of the indices are regarded as low if within the range 0.0–0.19, moderate: 0.2–0.39, high: 0.4–0.59, and very high if above 0.6.

The results for the entire research sample show that the mean degree of both outward and inward internationalization is low (slightly higher for outward internationalization). The vast majority of firms present the low degree for both types of internationalization and strong right asymmetry in their value distribution. The means of the indices of the outward and inward innovativeness indicate moderate innovativeness of the surveyed firms within a very large range (bigger for outward innovativeness) and almost normal distribution.

The mean values of the degree of outward and inward internationalization and innovativeness vary by sector, firms' size and capital group affiliation. Nevertheless, most of the differences between the mean values of the indices are statistically insignificant, and none of them showed significant differences for firms varying by capital origin. The degrees of the outward and inward internationalization differ by sector—both are higher in industry than in services, and the degree of the outward internationalization in industry is twice as high as in services. The inward internationalization does not show any statistically significant differences between the groups of firms. The degree of innovativeness shows statistically significant differences only in the case of inward innovativeness. It varies between sectors, firm's size, and capital group affiliation, being higher for industrial then for service firms, for large firms versus small ones, and for non-affiliated to capital group, but the differences are rather small (approximately 0.05).

Further, to test the research hypotheses Pearson correlation coefficient r was used, which showed statistically significant, weak to moderate positive linear correlations between the majority of the internationalization and innovativeness indices, as presented in Table 4.

Table 4. Correlations between internationalization and innovativeness indices (N=274)

	Outward innovativeness	Inward innovativeness
Outward internationalization	.217**	.311**
Industry	.272**	.310**
Services	.149	.234**
Small	.264**	.364**
Medium	.147	.265**
Large	.269**	.287**
Affiliated	.208**	.339**
Non-affiliated	.222**	.305**
Domestic capital only	.240**	.343**
With foreign capital	.179	.297**
Inward internationalization	.106	.182**
Industry	.078	.169
Services	.121	.161
Small	.143	.152
Medium	.006	.227**
Large	.097	.140
Affiliated	.170	.266**
Non-affiliated	.071	.141
Domestic capital only	.083	.175**
With foreign capital	.158	.238**

** $p < 0.05$.

First, the correlation analysis for the entire sample confirms the presumption of the study that internationalization is positively related to innovativeness of firms. In most cases, the hypotheses are verified and the statistical significance of the results is found to be high enough, though the strength of correlations is not large (weak to moderate).

Second, the hypotheses H1a and H1b, predicting that the outward internationalization is positively related to the outward and inward innovativeness are supported. However, the strength of the correlation between the outward internationalization is higher for the inward innovativeness than for the outward innovativeness, which is an unexpected result. This result involves the entire sample and all types of firms grouped by sector, size, capital group affiliation and origin of capital. It is strongest for small firms, affiliated to a capital group and with domestic capital only. The outward internationalization is not conducive to outward innovativeness for service, medium-sized firms, and firms with foreign capital shares.

Third, the testing of hypotheses H2a and H2b, which presume positive effect of the inward internationalization on the outward and inward innovativeness, brought mixed results. The hypothesis H2a, stating that the inward internationalization is positively related to outward innovativeness has not gained the required support and should be rejected. The hypothesis H2b, predicting the positive relationship between the inward internationalization and the inward innovativeness has been supported. The relationship concerns the entire sample and only some types of firms, i.e. firms of medium size, affiliated to a capital group, both with foreign capital and without it.

To sum up, the outward internationalization is favorable to both the outward and inward innovativeness of firms, whereas the inward internationalization supports only the inward innovativeness. Moreover, the strength of relationships is particularly larger for the outward internationalization than for the inward internationalization. Furthermore, the relationships of internationalization with innovativeness are in general stronger for the inward innovativeness, then for the outward innovativeness. In addition, noticeable differences exist when the type of firms is considered—in many cases the strength of the correlations either increases or decreases for individual groups of firms.

5 Conclusions and discussion

The outcomes of the study show that the outward internationalization is supporting both the outward innovativeness (based on product and marketing innovations) and the inward innovativeness (related with process and organizational innovations), in which the latter relationship is stronger, while the inward internationalization is conducive only to the inward innovativeness of firms. The revealed differences in relationships between the outward and inward types of internationalization and innovativeness confirm the rationale for employing a holistic approach to the examination of firms' internationalization [Jones, 1999, 2001; Fletcher, 2001, 2008] and innovativeness [Hollenstein, 1996; Kleinknecht et al., 2002; Hagedoorn & Cloudt, 2003] and particularly important when firms are engaged in both types of internationalization and innovativeness, which is quite common.

The research results may be interpreted in the context of knowledge which is developed and gained in the internationalization and innovation processes, resulting in international competitiveness of the firms studied. They show that internationalization is a source of different types of knowledge acquired through firm's involvement in international operations. The technological, market, and marketing knowledge are necessary for product and marketing innovation, while the technological, managerial, and business knowledge are more important for the process and organizational innovations. The first type of innovativeness (outward) leads to differentiation-based advantage on the international market, which is supported only by the outward internationalization. The second type of innovativeness (inward) is related to the cost-based competition and may be supported by both the outward and inward internationalization. This confirms the results of other studies stating that in less developed or emerging economies, which are generally characterized by a low degree of internationalization and innovativeness, both the outward and inward internationalization are rather used for enhancing the cost-based advantage than the differentiation-based advantage.

The differentiation-based competitive advantage is supported only by the outward internationalization, most strongly for both small and large firms from industry and with domestic capital only. The cost-based advantage is supported by both the outward and inward internationalization. In the first case, the strongest relationships observed in firms which are small, affiliated to a capital group and with domestic capital only, while the latter case relates to a medium size firm affiliated to capital groups both with foreign capital share and with domestic capital only. These findings corroborate the purposefulness of examining the relationships between internationalization with the use of universal measures, which has been the methodological assumption applied in this research for the related phenomena of internationalization and innovativeness in different types of firms. They also indicate the necessity of recognizing the type of a firm by sector, size, capital group affiliation, and origin of capital in further research on the relationship between internationalization and innovativeness of firms, because the results are dependent on the type of a firm.

The results of the study may be specific for firms in Poland as a transition and emerging economy and a modest innovator among other EU economies (IUS, 2013). In this type of economy price competition is still a dominant force, while differentiation is limited to imitation of product innovations created elsewhere. Having a relatively large and still growing domestic market like the Polish one, firms do not need to go abroad to survive and develop. They may implement product and marketing innovations (outward innovativeness) based on their domestically developed technological and market knowledge to compete on the home market still dominating in their sale. They use outward and inward internationalization to gain access to technological and managerial knowledge necessary to pursue cost-reducing measures by implementing process and organizational innovations (inward innovativeness). They can compete in domestic and international market with domestic and international firms by offering lower price and similar or higher quality products and services. This type of competitive strategy based on the cost-based advantage and the quality dominates also in other transition economies from Central and Eastern Europe (CEE). However, the ability to create differentiation-based advantage by outward (product and marketing) innovations is constantly growing [Stojcic et al., 2011].

The relatively weak correlation between the outward internationalization and outward innovativeness and lack of correlation in case of the inward internationalization may also result from a low degree of innovativeness and internationalization of the studied firms, which is also true for the majority firms in Poland. The low innovativeness of firms may be a source of their *liability of newness* and *liability of unconnectedness* [Powell et al., 1996]. Furthermore, their low level of engagement in R&D and innovation processes may result in a lack of *absorptive capacity of knowledge* (technological, market, and managerial) necessary for innovation [Cohen and Levinthal, 1999]. This means that the internationalization—both outward and inward—does not serve as a vehicle for acquiring new knowledge since the knowledge already possessed by the firms is not sufficient to absorb the new knowledge from the foreign markets and partners. The transfer of technological, market, and marketing, as well as managerial and business knowledge is therefore hindered by the firms' inability to absorb the new knowledge and the effects of *liability of newness* or *liability of unconnectedness* come into existence [Zahra et al., 2000].

The same concerns the low degree of internationalization of the firms surveyed (and other firms in Poland), which manifests itself by small shares of exports/imports in their sale, lack of more advanced forms of international involvement (i.e. contractual agreements, joint ventures, alliances, FDI) and narrow scope of their international activity (mainly the EU markets). The effect of *learning by internationalization* may appear only in the more internationalized firms, and it seems that most of the studied firms have not yet achieved the threshold of ability to learn to innovate from international markets and partners. This also goes in line with the Johanson and Vahlne Uppsala model revised in 2009 [Johanson and Vahlne, 2009]. The *liability of outsidership* of Polish firms operating in the economy characterized by a low level of internationalization means that most of them have no access to relevant networks offering resources and knowledge necessary for further internationalizations and innovativeness. Though the *liability of foreignness* no longer creates an important barrier for Polish firms operating mainly within the Single European Market, their involvement in international operations abroad and at home is still very low. Network ties with mainly local partners are not used for knowledge exploration which could enable firms' innovativeness and expansion to foreign markets. The exploitation of firms' own knowledge enables only

continuing along their familiar path of development and enjoying the lower risk of resource commitment in the domestic market, i.e. they stay at home, large and still developing market [Forsgren, 2002; Hadley and Wilson, 2003; Sharma and Blomstermo, 2003].

6 Limitations and further research

The current study has a few limitations. One is related to the research sample, which is non-representative, thus reducing the opportunity to generalize the results. The sample is heterogeneous but not large; as a result the subsamples are rather small, which weakens the strength and statistical significance of the results obtained. Future research might focus on samples that are either similar by size and more homogenous, or heterogeneous and larger. These might enable testing the hypotheses with the use of more advanced analytical methods (e.g. regression), which was not possible in the study presented. The use of correlation analysis is a limitation of the study, which might be perceived as an exploratory one, but opening new avenues for future research with use of more advanced analytical method (e.g. PLS proper for formative variables). Another limitation is that the results of the study may be specific for firms in Poland. However, these findings may also remain true for other transition or emerging economies, which are not very innovative and begin to engage in international market to enhance their international competitiveness.

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