Innovation and export performance: a meta-analytic review and theoretical integration

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Innovation and Export Performance: A Meta-Analytic Review and Theoretical Integration

Abstract

Purpose: Since an accumulated body of research has examined the link between innovation and export performance and little attention has been paid to consolidate the existent fragmented findings in the pertinent literature, the objective of this research is to systematically integrate empirical findings based on a meta-analysis of relevant research investigating the association between innovation and export performance.

Design: In this research, correlations within individual studies were examined through performing a meta-analysis, which assists to synthesize the entire findings among past individual studies and helps to quantify the aggregated results. In total, 38 articles surveyed 554,227 exporting manufacturing companies were analyzed through a meta-analysis of 145 total effects.

Findings: This study demonstrates that innovation is a strategic source to achieve competitive advantage with an intent to achieve superior performance in export markets. In this sense, the results reveal that while there is a significant relationship between innovation activities of companies and their export performance, export strategic performance dimension captures important facets in this relationship. Moreover, the results indicate that conceptualization of innovation and the development level of countries moderate the link between innovation and export performance. While output-oriented innovation is more influential on innovation-financial export performance association, the input-oriented innovation is more influential on strategic and market performance.

Originality: This present study attempted to synthesize fragmented results examining innovation-export performance link via revealing potential moderators on the association between innovation and export performance and providing important insights for both practitioners and scholars.

Keywords: Innovation; export performance; meta-analysis; moderator analysis
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1. Introduction

Recent decades have been characterized by an increased internationalization of business environments with the effect of two substantial phenomena - globalization and technological change (United Nations, 2009; World Trade Organization, 2004). Being competent in the achievement of export success is regarded as a principal sign of competitiveness in the global market (Roper and Love, 2002). Therefore, a substantial amount of empirical research has been compiled investigating the forces stimulating the export success of companies in the last two decades (Chen, Sousa, and He, 2016). In this sense, the extant literature puts an excessive emphasis on ‘innovation concept’ as a means of surviving in these highly competitive and dynamic environments (Azar and Ciabuschi, 2017; Bagheri et al., 2019). Innovation and internationalization are considered as highly related since innovation assists companies in penetrating their business operations by means of exporting (Blyde et al., 2018; Saridakis et al., 2019) and companies that are highly innovative can cope with liability of foreignness by their special technological innovations (Li, 2018).

However, an accumulated body of research has demonstrated that differences in innovation highly influence the behavior and performance of export companies and necessitate further research in the context of specific industries with diverse degrees of technologies (e.g., Oura, Zilber, and Lopes, 2016; Gkypali, Rafailidis and Tsekouras, 2015; Azar and Drogendijk, 2016; Saridakis et al., 2019; Exposito and Sanchis-Llopis, 2019). Besides, companies may handle specific risks in international markets as they gain competitive advantages which differentiates them from their major rivals (Pla-Barber and Alegre, 2007). In this context, the phenomena of innovation constitute a vital place in the achievement of competitive advantage (Tavassoli, 2018), since a competitive advantage stems from accumulated know-how, technological abilities and experience in the process of new product development (Teece, Pisano, and Shuen, 1997; Tidd, Bessant, and Pavitt, 1997; Paul et al., 2017).

In addition, a large body of empirical studies examining the link between innovation and export performance, reveals inconsistent and fragmented results (Love and Roper, 2015). While several studies have demonstrated a significant positive linkage between innovation and export performance (e.g., Fernandez-Mesa and Alegre, 2015; Costa, Lages and Hortinha, 2015; Guan and
Ma, 2003; Lee et al., 2016), others have reported that innovation has a negative impact on export performance (e.g., Boehe and Cruz, 2010) and does not have a significant effect on export performance (e.g., Silva et al., 2017). In particular, empirical findings can be also differentiated with regard to the nature of innovation, since innovation has various different perspectives and distinct types of innovation can result in distinct impacts of performance in export markets (Damanpour and Aravind, 2011). For instance, Azar and Ciabuschi (2017) reported a positive and significant finding for the link between organizational innovation and export performance, whereas the scholars could find a partial support for the linkage between technological innovation and export performance. Further, Zhang and Zhu (2016) have demonstrated a positive association between innovation performance and export performance. However, Silva et al. (2017) have presented a non-significant effect of innovation on economic export performance and negative impact of innovation on strategic export performance, while the researchers have revealed significant influence of technological innovation for both strategic and economic export performance.

Although there have been some attempts to review this line of research, prior review and meta-studies have not concentrated on the innovation-performance relationship in the international context (e.g., Rosenbusch et al., 2011; Bowen, Rostami and Steel, 2010) via focusing merely on small and medium sized companies (e.g., Love and Roper, 2015), the dimensions and determinations of innovation (e.g., Crossan and Apaydin, 2010; Camisón-Zornoza et al., 2004). In this sense, there exists a need to consolidate all existent empirical studies examining the link between innovation and performance within export context in consideration of diverse effects of innovation on the various types of export performance.

With an intent to fill the knowledge gap, the present study was aimed to systematically synthesize the research findings based on a meta-analysis of existent empirical studies investigating the relationship between innovation and export performance. In accordance with this, this meta-analysis endeavours to acknowledge the following research questions: (a) Does the association between innovation and export performance provide widespread findings across different environmental contexts? (b) Are the associations between innovation and export performance affected by country-level factors and diverse measurement types? (c) Which theoretical and managerial implications does innovation offer with regard to its outcomes (i.e., export strategic
performance, export market performance, and export financial performance) and boundary conditions (i.e., country level factors and measurement types)? In particular, the objectives of this meta-analytic study are threefold: (1) to examine previous empirical findings related to the association between innovation and its export performance related consequences; (2) to test the country-level and measurement factors which moderate the relationship between innovation and different dimensions of export performance (i.e., strategic, market, and financial); and (3) to present theoretical, managerial, and societal implications with an aim of enhancing the research stream on innovation within export context. In this sense, the research framework of this meta-analysis can be seen in Figure 1. The rest of the study is organized as follows. First, the pertinent literature on the link between innovation and export performance is presented. Following that, the details of the methodology are presented. Afterwards, research findings are reported and discussed via drawing conclusions, limitations and managerial implications.

“Insert Figure 1 about here”

2. Theoretical Background

The pertinent literature concentrating on the relationship between innovation and export performance can be examined under three classes; (a) nature, (b) antecedents and (c) outcomes. The first stream focuses on innovation concept, discussing their types in terms of technological innovation, consisting of process and product innovation (e.g., Silva et al., 2017; Azar and Ciabusch, 2017; Azar and Drogenjik, 2016; Azari et al., 2017; Boehe and Cruz, 2010; Boso et al., 2019; Pla-Barber and Alegre, 2007; Faroque et al., 2017; Lages et al., 2009), organizational innovation, involving managerial and marketing innovation (e.g., Bodlaj et al., 2018; Silva et al., 2017; Azar and Ciabusch, 2017; Azar and Drogenjik, 2016), innovation capabilities (e.g., Oura et al., 2016; Ribau et al., 2017; Arslanagic-Kalajdzic et al., 2017; Rodriguez et al., 2013; Costa et al., 2015; Flor and Oltra, 2005; Guan and Ma, 2003; Hortinha et al., 2011), innovation resources (e.g., Ogasavara et al., 2016; Zhang and Zhu, 2016), innovation performance (e.g., Fernandez-Mesa and Alegre, 2015; Zhang and Zhu, 2016).

The second area involves the research examining the antecedents of innovation-performance relationship within exporting context, consisting of firm capabilities, strategic orientations, relational factors, contextual factors and other conceptualization of innovations. With regard to firm capabilities, while some scholars support the significant impacts of learning capabilities on
innovation-export performance link (i.e., technological learning, market learning) (e.g., Rodriguez et al., 2013), others reveal the importance of organizational learning capabilities, relationship capabilities, quality capabilities, and market capabilities (e.g., Lages et al., 2009; Silva et al., 2017)

Respecting to the strategic orientations, most of the studies examined the antecedent role of strategic orientations on innovation-performance link within exporting context. For instance, Hortinha et al. (2011) investigated how customer orientation and technological orientation influence exploratory and exploitative innovation, whereas, Fernandez-Mesa and Alegre (2015) focused on the role of entrepreneurial orientation and supported its significant place in innovation performance within exporting context. In terms of relational factors, only one study has explored the impact of personal networking and inter-firm networking on innovativeness within exporting context (e.g., Faroque et al., 2017). On the other hand, concerning to the contextual factors, Azar and Drogenjik (2016) have found the positive effect of cultural distance on technological and organizational innovation, while Ogasavara et al. (2016) have revealed the insignificant impact of export experience on innovation resources within exporting context.

The third division consists of the nature of performance related outcomes of innovation within exporting context. Although most of the studies focus on the role of innovation in influencing overall export performance (e.g., Oura et al., 2016), some of them approaches its different dimensions which center on strategic, financial and market-related performance within exporting context. Regarding to the strategic dimension, prior research examined the positive and significant effects of innovation-related constructs in improving strategic export performance (e.g., Silva et al., 2017; Azar and Drogenjik, 2016; Azar and Ciabusch, 2017). With reference to market perspective, the pertinent literature focused on examining the significant effect of innovation in enhancing market export performance (e.g., Ogasavara et al., 2016). However, most of the studies concentrated on investigating the significant effects of innovation on financial performance related outcomes within exporting context (e.g., Pla-Barber and Alegre, 2007; Fernandez-Mesa and Alegre, 2015; Guan and Ma, 2003; Lages et al., 2009; Azar and Drogenjik, 2016; Azar and Ciabusch, 2017; Ogasavara et al., 2016). In addition, Silva et al., (2017) analyzed the interplay between the different types of innovation on different types of export performance by addressing the effects of market and technology innovation on strategic and economic performance. Moreover, there appears also a limited number of studies examining the positive effect of
innovation-related construct on relationship performance within exporting context (Lages et al., 2009).

3. Conceptual Model and Hypotheses

3.1. Innovation and Export Performance

The concept of internationalization has been widely acknowledged in the literature, especially the importance of exporting for both firm and national growth (Dhanaraj and Beamish, 2003, Roper and Love, 2002). Within the context of international business, the attention given to exporting has increased over the past decades (Leonidou, Katsikeas, and Coudounaris, 2010). As globalization increasingly intensifies the competition, firms are compelled to internationalize in order to exploit opportunities for their survival. Exporting is considered as the most common and basic market entry mode, especially for small and medium sized firms (Leonidou et al., 2002; Guan and Ma, 2003). However, firms need to develop capabilities that enable them to survive and outperform their rivals in the global arena (Barney, 1991; Teece, 2007). Studies in the literature have shown that innovation can boost firm performance and the national economy (Weerawardena et al., 2006; Thornhill, 2006; Li and Atuahene-Gima, 2001; Walker, 2004). Through innovation activities, firms can effectively utilize the opportunities in international markets (Paul, et al., 2017). Therefore, innovation efforts and competitiveness in global markets are considered as the source of high performance (Guarascio et al., 2017). In addition, despite the number of studies in the literature, the relationship between innovation and export performance still needs to be uncovered (Love, Roper, and Zhou, 2016). In this sense, Schumpeter (1934) views innovation as the source for creating value. According to Lepak, Smith and Taylor (2007), success in international markets depends on the innovation operations of companies. Also, Schumpeter (1934), as being the pioneer of innovation, stressed the importance of the introduction of new technologies and the creation of new markets for national growth. Therefore, innovation is considered to be critical for gaining and maintaining a sustainable competitive advantage in overseas markets in order to utilize the economies of scale and scope (Fernández-Mesa and Alegre, 2015). Innovation is viewed as a process whereby ideas are transformed into a commercial asset that can be in terms of products, processes, structures, strategies or systems for maintaining the sustainable market position and outstanding performance in international markets (Gunday et al., 2011; Roper and Love, 2002). Moreover, R&D, developing new products, processes, and organizational structures to adapt to
external environment, or improving already existing processes and products, plays a crucial role in the international success of companies (Guarascio et al., 2017; Hamel, 2006; Roper and Love, 2002; Wang et al., 2008; Alvarez, 2004). Hence, in today's hypercompetitive environment, where product life cycles are getting shorter and shorter, innovation is regarded as the key to keeping pace with the changes in the market and adapting internal firm strategies to the external environment that are considered as the sources of success (Cardinal, 2001; Tushman and O'Reilly, 1996). In addition to those benefits, companies may learn from their innovation activities, which is also crucial for enhancing their export performance (e.g., Van De Ven and Polley, 1992; Guan and Ma, 2003; Javernick-Will, 2009; Azar and Drogendijk, 2016; Azar and Ciabuschi, 2017; Ribau et al., 2017). On the other hand, the role of innovation on firm-level behavior has received attention in the extant literature (Wakelin, 1998; Azar and Ciabuschi, 2017; Kirbach and Schmiedeberg, 2008; Bodlaj et al., 2018; Dohse and Niebuhr, 2018; Rua et al., 2018). Aforementioned studies examining the link between innovation and export performance still demonstrate fragmented and inconsistent results (e.g., Fernandez-Mesa and Alegre, 2015; Costa, Lages and Hortinha, 2015; Guan and Ma, 2003; Silva et al., 2017; Azari et al., 2017; Lee et al., 2016). These controversies in the literature emerge due to the different measurements of innovation in the pertinent literature (Cruz-Cazares et al., 2013). According to Womack et al. (1990), if the innovation operations of a company do not provide any efficiency, such as lowering production costs, the returns of those innovation activities may harm company performance, especially if the firm suffers from resource inadequacy. In addition, as innovation by its nature is a risky and costly investment, if the management of this process is not handled thoroughly the hazards can be inevitable and it would take a long time to recover from such a mishap (Simpson et al., 2006).

In addition, the controversies regarding the relationship between innovation and export performance can be related to a different conceptualization of export performance (Zou et al., 1998). Operationalization of export performance shows variations, which are due to the different conceptualizations of the construct (Leonidou and Katsikeas, 2010; Brouthers et al., 2009). There are controversies on the measurement and the conceptualization of export performance (Shoham, 2003; Aaby and Slater, 1989; Al-Khalifa and Morgan, 1995). For instance, some researchers prefer using subjective measures, which are based on the self-examination and perceptions of respondents (Katsikeas, Piercy and Ioannidis, 1996). Others prefer to use objective measures
dependent on financial numbers with respect to the firm’s sales, profitability and growth (Katsikeas, Piercy and Ioannidis, 1996). Also, some prefer to use a combination of both subjective and objective measures at the same time (Cavusgil and Kirpalani, 1993; Cavusgil and Zou, 1994; Shoham, 1998; 2003). strategic, market, financial, economic, process, behavioral, and relationship types. Some measurements cover all of these classification types (Carneiro, 2016; Lages et al., 2009). Therefore, the effect of innovation differentiates depending on the type of export performance in the extant literature, as market innovation was found to have a positive relationship with export economic performance, it shows a negative relationship with export strategic performance (e.g., Silva et al., 2017).

With regard to export strategic performance, it focuses on the extent that a firm achieves its strategic goals as outcomes of exporting (Cavusgil and Zou 1994). Strategic goals reflect the strategic global position, global competitiveness in the market and satisfaction with the overall performance (Evans and Mavondo, 2002; Evans et al., 2008). Since innovation provides strategic flexibilities to companies such as adapting to different markets, different cultures, meeting with different customers’ needs and conducting different business practices, it has a crucial place in enhancing export strategic performance (Hitt et al., 1994). Also, prior studies support the positive association between innovation and export strategic performance (Azar and Ciabusch, 2017; Costa, Lages and Hortinha, 2015).

\textbf{H$_1$:} There is a positive relationship between innovation and export strategic performance.

Financial performance measurement is the most common measurement type of export performance, which focuses on the financial returns of exporting (Zou et al., 1998). Financial export performance reflects a firm's export sale, export sales growth (e.g., Cavusgil 1984; Cooper and Kleinschmidt 1985), profitability of exports (e.g., Madsen 1989), and export ratio achieved in international markets (e.g., McGuinness and Little 1981). Companies that pursue innovation are likely to be more productive and have profitable returns in abroad markets (Mansion and Bausch, 2019; Silva et al., 2017). Firms can achieve superior financial performance and enjoy a high level of profitability through their unique products and processes through which the firms have achieved efficiency (Wolff and Pett, 2006). Especially product innovations act as an enabler of financial performance since product success can boost financial performance of firms (Rubera and Kirca, 2012). Given the highly volatile markets, firms that pursue and engage innovations are more likely
to achieve high levels of performance and growth (Bayus et al., 2003, Srinivasan et al., 2009). Innovation can provide firms with first mover advantages that result in long-term firm profitability (Roberts and Amit, 2003). In addition, innovations can act as an inhibitor of cash flow vulnerability by launching new products into markets (Srinivasan et al., 2009).

In previous literature, the relationship between innovation on financial export performance has been found as positive (e.g., Oura et al., 2016; Silva et al., 2017; Aarstad et al., 2015).

**H2:** There is a positive relationship between innovation and export financial performance.

In respect to export market performance, it concentrates on the market related activities of a company (Katsikeas et al., 2000). This includes the number of countries/markets in which a firm operates, market expansion, the number of new export markets, export market share, export market share growth and market diversification (Katsikeas et al., 2000; Sousa, 2004). Engaging in innovation increases firm responsiveness to rapidly changing market conditions that can increase customer loyalty and satisfaction (Mole and Worrall, 2001; Damanpour et al., 2009; Lawrence and Lorsch, 1967; Lieberman and Montgomery, 1988; Rialp-Criado and Komochkova, 2017). New product developments and widening the product lines also have positive effects on export market performance, since firms may increase their market penetration through their new product and service lines (Cassiman and Golovko, 2011; Cirera et al., 2015; Mansion and Bausch, 2019). In addition, firms produce a higher quality of products through their innovation capabilities, which in turn, creates a competitive advantage for them in overseas markets and increases their export market performance (Roper and Love, 2002). Through innovation, companies identify and serve niche markets with their unique products and services (Knight and Cavusgil, 2004). In the literature, the relationship between innovation and export market performance has received attention and found to be positive (e.g., Ogasavara et al., 2016; Azari et al., 2017; Arslanagic-Kalajdzic et al., 2017). According to the literature, the following hypothesis has been developed.

**H3:** There is a positive relationship between innovation export market performance.

3.2. Moderators of the innovation-export performance relationship

The conceptualization and measurement of innovation has been made in various forms in the literature (Stoneman, 1995; Garcia and Calantone, 2002; Damanpour et al., 2009), which can be
in terms of developing new products and processes, changing marketing strategies, entering new markets, or engaging in new organizational structures (Brockhoff 1998; Damanpour and Gopalakrishnan, 1998; Damanpour et al., 1989; North et al., 2001). Innovation activities are classified into four distinctive types: product innovation, process innovation, marketing innovation and organizational innovation (OECD, 2005). Product innovation can be related to the application of newly developed technologies to produce new products and services, or incremental changes to existing goods and services (Utterback and Abernathy, 1975; Li and Atuahene-Gima, 2001). Process innovation encompasses the changes and/or any improvements in production, service operation, or delivery systems (Bates and Flynn, 1995; Damanpour and Gopalakrishnan, 2001). While marketing innovation can be any developments applied to marketing methods, changing market segments or target customers, or entering new markets (Benner and Tushman, 2003; Levitt, 1960); organizational innovation reflects the developments in the business practices of an enterprise (Birkinshaw et al., 2008). Damanpour and Aravind (2011) assert that organizational innovation (i.e., managerial innovation) can be applied to organizational structures, management practices and techniques.

Within those conceptualizations, Damanpour's (1991) categorization is the most accepted one in the literature (Jiménez-Jiménez and Valle, 2011; Naranjo Valencia et al., 2010), which categorizes innovation as technological (i.e., technical) and administrative (i.e., organizational) innovations. While technological innovations represent new processes, products and services; administrative or organizational innovations reflect changes in the business practices of an enterprise such as developing new business models (Birkinshaw et al., 2008). In addition to those categorizations, innovation is also evaluated in terms of novelty, which reflects the radicalness of the innovation (Damanpour and Aravind, 2011). There is also an input and output orientation approach to innovation (Rialp-Criado and Komochkova, 2017). While innovation input reflects the resources to engage in innovation such as R&D expenditure, and number of employees in R&D department. Innovation output focuses on the number of patents, sales volume of new developed products etc. (Duran et al., 2016; Adams et al., 2006). Innovation is also evaluated as "innovation capability or innovativeness" which encompasses two approaches in the pertinent literature. The first approach reflects the rate of innovation adoptions, while the second one focuses on the openness and willingness to change at an organizational level (Hurley and Hult, 1998; Calantone et al., 2002).
As innovation is a multifaceted construct (Kleinknecht et al., 2002), each type of innovation can have different effects on a firm's performance and behavior in international markets. Since these different types of innovations may require different amounts of resources and the return of the investment made on different types of innovations can show these differences (Rosenbuch et al., 2011; Damanpour et al., 1989). Each innovation type has a different contribution to firm performance (Damanpour and Aravind, 2011). For instance, while technological innovations (i.e., product, process and service innovations) provide that firms have a high level of responsiveness towards technological changes in the market place, organizational innovations (i.e., marketing and managerial innovations) create an appropriate organizational climate to improve communication, knowledge sharing, and coordination within the firm (Damanpour and Evan, 1984; Damanpour and Aravind, 2011; Gunday et al., 2011). In addition, innovation capabilities are important for the structural flexibility required for adapting to environmental changes and achieving a better performance (Hitt et al., 1994; Lejpras, 2019). Also, resources and capabilities can have a booting effect on export performance (Ogasavara et al, 2016; Ribau et al., 2017; Rua et al., 2018). In addition, as the resources required for engaging in innovation are costly, the effect of those resources can deteriorate performance, especially for small firms that suffer from resource inadequacy in the short run (Womack et al., 1990). As can be understood, innovation types can determine the strength and direction of the relationship between innovation and export performance. In light of the literature, it can be hypothesized that:

**H4a:** The relationship between innovation and export strategic performance is moderated by conceptualization of innovation.

**H4b:** The relationship between innovation and export financial performance is moderated by conceptualization of innovation.

**H4c:** The relationship between innovation and export market performance is moderated by conceptualization of innovation.

During the last two decades the world has witnessed a dramatic increase in terms of international trade and innovation, especially export in sectors related to technology are considered to be above the average in terms of number of patents (Montobbio and Rampa, 2005). The pioneers of technological changes have the biggest shares in the worldwide export market, in that sense, countries leading the technology have high levels of export rate (Montobbio and Rampa, 2005).
Previous studies support the notion that economies harboring high stock of technology can improve their trade worldwide, which reflects the relationship between innovation and international trade and the level of development of a country (e.g., Greenhalg, 1990; Laursen and Meliciani, 2000; Montobbio, 2003). Countries achieving economic success show high levels of innovation and export performance level (Montobbio and Rampa, 2005; Kumar and Siddharthan, 1994). Among empirical studies in the literature, technology is found to be the driver of international trade (Gruber et al., 1967; Hitt et al., 1994; Caves et al., 1980; Calantone et al., 2006). While developed countries are the exporters of innovation, developing and least developed countries are considered as technological followers and importers of technologies (Lall, 2000). In addition, companies from developing countries can show low levels of internationalization due to the regulations of the related institutions and lack of economic resources that can act as a barrier to international operations (Peng et al., 2008; Rialp-Criado and Komochkova, 2017). Limited human and financial resources can negatively affect innovation and internationalization operations of companies (Rialp-Criado and Komochkova, 2017). Firms have difficulties in finding technologies and technologies are costly to apply for them, although firms import technologies, using the technology needs skill and knowledge (Kumar and Siddharthan, 1994). In addition, while developed countries focus on R&D and frontier innovation, in less developed countries and developing countries innovations are based on non-R&D activities, they usually import frontier technologies. Especially, due to the fact that less developed countries import almost all of their technology (Bell, 2007). Moreover, the engines of innovation that are universities and research centers, may not exist in some developing and less developed countries (Pietrobelli and Rabellotti, 2011). As can be understood, the intensity of innovation varies between developed, developing and less developed countries which can also be an indicator of their export performance. In this regard, based on the literature, the hypothesis is as follows;

\( H_{S_a} \): The relationship between innovation and export strategic performance differ based on the development level of the country.

\( H_{S_b} \): The relationship between innovation and export financial performance differ based on the development level of the country.

\( H_{S_c} \): The relationship between innovation and export market performance differ based on the development level of the country.
4. Methodology

4.1. Search criteria

Since the choice of relevant studies influences the results of meta-analyses, it is crucial to identify the right inclusion criteria (Hunter and Schmidt, 2004). The inclusion criteria of this study consist of: (a) studies focusing on the link between innovation and export performance as a fundamental research question of this study; (b) studies measuring export performance objectively or subjectively but taken as export intensity, export sales ratio, export exposure, the number of countries exported and the number of people at export department; (c) studies addressing innovation construct as R&D expenditure, R&D employees, the number of R&D alliances, the number of patents and new products/processes, the share of sales derived from new products, innovation orientation, innovation capability, innovation resources, innovation performance, and innovativeness; (d) empirical studies that have collected data from both primary and secondary sources and report the Pearson’s correlation coefficients or r-family statistics that could be converted to the correlation coefficients (Rosenthal, 1979).

4.2. Study identification process

In order to reach the objectives of this study and determine for the related studies, keyword search identified the full texts of articles from the Elsevier, Emerald, JSTOR, Sage, Taylor and Francis, Springer and Wiley search engines by the help of following other important review studies within the field (e.g., Aykol et al., 2013; Leonidou and Katsikeas, 2010). Empirical studies were included in this review, excluding books, book chapters, reports and conference proceedings, qualitative and conceptual studies from this meta-analysis. To select relevant studies, several keywords in line with innovation and export performance were used. The list of the keywords involves “innovative”, “innovation”, “export”, “export performance”. Also, the reference parts of the articles were examined as a further elimination.

Furthermore, after the keywords had been searched in the databases based on abstract, title and keywords of the articles, 67 articles were obtained in total. With regard to the quality of the studies obtained, all gathered articles were examined concerning to the academic guide of Association of Business Schools (ABS) (e.g., Adams et al., 2016; Coombes and Nicholson, 2013). Following, studies reporting Pearson correlations or values that can be converted into r and participating in the journal list of ABS were included in this study (n=38). Referring to the approach of Grewal,
Puccinelli and Monroe (2018), when a study can be divided into conceptually identical but statistically independent iterations (i.e., providing results for more than one innovation-export performance estimate), each finding should be inputted into the analysis solely and treated as multiple distinct measurements from one dataset such as if one study may supply findings of multiple distinct associations and investigate more than one outcome from the same dataset (e.g., Orsinger et al., 2010). In this sense, the final sample consists of 38 independent samples, from which a total of 145 correlations are calculated, based on more than 550000 companies (N=554257) and representing a powerful empirical basis for a meta-analysis (Brinckmann et al., 2010; Read et al., 2009).

4.3. Coding process

Overall, 38 papers appearing during the period from 2003 to 2018 and were coded for further analysis. In this study, paper included in the database was defined as a journal article that provides original findings. Therefore, no redundant and duplicated studies were placed in the dataset (Wood, 2008). In addition, two coders recorded the data independently on a specifically schemed coding protocol, which consists of four phases. At first, the coders concentrated on key methodological characteristics of studies (i.e., sample size, sampling method, analytical techniques, the nature of dependent and independent variables). Second, specific export performance measures were grouped under three themes (i.e., financial export performance, strategic export performance and market export performance). In the third part, distinct innovation measures were classified under five different categories (i.e., innovation resources, innovation capabilities, organizational innovation, technological innovation and innovation performance) and each association between innovation and export performance was recorded using all available effect size estimates. Lastly, the countries were coded regarding their economic development levels as developed and developing (United Nations, 2018). Inter-coder reliability varied between 95% and 100%, which represents acceptable threshold levels and any disagreements were solved through discussion (Szymanski and Henard, 2001).

4.4. Meta-analytic procedure

Empirical work on the innovation-export performance association is distinguished by several studies that demonstrate largely contradictory results. Meta-analysis is an approach to aggregate entire findings among past individual studies (Glass, 1976) and can be regarded as a quantitative
synthesis of these aggregated study results (Geykens et al., 2009). Also, a meta-analysis provides certain estimates of accurate association owing to improved statistical power via presenting systematic quantification of the links between innovation and export performance and presents influential information on average impacts as well as moderating effects of contextual variables (Zhao et al., 2004; Hunter and Schmidt, 2004).

In this research, correlations within individual studies were examined through performing a meta-analysis. Consistent with several meta-analyses in marketing and management fields (e.g., Geyskens et al., 1998; Henard and Szymanski, 2001; Janiszewski et al., 2003; Kirca et al., 2005; Palmatier et al., 2006), correlations (i.e., the r family of effect sizes) were employed as the effect size metric for this meta-analysis. When a research reported more than one effect sizes for the same relationship, the average of r estimates was calculated and entered to the analysis (Borenstein et al., 2009). In the sense of measurement error, corrected correlations calculated via dividing all individual effect sizes by the square root of the reliabilities (Hunter and Schmidt, 2004). However, the mean reliabilities were replaced by the construct reliabilities depending upon their presence (e.g., Ellis, 2006; Kirca Jayachandran, and Bearden, 2005). Further, the reliability-corrected correlations were converted into Fisher’s z-coefficients, which were averaged, and then re-transformed to the correlation coefficients (e.g., Grinstein, 2008).

The methods for conducting a meta-analysis outlined by Hunter and Schmidt (2004) were followed in this study. At first, the random-effects model which enables for variation of the population parameters among studies was adopted for mean correlation calculations to balance the corresponding weights to the studies (Raudenbush et al., 2009; Grewal et al., 2018), since the results (Q-value (144df)= 9302.736 (p=0.00), I-squared= 98.452) indicate heterogeneity in the proportions of variance across studies significantly (Cooper et al., 2009), which in turn, leads up to potential moderator variables (Hunter and Schmidt, 2004). Besides, the 95% confidence interval which does not include zero also gives insights about heterogeneity of populations and implies a significant association among the constructs (Finkelstein et al., 1995).

Afterwards, three different most preferably approaches dealing with publication bias were conducted to address file drawer problem in meta-analyses (Grewal et al., 2018; Geykens et al., 2009). First, as ‘File drawer N procedure’ was applied to demonstrate the number of studies with null effects needed to make the overall result as non-significant (Rosenthal, 1979; Rosenthal and
Rosnow, 2008), this method reveals that the results are less likely to be considerably affected by publication bias (mean file drawer N is 38342), which is also an indicator of the robustness of the results. Second, ‘Orwin fail safe N’ (set to .05) outlined by Borenstein et al. (2009) also provides evidence for low effect of publication bias (Cohen, 1977). Third, ‘Trim and Fill’ approach was also tested to assess the existence and influence of missing studies (Duval and Tweedie, 2000), which emphasizes that publication bias remains low for this meta-analysis illustrating with a funnel plot which depicts a more symmetric-oriented tendency. Moreover, sensitivity analyses were performed using the ‘one study removed’ option in to assess the effects of possible outliers on the analysis. In this context, further meta-analyses excluding outliers were not conducted, since sensitivity analysis did not display any significant influence of any one study’s correlation on the results summary in this meta-analysis.

5. Findings and Discussion

In this study, correlations within individual studies were examined through Comprehensive Meta-Analysis (CMA version 2.2.057) software program to test the research hypotheses. Table 1 summarizes the results of meta-analysis on the relationship between innovation and export performance with a total of 145 effects. In the meta-analysis, the guidelines reported by Cohen and Cohen (1983) and Cohen et al. (2003) was followed, which advocate that a correlation effect size of less than 0.10 is regarded as weak, 0.10–0.30 is moderate and higher than 0.30 represents a strong association. With regard to the H1, innovation was found to have a positive and strong relationship with export strategic performance (r=0.342, p=0.000), which is also supported by the other studies in the literature (e.g., Azar and Ciabusch, 2017; Costa, Lages and Hortinha, 2015). In addition, Oura et al. (2016) have also concluded that the impact of innovation on the strategic dimension of export performance was found as the highest and significant coefficient in comparison with the other dimensions of export performance, which is in consistent with the findings of the present study. Moreover, innovative actions of companies will be beneficial to improve their strategic competitiveness and strategic orientations on companies in the markets they operate (Vázquez, Leticia-Santos and Alvarez, 2001). In the case of H2, the results show that the relationship between innovation and export financial performance is significant and at a moderate level (r=0.260, p=0.000) and is in contrast with the results of Zhao and Zou (2002), which provides evidence for the negative link between innovation and export financial
performance. The finding of the present study gives credibility to the notion that as companies make higher investments in innovation operations regardless of their costs such as new product or process development, companies in fact get higher financial revenues which is parallel with the previous studies in the literature (e.g., Oura et al., 2016; Silva et al., 2017; Aarstad et al., 2015), although there have been some studies which suggest that innovative efforts may not give benefits such as lower costs and damage companies with inadequate resources in terms of performance (Womack et al., 1990). In addition, the results support H3, which focuses on the relation between innovation and export market performance (r=0.157, p=0.000), as can be seen there is a moderate and significant relationship between export performance and innovation, which is in the line with the previous studies advocating that innovative activities of companies enhance their market share performance (e.g., Robinson, 1990). More specifically, O'Cass and Weerawardena (2009) have demonstrated that organizational innovation intensity has a significant and positive influence on marketplace performance by the help of concentrating on both technological and non-technological innovations and getting positional advantages in export markets.

"Insert Table 1 about here"

Besides, moderator analyses were performed for different measurement types of innovation and the economic development level of countries. Regarding the H4a, measurement types of innovation significantly moderates the relationship between innovation and export strategic performance (Q-value (3df) = 71.111, p=0.000). However, the results reveal that technological innovation (r=0.433) has higher impact on export strategic performance, followed by innovation capability (r=0.356). With respect to H4b, measurement types of innovation have been found as significantly moderating the association between innovation and export financial performance (Q-value (4df) = 20.677, p=0.000), which emphasizes the crucial role of innovation capabilities (r=0.308) and innovation performance (r=0.308) on financial success in international markets. Since innovations are considered as risky and costly investments which take long time to recover these costs for companies (Simpson et al., 2006), innovation performance from the perspective of output approach has a higher boosting effect on export performance (Rosenbusch et al., 2011). In terms of H4c, the results reveal that the relationship between innovation and export market performance significantly differ relying upon the measurement types of innovation (Q-value (3df) = 7.182, p=0.066), which highlights the importance of innovation capabilities (r=0.222) and technological innovation (r=0.159) in enhancing export market performance.
In addition, the results support the H$_{5b}$, which reveals significant difference among the different economic development levels of countries for the link between innovation and export financial performance (Q-value (3df) = 27.026, p=0.000). In this sense, the findings demonstrate that the relationship between innovation and export financial performance is stronger when examined countries have higher economic development levels (r=0.371, p=0.000). The reason lies under the fact that technology helps to boost innovation activities of developed countries, as technology is found to be costly requiring skills and development for developing markets (Calantone et al., 2006). With regard to H$_{5a}$ and H$_{5c}$, economic development level of countries does not play a moderator role in between innovation and export strategic (Q-value (1df) = 1.754, p=0.185) and export market performance (Q-value (2df) = 2.989, p=0.224). However, the results demonstrate that developed countries are more advantageous for both export strategic (r=0.373) and export market performance (r=0.232), which supports the previous studies presenting developed countries as exporters of innovation (Lall, 2000).

"Insert Table 2 about here"

6. Conclusion

Meta-analysis offers valuable insights to understand the global results of various research done in different markets and societies. This study shows that innovation is a strategic source to achieve competitive advantage in international markets for superior firm performance (Pla-Barber and Alegre, 2007; Sousa et al., 2008; Vázquez, Leticia-Santos and Alvarez, 2001). Innovations as vital components for the companies facilitate to engage more efficient production processes, to increase positive reputation, gain a competitive advantage, and to achieve a better performance (Gunday et al., 2011). As new technologies are developed, new rivals appear, and consumer expectations change faster than ever, export performance facilitated by innovation will create more undeviating routes for sustainable success international markets.

The findings of this study reveal that while there is a significant relationship between innovation related activities of companies and their export performance, export strategic performance dimension captures important facets in this relationship. Innovation activities provide flexibility for companies to adapt to the markets in which they operate that results in development in strategic position in international markets (Oura et al., 2016). In this sense, innovative companies can have
strategically better competitive position in their export markets which also can strengthen the export financial and market performance (Boso et al., 2019; Aarstad et al., 2015). The effect of innovation on export performance can show differences depending on the measurement type of innovation (Damanpour et al., 2009; Azar and Drogendijk, 2016). The results of the meta-analysis show that strategic and market export performance are affected by technological innovations and innovation capabilities at the highest level among the other types. Technological innovations and innovation capabilities act as an enabler of quick responses to the rapid changes in highly volatile and competitive markets, which creates a competitive advantage boosting the competitive and strategic position of firms in international markets (Gunday et al., 2011; Kafouros et al., 2008; Murray et al., 2011; Zahra and Covin, 1995). Innovation capabilities can facilitate strategic flexibility for companies to adapt to the markets that results in development in strong strategic position in international markets (Oura et al., 2016; Zhou and Wu, 2010). In this related domain, companies high in innovation capability and technological innovations may have strategically better competitive position in their export markets which also can strengthen the market performance (Boso et al., 2019; Aarstad et al., 2015; Oura et al., 2016). Through technological innovations and innovation capabilities firms can expand their international market scope and export volumes (Arslanagic-Kalajdzic et al., 2017; Boehe and Cruz, 2010; D’Angelo, 2012). Engaging in product and service innovations can help companies achieve customer satisfaction and expand market penetration (Damanpour et al., 2009; Lawrence and Lorsch, 1967; Cassiman and Golovko, 2011; Cirera et al., 2015). Moreover, unique and high quality of products can facilitate firms’ market export performance (Roper and Love, 2002). According to the results, financial export performance is affected highly by innovation performance, innovation capabilities, and technological innovations. Technology related capabilities, patented products, and sales of new products can have financial returns (Costa et al., 2015; Lefebvre et al., 1998; Oura et al., 2016; Simpson et al., 2006). Those returns can be higher especially in knowledge intensive industries (Zhang and Zhu, 2016; Boehe and Cruz, 2010; Pla-Barber and Alegre, 2007). Among the measurement types of innovations, the results show that innovation capabilities play a crucial role for all dimensions of export performance. Further, the results demonstrate that while strategic and market performance is mostly affected by input-oriented innovations, financial performance is influenced by both input and output orientations; which shows the substantial importance of innovation on export performance. Innovation is a growth strategy instrument for
firms to achieve productivity, profitability, high, and development of unique and high-quality products that ignites the firm performance (Gunday, et al., 2011; Wang et al., 2008; Alvarez, 2004).

Furthermore, the effect of innovative activities on export performance can be associated with the home country development level. Although, the association between innovation and export performance is positive in both developed and developing countries, the relationship becomes stronger in developed countries. Developing countries are the followers of technological developments while the developed countries are the first movers (Hobday, 2003). While developed countries are considered as the exporters of innovation, developing and least developed countries are considered as technological followers and importers of technologies (Lall, 2000). Especially in developing countries, firms can fail to apply required technologies as they can be quite costly in their countries (Kumar and Siddharthan, 1994). Furthermore, firms located in developed countries can benefit from spill-over effects in R&D activities through locational advantages, firms in developing countries lack those advantages and innovations are based on non-R&D activities, therefore, they import majority of the technologies. As the education level and research centers play a vital role in innovation, developing countries show low levels of innovation (Pietrobelli and Rabellotti, 2011). In addition, developed countries put great effort to facilitate favorable conditions for firms to engage innovation activities (Mardas, 1994).

This meta perspective addresses the interplay between the different types of innovations and export performance conceptualizations under the effect of country development level. The main argument is that regardless of country development level, innovative firms are likely to achieve success in their export markets. This study provides valuable contributions to the existing literature. In the sense of theoretical implications, the first is to synthesize fragmented results of extant empirical studies on the association between innovation and export performance, which can give beneficial insights to the researchers and practitioners. Second, this study makes a quantitative empirical aggregation taking into consideration contextual and possible moderators. Third, how different conceptualization of innovation may influence the relationship between innovation and export performance was also taken into account in this meta-analysis, which reveals that while input oriented innovation has a dominant power on strategic and market export performance, financial export performance is highly influenced by both input and output orientated innovation. Lastly, the context of country development level was analyzed as a moderator of the innovation–export
performance relationship, which suggest that the association between innovation and export performance is stronger in firms located in developed countries.

From the practitioners’ point of view, companies which would like to improve export performance should not only give their emphasis on technological innovation and the integration of all types of innovations can turn into innovation performance that has potential to ignite firm performance. This current study reveals that innovation efforts are likely to contribute to the firm performance, however, among the other types, strategic export performance receives the highest force from technological innovations and innovation capabilities. Thus, firms should focus on technological innovations and innovation capabilities in order to achieve a better strategic export performance. Through innovations, firms can differentiate their products and services from their competitors, which can provide them a competitive advantage in international markets and export success can also boost firm innovativeness (Lejpras, 2018; Tavassoli, 2018). Firms that target international markets and outperforming their rivals should improve their innovation efforts, which in turn, can increase scope and scale of their international operations. Moreover, managers should concentrate on input-oriented innovations (e.g., resources, capabilities) with a final aim of achieving output-oriented innovations (e.g., new product development, patents) in order to enhance their export performance. Adopting innovations is important to achieve a sustainable performance in international markets. In this vein, managers should be aware of the high returns of innovation in international markets by considering the financial gains by innovation outputs.

From the perspective of policy implications, companies can initially set their innovation strategies in accordance with their home country environmental constraints (such as low-skilled labor force or inadequate economic resources). Developing countries can focus on improving educational background in order to host more educated and high-skill workforce that play a vital role in innovation operations and provide regulations that can foster international operations of companies. As innovation and international business operations are drivers for economic growth for countries and firms, they interact simultaneously and as innovation is required for more international operations, international operations can induce more innovation efforts (Yang, 2018). In this related domain, developing countries can improve their innovation by more internationalization operations.
Missing some of the studies due to the disclosure of required statistical information can be mentioned as one of the limitations of this study. Also, the present study did not focus on the antecedent of innovation, which may constitute another limitation for this study. Therefore, further studies can provide a holistic insight via integrating both antecedent and outcomes of innovation. Moreover, future studies can focus on the effect of industry type. As industries get more knowledge intensive, the role innovation becomes more important (Pla-Barber and Alegre, 2007). Moreover, other researchers can investigate ownership structures and international experience as moderation effects, since they can affect the relationship between export performance and innovation. Also, researchers should concentrate on younger and smaller firms, which may suffer from required resources to engage in innovation for future studies.
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