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Investigating the complementarity between export and innovation for firm sales performance in middle income developing countries

A study on Argentina

Abstract

This paper investigates whether export and innovation are complementary strategies for the sales performance of firms in middle income developing countries. Through exporting, firms can gain access to new foreign knowledge and could enhance their innovation performance through learning by exporting. Vice versa, innovation could enhance the export performance of a firm, as innovative firms have the ability to assimilate and exploit new knowledge, which is helpful for firms to compete and grow in foreign markets. This idea is tested using data on Argentina from an Enterprise Survey of the World Bank, conducted in the years 2006, 2010 and 2017. The empirical results of this study provide evidence that, although innovation and export as independent activities are positively related with the sales performance of firms in middle income developing countries, export and innovation cannot be seen as complements. This result, with regard to the complementarity of export and innovation, contradicts the existing literature, which mostly focusses on developed countries. Based on this study it can therefore be concluded that associations with regard to export, innovation and the combination of the two with firm sales performance are dependent upon the economic development of a country. Moreover, this study adds a dimension to the existing literature by distinguishing between different export modes and innovation activities. The empirical results show that in order to improve the sales performance, firms in middle income developing countries should focus their strategy on either initiating direct export or product innovation. These results are insightful for the managers of these firm and can in the long run contribute to the economic development of the country. Finally, this study also indicates that the economic situation of a country in a certain period can play a role when examining these associations.

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1. Introduction

"Survival of the fittest" is a concept that goes way back to the Darwinian theory of evolution (Spencer, 1864). Growth is vital for firms in order to survive in the market (Rufín & Medina, 2010). The two dominant growth strategies for firms to improve their sales performance are to either expand by improving their products and services through innovation or to expand their market to foreign economies through export (Ansoff, 1965).

Previous literature has provided substantial evidence that supports a positive relation between both innovation and export with the sales performance of firms (Cameron, 1998; Coad & Rao, 2008; Cooper & Kleinschmidt, 1985; Becchetti & Trovato, 2002). Through export firms can increase their sales volume by expanding their markets over a wider geographical area (Andersen, 1993). In our current digital world export becomes more and more important as the internet offers firms a platform to enter the global markets at lows costs, but also simplifies communication, networking, market research and thus offers firms an opportunity to improve their sales volume (Lu & Julian, 2007). When entering the export market, firms can decide to export directly to the customers abroad or to export indirectly, which involves the help of a third party, also referred to as an intermediary (Peng & York, 2001). Moreover, innovation can contribute to the firm sales performance both through product innovation, which can create new markets and thus increase the consumer base, as through process innovation, which can lower the firm's average costs of production and therefore lower prices and increase demand (Cohen & Klepper, 1996).

However, not all literature is unanimous. Explanations in the literature for drawbacks that can hinder the positive association between innovation and firm sales are cannibalization of the current products (Reinganum, 1983) and failure in the commercialization of the innovations (Crépon et al., 1998; Coad & Rao, 2008). The same yields for export, for which firms need the financial resources to pay the entry costs and sufficient scale to succesfully engage in export activities (Atkin et al., 2017; Bernard et al., 2007). Moreover, altering products to meet the demands of foreign markets can result in a loss of the domestic sales and thus deteriorate the overall sales performance of a firm (Lehmann et al., 2013).

However, these studies have only examined the relation of innovation and export with firm performance as independent activities. An emerging strand of research explores whether export and innovation are in fact complementary activities with regard to firm sales performance (Filatotchev & Piesse, 2009; Golovko & Valentini, 2011; Cassiman & Martinez-Ros, 2007). Export involvement can increase the firm's learning ability through external knowledge, which could enhance the innovation performance of a firm (Alvarez & Robertson, 2004; Salomon & Shaver, 2005). Simultaneously, innovation can help firms to enter new markets through the introduction of new and improved products, which can make the decision of entering export markets more successful (Hitt et al., 1997). However, Roper & Love (2002) find that implementing a growth strategy simultaneously along both the product and international

dimension could have a negative effect on firm performance. Since the literature on the subject of complementarity between innovation, export and firm sales performance is not conclusive yet, part of the mixed findings with regard to this complementarity may be explained by the fact that studies so far have mainly focussed on export and innovation as independent activities.

The existing studies that do examine whether innovation and export are complementary activities are mainly focussed on developed European countries. Compared to developed economies, developing economies are however often characterized by weak infrastructure, a lack of domestic linkages and underdeveloped knowledge bases. These characteristics hinder the engagement of firms in developing countries to initiate export and innovation activities as they are not able to acquire, absorb and apply new technologies and convert these into extra capacity (Metcalfe & Ramlogan, 2008). In order to complement the existing literature it might be interesting to find out how export and innovation are related with firm sales performance in developing countries. By distinguishing between different types of export, the role of indirect export, with intermediaries as a tool to reduce knowledge gaps and to help to identify customers, financing and distribution infrastructure providers, is analysed (Balbanis, 2000). Through the distinction in product innovation and process innovation as innovative activities, this paper can gain insights in the importance of innovative strategies in developing economies.

The current study will investigate to what extent export and innovation, and the distinguished types of these activities, are related to firm sales performance in a developing country and to what extent these activities might be complementary. In order to test this, I chose to use a dataset on Argentina, displaying the years 2006, 2010 and 2017. Argentina is classified by the World Bank as a middle income developing country (The World Bank, 2020). This makes Argentina an interesting subject for this study, as on the one hand developing middle income countries are considered drivers of the world economy while on the other hand these countries are not finished developing and risk being trapped in their current status if they do not persist their own economic, social and structural transformation (The World Bank, 2020). Due to this, both export and innovation are becoming increasingly important as strategies in order to escape the status of being a developing country. Because Argentina is the subject of this research, the results might however be less reflective of lower income countries. Despite this, this study can offer recommendations to middle income developing countries on how to target their challenges, such as competitiveness and trade policies, by creating awareness of the benefits of export and innovation activities for firm sales, both separately as combined.

Testing the complementarity of export and innovation with regard to firm sales for Argentina, as a middle income country, and using a recent dataset displaying the characteristics of the current digital economy, this study will contribute to the existing literature answering the following research question:

To what extent are innovation and export complementary strategies for firm sales performance in middle income developing countries?

This relationship is tested using Ordinary Least Squares regression analyses for a sample of 1,843 firm-year observations of Argentinian enterprises in the manufacturing and key service sectors. First the relation of export and innovation with firm sales performance are tested separately. Moreover, to add a dimension to the literature, the heterogeneity of the different types of export and innovation are taken into account by testing whether the potential relationship is mainly driven by product or process innovation or by direct or indirect export. After this, the complementarity of innovation and export is tested, and again a distinction is made between the different types of export and innovation to test which type is the driver of the potential complementarity.

The article is structured as follows. Section 2 provides an overview of the literature on firm performance, export and firm sales performance, innovation and firm sales performance and the complementarity of export and innovation with regard to firm sales performance. Moreover, this section puts forwards multiple hypotheses predicting the relationship between firm sales and the different activities. Section 3 describes the data and the method that is used for the analyses. In section 4 the results are presented and finally section 5 presents the conclusion, including a discussion of the limitations, the implications for theory and practice and recommendations for future research.

2. Theoretical background

Growth is vital for firms in order to survive in the market (Rufín & Medina, 2010). To accomplish this growth, firms have different options, which are referred to as growth strategies. One of the main growth strategies for firms is to expand the geographic scope in which they offer their products and services through internationalization (Kathuria et al., 2008). Internationalization is possible either through export or through foreign direct investment (FDI). In this paper I will focus on export, because it involves relatively low levels of commitment and risk compared to FDI, for which the commitment of firms to the foreign market in terms of resources is quite substantial (Golovko & Valentini, 2011). Export is therefore labelled as the preferred way for firms to take their product and services abroad, as it is considered the easiest and fastest way for firms to enter new markets (Young et al., 1989). Moreover, digitalization has transformed the process of internationalization of firms, as the digital world that we live in nowadays offers even more and new opportunities in markets abroad and makes international communication easier (Joensuu-Salo et al., 2018). The other main growth strategy for firms is to introduce new products and processes or to improve them through innovation. The purpose of this study is to test the relation of both export and innovation and the combination of the two with firm performance.

2.1 Firm performance

Firm performance is an important construct in strategic research papers and is frequently used as an outcome variable (Richard et al., 2009). Despite its relevance, there is no consensus in the literature about the exact definition of firm performance and the best way to measure it. This is because firm performance is a complex term which entails the overall organizational effectiveness of firms, covering both operational and financial outcomes (Santos & Brito, 2012). The financial domain is represented by profitability, growth and market value. The operational domain includes the non-financial aspects, such as customer satisfaction, employee satisfaction, environmental performance and social performance (Venkatraman & Ramanujam, 1986).

In empirical strategy research firm performance is predominantly measured by examining financial outcomes (Hofer, 1983) . To follow this trend and to specify the use of firm performance in this research, I have decided to test the relationship between export, innovation and the financial performance of firms. As stated before, the financial domain of firm performance is represented by various dimensions. For each dimension there are certain indicators which can be used as measurements for financial firm performance. Possible indicators for the profitability dimension are the return on assets, return on investment, sales revenues and the economic value added by a certain activity. With regard to the market value dimension indicators such as the earnings per share, dividend yield and Tobin's q are often used. Finally, the growth dimension is often measured using market-share growth, asset growth or sales revenues growth as indicator (Santos & Brito, 2012).

Hubbard & Bromiley (1995) identify sales as the most commonly used measure in the literature for financial firm performance. Delmar et al. (2003) have also argued that sales is the most preferred measure of firm performance, as it is relatively easy accesible and is applicable to most kinds of firms. Moreover, through export firms can expand their market over a wider geographical area and this way increase their sales volume and revenues (Andersen, 1993) and through product and process innovation firms can create new and improved products and lower production costs, which can also result in higher sales volumes and revenues (Cohen & Klepper, 1996). Due to this, I choose to use firm sales as measurement for financial firm performance. With regard to firm sales performance is it possible to use the sales volume at a certain point in time or to use a growth variable, which measures the growth in terms of sales over a period of time (Santos & Brito, 2012). In this study the sales volume in the past fiscal year is selected over alternative measurements, such as firm growth in terms of sales.

2.2 Export involvement and firm sales performance

One of the main strategic decisions that a firm has to make, is whether to engage in export activities. This decision can be dependent upon both the perception of the home market environment as the current degree of internationalization of the organisation (Hessels & Terjesen, 2010). Once a firm has decided to enter the export market, the next step is to determine the export mode: firms can either export directly to their foreign customers or they can export indirectly with the help of a third party, also referred to as an intermediary (Peng & York, 2001). Finally the export intensity of the firm is established, which is represents the percentage of the total sales that is conducted through export activities (Pla-Barber & Alegre, 2007). However, since the purpose of this study is to investigate whether export and innovation are complementary activities, only the decision with regard to the export involvement is taken into account in this research and not the export intensity. This way the sales performance of firms engaging in export activities can be compared to the sales performance of those firms who do not.

Prior literature has established that export is one of the main drivers of the sales performance of a firm. This is because through exporting strategies firms can expand their market over a wider geographical area by anticipating on existing or expected demand for their products and services abroad (Andersen, 1993). This expansion of the sales volume, through a larger consumer base, can then lead to scale economies, through the increase of the production and the decrease of production costs as a result of increased labour productivity and management efficiency (Lu & Beamish, 2006). Moreover, export-oriented firms have to face international competition and therefore have higher incentives to upgrade their technologies and product features, which again can increase the sales revenues both through higher prices as through more demand. Based on a sample of UK firms, Robson & Bennett (2000) have found a significant and positive effect of export involvement on the turnover of firms. The authors suggest that this indicates that engaging in exporting activities might lead to higher sales due to scale expansion.

There are also several reasons why export involvement may not contribute to the sales performance of a firm or may even come at the expense of the firm's sales performance. For instance, while the decision of firms to enter the export market can be seen as a driver of real income gains, this is a decision that can only be undertaken profitably by those firms with sufficient scale (Atkin et al., 2017). The process of engaging in export activities often takes several years, as it takes time before the scale of a firm is sufficient in order for a firm to enter the export market in a profitable way, if it ever does (Bernard et al., 2007). Moreover, an initial investment has to be made by the firm, which is referred to as the entry costs of entering the export market. These entry costs are sunk start-up costs of breaking in before any export activities are possible and usually exist of the costs of setting up distribution channels and adjusting the products and packaging to the foreign markets. Firms that enter the export market and pay these entry costs bear the risk that after making this initial investment the exporting activities of the firm do not become profitable while the costs are sunk (Das et al., 2007).

Furthermore, the efforts involved in export may come at the expense of other activities of the firm that contribute to the firm's sales performance. For example, one of the risks of entering the export market is the copying of products by foreign competitors. These competitors can imitate the product that the exporting firm has developed and offer this at a lower price. Due to this, both the sales in the foreign as in the domestic market can decline as a result of increased international competition and imitation (Lehmann et al., 2013). Another risk imposed by export involvement is the fact that products of exporting firms have to meet widely diverging needs. The development of products that meet these international needs is a costly and time-consuming process, which if firms lose the essence of their initial product can result in the loss of domestic sales or a decrease in the firms profitability (Lehmann et al., 2013).

Most scholars have focussed on developed economies when examining this relation between export and firm sales performance. This paper however focusses on middle income developing economies by examining Argentina as a subject. In prior literature about Argentina the determinants of the ability of firms to engage in exporting activities are investigated. One study states that the main challenge for developing economies, such as Argentina as a middle income country, does not lay in resolving production problems, but in the orientation of the export market and the acquisition of knowledge to understand the demand of the consumers in these countries and how to work with the distributors (Artopoulos et al., 2013). Moreover, using a sample of 41 developing countries, Michealy (1977) concluded that there is a certain minimum level of development that a country has to achieve in order to let firm performance be affected by export. This can be explained by the fact that successful economic development can be linked to the capacity of a country to acquire, absorb, disperse and apply new technologies and to convert these intro extra capacity, while developing economies are characterized by weak domestic linkages, a dualistic industry structure and knowledge bases which are underdeveloped (Metcalfe & Ramlogan, 2008). For this reason, most research focusing on developing countries

demonstrates little to no evidence of a positive association between firm sales and export involvement (Bernard & Jensen, 1999; Clerides et al., 1998).

However, a more recent study by Van Biesebroeck (2005) did find positive evidence for lower developed countries. The results of this study indicate that the productivity advantage of the firms that start exporting only increases after entry into the export market. This productivity advantage is mainly caused by scale economies. Moreover, Capelleras & Rabetino (2008) confirm this association in their study on Argentina, Brazil, Mexico and Peru. Most recently, Atkin et al. (2017) stated that the decision of firms to initiate export involvement can really drive the income gains of firms in developing countries. This change in the literature concerning export and firm performance in developing countries can be explained by the processes of globalization and digitalization, which have drastically changed the world economy. The current digital world has given rise to more and new opportunities for developing countries to grow, such as e-commerce, electronic businesses and the development and support of infrastructure (Izmaylov et al., 2018). The internet offers firms a platform to enter the global markets at lows costs, but also simplifies communication, networking, market research and thus offers firms an opportunity to improve their sales volume (Lu & Julian, 2007).

All in all, using a recent dataset in order to account for these new characteristics of the current economy, I expect to find a positive relation between export involvement and sales performance in middle income developing economies.

H1: There is a positive relation between export involvement and firm sales performance in middle income developing countries

Once a decision about the export involvement is made, the firm has to decide which export mode to use. Firms can decide either to export directly to their foreign customers or to export indirectly, through the use of an intermediary (Peng & York, 2001). If a firm already has a clear competitive advantage in its domestic markets, it is less likely that this firms has to rely on an intermediary (Hessels & Terjesen, 2010), while firms that do not can pursue the help of intermediaries to reduce knowledge gaps and to identify potential customers (Terjesen et al., 2008). Direct export is the most common way for firms to internationalize, as this way the extra costs of an intermediary can be avoided and the firm stays in control (Blomstermo et al., 2006), but there are also certain benefits attached to the decision of a firm to use an intermediary for their exporting activities (Hessels & Terjesen, 2010). Indirect export, compared to direct export, reduces the levels of risk and uncertainty and certain costs associated with operating abroad, that are involved with export (Johanson & Wiedersheim-Paul, 1975).

Artopoulos et al. (2013) found that the main challenge with regard to export for developing economies does not lay in resolving production problems, but in the orientation of the export market and the acquisition of knowledge to understand the demand of the consumers in these countries and how to work with the distributors. Moreover, the poor infrastructure of developing countries hinders the organization

of firms and their distribution channels (Levine, 1997). A solution for these problems of underdeveloped knowledge bases, weak infrastructure and international linkages could be for developing countries to use the help of an intermediary when engaging in export activities. These intermediaries can help firms from developing countries, as they can reduce the knowledge gaps and can help to identify customers, financing and distribution infrastructure providers (Balbanis, 2000).

Taking the advantages and disadvantages of both export modes into account, I expect that the relation between export and the sales performance of a firm is mainly driven by direct export. Although I acknowledge that indirect export is more beneficial to firms in developing countries than in developed countries, I still expect that the association with firm sales performance is stronger for those firms that are able to export directly. This is because these firms are capable of managing their export independently and often have a clear competitive advantage, which I expect to have a larger impact on the probability that a firm engages in export than indirect export with the help of an intermediary.

This leads to the following hypothesis:

H2: The positive relation between export and firm sales performance in middle income developing countries is mainly driven by direct export

2.3 Innovation and firm sales performance

Another important driver of firm performance is innovation. Because we live in a world with rapid technological change, global competition and thus short product life cycles, innovation has become important for firms in order to achieve success (Cho & Pucik, 2005). Innovation can either relate to products and services or to processes. Product innovation entails the introduction or significant improvement of a product or service while process innovation concerns the improvement of a production technology or process (Fagerberg, 2004). Due to these different types, innovation can contribute to the sales performance of a firm in multiple ways. First of all, product innovation can lead to the creation of new markets and consumer bases through the introduction of a new product or service. Secondly, product innovation can increase the consumer's willingness to pay by improving their product or service. Finally, process innovation can lower the firm's average costs of production (Cohen & Klepper, 1996). The literature has therefore established that innovation is of crucial importance for firms (Carden et al., 2005; Robson & Bennett, 2000; Yasuda, 2005), especially for those with the ability to grow fast (Coad & Rao, 2008) .

However, the literature also describes certain drawbacks that can hinder the positive association between innovation and firm sales. For example, while R&D expenditures stimulating innovation can increase the sales performance of a firm, there is a risk involved that the newly introduced products cannibalize the market share of the current products (Reinganum, 1983). Moreover, not all innovative inputs are succesfully transformed into innovative outputs, which could hinder the increase in productivity (Crépon

et al., 1998). Furthermore, it may take a long time for innovation activities to translate into extra sales. Innovations require a lot of investments in product development and converting the initial idea into succesfull manufacturing procedures and endproducts is a costly and difficult process. This makes innovative activities quite risky, because there is a change that the commercialization of the innovation fails (Coad & Rao, 2008).

The literature above mainly focusses on developed economies. When looking at literature about developing countries, it becomes apparent that the innovation climate in these countries is hindered by the low levels of educational attainment, the lack of infrastructure and the low quality of the business environment in these countries (Aubert, 2005). Due to these characteristics of developing countries, the development of innovative products and processes is inhibited. Using data from Brazilian manufacturing firms, Goedhuys & Veugelers (2012) find that the innovation strategy of most developing economies is therefore to acquire new technologies, through the acquisition of knowhow embodied in machinery and equipment. This way these countries can license foreign technologies in order to increase the probability of succesful product or process innovation, which can lead to higher sales volumes. However, Bell & Pavitt (1995) underscore that the positive relation between the acquisition of foreign technologies and the performance of a firm is dependent upon the domestic capabilities and the absorptive capacity of the firm to absorb the knowledge and to transform this into innovations. Another study by Goedhuys (2007) on Tanzania revealed that licensing foreign technologies is not sufficient for firm in the least developed countries to improve the firm sales performance. The ability to adapt and master foreign technologies requires technical learning from these firms, which is costly and risky, as it requires a financial commitment in order to build up skills through R&D and training (Katz, 1987; Malerba, 1992; Fransman, 1985).

However, when looking at literature on middle income developing economies, the paper by Goedhuys & Veugelers (2012) on Brazil did find evidence that the participation in innovative activities, as a result of the acquisition of foreign technologies, is an important driver for the sales performance of firms. Moreover, using a dataset on Argentina as a middle income country, Berrone et al. (2014) also find that innovation is an important determinant of firm performance, due to its positive impact on the sales of a firm. This positive relation can be explained by the fact that the financial situation in the middle income developing economies is better than that in the least developed economies, such as Tanzania, as described by Goedhuys (2007). In Argentina for example the investments in R&D and innovation have increased in the past years, driven mostly by the greater government commitment as a result of the Ministry of Science, Technology and Productive Innovation, which was created in 2007 (Oxford Business Group, 2018).

This leads to the following hypothesis with regard to Argentina as a middle income developing country:

H3: There is a positive relation between innovation and firm sales performance in middle income developing countries

As stated before, a distinction can be made between product and process innovation. Product innovation can improve the sales performance of a firm by creating new markets and consumer bases through the introduction of a new product. Moreover, product innovation can increase the consumer's willingness to pay by improving the quality of the product or service. This way product innovation can both generate new sales as a result of new products and increase the revenues of the existing sales through improved quality and new features. Process innovation on the other hand lowers the production costs of a firm through the introduction of new technologies, which can lead to an increase in demand (Cohen & Klepper, 1996).

As described above, both types of innovation can contribute in a positive way to the sales performance of a firm. However, using a dataset of Brazilian manufacturing firms, Goedhuys & Veugelers (2012) find that it is the introduction of product innovation exclusively that translates into a signficant increase in sales. They also find that there is no significant increase in sales for those firms that are only involved in process innovation. Moreover, Cassiman & Martinez-Ros (2007) have found empirical evidence that product innovation rather than process innovations affects firm performance in terms of productivity. This is because they find that firm specific demand shocks, rather than production efficiencies, lead to productivity shocks and therefore improve the firm's sales performance. Since product innovation is the answer to these specific demand shocks, I expect, although the two activities might possibly reinforce each other, that the association between product innovation and the sales performance of a firm is stronger than the association with process innovation.

Moreover, this expectation is supported by the statement of Gerstenfeld & Wortzel (1977) that the demand-pull innovations, which originate from outside of the firm and usually come from the market, are most likely to succeed in developing countries. The authors of this paper hereby suggest that product innovations improve the firm performance of a firm, especially through the early life-cycle-imitation and production of products that are new to the domestic country instead of innovating products that are new to the world, rather than process innovation.

H4: The positive relation between innovation and firm sales performance in middle income developing countries is mainly driven by product innovation

2.4 Complementarity between export and innovation

Other scholars have looked at export and innovation as complementary strategies for firm performance. Following Milgrom & Roberts (1990), these activities can be seen as complements if the firm sales as a result of one of the two activities increase when the firm also engages in the other activity. For this concrete relationship this would mean that if the activities of innovation and export are combined, that they positively reinforce each other. In order for exporting firms to improve their sales performance, they need to either increase the quantities sold in the export market or they need to optimize the generated mark-up through high prices (Bughin, 1996). Competition and the costs related to export however complicate these goals (Golovko & Valentini, 2011). Aw et al. (2001) found that most price differences between domestic and foreign markets can be led back to differences in prices amongst firms in the same market rather than prices across markets. Since within-market price variation reflects the differences in products and their quality, and these differences can be explained by investments in innovation, innovation can be seen as a complementary activity to firms that already perform export activities in order to improve firm sales performance. This is because innovation will give firms the ability to meet both domestic and international demand (Zahra & Covin, 1994). Moreover, prior literature has established that organizational learning and innovation may be drivers of export. Organizational learning in this context refers to the ability to assimilate and exploit new knowledge. This is necessary for firms in order to compete and grow in a market in which they do not have any experience yet (Autio et al., 2000). Through innovation firms can adapt to the local foreign market, offer customized products and services and exploit opportunities in new markets through the development of new products and services (Zahra et al., 2000).

Vice versa, the improvement of firm sales through innovation is dependent upon the firm's learning abilities. 'Learning by exporting' can be seen as an opportunity for firms to gain access to new information and technologies, which are not available in the home market (Salomon & Shaver, 2005). This positive relationship between export and the probability of innovating is confirmed for numerous innovative activities, varying from improving the design and quality of products and production processes to the presence of R&D investments and the licensing of foreign technologies (Alvarez & Robertson, 2004). Salomon & Shaver (2005) have found consistent evidence that the export activity of a firm is positively associated with an increase in the firm's product innovations and its number of patents applications. On top of that, export and innovation are often combined, because innovative firms have the incentive to internationalize sales in order to spread their development costs over a larger production (Zahra et al., 2000).

Filatotchev & Piesse (2009) have investigated this relationship for newly listed firms in four European countries and found that these two activities in fact complement each other, leading to an increase in firm sales. They describe that the complementarity is mainly driven by innovation, which enforces the export of a firm through organizational learning and R&D investments to increase the capacity. The

study by Golovko & Valentini (2011) complements this study by examining the joint effect of export and innovation on the sales performance of Spanish SMEs and confirms the complementarity of the activities. These results are consistent with other studies regarding this topic that are conducted in the Spanish firm setting (Cassiman & Golovko, 2010; Monreal-Pérez et al., 2012). Moreover, Love et al. (2010) confirm this conclusion regarding the complementarity of export and innovation in their study, in which they examine the service-sector in Northern Ireland.

What can be seen is that previous papers have mainly focussed on European countries, which makes that their results are based on developed economies with better circumstances concerning institutional, financial and governance regimes. This raises the question whether the complementarity of these activities is also confirmed in developing economies. Bernard et al. (2007) have found that the relation between export and firm sales might depend upon the economic development of a country. This is because successful economic development can be linked to the capacity of a country to acquire, absorb, disperse and apply new technologies and to convert these intro extra capacity, while developing economies are characterized by weak domestic linkages, a dualistic industry structure and knowledge bases which are underdeveloped (Metcalfe & Ramlogan, 2008). Due to these characteristics the association between export, innovation and firm sales performance is different than in developed countries.

The decision to enter the export market is harder for firms in developing economies, as due to their weak domestic linkages and bad infrastructure, they have difficulty with the orientation of the export market and the acquisition of knowledge to understand the demand of the consumers in these foreign countries and how to work with the distributors (Artopoulos et al., 2013). However, the current digital world has given rise to more and new opportunities for developing countries to export, as the internet offers these firms a platform to enter the global markets at lows costs, but also simplifies communication, networking, market research and thus offers firms an opportunity to improve their sales volume (Lu & Julian, 2007). With regard to engaging in innovation activities, it becomes apparent that the innovation climate in developing countries is hindered by the low levels of educational attainment, the lack of infrastructure and the low quality of the business environment in these countries (Aubert, 2005). Goedhuys & Veugelers (2012) find that due to this, the innovation strategy of most developing economies now is to acquire new technologies, through the acquisition of knowhow embodied in machinery and equipment. This way these countries can license foreign technologies in order to engage in product and process innovations, instead of having to develop these technologies themselves. However, whether these acquired technologies can then be converted into actual product or process innovations depends upon the absorptive capacity of the firm.

In order for export and innovation to be complementary, engaging in one of these activities must reinforce the benefits in terms of firm sales of also engaging in the other activity (Milgrom & Roberts,

1990). For firms in developing economies that already export, also engaging in innovation activities can be beneficial as export creates linkages between the exporting firms and the foreign market which can result in collaboration and 'learning by exporting' (Goedhuys, 2007; Salomon & Shaver, 2005). This way, export contributes to the absorptive capacity of firms in developing economies and can function as a support for these firms to adapt to new foreign technologies and to transform this knowledge successfully into product or process innovation. Ren et al. (2015) find in their paper that export involvement is only positively related with firm performance in developing economies, when the absorptive capability of the firms is sufficiently high. This highlights the importance of export involvement for firms that want to engage in innovative activities in developing economies.

Vice versa, for firms in developing economies that already innovate, also engaging in export activities can be beneficial, as innovative firms have the ability to accumulate and exploit new knowledge, which is necessary for firms to compete and grow in foreign markets in which they do not have any experience yet (Autio et al., 2000). Due to the underdeveloped knowledge bases and the weak infrastructure, exploiting opportunities in foreign markets is often not possible for firms in developing economies (Metcalfe & Ramlogan, 2008). However, innovation can help these firms to exploit new market opportunities by adapting their products to the foreign market in order to increase their sales volume (Zahra et al., 2000). Moreover, the digitalization process in the past decade enhances export opportunities for innovative firms, as the internet offers firms a platform to enter the global markets at lows costs, while simplifying communication, networking, market research and thus solving some of the problems of firms in developing economies with regard to export (Lu & Julian, 2007).

As a result, I expect the complementarity hypothesis to also hold for middle income developing countries:

H5: Innovation and export are complementary activities for firm sales performance in middle income developing countries

When looking at the distinction between the different types of innovation, I expect product innovation to have a larger positive impact on the interaction between export and innovation than process innovation. This is because the quality and diversity of the product has a larger impact on the quantity sold and the price of products in the export market, than the cost reductions that are the result of process innovation (Golovko & Valentini, 2011). Cassiman & Golovko (2010) confirm that the strong positive association between export and a higher sales volume is moderated through product innovation. Finally, Becker & Egger (2013) state that while both modes of innovation increase the probability that the firm engages in export activities, innovation in terms of new products and services is relatively more important due to its importance for a firm's entry into the export market. This can be explained by the fact that Foster et al. (2005) found that increases in the productivity of firms are often caused by demand shocks rather than efficiencies in the production process. As positive demand shocks are often

responsible for product innovation, while production efficiencies are linked to process innovation, it can therefore be stated that product innovation is more important for higher sales volumes. Combining this with the fact that firms in developing countries mainly improve their sales performance through product innovation and especially through early life-cycle-imitation and production of product that are new to the domestic country, implies that product innovation can therefore help to increase the productivity of firms in middle income developing countries and thus increase the probability of a firm to enter the export market (Cassiman & Martinez-Ros, 2007).

In addition, concerning the different modes of export, I expect direct export to play a larger role in the positive interaction between export and innovation than indirect export. This is because with direct export the firm needs no help of an intermediary and therefore is able to gain knowledge from all the different stages in the exporting process, while with indirect export the intermediary mostly helps with this and firms are only active in one stage in which they can gain access to new knowledge (Peng & Ilinitch, 1998). Moreover, since in this section we are looking at the complementarity between export and innovation, the help of an intermediary becomes less relevant for firms in developing countries, as the innovative acticities of the firm already help to reduce the knowledge gaps and create linkages with other institutes and firms (Balbanis, 2000). Due to this, I expect that the ability of a firm to absorb new knowledge is larger for firms that engage in direct export than those that only engage in indirect export.

With regard to the complementarity between export and innovation in middle income developing economies, this leads to the following hypotheses:

H6a: The positive relation between the interaction of export and innovation in middle income developing countries is mainly driven by direct export.

H6b: The positive relation between the interaction of export and innovation in middle income developing countries is mainly driven by product innovation.

3. Data and methodology

3.1 Data

The data that is used is an Enterprise Survey from The World Bank. This survey is collected from enterprises in manufacturing and service sectors in every region of the world (The World Bank, 2019). For this research the Enterprise Survey on Argentina for the period 2006 until 2017 is chosen, as Argentina is considered a developing economy by the classification of the United Nations in 2017, which is the most recent year that is covered in the dataset (United Nations, 2017). Moreover, Argentina is classified by the World Bank as a middle income country (The World Bank, 2020). This makes Argentina an interesting subject for this study, as on the one hand middle income countries are considered drivers of the world economy, while on the other hand these middle income countries are not finished developing and risk being trapped in their current status if they do not persist their own economic, social and structural transformation (The World Bank, 2020). Because Argentina is the subject of this research, the results might be less reflective of lower income countries. On the other hand, this study can offer recommendations to middle income developing countries on how to target their challenges such as competitiveness and trade policies by creating awareness of the benefits of export and innovation activities for firm sales, both separately as combined.

Furthermore, both innovation and export play an increasingly important role in Argentina. When comparing the ranking of Argentina on the Global Innovation Index with that of the other eight middle income developing countries from South America (United Nations, 2017), Argentina is in the top 3 in 2006 and 2010 and in the top 5 in 2017 (Dutta et al., 2017; Dutta et al., 2010; Dutta & Caulkin, 2006). When looking at the international ranking of merchandise export Argentina also scores relatively high compared to other middle income developing countries from South America (World Trade Organization, 2018). Argentina as a subject therefore enables this research to analyse the case of a middle income developing country where both export and innovation can contribute to the economic development of the country in order to escape the status of being a developing country.

This dataset on Argentina displays a response rate of 68%. Moreover, the sample of this country is selected using a stratified random sample with three levels of stratification: industry, establishment size and region. The industries included are Food, Textiles & Garments, Other manufacturing, Retail and Other services. The establishment size varies from small with 5 till 19 employees, to medium with 20 to 99 employees, to large with more than 100 employees. Finally, the regions that are reflected by the data are Buenos Aires, Rosario, Mendoza, Cordoba and Tucuman. These three levels of stratification are added as control variables, which will be discussed more thoroughly in the next chapter. Furthermore, a weight is included in the analysis, weighing for the three stratification levels that are mentioned above, in order to make the sample representative so that is it becomes possible to obtain unbiased estimates for the whole population. I chose to use the median weight assumption, which weighs

the sample using a ratio of those firms that directly responded and those that only answered through an answering machine or fax divided by the total number of firms in the sample.

The survey that is used is conducted in the years 2006, 2010 and 2017, due to which the dataset contains data from these three years and has gaps in between. The fact that this dataset has such large gaps is a limitation. Ideally the dataset would cover a total of ten consecutive years and would contain data of firms that are present in each of the ten waves to provide a more suitable setting to test the relationship between export, innovation and firm sales performance. Due to this limitation, plus the fact that the sample of firms that is present in all three waves is relatively small, the analysis will be based on the cross sectional data per year, for which some data of the previous years can be used as a control. The panel analysis will merely be used as a robustness check. By doing this, I attempt to take the dynamic path of the behaviour of firms into account. This will however be further discussed in the chapter concerning the robustness checks. Moreover, the sample is an unbalanced panel, indicating that not all firms are observed throughout all the 3 years. From the 2.299 firms in total, only 180 firms are present in all the three years. Furthermore, 318 firms are present in both 2006 and 2010 and 131 firms are present in both 2010 and 2017. The remaining 1.670 firms only occur in one of three years within the period of 2006 until 2017. As a consequence the number of observations is relatively low for a panel analysis. Moreover, due to the fact that the sample is an unbalanced panel, the number of firm-year observations also differ per year. The initial sample therefore consists of 1.063 firm-year observations in 2006, 1.054 firm-year observations in 2010 and 991 firm-year observations in 2017. These firm-year observations differ in quantity per year, since the sample frame of each year's survey consists of the list of the previous survey year minus the firms that did not survive and plus fresh firms that were not covered in the previous survey year. Finally, because of missing values for some of the key variables used in this study the final sample is reduced from a total of 3.108 firm-year observations to a total of 2.018 firm-year observations.

When looking at the distribution of firms in the final sample, approximately 75% of the firms report engaging in either product or process innovation activities, ranging from 82% in 2006 and 2010 to 61% in 2017. As innovation is measured subjectively, by letting firms answer whether they have introduced new products or services in the past three years or have introduced new or significantly improved processes, the share of innovating firms is quite high. This can possibly be explained by the fact that this measure is subjective, which indicates that some firms can be of the opinion that a product or process is new, while in fact this has already been introduced by another firm, without them knowing about this. Using a more objective measure could therefore lead to a different distribution, as innovation would then be measured more strictly. Moreover, as can be seen in Table 1, the same decrease in innovative activities occurs for the subsamples of product innovation and process innovation separately. Moreover, about 40% of the firms are exporters, with the proportion of exporting firms decreasing from around

52% in 2006 and 2010 to only 18% in 2017. Again, the same reduction occurs for the subsamples of direct and indirect export separately.

Both exporting and innovating firms constitute a large proportion in the sample, which makes this dataset suitable for the analysis. However, the proportion of firms in Argentina that performs either innovation or export activities has decreased over time, as can be seen in Table 1 after 2010. This is the result of the Argentina's unique economic history, during which it has defaulted on its debt multiple times and inflation has been a problem multiple times. One of these economic downfalls occurred in the period 1998 until 2002, which later was labelled as the worst political and economic crisis of Argentina (Veigel, 2005). During this period the economy diminished by 20%, output decreased more than 15% and the Argentine peso lost 75% of its value (Independent Evaluation Office, 2003; Veigel, 2005). After this period Argentina returned to a period of growth, which lasted from 2003 until 2015. This economic growth was the result of a boom in the commodity prices, due to the rising demand from emerging markets, and the efforts of the government to keep the value of the peso low, which led to a boost in industrial exports (Mount, 2011). This high proportion of export in these years of economic growth is confirmed by Table 1. However, momentarilly Argentina is again facing an economic downfall since Mauricio Macri was voted president in December 2015. This economic crisis has led to higher interest rates, a depreciation of the peso and high external debts. Moreover, this effect was enhanced by a terrible drought that has destroyed the harvest of some of Argentina's main export products, such as soybeans and corn (Cohen, 2018). This economic downfall therefore largely explains the decrease in the proportion of firms that engages in either export or innovation activities after 2010.

Because the dataset includes both periods of economic growth and recession, the data displays substantial variation across firms over time for the main variables of innovation and export. This variance can be exploited to examine the performance of firms in Argentina in 2006, 2010 and 2017 (Golovko & Valentini, 2011). Moreover, it is now possible to examine whether the relationship of export and innovation with firm sales is dependent upon the economic situation of the country or not. However, external factors caused by the economic crisis can also disturb the relationship between export or innovation and firm performance. There are unfortunately no variables available in the dataset to cover for this externality.

Table 1: export and innovation status (expressed in %) during the sample period

	2006	**2010**	**2017**	**2006-2010-2017**
Innovators	82.57%	83.28%	60.85%	74.98%
Product innovators	75.49%	72.87%	51.65%	66.01%
Process innovators	68.09%	58.06%	38.05%	53.87%
Exporters	51.48%	52.93%	17.45%	39.69%
Indirect exporters	6.91%	9.97%	3.16%	6.59%
Direct Exporters	47.70%	46.33%	14.84%	35.38%

3.1.1. Key variables

In this research I intend to gain insight in the relation of innovation and export and the combination of these activities with firm performance. As discussed, firm performance can be measured in a lot of different ways. In this study I chose to measure financial firm performance in terms sales, as Hubbard & Bromiley (1995) have found that sales is the most commonly identified measure of financial firm performance. Delmar et al. (2003) have also argued that sales is the most preferred measure of firm performance, as it is relatively easy accesible and it is applicable to most kinds of firms. In this study the sales volume in the past fiscal year is selected over alternative measurements, such as firm growth in terms of sales. This is because, although firm growth in terms of sales is often used to analyse the sales performance of a firm, in this dataset firm growth in terms of sales is measured over the past three years, which could cause reversed causality. In this case reverse causality would mean that firm growth in the past three years could be associated with the export involvement of the firm in the past year and the innovation activities of the firm in the past three years instead of the other way around. Using the sales volume in the past year as measure for firm sales performance can reduce this problem as it can direcly reflect the impact of export involvement in the past year and engagement in innovation activities in the past three years on the sales revenues of a firm.

Because the variable *Sales* is highly skewed, the variable is transformed into a logarithm. This way the spread in the dataset with regard to the sales performance of firms is normalized. Due to this transformation I will be able to examine the percentage of increase in the sales performance of firms as a result of engaging in export or innovation activities. Due to this transformation a total of 156 observations have to be deleted due to missing values, as it is not possible to take the logarithm of a negative value, leading to a total of 1,843 firm-year observations. Moreover, to investigate the relationship of innovation and export with firm sales performance, two dummy variables are created. The dummy *Innovation* which will give the value 1 if the firm introduced any new products, services or processes in the past three years and the dummy *Export* which will give the value 1 if at least one percentage of the firm's sales in the last fiscal year are the result of either direct or indirect export.

The lag of the variable *Innovation* used in this study is three years, as certain effects of innovation appear with a delay and therefore do not translate directly into firm sales. Triguero et al. (2014) for instance found that, while the displacement effect, which results in less labour for a given output, of both product and process innovation will not lag much to the time of their introduction, the compensation effect, which results in output growth, especially of process innovation, appears with a delay. This is because product and process innovation are not immediately converted into extra sales. For the variable *Export* on the other hand, a lag of only one year is used, as this more suitable. This is because an improvement in the sales performance of a firm as a result of export involvement appears faster, as export is defined selling products or services abroad, and therefore does translate directly intro firm sales.

Moreover, categorical variables are created to display the distinguished types of export and innovation. The categorical variable *Innovation Status* has the categories *Product & Process Innovation*, giving value 1 if the firm has introduced any new products or services in the past three years and has introduced a new or significantly improved process, *Only Product Innovation*, giving value 1 if the firm did introduce a new product or service in the past three years but did not engage in process innovation, *Only Process Innovation*, giving value 1 if the firm did introduce a new or significantly improved process but did not engage in product innovation and *No Innovation*, giving value 1 if the firm did not engage in either type of innovation in the past three years. The categorical variable *Export Mode* has the categories *Direct & Indirect Export*, giving value 1 if at least one percentage of the firm's sales are a result of direct export and at least percentage of the firm's sales are a result of direct export in the past year, *Only Direct Export*, giving value 1 if at least one percentage of the firm's sales of the past year are the results of direct export but the firm did not export indirectly, *Only Indirect Export*, giving value 1 if at least one percentage of the firm's sales of the past year are the result of indirect export but the firm did not export directly and *No Export*, giving value 1 if the firm did not export at all in the past year. Through this categorical variables the association between the distinguished types of export and innovation can be examined with regard to firm sales performance, compared to firms who do not export or innovate at all, due to which it is possible to investigate witch type of export or innovation is the main driver of the found overall association.

To test whether export and innovation are complementary activities with regard to firm sales performance, the categorical variable *Complementarity* is created, displaying four different scenarios, following Cassiman & Veugelers (2006). These scenarios display the different interactions between export and innovation, being firms that both export and innovate (*Innovation&Export)*, firms that only export *(OnlyExport)*, firms that only innovate *(OnlyInnovation)* and firms that do neither of the two activities *(NoInnovation&NoExport).* Finally, for hypotheses 6a and 6b these 4 scenarios are split up in combinations of different types of export and innovation, to investigate which of these activities mainly drives the potential complementarity of the relationship. This results in the following interaction terms: *ProductInnovationExport, ProcessInnovationExport, InnovationDirectExport* and *InnovationIndirectExport.*

3.1.2. Control variables

The categorical variables industry, region and firm size are used for the stratification of the sample in order to increase the representativeness of the sample. These variables are relevant to add as controls in the analysis to account for their relationship with firm sales performance. The industry that a firm operates in can have certain characteristics which can contribute to the sales performance of a firm. Due to this, some industries may perform systematically better than others. By including the different industries as a control variable, being Food, Textiles & Garments, Other manufacturing, Retail and Other services, the effect of the industry is isolated and therefore the true relationship between export and

innovation with firm performance can be examined (Chen & Ku, 2000). The same yields for the region that a firm operates in, in this dataset being Buenos Aires, Rosario, Mendoza, Cordoba and Tucuman, which may reflect underlying structural differences that contribute to the way that the dynamics of a firm are shaped. The region offers the resource base and the environment conditions that the firm has to operate in and are therefore relevant for the sales performance of firms (Barbosa & Eiriz, 2011). Finally, the size of a firm can influence its performance. In the literature it has been established that firm size is negatively associated with firm sales performance, as small firms are more active, competitive and flexible than large firms (Chen & Hambrick, 1995). In this dataset the establishment size varies from small with 5 till 19 employees, to medium with 20 to 99 employees, to large with more than 100 employees. Moreover, firm age, displaying that the number of years that the establishment is operating in that survey year, is added as control. This is because various empirical studies report diminishing returns on sales performance when the age of a firm increases (Evans, 1987; Dunne & Hughes, 1994; Yasuda, 2005), also for developing countries (Macpherson, 1996).

Furthermore, following Najib (2005) I also control for the legal status of the firm, since whether the firm is a sole propriertorship or is a partnership, can be associated with the sales performance of a firm. This is because when the owners of a firm enjoy limited liability they have higher incentives to engage in risky project, which can lead to higher profits and thus a higher sales volumes (Stiglitz & Weiss, 1981). Also, based on Goedhuys & Veugelers (2012), who examine the performance of Brazilian manufacturing firms, a control is added that indicates whether access to finance is an obstacle for the firm. The access to finance can stimulate firm sales, because it can help firms to expand their operations, invest in innovation and product facilities and new staff (OECD, 2006). Empirical studies have confirmed that this negative association, which occurs when access to finance is an obstacle for a firm, also yields for developing economies (Fowowe, 2017; Adomako et al., 2016).

Other variables that can be associated with the sales performance of a firm are whether a firm engages in R&D acitivities and whether the firm engages in foreign licensing. Previous literature has shown that the R&D activity is positively associated with the sales performance of firms, due to the increase in the quality of the firms product, which results in higher demand (Falk, 2012; Klette & Griliches, 2000). Moreover, the decision of using technologies that are licensed from a foreign-owned company, is positively related with the sales performance of firms. Goedhuys & Veugelers (2012) provide evidence that the innovation strategy of most developing countries is to acquire new technologies through foreign technology licensing, as this enhances the probability of product or process innovations. This way firms in developing economies can convert acquired technologies into product or process innovations, instead of having to develop these technologies internally, which can result in higher sales levels (Chudnovsky et al., 2006).

Table 2 provices some descriptives of the main variables used in this study.

Table 2: Descriptive statistics

Variable	Obs.	Mean	Std. Dev.	Min	Max
Dependent variable					
Ln (sales)	1,843	16.182	2.045	10.82	23.206
Independent variables					
Innovation	1,843	.753	.431	0	1
Export	1,843	.414	.493	0	1
Product innovation	1,843	.207	.405	0	1
Process innovation	1,843	.086	.281	0	1
Direct export	1,843	.348	.476	0	1
Indirect export	1,843	.042	.201	0	1
Innovation*Export	1,843	.364	.481	0	1
Only Innovation	1,843	.39	.488	0	1
Only Export	1,843	.05	.219	0	1
No Innovation & No Export	1,843	.196	.397	0	1
Innovation & Direct Export	1,843	.305	.461	0	1
Innovation & Indirect Export	1,843	.035	.185	0	1
Product Innovation & Export	1,843	.081	.274	0	1
Process Innovation & Export	1,843	.032	.176	0	1
Control variables					
Size: small	1,843	.433	.496	0	1
Size: medium	1,843	.371	.483	0	1
Size: large	1,843	.196	.397	0	1
Industry: food	1,843	.234	.423	0	1
Industry: textiles & garments	1,843	.234	.423	0	1
Industry: other manufacturing	1,843	.417	.493	0	1
Industry: other services	1,843	.058	.234	0	1
Industry: retail	1,843	.058	.233	0	1
Region: Buenos Aires	1,843	.603	.489	0	1
Region: Cordoba	1,843	.1	.3	0	1
Region: Mendoza	1,843	.117	.321	0	1
Region: Rosario	1,843	.139	.347	0	1
Region: Tucuman	1,843	.041	.198	0	1
Firm age	1,843	37.814	24.931	2	183
Legal status	1,843	.078	.268	0	1
R&D activity	1,843	.449	.498	0	1
Foreign licensing	1,601	.158	.365	0	1
Finance as an obstacle	1,843	.835	.371	0	1

3.2 Method

In order to test to what extent innovation and export are complementary strategies for the sales performance of firms in middle income developing economies, several steps are followed. First of all, hypotheses 1 until 4 are tested to investigate how export and innovation, and the different types of export and innovation, relate to the sales performance of a firm, without considering their potential interrelatedness. Using an Ordinary Least Squares regression, this leads to the following estimation model:

$$\ln(Sales_i) = \beta_{10} + \beta_{11} * Export + \delta_1 * X + u_i \quad (1)$$

$$\ln(Sales_i) = \beta_{20} + \beta_{21} * DirectExport + \beta_{22} * IndirectExport + \delta_2 * X + u_i \quad (2)$$

$$\ln(Sales_i) = \beta_{30} + \beta_{31} * Innovation + \delta_3 * X + u_i \quad (3)$$

$$\ln(Sales_i) = \beta_{40} + \beta_{41} * ProductInnovation + \beta_{42} * ProcessInnovation + \delta_4 * X + u_i \quad (4)$$

In these formulas $Sales_i$ displays the sales performance of a firm in the past fiscal year. Formulas 1 and 3 represent both innovation and export as independent activities, where β_{11} displays the relation of export with firm sales and β_{31} displays the relationship between innovation and firm sales. *Innovation* and *Export* are both dummy variables, which are equal to 1 if the firm engages in respectively export or innovation activities. Formulas 2 and 4 represent the distinguished types of export and innovation in order to examine whether the relation with sales performance differs depending on the type of export and innovation. These distinguished types of export and innovation are captured by dummy variables as well and their estimated association is captured by β_{21} and β_{22} for export and by β_{41} and β_{42} for innovation. These OLS-regressions will both be performed for the years 2006, 2010 and 2017 separately, as with all the years combined, to check the robustness of the results. Moreover, the letter X in the formulas above is a vector of the control variables and their association with the firm's sales performance is displayed by δ. To control for the context in which the firm operates the control variables industry and region are added to the regression. Furthermore, some firm characteristics which might be related with firm sales performance are added as controls, such as firm size, firm age, the legal status of the firm, whether the firms engages in the R&D activities, whether a firm engages in foreign licensing and whether access to finance is an obstacle. Finally, u_i is added as a residual variable, which displays the error term of the regression. This error term indicates the uncertainty in the model and accounts for a lack of perfect goodness of fit of the regression.

Next, in order to test the complementarity of the two activities, as stated in hypothesis 5, the categorical variable *Complementarity* is used. This leads to the following estimation model:

$$\ln(Sales_i) = \beta_{50} + \beta_{51} * Complementarity + \delta_5 * X + u_i \quad (5)$$

The variable *Complementarity* displays the categories *NoInnovation&NoExport*, *OnlyExport*, *OnlyInnovation* and *Innovation&Export*, which represent the choice of each firm to engage in export

and innovation activities. The coefficient β_{51} displays the association of the different categories of the variable *Complementarity* with firm sales performance, compared to the reference category. If innovation and export are in fact complementary activities, the coefficient of *Innovation&Export* has to be positive and significant compared to the reference categories of both *OnlyExport* and *OnlyInnovation*. This leads to the following expectation:

$$Sales_i(Innovation\&Export) - Sales_i(OnlyInnovate) > 0$$

$$Sales_i(Innovation\&Export) - Sales_i(OnlyExport) > 0$$

Finally, again the distinction is made between different types of innovation and export, to identify the main driver of the potential complementarity between the two activities. The following models are used for this estimation:

$$\ln(Sales_i) = \beta_{60} + \beta_{61} * InnovationDirectExport + \beta_{62} * InnovationIndirectExport + \delta_6 * X + u_i \quad (6a)$$

$$\ln(Sales_i) = \beta_{70} + \beta_{71} * ProductInnovationExport + \beta_{72} * ProcessInnovationExport + \delta_7 * X + u_i \quad (6b)$$

The method used to estimate equations 1 until 6b is the Ordinary Least Squares (OLS) Regression. As the dataset consists of large time gaps between the three years in which the data were collected, a cross-sectional analysis fits the data better than a longitudinal analysis (Gayle & Lambert, 2018). Due to this, I choose to execute a cross sectional OLS-regression both with all the years combined as separately for the different years in the dataset. The OLS-regression method is the most common estimation method for linear models, as it is an easy way to test associations in a cross sectional dataset (Hutcheson & Sofroniou, 1999). In order for an OLS-regression to be unbiased, there are several assumptions that need to hold (Woolridge, 2014). First of all, the parameters must be linear. Since innovation, export and their interactions as the independent variables are linear, but the dependent variable displays the natural logarithm of firm sales performance, the above mentioned equations can be as identified as log-linear models. Secondly, the sample must be drawn randomly following the population model. This assumption is also met, since the sample contains data collected from firms in manufacturing and service sectors from different regions in Argentina, displaying a variety of firm sizes and industries. Moreover the dataset must exhibit sample variation in the explanatory variables. As can be seen in Table 1, the explanatory variables export and innovation differ over time, as the ratio of firms that engages in one or both of the activities varies from year to year. Finally, the zero conditional mean assumption must hold. This assumption indicates that that the error term must not be correlated with the independent variables, so that the error term is the same for different values of the independent variables (Woolridge, 2014). For the zero conditional mean to hold in this research, the error term cannot be correlated with export and innovation, otherwise the explanatory variable is endogenous. This possibility can however never be completely excluded. After taking these assumption into consideration, it can be concluded that the OLS-regression is the most suitable method to determine the association of the linear relationship between innovation, export and their interactions with firm sales performance. However, since the

dataset does contain data on multiple years, a longitudinal analysis will also be conducted as a robustness check.

A limitation of the OLS-regression is that all firm-observations per year are regressed as unique observations. If the survey would not display such large gaps, but would for example cover a total of ten consecutive years, this problem could be solved by using a fixed effects model on a panel dataset without gaps. A fixed effects model accounts for the different firms and for each observation of a firm it subtracts the average value of that firm. By doing this, a fixed effects model accounts for all time-invariant heterogeneity, due to which it only exploits the within variation, so the changes within a certain firm over time. The used OLS-model however exploits the overall variation of the sample. In order to optimize the estimations of the OLS-regression as much as possible, control variables are added to account for the context in which the firm operates and the firm-specific characteristics. Examples of these control variables are firm size, industry and region.

4. Results

In this chapter the results of the empirical analysis are presented and discussed. First of all, section 4.1 contains the main results of the study. Furthermore, section 4.2 contains several checks in order to test the robustness of the main results.

4.1 Main findings

In this section the main findings of the study are presented and discussed. First of all, section 4.1.1. includes a correlation matrix. Moreover, in section 4.1.2 the pooled OLS results are presented to show the overall results of the years 2006, 2010 and 2017 together, while controlling for each time period. In sections 4.1.3. until 4.1.5 the results of the cross sectional OLS-regressions per year are presented and the interpretation of these results are discussed. Each section represents one of the three main topics, as mentioned in the theoretical background, and discusses whether the hypotheses concerning this topic are supported or rejected. Furthermore, these cross-sectional results provide evidence whether the findings are dependent upon the economic situation of a country or not.

4.1.1. Spearman's correlation matrix

Table 3 presents the correlation between the coefficients of the dependent variable *Ln(sales)* with the key variables of this research. The correlations between export and sales performance and innovation and sales performance are positive and significant at a 5% significance level, and therefore consistent with prior research. However, when looking at the distinguished types of export, it can be seen that direct export is positively and significantly correlated with the sales performance and that indirect export is negatively and significantly correlated. This could be an indication of the fact that export is only beneficial for the sales performance of a firm, when the firm is able to export abroad directly and thus has a clear competitive advantage, and that this association becomes negative once a firm needs the help of an intermediary for their exporting activities. The same yields for the different innovation activities, as product innovation is positively correlated and process innovation is negatively correlated with firm sales performance. This could indicate that firms in middle income developing economies, such as Argentina, in fact mainly improve their sales through product innovation, most probably through early life-cycle-imitation which has an effect in the short run, instead of through process innovation which has more long term costs benefits. However, the correlation of both product and process innovation are insignificant, due to which these results cannot be interpreted.

Table 3: Spearman's rank correlation coefficients

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
(1) Ln (sales)	1.000						
(2) Export	0.240	1.000					
(3) Innovation	0.077	0.244	1.000				
(4) Direct export	0.264	0.869	0.212	1.000			
(5) Indirect export	-0.065	0.250	0.039	-0.154	1.000		
(6) Product innovation	0.006	-0.021	0.292	-0.016	0.019	1.000	
(7) Process innovation	-0.006	-0.027	0.176	-0.017	-0.007	-0.157	1.000
(8) Innovation*Export	0.246	0.899	0.433	0.782	0.205	0.032	0.005
(9) Only innovation	-0.175	-0.671	0.457	-0.583	-0.168	0.227	0.151
(10) Only export	-0.002	0.274	-0.403	0.238	0.112	-0.118	-0.071
(11) No innovation & no export	-0.082	-0.416	-0.864	-0.361	-0.104	-0.252	-0.152
(12) Innovation & direct export	0.277	0.789	0.380	0.908	-0.139	0.031	0.010
(13) Innovation & indirect export	-0.073	0.227	0.109	-0.140	0.910	0.040	0.004
(14) Product innovation & export	0.071	0.354	0.170	0.312	0.125	0.583	-0.091
(15) Process innovation & export	0.029	0.216	0.104	0.197	0.054	-0.093	0.592

Spearman rho = -0.054

Additionally, export and innovation are positively and significantly correlated with each other, which indicates that innovation and export activities are often combined by firms. Moreover, the fact that the variable *Innovation*Export* is positively and significantly correlated with the sales performance of firms aligns with the hypothesis on the complementarity between export and innovation activities. Finally, in order to conclude that no multicollinearity issues occur in this study, all models discussed in the method section are tested using variance inflation factors. The highest value that is found for an independent variable is 1,6, which indicates that the correlations between the dependent variables are not too high. When also taking the different interaction terms into account, the highest VIF value that is found is 7,04. This is however logical and even inevitable, as interaction terms include the main effects and are therefore always correlated. Moreover, this value is still lower than 10, which according to Hair et al. (1995) makes this level of correlation between the dependent variables acceptable.

4.1.2. Results pooled OLS

In this section the results of the pooled OLS analysis are presented and discussed. These results, as displayed in Table 4 and 5, represent the overall findings, and thus include data from the years 2006, 2010 and 2017 together, while at the same time controlling for each time period which captures the state of the economy. Due to this, these results can give insight in the associations between export, innovation and firm sales independent of the economic situation of Argentina.

In line with prior literature, both innovation and export are positively associated with the sales performance of a firm. As can be seen in models 1 and 2 of Table 4, when examined separately, the coefficients of *Export* and *Innovation* are positive and both significant at a 1% significance level. In model 3, where *Export* and *Innovation* are both added in the same model, the coefficients remain positive and significant, although the magnitude of the coefficients decreases slightly and *Innovation* is significant at a 5% significance level instead of 1%. This indicates that, controlling for the other activity, engaging in either export activities or innovation activities improves the sales performance of firms in

middle income developing economies. Based on the results of this pooled OLS both hypothesis 1 and 3 are therefore supported as these results are in line with the expectation based on the literature.

When looking at the control variables, it can be seen that the coefficient of firm size, both for medium and large firms compared to small firms, are positive and highly significant throughout all the models. This positive association between firm size and firm sales performance is even larger in magnitude for large firms that the association for medium firms. This positive association is mainly caused by the fact that the dependent variable level of sales can also be used as a measure of the size of a firm and that therefore these two variables are positively correlated. When looking at the remaining control variables, it can be concluded that these are consistent with the literature. The *Legal status* dummy coefficients show the expected sign, indicating that firms with sole proprietorship score lower in terms of firm sales performance than firms in a partnership or shareholding companies, as the the owners of these firm enjoy limited liability and therefore have higher incentives to engage in risky project, which can lead to higher profits and thus a higher sales volumes. Moreover, the coefficients of the variables *R&D activity* and *Foreign licensing* are both positive and significant at a 1% significance level throughout all the models. These results are consistent with prior research which has provided evidence that spending money on R&D can improve the quality of the firms product and can therefore increase demand and that licensing foreign technologies is a common way for firms in middle income developing countries to initiate innovation activities, which again can result in higher sales level. Finally, the coefficient of *Access to finance* is negative as expected, although it is statistically insignificant.

In order to determine the main drivers of the found positive association between both export and innovation with firm sales performance, the models 4 until 6 of Table 4 have to be examined. These models include the categorical variables *Export mode* and *Innovation activity*, which display the relationship between the different types of export and innovation and firm sales performance, both separetely as combined, compared to the reference category in which there is no export or innovation at all. The coefficient of the export mode *Only direct export* in model 4 is positive and significant at a 1% significance level, while the coefficient of the export mode *Only indirect export* is insignificant. This means, when looking at the different export activities separetely, that the positive association between export and firm sales performance is mainly driven by the firms that engage in only direct export. These results therefore provide evidence for hypothesis 2 and show that, although indirect export can be of value for firms in developing countries in order to reduce knowledge gaps and to provide distribution infrastructure, that these benefits are exceeded by the firms that are able to export independently and thus have a clear competitive advantage. However, the positive and highly significant coefficient of the export mode *Direct & indirect export* indicates that combining the two types of export also results in an improvement of the sales performance of firms in middle income developing countries compared to the sales performance of firms who do not engage in export at all.

Table 4: Results of the pooled OLS analysis for export and innovation as independent activities

VARIABLES	(1) H1 Ln(sales)	(2) H3 Ln(sales)	(3) H1&H3 Ln(sales)	(4) H2 Ln(sales)	(5) H4 Ln(sales)	(6) H2&H4 Ln(sales)
Export	0.627***		0.598***			
	(0.144)		(0.142)			
Innovation		0.416***	0.362**			
		(0.149)	(0.147)			
Export mode: only direct export				0.798***		0.763***
				(0.156)		(0.153)
Export mode: only indirect export				-0.098		-0.089
				(0.208)		(0.202)
Export mode: direct & indirect export				0.679***		0.557***
				(0.180)		(0.176)
Innovation activity: only product innovation					0.329*	0.262
					(0.180)	(0.183)
Innovation activity: only process innovation					0.223	0.250
					(0.202)	(0.196)
Innovation activity: product & process innovation					0.543***	0.462***
					(0.167)	(0.160)
Firm size: medium	0.898***	0.952***	0.904***	0.848***	0.939***	0.849***
	(0.132)	(0.133)	(0.132)	(0.130)	(0.133)	(0.131)
Firm size: large	2.703***	2.874***	2.695***	2.621***	2.861***	2.607***
	(0.139)	(0.130)	(0.141)	(0.143)	(0.132)	(0.145)
Firm age	-0.001	0.000	-0.000	-0.000	-0.000	-0.000
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Legal status	-1.141***	-1.185***	-1.096***	-1.070***	-1.225***	-1.060***
	(0.239)	(0.245)	(0.240)	(0.235)	(0.248)	(0.238)
R&D activity	0.637***	0.711***	0.569***	0.596***	0.649***	0.482***
	(0.135)	(0.136)	(0.139)	(0.134)	(0.140)	(0.138)
Foreign licensing	0.587***	0.671***	0.600***	0.536***	0.665***	0.544***
	(0.182)	(0.190)	(0.187)	(0.186)	(0.192)	(0.191)
Finance as an obstacle	-0.221	-0.181	-0.199	-0.235	-0.194	-0.221
	(0.177)	(0.180)	(0.177)	(0.168)	(0.182)	(0.170)
Constant	14.736***	14.577***	14.478***	14.677***	14.595***	14.440***
	(0.253)	(0.291)	(0.286)	(0.250)	(0.291)	(0.281)
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Region fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,601	1,601	1,601	1,601	1,601	1,601
R-squared	0.479	0.464	0.487	0.491	0.467	0.501

*** p<0.01, ** p<0.05, * p<0.1

Furthermore, when looking at model 5 of Table 4, it can be seen that with regard to the innovation activity the coefficient of *Product innovation* is positive and significant at a 10% significance level, while *Process innovation* is insignificant. This aligns with the expectation as formulated in hypothesis 4, that firms in developing economies mainly benefit from responding to specific demand shocks and early life-cycle imitation through product innovation, compared to process innovation. However, again the combination of the two types of innovation also leads to an improvement of the sales performance compared to firms who do not engage in innovation at all, as the coefficient of the innovation activity *Product & process innovation* is also positive and even significant at a 1% significance level. For future research it might be interesting to look deeper into this complementarity of both the different types of

export and innovation activities for developing countries. Especially, because when these two categorical variables are combined into one model (model 6), the found results with regard to the export mode remain the same, but with regard to the innovation activities *Product innovation* becomes insignificant, while *Product & process innovation* remains highly significant.

Models 1 until 3 of Table 5 display the test whether export and innovation are complementary activities for the sales performance of firms. The first step in investigating complementarity is to include the interaction between export and innovation in the analysis. This way it is possible to determine whether combining the two activities is positively related with the sales performance of firms in middle income developing economies. The coefficient of *Export*innovation* is however insignificant, indicating that it is not possible to conclude anything about the relation of the interaction of export and innovation activities with firm sales performance. In models 2 and 3 the categorical variable *Complementarity* is introduced, where the relation of *Export & Innovation* with firm sales performance is measured and compared to a situation of respectively *Only Export* and *Only Innovation*. In order for complementarity to hold, both coefficients have to be positive and significant. However, only the results of the combination of export and innovation in model 3 of Table 5, comparing the interaction to a situation of only innovation activities, are positive and statistically significant. Due to this it can be concluded that, although export can reinforce the sales performance of innovative firms, this analysis does not provide evidence for hypothesis 5 concerning the complementarity of export and innovation activities for firm sales performance in middle income developing economies, as the interaction in model 2, compared to a situation of only export activities, is statistically insignificant.

Finally, models 4 and 5 are included in Table 5 to test hypotheses 6a and 6b. Model 4 displays that both *Direct export & innovation* as *Indirect export & innovation* are statistically insignificant. These insignificant results, showing the interaction between the different export modes with innovation, are not surprising as the interaction of export and innovation as a whole in model 1 is also insignificant. As these insignificant results cannot be interpreted, it is not possible to draw a conclusion with regard to hypothesis 6a. Model 5 however does display statistically significant results for both *Product innovation & export* as for *Process innovation & export*. The negative coefficients of these two variables indicate that the combination of only engaging in product innovation with exporting and the combination of only engaging in process innovation with exporting are both negatively associated with the sales performance of a firm. As can be seen in model 1 the coefficient of the interaction of export and innovation is only slightly negative compared to the magnitude of the variables in model 5. This could indicate that the two innovation activities are in fact complementary, as we also found in model 5 and 6 of Table 4, and can only have a positive association with the sales performance of exporting firms in middle income developing economies when combined. It can therefore be concluded that hypothesis 6b is rejected, as the coefficient of *Product innovation & export* is negative instead of positive.

Table 5: Results of the pooled OLS analysis with regard to the complementarity of export and innovation

VARIABLES	(1) H5 Ln(sales)	(2) H5 Ln(sales)	(3) H5 Ln(sales)	(4) H6a Ln(sales)	(5) H6b Ln(sales)
Innovation*Export	-0.191				
	(0.312)				
Export	0.751***				0.920***
	(0.287)				(0.165)
Innovation	0.417**			0.451***	
	(0.166)			(0.165)	
Complementarity: innovation & export		0.227	0.561***		
		(0.275)	(0.156)		
Complementarity: only innovation		-0.334			
		(0.262)			
Complementarity: only export			0.334		
			(0.262)		
Complementarity: no innovation & no export		-0.751***	-0.417**		
		(0.287)	(0.166)		
Innovation & direct export				-0.181	
				(0.314)	
Innovation & indirect export				-0.721	
				(0.710)	
Direct export				0.880***	
				(0.277)	
Indirect export				0.415	
				(0.697)	
Product innovation & export					-0.989***
					(0.323)
Process innovation& export					-0.767**
					(0.347)
Product innovation					0.382**
					(0.166)
Process innovation					0.173
					(0.214)
Firm size: medium	0.906***	0.906***	0.906***	0.869***	0.879***
	(0.132)	(0.132)	(0.132)	(0.130)	(0.129)
Firm size: large	2.712***	2.712***	2.712***	2.650***	2.744***
	(0.144)	(0.144)	(0.144)	(0.150)	(0.140)
Firm age	-0.000	-0.000	-0.000	-0.000	-0.001
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Legal status	-1.097***	-1.097***	-1.097***	-1.056***	-1.136***
	(0.240)	(0.240)	(0.240)	(0.239)	(0.239)
R&D activity	0.574***	0.574***	0.574***	0.546***	0.573***
	(0.140)	(0.140)	(0.140)	(0.138)	(0.134)
Foreign licensing	0.587***	0.587***	0.587***	0.529***	0.558***
	(0.187)	(0.187)	(0.187)	(0.189)	(0.182)
Finance as an obstacle	-0.200	-0.200	-0.200	-0.204	-0.251
	(0.178)	(0.178)	(0.178)	(0.168)	(0.176)
Constant	14.442***	15.193***	14.860***	14.374***	14.661***
	(0.292)	(0.357)	(0.253)	(0.287)	(0.257)
Year fixed effects	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	Yes
Region fixed effects	Yes	Yes	Yes	Yes	Yes
Observations	1,601	1,601	1,601	1,601	1,601
R-squared	0.487	0.487	0.487	0.498	0.494

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

4.1.3. Export and innovation

The results of the estimations with regard to export and innovation as independent activities are reported in Table 6. Models 1 until 3 display the results of 2006, models 4 until 6 the results of 2010 and finally models 7 until 9 display the results of 2017.

Table 6: Results of the cross-sectional OLS-regression of the relation between export and innovation with firm sales performance for 2006, 2010 and 2017

	(1) H1 2006	(2) H3 2006	(3) H1&H3 2006	(4) H1 2010	(5) H3 2010	(6) H1&H3 2010	(7) H1 2017	(8) H3 2017	(9) H1&H3 2017
VARIABLES	Ln(sales)	Ln(sales)	Ln(sales)	Ln(sales)	Ln(sales)	Ln(sales)	Ln(sales)	Ln(sales)	Ln(sales)
Export	1.061***		0.985***	0.563***		0.577***	0.172		0.130
	(0.252)		(0.243)	(0.195)		(0.195)	(0.230)		(0.228)
Innovation		0.856***	0.693***		0.224	0.277		0.262	0.245
		(0.284)	(0.241)		(0.314)	(0.299)		(0.207)	(0.207)
Firm size: medium	0.536**	0.536**	0.521**	0.916***	0.948***	0.916***	1.185***	1.223***	1.207***
	(0.224)	(0.232)	(0.221)	(0.192)	(0.201)	(0.191)	(0.202)	(0.211)	(0.207)
Firm size: large	2.422***	2.639***	2.339***	2.701***	2.873***	2.696***	2.888***	2.941***	2.903***
	(0.342)	(0.349)	(0.347)	(0.177)	(0.183)	(0.175)	(0.188)	(0.173)	(0.187)
Firm age	0.002	-0.000	0.001	0.001	0.003	0.001	-0.004	-0.003	-0.003
	(0.004)	(0.005)	(0.004)	(0.004)	(0.004)	(0.004)	(0.005)	(0.005)	(0.005)
Legal status	-1.281***	-1.698***	-1.441***	-1.136***	-1.115***	-1.063***	-1.079***	-0.983**	-0.970**
	(0.351)	(0.388)	(0.354)	(0.356)	(0.314)	(0.357)	(0.399)	(0.401)	(0.403)
R&D activity	0.631**	0.802***	0.550**	0.236	0.271	0.154	0.945***	0.905***	0.877***
	(0.262)	(0.257)	(0.260)	(0.185)	(0.177)	(0.179)	(0.189)	(0.209)	(0.211)
Foreign licensing	0.665**	0.818**	0.737**	0.642***	0.644***	0.621***	0.333	0.390	0.356
	(0.312)	(0.351)	(0.324)	(0.171)	(0.182)	(0.167)	(0.289)	(0.270)	(0.290)
Finance as an obstacle	-0.628*	-0.550	-0.610*	-0.353**	-0.250	-0.317*	-0.010	-0.008	-0.004
	(0.327)	(0.357)	(0.322)	(0.178)	(0.179)	(0.173)	(0.253)	(0.249)	(0.249)
Constant	15.438***	15.290***	15.025***	15.532***	15.361***	15.293***	15.688***	15.540***	15.546***
	(0.341)	(0.390)	(0.358)	(0.324)	(0.493)	(0.449)	(0.313)	(0.370)	(0.369)
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	582	582	582	619	619	619	400	400	400
R-squared	0.439	0.398	0.459	0.505	0.481	0.508	0.493	0.497	0.498

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

When looking at the variable *Export* it can be seen that in the years 2006 and 2010 the coefficient is positive and significant at a 1% significance level, both separately in the models 1 and 4, as in model 3 and 6 where innovation is added as a control. The magnitude of the coefficient of *Export* is however twice as high in 2006 as in 2010. This indicates that the association between export and firm sales performance in 2006 was even higher than in 2010. This could be the results of the global financial crisis, which hit Argentina in late 2008, after the economy of Argentina had known a period of economic upturn while recovering from the economic crisis that lasted until 2002. This global financial crisis had an impact on the output of firms at the beginning of 2009. However, Argentina managed to recover relatively fast due to its experience with previous crises which translated into efficient and effective

policy responses (International Institute for Labour Studies, 2011). This global financial crisis can therefore explain why the association between export and firm sales performance in 2010 is still positive, but slightly smaller in magnitude, as Argentina was still recovering slightly. Based on the data of 2017 on the other hand, where Argentina faced an economic downturn, the coefficient of the variable *Export* is statistically insignificant. These results indicate that the positive association between export and firm sales performance could in fact be dependent upon the economic situation of the country. With regard to hypothesis 1 this means that for the years 2006 and 2010 this hypothesis is supported, while for 2017 no conclusion can be drawn.

For the variable *Innovation* the results are slightly different. In 2006 the coefficient of *Innovation* is positive and highly significant at a 1% significance level, both separately in model 1 as in model 3 where export was added as a control. However, while remaining positive, both in 2010 and 2017 the results are statistically insignificant, due to which no conclusion can be drawn with regard to the association between innovation and firm sales performance for these two years. As hypothesis 3 is therefore only accepted in 2006, but no conclusion can be drawn for 2010 and 2017, these results again indicate that the state of the economy could play an important role and in this case could moderate the relationship between innovation and firm sales performance in middle income developing countries.

With regard to the control variables, most results are the same as for the pooled OLS analysis in the previous section. The signs of the coefficients remain the same, although some of the results become less significant or even insignificant compared to the coefficients of these control variables in Tables 4 and 5.

4.1.4. Export modes and innovation activities

The results of the estimations with regard to the different export modes and innovation activities, that as a whole form respectively export and innovation, are reported in Table 7. Models 1 until 3 display the results of 2006, models 4 until 6 the results of 2010 and finally models 7 until 9 display the results of 2017.

Table 7: Results of the cross-sectional OLS-regression of the relation between export modes and innovation activities with firm sales performance for 2006, 2010 and 2017

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	H2 2006	H4 2006	H2&H4 2006	H2 2010	H4 2010	H2&H4 2010	H2 2017	H4 2017	H2&H4 2017
VARIABLES	Ln(sales)	Ln(sales)	Ln(sales)	Ln(sales)	Ln(sales)	Ln(sales)	Ln(sales)	Ln(sales)	Ln(sales)
Export mode: only direct export	1.128***		1.019***	0.672***		0.681***	0.289		0.235
	(0.267)		(0.254)	(0.214)		(0.212)	(0.275)		(0.274)
Export mode: only indirect export	-0.084		-0.226	0.163		0.190	-0.066		-0.070
	(0.318)		(0.334)	(0.268)		(0.267)	(0.323)		(0.329)
Export mode: direct & indirect export	0.938**		0.625	0.465		0.456	-1.644***		-1.668***
	(0.407)		(0.391)	(0.296)		(0.306)	(0.346)		(0.349)
Innovation activity: only product innovation		0.286	0.230		0.222	0.191		0.446*	0.414*
		(0.367)	(0.377)		(0.348)	(0.339)		(0.258)	(0.249)
Innovation activity: only process innovation		0.829*	0.756*		0.484	0.517		0.139	0.156
		(0.437)	(0.422)		(0.417)	(0.383)		(0.267)	(0.273)
Innovation activity: product & process inn.		1.026***	0.858***		0.145	0.202		0.149	0.118
		(0.298)	(0.256)		(0.313)	(0.300)		(0.243)	(0.249)
Firm size: medium	0.544**	0.521**	0.517**	0.876***	0.973***	0.896***	1.158***	1.205***	1.169***
	(0.223)	(0.229)	(0.219)	(0.196)	(0.208)	(0.202)	(0.197)	(0.211)	(0.200)
Firm size: large	2.390***	2.666***	2.345***	2.631***	2.888***	2.638***	2.855***	2.956***	2.886***
	(0.342)	(0.363)	(0.359)	(0.188)	(0.186)	(0.190)	(0.193)	(0.178)	(0.190)
Firm age	0.002	-0.001	0.001	0.001	0.003	0.001	-0.004	-0.003	-0.004
	(0.004)	(0.005)	(0.004)	(0.004)	(0.004)	(0.004)	(0.005)	(0.005)	(0.005)
Legal status	-1.200***	-1.774***	-1.435***	-0.986***	-1.095***	-0.915***	-1.085***	-1.011**	-1.001**
	(0.352)	(0.386)	(0.352)	(0.331)	(0.322)	(0.339)	(0.399)	(0.402)	(0.403)
R&D activity	0.663**	0.713***	0.517**	0.238	0.293*	0.169	0.903***	0.966***	0.912***
	(0.264)	(0.251)	(0.245)	(0.184)	(0.171)	(0.172)	(0.205)	(0.218)	(0.229)
Foreign licensing	0.631**	0.824**	0.705**	0.622***	0.688***	0.648***	0.287	0.430	0.347
	(0.315)	(0.341)	(0.317)	(0.173)	(0.185)	(0.174)	(0.304)	(0.268)	(0.300)
Finance as an obstacle	-0.643**	-0.450	-0.541*	-0.336**	-0.254	-0.301*	-0.019	0.019	0.020
	(0.322)	(0.361)	(0.319)	(0.171)	(0.176)	(0.165)	(0.250)	(0.244)	(0.244)
Constant	15.373***	15.292***	14.967***	15.506***	15.291***	15.231***	15.707***	15.502***	15.521***
	(0.338)	(0.395)	(0.360)	(0.320)	(0.493)	(0.450)	(0.311)	(0.360)	(0.355)
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	582	582	582	619	619	619	400	400	400
R-squared	0.446	0.417	0.480	0.510	0.484	0.517	0.497	0.503	0.507

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

With regard to the different types of export, Table 7 introduces the variable *Export mode* again which displays the relation of direct and indirect export with firm sales performance, both separately and combined, compared to not engaging in exporting activities at all. Model 1 of this table displays that in 2006 the variable of *Only direct export* is positive and significant at a 1% significance level. Moreover, when combining the different export modes and innovation activities in one model, as can be seen in model 3, the association of *Only direct export* with the firm sales performance remains the same. In

2010 the export mode of *Only direct export* is again positive and highly significant, both in model 4 as in model 6, where the various innovation activities are added as a control. The export mode *Only indirect export* on the other hand remains insignificant throughout all the models. Therefore it can be concluded that hypothesis 2 is accepted based on the data concerning 2006 and 2010, confirming that direct export in fact is the main driver of the positive association between export and firm sales performance that was found in Table 6. Finally, when looking at the models 7 until 9 that display the results of 2017, it can be seen that both export modes are statistically insignificant throughout these models. As the variable *Export* was also insignificant in models 7 until 9 of Table 6, these results are not surprising. This makes 2017 the only year where there is no interpretable association between the variable *Only direct export* and the firm sales performance at all. Due to this, it can be concluded that the positive association between direct export and the sales performance of a firm might in fact be dependent upon the economic situation of the country. This could be explained the fact that in periods of economic downturn firms focus mostly on their domestic market, as engaging in export also brings along various costs, such as entry costs and the costs of establishing distribution channels and adapting the producst and packaging to the foreign markets.

For the different types of innovation the variable *Innovation activity* is introduced, displaying the relation of product innovation and process innovation with firm sales performance, both separetely and combined, compared to a situation in which there is no innovation at all. In 2006 hypothesis 4, concerning the innovation activities is rejected, as opposed to the expectation based on the literature, the coefficient of the innovation activity *Only process innovation* is positive and significant at a 10% significance level, while the coefficient of *Only product innovation* is insignificant. This result indicates that in 2006 it was more beneficial for the sales performance of a firm to only engage in process innovation than it was to only engage in product innovation. This could be explained by the fact that in an economic upturn it is likely that there is more competition in the market, as this is a good time for firms to enter the market. This increase in competition could enhance the importance of lowering production costs in order to be able to compete in prices, and can therefore make that it is in fact process innovation that is most important.

However, it is not possible to draw any conclusions with regard to hypothesis 4 based on the data of 2010. While the coefficient of the innovation activity *Only product innovation* is positive as expected, it is not statistically significant. The same yields for the coefficient of the innovation activity *Only process innovation*. These results are however not surprising, as the coefficient of *Innovation* in models 5 and 6 of Table 6 was also insignificant. Finally, when testing the data of 2017, I do find a positive and significant coefficient for *Only product innovation*, while the coefficient for *Only process innovation* is insignificant. When adding the different export modes to the model, as can be seen in model 9 of Table 7, these results with regard to the category *Only product innovation* remain positive and significant. Therefore it can be concluded that based on this data hypothesis 4 is supported.

It is surprising that while hypothesis 4 is accepted based on the pooled OLS results as displayed in models 5 and 6 of Table 4, the results of the cross-sectional analysis per year vary significantly. This variation in the results could again be caused by the differences in the economic situation of Argentina in the years 2006, 2010 and 2017. As mentioned before, in an economic upturn, such as in 2006, process innovation might be more beneficial with regard to the firm sales performance due to its cost reduction nature, which could help with price wars in a market with a lot of competition. In 2017 on the other hand, where Argentina faces and economic downfall, product innovation turns out to be of greater importance for the sales performance of firms, as the market is likely to be more concentrated, due to which new or significantly improved products or services are likely to draw more additional sales revenue than the cost reduction of process innovation.

4.1.5. Complementarity

In this section, the results with regard to the potential complementarity of export and innovation activities for firm sales performance in middle income developing economies, are reported in Tables 8.1 and 8.2. Models 1 until 5 of Table 8.1 display the results of 2006, models 6 until 6 10 of Table 8.1 display the results of 2010 and finally models 11 until 15 of Table 8.2 display the results of 2017.

The first step in establishing whether innovation and export are complementary activities is to include the interaction between export and innovation in the analysis. This way it is possible to determine whether the interaction of the two activities is positively related with the sales performance of firms in middle income developing economies. The results with regard to this interaction *Innovation*export* are consistent throughout the years, as can be seen in models 1, 6 and 11 of Table 8, and are all negative and statistically insignificant. Due to this insignificance, is it not possible to conclude anything based on these results.

The next step in the complementarity analysis is to introduce the categorical variable *Complementarity*, where the relation of *Export & Innovation* with firm sales performance is compared to situations of respectively *Only Export* and *Only Innovation*. In order for complementarity to hold, both coefficients have to be positive and significant. However, the results for the cross-sectional analysis of 2006 and 2010, as presented in models 2 and 3, and 7 and 8 of Table 8.1, confirm the findings of the pooled OLS, that export can positively reinforce the sales performance of innovative firms, but that there is no significant association between the sales performance of exporting firms that initiate innovation activities. Models 12 and 13 of Table 8.2, displaying the results of the combination of export and innovation activities for the year 2017, even find no significant coefficients at all, both compared to a situation of only export and that of only innovation. Due to the fact that the category *Innovation & export*, although positive in sign, is not significant, this analysis does not provide evidence supporting hypothesis 5 concerning the complementarity of export and innovation activities for firm sales performance in middle income developing economies.

Finally, hypotheses 6a and 6b are tested by including interaction terms of the various export modes and innovation activities to the analysis. With regard to the different export modes in combination with innovation the results are mostly insignificant. The only significant result that can be interpreted with regard to this interaction is the positive coefficient of *Innovation & indirect export* in model 4 of Table 8.1, which is statistically significant at a 10% significance level. This result, based on data of 2006, confirms that for firms in middle income developing economies the help of an intermediary can be useful in order to overcome knowledge gaps and to identify potential customers. This contradicts the expectation as stated in hypothesis 6a, which is based on the fact that with direct export the firm needs no help of an intermediary and therefore is able to gain knowledge from all the different stages in the exporting process.

With regard to the different innovation activities in interaction with export, again most of the results are not interpretable. This is because the variable *Product innovation & export* remains insignificant throughout all the models, due to which is it not possible to interpret these results. The only significant result that can be interpreted is based on the data of 2006 and is the positive coefficient of *Process innovation & export*, which is statistically significant at a 1% significance level. While this variable remains positive throughout the models 5, 10 and 15 of Table 8, only model 5 displays a significant coefficient. This leads to the conclusion that only for the year 2006 it is possible to draw a conclusion with regard to hypothesis 6b, namely that it is rejected based on this data, as process innovation in combination with export leads to a significant improvement of the sales performance of firms in middle income developing countries, while for product innovation in combination with export no significant coefficients are found.

Table 8.1: Results of the cross-sectional OLS-regression of the relation between the complementarity of export and innovation with firm sales performance for 2006 and 2010

VARIABLES	(1) H5 2006 Ln(sales)	(2) H5 2006 Ln(sales)	(3) H5 2006 Ln(sales)	(4) H6a 2006 Ln(sales)	(5) H6b 2006 Ln(sales)	(6) H5 2010 Ln(sales)	(7) H5 2010 Ln(sales)	(8) H5 2010 Ln(sales)	(9) H6a 2010 Ln(sales)	(10) H6b 2010 Ln(sales)
Innovation*Export	-0.583					-0.173				
	(0.498)					(0.559)				
Export	1.466***				0.458	0.718				0.573
	(0.417)				(0.359)	(0.543)				(0.364)
Innovation	0.926***			0.888***		0.358			0.232	
	(0.291)			(0.288)		(0.372)			(0.318)	
Complementarity: innovation & export		0.343	0.883***				0.184	0.545***		
		(0.394)	(0.278)				(0.444)	(0.193)		
Complementarity: only innovation		-0.540					-0.360			
		(0.371)					(0.449)			
Complementarity: only export			0.540					0.360		
			(0.371)					(0.449)		
Complementarity: no innovation & no export		-1.466***	-0.926***				-0.718	-0.358		
		(0.417)	(0.291)				(0.543)	(0.372)		
Innovation & direct export				-0.459					-0.035	
				(0.502)					(0.512)	
Innovation & indirect export				1.101*					0.337	
				(0.589)					(0.510)	
Direct export				1.431***					0.694	
				(0.415)					(0.512)	
Indirect export				-1.314*					-0.053	
				(0.717)					(0.510)	
Product innovation & export					-0.596					-0.087
					(0.523)					(0.413)
Process innovation & export					1.483***					0.083
					(0.495)					(0.379)
Product innovation					0.198					0.133
					(0.283)					(0.323)
Process innovation					-0.297					0.345
					(0.598)					(0.302)
Firm size: medium	0.545**	0.545**	0.545**	0.549**	0.417*	0.915***	0.915***	0.915***	0.887***	0.944***
	(0.225)	(0.225)	(0.225)	(0.223)	(0.215)	(0.190)	(0.190)	(0.190)	(0.197)	(0.204)
Firm size: large	2.400***	2.400***	2.400***	2.354***	2.401***	2.704***	2.704***	2.704***	2.647***	2.714***
	(0.356)	(0.356)	(0.356)	(0.356)	(0.385)	(0.177)	(0.177)	(0.177)	(0.186)	(0.181)
Firm age	0.001	0.001	0.001	0.001	0.000	0.001	0.001	0.001	0.001	0.002
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Legal status	-1.481***	-1.481***	-1.481***	-1.401***	-1.382***	-1.086***	-1.086***	-1.086***	-0.850**	-1.096***
	(0.352)	(0.352)	(0.352)	(0.352)	(0.348)	(0.365)	(0.365)	(0.365)	(0.367)	(0.382)
R&D activity	0.548**	0.548**	0.548**	0.582**	0.509**	0.160	0.160	0.160	0.167	0.229
	(0.258)	(0.258)	(0.258)	(0.260)	(0.243)	(0.178)	(0.178)	(0.178)	(0.181)	(0.178)
Foreign licensing	0.702**	0.702**	0.702**	0.671**	0.755**	0.620***	0.620***	0.620***	0.606***	0.688***
	(0.322)	(0.322)	(0.322)	(0.325)	(0.302)	(0.168)	(0.168)	(0.168)	(0.169)	(0.174)
Finance as an obstacle	-0.635*	-0.635*	-0.635*	-0.651**	-0.494	-0.315*	-0.315*	-0.315*	-0.284*	-0.351**
	(0.326)	(0.326)	(0.326)	(0.320)	(0.323)	(0.174)	(0.174)	(0.174)	(0.168)	(0.173)
Constant	14.899***	16.365***	15.825***	14.871***	15.474***	15.222***	15.940***	15.580***	15.277***	15.383***
	(0.370)	(0.456)	(0.356)	(0.365)	(0.342)	(0.498)	(0.564)	(0.319)	(0.476)	(0.349)
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	582	582	582	582	582	619	619	619	619	619
R-squared	0.462	0.462	0.462	0.468	0.477	0.509	0.509	0.509	0.512	0.510

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 8.2: Results of the cross-sectional OLS-regression of the relation between the complementarity of export and innovation with firm sales performance for 2017

VARIABLES	(11) H5 2017 Ln(sales)	(12) H5 2017 Ln(sales)	(13) H5 2017 Ln(sales)	(14) H6a 2017 Ln(sales)	(15) H6b 2017 Ln(sales)
Innovation*Export	-0.226				
	(0.555)				
Export	0.314				-0.010
	(0.534)				(0.424)
Innovation	0.281			0.298	
	(0.217)			(0.218)	
Complementarity: innovation & export		0.055	0.087		
		(0.533)	(0.239)		
Complementarity: only innovation		-0.033			
		(0.523)			
Complementarity: only export			0.033		
			(0.523)		
Complementarity: no innovation & no export		-0.314	-0.281		
		(0.534)	(0.217)		
Innovation & direct export				-0.383	
				(0.464)	
Innovation & indirect export				-0.325	
				(0.975)	
Direct export				0.576	
				(0.394)	
Indirect export				0.133	
				(0.983)	
Product innovation & export					-0.122
					(0.421)
Process innovation & export					0.422
					(0.453)
Product innovation					0.453**
					(0.209)
Process innovation					0.024
					(0.272)
Firm size: medium	1.206***	1.206***	1.206***	1.168***	1.214***
	(0.208)	(0.208)	(0.208)	(0.205)	(0.193)
Firm size: large	2.919***	2.919***	2.919***	2.889***	2.889***
	(0.186)	(0.186)	(0.186)	(0.193)	(0.191)
Firm age	-0.003	-0.003	-0.003	-0.003	-0.005
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
Legal status	-0.956**	-0.956**	-0.956**	-0.956**	-1.014**
	(0.402)	(0.402)	(0.402)	(0.403)	(0.402)
R&D activity	0.889***	0.889***	0.889***	0.849***	0.919***
	(0.214)	(0.214)	(0.214)	(0.239)	(0.201)
Foreign licensing	0.326	0.326	0.326	0.256	0.417
	(0.297)	(0.297)	(0.297)	(0.306)	(0.300)
Finance as an obstacle	0.000	0.000	0.000	-0.010	0.003
	(0.251)	(0.251)	(0.251)	(0.256)	(0.259)
Constant	15.517***	15.831***	15.798***	15.527***	15.575***
	(0.369)	(0.611)	(0.293)	(0.378)	(0.333)
Industry fixed effects	Yes	Yes	Yes	Yes	Yes
Region fixed effects	Yes	Yes	Yes	Yes	Yes
Observations	400	400	400	400	400
R-squared	0.499	0.499	0.499	0.503	0.506

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

4.2. Robustness check

This section includes several robustness checks. First of all, a fixed effects panel analysis is conducted in order to take the dynamic path of the behaviour of firms into account. Secondly, firm growth in terms of sales is used as a dependent variable instead of firm sales performance, in order to test the robustness of the results on a growth variable which is measured over time, instead of a static variable which is measured in one year.

4.2.1 Fixed effects analysis

Since an OLS-regression can never entirely account for firm characteristics, a fixed effects model for the period 2006 until 2017 is added as a robustness check, in order to account for time-invariant unobserved heterogeneity. However, since the dataset displays large gaps between the periods, this dataset is not ideal for a panel analysis. Moreover, the sample is an unbalanced panel, indicating that not all firms are observed throughout all the 3 years. From the 2,299 firms in total, only 180 firms are present in all the three years. Furthermore, 318 firms are present in both 2006 and 2010 and 131 firms are present in both 2010 and 2017. The remaining 1.670 firms only occur in one of three years within the period of 2006 until 2017. As a consequence the number of observations of firms that are present in multiple waves is relatively low for a panel analysis.

When examining the results of the fixed effects analysis, as displayed in Table 9, it can be seen that there are only a few significant results. This could be the result of the low number of observations of firms that are present in multiple waves. Where *Export* was positive and significant in both the pooled OLS analysis as in most of the cross sectional OLS regressions, model 1 of Table 9 does not display a significant result. For *Innovation* however the positive and significant effect as found in the pooled OLS analysis is confirmed in model 2 of Table 9. These results remain the same when adding the variables of *Innovation* and *Export* together in one model, as can be seen in model 3, where *Innovation* is still significant at a 5% significance level. With regard to the different export modes as displayed in model 4 of Table 9, the results are insignificant. However, Table 9 shows that with regard to the innovation activities, both *Only product innovation* and *Only process innovation* are positive and significant at a 10% significance level, both in model 5 as in model 6 where the different export modes are added as controls. Moreover the combination of the two innovation activities, displayed by the variable *Product & process innovation* is also positive and statistically significant at a 10% significance level, indicating that these two activities might in fact be complementary and when combined can also improve the sales performance of firms in developing countries.

For this fixed effects analysis only the interaction term is added to the table to test for complementarity, as the number of observations for the change within firms with regard to the *Complementarity* variable is too low. By adding the interaction *Innovation*export* it is possible to determine whether the interaction of the two activities is positively related with the sales performance of firms in middle income

developing economies. Model 7 of Table 9 shows that, consistent with all the other analyses, *Innovation*export* is again insignificant and can therefore not be interpreted.

Table 9: Results of the fixed effects analysis

VARIABLES	(1) H1 Ln(sales)	(2) H3 Ln(sales)	(3) H1&H3 Ln(sales)	(4) H2 Ln(sales)	(5) H4 Ln(sales)	(6) H2&H4 Ln(sales)	(7) H5 Ln(sales)
Export	0.125		0.119				0.306**
	(0.077)		(0.077)				(0.151)
Innovation		0.168**	0.164**				0.249**
		(0.082)	(0.081)				(0.104)
Export mode: only direct export				0.123		0.108	
				(0.075)		(0.076)	
Export mode: only indirect export				0.135		0.130	
				(0.139)		(0.134)	
Export mode: direct & indirect export				0.103		0.092	
				(0.188)		(0.192)	
Innovation activity: only product innovation					0.165*	0.161*	
					(0.093)	(0.093)	
Innovation activity: only process innovation					0.227**	0.213*	
					(0.115)	(0.116)	
Innovation activity: product & process innovation					0.151*	0.152*	
					(0.086)	(0.085)	
Innovation*export							-0.223
							(0.143)
Firm age	0.004	0.003	0.004	0.004	0.003	0.004	0.003
	(0.004)	(0.003)	(0.003)	(0.004)	(0.003)	(0.003)	(0.003)
Legal status	-0.351**	-0.341**	-0.360**	-0.353**	-0.338**	-0.359**	-0.382**
	(0.159)	(0.167)	(0.165)	(0.161)	(0.167)	(0.167)	(0.165)
R&D activity	0.157**	0.134**	0.130*	0.158**	0.140**	0.135**	0.124*
	(0.067)	(0.068)	(0.067)	(0.069)	(0.067)	(0.067)	(0.067)
Foreign licensing	-0.043	-0.034	-0.042	-0.044	-0.032	-0.042	-0.041
	(0.087)	(0.086)	(0.086)	(0.089)	(0.086)	(0.087)	(0.086)
Finance as an obstacle	-0.104	-0.122*	-0.122*	-0.105	-0.119*	-0.121	-0.132*
	(0.074)	(0.073)	(0.074)	(0.076)	(0.072)	(0.074)	(0.075)
Firm size: medium	0.016	0.007	0.005	0.016	0.015	0.011	0.008
	(0.076)	(0.076)	(0.077)	(0.076)	(0.077)	(0.077)	(0.076)
Firm size: large	0.296**	0.286**	0.288**	0.296**	0.293**	0.293**	0.281**
	(0.119)	(0.119)	(0.118)	(0.119)	(0.118)	(0.117)	(0.117)
Constant	14.808***	14.880***	14.784***	14.810***	14.896***	14.808***	14.774***
	(0.345)	(0.376)	(0.355)	(0.348)	(0.374)	(0.360)	(0.362)
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,601	1,601	1,601	1,601	1,601	1,601	1,601
R-squared	0.771	0.772	0.774	0.771	0.773	0.774	0.775
Number of panelid	1,233	1,233	1,233	1,233	1,233	1,233	1,233

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

4.2.2. Sales growth as dependent variable

Santos & Brito (2012) state that in order to measure whether a firm has a competitive advantage it is conceptually justified to measure both the firm sales performance and the sales growth of a firm simultaneously in order to capture both the effect of the price and the quantity on sales. Due to this, I will use the firm growth in terms of sales over the past three years as a dependent variable in this robustness check to test the whether a competitive advantage exists in terms of sales for those firms who engage in export or innovation activities or both compared to those firms who do not.

The data allows to construct firm growth in terms of sales based on data on the annual sales of the firms in previous fiscal years. However, since there is no growth variable present in the dataset, this growth variable has to be created. This variable, called *GrowthSales,* is constructed by subtracting the annual sales of three fiscal years ago by the annual sales of the last fiscal year. This way the growth of the firm over the past three fiscal years can be measured. Unfortunately this is the only possibility to construct a variable capturing firm growth, as there are no variables present which can calculate firm growth over the past year or can predict the firm growth for the upcoming year for example. After transforming this dependent variable into a natural logarithm and dropping the missing values of the key variables used in this analysis, the total sample contains 1,447 firm-year observations.

The period of three years for measuring firm growth in terms of sales is not ideal, as it makes the relationship between innovation and export with firm growth less reliable. This is because the explanatory variables export and innovation are also measured over respectively the past fiscal year and the past three fiscal years. This means that this robustness check examines the relation of export in the past year and innovation in the past three years with sales growth in the past three years, which leads to a reverse causality problem. In this case reverse causality would mean that firm growth in the past three years could be associated with the export activity in the past year and the innovation activities of the firm in the past three years. One could argue that firm growth could lead to more profit, which could be used to expand the production in order to engage in export activities and to improve the quality of the products of the firm through innovation. However, these processes to scale up the production and to improve the products and processes of a firm are time consuming and are not likely to occur so soon after the firm has achieved growth (Kline, 1985). Ideally, I would like to have data on the export and innovation status of firms three years ago, to test their relation with the sales growth over the past three years. Moreover, a growth variable which displays the expected growth for the next year could be a solution in solving this reverse causality problem. This way the chance that firm growth affects export and innovation instead of the other way around could be reduced.

When comparing the results of the pooled OLS with sales volume as dependent variable, as displayed in Tables 4 and 5, with the pooled OLS with sales growth as dependent variable, as displayed in Tables 10 and 11, it can be seen that most results remain the same. Table 10 also displays a positive and

statistically significant coefficient for both *Export* and *Innovation*, both separately and combined in a model and with regard to the different export modes and innovation activities it are again the coefficients of *Only direct export* and *Only product innovation* that are positive and significant.

Table 10: Results of the pooled OLS analysis with sales growth as dependent variable for export and innovation as independent activities

	(1)	(2)	(3)	(4)	(5)	(6)
	H1	H3	H1&H3	H2	H4	H2&H4
VARIABLES	Ln(Growth)	Ln(Growth)	Ln(Growth)	Ln(Growth)	Ln(Growth)	Ln(Growth)
Export	0.618***		0.587***			
	(0.179)		(0.179)			
Innovation		0.339**	0.265*			
		(0.159)	(0.154)			
Export mode: only direct export				0.833***		0.799***
				(0.189)		(0.187)
Export mode: only indirect export				-0.293		-0.300
				(0.334)		(0.325)
Export mode: direct & indirect export				0.353		0.255
				(0.560)		(0.559)
Innovation activity: only product innovation					0.344*	0.282
					(0.193)	(0.196)
Innovation activity: only process innovation					0.099	0.158
					(0.269)	(0.257)
Innovation activity: product & process innovation					0.418**	0.346**
					(0.180)	(0.174)
Firm size: medium	0.939***	0.993***	0.943***	0.895***	0.985***	0.896***
	(0.153)	(0.154)	(0.153)	(0.151)	(0.154)	(0.152)
Firm size: large	2.584***	2.765***	2.578***	2.497***	2.759***	2.488***
	(0.187)	(0.173)	(0.188)	(0.180)	(0.178)	(0.182)
Firm age	-0.003	-0.003	-0.003	-0.003	-0.003	-0.003
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Legal status	-0.967***	-1.053***	-0.948***	-0.901***	-1.085***	-0.901***
	(0.248)	(0.243)	(0.242)	(0.239)	(0.245)	(0.234)
R&D activity	0.556***	0.652***	0.511***	0.513***	0.613***	0.437**
	(0.167)	(0.159)	(0.171)	(0.168)	(0.165)	(0.175)
Foreign licensing	0.680***	0.751***	0.689***	0.605***	0.749***	0.614***
	(0.179)	(0.185)	(0.181)	(0.183)	(0.187)	(0.186)
Finance as an obstacle	-0.084	-0.031	-0.066	-0.085	-0.042	-0.072
	(0.208)	(0.220)	(0.209)	(0.202)	(0.221)	(0.204)
Constant	14.155***	14.059***	13.969***	14.082***	14.066***	13.886***
	(0.288)	(0.328)	(0.318)	(0.278)	(0.326)	(0.310)
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Region fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,447	1,447	1,447	1,447	1,447	1,447
R-squared	0.389	0.373	0.393	0.406	0.375	0.411

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

However, when examining the complementarity test, which is performed throughout the models 1 until 3 of Table 11, model 1 shows that the coefficient of *Innovation*export* is again negative and insignificant. In order to conclude something about the complementarity, the variable *Complementarity* is then added, to test whether the firm growth in terms of sales as a result of one of the two activities

increases when the firm also engages in the other activity. While the results of model 2 of Table 11 are statistically insignificant, the positive coefficient of *Complementarity: innovation & export* in model 3 of Table 11 is statistically significant at a 5% significance level. This indicates that engaging in export activities is beneficial for firms that only perform innovation activities. However, as for complementarity to hold both the coefficients of model 2 and 3 of Table 11 should be positive and significant, no conclusion can be drawn with regard to the complementarity of export and innovation for firm growth in terms of sales of firms in middle income developing countries. These results again confirm the findings of the pooled OLS analysis as displayed in Table 5.

Furthermore, as opposed to model 4 of Table 5, model 4 of Table 11 does displays a significant result with regard to the interaction of the different export modes with innovation, namely for *Innovation & indirect export*. This variable displays a negative coefficient which is statistically significant at a 5% significance level and thus indicates that the combination of innovation with indirect export is negatively associated with sales growth of firms in middle income developing economies. This could be explained by the fact that with indirect export a firm is not able to gain knowledge from all the different stages of the exporting activity, as these are managed by an intermediary, and therefore the indirect exporting activity is not able to reinforce the innovation activities of the firm. In this case it might be more beneficial for a firm to focus on one of the two activities, as combining them could in fact lead to a decrease in firm growth in terms of sales.

Furthermore, the coefficient of *Product innovation & export* is statistically significant at a 1% significance level and again negative in sign. This result confirms the association that was found in model 5 of Table 5, where using sales volume as the dependent variable, *Product innovation & export* was also negative and significant. Moreover, *Process innovation & export* displays a negative coefficient, just like in Table 5, although in this case it is insignificant, due to which this result cannot be interpreted.

Based on this robustness check it can be concluded that using different measures for the performance of a firm as the dependent variable will not lead to large differences in the results. It can therefore be stated that the results are robust to a number of specifications.

Table 11: Results of the pooled OLS analysis with sales growth as dependent variable and with regard to the complementarity of export and innovation

VARIABLES	(1) H5 Ln(Growth)	(2) H5 Ln(Growth)	(3) H5 Ln(Growth)	(4) H6a Ln(Growth)	(5) H6b Ln(Growth)
Innovation*Export	-0.542				
	(0.331)				
Export	1.034***				0.932***
	(0.292)				(0.201)
Innovation	0.410**			0.435**	
	(0.173)			(0.172)	
Complementarity: innovation & export		-0.132	0.492**		
		(0.292)	(0.198)		
Complementarity: only innovation		-0.624**			
		(0.276)			
Complementarity: only export			0.624**		
			(0.276)		
Complementarity: no innovation & no export		-1.034***	-0.410**		
		(0.292)	(0.173)		
Innovation & direct export				-0.332	
				(0.340)	
Innovation & indirect export				-2.119**	
				(1.077)	
Direct export				1.056***	
				(0.296)	
Indirect export				1.510	
				(1.025)	
Product innovation & export					-1.057***
					(0.359)
Process innovation & export					-0.825
					(0.526)
Product innovation					0.482***
					(0.171)
Process innovation					0.121
					(0.296)
Firm size: medium	0.941***	0.941***	0.941***	0.894***	0.920***
	(0.152)	(0.152)	(0.152)	(0.150)	(0.149)
Firm size: large	2.616***	2.616***	2.616***	2.516***	2.624***
	(0.191)	(0.191)	(0.191)	(0.184)	(0.193)
Firm age	-0.003	-0.003	-0.003	-0.002	-0.003
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Legal status	-0.946***	-0.946***	-0.946***	-0.922***	-0.958***
	(0.242)	(0.242)	(0.242)	(0.240)	(0.249)
R&D activity	0.520***	0.520***	0.520***	0.462***	0.484***
	(0.172)	(0.172)	(0.172)	(0.171)	(0.169)
Foreign licensing	0.645***	0.645***	0.645***	0.587***	0.645***
	(0.180)	(0.180)	(0.180)	(0.184)	(0.179)
Finance as an obstacle	-0.080	-0.080	-0.080	-0.076	-0.111
	(0.210)	(0.210)	(0.210)	(0.202)	(0.205)
Constant	13.879***	14.913***	14.289***	13.775***	14.056***
	(0.318)	(0.393)	(0.292)	(0.306)	(0.290)
Year fixed effects	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	Yes
Region fixed effects	Yes	Yes	Yes	Yes	Yes
Observations	1,447	1,447	1,447	1,447	1,447
R-squared	0.396	0.396	0.396	0.417	0.405

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

5. Conclusion and discussion

Middle income developing countries are on the one hand considered drivers of the world economy, while on the other hand these countries are not finished developing and risk being trapped in their current status if they do not persist their own economic, social and structural transformation. Due to this, both export and innovation are becoming increasingly important as strategies in order to escape the status of being a developing country. It is therefore of great importance to understand the association between these two strategies, both as independent activities as combined, with the sales performance of firms in these middle income developing countries. The literature on this subject, with regard to middle income developing countries, is however scarce and has provided mixed results, especially concerning the potential complementarity of export and innovation. The empirical findings of this study show that, although innovation and export and the different export modes and innovation activities independently lead to a significant improvement of the sales performance of firms in middle income developing economies, export and innovation cannot be seen as complements. These results differ from those of earlier studies, investigating the complementarity of export and innovation in European countries, that found that export and innovation do positively reinforce each other and thus this paper emphasizes the importance of taking country characteristics with regard to development into account, such as the infrastructure, knowledge bases and the absorptive capacity of firms.

One major contribution of this study is that it provides insight into the mechanisms that contribute to a successful survival strategy of firms in middle income developing countries. The empirical findings confirm that both innovation and export as independent activities lead to an improvement in the sales performance of firms. The main purpose of this study was however to test to what extent innovation and export are complementary strategies for firm sales performance in middle income developing economies. With regard to the complementarity, this study concludes that the results only provide evidence for the fact that export can reinforce the sales performance of innovative firms in middle income developing countries, and not the other way around. This indicates that firms in middle income developing countries that are able to create their own competitive advantage through innovation can benefit from export as this is a good way to expand their market and therefore increase their sales volume. On the other hand, firms that are already exporting do not seem to be able to benefit in terms of sales from the learning by exporting strategy, possibly because their absorptive capacity to transform this knowledge into technologies is not sufficient. An explanation for this difference could be that exporting is a logical next step once a firm already has an innovative product, but that learning by exporting is a process that takes some time, and therefore does not translate immediately into higher sales for exporting firms. Moreover, in order to achieve this complementarity, exporting firms in middle income developing countries could focus on improving their knowledge bases, for example through cooperation with universities or other knowledge institutes, in order to also be able to benefit from innovation through the learning by exporting strategy. A relevant dimension for future research is

therefore the investigation of the association between knowledge enhancing activities and the ability of firms in middle income developing countries to benefit in terms of sales from a learning by exporting strategy. Examples of these knowledge enhancing activities could be R&D (cooperation), human resource development and cooperation with universities and other knowledge institutes in order to benefit from knowledge spillovers (Todo & Miyamoto, 2002; Morbey, 1988; Belderbos & Lokshin, 2004; Eom & Lee, 2010) If knowledge enhancement is in fact the solution for achieving complementarity between export and innovation activities, this finding can be integrated in the public policies of middle income developing economies in order to stimulate synergies, which can positively affect the economic development of a country.

Another explanation for the results of this study, that only provide evidence for the fact that export can reinforce the sales performance of innovative firms in middle income developing countries, and not the other way around, is that with regard to export activities, firms in developing country often mirror the Uppsala Model. This entails that the initiation of exporting activities is a stepwise process and the degree of internationalization increases when the firm has gained more experience and knowledge of the international markets (Johanson & Wiedersheim-Paul, 1975; Armario et al., 2008). Therefore, while the decision of firms in developed countries to initiate export activities is often based on innovation, firms in middle income developing countries, such as Argentina, often first focus on their domestic market and only later on initiate exporting activities gradually (Taylor, 2013). This explanation aligns with the findings, stating that firms that already engage in innovation can profit from export, as these innovative firms have more knowledge and can therefore better adjust to foreign markets.

Moreover, this study fills a gap in the literature by making a distinction between different export modes and innovation strategies and this way sheds some light on the optimal mechanisms through which firms in middle income developing countries can enhance their sales performance. The results confirm that, compared to a situation of no export at all, engaging in only direct export leads to a significant improvement of the sales performance of firms. With regard to the different innovation activities it is the engagement in only product innovation that leads to a significant improvement of the sales performance, compared to a situation in which a firm does not innovate at all. These results are important from a practical perspective, as they can contribute to the decisions of manager's in middle income developing countries, when considering various growth strategies for their firms. By focussing on these strategies, which lead to the optimal sales performance, these results can in the long run contribute to the economic development of the country. Moreover, this study can offer recommendations to middle income developing countries on how to target their challenges such as competitiveness and trade policies by creating awareness of the benefits of different types of export and innovation activities for firm sales, both separately as combined.

While the hypotheses concerning the different export modes and innovation activities in this study mainly focussed on determining one independent activity as the main driver of the potential association between export, innovation and firm sales performance, examining these different export modes and innovation activities has also provided information with regard to the complementarity of these activities. Some models in this research namely provide positive and significant coefficients when considering the combination of direct and indirect export or of product and process innovation. These results are however not consistent throughout all the models. With regard to future research, it might be interesting to look deeper into the complementarity of the different innovation activities and export modes of firms in middle income developing economies. A big strand of research namely states that different innovation activities are in fact complementary (Hullova et al., 2016; Miravete & Pernias, 2006; Percival & Cozzarin, 2008; Martínez-Ros & Labeaga, 2009). The interrelatedness of product and process innovation can be explained by the fact that the introduction of new products often requires the development of new equipment, while the introduction of a new cost-reducing process if frequently accompanied by changes in the design and materials of the product (Lager, 2002; Reichstein & Salter, 2006; Tang, 2006). Using a dataset of Brazilian manufacturing firms Goedhuys & Veugelers (2012) find that it is the introduction of product innovation, exclusively, but mostly done in combination with process innovation, that translates into a signficant increase in sales. Future research could investigate whether this complementarity remains when examining more data on middle income developing countries, and whether this also holds with regard to the different export modes.

A final contribution of this study, when compared to prior studies, is that this study takes data from different periods into account, due to which it can be concluded that some of the found associations are in fact dependent upon the economic situation of the country in that period. While for 2006, where Argentina faces an economic upturn, most of the results remained the same as the main results, the results for 2010, in which Argentina was still recovering from the global financial crisis, and the results for 2017, where Argentina was facing an economic downfall, differ from the main results. Some interesting findings of this analysis are for example that export and the various export modes separetely are slightly affected by the economic situation of Argentina, as positive and significants results are found for both 2006 and 2010 but not for 2017, while innovation and the various innovation activities are more strongly affected, as their coefficients already become insignificant in 2010. Besides the fact that this study confirms that certain associations with regard to export, innovation and the combination of the two with firm sales performance depend upon the economic development of a country, this study also indicates that the economic situation of a country in a certain period can play a role when examining these associations. This study therefore contributes to the literature regarding innovation and export management in times of economic crisis (Milić, 2013; Archibugi et al., 2013; Lee et al., 2009), as it provides empirical evidence of the associations between export, innovation and firm sales performance in times of economic crisis. The results regarding innovation for example show that the effectiveness of

innovation is very sensitive to the economic situation of a country and that in an economic downfall innovation activities do not result in better sales volumes, no matter which innovation activity is chosen. These results can therefore confirm that innovation should not be the focus of managers in times of economic crisis (Milić, 2013).

Even though the results of this study are robust to a number of different specifications and additional robustness checks, there are still some limitations with regard to the interpretation of these results. First of all, the results of this study rely on data from a single country, and therefore the associations investigated might vary for countries with different country characteristics. Since Argentina is the subject of this study, the results might apply to other developing middle income countries, but may not strictly apply to other (developed) countries. Another limitation is the fact that several studies have shown that firms that perform well in terms of sales often self-select into exporting, which could make the positive relationship between export and firm sales performance endogenous (Bernard & Jensen, 1999; Roberts & Tybout, 1997). This is because those firms with a high productivity and thus a high sales volume are the ones that engage in export, since entering a foreign market is a costly activity, which implies that this higher productivitiy is the cause instead of the consequence of a firm entering the export market (Clerides et al., 1998). Nonetheless, Bigsten et al. (2004) found evidence that the effect of learning-by-exporting is predominant and that therefore self-selection of the more productive firms into exporting plays no major role.

A final concern is the way that the datasat is constructed. As the dataset consists of three periods with large time gaps in between, it is not ideal for performing a longitudinal analysis. Moreover, the fact that only a few firms are present in all time waves, makes it difficult to exploit the within variation over time. Although this study contains a longitudinal analysis as robustness check, a suggestion for future research is to replicate this longitudinal analysis using a more balanced and extensive dataset in order to take the firm characteristics into account and to provide evidence based on a larger number of observations.

References

Adomako, S., Danso, A., & Damoah, J. O. (2016). The moderating influence of financial literacy on the relationship between access to finance and firm growth in Ghana. *Venture Capital, 18*(1), 43-61.

Alvarez, R., & Robertson, R. (2004). Exposure to foreign markets and plant-level innovation: evidence from Chile and Mexico. *The Journal of International Trade & Economic Development, 13*(1), 57-87.

Andersen, O. (1993). On the internationalization process of firms: A critical analysis. *Journal of International Business Studies, 24*(2), 209-231.

Ansoff, H. I. (1965). *Corporate strategy: business policy for growth and expansion.* New York: McGraw-Hill.

Archibugi, D., Filippetti, A., & Frenz, M. (2013). Economic crisis and innovation: is destruction prevailing over accumulation? *Research Policy, 42*(2), 303-314.

Armario, J., Ruiz, D., & Armario, E. (2008). Market orientation and internationalization in small and medium-sized enterprises. *Journal of Small Business Management, 46*(4), 485-511.

Artopoulos, A., Friel, D., & Hallak, J. C. (2013). Export emergence of differentiated goods from developing countries: Export pioneers and business practices in Argentina. *Journal of Development Economics, 105*(1), 19-35.

Atkin, D., Khandelwal, A. K., & Osman, A. (2017). "Exporting and Firm Performance: Evidence from a Randomized Experiment. *The Quarterly Journal of Economics, 132*(2), 551-615.

Aubert, J. E. (2005). *Promoting innovation in developing countries: a conceptual framework.* The World Bank: Washington D.C.

Autio, E., Sapienza, H. J., & Almeida, J. G. (2000). Effects of age at entry, knowledge intensity, and imitability on international growth. *Academy of Management Journal, 43*(5), 909-1014.

Aw, B. Y., Chen, X., & Roberts, M. J. (2001). Firm-level evidence on productivity differentials and turnover in Taiwanese manufacturing. *Journal of Development Economics, 66*(1), 51-86.

Balbanis, G. I. (2000).). Factors affecting export intermediaries' service offerings: The British example. *Journal of International Business Studies, 31*(1), 83-99.

Barbosa, N., & Eiriz, V. (2011). Regional variation of firm size and growth: the Portuguese case. *Growth and Change, 42*(2), 125-158.

Becchetti, L., & Trovato, G. (2002). The determinants of growth for small and medium sized firms: The role of the availability of external finance. *Small Business Economics, 19*(4), 291-206.

Becker, S. O., & Egger, P. H. (2013). Endogenous product versus process innovation and a firm's propensity to export. *Empirical Economics, 44*(1), 329-354.

Belderbos, R. C., & Lokshin, B. (2004). Cooperative R&D and firm performance. *Research Policy, 33*(10), 1477-1492.

Bell, M., & Pavitt, K. (1995). Trade, technology and international competitiveness. In I. Haque, & M. Bell, *The development of technological capabilities* (pp. 69-102). Washington D.C.: World Bank Publications.

Bernard, A. B., & Jensen, J. B. (1999). Exceptional exporter performance: cause, effect, or both? *Journal of International Economics, 47*(1), 1-25.

Bernard, A. B., Jensen, J. B., Redding, S. J., & Schott, P. K. (2007). Firms in international trade. *Journal of Economic Perspectives, 21*(3), 105-130.

Berrone, P., Gertel, H., Giuliodori, R., Bernard, L., & Meiners, E. (2014). Determinants of performance in microenterprises: Preliminary evidence from Argentina. *Journal of Small Business Management, 52*(3), 477-500.

Bigsten, A., Collier, P., Dercon, S., Fafchamps, M., Gauthier, B., Willem Gunning, J., & Teal, F. (2004). Do African manufacturing firms learn from exporting? *Journal of Development Studies, 40*(3), 115-141.

Blomstermo, A., Sharma, D. D., & Sallis, J. (2006). Choice of foreign market entry mode in service firms. *International Marketing Review, 23*(2), 211-229.

Bughin, J. (1996). Capacity constraints and export performance: Theory and evidence from Belgian manufacturing. *The Journal of Industrial Economics, 44*(2), 187-204.

Cameron, G. (1998). *Innovation and growth: A survey of the empirical evidence*. mimeo.

Capelleras, J. L., & Rabetino, R. (2008). Individual, organizational and environmental determinants of new firm employment growth: evidence from Latin America. *International Entrepreneurship and Management Journal, 4*(1), 79-99.

Carden, S. D., Mendonca, L. T., & Shavers, T. (2005). What global executives think about growth and risk. *McKinsey Quarterly, 2*, 16-25.

Cassiman, B., & Golovko, E. (2010). Innovation and internationalization through exports. *Journal of International Business Studies, 42*(1), 56-75.

Cassiman, B., & Martinez-Ros, E. (2007). *Product innovation and export: Evidence from Spanish Manufacturing.* Barcelona: IESE Business School.

Cassiman, B., & Veugelers, R. (2006). In search of complementarity in innovation strategy: Internal R&D, cooperation in R&D and external knowledge acquisition. *Management Science, 52*(1), 68-82.

Chen, M. J., & Hambrick, D. C. (1995). Speed, stealth, and selective attack: How small firms differ from large firms in competitive behavior. *Academy of Management Journal, 38*(2), 453-482.

Chen, T. J., & Ku, Y. H. (2000). The effect of foreign direct investment on firm growth: the case of Taiwan's manufacturers. *Japan and the World Economy, 12*(2), 153-172.

Cho, H., & Pucik, V. (2005). Relationship between innovativeness, quality, growth, profitability, and market value. *Strategic Management Journal, 26*(6), 555-575.

Chudnovsky, D., López, A., & Pupato, G. (2006). Innovation and productivity in developing countries: A study of Argentine manufacturing firms' behavior (1992-2001). *Research Policy, 35*(2), 266-288.

Clerides, S. K., Lach, S., & Tybout, J. R. (1998). Is learning by exporting important? Micro-dynamic evidence from Colombia, Mexico, and Morocco. *The Quarterly Journal of Economics, 113*(3), 903-937.

Coad, A., & Rao, R. (2008). Innovation and firm growth in high-tech sectors: A quantile regression approach. *Research Policy, 37*(4), 633-648.

Coad, A., Segarra, A., & Teruel, M. (2016). Innovation and firm growth: Does firm age play a role? *Research Policy, 45*(2), 387-400.

Cohen, L. (2018). Argentina's economic crisis explained in five charts. *Reuters*, pp. 2-4.

Cohen, W. M., & Klepper, S. (1996). Firm size and the nature of innovation within industries: the case of process and product R&D. *The Review of Economics and Statistics, 78*(2), 232-243.

Cooper, R. G., & Kleinschmidt, E. J. (1985). The impact of export strategy on export sales performance. *Journal of International Business Studies, 16*(1), 37-55.

Crépon, B., Duguet, E., & Mairessec, J. (1998). Research, Innovation And Productivity: An Econometric Analysis At The Firm Level. *Economics of Innovation and new Technology, 7*(2), 115-158.

Das, S., Roberts, M. J., & Tybout, J. R. (2007). Market entry costs, producer heterogeneity, and export dynamics. *Econometrica, 75*(3), 837-873.

Delmar, F., Davidsson, P., & Gartner, W. (2003). Arriving at the high-growth firm. *Journal of Business Venturing, 18*(2), 189-216.

Dunne, P., & Hughes, A. (1994). Age, Size, Growth andSurvival: UK Companies in the 1980s. *The Journal of Industrial Economics, 43*(2), 115-140.

Dutta, S., & Caulkin, S. (2006). *The world's top innovators.* Fontainebleau: INSEAD.

Dutta, S., Lanvin, B., & Wunsch-Vincent, S. (2017). *The Global Innovation Index 2017: Innovation Feeding the World.* Ithaca, Fontainebleau and Geneva: Cornell University, INSEAD, and WIPO .

Dutta, S., Pal, A., Skaria, G., & Khanna, L. (2010). *The Global Innovation Index 2009-2010.* Fontainebleau: INSEAD.

Eom, B. Y., & Lee, K. (2010). Determinants of industry–academy linkages and, their impact on firm performance: The case of Korea as a latecomer in knowledge industrialization. *Research Policy, 39*(5), 625-639.

Evans, D. S. (1987). The relationship between firm growth, size, and age: Estimates for 100 manufacturing industries. *The Journal of Industrial Economics, 35*(4), 567-581.

Fagerberg, J. (2004). *Innovation: A guide to the literature.* Georgia: Georgia Institute of Technology.

Falk, M. (2012). Quantile estimates of the impact of R&D intensity on firm performance. *Small Business Economics, 39*(1), 19-37.

Filatotchev, I., & Piesse, J. (2009). R&D, internationalization and growth of newly lister firms: European evidence. *Journal of International Business Studies, 40*(8), 1260-1276.

Fowowe, B. (2017). Access to finance and firm performance: Evidence from African countries. *Review of Development Finance, 7*(1), 6-17.

Fransman, M. (1985). 'Conceptualising Technical Change in the Third World in the 1980s: An Interpretive Survey. *Journal of Development Studies, 21*(4), 572-652.

Gayle, V., & Lambert, P. (2018). *What is Quantitative Longitudinal Data Analysis?* London: Bloomsbury Publishing.

Gerstenfeld, A., & Wortzel, L. H. (1977). Strategies for innovation in developing countries. *Sloan Management Review, 19*(1), 57-68.

Goedhuys, M. (2007). Learning, product innovation, and firm heterogeneity in developing countries; Evidence from Tanzania. *Industrial and Corporate Change, 16*(2), 269-292.

Goedhuys, M., & Veugelers, R. (2012). Innovation strategies, process and product innovations and growth: Firm-level evidence from Brazil. *Structural Change and Economic Dynamics, 23*(4), 516-529.

Golovko, E., & Valentini, G. (2011). Exploring the complementarity between innovation and export for SMEs' growth. *Journal of International Business Studies, 42*(3), 362-380.

Hair, J. F., Anderson, R. E., Tatham, R. L., & Black, W. C. (1995). *Multivariate Data Analysis* (3 ed.). New York: Macmillan.

Hessels, J., & Terjesen, S. (2010). Resource dependency and institutional theory perspectives on direct and indirect export choices. *Small Business Economics, 34*(2), 203-220.

Hitt, M. A., Hoskisson, R. E., & Kim, H. (1997). International diversification: Effects of innovation and firm performance in product diversified firms. *Academy of Mangement Journal, 40*(4), 767-798.

Hofer, C. W. (1983). ROVA: A new measure for assessing organizational performance. *Advanced in Strategic Management, 2*(1), 43-55.

Hubbard, G., & Bromiley, P. (1995). *Researchers and top managers: How do they measure firm performance.* Minneapolis: University of Minnesota.

Hullova, D., Trott, P., & Simms, C. D. (2016). Uncovering the reciprocal complementarity between product and process innovation. *Research Policy, 45*(5), 929-940.

Hutcheson, G. D., & Sofroniou, N. (1999). *The Multivariate Social Scientist: Introductory Statistics Using Generalized Linear Models.* Thousand Oaks: SAGE Publications.

Independent Evaluation Office. (2003). *The Role of the IMF in Argentina, 1991-2002.* Washington D.C.: International Monetary Fund.

International Institute for Labour Studies. (2011). *Case study of past crises: Lessons learned from Argentina.* Genève: International Labour Organization.

Izmaylov, Y., Yegorova, I., Maksymova, I., & Znotina, D. (2018). Digital economy as an instrument of globalization. *Scientific Journal of Polonia University, 27*(2), 52-60.

Joensuu-Salo, S., Sorama, K., Viljamaa, A., & Varamäki, E. (2018). Firm performance among internationalized SMEs: The interplay of market orientation, marketing capability and digitalization. *Administrative Sciences, 8*(3), 31-41.

Johanson, J., & Wiedersheim-Paul, F. (1975). The internationalization of the firm: Four Swedish cases. *Journal of Management Studies, 12*(3), 305-322.

Kathuria, R., Joshi, M. P., & Dellande, S. (2008). International growth strategies of service and manufacturing firms. *International Journal of Operations & Production Management, 28*(10), 968-990.

Katz, J. (1987). *Technology Generation in Latin American Manufacturing Industries: Theory and Case-studies Concerning its Nature, Magnitude and Consequences.* Basingstoke: Macmillan.

Klette, T. J., & Griliches, Z. (2000). Empirical patterns of firm growth and R&D investment: a quality ladder model interpretation. *The Economic Journal, 110*(463), 363-387.

Kline, S. J. (1985). Innovation is not a linear process. *Research Management, 28*(4), 36-45.

Lager, T. (2002). Product and process development intensity in process industry: a conceptual and empirical analysis of the allocation of company resources for the development of process technology. *International Journal of Innovation Management, 6*(2), 105-130.

Lee, S. H., Beamish, P. W., Lee, H. U., & Park, J. H. (2009). Strategic choice during economic crisis: Domestic market position, organizational capabilities and export flexibility. *Journal of World Business, 44*(1), 1-15.

Lehmann, R., Chur, H. T., Hauser, C., Baldegger, R., & Fribourg, H. S. (2013). *Managing export risks: Export risk management guidelines.* Bern: PostFinance AG.

Levine, R. (1997). Financial development and economic growth: views and agenda. *Journal of Economic Literature, 35*(2), 688-726.

Love, J., Hewitt-Dundas, N., & Roper, S. (2010). Service innovation, embeddedness and business performance: Evidence from Northern Ireland. *Regional Studies, 44*(8), 983-1004.

Lu, J. W., & Beamish, P. W. (2006). SME internationalization and performance: Growth vs. profitability. *Journal of International Entrepreneurship, 4*(1), 27-48.

Lu, V. N., & Julian, C. C. (2007). The internet and export marketing performance. *Asia Pacific Journal of Marketing and Logistics, 19*(2), 127-144.

Macpherson, M. A. (1996). Growth of Micro and Small Enterprises in Southern Africa. *Journal of Development Economics, 48*(2), 253-277.

Malerba, F. (1992). Learning by Firms and Incremental Technical Change. *The Economic Journal, 102*(413), 845-859.

Martínez-Ros, E., & Labeaga, J. M. (2009). Product and process innovation: Persistence and complementarities. *European Management Review, 6*(1), 64-75.

Mayer, K. B., & Goldstein, S. (1961). *The first two years: Problems of small firm growth and survival* (Vol. 2). Sidney: Small Business Administration.

Metcalfe, S., & Ramlogan, R. (2008). Innovation systems and the competitive process in developing economies. *The Quarterly Review of Economics and Finance, 48*(2), 433-446.

Michealy, M. (1977). Exports and economic growth: An empirical investigation. *Journal of Development Economics, 4*(1), 49-53.

Milgrom, P., & Roberts, J. (1990). The economics of modern manufacturing: Technology, strategy, and organization. *The American Economic Review, 80*(3), 511-528.

Milić, T. (2013). Innovation Management in times of economic crisis. *Management*(66), 81-88.

Miravete, E. J., & Pernias, J. C. (2006). Innovation complementarity and scale of production. *The Journal of Industrial Economics, 54*(1), 1-29.

Monreal-Pérez, J., Aragón-Sánchez, A., & Sánchez-Marín, G. (2012). A longitudinal study of the relationship between export activity and innovation in the Spanish firm: The moderating role of productivity. *International Business Review, 21*(5), 862-877.

Morbey, G. K. (1988). R&D: Its relationship to company performance. *Journal of Product Innovation Management, 5*(3), 191-200.

Mount, I. (2011, september 2). Argentina's Turnaround Tango. *The New York Times*, p. 23.

Najib, H. (2005). *Determinants of Firm Growth: An Empirical Analysis from Morocc.* Northwestern Switzerland: University of Applied Sciences.

OECD. (2006). *Financing SMEs and Entrepreneurs, OECD Policy Brief.* Paris: Organisation for Economic Co-operation and Development.

Oxford Business Group. (2018). *The Report: Argentina 2018.* London: Oxford Business Group.

Peng, M. W., & Ilinitch, A. (1998). Export intermediary firms: A note on export development research. *Journal of International Business Studies, 29*(3), 609-620.

Peng, M. W., & York, A. (2001). Behind intermediary performance in export trade: Transactions, agents and resources. *Journal of International Business Studies, 32*(2), 327-346.

Percival, J., & Cozzarin, B. (2008). Complementarities affecting the returns to innovation. *Industry and Innovation, 15*(4), 371-392.

Pla-Barber, J., & Alegre, J. (2007). Analysing the link between export intensity, innovation and firm size in a science-based industry. *International Business Review, 16*(3), 275-293.

Reichstein, T., & Salter, A. (2006). Investigating the sources of process innovation among UK manufacturing firms. *Industrial and Corporate Change, 15*(4), 653-682.

Reinganum, J. F. (1983). Uncertain innovation and the persistence of monopoly. *The American Economic Review, 73*(4), 741-748.

Ren, S., Eisingerich, A. B., & Tsai, H. T. (2015). How do marketing, research and development capabilities, and degree of internationalization synergistically affect the innovation performance of small and medium-sized enterprises (SMEs)? A panel data study of Chinese SMEs. *International Business Review, 24*(4), 642-651.

Richard, P. J., Devinney, T. M., Yip, G. S., & Johnson, G. (2009). Measuring organizational performance: towards methodological best practice. *Journal of Management, 35*(3), 718-804.

Roberts, M., & Tybout, J. (1997). The decision to export in Colombia: An empirical model of entry with sunk costs. *American Economic Review, 87*(4), 545-564.

Robson, P., & Bennett, R. (2000). SME growth: The relationship with business advice and external collaboration. *Small Business Economics, 15*(3), 193-208.

Roper, S., & Love, J. H. (2002). Innovation and export performance: evidence from the UK and German manufacturing plants. *Research Policy, 31*(7), 1087-1102.

Rufín, R., & Medina, C. (2010). Market delimitation, firm survival and growth in service industries. *The Service Industries Journal, 30*(9), 1401-1417.

Salomon, R. M., & Shaver, J. M. (2005). Learning by exporting: new insights from examining firm innovation. *Journal of Economics & Management Strategy, 14*(2), 431-460.

Santos, J. B., & Brito, L. A. (2012). Toward a subjective measurement model for firm performance. *Brazilian Administration Review, 9*(1), 95-117.

Spencer, H. (1864). *Principles of Biology* (Vol. II ed.). New York: Appleton and Co.

Stiglitz, J. E., & Weiss, A. (1981). Credit rationing in markets with imperfect information. *The American Economic Review, 71*(3), 393-410.

Tang, J. (2006). Competition and innovation behaviour. *Research Policy, 35*(1), 68-82.

Taylor, P. (2013). The effect of entrepreneurial orientation on the internationalization of SMEs in developing countries. *African Journal of Business Management, 19*, 1928-1935.

Terjesen, S., O'Gorman, C., & Acs, Z. J. (2008). Intermediated mode of internationalization: New software ventures in Ireland and India. *Entrepreneurship and Regional Development, 20*(1), 89-109.

The World Bank. (2019). *World Bank Group's Enterprise Survey: Understanding the Questionnaire.* Washington D.C.: The World Bank.

The World Bank. (2020). *Data*. Retrieved June 11, 2020, from Website from The World Bank: https://datahelpdesk.worldbank.org/knowledgebase/articles/906519-world-bank-country-and-lending-groups

The World Bank. (2020). *The World Bank in Middle Income Countries*. Retrieved June 15, 2020, from Website from The World Bank: https://www.worldbank.org/en/country/mic/overview#2

Todo, Y., & Miyamoto, K. (2002). *Knowledge diffusion from multinational enterprises: the role of domestic and foreign knowledge-enhancing activities.* Paris: OECD.

Triguero, A., Córcoles, D., & Cuerva, M. (2014). Persistence of innovation and firm's growth: evidence from a panel of SME and large Spanish manufacturing firms. *Small Business Economics, 43*(4), 787-804.

United Nations. (2017). *World Economic Situation and Prospects 2017.* New York: United Nations.

Van Biesebroeck, J. (2005). Exporting raises productivity in sub-Saharan African manufacturing firms. *Journal of International Economics, 67*(2), 373-391.

Veigel, K. F. (2005). *Governed by Emergency: Economic policy-making in Argentina, 1973-1991.* Princeton: Princeton University.

Venkatraman, N., & Ramanujam, V. (1986). Measurement of business performance in strategy research: A comparison of approaches. *Academy of Management Review, 1*(4), 801-814.

Woolridge, J. M. (2014). *Introductory Econometrics: A Modern Approach* (EMEA Edition ed., Vols. 1-9). Boston: Cengage Learning.

World Trade Organization. (2018). *World Trade Statistical Review 2018.* Gèneve: WTO. Retrieved from Index Mundi: https://www.trademap.org/(X(1)S(wxymkd45vpinba45qduyc345))/Country_SelProduct.aspx?nvpm=1%7c%7c%7c%7c%7cTOTAL%7c%7c%7c2%7c1%7c1%7c2%7c1%7c%7c2%7c1%7c

Yasuda, T. (2005). Firm growth, size, age and behaviour in Japanese manufacturing. *Small Business Economics, 24*(1), 1-15.

Young, J., Wheeler, C., & Davies, J. (1989). *International Market Entry and Development: Strategies and Management.* London: Harvester Wheatsheaf.

Zahra, S. A., & Covin, J. G. (1994). Domestic and international competitive focus, technology strategy and company performance: An empirical analysis. *Technology Analysis & Strategic Management, 6*(1), 39-54.

Zahra, S. A., Ireland, D. R., & Hitt, M. (2000). International expansion by new venture firms: International diversity, mode of market entry, technological learning, and performance. *Academy of Management Journal, 43*(5), 925-950.