

Master Thesis U.S.E.

What are the main determinants of export performance for EU-based SMEs?

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Abstract

The main objective of the paper has been to identify the key export performance determinants amongst SMEs based in the European Union. The study contributes to the discussion of whether internal and external factors matter more when measuring SMEs' export performance. The relationship between internal and external factors has been first established by using an exploratory factor analysis and found that there is an inverse movement between the indicators, depending on whether they display internal or external characteristics.

The regression analysis of the paper was based on the contingency theory and found that external variables display a stronger effect on SMEs' export performance, along with factors such as regulation, investment and level of competition in the country, thus being the main determinants of export performance.

Keywords: export performance, SMEs, exploratory factor analysis, European Union.

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Introduction

The presented paper aims at providing a thorough and clear analysis of export performance (EP) determinants for SMEs in the EU (European Union), highlighting the key factors and providing with directions of possible policy change in the applicable areas among EU member states.

The idea behind the research is to give a thorough quantitative analysis, using a relatively untouched database, namely the TEC (Trade by enterprise characteristics) along with other relevant indicators from the World Bank. The conducted analysis can highlight key EP (export performance) determinants for EU-based SMEs, that can be used by both EU policymakers and policymakers of member states to understand and implement necessary policy, as well as regulatory changes, if applicable. Furthermore, the study's objective is also to identify and evaluate the key determinants of EP to point out the key factors that have the strongest effect on the sectoral export performance of SMEs, and thus directly on the economic growth of the observed countries.

The choice of countries, namely EU Member States, was made to examine countries that are under the regulation of a supranational organization, the European Union. Since it is often argued that a supranational organization promotes trade within the connected regions or even beyond the scope of them (Nuruzzaman et al., 2021), the research will evaluate the export performance and determinants of countries that are members of such supranational organization.

The focus of the study lays on SMEs as they account for most of the functioning enterprises in every country, especially in the EU. Additionally, SMEs account for more than 95% of enterprises and 60 to 70% of jobs in most OECD nations, which demonstrates the importance of them in most economies (Publications Office of the European Union, 2017). The vital presence of SMEs is therefore of paramount importance for each country in terms of trade facilitation and economic growth.

Because of the growing importance of SMEs, an increasing amount of attention in the literature has been brought to identifying the key export performance indicators in different countries. The related studies use different models and methods to research the phenomenon, the most used ones of which are the resource-based view (RBV), the contingency theory and the dynamic capabilities theory (Safari & Saleh, 2020). The contingency theory is often used to demonstrate that the firms' export performance is related to the context in which the company operates (Robertson & Chetty, 2000). The contingency

theory is, however, mostly expressed as both internal and external environmental factors that influence firms' export performance (Gnizy et al., 2017). Freeman et al. (2012) uses RBV to analyze the importance of a firm's location as a valuable resource to explain export performance and finds that location is a significant factor. Safari and Saleh (2020) found that besides government assistance and external factors such as information about foreign markets, managerial determinants such as networks, skills, export motivation, risk-taking behavior, and psychological distance are relevant determinants in explaining export performance among Vietnamese SMEs.

Oura et al. (2016) concluded that international experience has a greater impact on export performance than innovation capacity among Brazilian SMEs. Maurel (2009), on the other hand, found that innovation, business partnerships, size and an effective export commitment are key determinants of export performance among French SMEs, present in the wine industry.

Since the literature is still often vague, the taking of all EU countries and the analysis of their export performance, conducted on the SME level, will provide a more comprehensive structure and analysis to measure the significance of the used factors within the EU. The analysis thus will use both external factors, such as regulatory environment of the observed countries, and internal factors, such as innovation and entrepreneurial indicators, to identify the leading patterns in export performance.

The paper is constructed in a way to first provide with the relevant literature review, which points out the leading studies in this area while also identifying their findings in a structured way. After the literature review, the paper's methodology will be identified and elaborated, describing the exploratory factor analysis and the panel regression that the quantitative analysis of the paper is constructed on to evaluate 5 hypotheses.

Literature Review

There have been a growing number of studies regarding SMEs in both developed and developing countries. The methodology used by these papers might differ in some cases, but it is recognized that most studies focus on internal and/or external environmental characteristics when evaluating key drivers of export performance (Safari & Saleh, 2020).

Internal and external factors

Cavusgil and Zou (1994) argue that internal drivers include firm- and product-related characteristics, while external factors comprise country-level features and determinants of the export market. Regarding the distinction of internal and external forces, a lot of academics have used different interpretations and sometimes combination of the factors in their research (Safari & Saleh, 2020). Beleska-Spasova (2014) points out that numerous internal and external, firm-level, and environmental variables have been investigated as possible determinants of export outcomes in the exporting literature, with inconsistent and sometimes conflicting results of their positive, negative, or neutral association with export outcomes. Beleska-Spasova (2014) constructed a collective study of papers and their approaches of measuring export performance, in her study she found that most of the papers used one or a collection of the following factors when measuring EP: regarding internal factors, studies used factors such as Management Characteristics and Perceptions (export commitment and support, international orientation, export motivation, international experience, perception of export advantages, age and education); Organizational Capabilities (advanced technology and quality of product/service); Organizational Capabilities regarding export strategy (general export strategy, export organization, export planning, service strategy, proactiveness/reactiveness, risk taking, market expansion, control, process); Marketing Mix Elements (product strategy, promotion strategy, price strategy, distribution strategy); Knowledge-based Factors in terms of export expertise (international experience); Export Knowledge (market research, market information, customer information, supply chain channels information, competitor information); Relational Factors regarding Business and Institutional relationships (customer relationship, distribution channel relationship, partners relationship, supplier relationship, membership in formal and informal business networks, government and other institutional relationships); and Firm characteristics (firm size, firm age, degree of internationalization, organizational culture, industrial sector/product type, ownership structure, financial resources).

Regarding the external factors, fewer factors have been used by the literature, such as Export Market Characteristics (legal and political, market competitiveness, cultural similarity, economic similarity, customer exposure, environmental hostility/turbulence, channel accessibility) and Domestic Market Characteristics (export assistance, domestic market conditions, environmental hostility) (Beleska-Spasova, 2014).

Given the inconsistencies and various ways of measuring EP, this study adds to the existing literature by creating an integrative model that considers both internal and external forces with the attempt of determining key export performance indicators. The main focus, however, will lay on the use of external indicators since the study will make use of the available secondary data, derived from different applicable databases, which will be transformed into a usable set of variables.

Leading theories of EP measurement

As displayed, most of the literature in this field has used one of the mentioned approaches when measuring export performance. Regarding models that have been used to explain EP using internal/external factors or both, three main theories emerged on which most research have been based. These are the resource-based view (RBV), the dynamic capabilities theory and the contingency theory (Safari & Saleh, 2020). Though from these 3, the resource-based view and the contingency theory are the ones that are used by the vast majority of studies conducted on this topic (Beleska-Spasova, 2014).

Beleska-Spasova (2014) states that studies examining internal factors of EP are based on the resource-based view (RBV) and assume that it is the firm's control, as well as management orientation that influences the firms' export performance. The theory also points out the resources that a firm possesses and which the firm can achieve competitive advantages with.

As for external determinants, the contingency theory is the leading model to be used and to measure the EP of firms; this theory maintains that in order to live and flourish, a company must adapt to external environmental pressures (Cavusgil and Zou, 1994). It is often argued that the RBV model contains determinants that are managerially controllable, while that of the contingency theory maintains that determinants are external, thus uncontrollable (Beleska-Spasova, 2014).

The contingency theory is often interpreted slightly differently in different studies, Robertson and Chetty (2000) have used the theory to demonstrate that the firms' export performance is related to the context in which the company operates. The contingency theory, in other interpretations, is often

expressed as both internal (firm-level) and external (environmental) factors, both of which are key determinants of firms' export performance (Gnizy et al., 2017).

Freeman et al. (2012) uses the resource-based view to measure the importance of firm-location among Australian SMEs and concludes that location plays a vital role in determining the success of EP among the observed SMEs. Since Freeman et al (2012) has conducted his research on a limited number of SMEs in a geographically closed environment, more accurately on one economy, further research is needed to strengthen the hypothesis according to which firm location is more important in explaining export performance than other factors.

Safari and Saleh (2020) suggested that besides the followed practice of focusing only on internal and external factors when measuring export performance, it is also necessary to include any potential mediating factors such as export marketing strategy, innovation strategy and business strategy, which can influence the factors on EP. Having conducted their research, Safari and Saleh (2020) discovered that, in addition to government assistance, external factors like information about foreign markets, managerial determinants like networks, skills, export motivation, risk-taking behavior, and psychological distance are important in explaining export performance among Vietnamese SMEs.

Using internal factors, Oura et al. (2016) concluded that from the comparison of international experience and innovation capacity of firms, international experience tends to have greater impact on firms' export performance among the observed Brazilian SMEs.

Having conducted his research, Maurel (2009) found that among French SMEs in the wine industry, innovation, business partnerships, size and an effective export commitment turned out to be the key determinants of export performance.

As listed, there are various methods and ways of measuring EP, using numerous indicators, some factors, however, are often of a restrictive nature. Thai (2008) argues that SMEs are often hindered by barriers deriving from a country's organizational setting. Such barriers are often related to weak legislative systems, corruption, unproductive associations, inadequacy of capital and heavy bureaucracy. This consideration of Thai (2008) will also be integrated in this paper's research to measure the assumed negative/restrictive impact of such trade barriers amongst SMEs in EU member states.

Although a growing number of researches have been conducted on export performance on both SMEs and large corporations' level, the research on SMEs is often of less significance in the literature, as a

result of which this study will specifically observe and analyze SMEs in the European Union to contribute to the literature conducted on SMEs.

Micro, small, and middle-sized enterprises

To fully understand the researched topic and its key aspects, one must define and understand what SMEs are, according to European Union's definition.

According to the collective definition of the European Union, micro, small, and medium-sized enterprises (SMEs) are defined as businesses with fewer than 250 employees, a yearly revenue of less than 50 million euros, and an annual balance sheet of less than 43 million euros (Publications Office of the European Union, 2017).

Furthermore, SMEs can be classified in 3 distinct categories. Micro enterprises are described as companies that employ fewer than ten people and have a yearly revenue or balance sheet sum of less than two million euros. Small businesses are described as those that employ fewer than 50 people and have a yearly turnover or balance sheet total of less than 10 million euros. Medium-sized enterprises are described as those that employ fewer than 250 people and have a yearly turnover of less than 50 million euros or an annual balance sheet of less than 43 million euros (Publications Office of the European Union, 2017).

Regarding EU-based SMEs, Cernat et al. (2020) states that in 2017, over 700,000 EU businesses exported goods to countries outside the EU for a total worth of 1,673 billion euro. Of these enterprises, approximately 615,000 were SMEs. More than half of all exporters were micro enterprises with 1-9 employees. One-quarter were small businesses with 10-49 workers and around 10% were medium businesses, those with 49-250 employees. As for large companies, they only accounted for 3% of exports of all EU companies.

To conduct thorough research on an SME level, the TEC (Trade by Enterprise Characteristics) database provides key patterns and information regarding the sectoral export performance of these enterprises in EU member states (Cernat et. al, 2020). The database contains export and import data which can be applied on a sectoral basis. This way, several key patterns can be identified and pointed out, such as manufacturing, machinery, metal products, transportation, construction, rubber and plastics account for the highest value and for the greatest number of exporting SMEs among member states (Cernat et. al, 2020).

Methodology and Empirical strategy

Structure of research

In the main body of the research, a quantitative analysis will be conducted to analyze the above-described phenomenon, making use of various databases of internal and external effects in the EU, thus the research will rely on secondary data derived from large datasets. Regarding the sampling strategy, cluster sampling will be used, as countries in the European Union will be the main observations of this study.

Besides the available datasets, the paper will make use of sectoral data derived from the TEC (Trade by Enterprise Characteristics) to measure what factors change the sectoral exports among SMEs during the observed time period. The sectors have been chosen on the merit of their export volume and significance, thus agriculture, manufacturing, wholesale, construction, transportation, and ICT (Information and communications technology) will be incorporated in the analyses.

Methodology of EP papers

Leading studies that have been mentioned and described in the literature review used various methods in their methodology. The same pattern in each study is that they all used a quantitative regression analysis to identify and measure the key indicators and patterns in export performance.

As for the chosen theory, various methods were used, but the 2 leading theories are the resource-based view (RBV) and the contingency theory when structuring the research. By choosing the theory, previous studies also reflected differently on whether to emphasize and measure internal factors or external ones. The internal factors, as already mentioned, put a greater emphasis on firm-level resources that the firm can capitalize on and thus build a competitive advantage. The studies examining external factors focused more on country specific characteristics, such as the regulatory environment of SMEs in the observed countries, to find whether they have a significantly negative or positive effect on export performance among the observed firms. There were also studies that regressed on a combination of such factors, both external and internal, to find which factor has more impact on EP using mostly the contingency theory.

This study also leans towards a contingency theory-based analysis as there will be both external (mostly regulatory environment related) and internal (more of soft elements, such as innovation and entrepreneurial) indicators included in the analysis.

Data source and variables

The data and the variables that have been collected are mostly related to a macro, country-level. Such categories of data are, for instance, the Ease of Doing Business Score by the World Bank, that provides valuable variables and country-level data for regulatory performance and environment that are applicable to SMEs in the observed countries (days of registering a business, number of procedures, number of documents needed to do exporting, etc...); the Logistics Performance Index by the World Bank, displaying indicators for the performance and score of logistics-related infrastructure and competences such as logistics competence, logistics related infrastructure, efficiency of custom clearance procedures, and others; the Global Innovation Index, that comprises indicators measuring the innovative capacities and capabilities of countries like creative goods exports as a %, innovation linkages, ICT services exports, high-tech exports, and so on; and the Global Entrepreneurial Monitor that provides valuable internal factors related to entrepreneurship such as entrepreneurial intentions, opportunities, motivational index, total Early-Stage Entrepreneurial Activity (TEA), and innovation, amongst others. The exact variables and indicators identified are included in the appendix at the end of the proposal for visualization.

Regarding the operationalization of the analysis, the measurement of the concept will be executed along the dependent variable of 'Sectoral Export'. The variable, as already discussed, will be obtained from the TEC (Trade by enterprise characteristics) database that is constructed on an EU basis, thus providing data for each observed countries' sectoral export performance, considering the 6 most significant sectors.

Quantitative analysis

The proposed method of quantitative analysis lays on two foundations, first an exploratory factor analysis (EFA) will be conducted, which is needed to narrow down the number of variables that have been collected according to their relevance; secondly a panel-data regression model will be conducted using the dependent variable that has been identified in the concept part of the measurement, namely sectoral export performance, and the independent variables that have been narrowed down making use of the exploratory factor analysis. As a result of the factor analysis, the most significant factors will be retained to include them in the regression analysis and to measure their effects on export performance.

The panel data regression will be conducted using 25 EU countries as observations from the year 2014 to 2018. The combination of an exploratory factor analysis and the panel regression enables a

comprehensive examination of the relationship between the identified factors and sectoral export performance, contributing valuable insights to both academia and policymaking.

Hypothesis testing

By conducting the regression analysis, a number of hypotheses will be tested to find out the underlying factors regarding export performance. The factors are related to previous research findings; thus, I will measure the same phenomenon on a distinct set of observations, evaluating whether the previous findings can be supported or argued against based on the conducted analyses.

- H1: External, country and organizational setting specific, variables show different effect and movement in their values over time against internal, entrepreneurship and innovation related, indicators.

The first hypothesis attempts to contribute to the main discussion arising in the literature with regard to the differentiation of external and internal factors when measuring export performance. The differing factors used in the literature have been collectively sampled and collected in Beleska-Spasova's (2014) study. Since the variables collected for this study are in line with the ones displayed by Beleska-Spasova's (2014) collective literature review, the hypothesis will be evaluated to contribute to this debate.

- H2: Regulation is a significant determinant in driving SMEs' export performance in different sectors.

Regulation is a key element that can have an influence on the operations and competitiveness of SMEs in a variety of industries. For SMEs involved in export activities, governmental policies, legislation, and regulations may impose obstacles or open up opportunities. By analyzing the connection between regulation and the export performance of SMEs, I aim at providing further evidence to Thai's (2008) findings in which he argued that SMEs are often hindered by barriers deriving from a country's organizational setting, thus regulatory environment are significant determinants of EP.

- H3: Internal factors, such as human capital and entrepreneurial perception, are relevant factors of sectoral export performance among SMEs in the EU.

Following Oura's et al. (2016) research direction in measuring whether the relevance and effect of internal factors such as innovation capacity in SMEs' export performance are indeed relevant factors to consider to understand what drives the export growth of SMEs in various sectors. Since, the

majority of the researchers argued that external variables are more significant than internal ones, I expect this hypothesis to be rejected.

- H4: Competition and the degree of investment are positively affecting SMEs' export performance.

Based on Maurel's (2009) research findings, according to which business partnerships, size and an effective export commitment are key determinants of export performance among French SMEs in the wine industry, this hypothesis aims at finding the effect of similar elements on EP among EU-based SMEs. The underlying premise is that an increasing level of competition and investment have positive side effects on the sectoral export intensity of SMEs, thus I expect them to have positive side effects. I expect the factors to be positively displayed when regressed on the sectors.

- H5: Based on the contingency theory, external factors are more significant in explaining SMEs' export performance than internal factors.

The 5th hypothesis reflects on a key pattern amongst other leading studies of export performance research, as it will measure whether it is the internal, or the external environmental characteristics that tends to have a stronger effect on EP. I expect the external, the regulatory country-specific indicators to have a more significant effect on SMEs' export performance over the internal, softer indicators such as innovation and entrepreneurship. The hypothesis aims at providing with further analysis and proof, like those of Chetty's (2000) and Thai's (2008) findings, according to which country specific, external factors play a significant role in explaining SMEs' export performance.

The evaluation of the hypothesis could contribute to the discussion of whether external factors are really the ones to consider for EP over internal ones.

Quantitative Analysis

Databases

As thoroughly explained, the first part of the quantitative analysis comprises an exploratory factor analysis which is a viable part of the whole regression due to the extreme number of collected independent variables. The collection of all independent variables was executed using 5 different databases that provide data for both internal as well as external export performance determinants for the EU countries.

The first database, namely the 'Indicators of entrepreneurial determinants' from the Global Entrepreneurial Monitor (GME) provided with internal determinants with a strong emphasis on entrepreneurship in the measured countries. The database of the 'Logistics Performance Index (LPI)', on the other hand, includes data pointing out the external capabilities of countries in which the measured SMEs situate. This data source is vital to measure the effect of logistics and infrastructure, as well as location, on export performance of SMEs in different countries.

The 'Ease of Doing Business' database is also a large database containing country specific external factors to measure their significance and effect among the EU countries' administrative capabilities and infrastructure. Regarding these indicators, there is a great emphasis on how countries perform in terms of administrative burdens, red tape, and ease of doing business as for government support and participation.

The 'Global innovation index' is a key data source to collect variables regarding innovation and entrepreneurial indicators in the particular countries. This index compounded by the World Bank is aimed at describing the innovative capabilities of countries through various indicators, thus measuring which countries perform better according to the grading criteria set by the researchers.

Lastly, the 'World Development Indicators' are close to the 'Ease of Doing Business' dataset as the dataset also displays indicators that are aimed at providing information on how the characteristics of countries influence their current and future developments. After collecting the data for EU countries, I had to exclude 2 nations from the analysis due to the unavailability and the scarcity of data for these 2 counties, namely Malta and the Republic of Cyprus.

Exploratory Factor Analysis

After creating a compact database, using the mentioned data sources, there were a total of 159 variables identified. In the compact database, the collected data is derived from 5 years, from 2014 until

2018, because the available data from the different data sources could mostly be collected from these 5 years.

A number of steps were taken to obtain an unbiased and accurate study of the underlying determinants impacting export performance. Initially, a thorough set of 159 variables, displaying various factors potentially associated with export performance, was obtained.

To streamline the analysis and enhance its relevance, the overall number of variables was narrowed down to 39, based on their significance in the context of the study. Redundant variables, which exhibited identical values with at least one other indicator, were excluded from the factor analysis to avoid multicollinearity issues and biased results. The reason behind these measures was to preserve the integrity of the other indicators that displayed unique effects without being identical or close to other similar variables.

An exploratory factor analysis (EFA) was chosen for the analytical technique for several reasons. To begin with, EFA is best suited for the first investigation and discovery of latent components within a dataset, as it does not impose any pre-defined factor structure. Given the varying nature of the factors and their possible interdependence, EFA enables a data-driven approach to identifying the fundamental aspects driving SMEs' export success. EFA offered a robust and effective approach for factor extraction and interpretation because the study comprised many variables across 25 nations.

To conduct the EFA distinctly in all 5 years, STATA has been used. In STATA, each yearly sub-dataset, derived from the databases, is considered separately when conducting the factor analysis to be able to attach the factors to the particular year without losing the years' unbiased results.

To assess the significance and the relevance of the factors, the determination of the factors' eigenvalues will be used as the first step to obtaining the relevant and the right number of factors. As standard, an eigenvalue of 2 is used as benchmark, so all obtained factors with eigenvalues 2 or above are retained. Additionally, a scree plot diagram is also assigned to the obtained factors to visually show the underlying variation of the extracted factors, and to see which factors are above the threshold value at the y-axis, thus being a significant factor in explaining the variation amongst the variables used in the factor analysis. Since the retained indicators may change over time from 1 year to the other, each yearly conducted factor analysis will have a slightly different eigenvalue for the retained factors.

The 39 obtained distinct indicators, derived from the mentioned databases, are defined in the following table:

variable name	storage type	display format	value label	variable label
PerceivedEntr~l	double	%10.0g		Perceived Entrepreneurial Capabilities
FearOfFailure~e	double	%10.0g		Fear Of Failure Rate as Entrepreneur
Entrepreneuri~s	double	%10.0g		Entrepreneurial Intentions
Entrepreneuri~t	double	%10.0g		Entrepreneurial Employee Activity
MotivationalI~x	double	%10.0g		Motivational Index
HighJobCreati~n	double	%10.0g		High Job Creation Expectation
Innovation	double	%10.0g		Innovation
OverallLPIscore	double	%10.0g		Overall LPI score
Easyofdoingbu~s	double	%10.0g		Easy of doing business
ScoreStarting~s	double	%10.0g		Score Starting a business
Patentapplica~s	long	%10.0g		Patent applications residents
Researchandde~i	double	%10.0g		Research and development expenditure
Researchersin~n	double	%10.0g		Researchers in R&D per million
Politicalenvi~t	byte	%10.0g		Political environment
Politicalstab~e	byte	%10.0g		Political stability and absence
Governmenteff~s	byte	%10.0g		Government effectiveness
Regulatoryenv~t	byte	%10.0g		Regulatory environment
Regulatoryqua~y	byte	%10.0g		Regulatory quality
Businessenvir~t	byte	%10.0g		Business environment
Tertiaryenrol~t	byte	%10.0g		Tertiary enrolment
Graduatesinssc~e	byte	%10.0g		Graduates in science and engineering
Infrastructur~e	byte	%10.0g		Infrastructure score
Informationan~e	byte	%10.0g		Information and communication technologies (ICTs)
ICTaccess	byte	%10.0g		ICT access
Governmentson~e	byte	%10.0g		Government's online service
Ecologicalsus~y	byte	%10.0g		Ecological sustainability
Environmental~e	byte	%10.0g		Environmental performance
ISO14001envir~c	byte	%10.0g		ISO 14001 environmental certificates
Marketsophist~n	byte	%10.0g		Market sophistication
Investment	int	%10.0g		Investment
Easeofprotect~s	byte	%10.0g		Ease of protecting investors
Tradeandcompe~n	byte	%10.0g		Trade and competition
Businesssophi~n	byte	%10.0g		Business sophistication
Knowledgeabso~n	byte	%10.0g		Knowledge absorption
Royaltiesandl~e	byte	%10.0g		Royalties and license fees payments (% of total trade)
Foreigndirect~u	int	%10.0g		Foreign direct investment net outflows
Creativeoutputs	byte	%10.0g		Creative outputs
ICTsandorgani~r	byte	%10.0g		ICTs and organizational model creation
Creativegoods~s	byte	%10.0g		Creative goods and services

Figure 1. Retained indicators definition

As explained, the indicators were narrowed down as for their numbers to be able to conduct an unbiased factor analysis. Among the variables both external and internal effects can be found to describe the factor loadings table and the included factors. When distinguishing between internal and external factors, one can identify the original indicators that are measuring external, country organizational and regulatory settings, and also the ones that are aimed at providing with internal, entrepreneurship and innovation related elements, focusing on the pool of talents found in a country and possibly contributing to a greater level of export performance among SMEs.

Exploratory Factor Analysis of 2014

Conducting the first year's (2014) EFA in STATA, one can see how the obtained factors explain the common variance among the variables. As said before, a default eigen value of 2 is being utilized to obtain no more than 5 factors that show adequate explanatory power within the dataset's indicators.

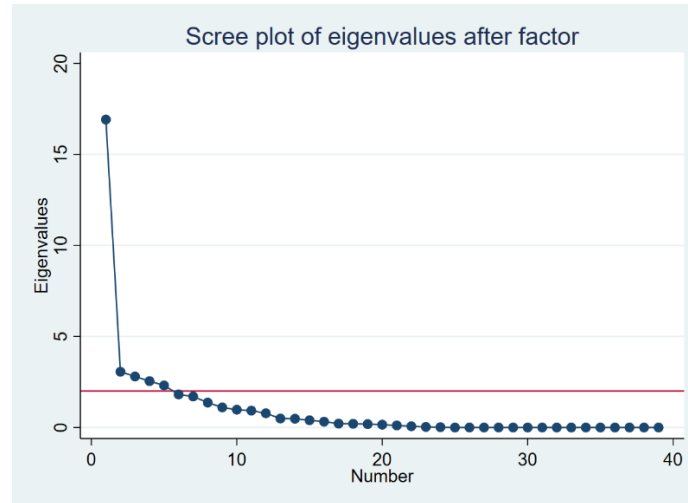


Figure 3. Scree plot (2014)

From the scree plot it is clearly visible the Factor 1 is in great superiority when it comes to capturing the underlying variance within the whole dataset. Its eigen value is above 15, while that of the other 4 factors, that are still above the red line (representing the threshold eigen value of 2), is between the eigen value of 2 and 3.

Variable	Factor1	Factor2	Factor3	Factor4	Factor5	Uniqueness
PerceivedE~1						0.6285
FearOfFail~e						0.4405
Entreprene~s	0.6263	0.5084				0.2483
Entreprene~t	-0.5430					0.3933
Motivation~x	-0.7431					0.2238
HighJobCre~n		0.6627				0.2256
Innovation						0.5183
OverallLPI~e	-0.7894					0.2862
Easyofdoin~s	-0.6541					0.2971
ScoreStart~s					0.6776	0.3637
Patentappl~s						0.4630
Researchan~i	-0.8310					0.2387
Researcher~n	-0.9126					0.1332
Politicale~t	0.8736					0.0764
Politicalsa~e	0.6541					0.3614
Government~s	0.9279					0.0580
Regulatory~t	0.7763					0.2905
Regulatory~y	0.8769					0.1491
Businessen~t	0.7849					0.0989
Tertiaryen~t			0.7119			0.3334
Graduatesi~e		0.5207				0.6289
Infrastruc~e	0.8443					0.0736
Informatio~e	0.8639					0.1491
ICTaccess	0.9181					0.0796
Government~e	0.7710					0.3012
Ecological~y				-0.5488		0.5179
Environmen~e	0.7373					0.2483
ISO14001en~c				-0.7644		0.2216
Marketsoph~n	0.7365					0.1434
Investment	0.8199					0.1693
Easeofprot~s			0.7951			0.2008
Tradeandco~n	0.5373				0.5221	0.3563
Businessso~n	0.9064					0.1245
Knowledgea~n	0.5510					0.2926
Royaltiesa~e						0.5838
Foreigndir~u	0.5092					0.5704
Creativeou~s	0.8958					0.1118
ICTsandorg~r	0.8357					0.2082
Creativego~s						0.5513

(blanks represent abs(loading)<.5)

Figure 4. Factor loadings (2014)

The inserted factor loadings table is useful to analyze how the variables are captured by the retained factors since it shows the loading values that are above or below the +/-0.5 threshold mark to observe which variables are captured the most by which factor(s). Factor loadings, thus reveal the strength and direction of the relationship between the observed variables and the underlying factors.

As discussed, by choosing an eigen value of 2, there have been 5 factors retained, for which the factor loadings are displayed. For instance, the variable 'Entrepreneurial Intentions' has high loadings on Factor 1 with a factor loading of 0.6263 and Factor 2 with a factor loading of 0.5084, indicating that it is strongly related to both mentioned factors. Before interpreting the output table, it is important to note that when factor loadings of variables with opposite signs (one positive and one negative) are displayed within the same factor, it implies that they have inverse relationship with that factor. Positive loadings on variables show a positive link with the underlying factor, meaning that the factor score increases as the values of these variables rise. These variables with '+' signs contribute positively to the factor and are aligned with the construct which is represented by that factor. Negatively loaded variables suggest a negative association with the underlying factor. The factor score drops as the values of these variables grow. These variables contribute inversely to the factor and constitute the factor's inverse construct.

The first factor is mainly made up of variables linked to entrepreneurship, government effectiveness, regulations, infrastructure, and access to information and communication technology. It emphasizes the significance of many elements in encouraging and supporting entrepreneurial activities, although looking at the positive and negative signs of how the variables are captured by Factor 1, one can identify a fairly interesting pattern. Entrepreneurial indicators such as 'Entrepreneurial employee activity', 'Motivational Index', 'Research and Development expenditure' and 'Ease of doing business score', for instance, are negatively loaded within the factor, meaning the increase on value for Factor 1 will result in an inverse movement in value for entrepreneurial, internal elements.

On the other hand, external variables such as 'Political environment' (0.8736), 'Government effectiveness' (0.9279), 'Regulatory environment' (0.7763), 'Regulatory quality' (0.8769), 'Business environment' (0.7849), and 'Infrastructural score' (0.8443) are loaded positively within the factor and possess great factor loading values. Factor 1, thus represents a strong combination of variables related to entrepreneurship and government effectiveness, from which government effectiveness shows a superior role within the factor.

Factor 2 can be interpreted more easily because of the fewer number of variables with high factor loadings and the connection of significant variables to each other as for their factor loadings.

'Entrepreneurial Intentions', 'High job creation expectation', and 'Graduates in science and engineering' are the variables that are captured within the second factor the most, thus Factor 2 displaying strong Human capital related indicators. Factor 3 displays 2 factor loadings that are above 0.5, thus 'Tertiary enrolment' and 'Ease of protecting investors' indicate a strong and developed organizational structure.

Factor 4 again shows an interesting relationship between the obtained factor and the 2 variables with the highest factor loadings. The 2 variables, namely 'Ecological sustainability' and 'ISO 14001 environmental certificates' are displayed with a negative sign within the factor, meaning that the value increase in the factors inversely impacts the 2 listed significant variables.

Factor 5 displays a rather clear factor interpretation regarding the significant variables it captures. 'Score starting a business' and 'Trade and competition' are captured the most by the factor, displaying a strong effect of competition amongst the business entities within the countries.

In addition to factor loadings, the table also displays the variables' unique variances ('uniqueness'). Variables with high uniqueness values may not be highly connected to the identified factors. These factors may be one-of-a-kind or distinctive in nature, and they should be researched for further understanding how to influence EP. From the first year's uniqueness output, one can see that 'Graduates in science and engineering' and 'Perceived entrepreneurial capabilities' possess a uniqueness score of over 0.6, thus could be also considered independently in future research. However, 'Graduates in science and engineering' shows a great loading value in Factor 2, thus worthy of measuring its effect within the second factor.

Factor loadings comparison

Before going further with the following years' exploratory factor analyses, it is worthwhile to state that by using an eigen value of 2 to retain the most relevant factors, 5 factors have been obtained from all additional years, thus making it possible to use all of them in the panel regression that is yet to be conducted.

Factor 1 was always the one with the highest eigen value, thus capturing the most underlying variance within the dataset, amongst all displayed variables. As for the other factors, due to the slight change in the values of the variables, the factors often showed a slight difference regarding which variables are

loaded above the 0.5 threshold for the particular factors, making it more difficult to find the most appropriate name for the factors to be included in the panel regression.

Due to the mentioned challenge, the next parts focus on the factor loadings tables to interpret and point out the possible changes compared to the first year's data (2014) starting with year 2015.

Factor loadings for 2015

The conducted EFA for 2015 resulted in a similar outcome to that of the preceding year's, meaning that 5 factors have been retained using an eigen value of 2 as threshold. The strength and significance of the factors are displayed in the scree plot diagram:

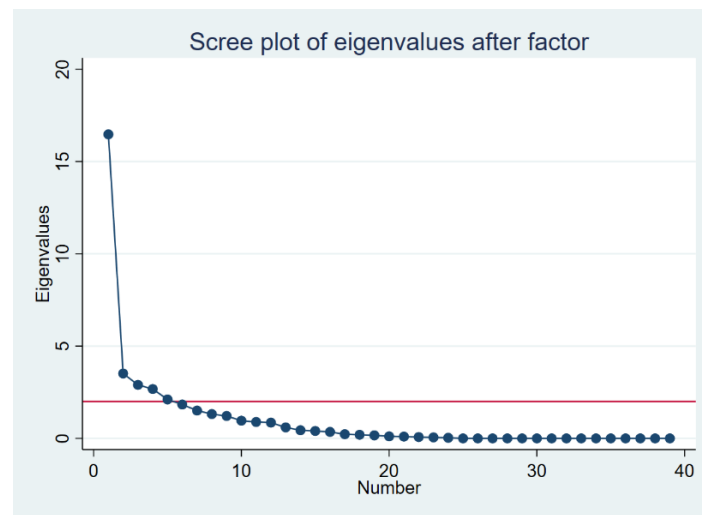


Figure 5. Scree plot (2015)

Just like in the first year's factor analysis, Factor 1 continues to be superior as for its high eigen value and the other 4 factors show a similar tendency of being above the set threshold but the possibility of slightly varying loadings within the factors cannot be excluded with certainty.

The factor loadings for the second year can be seen in a similar factor loading table to see the underlying pattern within how the variables are captured by each factor:

Variable	Factor1	Factor2	Factor3	Factor4	Factor5	Uniqueness
PerceivedE~l						0.6624
FearOfFail~e			-0.5064	0.5420		0.3550
Entreprene~s		0.5815				0.1496
Entreprene~t	-0.6294					0.2676
Motivation~x	-0.7167					0.4314
HighJobCre~n		0.6042				0.2768
Innovation	-0.7588					0.3750
OverallLPI~e	-0.7832					0.1752
Easyofdoin~s	-0.6677					0.2886
ScoreStart~s						0.4034
Patentappl~s						0.7528
Researchchan~i	-0.7965					0.2519
Researcher~n	-0.9019					0.1256
Politicale~t	0.9069					0.0955
Political~s	0.6022	-0.5257				0.2841
Government~s	0.9549					0.0856
Regulatory~t	0.8162					0.2264
Regulatory~y	0.9131					0.1187
Businessen~t	0.7311					0.2285
Tertiaryen~t		0.6245				0.4672
Graduatesi~e		0.6219				0.4638
Infrastruc~e	0.8371					0.1371
Informatio~e	0.7519					0.1574
ICTaccess	0.8983					0.1342
Government~e	0.6310				-0.5348	0.1638
Ecological~y				0.6197		0.4860
Environmen~e	0.6903					0.1296
ISO14001en~c	-0.5034					0.3424
Marketsoph~n	0.8664					0.1310
Investment	0.7777					0.2485
Easeofprot~s		0.5463				0.4645
Tradeandco~n						0.3324
Businessso~n	0.8833					0.1601
Knowledgea~n	0.6364					0.3232
Royaltiesa~e				-0.5194	0.5576	0.2519
Foreigndir~u	0.5185			0.5426		0.4249
Creativeou~s	0.8661					0.1538
ICTsandorg~r	0.7345					0.2702
Creativego~s						0.5322

(blanks represent abs(loading)<.5)

Figure 6. Factor loadings (2015)

Having conducted the second year's (2015) factor analysis, the first factor, as mentioned, displays a very high loading in government effectiveness, regulations and infrastructure as external variables. The negative effect of entrepreneurial and innovation related variables can also be seen in the second year, too. The very similar effects are the result of a high eigen value for Factor 1, as the scree plot displays it.

Regarding the second retained factor, one can see a fairly similar pattern to that of the first year's EFA, as the same entrepreneurial variables, along with human capital related indicators, appear with significant factor loadings (those above +/-0.5). As a result, 'Entrepreneurial Intentions', 'High job creation expectation', 'Graduates in science and engineering', along with a new but related variable 'Tertiary enrolment' turn out to have substantial factor loadings in the second factor. Additionally, two other variables show high loading values for this factor which are 'Ease of protecting investors' and 'Political stability', the latter of which is represented inversely, meaning that it displays a negative movement against the factor's value increase. Factor 3 does not provide with strong loading values since there is only 1 variable that is above the 0.5 threshold. The variable 'Fear of failure rate as an entrepreneur' thus has a negative relationship with the factor, meaning that they move inversely to each other.

As for the fourth factor, since it displays a lower number of high factor loadings, there is a higher chance of not having the same variables represented by the particular factor over the years. The main difference to the preceding year's EFA regarding Factor 4 is that 'Ecological sustainability' is displayed in the opposite way, meaning that for the year 2015 the variable is moving inversely against the factor, as opposed to the preceding year. It is also worthwhile to state that 'Fear of failure rate as an entrepreneur' has a positive relationship with the factor.

Factor 5 also only displays 2 factors with moderate factor loadings just above the 0.5 set threshold. 'Government's online service' is displayed with a negative sign, meaning it moves inversely against the factor; 'Royalties and license fees payments' on the other hand is displayed positively as for its relationship with the factor's movement.

Factor loadings for 2016

The conducted EFA for 2016 again shows a similar trajectory of the obtained factors regarding their eigen values. The scree plot can be used for visualization to compare the results with previous years:

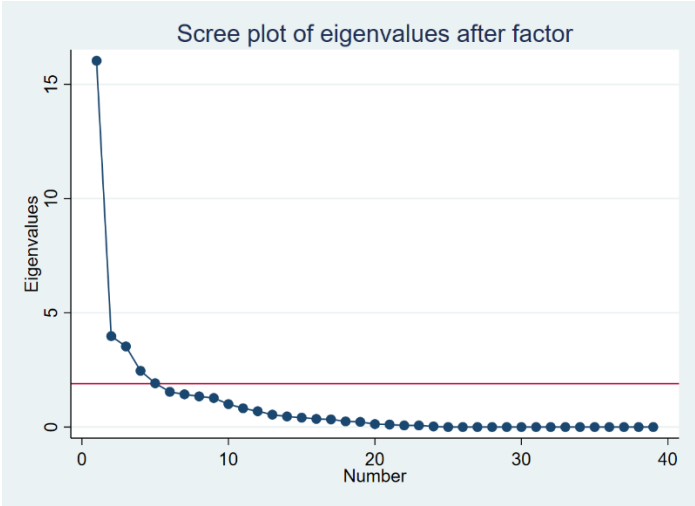


Figure 7. Scree plot (2016)

The first obtained value continues to be very consistent in terms of its eigenvalue and capturing most underlying variance within the included variables. The following 4 factors show a similar layout with regard to their position after the first factor. To measure the possible change regarding which variables the factors capture the most, the factor loadings table helps with the interpretation:

Variable	Factor1	Factor2	Factor3	Factor4	Factor5	Uniqueness
PerceivedE~l						0.4703
FearOffFail~e				0.6534		0.2536
Entreprene~s						0.3602
Entreprene~t	-0.6837					0.3071
Motivation~x	-0.6932					0.3063
HighJobCre~n			0.5858			0.4077
Innovation	-0.5537					0.3808
OverallPI~e	-0.8672					0.0849
Easyofdoin~s	-0.6032					0.2380
ScoreStart~s				0.5185		0.3503
Patentappl~s			-0.5300			0.6257
Researchan~i	-0.8069					0.2123
Researcher~n	-0.9008					0.1405
Political~t	0.8966					0.0984
Political~e	0.6976					0.2493
Government~s	0.9444					0.0859
Regulatory~t	0.8345					0.2259
Regulatory~y	0.8797					0.1358
Businessen~t	0.6878					0.2241
Tertiaryen~t		0.6813				0.2788
Graduatesi~e		0.6289				0.5736
Infrastruc~e	0.8210					0.1806
Informatio~e	0.7713					0.1428
ICTaccess	0.8652					0.1468
Government~e	0.6601			-0.5258		0.1975
Ecological~y		0.5289				0.2881
Environmen~e		0.5774				0.3482
ISO14001en~c	-0.5035	0.5119				0.2962
Marketsoph~n	0.7102					0.1735
Investment	0.7815					0.2534
Easeofprot~s		0.6752				0.5142
Tradeandco~n			0.7417			0.3086
Businessso~n	0.8709					0.1095
Knowledg~n	0.6694					0.2796
Royaltiesa~e						0.5302
Foreigndir~u						0.5271
Creativeou~s	0.9033					0.1589
ICTsandorg~r	0.8056					0.2390
Creativego~s	0.6164					0.3764

(blanks represent abs(loading)<.5)

Figure 8. Factor loadings (2016)

Factor 1, as expected, shows very little change as for what variables it captures and how these variables are loaded within the factor regarding their positive or negative relationships to it. The entrepreneurial and related internal factors are loaded with a negative sign, while regulatory and government related factors are displayed positively within the factor, just like in the preceding years.

Factor 2, similarly to the preceding years, displays human capital and education related variables regarding their factor loadings, thus 'Tertiary enrolment' and 'Graduates in science and engineering' being significant within the factor. The difference to the preceding 2 years is that this year's EFA displays environmental related variables with the same direction to those of human capital related one. As a result, 'Ecological sustainability', 'Environmental performance', and 'ISO 14001 environmental certificates' also show a significant relationship to the factor.

As for the third factor, 'Trade and competition' turns out to have the highest loading within the factor. Factor 3 in 2016 displays two additional variables with middle- to moderate level of loading values which

are rather close to the variable with the highest factor loading, the 2 variables are thus shown in relation to patent application and job creation.

In the 4th factor, 'Fear of failure rate as entrepreneur' is the main driver with its 0.6534 loading value. Besides this variable, the 'Score starting a business' is also represented along with 'Government effectiveness' that is displayed with an inverse relationship to the factor and its most captured variable 'Fear of failure rate as entrepreneur', which is logical considering that a higher score of fear of failure explains an inverse relationship with government effectiveness.

As for Factor 5, no variable has a factor loading of +/- 0.5 or greater, meaning that it is rather difficult to assign the factor to a specific area of indicators in this year's EFA.

Factor loadings for 2017

The penultimate year yields a similar factor output to the preceding years since the scree plot, as seen below, displays a similar trajectory for the 2nd to 5th factors.

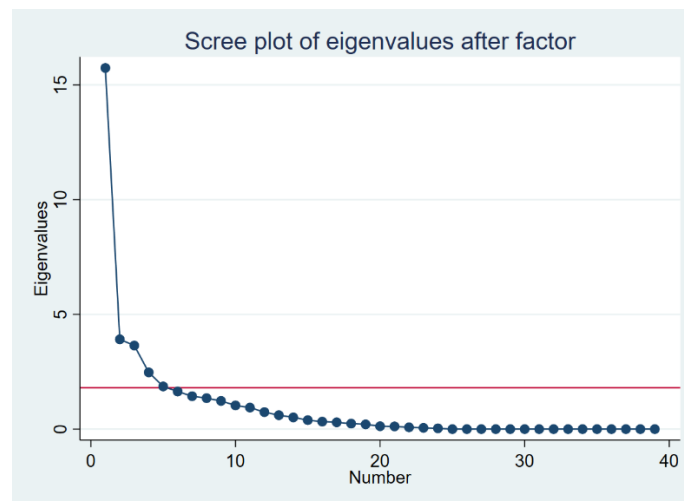


Figure 9. Scree plot (2017)

Factor 1, as expected, shows a very reliable position with regard to its eigen value since it has been consistently just above the 15 mark. The other 4 factors also display very similar eigen values and suggest that the factors will capture similar effects and variables as the previous years' EFA. To check the reliability and the expected consistency of the captured variables for each factor, a factor loading table is presented for the year 2017:

Variable	Factor1	Factor2	Factor3	Factor4	Factor5	Uniqueness
PerceivedE~l				-0.5812		0.4752
FearOffFail~e				0.8848		0.2096
Entreprene~s			-0.5562			0.4229
Entreprene~t	-0.7150					0.2877
Motivation~x	-0.6854					0.3899
HighJobCre~n						0.4684
Innovation				0.5566		0.2510
OverallLPI~e	-0.8257					0.0739
Easyofdoin~s	-0.6121					0.2242
ScoreStart~s			-0.5523			0.4289
Patentappl~s						0.6974
Researchan~i	-0.8051					0.2496
Researcher~n	-0.8959					0.1885
Politicale~t	0.8861					0.1083
Politicalsa~e	0.6100	-0.5062				0.2478
Government~s	0.9348					0.1098
Regulatory~t	0.8697					0.2089
Regulatory~y	0.8960					0.1343
Businessen~t	0.7219					0.3021
Tertiaryen~t		0.7726				0.2094
Graduatesi~e		0.6044				0.5364
Infrastruc~e	0.8279					0.1759
Informatio~e	0.8274					0.2171
ICTaccess	0.7969					0.2068
Government~e	0.6986					0.3777
Ecological~y			0.5701		0.5753	0.2292
Environmen~e			0.5669			0.2983
ISO14001en~c	-0.5331		0.5286			0.3651
Marketsoph~n	0.7337					0.1997
Investment	0.8105					0.1594
Easeofprot~s		0.6423				0.4779
Tradeandco~n			-0.6440			0.3461
Businessso~n	0.8916					0.1238
Knowledgea~n	0.6858					0.2723
Royaltiesa~e					0.5354	0.4054
Foreigndir~u						0.5289
Creativeou~s	0.8642					0.2088
ICTsandorg~r	0.8477					0.1884
Creativego~s		-0.6077				0.3634

(blanks represent abs(loading)<.5)

Figure 10. Factor loadings (2017)

Factor 1 continues to be the most reliable factor in terms of capturing the same set of variables with the same + or – signs within the factor. As in the preceding years, the first factor negatively affects entrepreneurial variables, while organizational settings related along with government regulatory indicators are positively loaded in the factor.

Factor 2 displays high factor loading for variables that showed consistency within the second factor over the last 3 years, thus ‘Tertiary enrolment’, ‘Graduates in science and engineering’ suggest that the factor has significant explanatory value for human capital related indicators. A third, consistently returning variable is the ‘Ease of protecting investors’ with its 0.6423 loading value that is loaded with the same positive sign in the factor. The change that needs to be accounted for lays in 2 newly included variables that have loading values over the threshold, thus ‘Political stability and absence’ and ‘Creative goods and services’ turn out to have significant factor loadings in the factor, though inversely due to their negative signs.

The third factor appears to show ranging variables in terms of their factor loadings within the factor, thus making it harder to interpret the results. The first interesting result is the fact the ‘Trade and

competition' is displayed negatively within the factor, while in preceding years it has been positively incorporated. Moreover, environment and sustainability related factors appear to have positive factor loadings for Factor 3.

It is worth pointing out that when an environment related variable has turned out to have a high loading, all related indicators have appeared to move in the same direction with regard to their +/- sign, which is expected due to the similarity in their scores among the 25 countries.

Factor 4 also appears to be reliable in the sense that the returning variable of 'Fear of failure rate as an entrepreneur' is loaded with a high value in the factor, as in preceding years.

The last retained factor displays that 'Ecological sustainability' and 'Royalties and license fees payment' are loaded above the set threshold, although not by much, thus cannot be stated that they have high explanatory power when looking at the values of the factor.

Factor loadings for 2018

Finally, looking at the last years EFA, it is possible to fully comprehend the similarities and the differences within each year's EFA.

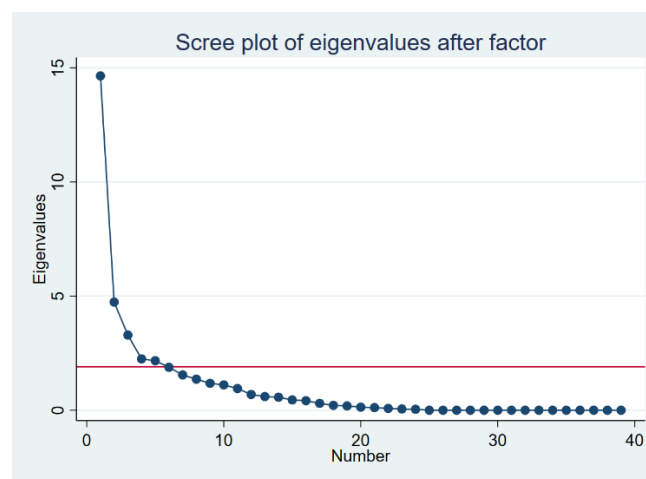


Figure 11. Scree plot (2018)

The scree plot of the last year's EFA shows that the first factor, although possessing a high eigen value, is slightly below the eigen value of 15, as opposed to all previous years. This slight change in value also affects the second and moderately the third factor since their values increased from the preceding years in terms of eigen value. The obtained factors, however, are very similar to the previous years.

The factor loadings table helps the reader to have a clear understanding regarding how and which variables are loaded in each factor.

Variable	Factor1	Factor2	Factor3	Factor4	Factor5	Uniqueness
PerceivedE~l						0.6499
FearOfFail~e				0.5000	0.7060	0.2328
Entreprene~s		0.6504				0.3920
Entreprene~t	-0.6800	0.5013				0.2218
Motivation~x	-0.5745					0.6329
HighJobCre~n						0.5159
Innovation					0.5343	0.1261
OverallPI~e	-0.8203					0.0855
Easyofdoin~s	-0.5810		-0.5094			0.2570
ScoreStart~s						0.5319
Patentappl~s						0.6856
Researchchan~i	-0.7989					0.2146
Researcher~n	-0.8739					0.2070
Politicale~t	0.8948					0.1115
Politicals~e	0.5089					0.3846
Government~s	0.9322					0.0900
Regulatory~t	0.8601					0.2248
Regulatory~y	0.8775					0.1857
Businessen~t	0.7024					0.3536
Tertiaryen~t			0.7657			0.2105
Graduatesi~e			0.5425			0.5795
Infrastruc~e	0.8324					0.1187
Informatio~e	0.8187					0.2603
ICTaccess	0.7677					0.3351
Government~e	0.7182					0.3711
Ecological~y				-0.7513		0.2884
Environmen~e	0.7328					0.2029
ISO14001en~c	-0.5607					0.3761
Marketsoph~n	0.7338					0.2646
Investment	0.6489					0.4045
Easeofprot~s			0.7124			0.3818
Tradeandco~n		0.7839				0.2017
Businessso~n		0.8634				0.1214
Knowledgea~n	0.6759					0.2759
Royaltiesa~e						0.3554
Foreigndir~u					0.5662	0.4385
Creativeou~s	0.8864					0.1223
ICTsandorg~r	0.8578					0.1440
Creativego~s		-0.5820				0.3416

(blanks represent abs(loading)<.5)

Figure 12. Factor loadings (2018)

The first factor has turned out to be the most consistent one in terms of capturing the same set of variables over the course of the 5 years, ending with the year of 2018. Variables that represent values of regulatory environment, organizational setting, and government effectiveness are loaded positively within the first factor. Internal, entrepreneurial elements, on the other hand, are still displayed negatively, just like before.

Factor 2 has showed a slight change, as also seen in the scree plot, since the human capital variables of ‘Tertiary enrolment’ and ‘Graduates in science and engineering’ have not projected high factor loadings in the factor, as opposed to all previous years. In this year’s EFA, Factor 2 captures ‘Entrepreneurial intentions’, and ‘Entrepreneurial employee activity’ as of internal/soft indicator, thus still being a proxy for human capital. Other, external variables that have been loaded significantly in the second factor are ‘Trade and competition’ and ‘Business sophistication’ with fairly high loading values of 0.7839 and 0.8634 respectively.

As opposed to previous years, education and human capital related variables are displayed in the third factor, while those of previous years were incorporated in the second one.

'Fear of failure', however, has stayed consistent also in the last year, next to which 'Ecological sustainability' is loaded inversely in the 4th factor with a relatively significant loading value of -0.7513. The last factor has high loadings of 'Foreign direct investment net outflows', 'Innovation' and 'Fear of failure rate as an entrepreneur' that also show similarities to preceding years.

Overall EFA analysis

The interpretation of each year's EFA has been an important step to execute to really understand the reliability and captured values of the factors. After having discussed the partly different effects of the obtained factors, a main outline has been established that allows us to incorporate all 5 factors under 5 collective terms for the panel regressions yet to be conducted.

Having identified the pattern within each factor over the course of 5 years (2014-2018), Factor 1 has been consistent in capturing government regulatory indicators with high loading values, thus it can be best expressed as '**Regulation**' for the first independent variable when including the factor in the panel regression analysis. 'Regulation' thus moves positively with government regulatory and administrative infrastructure related indicators, while those of entrepreneurship and internal related ones are inversely included in the factor.

The second factor has shown a pattern of capturing the human capital and talent as most consistent elements over the course of the 5 years, thus this factor shall be included as '**Human capital**' in the regression analysis in all years to measure its effect on SMEs' sectoral export performance in the observed countries.

Regarding Factor 3, the relevant variables have varied quite a lot over the years but by trying to identify the pattern, the factor could be expressed as '**Competition**' due to the variable 'Trade and competition' being loaded high during a number of years. Furthermore, the occasional higher education related variables were also often displayed, meaning that competitive forces can be identified when treating these variables together.

Factor 4 has displayed a fairly reliable set of fields by consistently having high factor loadings of 'Fear of failure rate as an entrepreneur', thus showcasing an indicator in relation to a barrier, as a result of which Factor 4 will be included as '**Barriers**' in the panel regression. Thai (2008) also argued in his research that SMEs are often hindered by barriers deriving from a country's organizational setting but in his research, such barriers are mostly related to weak legislative systems, corruption, and bureaucracy. In the context

of this 4th factor, however, 'Barriers' relate to an internal interpretation that comes from the perception of barriers, which is thus close to psychological distance as also identified by Safari and Saleh (2020).

Regarding Factor 5, the pattern has displayed a set of variables that are related directly or indirectly to the degree of investments, as variables such as 'Foreign direct investment net outflows', 'Royalties and license fees payments' have had returning high factor loadings, along with 'Innovation', and 'Trade and competition'. This factor thus shall be named '**Investment**', the factor of which often refers to investments and payments to the outside of the country though.

Hypotheses evaluation

To evaluate the proposed Hypotheses from the first part of the paper, it is necessary to run the proposed panel regressions using the extracted factors from the collected data. The chosen regression model is panel data analysis since I am measuring the sectoral export performance of SMEs in EU countries over a certain period, namely over the course of 5 years (from 2014 to 2018).

In the panel data analysis, the cross-section data represent the measured EU countries with the exception of Cyprus and Malta due to the lack of data regarding numerous variables. The time series data, on the other hand, is equal to the number of years over which the phenomenon is being observed and researched on. The dependent variable is constructed by taking 6 sectors' export output of SMEs in each country over 5 years. The sectors were selected on the basis of importance and significance regarding export volume, thus agriculture, manufacturing, wholesale, construction, transportation, and ICT have been used to construct the dependent variable. Furthermore, to see the sector specific effects, all regression contains interaction effects to measure if the interaction of the sectors and the included independent variables show any significance or difference to the main effects between the sector and the predictor.

In the regression analysis part of the paper, I will use a random effects model for numerous reasons. To begin with, the random effects assumption is appropriate since it implies that unobserved individual-specific effects are uncorrelated with the independent variables, which eliminates concerns about endogeneity or omitted variable bias. Second, the presence of time-invariant effects or unobserved heterogeneity among individual nations is acknowledged, third, random effects models outperform fixed effects models in terms of efficiency and precision, especially when there is little variation within units across time. This option is justifiable given the features of our dataset and the level of within-unit variation found in the panel. The low level of variation has been obtained by conducting an EFA in the previous part of the paper, which automatically reduced the within-unit variation.

Finally, I assume that the effects of the independent factors on the dependent variable are stable throughout time, as justified by theoretical and empirical explanations. Taking these arguments into account, the random effects model appears to be adequate for investigating the relationship between the factors and sectoral export performance. Since the analysis considers 5 years (2014-2018) when measuring 6 sectors' export performance for 25 countries, the total number of observation results in 750 at each of the conducted panel regressions.

Hypothesis 1.

- H1: External, country and organizational setting specific, variables show different effect and movement in their values over time against to internal, entrepreneurship and innovation related, indicators.

The first hypothesis, as described in the first half of the paper, attempts to measure how external (country, regulatory specific) variables move against internal (entrepreneurship and human capital related) factors. Beleska-Spasova (2014) has listed the most used export performance related variables based on the majority of highly rated studies. She found that there is a clear distinction between external (country-level) and internal (soft) variables in the studies that she has made a collective overview of. Since studies mostly used external and internal factors distinctly, I expect them to have inverse effects to each other. The hypothesis can be evaluated using the already conducted EFAs from which the first, most significant factor is the basis of this hypothesis' evaluation.

Based on the first factor over the course of 5 years (2014-2018) in the conducted EFAs, there has been a very consistent outcome as for how and which variables are loaded in the first factor in all years. As a result, 'Political environment', 'Government effectiveness', 'Regulatory environment', 'Regulatory quality', 'Business environment', and 'Infrastructure score' all were displayed positively within the factor, as opposed to internal variables such as 'Entrepreneurial employee activity', 'Motivational Index', 'Research and Development expenditure', 'Ease of doing business score', 'Research and development expenditure', and 'Researchers in R&D per million', that are negatively loaded in the factor, meaning that with the increase of the factor, the internal variables move inversely in the opposite direction.

Based on the exploratory factor analysis, Hypothesis 1 cannot be rejected due to the supporting evidence for the distinct nature of external and internal variables as also argued by Beleska-Spasova (2014).

Hypothesis 2.

- H2: Regulation is a significant determinant in driving SMEs’ export performance in different sectors.

As discussed earlier, regulation is an important element that has been continuously used by many scholars and researchers when measuring SMEs export performance. By evaluating this hypothesis, it is possible to provide further evidence to Thai’s (2008) conclusion, according to which SMEs are often negatively and significantly influenced by barriers deriving from a country’s organizational setting, by observing the phenomenon on a sectoral level.

The hypothesis can be evaluated using the results obtained from the EFA in the first part of the quantitative analysis. As a result, the first factor of every year has displayed a reliable set of variables, mostly related to the countries’ organizational setting and regulatory environment, thus the named first factor will be included as ‘Regulation’ in the panel regression.

The regression for hypothesis 2, thus has been obtained with the following results:

Exports and the effect of regulation across sectors						
	Agriculture	Manufacturing	Wholesale	Construction	Transportation	ICT
Regulation	0.015 [0.15]	0.081 [0.79]	0.107 [1.05]	0.060 [0.59]	0.105 [1.02]	0.155 [1.52]
Regulation* <i>Agriculture</i>	0.432*** [3.04]					
Regulation* <i>Manufacturing</i>		0.036 [0.25]				
Regulation* <i>Wholesale</i>			-0.118 [-0.81]			
Regulation* <i>Construction</i>				0.162 [1.11]		
Regulation* <i>Transportation</i>					-0.105 [-0.72]	
Regulation* <i>ICT</i>						-0.407*** [-2.86]
Observations	750	750	750	750	750	750

Figure 13. Panel regression (Regulation)

The panel regression is compounded by having the sectoral export output of countries over the course of 5 years as dependent variable to find how the included ‘Regulation’ predictor affect the export performance of SMEs in the identified sectors.

The coefficients for the main impact of regulation (first row in the regression output) on each sector's export performance (agriculture, manufacturing, wholesale, construction, transportation, and ICT) are shown in the table, however, none of these coefficients are statistically significant at conventional levels ($p\text{-value} < 0.05$ or $p\text{-value} < 0.01$). This shows that the overall influence of 'Regulation' on SMEs' export performance across industries may be minor.

The panel regression also includes interaction effects between 'Regulation' and each sector independently to see if their interaction yields to different outcomes in terms of significance. These interaction terms describe the additional influence of 'Regulation' on export performance when paired with each individual sector.

From the regression output, one can see that 'Regulation*Agriculture' and 'Regulation*ICT' are the only statistically significant interaction terms, with a value of 0.432 ($p\text{-value}$ of 0.01) and -0.407 ($p\text{-value}$ of 0.01). This implies that the interaction modifies the influence of regulation on the agriculture, and the ICT sector's export performance. The remaining interaction terms (manufacturing, wholesale, construction, and transportation) are not statistically significant. The positive coefficient of the Regulation*Agriculture (0.432) suggests that an increase in 'Regulation' has a positive impact on the agriculture sector's export performance, but this effect is contingent on the agriculture sector itself.

The coefficient of 0.432 indicates that when the 'Regulation*agriculture' interaction term increases by one percentage point, the agriculture sector's export performance increases by 0.432 percentage points on average. This suggests that the predictor may have a positive influence on agricultural export performance among SMEs, when merely observing the pair of them. The 'Regulation*ICT's coefficient indicates that 1 percentage point increase in 'Regulation' decreases the ICT related export output by 0.407, thus the relationship of the interaction term and the sector yields to a negative relationship between one another.

The hypothesis, according to which "Regulation is a significant determinant in driving SMEs' export performance in different sectors" turns out not to be supported since only 2 of the interaction terms showed significant results and 'Regulation' itself did not indicate a significant positive or negative relationship between it and the sectors without the interactions. Though the interactions indicate that the hypothesis cannot be fully rejected and requires further study of the relevant sectors where the interactions displayed significant results.

Hypothesis 3.

- H3: Internal factors, such as human capital and entrepreneurial perception, are relevant factors of sectoral export performance among SMEs in the EU.

As already explained, the hypothesis aims at evaluating Ours et al. (2016) research in measuring whether the effect of internal factors such as innovation and entrepreneurial factors are indeed relevant indicators to explain what drives the export growth of SMEs in different sectors. The hypothesis also considers the collective literature review of Beleska-Spasova (2014) in which most of the internal variables initially included in the EFA of this paper were narrowed down to incorporate them in some of the 5 retained factors.

First, it is necessary to identify the factors that have been obtained from the EFA earlier and that display internal effects with regard to their nature. From the EFA thus ‘Human capital’ and ‘Barriers’ have been identified as internal factors. ‘Barriers’, as already outlined, refers to the perception of barriers and not the protectionist measures that a country would deploy to influence trade within its borders.

Exports and the effect of human capital across sectors

	Agriculture	Manufacturing	Wholesale	Construction	Transportation	ICT
Regulation	0.088 [0.89]	0.088 [0.88]	0.087 [0.88]	0.086 [0.87]	0.081 [0.82]	0.090 [0.90]
HC*Agriculture	-0.030 [-0.63]					
HC*Manufacturing		-0.021 [-0.45]				
HC*Wholesale			0.010 [0.22]			
HC*Construction				0.033 [0.71]		
HC*Transportation					0.227*** [4.90]	
HC*ICT						-0.070 [-1.50]
Observations	750	750	750	750	750	750

Figure 14. Panel regression (Human capital)

Figure 14. displays the conducted panel regression with the first internal factor, namely ‘Human capital’.

From the main effects of Human capital on the individual sectors, none of the results are significant, meaning that to find whether there is any significance of ‘Human capital’ on the sectors, one has to look at the interaction terms. The value of 0.227 (p-value of < 0.01) for HC*Transportation suggests a statistically significant interaction effect between human capital and the transportation sector.

The positive coefficient indicates that the increase in human capital has a strong positive influence on the transportation sector's export performance but it is contingent on the sector itself. On average, each unit increase in human capital corresponds to a 0.227 unit rise in the transportation sector's export performance. The significance level of the coefficient, a p-value of <0.01, indicates that this interaction effect is unlikely to have occurred by coincidence. It demonstrates that the connection between human capital and transportation sector export performance is of statistical importance. As visible, there are no other interactions terms that would project a significant relationship between the sectoral export performance and Human capital.

Regarding the hypothesis' second factor, the following panel regression has been conducted:

Exports and the effect of Barriers across sectors						
	Agriculture	Manufacturing	Wholesale	Construction	Transportation	ICT
Barriers	-0.010 [-0.63]	-0.012 [-0.77]	-0.011 [-0.75]	-0.008 [-0.51]	-0.012 [-0.81]	-0.006 [-0.41]
Barriers*Agriculture	-0.001 [-0.04]					
Barriers*Manufacturing		0.012 [0.31]				
Barriers*Wholesale			0.009 [0.25]			
Barriers*Construction				-0.012 [-0.33]		
Barriers*Transportation					0.015 [0.40]	
Barriers*ICT						-0.022 [-0.59]
Observations	750	750	750	750	750	750

Figure 15. Panel regression (Barriers)

The second internal factor, that has been identified as relevant element to evaluate this hypothesis with, has not displayed any significance regarding its effect neither regarding its main effect to the sectors nor with the interaction terms. The regression output displays that all t-values (the ones in the parenthesis) are insignificant in explaining the sectoral export performance among the SMEs.

Hypothesis 4.

- H4: Competition and the degree of investment are positively affecting SMEs' export performance.

Contributing to the research direction of Maurel (2009), according to which business partnerships, innovation, as well as size and an effective export commitment are key determinants of export performance among French SMEs, this hypothesis also aims at evaluating the effect of similar elements.

As a result, the premise behind the hypothesis is that an increasing degree of competition and investment positively influence the sectoral export intensity of SMEs.

To evaluate this hypothesis, one has to go back and look at the EFA that has been conducted in the first part of the quantitative analysis. The two factors that shall be incorporated in the panel regressions are 'Competition' and 'Investment'. It is important to outline that the factor that has been identified as 'Investment' refers to the investment outflows and also includes royalty payments and license fees as payback for the investors that have invested in the growth of SMEs. 'Investment' and 'Competition' thus have been included based on the result of the EFA on the applicable factors.

Exports and the effect of Competition across sectors						
	Agriculture	Manufacturing	Wholesale	Construction	Transportation	ICT
Competition	-0.024* [-1.85]	-0.026** [-2.06]	-0.022* [-1.69]	-0.020 [-1.54]	-0.011 [-0.83]	-0.020 [-1.53]
Competition*Agriculture	0.021 [0.66]					
Competition*Manufacturing		0.037 [1.17]				
Competition*Wholesale			0.008 [0.26]			
Competition*Construction				-0.003 [-0.10]		
Competition*Transportation					-0.058* [-1.87]	
Competition*ICT						-0.004 [-0.13]
Observations	750	750	750	750	750	750

Figure 16. Panel regression (Competition)

As seen from the first factor's ('Competition') panel regression with the interaction effects included, the coefficients for 'Competition' on each sector show a negative impact. The significance level indicates that the negative link between competition and agricultural, as well as wholesale export output, are marginally significant at the 10% significance level. While that of the manufacturing sector turns out to be even more significant, meaning that the p-value is below 0.05. The coefficients of the remaining 3 sectors, namely construction, transportation, and ICT are not statistically significant ($p > 0.10$). This suggests that there is no significant relationship between competition and export performance in these sectors.

From the regression table, one can see that every percentage point increase in competition results in a 0.024 percentage point decrease in agricultural export performance. Furthermore, a 1 unit increase in

competition decreases the manufacturing export volume of SMEs by 0.026 percentage points, while a 1 percentage point increase in competition results in a 0.022 percentage point decrease in wholesale.

As indicated before, when paired with each unique sector, the interaction terms indicate the extra influence of 'Competition' on the sectors' export performance. The displayed panel regression, in this case, does not yield any significant results apart from the interaction effect on the transportation sector that displays a negative relationship on EP in that sector, thus 'Competition' does not display strong extra influence when paired with the sectoral factors because the only significant effect (Competition*transportation) is also only significant at 10% significance level.

Overall, the panel regression findings do not greatly support the premise that 'Competition' enhances SMEs' export performance. Instead, the data indicate a negative association between competition and export success in the majority of industries.

Taking the second relevant factor, namely 'Investment', the panel regression has displayed the following results:

Exports and the effect of Investment across sectors						
	Agriculture	Manufacturing	Wholesale	Construction	Transportation	ICT
Investment	-0.030** [-2.08]	-0.023 [-1.61]	-0.018 [-1.26]	-0.028* [-1.94]	-0.010 [-0.69]	-0.001 [-0.04]
Investment*Agriculture	0.069** [1.99]					
Investment*Manufacturing		0.029 [0.84]				
Investment*Wholesale			-0.001 [-0.02]			
Investment*Construction				0.058* [1.66]		
Investment*Transportation					-0.050 [-1.43]	
Investment*ICT						-0.105*** [-3.04]
Observations	750	750	750	750	750	750

Figure 17. Panel regression (Investment)

Having conducted the panel regression using 'Investment' as predictor, a very similar set of results are displayed, as in the previous panel regression output. The majority of the shown coefficients are negative, meaning the 'Investment' is mainly linked negatively to the sectoral export performance of SMEs. Although, as outlined before, the factor 'Investment' often refers to investment outflows and the payment of royalties and license fees, which, on the other hand, is associated with previous investment

inflows. From the regression table, the effect of 'Investment' on the agricultural sector appears to have the highest significance regarding the effect between one another.

The main effect of 'Investment' on agriculture is significant at 5%, just like the interaction effect of them. A similar negative relationship can be observed with the construction sector regarding the main effect, but the significance level is only at 10%. The interaction of Investment*Construction, on the other hand, displays a positive coefficient, meaning that a percentage point increase in 'Investment' results in a 0.058 percentage point increase in the construction sector's export output, contingent on the sector itself.

From the interaction effects, the most significant predictor turned out to be Investment*ICT, which is surprising considering that the main effect between ICT and 'Investment' is insignificant at all levels. This indicates that the combined influence of investment and the ICT industry has a statistically significant impact on the export performance of SMEs. This suggests that the link between investment and export performance in the ICT sector is reflected by their interaction rather than just by the main effects of investment and the ICT sector. Thus a 1 percentage point increase 'Investment' results in a 0.105 percentage point decrease in the ICT sectoral export volume, when merely taking their interaction into account.

After having established the effects of 'Competition' and 'Investment' on sectoral export performance, the evidence suggests that the hypothesis, according to which "Competition and the degree of investment are positively affecting SMEs export performance", cannot be supported due to the inverse effect that the two predictors have on sectoral export performance. But since a lot of predictors showed significant effects on sectoral EP, both of these predictors turn out to be significant determinant in driving EP amongst SMEs.

Hypothesis 5.

- H5: Based on the contingency theory, external factors are more significant in explaining SMEs' export performance than internal factors.

The hypothesis aims at providing with further proof to that of Chetty's (2000) and Thai's (2008) conclusions, according to which country specific, regulatory factors tend to show a greater importance in measuring the success of SMEs when it comes to exporting, as opposed to internal (firm-level) factors. By evaluating this hypothesis, the study will provide with a clearer answer as to which factors are more

relevant in smaller enterprises' export growth, contributing to the discussion, mentioned by Safari and Saleh (2020), as well as Beleska-Spasova (2014).

The evaluation of this hypothesis can be made by looking at the previous regressions where all identified factors from the EFA are included to measure their effects and significance.

Based on the results from the third hypothesis, the internal factors did not display significance in explaining a positive or negative relationship within the sectoral export of SMEs, while that of external factors, such as 'Regulation', along with mediating factors such as 'Investment' and 'Competition', have showed greater significance in searching relevant determinants.

The hypothesis, according to which external factors are more significant than internal ones when explaining EP among SMEs, is, thus supported by the evidence from the panel regressions and the result is in line with most previous studies.

Conclusion

The main objective of the thesis has been to contribute to the discussion of export performance determinants among SMEs. There have been various methods used across a wide range of studies, as a result of which I aimed at providing with a combination of the used methods.

Safari and Saleh (2020) have already pointed out the different methods that have been used by other scholars. Among the methods, the resource-based view and the contingency theory are the ones that have been used by the vast majority of the researchers (Beleska-Spasova, 2014). Following Beleska-Spasova's (2014) collective study about the most used variables and indicators measuring EP, I have conducted my analysis on the basis of its contingency theory part.

Regarding the main results of this paper, regulatory and investment related factors turned out to be more significant in explaining the export performance among EU-based SMEs, the result of which is also supported by Chetty's (2000) and Thai's (2008) findings. Internal factors, that focus more on the human capital and entrepreneurial capabilities of countries, have not turned out to show significant drivers.

Since the research has been based collectively on SMEs present in EU countries, further research could be made on what factors are vital for the increase of export performance among Micro (0-9 employees), Small (10-49), and Medium-sized (50-250) enterprises separately. Due to the limited number of observed countries, a more extensive research with greater number of countries could be conducted for

which the exploratory factor analysis could give a more reliable and consistent result that later can be included in a panel regression to observe the effects of the identified external and internal factors.

Finally, since the research has been based on country-level data, a firm-level data could further investigate the significant factors' effects on EP and evaluate the additional effects of the significant interaction terms from the paper's conducted panel regressions. A firm-level data along with the sectoral relevance could evaluate if the significant interaction terms of this study can be supported on the firm-level, too.

The implication of the conducted research has been aimed at providing with valuable insights for practitioners and policymakers. Policymakers of the individual member states can better understand the impact of the current policies within the country in measuring what factors are the ones that can be developed and paid attention to, to provide SMEs with a more suitable infrastructure for exports in terms of administration, and a more suitable environment for investments. EU policymakers, however, could make an even better use of the research by understanding which areas of trade and administration could be developed on a single market basis to foster export growth within member states with each other and outside the Economical Union.

Regarding the limitation of this study, a limited number of countries (25) and years (5) have been used, mainly because of the fundamentally limited number of EU members and the number of years due to the scarcity of data from years before and after the considered period (2014-2018). The exploratory factor analysis, therefore, sometimes resulted in inconsistent outcomes regarding some factors over different years. In order to really see the effect of the obtained factors, a greater number of countries can be collected to see how the variables cluster with the country-level data.

Finally, to answer the main research question of this paper 'What are the main determinants of export performance for EU-based SMEs?', the relevant determinants have turned out to be 'Regulation', 'Competition' and 'Investment' from the set of variables that have been collected from 5 different databases and that have been expressed in factors after having conducted an exploratory factor analysis.

The reliability of the used data comes from the fact that the data is derived from accepted and internationally reliable sources such as the World Bank and Eurostat. In the EFA analysis, all data sources have been analyzed independently for each year to preserve the integrity of the data.

Lastly, the distinctive results between external and internal variables and their effect on export performance among SMEs are in line with the literature and the findings of scholars that also researched the same phenomenon.

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Retained variables' sources:

Index name	Source	external/internal factors	variables
Ease of Doing Business	World Bank - https://archive.doingbusiness.org/en/rankings	external	<ul style="list-style-type: none">• Ease of doing business• Score Starting a business• Political environment• Political stability and absence• Government effectiveness• Regulatory environment• Regulatory quality

<p>Logistics Performance Index (LPI)</p>	<p>World Bank- https://lpi.worldbank.org/</p>	<p>external</p>	<ul style="list-style-type: none"> • Overall LPI score
<p>Global innovation index</p>	<p>Global innovation index - https://www.globalinnovationindex.org/Home</p>	<p>internal</p>	<ul style="list-style-type: none"> • Tertiary enrolment • Graduates in science and engineering • Infrastructure score • Information and communication technologies (ICTs) • ICT access • Government's online service • Ecological sustainability • Environmental performance • ISO 14001 environmental certificates • Knowledge absorption • Royalties and license fees payments (% of total trade) • Foreign direct investment net outflows • Creative outputs • ICTs and organizational model creation • Creative goods and services

<p>Indicators of entrepreneurial determinants</p>	<p>Global Entrepreneurial Monitor - https://www.oecd.org/sdd/business-stats/indicatorsofentrepreneurialdeterminants.htm</p>	<p>internal</p>	<ul style="list-style-type: none"> • Perceived Entrepreneurial Capabilities • Fear of Failure Rate as Entrepreneur • Entrepreneurial Intentions • Entrepreneurial Employee Activity • Motivational Index • High Job Creation Expectation • Innovation
<p>World Development Indicators</p>	<p>World Bank - https://databank.worldbank.org/source/world-development-indicators</p>	<p>Internal/external</p>	<ul style="list-style-type: none"> • Patent applications residents • Research and development expenditure • Researchers in R&D per million • Market sophistication • Investment • Ease of protecting investors • Trade and competition • Business sophistication