Research Article

Small And Medium-Sized Enterprises' Status in The Perspectives of Internationalization, Globalization and Artificial Intelligence

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Abstract

This paper analyses and presents the transition of SMEs in global prospects, taking into account the processes, impact and influence of internalization, globalization and artificial intelligence. The research was done by examining how SMEs' Internalization and Globalization could have such an impact on their integration into the international market, economic growth, international environment, and how internationalization is important for them. In SMEs, many technological and digital processes and innovations such as artificial intelligence have emerged and are considered more by SMEs compared to large companies. The methodology of research focused on a literature review, the use of the VOSviewer method to analyze which terms are important for the regional and international environments and to find out if there are links between authors dealing with the concept of globalization and internationalization for SMEs. Moreover, the impact of internationalization and globalization is illustrated in a case study of an unlisted Italian company. The case study answered the research question about how internalization may affect companies' economic performance. The paper shows that SMEs, for their part may also derive benefits and profitability from the degree of internationalization and globalization processes, as demonstrated and illustrated in the Italian case study that mentioned that the degree of internationalization has a positive relationship with profitability. Moreover, the use of AI in SMEs is still in its first stages and perspectives. The conclusions show that internationalization and globalization enable SMEs to improve their capabilities, their production levels, transition their innovation processes, and thus their competitiveness.

Keywords: SMEs, business, globalization and internationalization, profitability, international market, artificial intelligence.

JEL classification : F63, L25, L26, C40, C41

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Introduction

The development of the system of world economic relations is carried out within the framework of a process that includes internationalization. In subsequent years, this system acquired a new qualitative state and turned into a global one. Generally, Internationalization can be characterized as the process of moving the standard reproduction cycle beyond local boundaries. Both globalization and internationalization can sometimes be confused or considered the same. However, as Herman (1999) argues, there is a difference between them.

Internationalization means the growing importance of international trade, international relations, and so on. International of course means between nations, but despite the fact that relations between nations are becoming more important and necessary, the nation remains the basic unit (Herman, 1999). In contrast, globalization refers to the global economic integration of national economies into one global economy. Among the instruments that facilitate this integration can be included, for example, free trade and the free movement of capital or such easy and often uncontrollable migrations (Herman, 1999).

Larsson (2001) states that globalization "is the process of world shrinkage, of distances getting shorter, things moving closer. It pertains to the increasing ease with which somebody on one side of the world can interact to mutual benefit, with somebody on the other side of the world."

It is thus evident that these two concepts are indeed different and each means something different. The aim of this paper is to find out how exactly these two concepts are related and how they affect SMEs.

The VOSviewer software is used to analyse the terms of globalization and internationalization and a map of common concepts is constructed as well as a map of co-authors. For the analysis by VOSviewer, we used a document that contains one

thousand articles from the Web of Science database. These articles (their titles and abstracts) are analysed by the software and the maps are created. The literature search and comparison of concepts includes a historical method and a content analysis of the scientific literature to answer the research question.

To achieve and reach a degree of success in business by SMEs, planning plays a conducting role starting from identifying the goals to conducting strategies. Moreover, Companies use business plan despite their scale or size in particular in the field of development.

In the economic sector but a relevant business plan, successful relevant marketing, digitalization and leadership act on the SMEs or companies' performance by identifying either them in the regional or international market.

Indeed, the progress and appearance of SMEs made many technological processes and innovations come out compared to large companies and enterprises that attempt to improve old products to increase the quantity and profit for better economic growth.

Literature Review

Both concepts of globalization and internationalization can be encountered in many fields from education to economics to business. Globalization can be seen as a major trend in the development of the world economy since the 1990s (Wang & Luo, 2008). Wang & Luo (2008) focus on small and medium-sized enterprises in Zhejiang and analyse the constraining factory internationalization of SMEs in this province. According to these authors, it is essential that the strength of internationalization operations should be increased, and entrepreneurs should develop global ideas (Wang & Luo, 2008).

When the keywords globalization and internationalization are entered into the Web of Science database and the search is limited to the literature related to

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management, business, and entrepreneurship, more than a thousand scholarly articles, studies and so on can be found. A file containing one thousand scholarly publications was used for analysis using VOSviewer software.

The phenomenon of Globalization and SMEs

Globalization is the phenomenon of increasing importance due to multiple factors, such as the reduction of trade and investment barriers, competition from foreign companies, and the availability of raw materials (Knight, 2000). It represents one of the major challenges that SMEs have to face in the current economic context, in terms of production (Lee *et al.*, 2013), innovation (Narula, 2004) and the development of new strategies (Singh *et al.*, 2008).

One of the most complex aspects that SMEs have to face in order to reap the benefits of globalization and be able to be competitive is the definition of an adequate business model.

In this regard, the literature has developed three fundamental lines of research for understanding and interpreting the globalization strategies of SMEs: the definition of business models centred on the enterprise; the analysis of environmental factors; the analysis of the firm's characteristics.

Internationalization and SMEs

Among the influences that affect the internationalization process, innovation can be included. Kosała (2015) states that the natural consequence of innovation processes is the penetration of foreign markets. It is therefore the internationalization of the firm. Through this process there are other changes that are required by business in new conditions. It could even be argued that internationalization is one of the types of innovations that are implemented at a certain stage of innovation processes to act as stimulators of the internationalization process of the firm's organizational

development (Kosała, 2015).

The use of digital technologies can also help SMEs with the internationalization process. This presents new opportunities for SMEs to expand and succeed in foreign markets (Hervé, Schmitt & Baldegger, 2020). According to Hervé et all (2020), it is also one of the necessities for managers to rethink their strategies due to the convergence of globalization and digitalization. It is evident that the faster a company understands the benefits that the use of digital technology brings, the faster it can evaluate its decision-making processes. This in turn will help to increase the speed of internationalization (Neubert, 2018).

Environmental factors

As regards environmental factors, according to Zeibote, Volkova and Todorov (2019), the possibility of developing a competitive advantage at the regional level also depends on the specific local context and its ability to attract other firms. The factors that most affect local development are the state's ability to create goods and services for export and to compete with other states on the international market, as well as the ability to create a favourable environment for businesses to create added value. Furthermore, the impact of globalization depends on the stage of development of the country. Generally, firms operating in countries at a less developed stage are less competitive on global markets and therefore globalization has a stronger impact on them. On the contrary, in countries with a more advanced level of development, companies are able to compete better on international markets and therefore the impact of globalization is less strong.

There are also other policies that can favour the globalization of SMEs, especially in developing countries, such as the promotion of links with markets, through the provision of export intelligence services; support for training and the creation of specialized centers, to facilitate the growth of the human resources of firms; investment support through long-term credit (Humphrey, 2003).

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The region can also play an important role for SMEs innovation activities. In fact, it must be considered that SMEs typically have fewer resources, less R&D and greater uncertainties, and encounter greater barriers to innovation. Furthermore, SMEs generally have little links to science and technology and for all these reasons the region can help enhance the innovative capacity of SMEs through their integration into networks and innovation systems (Tödtling & Kaufmann, 2001).

Firm's characteristics

As for the individual characteristics of companies, the most relevant factors are product differentiation, the use of new production technologies and the creation of innovative distribution systems. However, not all SMEs want or are able to compete globally. In fact, some do not need to expand on international markets as they operate in sufficiently protected markets. Other firms, on the other hand, refuse to adapt to the new international context and by doing so they risk not surviving and can also weaken the competitiveness of the regions in which they are present on a large scale (Julien, Joyal & Deshaies, 1994).

In addition to these factors, there are further subjective characteristics of SMEs that affect their propensity for globalization. An important distinction exists between reactive and proactive SMEs. The former follow changes while the latter seek to develop innovative solutions that bring about change. In other cases, small businesses, due to their limited resources, begin by seeking support in their network, especially to penetrate foreign markets, and thus develop new forms of organization and new governance structures (Nummela, 2004).

Many SMEs carry out their international activity within regional markets thanks to free trade policies that have generated real intra-regional integrated markets. Alongside these firms there are others that still refuse to develop beyond regional borders because they believe that operating in unfamiliar markets implies the need to address a bigger resources gap. In turn, the existence of different types of SMEs and

entrepreneurship within a country helps to explain both financial and export performances of companies and those of the country in which they operate, in terms of national economic growth (Liñán, Paul, & Fayolle, 2020).

In this sense, SMEs can play an important role in the growth of countries through their global development strategies. According to Singh, Garg and Deshmukh (2009), in China and India the major challenges that SMEs have to face concern the creation of quality products, cost reduction and technological renewal, in addition to the gaps due to the lack of product design and development capabilities. In this context, it is essential that governments continue to provide and develop efficient and quality administrative and legal structures.

In this regard, however, some of the literature also suggests that investments in knowledge alone are not sufficient to guarantee innovation in SMEs and economic growth because there is a filter of knowledge that prevents its automatic diffusion. In fact, it is above all the entrepreneurship that allows the dissemination of knowledge from the organization in which this knowledge is created to other organizations that transform it into innovation. Therefore, when the comparative advantage is knowledge, entrepreneurial activity plays a decisive role for growth and innovation (Audretsch, Grilo & Thurik, 2011).

The importance and impact of SMEs in the world of globalization

Thanks to SMEs many technological processes and innovations came out compared to large companies and enterprises that attempt to improve old products to increase the quantity and profit for better economic growth.

Invention and creativity by SMEs have been so far a key to production ability and more than that to the economic satisfaction to provide at least more employment opportunities.

The contribution of SMEs to the global economy and market starts from the fact

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they should adapt faster to the transition and needs of the market. So, in other words, they are classified as an important economic category.

SMEs in the EU according to the European Commission recommendation of May 6th, 2003 have up to 250 persons employed (European commission, Eurostat 2022) with an annual gross revenue of Euro 50 million compared to Canada and the USA that consider SMEs to be with up to 500 persons employed SBA and statistics Canada 2022) and with an annual turnover and gross revenue of $50 million (See figure 1).
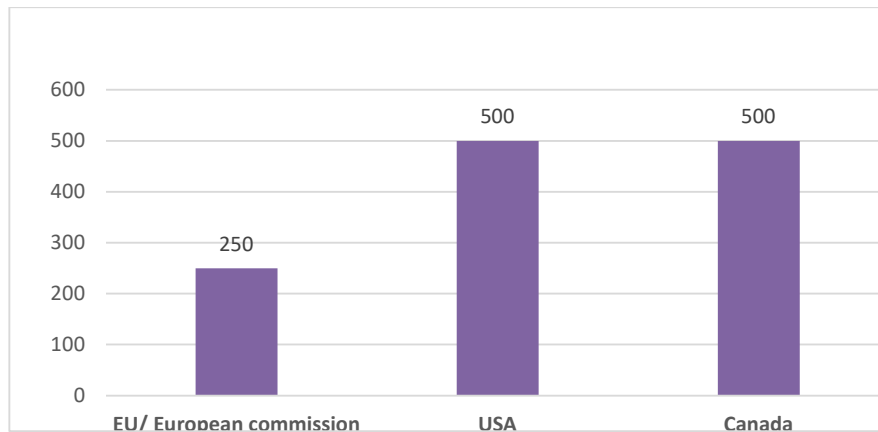
Figure 1: Max number of employees (persons employed) in SMEs

Source: Authors' contribution, Recommendation of the European commission, SBA, statistics Canada 2022

Business models and SMEs

With regard to the definition of business models suitable for an international development context, we can identify two lines of significant studies, one more focused on e-business and the other aimed at defining models of wider application.

According to Raymond (2003), from a business intelligence perspective, e-business, together with information technologies and information systems, are sources of added value and vectors of competitiveness.

Jeon, Han and Lee (2006) highlight how the Internet boom has greatly influenced the way of doing business and has created the right conditions for the development of e-business models, intended as online activities for the exchange of goods and services both business-to-business (B2B), and business-to-consumer (B2C). The factors that affect the adoption of an e-business model are the characteristics of the CEO, the characteristics of the e-business, the organizational characteristics and the environmental characteristics.

According to Kshetri (2007), in developing countries, in order to be truly competitive, firms must be able to simultaneously develop and manage multiple e-business models, group multiple products and services and outsource business functions.

However, although small businesses are aware of the many opportunities of e-business they are not always as aware of the risks that this business model entails (Bob & Clare, 2000).

Furthermore, as pointed out by Raymond, Bergeron and Blili (2005), investments in e-business are not alone capable of ensuring better performance, but it is necessary that they are consistent with the competitive environment in which the SMESs are inserted, with their strategic goals and with the production processes.

It should also be noted that not all business activities lend themselves to being managed

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as e-business and this model is especially suitable for the online marketing phase, while the production organization is only partially involved.

More general business models, also applicable to types of firms other than e-business, have been analysed in the literature since the early 2000s, with a focus on the decomposition of strategy into a system of relationships and interconnected decisions (Onetti *et al.*, 2012).

As a result of globalization, small and medium-sized enterprises can adopt relocation strategies through which to transfer activities, people and knowledge among territorial systems. These strategies can be of two types, selective and replicative. In the first case, the firms choose to relocate the business activities and functions that are able to ensure a stable competitive advantage, while in the second case, the firms transfer all their activities, especially in the markets where the demand allows an expansion of the production capacity (Biggiero, 2006).

Furthermore, the globalization processes SMEs can be based on specific marketing strategies (Chen & Huang, 2004), on the use of Information Technology (Nieto & Fernández, 2005) or on the exploitation of lower costs and better credit information in other markets (Ayyagari, Beck & Demirguc-Kunt, 2007).

Besides the fact that globalization strategies are multiple and closely linked to the type of activity carried out, companies must compare the advantages of international development with the opportunities offered by regional growth. Thus, it is not enough to consider only the business models but it is also necessary to adequately take into account the environmental factors and the firm's characteristics.

Artificial Intelligence importance for SMEs transition

The use of artificial intelligence is currently experiencing a peak. Artificial intelligence technologies are being used in science as well as in business, are the subject of many

new films and newspapers are constantly reporting on new developments. In this context, the term artificial intelligence is not so clearly defined and is context-dependent. A concise proposal for a definition was made by the European Commission in 2018: "AI refers to systems that display intelligent behaviour by analysing their environment and taking action – with some degree of autonomy – to achieve specific goals." The definition shows that this is about more than just programming "stupid" algorithms. The essential thing here is dealing with new situations and the associated problem solving.

Artificial intelligence provides a wide variety of technologies, such as chatbots, translation software, autonomous driving or image classification. They can be used to optimize products or services, processes and other areas in the company, for example to optimize the business performance. AI will therefore be a game changer in the corporate world and generate extra value in the firm (Wamba-Taguimdje *et. al.* 2020; Gentsch 2019; Plastino & Purdy 2018; Chamoni & Gluchowski 2017). In the meantime, a number of papers have been published that examine the drivers of business performance using Artificial intelligence (Reis *et. al.* 2020; Mishra & Pani 2020; Lui *et. al.* 2022). In the business sector, too, a lot has happened with regard to the use of artificial intelligence. Machine learning algorithms have become progressively common on the stock exchange and in banks in recent years. They are used, for example, to examine stock market prices or to recognize fraud (e.g. Han & Kim 2021; Bao *et. al.* 2022).

Many different methods and algorithms are now being used in the field of artificial intelligence or predictive analytics such as neural networks, support vector machines, decision trees and decision forests, naïve bayes, linear and logistic regression, cluster analysis, k-means, AdaBoost. k-nearest neighbor classification (e.g. Chamoni & Gluchowski 2017; Athey & Imbens 2019; Wu *et. al.* 2008). At the present time, however, it can still be stated that AI is still in its infancy and that there is a lot of potential for development (Di Vaio *et. al.* 2020). In the European Union a survey

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amongst companies shows, that only 7% of the enterprises in the EU with at least 10 employees used AI applications. Figure 2 shows algorithms used by SMEs in the European Union.
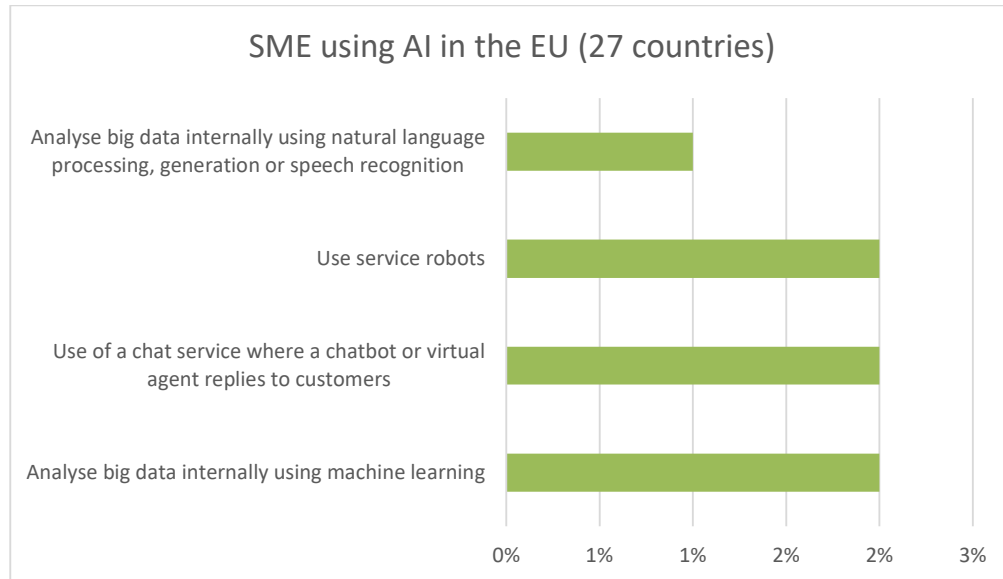
Figure 2: SMEs using AI in the EU (27 countries)
Source: Authors' Own contribution, Eurostat 2020

In relation to the digitalization currently taking place and with a focus on small and medium-sized enterprises, there is enormous potential for growth and improvement in connection with artificial intelligence (both in terms of new business models and in improving the situation for customers and entrepreneurs). A massive increase in data volume is expected, which can be processed with artificial intelligence methods (European Parliament, 2020). Nevertheless, there are many hurdles in implementing AI in SMEs, such as lack of qualified personnel, costs, knowledge deficits in this area, lack of regulations, technical aspects etc. (Prem, 2019). Here it is an advantage that entrepreneurial interest groups as well as educational institutions prepare the knowledge of AI and make it available in the form of processes and tools for companies, thus creating a knowledge platform for mediation and application for companies (e.g. Schuh et. al., 2019).

Another topic is the implementation of AI-systems in companies. Joerg and Carlos (2022) published a design framework for the implementation of AI-based (service) business models for small and medium-sized manufacturing enterprises. In general, it can be said that SMEs are not averse to the use of AI and even show a strong interest in it, while at the same time facing internal and external pressures from the implementation side that are hindering its adoption (Wang et. al. 2022). In times of digital transformation and globalization, another topic plays a central role, namely cyber security. Here, too, there is already research from Kant & Johannsen (2022) or Meda & Jahankhani (2022) using AI to increase cyber security in SMEs.

Despite the many possible applications and the implementation models and frameworks that have been developed, cultural differences between countries must also be taken into account in the transformation that is taking place in the context of internationalization and

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digitalization. A survey among German SMEs by Ulrich & Frank (2021) on the topic of the use of AI technologies shows, for example, that the companies tend to prefer traditional technologies and rule-based systems and see the lack of employee qualifications as one of the biggest implementation hurdles of such new technologies.

Artificial intelligence and SMEs' business environment

Small and medium-sized enterprises are linked directly to their business environment compared to large firms. The small and medium-sized environment is made of institutions and regulatory frameworks, market conditions, infrastructures, and market relationships (see figure 3).

The infrastructure of SMEs facilitates their access to markets and strategic resources. Since SMEs are vulnerable to market conditions, and administrative and economic aspects, the production factors are considered keys to their competitiveness. (Berryhill *et al.*, 2019)
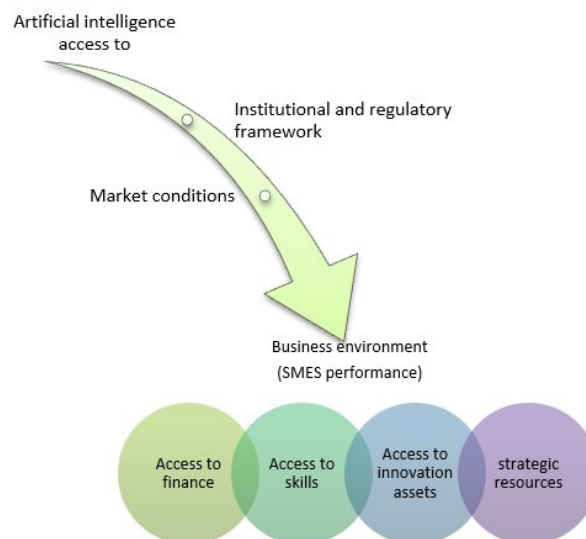
Figure 3: Artificial intelligence and SMES' business environment
*Source: Authors' contribution, OECD 2020*

Co-authors and visualization of terms connected to globalization and internationalization

In this section, the concepts of globalization and internationalization are explored using a software tool for creating bibliographic maps. For this purpose, a text file containing one thousand documents dealing with globalization and internationalization was retrieved from the Web of Science database.

In the first part, a bibliographic map was created showing concepts that are common to both globalization and internationalization. The criteria chosen in VOSviewer identified that the search terms should appear at least ten times in the publications´ titles and abstracts. The program found that out of 17,994 terms, 652 terms matched this criterion. Subsequently, the program selected 60% of the most relevant terms. Figure 4 therefore shows a map consisting of 391 terms

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common   to   globalization   and   internationalization.
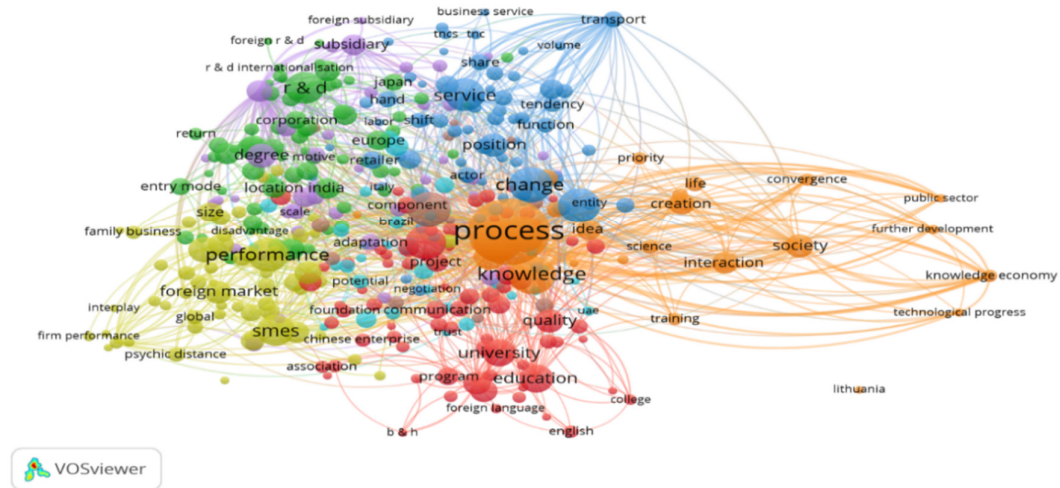
Figure 4: Common concepts for globalization and internationalization
Source: own elaboration using VOSviewer software

As mentioned, the map shows a total of 391 concepts. These concepts are divided into eight clusters, the total number of all links is 25,664 and the total strength of all links is 144,391. Some of the most important concepts are process, change, performance, R&D, foreign market, service, mix, etc. Some of these terms have already been mentioned above. The term 'process' occurs a total of seven hundred and twenty-three times in the documents examined, has 376 links and the total strength of the links is 15 362. It should also be noted that the term 'process' is linked to all the above terms that appear in the map. It can also be said that the closer terms are together, the stronger is their connection in the researched field. On this basis, it can be said that terms like change, idea and knowledge are one of the most relative to process in this field of research. Closer view to this connection can be seen in figure 5.
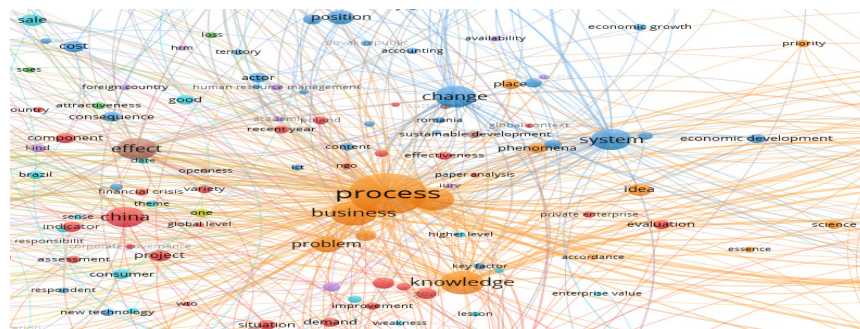

Figure 5: Term Process and its closest terms
Source: Authors' contribution using VOSviewer software

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The strongest relation is between the terms' process and knowledge (The strength link is 697). The second strongest connection for term process is the connection with business (The strength link is 400) and for the connection between the process and change, there is a link strength of 338. Finally can be mentioned the connection between process and idea with strength link 177.

Subsequently, a map of co-authors was created using the software. Criteria were given to ignore documents that had more than ten authors, and a requirement was given that each author had at least one document. According to these criteria, a map was created that shows 13 interconnected authors. This map can be seen in Figure 6.
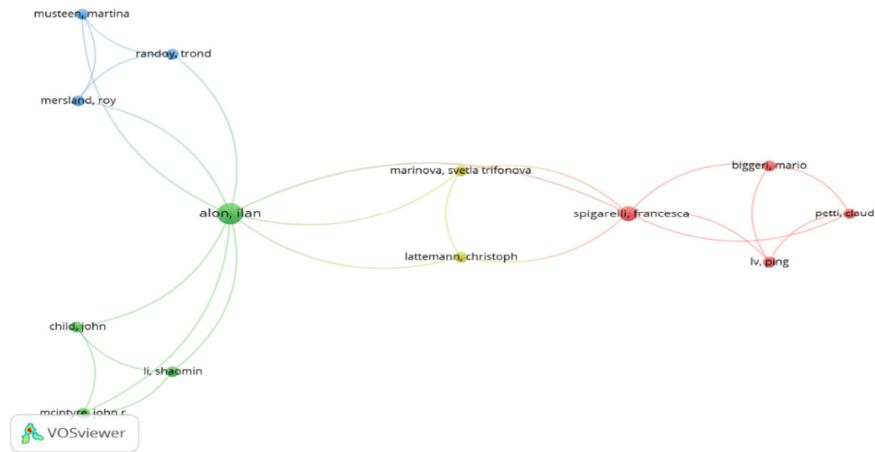
Figure 6: Map of co-authors
Source: Author's contribution using VOSviewer software

The authors are divided into four clusters and there are 24 connections between them in total. Alon could be considered the main one, with a total of nine connections on the map. For example, Alon deals with corruption in international trade, where he concludes a recommendation about the fact that strong international laws need to be put in place, in order to minimize the negative effects of corruption on international trade. Also, international business plays an important role where managers need to take corruption into account during the formulation of corporate organizational structure and strategy development and last but not least, there should be an anti-corruption architecture system in firms (Bahoo, Alon & Paltrinieri, 2020). Alon & Higgins (2005) looks at global leadership, which they view from the perspective of emotional and cultural intelligence. They assume that emotional intelligence (EQ), analytical intelligence (IQ) and leadership behaviour are moderated by cultural intelligence (CQ) during the formulation of

successful global leadership.

A case of a non-listed Italian medium-sized company

The business case we present in this section concerns a non-listed Italian company operating in the textile sector for decades. We consider the company as medium-sized on the basis of the quantitative parameters established by the European Commission Recommendation of 6 May 2003. Companies with less than 250 employees and an annual turnover not exceeding 50 million Euros or with total assets bellow 43 million Euros are medium-sized enterprises. The analysis considers the international development of the company in the period 2015-2021.

Methodology

For the case study we formulated the following research question:

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How does the internationalization of the company affect its economic performance?

To answer the research question, we measured the international development of the company, which we will call Alfa, it is measured by considering the financial statement items "sales revenues", "foreign sales revenues" and "operating income", according to the definitions of the Italian civil code.

The operating income used here differs from EBITDA as it also considers depreciation and amortization. The purpose of the survey is to assess whether there is a correlation between the international development of the company and its profitability.

For this purpose, the degree of internationalization is measured by foreign revenues to total revenues (Riahi-Belkaoui, 1998), as follow:

$Id = Fr/Tr$
        where,
        Id = internationalization degree,
        Fr = Foreign revenues, and
        Tr = Total revenues.

Profitability is measured by operating income calculated as

$OI = EBITDA – D – A$
        where
        OI = operating income,
        D = depreciation, and
        A = amortization.

To measure the relationships between the degree of internationalization and profitability, a correlation analysis is carried out based on the Pearson correlation coefficient, in which the independent variable is Id and the dependent variable OI.

Selected company and analysis period

The selected company is established in Italy and operates on international markets through exports, while production is entirely located in Italy.

The data necessary for the analysis were drawn both from the Aida Bureau van Dijk database and from documentation collected at the company.

The analysis period runs from 2015 to 2021. In this regard, we believe that a period of 7 years can be considered significant to capture the recent trend. Furthermore, it is important to underline that we have deliberately included the years 2020 and 2021, heavily damaged by the COVID-19 pandemic, to verify whether negative events of exceptional magnitude are able to change the relationship between Id and OI.

In particular, we calculated the Pearson index for three different time intervals:

- entire period: 2015-2021;
- pre-pandemic years: 2015-2019;
- years of the pandemic: 2020-2021.

Table 1 presents the main income statement data for the 2015-2021 period.

Table 1. Alfa income statements 2015-2021 (values in Euro)

	2015	2016	2017	2018	2019	2020	2021
Sales revenues	52,809,629	47,719,168	49,239,338	48,975,899	44,704,910	28,112,251	36,831,499
Other revenues	297,581	1,824,040	107,235	110,686	1,435,299	211,691	71,099
Operating costs	-53,627,473	-50,181,722	-49,718,710	-49,200,879	-46,182,155	-30,386,936	-37,934,083
Operating income	520,263	(638,514)	(372.137)	(114,294)	(41,946)	-2,062,994	-1,031,485

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Empirical Results

Table 2 presents the Pearson correlation between the independent variable (Id) and the dependent variable (OI) for the three intervals into which we have divided the analysis.

Table 2 Correlation analysis

Period	Pearson index
2015-2021	0,214
2015-2019	-0,086
2020-2021	-1

Results

The results shown in Table 2 show two significant circumstances. First of all, considered in the long term, the degree of internationalization has been a positive relationship with profitability. Although not particularly strong, this relationship nonetheless demonstrates that the company examined has benefited from internationalization. The relationship in the period 2015-2019 is weakly negative, while it becomes most negative in the years of the pandemic. The latter circumstance can be interpreted as a signal that in exceptionally negative market conditions, the international push can have negative effects on profitability.

In the case of the COVID-19 pandemic, this result may have been determined by the fact that the desire to maintain the positions reached on foreign markets, despite the difficulties of transport and communications, may have led to the incurring of higher costs than the benefits obtained, implying a worsening of profitability.

This result is in line with Lu and Beamish (2006) according to which export-based SMEs international expansion strategies, while having a positive impact on growth, can have a negative impact on profitability.

Conclusions

The conclusions show that Globalization has made it easy for SMEs. In other words, it increases their ability, production level, their processes of innovation and for sure their competitiveness since they contribute with a required annual turnover to the market and economic growth. This leads as well to the conclusion that measures to build knowledge in Artificial Intelligence must take place both at the societal level and at the company level in order to make SMEs fit for the future and to remain competitive.

SMEs can be considered as one of the best ways to understand business and find creative solutions that may be supported by national and world organizations and associations following the international norms and requirement and competitiveness.

The paper has identified as well that in the long term, the degree of internationalization has a positive relationship with profitability. However, the study also showed that in exceptionally bad conditions, such as the pandemic caused by COVID-19, internalization is not enough to counteract the reduction in profitability.

To sum up, the fact that SMEs should adapt faster to the transition and needs of the market may boost their contribution and make it easier and in the global economy and market starts from. So, in other, words that's why they are classified as an important economic category and such and innovative system according to their social and economic benefits.

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