

# **Relationship between Innovation & Technology and Internationalization: Cluster Analysis in Europe and Central Asia**

## **Introduction**

The fundamental change in the global business landscape and the dynamic nature of customer needs have led companies to develop new strategies and change existing ones in order to remain active in the national and international business competition increasingly based on innovation and technology (Donbesuur et al., 2020; Freeman & Soete, 2007).

Although innovation, technologies and internationalization have been presented as key factors in the literature, their possible relationships have not been extensively studied (Donbesuur et al., 2020; Lecerf & Omrani, 2020; Vrontis & Christofi, 2019).

In this sense, this study aims to analyze how companies in Europe and Central Asia group in clusters according to the relationship between Innovation & Technology and the Internationalization of companies.

To achieve the proposed objective, the statistical cluster analysis technique was applied, using SPSS, to a sample of 30 economies in Europe and Central Asia extracted from The World Bank – Enterprise Surveys database.

## **Literature Review**

Rapidly changing global business scenarios and the dynamic nature of consumer needs lead businesses to develop new strategies and change existing ones to remain relevant and competitive in domestic and foreign markets (Donbesuur et al., 2020). Thus, competitiveness is increasingly based on Innovation & Technology (Freeman & Soete, 2007). Companies need to develop new technologies or license innovative technologies for more efficient and less costly production (Castellani & Zanfei, 2007; Mansfield, 1968). Through Innovation & Technology it is possible for companies to introduce new products and processes becoming more competitive in the markets in which they operate (Castellani & Zanfei, 2007; Mansfield, 1968). In this way, international competitiveness is catapulted on the one hand by information technologies that allow greater adaptability to the environment and improve the flow of information and on the other hand by innovation both technological and organizational (Kroh et al., 2018; Lecerf & Omrani, 2020).

Internationalization is a very important process that sustains: (1) innovative activities; and (2) the technological dynamism of companies; (3) affects the return of innovation; (4) allows access to a greater flow of ideas from external sources;

and (5) enables learning with different contexts of innovation (Criscuolo et al., 2005; Filippetti et al., 2011; Filippov, 2011; Kyläheiko et al., 2011; Nosi et al., 2017; Wagner, 2006). In this sense, companies that internationalize have a higher probability of greater innovation performance and their resources, products and institutions are exposed to alternative contexts of innovation enabling learning in different environments (Filippetti et al., 2011; Kafouros et al., 2008). In addition, internationalization puts the company in a broader competitive environment leading it to innovate (Filippetti et al., 2011).

Finally, through the literature review, it is possible to see that some authors suggest that Innovation & Technology is a precondition for Internationalization, while other authors suggest that Internationalization leads to Innovation & Technology (Filippov, 2011; Lecerf & Omrani, 2020).

## **Methodology**

With regard to the methodology, the investigation was divided on: (1) literature review; (2) data collection; (3) treatment, analysis and study of data.

The literature review was based on the research and analysis of articles on the Web of Knowledge and its serialization was made according to the number of citations. This stage proved to be important not only for the elaboration of the conceptual model of research and understanding of the object of study in terms of literature, but also for the foundation and choice of variables that best defined Innovation & Technology and Internationalization.

As for the research data, they were extracted from the Enterprise Surveys – The World Bank database. The sampling methodology leading to business research is based on stratified random sampling, i.e., all stocks are grouped homogeneously, and simple random samples are selected within each homogeneous group. For the foregoing, the sample resulted in a group of 30 economies in Europe and Central Asia.

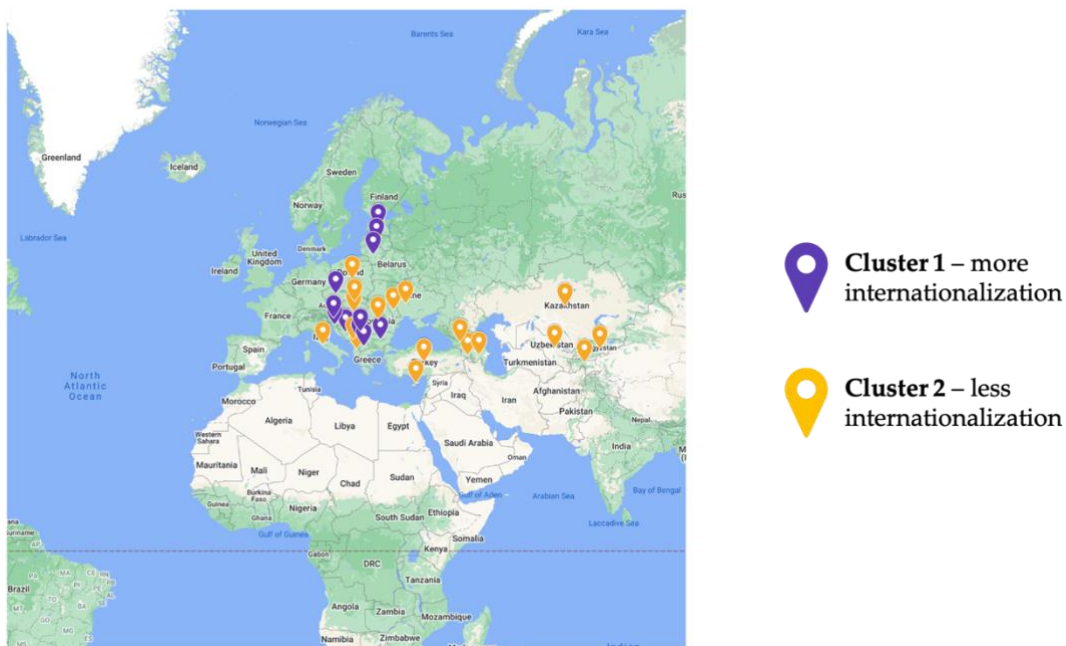
The treatment, analysis and study of data were carried out through Cluster Analysis, in the SPSS software, where economies were grouped into clusters according to Innovation & Technology and Internationalization.

## **Results**

From the analysis of clusters according to Innovation & Technology, 2 clusters result. It is concluded that in cluster 1 there are economies with a percentage of companies that use licensed technology coming from foreign companies above the global average. On the other hand, there are economies in which the percentages of companies with their own website; introducing new products/services; introducing new products/services also new to the main market; introducing innovation processes; and ultimately invest/spend on R&D below the global average. As for cluster 2, the opposite is true. So, it can be

concluded that the economies of cluster 2 are characterized by greater innovation and technology than cluster 1.

From the analysis of clusters according to Internationalization, 2 clusters also result. It is concluded that in cluster 1 there are economies whose average of the variables associated with internationalization are above the global average. On the other hand, in cluster 2 are the economies whose averages are below the global average. So, it can be concluded that cluster 1 is more internationalized than cluster 2.



**Figure 1:** Geographical representation of clusters

As it is possible to check through the Figure 1, the constituent economies of cluster 1 are more internationalized and are found in Europe, while the constituent economies of cluster 2 that are less internationalized are distributed among the 2 regions (Europe and Central Asia).

## **Conclusion and Implications**

Business competition is increasingly based on innovation (Freeman & Soete, 2007) and the literature on innovation suggests that technological and organizational innovation individually boosts the company's performance (Damanpour & Aravind, 2012), including international performance (Donbesuur et al., 2020).

From cluster analysis we can conclude that the approach according to Innovation & Technology result in 2 clusters, cluster 1 being characterized by less innovation and technology than cluster 2.

In the approach according to internationalization, there are also 2 clusters, and cluster 1 is characterized by greater internationalization than cluster 2.

It should be noted that the economies with the greatest internationalization are found in Europe while the less internationalized ones are spread across Europe and Central Asia.

Comparing the constitution of clusters in both approaches it is concluded that with the exception of 7 economies, the economies with greater Innovation & Technology are the economies with the highest Internationalization as well.

These lessons are found according to Pittiglio et al. (2009) and Filippetti et al. (2011) who argue that international companies are more innovative because they can have access to a greater flow of ideas from external sources (Pittiglio et al., 2009), but also that innovative companies are more successful in competing internationally and exposure to alternative business contexts leads to innovation (Filippetti et al., 2011).

This study presents as an implication a better understanding of the relationship between Innovation & Technology and Internationalization in terms of clusters. As a result of this investigation, it is important to look for explanatory factors for the distribution of clusters according to internationalization and try to understand why it is in Europe that the most internationalized economies are found.

As a limitation of the study, not only is the restriction to Europe and Central Asia, but also to The World Bank - Enterprise Surveys database.

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