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DISRUPTIVE INNOVATION AND DIGITAL TECHNOLOGIES IN THE CONTEXT OF BUSINESS PERFORMANCE

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Abstract:
The way in which business organisations conduct their activities has changed significantly in recent years, largely influenced by technological progress, digital abundance and the reshaping of the business environment as a whole. The challenges of the new business environment, which is increasingly difficult to define and characterise, are driving managers to include in their business strategies those resources, tools or technologies that can improve efficiency in the process of leveraging the advantages/assets they hold, that can increase competitiveness and enhance performance. Inevitably, a successful business model is associated with a successful management that influences the direction of an economic entity in the process of consolidating its market position and increasing its innovative activity. For this reason, in the current language of business decision-makers we find terms such as innovation, disruption, digital technologies that are increasingly associated with performance and competitiveness. The pragmatic vision of managers and the innovative organisational philosophy are undoubtedly a driver of disruptive business change. At the same time, entrepreneurial attitudes and corporate innovation are a catalyst in strengthening competitive advantage and, at the same time, organisational performance.

Keywords: innovation, disruption, technologies, performance, competitive advantage

JEL classification: M15, M19, O32

INTRODUCTION

Innovation is an important component in the long-term economic development of business organizations in the information society, i.e. the digital economy. Equally, technologies, especially information/digital technologies have strengthened their position in the sustainable progress of economic entities and beyond. These two elements join the pile of other factors influencing the behavior, i.e. the way an economic entity performs in order to achieve a certain level of performance.

The aim of this paper is to analyze the impact of disruptive innovations, i.e. digital technologies, on the activities of business organizations in the digital economy in order to improve their competitiveness in the market and at the same time increase their performance. As a subsidiary, we propose the following objectives:

O1. To explore how digital technologies are embedded in the activities of business organizations in the digital economy.

O2. To systematically analyze the role of innovative processes on the competitiveness of business organizations, i.e. how innovation can improve their performance

O3. To assess how disruptive innovations and digital technologies shape new business models.

The strategy behind the research was a literature review in areas related to the topic to determine the state of knowledge on the proposed topic. Therefore, we considered appropriate a bibliometric analysis, using the Web of Science database and the VOSviewer software in order to get an overview of the published works related to the topic included in the research.

LITERATURE REVIEW: A SHORT BIBLIOMETRIC ANALYSIS

In order to give an overview of the existing literature in the field, in relation to the topics addressed in this research, we initially performed a bibliometric analysis using the Web of Science database and VOSviewer. In terms of the modus operandi, we considered the following logical scheme:

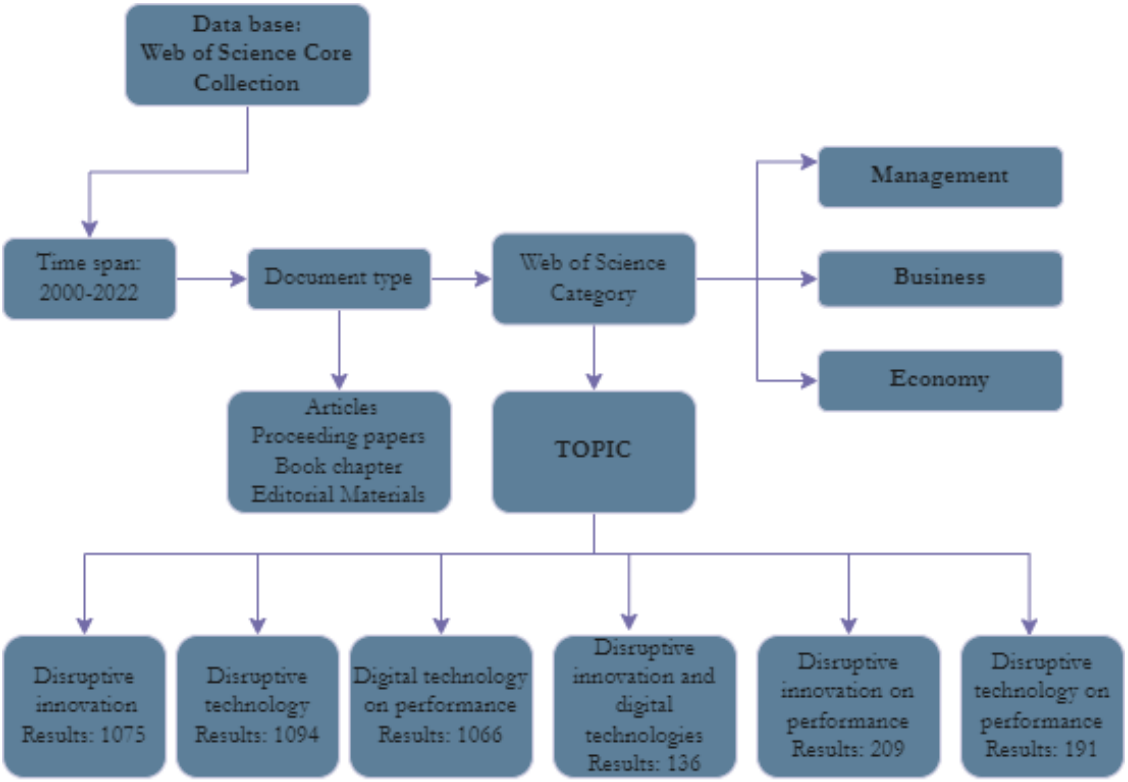


Figure no. 1. Research map based on Web of Science Core Collection

Source: Author's own creation

In carrying out the bibliometric analysis we have selected papers published between 2000 and 2022, with the remark that the data for the current year are obviously partial and do not give a global picture of the papers published this year. We have selected only this interval since the issues addressed are linked to the development of information technologies, the advance of which has been more clearly observed in recent decades. At the same time, it is necessary to point out that, from the perspective of the type of paper, we selected the categories that were of interest for the present research, especially from the perspective of the comprehensiveness of the research. As can be seen from Figure 1, the analysis carried out focused on several topics, due to the importance and complexity of the two concepts at the heart of the research: disruptive innovation and digital technologies. Intuitively, we considered that there is a connection between these two aspects/elements and the performance and competitiveness of business organizations.

We consider it necessary to specify that the research has focused on works that address the topics analyzed in the field of economics (categories of works in economics, management and business), since the perspective addressed in this research is directly addressed to business organizations. For example, the general search for the topic "disruptive innovation" generated over 3,000 results and for the topic "disruptive technology" over 6,000 results, but these do not directly reflect on the topics investigated. As a result, restricting to the three categories gives a truer picture of the topics included in the study. At the same time, we can see that most results (over 1000) were obtained for three topics (disruptive innovation, disruptive technology, digital technology on performance) and therefore in the following we will highlight a number of aspects related to each

topic (evolution of the number of papers including these topics and the fields in which they were published during the time period under analysis).

For example, for the phrase "disruptive innovation", 1075 results have been generated for the time period in question (2000 - 2022), and the figure below shows a series of data that facilitate the creation of an overview of the works published on this topic:

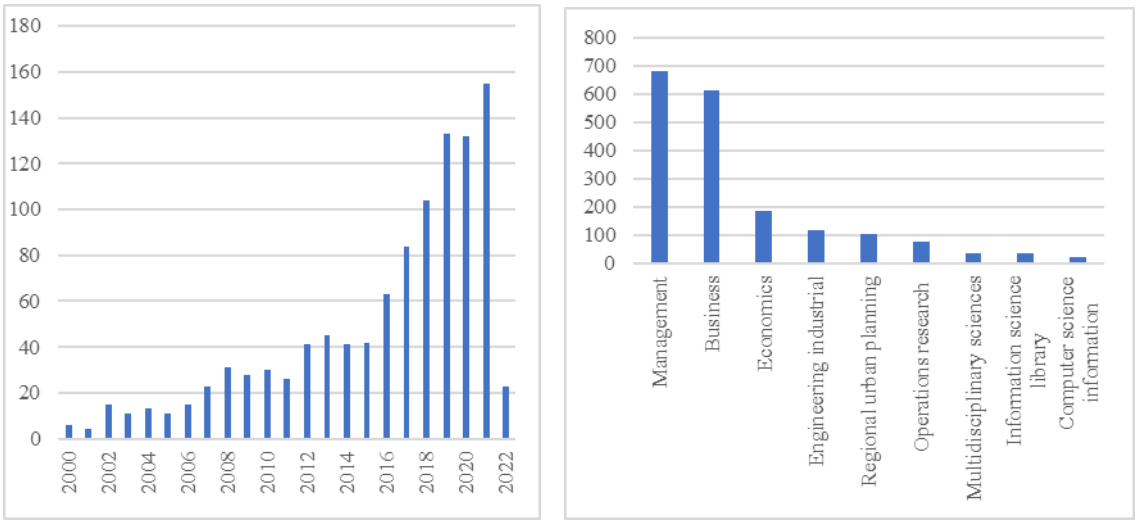


Figure no. 2. On overview of the international publications regarding the topic ”disruptive innovation”

Source: Author’s creation based on www.webofscience.com

The interest in this topic has intensified since 2016, which means that the number of papers published in 2021 was 250% higher than this year and much higher than in 2000, the first year included in the interval of the study. This highlights the fact that the issue of disruptive innovation is increasingly being considered and debated in studies in this field due to its impact on the economic activities carried out by business organizations. From the perspective of the fields in which this topic has been addressed, we note that most research is in the fields of management and business, followed by economics, as can be seen in the figure above.

With regard to the phrase "disruptive technology", 1,094 results were generated for the same time frame, and the figures below show a series of data that facilitate the creation of an overview of the works published on this topic:

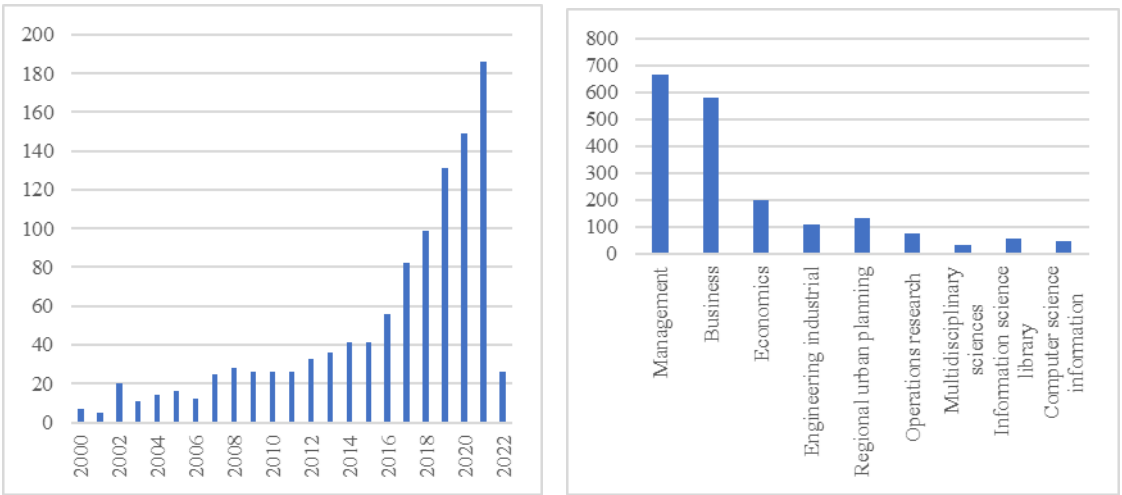


Figure no. 3. On overview of the international publications regarding the topic ”disruptive technology”

Source: Author’s creation based on www.webofscience.com

Similar to the previous figures, we find that the number of papers published in relation to the topic analysed has been growing at a faster pace since 2016, in the same three main areas (management, business and economics). Considering that the papers are predominantly concentrated in the management and business sphere, we can state that this topic denotes a certain importance for business strategies.

Finally, for the phrase "digital technology on performance", 1066 results were generated for the period analysed, in which sense we present in the figure below a series of data that facilitate the creation of an overview of the works published on this topic:

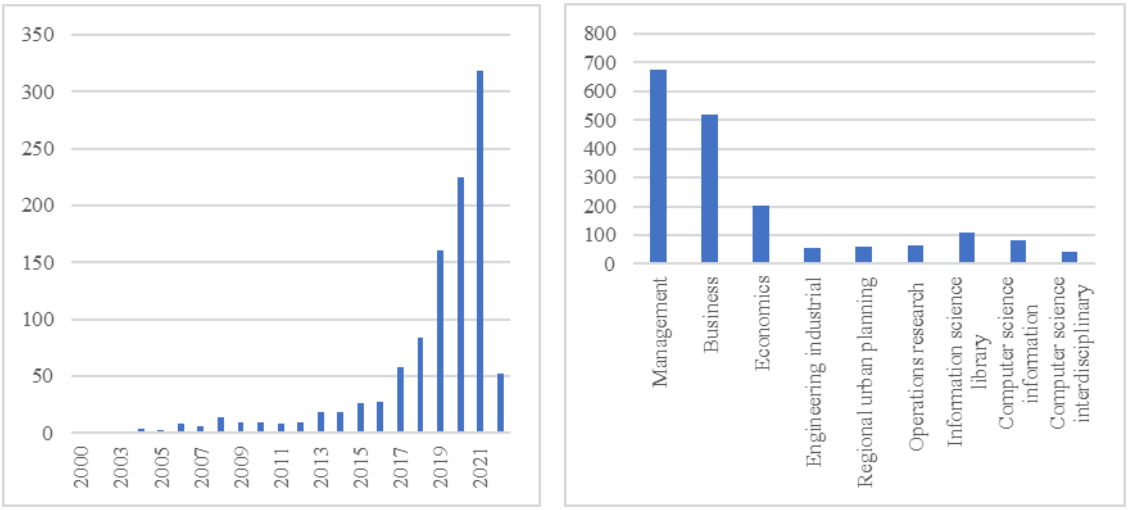


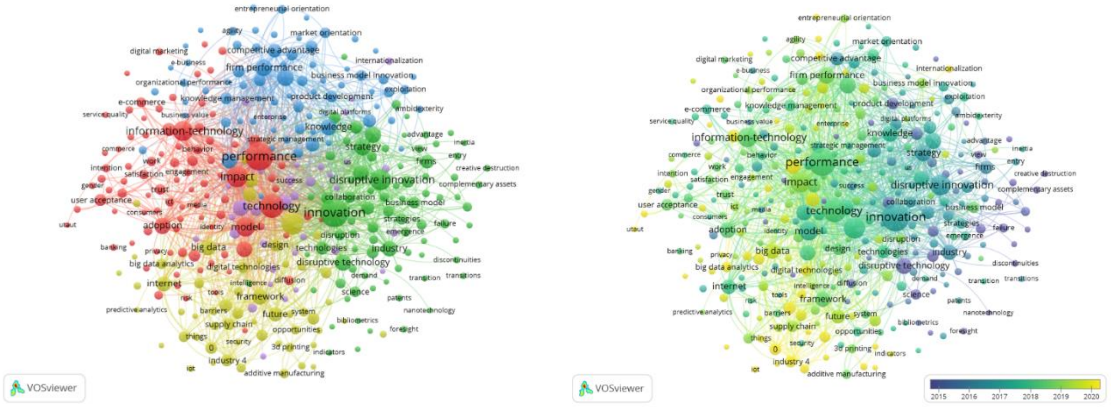
Figure no. 4. On overview of the international publications regarding the topic ”digital technology on performance”

Source: Author’s creation based on www.webofscience.com

For this perspective, we observe that the number of papers increases to a greater extent from 2017 onwards, reflecting a growing interest. The degree of novelty of the examined topics (for all 3 topics) is high, with the number of published papers registering the highest values for 2021. At the same time, we point out that the same three topics encompass the highest number of papers which suggests the importance of these issues for the way economic entities organize their activities.

In order to highlight the main issues regarding the topics included in the research (as can be seen in Figure 1), we conducted a keyword frequency analysis of the titles and abstracts of the papers included in the Web of Science database using the VOS viewer. Thus, we set the minimum number of occurrences of a keyword to be 10. Out of 8641 of keywords, 338 met the condition. For these keywords, a relevance score was calculated using which the most relevant terms for the research were selected, i.e. those between which there were the highest connections.

With reference to Figure 5 (a), we point out that the size of a circle actually reflects the occurrence of a keyword; therefore, the larger a circle is, the higher the number of specific terms considered from the works concerned on the topic under study. Figure 5(a) shows 5 clusters including publications related to the topic addressed in this research. In the largest cluster (red - 94 terms) terms such as digital technology, information technology, innovativeness, performance) are linked. The next cluster (green - 84 terms) highlights links between terms such as business model, disruptive innovation, disruptive technologies and technological change. The third cluster (blue - 71 terms) connects concepts such as competitive advantage, digital innovation, innovation performance and organizational performance. The next cluster (yellow - 55 terms) highlights links between terms such as business models, sustainability, big data and management. Then, in the last cluster (purple - 34 terms) the links between terms such as competitiveness, innovation, digital platforms and efficiency are highlighted.



(a) (b)

Figure no. 5. The occurrence of the keywords (2000–2022); (a) Network visualizations; (b) Density visualization (average publications years)

Source: Author's creation using VOS viewer

In Figure 5(b) we have highlighted the frequency of occurrence of keywords in selected papers from the Web of Science database over the time interval included in the study. A better picture of the connections between keywords is given in Table 1 where we have highlighted a number of characteristics of the terms with the highest frequency and of interest for our research. In addition, we find that there are significant connections between innovation, technologies and performance, which will allow us to explore the role of disruptive innovations and digital technologies on the performance of business organizations in a subsidiary, more in-depth analysis.

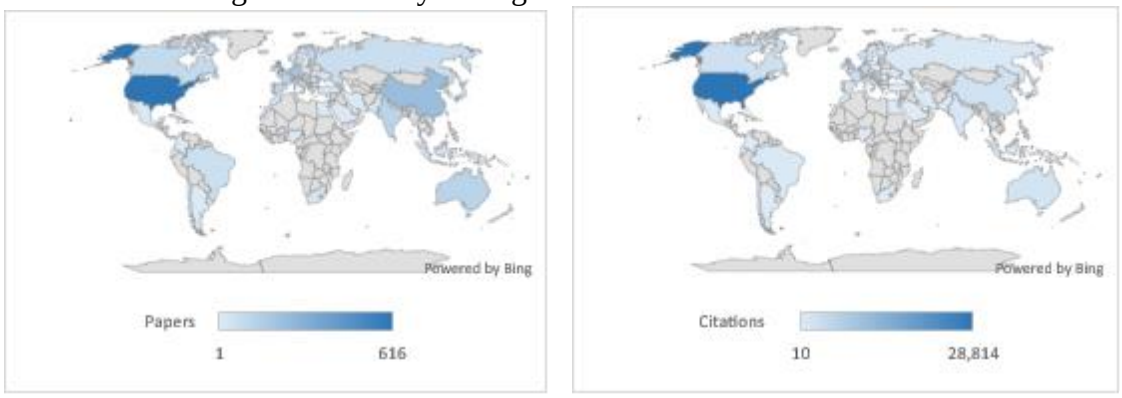
Table no. 1. An overview of the links and total links strength for the selected occurrence terms

Term	Cluster	Links	Total links strength	Average Publication year
Digital technology	1	116	173	2019
Information technology	1	142	279	2016
Disruption	2	140	289	2018
Disruptive innovation	2	256	1268	2016
Disruptive technology	2	154	318	2014
Digital innovation	3	155	371	2019
Organizational performance	3	114	207	2019
Digital transformation	3	218	834	2020
Competitive advantage	3	182	610	2016
Business model innovation	3	125	325	2018
Firm performance	3	241	1120	2018
Digitalization	4	191	599	2019
Sustenability	4	164	465	2019
Big data	4	230	852	2019
Digital platforms	5	72	110	2019
Digital economy	5	70	130	2018

Source: Author's creation using VOS viewer

A link represents the connection between two concepts. Each link has a strength, given by a positive numerical value. The higher this value, the stronger the link. The strength of a link may for example indicate the number of publications in which two terms occur together (in the case of cooccurrence links). Therefore, concepts as firms' performance, disruptive innovation, digital transformation, big data and competitive advantage represented o point of interest for researchers in different fields.

From a geographical perspective, Figure 6 shows the countries in which papers dealing with topics related to the theme under analysis have been published, as well as the papers with the most citations according to the country of origin of the authors:



(a) (b)

Figure no. 6. The geographic overview on papers and citations regarding the topics included in the paper

Source: Author's creation using VOS viewer and Excel

The issues highlighted indicate that from both perspectives analyzed the US and the UK hold the best positions. Thus, most of the papers dealing with the proposed research topics belong to authors from the USA and the United Kingdom, and the most citations are given to authors from the same countries (28,814 citations to authors from the USA and 8,608 citations to authors from the United Kingdom). The concentration of the number of papers in these countries shows that the topics covered are of interest and reflect the situation in the business environment.

However, the number of papers available on Web of Science that consider disruptive innovation and digital technologies in the context of business performance is quite small. Hence, in order to create an overview over the topics included in the research we have selected a number of papers, others than the one available on Web of Science to study further.

DISCUSSIONS

Disruptive innovations such as the internet, cloud computing, big data and others in this category require business decision-makers to re-engineer the companies they run or to develop new businesses adapted to current market conditions and society as a whole.

Technological advances in the information technology sphere have produced a digital disruption that is reshaping the business environment, including contributing to the development of new business models. In this regard, Rogers (2016) points out that in the digital age disruption has produced significant changes in the ways/conditions governing how economic activities are conducted. Specifically, these new conditions have fostered the emergence of new opportunities for companies, opportunities that can improve their long-term profitability and growth. In this regard, he refers to Airbnb, which has become a competitor for the hotel industry through a digital platform (without owning any tangible assets, such as accommodation); the author includes the company in the category of software-powered disrupters that have in common, beyond the obvious information technology component, a concern to create value for customers.

Incorporating digital technologies into the technical infrastructure of a business organization can have multiple benefits, even helping to streamline processes. However, simply using various digital platforms alone does not constitute a company's competitive advantage, as Charan (2021) points out. However, improving the organization's digital capability through the use of different algorithms to monitor resource consumption, i.e. to better run organizational processes, the use of e-commerce or more recently m-commerce (mobile), can be elements that strengthen organizational performance through better cost control.

Regarding the adoption of digital technologies, i.e. the digital transformation of business organizations, Condea et al. state that one aspect that managers should take into account is the practices/methods associated with the co-innovation process. By co-innovation the authors refer to the interest of companies to develop their innovative activity and propose solutions that respond to market needs by using external consultants or by developing partnerships/collaborations with other entities specialized in certain fields. Based on these considerations, managers who are concerned about the digital dimension of their company can use co-innovation to identify more options in the process of integrating specific equipment, software and other tools from different suppliers; co-innovation can be a key element in identifying solutions to some of the complex situations that the company has to face, problems that the business organization cannot solve alone. In addition, the co-innovation process will have a positive effect on the development of companies' core competencies and thus their knowledge, which will directly reflect on their performance and competitiveness.

Bounfour (2016) points out that digitization (the use of ICT tools) will play an important role both at the microeconomic level by shaping new business models, by developing organizational design, by making innovative activity more efficient and by updating the strategy aimed at developing human resources, but also at the macroeconomic level by reshaping the policies adopted by governments and the socio-economic development of society. We therefore see that digital technologies are becoming part of business organizations in the digital economy, having a direct impact on the way companies run their operations globally. Reynolds (2016) highlights that the importance of information technologies also emerges from the role they play on the process of knowledge acquisition, production, storage, dissemination and integration at the organizational level. In this respect, the author refers to social network analysis, Web 2.0 technologies (e.g. Procter & Gamble uses tools such as blogs, podcasts, forums in other to encourage collaboration and knowledge sharing in the company), business rules management systems and other similar tools. Knowledge is an essential asset for any business organization, helping to strengthen its competitive advantage.

Johnson (2021) highlights that for business organisations in today's society (regardless of their industry or size) disruptive innovation and digital transformation are two key elements in the long-term growth strategies implemented by their management. Innovation and the process of digitisation enable managers to act in directions that can benefit companies by changing the way they work and identifying innovative solutions to meet the current and future needs of companies' current and potential customers. In addition, Christensen (2003) points out that the implementation of a disruptive strategy can lead to a significant increase in the activity of a business organisation. Furthermore, he states that most of the past performance of companies has been achieved by initiating disruptive innovations. Thus, he suggests that a disruptive business model that can achieve reasonable profitability by charging lower prices to attract certain market segments is a key element in a company's future success and growth. One thing is certain, namely innovation means value, growth and welfare for both companies and their users; innovations are found in the form of a new product/process, a new business model, a new market, etc., having a significant role on their developers and users (Drucker, 2011).

The phrases disruptive innovation and disruptive innovation are often used synonymously in the literature because most innovations are technical in nature. The disruptive nature of technologies/innovations, however, also resides in the nature of the business model applied, namely the strategy applied by management when trying to identify a way to penetrate new markets, to identify an optimal framework for the operations of the business organization, i.e. a new organization structure (Christensen and Raynor, 2016).

In the context of the changing business environment, a business model focused on innovative processes is emerging. In this regard, Kuratko et al. (2019) refer to the innovative organization, namely the I-Organisation in which a number of sub-elements are developed that define, respectively describe this type of company. More specifically, the authors relate the I-Organisation to aspects concerning Innovation skills: I-Skills, the Design Function in Innovation: I-

Design, the organizational innovation: I-Team and the Implementation of Innovation: I-Solution. In fact, they highlight the importance of innovative thinking and managerial skills, as well as team building in developing new innovations, in carrying out processes that contribute to the creation of new products, new business methods or to respond to market needs.

Maintaining the market position and competitiveness of companies depends on the extent to which they effectively adopt disruptive technologies. Managers must therefore 'surrender' to digital transformation in order not to lose the battle with those competitors who are more flexible in the early adoption of disruptive technologies. Information technologies will therefore become a constant in organizational models and processes, redefining the functions of an enterprise. In this context, a new type of organization is emerging called the technology-driven enterprise where there will not be a separate IT department but will include a technology component in each department. Specifically, we discuss about sales technologists, marketing technologists, finance technologists, customer service technologists, innovation technologists, supply chain management technologists and more (Andriole et al., 2018).

In connection with the aforementioned model, we mention the cloud-based business model that allows business organizations to better respond to market demands. Companies using cloud solutions are more innovative and therefore more successful. From this perspective, the adoption of such technologies has become a necessity for business organizations as digitalization has a direct impact on sales growth and company development. In addition, digital solutions drive innovative activity, which has positive effects on the competitiveness of economic entities. Therefore, digitalisation and cloud-based organizational activities are basic elements in the infrastructure of companies in this era of digitalisation in which we live. The use of various platforms to run the firm's operations allows the exploitation of new opportunities, improvement of market position and intensification of innovative activity (Abolhassan, 2017).

CONCLUSIONS

The complexity of the issue under analysis is reflected in the uniqueness of each company when we look at the advantages that disruptive innovations and digital technologies can offer in achieving a certain performance or market position. It is necessary to point out that both disruptive innovative processes and technologies have a significant impact on the competitiveness and performance of the firm but they are also joined by other factors such as the strategies implemented by management, organizational knowledge, talent and creativity of human resources, etc. Based on the aspects highlighted, we find that there is a connection between innovative activity and digital technologies when considering the performance and competitiveness of a business organization, which contributes to the shaping of new business models.

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