

Digital Entrepreneurship and Micro and Small Enterprises in Times of Covid-19 in Mexico

Emprendimiento Digital y Micro y Pequeñas Empresas en Tiempos del Covid-19 en México

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Abstract

COVID-19 has affected the development of economic activities and increased unemployment around the world. The most viable alternative is to promote entrepreneurship. Digital entrepreneurship took on greater importance in the face of the confinement imposed to curb the spread of COVID-19. The objective of this research is to analyze some work areas for the development of digital entrepreneurship with the aim of promoting self-employment of young people. A qualitative methodology with cross-sectional and descriptive scope was used using secondary sources. The results of this study show that technological tools are the new source for business development as Content Marketing and Social Networks, Artificial Intelligence, 3D Printing, Virtual Reality, Big Data, Devices through the Voice, Robotization, automation and digital transformation of companies, Electronic Commerce and Digital Leisure just to mention these. Although Mexico is prepared for the implementation of businesses via the Internet, it should be noted that there are still barriers such as bureaucracy, training, greater investment, ignorance and resistance to change. Then, it is urgent to develop collaborative public-private-academy strategies to strengthen institutions, infrastructure and human skills focused on new technologies to guarantee decent employment for generation Z, also known as the Centennials generation, those born between 1995 and 2010.

Keywords

Unemployment, Pandemic, Technology, Generation Z, Regulation, Mexico, Organization.

Resumen

El COVID-19 ha afectado el desarrollo de las actividades económicas y ha aumentado el desempleo. La alternativa más viable es promover el emprendimiento. El emprendimiento digital tomó mayor importancia ante el confinamiento impuesto para frenar la propagación del COVID-19. El objetivo de esta investigación es analizar algunas áreas de trabajo para el desarrollo del emprendimiento digital con el objetivo de promover el autoempleo de los jóvenes. Se utilizó una metodología cualitativa con alcance transversal y descriptivo utilizando fuentes secundarias. Los resultados muestran que las herramientas tecnológicas como el Marketing de Contenidos y Redes Sociales, Inteligencia Artificial, Impresión 3D, Realidad Virtual, Big Data, Dispositivos a través de la Voz, Robotización, automatización y transformación digital de empresas, Comercio Electrónico y Ocio Digital son la nueva fuente para el desarrollo empresarial. Si bien México está preparado para la implementación de negocios vía Internet, cabe señalar que aún existen barreras como la burocracia, capacitación, mayor inversión, desconocimiento y resistencia al cambio. Entonces, es urgente desarrollar estrategias colaborativas público-privadas-académicas para fortalecer las instituciones, la infraestructura y las capacidades humanas enfocadas en las nuevas tecnologías para garantizar el empleo digno para la generación Z, también conocida como la generación Centennials, los nacidos entre 1995 y 2010.

Palabras Clave

Desempleo, Pandemia, Tecnología, Generación Z, Regulación, México, Organización.

Introduction

The pandemic crisis that appeared in 2020 has caused massive disruption at different levels (Altamirano Flores et al., 2022): the human, economic and environmental fields. For Fierro Moreno et al. (2021) the world economy will lose 9 trillion dollars in the course of 2020 and 2021 and those developing countries will lose 220 000 million dollars of GDP in 2020 alone. There were several from the loss of more than 1 million jobs in the first 6 months of confinement according to data from the National Institute of Statistics and Geography (INEGI, 2022a) to the closure of millions of companies. For Velázquez Martínez and Rivero Hernández (2020), more than 70 % of the established Micro, Small and Medium-sized Enterprises (MSMEs) had to temporarily close their doors due to the imposition of confinement that significantly reduced mobility with the intention of curbing the rate of contagion among the population.

MSMEs represent a very important segment for the world economy and for the Mexican economy. In fact, according to INEGI (2022b) there are more than 5 528 698 million companies, and of these 5 514 815 million are within the classification of MSMEs, which in turn represent 52 % of the Product National Gross Domestic and provide approximately 72 % of the jobs in the country. Also, within the classification of Micro and Small Enterprises (MaSEs) that is the interest of this research, there are 5 459 659 million companies, which represents 98.75 % of all companies. It means in the first instance that almost all companies are in this segment and secondly, the MaSEs are important for the economy and development of the country.

From the above, Bejarano et al. (2021) speculate that this class of micro and small businesses are the first affected by any temporary closure policy or restrictions that limit

the operation of establishments. The lack of operation of the MaSEs entails multiple economic effects that translate into a decrease in production, loss of jobs with a high uncertainty for the reopening, an increase in the number of families in a situation of poverty and extreme poverty (Cueva-Rivera & Erazo-Álvarez, 2021), decrease in income, demand and cancellation of orders, abide by health and hygiene measures (Santiago Hernández et al., 2021) as well as the strategies that businessmen of the sector have implemented according to Rodríguez González et al. (2020).

Therefore, Durán (2017) concludes that, in Mexico, MaSEs play an important role in developing countries in terms of job creation and economic growth in their regions, contributing up to 45 % to formal employment and at 33 % in terms of GDP in emerging economies, they provide work to vulnerable strata such as women and youth (Sigüenza-Orellana et al., 2023).

Faced with the aforementioned social difficulties, entrepreneurial activity appears as a possible solution for self-employment and the need to generate income, which is why entrepreneurship has aroused great interest in recent years. This responds to the need to boost employment, especially in underdeveloped economies according to Ortiz García (2016). By the way, entrepreneurship is considered an essential part of the economic and social development of any community, region, and country since it generates innovative alternatives for products, processes, or inputs in the production of goods and services that with the profits generated support the entrepreneur and his family (García Vidal & Guzmán-Vilar, 2021; Hernández-Ramírez et al., 2022; Guilarte-Barinaga et al., 2023)

The confinement forced companies to opt for work at home with the intention of maintaining activities, this form of work called Telecommuting or Home Office (in English) completely changed the labor sec-

tor. The introduction of technology is here to stay and is adapted to various sectors of activity, even to entrepreneurship. Digital entrepreneurship, which is the ability to generate companies or businesses on the Internet, distribute their products and services online without the need to invest in physical spaces or offices, has been required during the closure of companies to survive (Geraldo-Campos et al., 2022).

Traditional entrepreneurs, those who use physical spaces for their activities, could not survive the confinement because they were not prepared to face the pandemic crisis, they were not trained in the use of new technology and also, according to Baltazar Vilchis and Velázquez Ramírez (2022) during this period, the low level of support from the authorities towards microenterprises (entrepreneurs) in the retail trade sector was observed in the municipalities of Region II Atlacomulco, of the State of Mexico during the first quarter of 2021, as well as the ability they have had to continue their economic work through the use of ICT and the different communication platforms with their customers.

From the above, the objective of this research is to analyze some work areas of interest as a result of the COVID-19 pandemic such as Content Marketing and Social Networks, Artificial Intelligence, 3D Printing, Virtual Reality, Big Data, Devices through the Voice, Robotization, automation and digital transformation of companies, Electronic Commerce and Digital Leisure for the development of digital entrepreneurship with the aim of promoting self-employment of young people, mainly from generation Z.

The work is distributed as follows. After the introduction, section 1 presents the theoretical framework of this document that is articulated on digital entrepreneurship and the classification of companies in Mexico. Part 2 shows the methodology used, which is descriptive and analytical

with a qualitative approach using secondary data from various databases such as INEGI as well as previous research. Part 3 details the results of the research, in this case the areas indicated and their importance in generating employment using technology will be addressed. Finally, conclusions and recommendations are presented.

Literature Review

Digital entrepreneurship and companies in Mexico

The different crises around the world and mainly in Latin America, such as the 2008 financial crisis in the United States and currently the crisis derived from the COVID-19 pandemic, have increased unemployment in the countries, as well as inequality. Entrepreneurial activity appears as a possible solution due to the uncertainty about employment and the need to generate income. By the way, entrepreneurship is considered an essential part of the economic and social development of any community, region and country since it generates innovative alternatives for products, processes or inputs in the production of goods and services, which with the profits generated support the entrepreneur and his family, but it also generates jobs and attracts other investments to form an innovative entrepreneurial ecosystem (Shapiro, 1981)

In this regard, Gálvez Albarracín et al. (2020) argue that entrepreneurship and its manifestation in the creation of companies are considered catalysts for the development of nations and regions, for which the public, private and academic sectors they show growing interest in understanding these phenomena and the elements that stimulate or discourage them.

In another study, Mora Pabón (2011, p. 70) shows "a deep link between entrepre-

neers and their beliefs that leads them to act and feel in a way that they take measured risks, have control over what they do, feel satisfied with themselves, are in a permanent search for innovation and have a high achievement motivation. Additionally, they indicate that not only social norms intervene in the attitude of creating a company, but that this can also influence people to achieve a favorable acceptance of the behavior of undertaking, generating a bidirectional or two-way feedback”.

This shows that social norms, beliefs and the ability to take risks are personal factors that are related to the entrepreneurial attitude. There are also elements such as the public, private and academic sectors that are relevant in the business creation process. During the COVID-19 period Chaturvedi and Karri (2022) found prime barriers which affected the firms: organizational readiness, infrastructural support by government, technological inadequacy and financial crises. The main strategies emphasized by founders to overcome the barriers of organizational readiness and financial crunch were marketing, strategic networking and product and services, and for technological ineptness was digitization. The COVID-19 crisis forced us to permanently consider the use of technology in organizational processes, whether in sales, recruitment, production, marketing, and other business areas. Hence the interest in digital entrepreneurship in this study.

Although technological progress has led companies to digitize, the COVID-19 pandemic accelerated this process due to the restriction of mobility due to confinement. The way organizations work changed completely, teleworking was implemented, online sales increased and home deliveries were also adopted. According to Wim and Werner (2020) In a digital economy, digital entrepreneurs pursue opportunities to produce and trade in digital artifacts on digital artifact sto-

res or platforms, and/or to create these digital artifact stores or platforms themselves.

In this context, digital entrepreneurship becomes a tool for greater competitiveness for organizations in developed and emerging countries that want to compete both nationally and internationally. Recent results of the Digital Economy and Society Index (52.45 %) and the European Index of Digital Entrepreneurship Systems (EIDES) (48 %) illustrate an improved level of the digital performance in European Union countries and a significant progress towards unlocking the productivity of digital value co-creation and collaborative networks. It is also agreed that the rapid digitalization of the economy and the digital entrepreneurship approach fosters a transition of traditional business models to networked and integrated digital platform business models following Barauskas and Raišienė (2022).

By the way, Jawad et al. (2020) in a research paper reconnoiters the digital entrepreneurship and its influence on the business setting in developing economies. The outcomes highlighted that entrepreneur’s knowledge act as a sensitive social expectation and enhances support, even the non-contributively factor of institutional trust. Findings demonstrated that administrative initiatives toward digitalization are pledged to consume invigorated entrepreneurship in all emerging economies consequently providing better chances for advancement and prevailing institutions requirements for further development in order to confirm the economic growth and supportable entrepreneurial situation.

According to Kraus et al. (2018) digital entrepreneurship is of high topicality as technological developments and advances in infrastructure create various opportunities for entrepreneurs. Society’s great attention to new digital business models is opposed to very little research regarding opportunities,

challenges and success factors of digital entrepreneurship. These authors mention that digital entrepreneurship is an opportunity to generate independent jobs and respond satisfactorily to the needs of consumers, which continue to be more complex. Technological development plays a key role in promoting products and/or services. Companies must adapt to technological tools to boost sales.

The above presented shows that Most of these studies have reported a positive influence of digital transformation on entrepreneurial activities globally in accordance with Haitham and Mehroz (2020). Therefore, entrepreneurs must reorient or readapt their training needs towards new technologies to achieve a better insertion of their business in the markets.

For Recker and von Briel (2019) the intersection of digital technologies and entrepreneurship— is gaining increasing importance in the global economy and scholarly community. Although digital entrepreneurship is important for the transformation of entrepreneurial activities, what are the challenges faced by entrepreneurs for its implementation?

Answering the question above, Anim-Yeboah et al. (2020) comment that the capabilities and capacities of enterprises, as well as the strategies in implementing digital technologies and harnessing the opportunities of digitalization, are key issues that have not hitherto received much attention. Also, Baranauskas and Raišiene (2022) point out that the well-recognized benefits of the digital entrepreneurship and the digital business ecosystem, application of emerging technologies and modern business models also brings inevitable sustainable management challenges. The main negative outcomes are in the disruption or exposure of vulnerabilities within collaborative organizational and social networks, the additional socio-technical pressure for both network supervisors and incumbents, and the asymmetry of digital information and resources, etc.

Micro Small and Medium Enterprises facing the digital in Mexico

Economic activity is essential for the growth of countries and the development of the human being; and in this process, companies are key, because although they seek (personal) benefits, they also satisfy the needs of the population, as well as care for the environment. In addition, they participate in the generation of jobs and the national GDP. The appearance of the COVID-19 pandemic showed the weakness of these, mainly the Micro, Small and Medium-sized ones that are the link of the economy. According to Economist Impact (2021a) of Mexico's 4.9 million MSMEs operating in 2019, over a million have not survived the pandemic driven recession. Mexico's microenterprises —ten staff or less— employ almost half of the workforce. The country's SMEs need a productivity boost. Despite representing 95.4 % of businesses, SMEs contribute just 52 % of GDP, and microenterprises only 12.4 %.

Regarding the impulses that MSMEs need to survive the pandemic, Molina-Sánchez et al. (2022) analyze the competitive factors that help make MSMEs successful. To do this in Guanajuato, Mexico. The results of the binary logistic regression analysis show that quality, technology, and innovation are the main variables that determine a company's success. These findings could provide guidelines to help MSMEs improve their competitiveness, and they could help public administrations better support MSME growth, especially in times of crisis. Digitalization represents an opportunity to modernize and boost economic activity.

Digitization alone is not enough to improve the performance of the development system once the pandemic is over. There are three areas of particular importance for economic recovery: support for the incorporation of digital technologies, incentives for for-

malizing companies and biosafety protocols. There are also signs of a shift in the way policies are formulated, towards adaptive management models that focus on accountability and the strengthening of public institutions, the deepening of partnerships with the business sector and the consolidation of decentralization dynamics that provide space for participation by local and regional actors according to Dini and Heredia Zurita (2021).

The implementation of this digitalization needs the support of the government since micro and small companies lack funds to obtain the necessary technology and machines. In addition, training for the use of the aforementioned tools. Hence the interest of the study of Sonobe et al. (2021) say that soon after the outbreak of the COVID-19 pandemic, many governments began extending financial and other forms of support to MSMEs and their workers because smaller firms are more vulnerable to negative shocks to their supply chain, labor supply, and final demand for goods and services than larger firms.

That's why there is a need for compatibility between industrial and competition policies and for greater coordination among the agencies responsible for data protection and competition policy and among the different government agencies. (Da Silva & Núñez Reyes, 2021, p. 9)

Since MSMEs are diverse, however, the severity of the pandemic's impact on them varies considerably depending on their characteristics. The research characterizes those firms in South, Southeast, and Northeast Asia that began participating in online commerce and tries to determine how their use of online commerce and their employment are related in this difficult time. And also examines the government support that MSMEs have received and the extent to which it has satisfied their support needs.

As an example of the above analyzed, DAI Global (2022) in a study found that 60

percent of surveyed MSMEs reported that they used digital tools for business purposes in the past year since COVID-19. Also, surveyed online MSMEs looked favorably on digital tool use during the pandemic: 69 percent reported that digital tools were important or essential to keeping their business running during COVID-19. Also, recognized the help that digital tools provided in adapting to the COVID-19 environment. Finally, 72 percent reported that Facebook apps helped them adapt to the COVID-19 environment.

The above shows that without the help of digital tools, many companies will have collapsed during the pandemic. Specifically, about 30 % of companies, that is, 3 out of 10 companies, closed during the pandemic. In this regard, Economist Impact (2021b) comments that the covid-19 pandemic had an immediate, negative impact on many of Mexico's MSMEs, forcing them to turn to digital platforms and tools just to survive. The initial financial pain from the pandemic meant those enterprises that could not adapt quickly enough to a digital-first approach to business either had to temporarily suspend operations or shut down for good. Those that survived learned quickly to adapt to e-commerce and use digital tools to thrive.

Other study Valdez-Juárez et al. (2022) mention that innovation management has positive and significant effects on the economic indicators and business performance of SMEs. It is also revealed that Open innovation strategies such as electronic commerce have positive and significant effects on innovation management and corporate performance. Similarly, the home office has significant effects on innovation management.

Castillo-Galván and Méndez Palacios (2022) point out that in a world of constant change and accelerated growth, the use of information systems based on digital technology, integrated into manufacturing processes and resource management, has

become a necessity for Mexican SMEs, who intend to grow globally and maintain their competitiveness in the market in which they operate. They see digital technologies as a tool that would allow them to achieve their development and growth plans, based on the concept of exponential growth organizations who, without many physical resources but with intensive use of technology, have managed to grow in short periods of time. However, it is not so simple, they face greater challenges such as the lack of expert personnel to advise and guide them in the implementation and management of the technology, this is a barrier that they must overcome in the state of San Luis Potosí.

Finally, SMEs lag in the digital transformation. Emerging technologies, as diverse as they are, offer a range of applications for them to improve performance and overcome the size-related limitations they face in doing business. However, SMEs must be better prepared, and stakes are high. The SME digital gap has increased inequalities among people, places and firms, and there are concerns that the benefits of the digital transformation could accrue to early adopters, further broadening these inequalities. Enabling SME digitalization has become a top policy priority in OECD and Latin America countries (OECD, 2021).

Materials and Methods

Design

This study is based on a non-experimental design, the phenomenon observed within its natural environment is analyzed, therefore the hypotheses are not contrasted. The purpose of this research is to present some technological tools as a source of job creation for the young generation. These tools are Content Marketing and Social Networks, Artificial Intelligence,

3D Printing, Virtual Reality, Big Data, Devices through Voice, Robotization, automation and digital transformation of companies, Electronic Commerce and Digital Leisure.

Instrument

The study has a qualitative approach; To discover and answer the research question, it is part of a data collection method. The latter will have a documentary nature, relying on secondary sources, that is, on documents of any kind such as bibliographical and newspaper articles; the first is based on consulting books and the second on articles or essays in magazines and newspapers. In this case, bases such as the Economist Impact (2021), DAI Global (2022), OECD (2021) and INEGI (2022).

Procedure

After collecting different sources of documents, an analysis of the information is carried out to know in depth about the subject. Then, the results of the methodology are executed and a series of conclusions related to the outlined objectives are built, all this with the purpose of solving the difficulties in terms of self-employment and post-pandemic digital entrepreneurship in Mexico.

Analysis and Results

The pandemic crisis paralyzed economic activities and companies looked for alternatives so as not to disappear from the markets. In this scenario, technology has become a great opportunity, as pointed out by Modgil et al. (2022) in a study whose results indicate the emergence of digital entrepreneurship opportunities in technology (EdTech, FinTech, cybersecurity), healthcare (diagnostics, virtual care, fitness), entertainment (over the top, gaming, social media), and e-commerce (contactless delivery, payment methods,

augmented reality). This allows the generation of online communities (Meurer et al., 2022). The interest of this section is to show the importance of new forms of work that include technology in times of crisis.

Content Marketing and Social Networks (CMSN)

The pandemic crisis has been very hard for companies, forcing entrepreneurs to look for alternatives both to continue their activities and to promote their products given the mobility restriction caused by confinement. To find customers, consolidate brands and sell products, content networks are developed. From there, Content Marketing and Social Networks (CMSN) become an opportunity for companies. CMSN is according to Kraus et al. (2019) is a set of strategies that are aimed at searching, developing and delivering content to users and followers of a brand in order not only to generate traffic, but also to create empathy and discussions around the brand's proposals. In other words, users are given a series of content that will expand the experience and concept of our brand towards social networks (Blázquez et al., 2020).

For the proper functioning of CMSN, it is important to consider the following: a means of concentrating users, understanding the needs and desires of customers, permanent review of the platform, positioning your brand, expanding your market share, improving your customer service, expand your market, develop lasting relationships. Some of the advantages of this activity are advice, feedback and the provision by the company of a full range of possibilities and means of exchange and interactive communication.

In Mexico, the development of technology focused on business is not new as in many countries, but the pandemic crisis accelerated the incorporation process in organizations. According to El-Gohary (2010),

due to the existing conditions of internet accessibility in Mexico and that Mexican people are more attracted to use them, it can be said that there are the necessary conditions to display any of the existing communication strategies and social media marketing (SMM). The SMM that can be very useful, due to a great number of advantages at a low cost, this thanks to the massive use of the Internet and mobile devices (cell phones, tablets), that represent many opportunities but also remove many threats.

The foregoing shows that Mexico has the capabilities to develop the area of CMSN and that access is neither restricted nor limited for those entrepreneurs who want to launch into this activity. Then concludes Madrigal Moreno et al. (2016) in a study that it is confirmed that the contemporary society has established the conditions to implement properly social media marketing in Morelia.

Artificial Intelligence (AI)

A market investigation according to Canales TI (2021) reveals that, in Mexico, 14 % of Information Technology (IT) professionals now use artificial intelligence (AI) in their company. Likewise, 40 % of them have accelerated their implementation of AI as a result of the COVID-19 pandemic as indicated throughout this investigation. The above shows that artificial intelligence is now more accessible than ever. For Donald (2019) AI is one of the most disruptive technologies of our time.

Another investigation according to Canales TI (2021) shows that more than 57 % of Mexican companies are exploring the adoption of AI. And half of Mexican professionals say that the pandemic has increased their focus on customer service (47 %), followed by marketing and sales (37 %) and process automation (26%). AI is already transforming the way businesses operate today, from how they communicate with their customers

through virtual assistants, to automating key workflows, and even managing network security. This allows AI to be defined as machines or computers that mimic cognitive functions that humans associate with the human mind, such as learning and problem solving according to Schalkoff (1990).

AI is applied in various areas of the organization as indicated by Yigitcanlar et al. (2020): (a) digital transformation, innovation, and sustainability are the most popular AI application areas in urban planning and development; (b) drones, automation, robotics, and big data are the most popular AI technologies utilized in urban planning and development, and; (c) achieving the digital transformation and sustainability of cities through the use of AI technologies —such as big data, automation and robotics— is the central community discussion topic.

Previous studies have shown the importance and adoption of AI in Mexican companies. It has also been shown that the country has the capacity to develop technology. However, entrepreneurs face certain challenges like many other countries in the world. Of these challenges, one can cite a lack of AI skills and a growing complexity in data management.

3D Printing

The demand for 3D printing is increasing in the manufacturing industry since it allows faster production and streamlines processes in the automotive industry such as the aerospace industry and the medical sector in the case of Mexico. In fact, according to Tecma (2022) currently, North America, including Mexico and Europe, account for 68 % of the revenue generated by 3D printing. The Asia Pacific region accounts for another 27 %. Stratasys, the leading manufacturer of 3D printing equipment and supplies estimates that the use of 3D printing in Mexican industry will grow between 30 % and 40 %

in the current year. The company believes that, in the next several years, Mexico will be the Latin American country with the highest adoption rate of this technology.

The above shows that 3D printing in Mexican industry will account for 70 % total parts production in the automotive, aerospace, medical devices and household appliances sector, among others.

Virtual Reality

Knowledge and mastery of spaces are of vital importance for the movements of human beings. Currently, with technological development, this concern finds a solution: Virtual reality. García Reyes et al. (2014) comments that with the help of the internet and the so-called information and communication technologies, a reflection of humanity can be made in virtual spaces. Therefore, artificial intelligence through the creation of virtual reality systems has offered an alternative solution to this need.

Virtual reality can be defined according to Burdea and Coiffet (1996) as a world that, despite not having any physical reality, is capable of giving the user, through adequate stimulation of their sensory system, the perfect impression of being in interaction with a physical world. This tool is applied in museum tours, archaeological sites, tourism, education, esports, medicine, engineering and other sectors. The foregoing shows that, in Mexico, virtual reality has gained a great boom and has become an essential tool that can refine and extend the skills of professionals, as well as to favor competitiveness in the field of companies.

Big Data

Like other technological instruments, Big Data is gaining popularity in Mexican companies given its advantages. According to

El Universal (2022), Investment in Big Data and data analytics around the world reached 215.7 billion dollars in 2021, 10.1 % more than in 2020. In Mexico there are almost 978 thousand people trained in IT, of which 72 % are men and 28 % women. This shows that globally there is a greater demand for data control to analyze and extract knowledge, manage resources and projects, help companies identify trends, get to know their customers and optimize processes.

Also, it is observed that in Mexico there is a greater number of people trained to manage Big Data, however, there is a gender imbalance in the use of this tool, trained men represent more than 2.5 times women. This situation must change if the inclusion of women in the workplace is to be improved. Finally, Big Data generates many benefits for entrepreneurs such as getting to know customers better, optimizing operations, marketing efforts, fostering loyalty and, ultimately, growing the business.

Devices through the Voice

The pandemic crisis forced the population to adopt other ways of life and entrepreneurship. The growth of display-based devices has been seen facilitating the growth of smart speakers, due to the evolution of use cases such as video calls, online content viewing, and social media. For Noguez (2021), Of the 86.8 million Internet users in Mexico, 1.2 % have a virtual assistant, that is, around 1 million 300 thousand people. The foregoing shows that, although the percentage of people who use the tool is not high, its importance cannot be denied, that is, more than one million users.

Robotization, automation and digital transformation of companies

Industry 4.0 implies the digitalization and integration of the processes within the com-

pany of the goods and services it offers and, abroad, the development of disruptive business models (Zegarra & Pérez, 2018). The technological revolution is the automation of all industrial processes by means of machines and robots, which coexist with workers within the company, with a strong component in production processes and the interconnection between production units, such that digital production networks are established that lead to an increase in efficiency. It is characterized by four dimensions: automation, digital customer access, connectivity and digital information (Blanco, 2016) and results from the combination of three fundamental components: hardware, software and connectivity (ONUJI, 2019). According to Zegarra and Pérez (2018), automated manufacturing processes will contribute 14 % of world GDP in 2030, more than 10 times the Mexican GDP.

Electronic Commerce

The lack of mobility caused by the health crisis forced them to focus on an intense use of technology, leading companies to define different types of measures, not only to attend to the health emergency, but also to continue their activities during closing and opening gradual. One of these modifications has been online sales or electronic commerce. According to the Mexican Association of Online Sales, in 2020 electronic commerce in Mexico reached 316 billion pesos; that is, a growth of 81% compared to 2019, which represented nine% of total internet retail sales; but also, the adaptation and innovation of retailers to meet this new demand (Boletín UNAM, 2021).

Digital Leisure

The technological evolution of video games has opened up a new field or business ideas for businessmen and entrepreneurs. The-

re has been a radical change in the way in which the majority of the population enjoys their leisure and free time after the period of confinement. Today electronic sports or eSports are gaining more interest in the population. Its operation is very simple: each eSport has its own rules and has access to different devices and platforms online or offline. For Rodríguez Martínez (2018), eSports are a great opportunity (video game tournaments) because they provide a potential market for entrepreneurs given the increased demand for their video game skills.

As a summary of this section, these tools are of great importance for the development of entrepreneurship because it allows obtaining flexible jobs, among others. However, Castañón Rodríguez et al. (2021) mention that in the face of difficulties in managing technological tools, they recommend adequate training and an operational approach to increase the intensity, richness, and responsiveness of marketing communication activities carried out through from facebook of these companies. Of the most used tools, Cruz-Estrada and Miranda-Zavala (2020) the platform that people use the most to search for restaurant information is Facebook; The factors that favor the use of digital social networks are the maintenance of the content; customer relationship management; price and promotion publications; links to official Internet sites and description of services.

Conclusions

The current technological revolution, based on the use of robots, automated processes, the Internet of Things (IoT) and the *big data*, Content Marketing and Social Networks, Artificial Intelligence, 3D Printing, Virtual Reality, Devices through the Voice, digital transformation of companies, Electronic Commerce and Digital Leisure. It implies a

transformation of the productive sectors throughout the value chain, with an impact on competitiveness and productivity in the short and medium terms. Increasingly, Industry 4.0 (I4.0) modifies production processes, industrial links and the way of relating in the market. New technologies contribute in two main areas. On the one hand, they favor the introduction of new products, which generates sources of employment and income opportunities, the emergence of new industries. On the other, it promotes production efficiency, encouraging the use of clean energy, industrial competitiveness and production chains.

This allows us to achieve the objective of this research, which is to analyze some work areas of interest as a result of the COVID-19 pandemic such as Content Marketing and Social Networks, Artificial Intelligence, 3D Printing, Virtual Reality, Big Data, Devices through the Voice, Robotization, automation and digital transformation of companies, Electronic Commerce and Digital Leisure for the development of digital entrepreneurship with the aim of promoting self-employment of young people, mainly from generation Z. The new generation of workers born in the 2000s should take advantage of these areas of opportunity. But for that, a participation of the state is needed to regulate the sector.

However, Mexico faces many barriers to the effective implementation of technology in industries. The first is the institutional barrier characterized by the absence of public policy. The second is ignorance of technology. Many of the executives are from generation X, the one that has not become familiar with technological processes, this situation leads to resistance to change in the decision to implement technology in organizational processes. The third barrier is the high bureaucracy that delays decision-making regarding the incorporation of technology. The fourth barrier is lack of training.

Some administrators do not see the need to invest in the training of their employees and the consequence is that the company has low-level workers and this delays the production and evolution of the company. The fifth barrier is the lack of expert personnel to advise and guide them in the implementation and management of the technology.

Continuing with the above, the link in the Mexican economy is the micro, small and medium-sized company and these present a lag in terms of digitalization of processes due to lack of capital among other reasons. Emerging technologies, as diverse as they are, offer a range of applications for them to improve performance and overcome the size-related limitations they face in doing business. However, SMEs must be better prepared, and stakes are high. The SME digital gap has increased inequalities among people, places and firms, and there are concerns that the benefits of the digital transformation could accrue to early adopters, further broadening these inequalities. Enabling SME digitalization has become a top policy priority in Mexico.

Finally, the relevance of establishing a technological policy that considers all technological actors with wide-ranging and long-term promotion measures should be discussed. Thus, it is necessary to strengthen the capacity of the Mexican economy to create, use, produce, sell and distribute technology, and move forward, following collaborative public-private-academy strategies to strengthen institutions, infrastructure and human skills focused on new technologies.

Acknowledgments

This work is the result of the project "Social entrepreneurship and business development: design of a roadmap" with SIP registration: 20221063 approved by the Secre-

tary of Research and Postgraduate Studies of the National Polytechnic Institute.

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Digital Entrepreneurship and Micro and Small
Enterprises in Times of Covid-19 in Mexico
Emprendimiento Digital y Micro y Pequeñas Empresas
en Tiempos del Covid-19 en México

Economía y Negocios

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vol. 14, no. 2 53

2023

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/ ISSN-E: 2602-8050

DOI: <https://doi.org/10.29019/eyn.v14i2.1158>

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