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DIGITAL TRANSFORMATION IN SMALL AND MEDIUM-SIZED ENTERPRISES ON COVID-19 DURATION

Küçük ve Orta Ölçekli Işletmelerde Dijital Dönüşüm: Covid-19 Süresinde

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ABSTACT

This consultancy pursued a double objective. On the one hand, it aimed to identify the main international trends of public initiatives in the promotion of digital transformation and the development of Industry 4.0. This, with the purpose of recovering international "good practices" from which some recommendations to the countries of the Ibero-American space emerge. On the other hand, it was sought to investigate the policies to promote the digital transformation of Ibero-American SMEs, paying special attention to their implementation characteristics. To this end, policies and instruments that promote the digital transformation of SMEs in the following countries were surveyed and analyzed: Spain, Portugal, Argentina, Brazil, Chile, Colombia and Mexico. The study focused on the most recent plans, strategies and instruments around this issue, without neglecting their history and development. The descriptive documentary-type approach was guided by previously constructed categories given the methodological strategy used In this way, the characteristics of design and execution of the policies to promote the digital transformation of SMEs were analyzed, with special emphasis on coordination between the different levels of public bodies and ministries, public-private dialogue bodies, affected budgets and articulated systems for their evaluation and monitoring.

Keywords: Small businesses, Covid-19, digital transformation.

ÖZET

Bu çalışmada iki amaç benimsenmiştir. Bir yandan dijital dönüşümün teşviki ve Endüstri 4.0'ın geliştirilmesinde kamu inisiyatiflerinin temel uluslararası eğilimlerini belirlemeyi amaçladı. Bu, bazı ülkelere bazı tavsiyelerin ortaya çıktığı uluslararası "iyi uygulamaları" kurtarmak amacıyla yapılmıştır. Öte yandan, bazı KOBİ'lerinin dijital dönüşümünü teşvik edecek politikaların, uygulama özelliklerine özel dikkat gösterilerek araştırılması amaçlandı. Bu amaçla, aşağıdaki ülkelerde KOBİ'lerin dijital dönüşümünü teşvik eden politika ve araçlar incelendi ve analiz edildi: İspanya, Portekiz, Arjantin, Brezilya, Şili, Kolombiya ve Meksika. Çalışma, geçmişlerini ve gelişimlerini ihmal etmeden, bu konuyla ilgili en son planlara, stratejilere ve araçlara odaklandı. Tanımlayıcı belgesel tipi yaklaşım, kullanılan metodolojik strateji göz önüne alındığında önceden oluşturulmuş kategoriler tarafından yönlendirildi. Bu şekilde, KOBİ'lerin dijital dönüşümünü teşvik etmeye yönelik politikaların tasarım ve uygulama özellikleri, farklı düzeylerde kamu kurumları ve bakanlıklar, kamu-özel diyalog örnekleri arasındaki koordinasyona özel vurgu yapılarak analiz edildi.

Anahtar Kelimeler: Küçük işletmeler, Covid-19, dijital dönüşüm.

1. INTRODUCTION

The emergency and the subsequent crisis resulting from the Covid-19 pandemic have pushed many companies in the Italian business fabric on the path of digital transformation. The forced closure of proximity stores following the lockdown imposed to contain the spread of the infection has changed consumer habits.

A large part of the population has turned to the purchase of goods and services online more and more frequently. In this sense, the data that emerges from the Salesforce Q1 Shopping Index report is significant: between 10 and 20 March 2020, spending on essential goods through e-commerce experienced an exponential growth, registering a + 200% compared to at the same period of the previous year.

It is now clear that the dissemination and use of digital tools represent the best opportunity to support and give continuity to the business. However, this is an opportunity that has yet to be seized and exploited by small and medium-sized enterprises in our country, which often show delays in the transition process towards a digital world and economy. In this regard, the acceleration towards more efficient and productive solutions was favored by the introduction of the e-invoice obligation not only towards the Public Administration (b2g), but also towards private individuals (b2b) and final consumers (b2c).

This has led many companies to adopt software for the digitalization of electronic invoices. Fatture in Cloud, for example, is a management software that allows you to manage taxation and corporate accounting at 360 °, offering excellent support to professionals and businesses.

However, the success achieved by electronic invoicing represents only the first step towards a complete digital transformation of Italian SMEs, which account for around 60% of b2b transactions.

If the aim is to survive and grow despite the crisis, then it will be necessary to fill further digital "gaps". 40% of managers interviewed during the quarantine period by Adaci (an association that has been dealing with logistics and supply management for more than 50 years) specified that for a more complete digital experience and a smarter agile transformation it is necessary to rethink and optimize the management of the relationship with suppliers. To survive in the current context of impacts caused by the COVID-19 pandemic, many companies have to resort to the intensive use of digital tools to implement teleworking, make purchases and sales online, as well as manage production processes remotely. But this constitutes a great challenge, especially for micro, small and medium-sized enterprises (MSMEs), the majority segment of the universe of existing firms and which has had a harder time getting on the digital wave.

Can the health crisis be an opportunity for the digital transformation of SMEs? How to support them to accelerate this process? We analyze some strategies and highlight the importance of digital diagnosis for SMEs, proposing a specific tool to do so.

1.1 What do SMEs need?

The key today is to continue generating income to sustain itself in the market and one way for this is the digitization of processes. However, for many MSMEs this may become impossible without the proper accompaniment and support to make the journey less painful.

Although the penetration of the Internet and mobile devices has increased significantly in the last decade in Latin America and the Caribbean (LAC), the use of productive and sophisticated applications is still highly concentrated in the subgroup of exporting companies and the service sector, of according to a study by the IDB INTAL. The reality is quite different for the majority of MSMEs in the region, which represent 99% of firms and 60% of employment, according to data from ECLAC for 2018. For example, in Chile, data from the Longitudinal Survey of Companies point out that, although 90% of SMEs have an Internet connection, their use is limited to sending and receiving emails, while only 40% have a website and 27% carry out electronic commerce. Another regional study (conducted in 8 LAC countries), commissioned by Visa in 2018, revealed that 70% of SMEs use cash as a payment method.

Digitization, which previously seemed like an “extra” to increase productivity and profits, today has become a requirement for companies to survive. In particular, MSMEs that are beginning to travel the path of digital transformation need to equip themselves very quickly with a series of elements. On the one hand, they need quality connections and technological devices (computers and servers). On the other, they require digital solutions, including computer systems for sales, marketing and customer management adapted to their specific needs, reinforced cybersecurity solutions, and tools to enhance their business opportunities (e-commerce platform, digital payment methods, etc.).

This is a daunting task for many MSMEs, who allocate most of their resources, human and financial, to day-to-day management. Therefore, now more than ever they need financing and technical advice to navigate this digital maze.

1.2 What strategies can be implemented?

Governments can help, in an agile and rapid way, a critical mass of companies can equip themselves with digital capabilities to continue operating without interruption in the context of the restrictions of this pandemic and to maximize growth opportunities in the post-crisis. To massify and optimize their interventions and resources, governments must rely on digital tools that already exist. This type of program has been strongly promoted in developed countries within the framework of comprehensive digital agendas, so its deployment has been faster than in LAC.

Currently, we even see that the large financing packages for MSMEs announced in many countries in the context of the health emergency are complemented by initiatives to support digitization.

In Spain, the digital platform Acelera Pyme (today focused on the response to COVID-19) has been strengthened, a one-stop shop or "one-stop-shop" for MSMEs, which consolidates a repository of technological solutions, relevant information on digitization in areas such as telecommuting, cybersecurity and digital commerce, as well as available financial solutions offered by the Official Credit Institute (ICO). Singapore, through the Stay Healthy Go Digital program, has expanded the number and range of pre-approved digital solutions from the SMEs Go Digital program to include digital solutions for worker temperature measurement, facilities management and workplace safety. For its part, Japan, within the framework of the US $ 4.1 billion package to support SMEs in the face of the pandemic, grants subsidies to them to facilitate teleworking, the adoption of technological solutions and electronic commerce.

In the region, the Brazilian Business Support Service (Sebrae), through its portal, offers digital services to MSMEs such as the issuance of online invoices, an electronic commerce platform, the comparison of financial services and access to experts on the impact of COVID-19 on business. It also offers a wide range of virtual courses for businessmen and entrepreneurs to develop the necessary skills to survive and grow in times of crisis.

The case of Colombia illustrates the importance of joining and coordinating public and private efforts. The country's chambers of commerce have been very active in providing solutions to their partner companies, offering training on electronic commerce, teleworking, digital marketing and new technologies, complementary to the training of the Ministry of Information and Communication Technologies. Likewise, they made available tools to promote virtual business, creating a business center where companies can make business appointments online, and giving access and support to MSMEs to access virtual showcases.

1.3 More Than A Third Of Formal Employment And A Quarter Of GDP Are Generated In Sectors Hit Hard By The Crisis

It is very difficult to predict the intensity and duration of the current crisis. However, it is possible to identify some of its specificities.

- ✓ It is a global phenomenon that affects all the countries of the world, although with different intensities. In each economy in the region, there are economic consequences associated with domestic demand and supply, as well as global demand and supply.
- ✓ As in other pandemics, it is a virus that was unknown until now, for which there is still no vaccine or universally effective remedies. The only way to control the pandemic is through prevention, which generally involves reducing social contacts. The measures taken by the countries translate into different levels of social restriction and, therefore, of limitation of economic activities.
- ✓ To the extent that the stage of greater spread of the virus is controlled, social restrictions and the development of economic activities will change, but they will not be completely eliminated. „There would be three stages, linked to the stages that will be experienced in relation to the epidemic in each country.
- ✓ The first is related to the emergency and the measures to be taken in a very short time. • The second will occur when, once the outbreaks of that epidemic have been controlled, it is necessary to "live" with a virus that, without health and social controls, can spread again. Some (many) of the restrictions on economic and social activities will be maintained and the economy will operate "in mid-gear", with differences between sectors. This stage is what is usually called reactivation.
- ✓ The third will take place when there is no danger of contagion (once the vaccine exists) and will involve a new economic and social reality. This reality will be different in each country according to the duration and intensity of the first two stages, the economic and social measures that have been taken and the institutional, productive and technological capacities accumulated.

In addition, there will be changes in the international economic and political scenario, since countries will enter the second and third stages at different times and under different conditions.

„The economic crisis has its origin in both supply and demand. Social restrictions have led to the total or partial suspension of productive activities. This effect has been stronger in sectors whose activities involve agglomeration and physical proximity (tourism, shows, hotels and restaurants, transport and personal services), while it has been less in those that have been considered essential (food, disinfectants, cleaning supplies , medicines and medical supplies and equipment).

„The interruption of many productive activities has also generated problems in the supply of inputs, domestic and imported, for the companies that have continued to operate.

„On the demand side, reduced consumer income and uncertainty have resulted in a drop in consumption and a change in consumption patterns. This has occurred in segments of durable consumer goods (cars, furniture, appliances, homes, clothing and footwear, for example), at the same time that the impact has been less or even positive for the sales of other types of goods and services (cleaning products and disinfectants, durable food, Internet television and telecommunications).

„The fall in economic activity and other aspects of the international situation (such as the sharp decline in the price of oil in recent months) have caused a general reduction in external demand and export returns.

„The combination of effects on supply and demand has had different intensities in the different sectors.

1.4 Reshoring And Automation

Although the pandemic crisis sets up a complex scenario, it only accelerates an international reorganization of production, generated by the tensions between China and the United States with their "America first" and processes of relocation of companies from the dispute over technological dominance that reached its historic peak in 2019, disrupting global value chains. Now the vulnerability of interdependence seems clearer, also driven by transport limitations. “It is expected that multinational companies will diversify their network of suppliers in countries and in companies” (ECLAC, 2020).

There is a tendency to prioritize locations closer to consumer end markets (nearshoring) and relocate critical processes when economically feasible with robotics (reshoring) that minimizes the relative importance of low wages as the only competitive factor. Digital transformation and robotics in particular, pave the way for these new ways of organizing production. To give a few examples, Japan has just allocated 2.2 billion dollars of an economic stimulus package to COVD-19 to help its companies relocate and stop producing in China. Brazil and Mexico could be two countries that will suffer the most from the vulnerability of interdependence. It is likely that in this context of a brutal drop in consumption, companies will intensely seek to reduce their costs and in many cases it will involve replacing tasks performed by people (Frey, 2020). In this context, better paid jobs have less risk of being automated (Oxford Martin School, 2020) In the same way, as e-commerce grows drastically, automation tasks in sheds deepen. In 2018, according to INTAL - BID studies, five out of ten Latin Americans believed that their work was going to be replaced by robots, surely that figure today would be much higher.

2. THE DIGITAL TRANSFORMATION OF SMES POST COVID-19

Business development sees digital transformation as a way to improve its results by optimizing its processes and facilitating its management, which is reflected in profits, growth and advantages over those who do not make these investments. Systems such as ERP, applications such as CAD, CAM, and FMS, artificial intelligence, cloud computing, blockchain, Big Data and IoT developments and platforms such as EDI, open innovation and e-commerce improve the capabilities to respond to market challenges. However, SMEs face various challenges to achieve this transformation: the few digital skills of their employees and owners, the ignorance of the benefits of digitization for companies, resistance to change, the lack of resources to invest and the degree of business sophistication. Thus, barriers are created for the evolution of companies and, consequently, less than half of SMEs have started their digital transformation process, especially in developing countries. This leads us to rethink how we want to work and live through new processes and new ways of doing things. It is not about digitizing the mechanisms, but about changing those mechanisms. That is, not to imitate the analog world in the digital world, but to reinvent. The coronavirus has caused a forced and hasty establishment of a working

model that has broken into our lives to stay. A couple of months ago there were very few companies that could boast of having an established structure to establish teleworking immediately for practically all of their workforce. Neither the main multinationals nor the SMEs.

Virtually no company was prepared to face the business and labor scenario caused by the coronavirus. In fact, some of them did not even consider this work model advantageous for productivity, nor were they considering implementing it in the short term. The new ways of working that many are currently adapting to are not going to go away after the initial chaos wears off - this period is going to reshape the workforce and reposition long-term digital transformation priorities. The coronavirus and the measures taken to stop its expansion have turned the business models of many companies upside down.

Daniel Isenberg identifies opportunities for entrepreneurs inherent to social change that will last over time. The configuration of safe environments, the emergence of physically separate meeting points, but socially together, the access to distributed knowledge or the centrality that the home acquires are important changes in our way of life that provide business opportunities. Isenberg sees enormous potential in the manufacturing of the future, security protocol services, food safety, Fintech, telemedicine, online education, health care analytics, multi-player entertainment or fitness equipment (Isenberg, 2020). Consumers may prefer automated services to face-to-face interactions for some time.

2.1 The New Social Organization As A Source Of Opportunities

The European DIGITAL SME Alliance is the largest network of small and medium-sized ICT companies in Europe, representing approximately 20,000 digital SMEs across the EU. The alliance is the joint effort of 28 national and regional SME associations from EU member states and neighboring countries to put digital SMEs at the center of the EU agenda. Portugal. The Government created the Digital Response Group for COVID-19, led by the Secretary of State for the Digital Transition, aimed at evaluating digital measures, and integrating the participation of public and private agents in an integrated response logic. Together with AMA, CEGER, telecommunications network operators and in association with APRITEL and some of the main technology companies, various tools, videos and other content were created to raise awareness about the best practices in teleworking. Among them, a portal (https: // covid19estamoson.gov.pt/teletrabalho/) that offers tools with the following premises: that they are free to use for citizens, public and private organizations and schools and that they are of proven scalability and availability Spain.

The Ministry of Economic Affairs and Digital Transformation, through Red.es, launched the Plan Acelera Pymes (https://acelerapyme.gob.es/) in order to help SMEs and the self-employed to mitigate the impact of the COVID-19. It is a collaborative public platform open to public and private agents that want to provide their solutions and digital tools to SMEs and freelancers so that they can maintain their activity. On the website created for this purpose, you can find various resources aimed at providing productivity solutions and remote work; cybersecurity tips and tools, resources to promote digital learning and training, and advice. Argentina. The Ministry of Productive Development, through the Secretariat for Small and Medium-sized Enterprises and Entrepreneurs, coordinates the Digital Assistance Network for SMEs, a public-private initiative aimed at offering technological solutions and tools to SMEs in the framework of the emergency health by the Coronavirus.

The main entities and companies in Argentina participate in this Network, as well as the network of technological poles and clusters. Various actions are carried out through the Network, among which the institutional portal stands out (https: //www.argentina.gob. Ar / produccion / Asistencia-digital-para-SMEs) which includes a catalog with more than 400 solutions offered free of charge or with a subsidy, aimed at assisting SMEs in remote work, electronic commerce, logistics and training. Awareness videos, tutorials and a section aimed at making collaborative projects of companies and entrepreneurs visible have also been put online. Mexico Launched in conjunction with the OAS, a portal that seeks to bring just over a million Mexican SMEs to the digital economy. The portal “Emprender. com.mx ”(http://www.emprender.com.mx/) seeks for SMEs to have an online store in just 30 minutes. Through it, the SME can create a smart Internet page with a 100% free payment button and can do so from a mobile phone. From there, the company can appear for free on Google maps a list of companies in the Google Digitization Plan and organic zone.

2.2 Digital Transformation and Challenges for SMEs

Digital technology has been around for more than half a century, almost 30 years since the public announcement of the Word Wide Web. During this time, the use and electronic transmission of data became an inseparable element of individual and collective functioning, leading to new forms of social organization, as well as the generation of structural changes in the world economy. Lately, digitization is causing renewed global interest, as the idea of a new industrial revolution (Industry 4.0) spreads, driven by the convergence of technologies that allow accessing, processing and analyzing data that until now were invisible to humans; which could lead to increases in productivity and the emergence of new business models. The origin of the Industry 4.0 concept is located in Germany. There is consensus that it began to be disseminated on a global scale when the Federal Government presented its high-tech strategy at the Hannover Fair in 2011. It was based on the generalized integration of information and communication technologies in production, within a coherent political framework with the objective of maintaining the global competitiveness of its industry (Smit et. Al. 2016). The German strategy was developed at a time characterized by at least 3 elements: a) omnipresent computing, b) the generation of macro data, and c) the ability to transform data into predictive actions.

Omnipresent computing is being overtaken by the arrival of smart phones and devices and access to the Internet through a new generation of mobile voice and data transmission (3G / 4G). Since the launch of the first iPhone in October 2007, mobile broadband subscriptions have grown at an average annual rate of 29%. This, added to a sustained growth in fixed broadband subscription, allowed more than half of the world population (51.2%) to use the Internet at the end of 2018, a proportion that in developed countries reached 86.6% . Likewise, almost the entire population (96%) currently lives under the coverage of a mobile phone network and 90% can access the Internet through a 3G network or faster (ITU, 2019). Smart devices allow to be "always connected" and are favoring the development of new digital platforms that provide a large number of online services. On the other hand, connectivity is no longer limited to people. Nowadays it is possible to connect things whose condition can be altered through the Internet thanks to sensors and actuators (Internet of Things).

This, along with other technologies (such as cloud computing) are creating Cyber Physical systems that operate in the form of complex networks and that are blurring the boundaries between the physical, the digital and the biological (Basco et al, 2018). The online activity of people through smart devices and things connected to the Internet exponentially increased the volume, variety and speed of data, generating macro data or Big Data. To measure its magnitude, it was necessary to adopt a new unit of measurement, the zetabyte (ZB), which is the equivalent of 1 billion terabytes or 1021bytes. According to the white paper prepared by CISCO, annual global Internet traffic will reach 4.8ZB per year in 2022, almost three times that registered in 2017. Furthermore, it is estimated that the number of devices connected to IP networks will be three times that world population, which is equivalent to 28.5 billion devices, or about 3.6 networked devices per capita.

Machinen to machine (M2M) connections will be the fastest growing categories, reaching 14.6 million, followed by smartphones. (CISCO, 2017) All this accounts for a dramatic growth in global traffic, which generated the exhaustion of the fourth version of the Internet protocol (IP) and its replacement by a new one, IPV6, which offers an opportunity to enable connectivity to the Internet of Things. The size of this data, which can be structured (database) or not (a video), is such that the capacity of conventional software to process it in a reasonable time is not enough. Thanks to the development of algorithms and Artificial Intelligence, combined with statistics and advanced mathematics, today it is possible to process them at high speed and perform predictive analysis of both behaviors and events.

These technologies, combined with other interrelated advances (such as collaborative robotics, machine learning or 3D printing), not only have more and more possibilities to perform physical activities, but also those that involve cognitive abilities, such as lip reading or car driving. Through this new technological map, what until a few years ago was an image of the future is becoming a reality; the ubiquitous or intelligent factory. That is, the manufacturing system in which autonomous and flexible production is possible through the collection, exchange and use of information in a transparent way at any time thanks to the network interaction between man, machine, materials and systems, based on ubiquitous technology and information technologies (Yoon, S et al; 2012).

2.3 Industry 4.0

Experts around the world agree that communication between humans and machines is unleashing a new industrial revolution. The revolutionary effect of digitization would be matching the one they had: the mechanical manufacturing driven by water and steam at the end of the 18th century, the division of labor at the beginning of the 20th century and the introduction of programmable logic controllers (PLC) for automation purposes in the 1970s (Brettel, et. al; 2014). Essentially, the fourth industrial revolution supposes the emergence of a model of organization of the production of goods and services in which the productive units are integrated horizontally and vertically in an autonomous way and make decentralized decisions in real time, based on mechanisms of self-determination. organization.

The intelligent enterprise accesses an enormous amount of data that allows it to understand how things are related to each other and that provides the basis for accelerating decision-making. The importance of Industry 4.0 lies in the rapid organizational adaptation facilitated by the key role of information processing (Acatech, 2011). The desirable characteristics for Industry 4.0 is for companies to be smart, reconfigurable, low-cost, adaptive, transformable, and agile (Radziwon et al; 2013). For this, it is not enough only with the adoption of an important variety of convergent technologies, new organizational approaches are also necessary. The mainstay of the collaborative interaction of machines and humans are the Cyber Physical systems (CPS). The concept of CPS was coined by the National Science Foundation of the United States (NFC) which defines them as designed systems that are built from, and depend on the perfect integration of computing and physical components. These systems are transforming the ways people interact with engineering systems. A large number of technologies converge in CPS (Internet of Things, sensors, actuators, cloud computing, Big Data) and disciplines (mechanical, production, hydraulic, electronic, systems, administration and business engineering) that must be communicated with each other at an operational (organizational), systemic (applicable), technical and semantic level so that they are interoperable. For this to be possible, interdisciplinary work and a coordinated and integrated vision of science, economics and politics are required (Acatech, 2011).

Unlike traditional embedded systems, designed to perform a limited number of functions, CPS have greater capacity, adaptability, usability; and they can, in interaction with other systems, form distributed and totally autonomous ecosystems. The incorporation of CPS in the production of goods and services, makes the machines, objects and devices available in the work environment stop being isolated and begin to send and process data in real time on the experience of using the equipment. In this way, the transition from preventive models to predictive models1 occurs, minimizing the need for inventories for the supply of inputs, which allows anticipating events, such as damage to equipment or requirements of the logistics system. If the user experience is shared by a set of systems, the learning possibilities are even greater, and it is in this combination that the axis of Industry 4.0 resides (Casalet, 2018).

Automation makes production processes more flexible, adapting them to the dynamics of the environment, managing to satisfy highly personalized demands on a massive scale, which leads to fundamental changes in product architecture and production, in particular the design of modular products and the integration of the supply chain (Brettel, et. al; 2014). This alters the model and value proposition of many businesses, which increases the pressure on companies to be more sensitive and adaptable to change.

Therefore, Industry 4.0 is not limited to the technical dimension of the digitization process of modern companies. To meet the standards of adaptability and prediction, it is not enough for the organization to be intelligent, it must also have the ability to assimilate changes in real time, reducing the time that elapses between the occurrence of an event and the implementation of an appropriate response. (for example, incorporating a customer's requirements during the manufacturing process). This requires companies to incorporate technological, but also cultural and organizational capabilities, so that the entire organization is prepared to support and shape the digital transformation and take advantage of the high quality of available data. In this sense, an organization adapted to Industry 4.0 must have an organic internal structure, dynamic collaboration with the value chain and a shared value system oriented to change, elements contemplated by ACATECH to elaborate its Digital Maturity Index.

Following Brettel et al (2014), collaborative manufacturing and collaborative development environments multiply available capabilities without the need for major investments and allow companies to adapt to volatile markets, shortening product lifecycles with great agility. This, which is especially important for SMEs with limited resources, requires at least: i) greater internal and external coordination so that companies and their employees can communicate with various departments efficiently; ii) new business models, leading companies to focus on their core competencies and outsourcing other activities to network partners; and iii) a trusted environment that facilitates the exchange of critical information between companies competing in the market and avoids asymmetric learning caused by opportunistic behavior and iv) integrated engineering throughout the value chain through advanced communication methods and virtualization, so that business processes, including engineering workflows, can be integrated end-to-end (Brettel et al, 2014). In short, we are facing a new industrial revolution that involves the continuous adaptation of the company to a changing environment, making decisions and implementing measures automatically and based on data, which lead to the best results in the shortest possible time (Acatech, 2011). However, many companies are not yet familiar with this concept; and those who are, distrust or fail to appreciate its concrete benefits. This situation occurs especially in SMEs, which generates disinterest or reluctance to face a digital transformation project. Although there are several factors that fuel mistrust, it finds a solid foundation in the threats to security and privacy posed by technological integration. These can damage the environment of trust and especially the performance of firms, either through system failures or the loss of important business information. While large companies tend to have policies designed to neutralize or prevent cyberattacks, SMEs have greater difficulties due to lack of resources and specific training.

2.4 The Scenario For Small And Medium Enterprises

The convergence of smart devices in the company was originally intended and designed to solve big player problems. However, it is possible to think of Industry 4.0 solutions in SMEs, which allow them to increase the productivity of the capital employed, diversify the offer of products and services, reduce response times to demands and create new value propositions. The adoption of these technologies by SMEs is also crucial so that they are not excluded in the local and global integration processes, in a context in which firms no longer compete in isolation but as participants in the interconnected supply of value chains (Katz, 2019).

Evidence has shown that innovation activities are not exclusive to large firms and that SMEs can develop technological changes that bring together particular characteristics and even advantages that allow them to assimilate, adapt and improve new technologies. Furthermore, those SMEs that manufacture on a small scale have a production process that is adaptable to the flexibility required by Industry 4.0 since they tend to operate in small batches and on request within discontinuous plants organized into sections or departments3 (Ferreira et al, 2010).

That is, a logic similar to the personalization proposed by Industry 4.0. Various authors4, who studied the innovation process in SMEs, highlight the adaptive and localized nature and the relevance of dynamic technological learning processes, which substitute and / or complement R&D activities. The accumulated knowledge allows specific learning, which constitutes a stimulus for the realization of innovative activities of an informal type. Most of them also highlight the crucial role that the environment (sectoral, institutional and territorial) plays in the relative performance of firms. In Latin America, for example, this incidence was verified empirically, by the little or no innovative activity of SMEs during the period of industrialization by import substitution (characterized by low competitive pressure) or in the increases in labor productivity of SMEs who operated in the fastest growing industrial branches in the period of economic opening during the 90s (Katz, 1999).

This suggests that, although SMEs have the potential to adapt to the new techno-economic paradigm, they will be conditioned by the ecosystem they inhabit. In this sense, the adoption of digital innovations in SMEs associated or belonging to cutting-edge sectors or located in developed economies will be much higher, vis a vis those of more backward activities and developing countries. In this scenario, the digitization policies of SMEs must be framed within an articulated and comprehensive development strategy aimed at solving the structural heterogeneity of many economies, of which SMEs are a reflection and central actor. Indeed, statistics show that, although SMEs from less developed countries

represent a significant percentage of the total volume of companies and employment, their share of GDP and their productivity compared to large companies is very low, if compares them with those of the more developed countries.

This inequality is even deepening as a result of the process of "premature deindustrialization" that, according to some experts, new technologies produce and that has at least two distinctive features. On the one hand, the preeminence of the non-tradable sector over the tradables in job creation (Frey, 2017) and, on the other, the relocation of the manufacturing industry from low-income and low-wage countries and their relocation to their countries of origin , hand in hand with additive manufacturing (Rodrik, 2017).

This section contains three interesting international experiences in promoting Industry 4.0. These are the cases of Germany, China and the United States, countries that present similarities and differences that deserve to be identified. Without a doubt, Germany is one of the countries that has advanced the most in recent years in promoting I4.0 through a wide variety of intervention instruments (which are embodied in the so-called Platform Industry 4.0). Among them, the creation of numerous institutions with a strong articulation between the public sector and the private sector stands out, as well as the recurrent efforts to combine private demands (in particular from SMEs) with the offer of different organizations (laboratories, university centers and academics, civil society organizations, etc.). All based on long-term strategic planning. The US strategy, also far-reaching and with the due participation of the national state and those at the subnational level, is based on the primary objective of developing "advanced manufacturing". In a similar way to the German case, in the USA there are important efforts to articulate supply and demand between the public and private sectors. This, in recognition of the need to rethink the policy to promote industry in general, given the relative decline that the country has experienced in recent decades at the hands of, especially, China, India and some Southeast Asian nations. Finally, China is the country that is relatively lagging behind in the "Industry 4.0 race". Precisely for this reason, it is one of those that has invested more resources and efforts to promote the digital industry. This strategy, framed within the strategic program of "made in China", has had important achievements, but the available evidence shows that there is still much to advance (especially with the ostensible structural heterogeneity that characterizes the production structure, Chinese social and regional). In this case, strategic planning with a long-term criterion and under strong state influence stands out.

One of the main strategies of the German government is the one that seeks the development of Industry 4.0 (I4.0) based on the integration of Cyber Physical production systems in manufacturing and logistics, the use of the internet of things and services in the industrial processes. The German success is not accidental, as in the design and implementation of public policies, the federal government played a prominent role, through the ministries of Education and Research and Economy and Energy in stimulating the formation of R&D networks. , with the aim of guiding digital manufacturing towards the interconnection of products, value chains and business models.

The role assigned to the continuous learning of workers shared by the social actors of the industry (trade union centers, large companies, federal governments, technology centers and universities) contributed to reinforcing alliances between the public and private sectors despite the differences to guide financing and funds to support I4.0. Specifically, since the mid-2000s the German government has been promoting the Internet of Things and Services with a high-tech strategy that involved multiple programs, including the research alliance between industry and academia for innovation. Research Alliance is the advisory council made up of 19 members representative of academia and industry. Among the promoters of this alliance are the Academy of Science and Engineering, which brings together the interest of the scientific and technological community, with organizational advisory functions in innovation both for policy markers and in the transfer of knowledge for the business sector; The German Center for Artificial Intelligence, oriented to the application of basic research, develops products, prototypes and patentable solutions in the area of ICT. In this framework, the initiative called Smart Factory KL Technology constitutes the first independent European public-private factory of suppliers for the industrial application of ICT, in addition to functioning as a pioneer of technology transfer in key aspects of I4.0, operating several pilot modules . A central aspect of the investigation in the demonstration of the Smart Factor platform that manufactures customized products in batches

according to the customer's specification. For its part, the 2020 High-Tech Strategy was launched in 2010 to consolidate German leadership in digitized manufacturing.

The Action Plan contemplates a multiplicity of objectives, among which the following stand out: promoting an increase and the generalization of digitization from the so-called "smart factories", the government assumes responsibility for the digital agenda for which it has funds specific research-oriented support, support for the participation of SMEs, and resources oriented to standardization and regulation.

Also, in 2012 a working group on I4.0 was organized. The Platform Industry 4.0 is constituted as an open network for the transfer of information and collaboration that brings together public, education and research actors, large companies, trade union centers and is gradually extended to universities and research centers to make diagnoses and research effective. research on the process, implementation and evaluation of the new model. A central aspect of Platform Industry 4.0 is the generation of conceptual developments and the creation of standards and regulation to consolidate a leading role for Germany in the new industrial transformation. Among the ideas that are discussed in this area of intersectoral and transversal collaboration, the following issues are worth highlighting:

- ✓ The creation of a reference architecture for standards and norms, and making recommendations for global standardization in industrial applications;
- ✓ The promotion of research and innovation with the interest of generating new scenarios for the development of I4.0 and identifying needs;
- ✓ Treatment of various elements related to security and network systems to favor the reliable handling of data and the protection of companies, especially SMEs; and,
- ✓ The development of a legal framework in order to examine the determining aspects of the digital economy (in particular, address the legal gaps that emerge with digitization) 5. The available evidence allows us to conclude that the organizational structure of the Platform Industry 4.0 makes it a central network for the advancement of digitization in German industry, its action involves numerous organizations, with the aim of transmitting adequate information to ensure trust in the application of digitization through the preparation and analysis of success stories and practical recommendations.

3. CONCLUSION

By virtue of the results achieved in this work, which analyzed the policies that promote the digital transformation of SMEs in Spain, Portugal, Argentina, Brazil, Chile, Colombia and Mexico, a series of suggestions and recommendations are set out below. practices found in the various analytical dimensions of the study. Regarding the institutional and strategic framework, it is noted that one of the main issues to address, if it is to translate a stable public policy, is to achieve the highest possible degree of coherence between the digital transformation policy of SMEs with certain general objectives drawn by governments. In particular, it is considered of vital importance that the definition of public policy starts from a strategic vision with the definition of medium and long-term objectives and with a clearly defined "road map" from the initial phase. As can be seen from the revised casuistry, such a "roadmap" should contemplate design and implementation, as well as follow-up, evaluation and monitoring in all phases of the process. In this sense, it is especially suggested to seek the incorporation of ad hoc coordination mechanisms throughout the entire process of public policy implementation. The issue of articulation / coordination is key since, as discussed in the preceding pages, the promotion of digital transformation in general, and of SMEs in particular, involves a multiplicity of edges, actors, institutions, etc. In this line, it is recommended that the digital transformation policy of the countries be implemented through specific development plans or agendas that contemplate particular guidelines for each area involved, but that in turn are complementary to each other and that all converge on the same objective: the implementation of the digital transformation policy according to the initial strategic vision. Therefore, to guarantee the coordinated operation of all the areas that are part of the digital transformation policy, it is recommended to focus on the alignment of strategic objectives in plans and program documents, as well as to have specific institutions dedicated to the design, coordination and monitoring; in other words, it is about laying the foundations for a comprehensive monitoring of the policy. Undoubtedly, one of the great challenges when establishing a public policy is its solidity and

permanence over time, something that is often threatened by the conjunctures and changes of governments that discontinue the initiatives of the previous administration.

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