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Bases for the digital transformation of the productive sector

An exploratory study of key
competencies in Peru

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ABSTRACT

The main objective of this research is to determine the basis of the key competencies necessary to achieve the digital transformation of public and private organizations in Peru. With this objective in mind, the conceptual framework involves the definition of a digital transformation in organizations and their impact on those organizations. Secondly, the article presented the results of the exploratory fieldwork conducted through in-depth interviews with ten executives from different productive sectors and analyzed them through content analysis. From this exploratory study, it concludes that all the experts interviewed agree on: i) the urgency of initiating a digital transformation process in small, medium, and large companies; ii) the need for training in digital transformation for company employees in all functional lines, giving priority to the commercial area; and iii) investment in the implementation process starting with cybersecurity and big data due to the impact on the operational and commercial results of the companies.

KEYWORDS

Digital transformation, Exploratory study, Key competencies, Peru, Productive sector.

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OBJECTIVE

A qualitative analysis through In-depth Interview in which the importance, training and implementation of digital transformation in different organizations is analyzed.

METHODOLOGY

An exploratory study, content analysis from secondary sources, showing the impact of digital transformation processes in companies in Peru and ten in-depth interviews are conducted with managers and businessmen.

RESULTS

Digital transformation seeks to change existing business models & business processes. It is concluded that all organizations must understand the urgency of implementing a digitization process.

LIMITATIONS

The data collection and the number of interviewees could have been broader.

PRACTICAL IMPLICATIONS

The literature review is supported by interviews that allow to analyze the perspective of digital transformation in terms of training, importance and implementation in companies in Peru.

1. INTRODUCTION

Companies increasingly face greater challenges at a competitive level because they operate in an environment where digital technologies have become essential tools for innovation in processes at all levels of the organization. According to Reis *et al.* (2016), business sectors have greater potential than others to develop digitally. Therefore, executives must adapt their business strategies to the current digital reality. The truth is that most companies do not know what methodology to follow in this initialization process towards digital transformation despite being aware of this need (Von Leipzig *et al.*, 2017). Therefore, the understanding and comprehension of the digital transformation in organizations becomes very relevant, so it is necessary to emphasize the implications that digital transformation could generate in the business world.

The existing academic literature shows different concepts about the meaning of digital transformation. On the one hand, it points out that digital transformation is a comprehensive organizational approach (Mergel *et al.*, 2019). Therefore, it is defined as a management trend generated by recurrent changes in information technologies (Reis *et al.*, 2016). Additionally, according to various research reports, it can be found that digital transformation is a strategic process where digital technologies manage to generate major structural changes in organizations. From this, it can be determined digital transformation has great implications for organizations that aim to digitize their structural processes (Vial, 2021).

From an institutional perspective, digital transformation is a fundamental axis in the institutional change in organizations. It combines various digital innovations that generate socio-cultural changes in an organization (Hinings *et al.*, 2018). Some companies seek digitization in their business models. It is not enough only to have digital assets but it is also important

to execute them effectively with the respective knowledge in digital issues (Verhoef *et al.*, 2021).

Given the current climate in which a growing wave of changes in terms of digital transformation within public and private organizations has been necessary, it is not surprising that this is seen as a paradigm shift and at times perceived as a technological revolution, without being far from reality. In addition, in these times of constant updating that organizations face, regardless of their size or expansion, each day brings with it the growing need to adopt transversal digital transformation skills also called soft skills, which are decisive and relevant when giving results in terms of efficiency, digitization or automation of processes.

The digital transformation of productive sectors in this research will be developed under interpretive approaches as well as for the analysis of results. Content analysis technique will also be used. This analysis aims to be objective, systematic, replicable, and valid due to the impact generated by digital transformation within some important Peruvian companies and the way in which they reflect the need to implement digital transformation disciplines.

Making a comparative analysis, the digital transformation in the private sector differs greatly from the public sector; this is mainly due to the management of processes at each organizational level. While the private sector is constantly implementing innovative digital tools in its functions, the public sector still lacks this due to the continued use of obsolete functional tools or bureaucratic procedures required in some processes. Moreover, according to various public sector specialists, digital transformation is a variant process that continuously needs to readjust and adapt to external influences that may arise over the years (Mergel *et al.*, 2019).

2. BACKGROUND OF THE DIGITAL TRANSFORMATION IN LATIN AMERICA

According to a survey of 600 executives in Colombia, Mexico, Argentina, and Brazil, 81% believe that the company they work for is undergoing a digital transformation process. Likewise, when asked how long their company has been undergoing a digital transformation process, 55% estimated that it has been going on for one and three years. Similarly, it is important to note that when asked about the areas in which companies were making the greatest effort in terms of investment to promote digital transformation: 49% indicated that this was the IT area, followed by sales (47%), marketing (43%), business intelligence (BI) (34%), operations (31%), human resources (25%) and supply chain (18%). In addition, when asked how much they agreed with the phrase "we need to hire and attract talent with digital skills," 50% of respondents agreed with the statement "we need to hire and attract talent with digital skills." In this regard, 50% of respondents strongly agreed with the idea (Glue, 2019).

In a concrete example, studies applied to the tourism sector on the digitization process; global experience reveals that business processes in this sector are increasingly taking place in the digital space. The use of big data, social networks, and Internet services is said to be part of forming tourism offers. Thus, e-commerce in travel and tourism services is increasingly becoming standard practice worldwide. So much so that by 2013 the volume of sales in the world reached the sum of USD 1.32 billion; by 2019, this volume reached the sum of USD 1.52 billion and, by 2021, it is estimated that it could reach USD 2.14 billion (Voronkova, 2020).

As we have seen, Latin America is no stranger to digital transformation. On the contrary, it is part of this adaptation process, supported by different executives from different companies in the region, highlighting its importance within the organization

compared to the traditional methods of managing, marketing, or directing previously. It should not seem strange that organizations that have started their digital transformation process have implemented, during the pandemic, the telecommuting of their employees more easily.

3. CONCEPTUAL FRAMEWORK

The digital transformation, duly accompanied by a cultural transformation, has led people and companies in different industries to adopt new digital skills or competencies daily to improve organizational performance and efficiency. Companies need increasingly skilled executives, especially when it comes to non-digital native generations. Below are the main skills required in any digital transformation process.

3.1. Digital transformation skills

Digital transformation can be enhanced by digital learning and technology to initiate digital change in organizations. Both are complementary because a correct transition to digital transformation will not be achieved without proper digital education of technology or digital tools. In addition, every organization needs to prioritize staying at the forefront of developing new skills. This trend will help organizations maintain a high degree of competitiveness in the market (Sousa & Rocha, 2019). The main people involved in the digital transformation are the same people who work in the organizations. Therefore, it is necessary to have people with high digital skills (van Laar *et al.*, 2018).

Several authors classify the skills for digital transformation according to their perspectives. In a research report, six skills were identified as contributing to digital change in organizations. Artificial intelligence (IA), nanotechnology, robotization, the Internet of Things (IoT), augmented reality

(AR), and digitization. Each of them arises from the need for organizations to face the challenges of the digital transformation phenomenon (Sousa & Rocha, 2019). Another research report agrees with Sousa & Rocha (2019) that the most relevant digital skills are the IoT, automation, robotization, and AI. Unlike the first report, the latter includes automation as an additional skill but only considers four skills for digital transformation (Arranz *et al.*, 2017).

On the other hand, according to Van Laar *et al.* (2018), we have the digital skills identified in the 21st century: information management, information evaluation, communicative expressiveness, shared communication, communication construction, communication networks, collaboration, critical thinking, creativity, and problem-solving. However, these same authors configured the number of digital skills. They reclassified it into six: digital information skills, digital communication skills, digital collaboration skills, digital critical thinking skills, digital creative skills, and digital problem-solving skills (van Laar *et al.*, 2019). In 2020, the same authors concluded that creativity and critical thinking skills are irrelevant to the digital context. They can perform more effectively in other domains outside of digital (van Laar *et al.*, 2020)

Finally, another recent research report details that digital manufacturing, the IoT, AI; additive manufacturing, cloud solutions, blockchain, and big data are considered digital innovations but not digital skills. Hence, organizations aim to invest in these digital innovations with respective digital skills to get maximum optimization from them (Shakina *et al.*, 2021).

3.2. Digital transformation in the private industry

The following are the factors that are driving digital transformation in organizations, mainly in the private sector:

3.2.1. Business digitalization

Digitization causes changes in companies at the operational, process, and organizational levels due to the use and adoption of digital technologies (Greeven *et al.*, 2017). Importantly, further digitization provides multiple mechanisms and possibilities for value creation by efficiently optimizing resource utilization (Nasiri *et al.*, 2017). That is, digitization is a means that allows companies to create a differential value that improves the user experience in digital channels and the optimization of business processes with respective efficient coordination (Pagani & Pardo, 2017). Furthermore, according to Greeven *et al.* (2017), digitalization is a key factor that helps to improve the internal and external efficiency of organizations.

There is a strong connection between sustainability and digitalization that merits considering them as key axes that will develop future production systems. This fact lies in the fact that while digitization is a trend-focused on technological advancement, sustainability requires a long-term commitment to reshape a manufacturing company's entire business approach. This correlation would imply that digitization would be fundamental to generating sustainable manufacturing (Maffei *et al.*, 2019).

Conjecturally, COVID-19 has caused dramatic effects on the commercial activities of companies worldwide. However, a plus point is that digitalization has become a key tool to help companies market their products through technology. As companies begin to make greater use of their digital marketing and sales channels, they will increase their digitization process. In addition, this process will help to promote telecommuting and the consumption of technological products through hybrid communication channels (blogs, social networks, etc.). Users will interact in an accessible way and will be able to participate in the experiences obtained with each of the products offered by a company (Almeida *et al.*, 2020).

Finally, digitization influences all organizations. Therefore, they should establish a proactive approach because the market is very changing and competitive (Greeven *et al.*, 2017). The effect that digitalization is generating is transversal in the areas of marketing, sales, and technology, so new work formats originate where cybersecurity will become a key element for the integrated development of technological solutions for the IoT, AI, big data, and robotics (Almeida *et al.*, 2020).

3.2.2. Artificial intelligence (AI)

The concept of AI relates to an intelligent system created for the analysis or observation of computational data that allows the performance of specific non-automated activities (Antonescu, 2018). AI is generating a great impact on those organizations focused on technological investment in their processes. This type of system requires the use of highly trained people for its correct execution. In addition, the success of organizations will depend on the proper implementation of a learning culture and the continuous development of new skills by staff (Infosys, <https://www.infosys.com/>).

AI is gaining great relevance in organizations, but mainly in three functional areas: finance, operations, and marketing. At the operational level, AI is key to achieving persuasive operational transformations in most current organizational configurations, such as applying synthetic technology in operation and maintenance of electrical equipment (Zhang *et al.*, 2020). AI at the operations management level involves strategic, operational, and tactical level decision-making. Strategic level decisions involve product and service design, quality management, process and capacity design, process design, automation level, material handling equipment selection, human resource management, and logistics and supply chain management. Operational level decisions involve job allocation, workforce allocation, work-

force level, inventory control. Tactical level decisions include managing day-to-day operations, such as purchasing and supply management, manufacturing, and logistics (Dhamija & Bag., 2020).

At the financial level, every time, more sophisticated AI systems are created. Companies in this sector are adopting it to provide customers with a great service experience. The causal effect of this disruptive technology is positive as it contributes to improving organizations' financial performance and market capitalization (Kumari *et al.*, 2021). At the commercial level, a research report details that AI influences all aspects of the marketing mix and is applied in various areas of marketing: image recognition, text, voice, robots, autonomous vehicles, and decision making where the application of voice recognition is being used on a large scale by large commercial companies such as Amazon, Google, Apple or Microsoft. In addition, AI is managing to change the delivery of value and the consumer shopping experience because companies are applying different dimensions in the marketing area, such as 24-hour customer service, hyper-personalized solutions, and digital shopping, among others. These dimensions greatly influence the functioning of marketing departments and organizations (Jarek & Mazurek., 2019).

In sum, AI will be most effective if it succeeds in augmenting (rather than replacing) human managers. Moreover, AI is likely to substantially change marketing strategies and customer behavior (Jarek & Mazurek., 2019).

3.2.3. Enterprise Internet of Things (IoT)

The IoT has a great impact in different areas such as industry, health, education, agriculture, and livestock. Its main functions are to make our lives easier and more accessible. Implementing this new technology in any business model has advantages. Still, also all actors (companies, governments, and consumers)

in this field should be aware of some challenges and threats such as privacy, security, and standardization. Therefore, the efforts of all IoT players: device vendors, operators, platform providers, system integrators, application providers, governments, and consumers must come together to ensure a safe and secure environment for communication and exchange of personal data. IoT integration should follow a certain vision and idea, identify opportunities to use the technology, attract commercial and government institutions, and build a culture of IoT use (Angelova *et al.*, 2017).

The IoT is a digital tool that allows the collection and analysis of data through different digital technologies. This technology generates a great impact on companies focused on analyzing their consumers' behavior through data analysis. However, companies should constantly monitor the manipulation of collected data as they could easily be hacked without a security level capable enough to counteract high levels of information hacking (Nguyen & Simkin, 2017). IoT can generate new markets and value networks by connecting existing information, networked economies, and societies (Nasiri *et al.*, 2017).

IoT is a developing and growing trend at the enterprise level with a huge potential to be exploited in the coming years (Tang *et al.*, 2018). Moreover, at the customer level, IoT enhances profitable customer-company relationships through the application of Customer Relationship Management (CRM); to do so, companies must stay ahead of customer expectations and the emergence of market trends (Yerpude & Singhal, 2018). Customer experience is a major factor in achieving customer satisfaction; achieving this connectivity is an additional advantage. Therefore, in the connectivity achieved with the help of IoT, the business strategy of an organization in the current scenario should include customer-centric objectives as a part of CRM. It should be kept in mind that the most crucial role in CRM operations is the effective

management of information arising from customer data collection, as the greater the real-time data, the better the decision making and damage control will improve (Yerpude & Singhal, 2018).

3.2.4. Enterprise nanotechnology

Nanotechnology has several novel and successful applications in various fields and industries (Babatunde *et al.*, 2020). It is applied in multiple sectors, e. g., agriculture, biomedical and military equipment. In addition, nanotechnology has a great impact on the development of smart cities (Gupta *et al.*, 2020); similarly, it is observed that it can generate a great technological and economic revolution that has never been recorded before (Babatunde *et al.*, 2020).

Nanotechnology has the potential to develop smart cities through the use of different nanomaterials for energy storage, smart building construction, infrastructure, smart textiles, environmental remediation, and nanoscale photonic technologies, among others (Gupta *et al.*, 2020). All of this could generate, for example, that the real estate sector seeks to implement nanotechnology in its business processes to improve productivity in the industry. In sum, nanotechnology will benefit humans in different aspects: economic growth, health, longevity, environmental protection, security, social vitality, and the improvement of human capabilities (Purohit *et al.*, 2017).

3.2.5. Enterprise virtual reality

Augmented reality (AR) is an emerging interactive technology that complements the real-world environment with virtual objects. Augmented virtual reality is transforming the way people shop in the digital channels that companies operate; for example, in the retail sector, augmented reality is being implemented as a digital tool capable of creating a differential value to improve the customer's shopping experience (Haumer *et al.*, 2020). In

addition, it is important to mention that various organizations in different sectors are adopting virtual reality: retail, automotive, health, etcetera (Upadhyay & Khandelwal., 2018). AR differs from virtual reality because the former is accessible to any digital device, and the latter requires specialized digital devices. The other difference is that AR immerses the user in the real world experience while virtual reality only immerses the user in the "virtual" world.

The developments that are taking place in AR involve the consumption of internet technologies, the export of information technologies, and the growth of mobile technology markets; for example, some companies are using 3D simulations, 4k to monitor the quality of products or services provided. However, the use of this tool is not accessible enough for all companies given its high cost to implement it; therefore, it is a great opportunity to create a competitive advantage in the market for those companies that have sufficient resources to implement it (Zhao *et al.*, 2019). AR is mainly affecting the retail sector, where trends in this sector are changing the market environment and the expectations of customers in the buying process. Therefore, companies must innovate the online shopping experience by implementing AR (Haumer *et al.*, 2020).

3.2.6. Enterprise robotization

Robotization is in a transition towards Industry 4.0, that is, having a greater number of robots to develop specific activities in an organization (Higgins-Desbiolles, 2006) (Rojko *et al.*, 2020). Robotization affects the labor market. Because as robotization increases, working hours decrease. Companies would compensate for those non-working hours by implementing robotization. In the coming years, it will be observed that companies will choose to prioritize robotization over labor because overall costs would be higher in the latter case than in the former.

Another relevant effect that could occur is that robotization increases to a greater extent in large firms than SMEs; this is because large firms have an easier time implementing robotization given their availability of greater capital and assets than SMEs (Cho & Kim., 2018).

Implementing robotization in production processes increases competitiveness in different economic sectors (Tyurina *et al.*, 2019). Therefore, robotization would also greatly influence an organization's employability and labor productivity. In contrast, it was stimulating further learning about the effects of implementing robotization (Rojko *et al.*, 2020). In sum, it can be inferred that Industry 4.0 will cause an increased demand for new digital knowledge and skills to help improve productivity in a digitally transformed organization (Rojko *et al.*, 2020).

The **Figure 1** presents an overview of each factor and the functional area of application within the organization, which allows understanding in a specific way the main factors of digital transformation.

3.3. Digital transformation in the public sector

As described in the different applications of new technologies and trends in the business sector, analyzing their development in the public sector is relevant and equally important.

The study conducted by ECLAC, CAF, ASIET, and Fundación Telefónica indicated that digital transformation is a process that requires the coordination of the public and private sectors to promote the massification of the use of technological tools and make the use of the Internet more productive for society as a whole. In Latin America, Colombia's "Vive Digital" plan stands out, which for the first time in the region proposed a holistic approach to the digital transformation process (International Chamber of Commerce, 2016).

In the public sector, digital transformation is of paramount importance because it can help restore users' trust in public institutions, making them more credible, efficient, inclusive, and innovative. Thus, citizens will trust public agencies more if they adopt public policies that promote a culture of transparency,

Figure 1. Factors of Digital Transformation

Business digitalization	<ul style="list-style-type: none"> • Digital Marketing and channel. • Functional area: Marketing, Logistics.
Artificial Intelligence (AI)	<ul style="list-style-type: none"> • Analysis or observation of computational data. • Functional area: Finance, operation and marketing.
Internet of Things (IoT)	<ul style="list-style-type: none"> • Collection and analysis of data through different digital technologies. • Functional area: Finance, operation and marketing
Enterprise nanotechnology	<ul style="list-style-type: none"> • Improve productivity in the industry • Functional areas: Series Production
Enterprise virtual reality	<ul style="list-style-type: none"> • Interactive technology that complements the real-world environment with virtual objects. • Functional areas: Series Production: Marketing and sales.
Enterprise robotization	<ul style="list-style-type: none"> • It has a greater number of robots to develop specific activities in an organization. • Functional areas: Series production, administration.

Adapted from: Parviainen et al., (2017), Antonescu, (2018), Angelova et al., (2017), Babatunde et al., (2020), Haumer et al., (2020) & Tyurina et al., (2019).

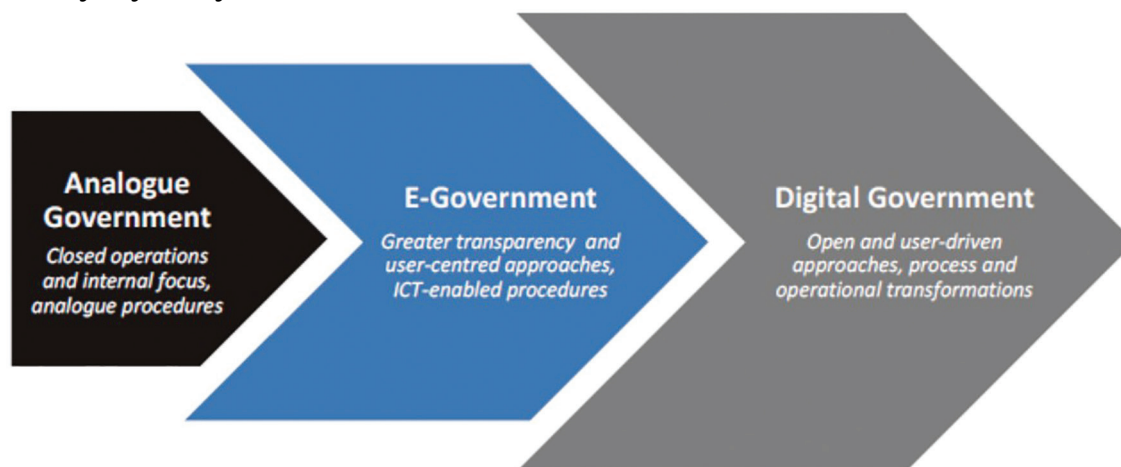
access to information, and control over the use of public funds. In addition, there is the advantage that digital transformation can benefit by generating greater efficiency by simplifying complex bureaucratic systems. In this sense, the digital transformation of governments can favor the achievement of more inclusive public services, especially in the context of the pandemic. Finally, digital tools can help administrations use new data sources and be more innovative in the way they approach public policies, which will benefit policy-making processes (OECD *et al.*, 2020).

However, despite the significant importance of digital transformation, in Latin America, there are no interconnected strategies that allow governments in each country to attract or retain digital talent to fulfill the digital transformation mission. As is the case in the private sector, the public sector faces particular challenges to achieve this goal. To mention a few: i) there is no political will to maintain or retain digital

talent since it implies a medium or long-term investment, which is not very attractive for any politician; ii) there are good initiatives, but they are isolated or do not last over time, they are developed according to the government of the day; iii) there is a mistaken belief that the issue of digital talent is only focused on the IT area or similar of a public entity, however, as it is known, digital talent is present at all levels of public administration (Estevez *et al.*, 2021).

The transformation process is present in the public and private sectors. The term Digital Administration is used instead of analog or Electronic Administration. Not only Information and Communication Technologies (ICT) are used, digital tools are an integral part of the modernization strategies of public entities, implying an interconnected digital ecosystem. Thus, **Figure 2** shows the transition from an analog administration to a digital administration.

Figure 2. *From Analog to Digital Management*



Adapted of: OECD (2020)

3.4. The impact of digital transformation

New technologies have revolutionized how companies generate value and do business, promoting them to resort to different digital tools, such as big data, AI, and robotization. These technologies improve the organization's operational efficiency by optimizing process management and improving market orientation through an advanced understanding of the market (Cenamor *et al.*, 2019). Additionally, it should be noted that they generate an improvement in communication with existing or potential customers and allow a better understanding of what is required, thus developing customized offers and products to the customer's specific needs (Barnes *et al.*, 2012).

It is under the existence of information technology infrastructure and the management decisions on the future development and investments made in new IT tools and services that the impact of digital transformation in different sectors of the economy can be glimpsed. Therefore, diverse stakeholders must be involved in the digital transformation process, but the main factor is the customer or user. During the decision-making process, and especially during its implementation, many organizational objectives will undergo some level of change (Dobrica, 2020). However, it is also worth noting that companies increasingly understand the fundamental impact of digital technologies on people's daily lives and internal processes, which is important because they focus their attention and develop business strategies (Wengler *et al.*, 2020).

In the financial sector, a significant impact from the digitization process encompasses digitization and computerization. Today, finance is the most globalized segment of the world economy and one of the most digitized and data-intensive. Thus, the transformation process can be observed along four major axes: the emergence of global wholesale markets, an explosion of financial technology companies since 2008, an unprecedented digital economic transformation in developing countries, and

the growing role of large technology companies in financial services, as well as increasing real-time interconnectivity between systems (Buckley *et al.*, 2019).

The outsourcing sector is undergoing disruption due to the technological revolution. Issues related to digitalization have generated new challenges for the outsourcing market, such as restructuring traditional ways to create value and rethinking or reconfiguring an organization's line of business. The objective of the organizations is to maintain their competitive advantage in the market (Mazumder and Garg, 2021).

This impact can also be seen through the various tools used to capture a wider audience, such as digital marketing channels that provide cost-effective means of reaching a large audience and disseminating information about products and brands online. Social networks share content among an interconnected group of users, usually in text, photo, or video, using two-way communication or eliciting user-generated content to create word-of-mouth effects. The main objective of mobile applications is to develop consumer connections and attachment to brands through information, promotion, and entertainment. Common characteristics are the development of trust, the ability to rate the quality of a product or service and user experience, and the ability to quickly and easily pay for the product or service within a mobile application (Matarazzo *et al.*, 2021).

It should be noted that the impact of digital transformation has been such that more and more companies are beginning to take advantage of investment in technology, specifically investing in technology to understand their customers through CRM better. This vision is because they seek to understand the buying and selling behavior of their customers. Thus, through social networks, they promote digital communities both to know their customers better and build customer

loyalty; this is seen, for example, in consumers of medical services (Sánchez, 2016).

One of the keys for digital transformation to impact organizations is through collaboration. This process can occur, for example, through project work with multidisciplinary teams, through universities, through think-tanks, and even through the customers themselves. But to have new ways of working and organization that replace the traditional rigid methods pre-established (Kane *et al.*, 2015).

So, it can be said that there are many ways to understand, define and apply digital transformation in organizations. The main characteristic of digital transformation is that it causes a major change and introduces new ways of running a company. Digital transformation, according to many professionals, is a major paradigm shift in which they start doing things differently. This business change is generally based on the intelligent use of information and the technological tools available. These include the use of i) mobile applications in a maximized way, ii) the use of AI, iii) machine learning, iv) cloud computing, v) the existence of large data packets of information, vi) larger analytics spectrums, vii) chatbots, viii) the IoT, ix) virtual and AR, and many other new digital tools and services (Dobrica, 2020).

Finally, the impact that digital technologies can have within an organization can occur on two fronts: on the one hand, can serve for companies to achieve internationalization and can help to provide small businesses with new tools and views to reach future global customers, as well as to rethink new forms of organization, both operationally and economically. The role of the Internet as a communication/sales channel between the company and its customers is becoming more and more important today, as it serves to support the early and rapid global growth of the company through greater diffusion (Denicolai *et al.*, 2021).

4. METHODOLOGY

An exploratory study is carried out, starting from content analysis from secondary sources, showing the application and impact of digital transformation processes in three large companies in Peru. Next, ten in-depth interviews are conducted with managers and executives representing the main economic sectors in Peru.

The impact of digital transformation on the business sector is latent. In the case of Peru, this impact is even clearer since we have the direct testimony of the main Peruvian business leaders. Below are some of the testimonies collected from three Peruvian companies on digital transformation (Dañino, 2019).

▪ Primax

In the fuel and services sector, the company Primax stands out; the efforts developed by this company to prioritize technology focused on the use of big data, which has been useful to have a more detailed profile of its consumers and reach them more accurately. This technology was achieved by developing the "Primax Go" application, which allows customers to pay from their cell phones at the point of sale. Primax has been undergoing the IoT has played an important role in the digital transformation. Specifically, it has enabled its operational efficiency by having an alert system that notifies when a fuel station has reached its refueling level.

▪ Rímac

The insurance company Rímac has used digital tools as part of its digital transformation process to improve its customers' shopping experience. In addition to the tools used, Rímac highlights having personnel trained with these tools, specifically in data analytics and customer journey experience. Thus, Rímac currently provides four digital services: i) virtual inspection, which allows the user to inspect their vehicle through the company's

application; ii) geolocation, which allows the user to report a claim with a button; iii) online speed, which allows the user to use the WhatsApp channel to process minor incidents and avoid charges; and, iv) e-workshop, which allows the user to receive notifications and photos on the progress of recovery of their vehicles.

▪ **Alicorp**

In the mass consumption sector, the digital transformation experienced by Alicorp stands out, which has embraced digitization as a strategic business element, giving life to the brands it manages through social networks. Likewise, Alicorp has created three types of digital enablers: digital per se, focused on e-commerce and digital customer experience; robotization, focused on improving the processes and productivity of the company's plants; and the management of big data and analytics.

4.1. In-depth Interview analysis

In order to know the different perspectives that business stakeholders have regarding the importance, training and implementation of digital transformation processes within their organizations, managers from different economic sectors in Peru were used to obtain primary sources through of in-depth interviews.

The main goal of the study is to understand the context of the digital transformation processes in private companies in economic sectors that are protagonists in the Gross Domestic Product (GDP) of the country. The participation for the year 2019 in the GDP of the industrial and commercial sector was 36.6% and services 63.4% according to the National Institute of Statistics and Informatics of Peru (INEI).

In-depth interviews were conducted with 10 experts to determine their opinions and expectations about implementing digital transformation in the companies in which they work; in particular, their argument was considered concerning the competencies required by managers today to participate in the digital transformation process.

For this purpose, the digital competencies model developed by the Academic Network of Digital Transformation (Radigital) was taken into consideration, which consists of separating the disciplines according to the role that the digital world represents in the organizations, on the one hand, the impact on the consumer experience, on the other hand, the necessary technological equipment and finally the role of senior management in the digital transformation process. **Table 1** defines the three groups.

Similarly, the questions suggested in the digital competencies model created by Radigital were adapted to develop the script.

Table 1. Corporate digital transformation groups

	Digital Customer Experience	Digital Technology	Digital Management
Definition	Group in which different disciplines of corporate digital transformation are addressed, focused on improving the customer experience and facilitating the achievement of business objectives.	Disciplines that facilitate operational development focused on optimizing processes, products, services, and effective decision-making.	Level of specialization in the direction and management of change. Ability to effectively implement technology that contributes to the improvement of most of the organization's cross-cutting processes.
Main disciplines	E-Commerce, Inbound Marketing, Social Media. CRM and marketing automation, etc.	Big Data, Cybersecurity, Virtual Reality, Augmented reality, etc.	Digital talent management. Digital innovation. Agile project management. Data governance, etc.

Source: Adapted from Radigital (<https://www.radigital.co.uk/>)

Table 2. Interview script

Category	
Importance of digital transformation disciplines	1. According to three groups of disciplines, to your professional experience, which do you consider the most important and why? 2. Of all the disciplines mentioned in the interview, do you consider that any should be added? It may not be related to the groups identified above.
Digital transformation skills training and education	3. Of the three groups of disciplines, indicate which ones are fundamental in forming a good work team? 4. According to your professional experience, in which disciplines do you prioritize internal and external training programs within your organization?
Implementation and investment in the different disciplines of digital transformation.	5. If your company invests in digital skills: which group(s) do you allocate the most important? 6. What have digital transformation disciplines your organization implemented? 7. What digital transformation disciplines have not been implemented, and do you consider they should have been implemented? Do you have the budget for it?

Own elaboration

As shown in **Table 2**, to know the opinion of each expert, they were classified into three categories: i) importance given by the organization to the digital transformation process, ii) training or knowledge of the collaborators in digital transformation, and iii) implementation within the organization and investment of the necessary skills for the digital transformation of the organizations.

4.2. Selection of experts

After reviewing the literature on digital transformation and its impact on organizations, the questions presented in Table 2 were prepared. This script made it possible to identify the competencies needed to transform organizations and prioritize the training and knowledge acquisition processes. To determine: the sample of experts, the experience in different economic sectors, and their responsibility in the company for decision making were considered, they had to occupy the positions of directors, managers, and heads in the industrial, productive, mass consumption, and services sectors, as well as they, had to have experience in the private sector or the public sector.

The experts interviewed, the position they hold and the sector, and their years of professional experience are presented in **Table 3**.

4.3. Analysis of results

The content analysis technique was used to analyze the results in the different interviews with the ten experts. The results are presented below.

Regarding the importance of carrying out digital transformation processes in an organization, Gilmer Cacho indicated that the Digital Technology category would be the most important because it helps manage the implementation of digital tools currently used by organizations. In the second place, he would prioritize implementing the Digital Customer Experience to improve business competitiveness.

Alberto Demarini indicated that digital transformation is linked to two factors: the adoption and use of technology, and on the other hand, open-mindedness related to management to adapt business models, which is why he prioritizes the importance of Digital Management. Similarly, Christian Aste mentioned that

Table 3. List of experts interviewed

No	Name	Position	Sector	Years of professional experience
1	Gilmer Cacho	CEO	Industrial	20
2	Alberto Demarín	Intelligence Manager	Services	10
3	Carlos Mendoza	Commercial Manager	Services	20
4	Christian Aste	Marketing Manager	Services (Finance)	10
5	Milagros Patiño	Human Resources Specialist	Services	20
6	Oscar Pastor	CEO	Services (Water)	30
7	Fabiola Pasará	Manager Brand Communication	Massive consumption	9
8	Ángel Martínez	Human Resources Manager	Fishing, hydrocarbons and massive consumption	15
9	Jimmy Solís	Operations and TI manager	Industrial	16
10	Rafael Estrada	Systems, Telecommunications and Process Control Manager	Industrial (Mining)	25

Own elaboration

this category is crucial for implementing a digital transformation process within any organization; his justification focuses on the fact that Digital Management belongs to a more global scope than the other two categories.

The opinion of Carlos Mendoza, who gives a different point of view to that expressed by Aste and Demarini, is surprising; for Mendoza, the Digital Customer Experience category is more important than the other two categories. These would take a back seat because they are not relevant, and their application in the country would not be necessary. Customer satisfaction becomes the central axis to be able to execute the digital transformation efficiently. Therefore, it is essential to continue looking at the customer as the main focus for digital transformation.

Regarding the lack of any digital transformation discipline within the groups mentioned, Cacho and Mendoza agreed that it would not be necessary to add any since there is a wide range of

digital disciplines and not all people. Depending on the management position, they hold, handle the concepts of each of them because all of them in one way or another are in different areas of work and handle other ideas or have specialized in certain disciplines.

About the Digital Management category, Demarini would add the understanding of an organization's digital maturity and make the right decisions with a clear and accurate diagnosis based on it. Similarly, Aste mentioned that he would add how to work the digital culture and devise a daily way. Implementing a methodology to avoid manual processes such as signatures and bureaucracy in procedures would be important; this would also be called culture towards digital transformation. Finally, he pointed out that it would be of utmost importance to evaluate the impact generated by investments in digital media (social networks) to achieve an effective Digital Customer Experience

and assess which would be the most appropriate and most profitable in the long term.

Regarding the category of training and education in digital transformation skills, Fabiola Pasara mentioned that due to the pandemic, e-commerce represents a very important channel because it allows to reach the consumer more directly and allows to manage better margins and better costs. Finally, it is not necessary to have an intermediary. Next, consider Digital Management, specifically Digital & Visual Analytics, because it allows us to understand the behavior and analyze the data to make a better decision or transaction finally. Similarly, Customer Journey Experience, although it does not generate a direct trade, is important because it allows us to understand consumer behavior to make the best decisions. A fourth discipline would be Display Marketing & Programmatic, an appropriate way to reach the right message to the target audience. The fifth variable would be implementing digital platforms within the company's process to maximize and make it more efficient. In this way, the involvement in training prioritizing the Digital Customer Experience group stands out.

On the other hand, Oscar Pastor commented that it could be summarized in two fundamental components necessary for training. The first is related to Digital Talent Management in the top management of organizations because it is not very common that these issues are discussed at the top of the company. It is important to train managers who have a clear vision of digital transformation. On the customer side, there is more and more intention to generate information, more ability to make decisions, so Big Data is required; however, it should be noted that this Big Data must work in tandem with AI. These two disciplines must be linked with digital innovation, not only as a strategic option for third parties but also from the company itself.

Milagros Patiño, for her part, indicated that the automation of processes is fundamental through robotization and that there is a great deficit of training in most organizations. She said that in Digital Talent Management, related to personnel, managing performance evaluations and personnel information requires digitalized information. Another important aspect that he highlighted is Agile Project Management, related to project management, where you have to plan or organize. He also pointed out the relevance of Big Data due to the large amount of information managed in human resources.

For Ángel Martínez, the Customer Journey Experience is extremely important and requires a constant training process because the experience is more important than the product. This process currently marks the loyalty process. He also highlights CRM, which is no longer a future discipline but something that all companies must have. After that also highlights the roles of Big Data, AI, and Data Analytics. Today, this is the most demanding in the professional profiles of companies.

Regarding the disciplines with the greatest supply of educational training, Pastor indicated that Social Media Management is one of the areas with the greatest knowledge and demand. Patiño and Martínez agree that e-commerce and digital innovation aimed at different sectors are the disciplines currently in greatest need of training. Martínez commented that, for example, the corporate groups Breca Caferatta (Breca), Rodríguez Pastor (Intercorp), and Romero (Credicorp) had set goals in terms of many people to train them in Data Analytics and BI. In addition, he also considers Agile Project Management; based on the results it has been giving; there are greater investments by the companies.

For his part, Pasara pointed out, from his professional experience, the disciplines with the highest demand for training are Web Analytics and everything related to e-commerce; this

is essential because it focuses on the buying process. In his opinion, Social Media Management is also relevant; from his position in the company, he comments that they always hire based on knowledge of Social Media Management. They look for a profile with this type of skill. Finally, he points out that Digital Events are a topic discussed a lot and is highly demanded.

Regarding investment and implementation, Patiño indicates that the greatest asset in digital disciplines is focused on the Customer Journey Experience, CRM, and customer service, mainly towards the Digital Customer Experience, an opinion shared by Pasará and Martínez.

For his part, Pastor indicated that it depends on the employee's position since those who are more linked to sales will be more focused on the customer, so companies will be concerned about training their employees in Digital Technology. At the same time, those who are less opposed to these changes will be more oriented to Digital Management.

In terms of implementation, Jimmy Solis indicates that cybersecurity is one of the most implemented disciplines today. This implementation is due to the constant audits that most companies are facing. Secondly, there is Big Data because decisions are made based on information, so it is sought to extract it by all possible means such as ERP, CRM, or simply in Excel files. All this information is derived to a central, where it will be analyzed to make a strategic and operational decision.

Agile Project Management offers the opportunity to manage uncertainty efficiently. In Calaminon, the company where he works, the Human Resources area is actively developing initiatives that promote the implementation of this discipline at the management level.

Similarly, Solis indicates that Calaminon has accelerated the implementation of cybersecurity mainly because administrative employees are working remotely. Some of them handle financial

information, so it is of utmost importance to quickly implement security policies to safeguard its IT assets. In addition to this, he pointed out that within organizations today; most employees are evaluated based on results, which is why there is a certain rejection of change on the part of employees who must adapt. Inevitably, this leads to the abandonment of many initiatives. Since 2018, Calaminon has been working on promoting a Digital Mindset, which changes the beliefs of workers and makes them identify how technology facilitates activities and generates value to their work positions.

In terms of investment, this is mainly focused on Digital Technology, followed by Digital Management and finally Digital Customer Experience, according to Rafael Estrada's comments. The nature of the business specifically influences this investment. Regarding Digital Technology, Estrada emphasizes that it is mainly about organizing and building the foundations by collecting data, developing data architecture, data preparation, and implementing Big Data projects.

At Antamina, the company where Estrada works, one of the areas where the greatest degree of investment is focused is in the use of virtual reality solutions. These solutions are mainly used for training activities. Due to the pandemic, it has been difficult to travel to the places where the practices are carried out. In this sense, this technology is applied to train operators, supervisors, and personnel in general. It is also used for topics related to industrial safety such as inspections, verification of conditions, and verification of behaviors.

Regarding Digital Management, Estrada indicated that work is being done on developing widespread and extended knowledge, especially in Visual Data Analytics, which is the first stage of advanced analytics. All this is done through easy-to-use interactive visual tools. Additionally, we are working on data governance, hand in hand with developing the company's data architecture.

On the other hand, another important investment area is in Agile Project Management, in which we seek to gradually adopt agile work methodologies of the "Squads with coaches" type. For this purpose, a large group of squads working hand in hand with a consulting company helps develop this practice. Finally, Digital Customer Experience mainly focuses on creating customer service and social media presence management.

5. CONCLUSIONS AND FUTURE RESEARCH

There is a global trend in the organizational field marked by the imperative need to develop or adopt new skills to transform organizations in all economic sectors effectively. Industry 4.0 is generating a demand for new digital knowledge and skills to increase the productivity and competitiveness of companies. In general, in all the industries studied, both by secondary sources and by the exploratory field carried out, this also occurs in Peru.

New technologies are changing the business models that companies follow to generate value, allowing them to use different digital tools, such as big data, the IoT, AR, and robotization, among others. These technologies improve operational efficiency by optimizing process management and improving market orientation through an advanced market understanding. These companies begin to make greater use of digital marketing and sales channels, increasing their digitalization process. This process will help drive telecommuting and the consumption of technological media through hybrid communication channels, where users will be able to interact remotely with companies. In practice, it is observed that transnational companies and large economic groups with operations in Peru were the first to worry about developing the skills required to implement these changes in their executives.

Cultural and digital transformation seeks to change existing business models, business processes and redefine the ways in which processes are managed within organizations, so that we can adapt these new trends to the current moment, and thus not lose competitiveness. Therefore, it is important to understand that organizations (public or private) should not look to the past or cling to the present, as they run the risk of losing the future.

Confirming the above, all interviewees agree that all organizations, public and private, in all economic sectors, in general, must understand the urgency of implementing a digitization process. To remain competitive in the markets, small and medium-sized companies must also begin the digitization process and not only leave it to large companies or large corporate groups to do so, thanks to the greater resources they have at their disposal. However, there is a large gap between the digital transformation processes initiated in the private sector versus the public sector, which lacks a budget and has a lack of continuity in directive managements.

Regarding training needs, experts also agree on the needs of employees in the different areas of the company. Companies must allocate budgets, and educational institutions, for their part, must generate offers that respond to these training needs. In addition to the significant gap in the public sector compared to the private sector shown, there is a generational gap, where digital natives show higher productivity. This situation reveals the change in priorities and determines the speed of response with which the stakeholders involved must act. Regarding training needs, there is a greater interest on the side of both companies and employees in training in disciplines related to the Digital Customer Experience, given its impact on the results of organizations. Experts believe that the priority of activity in a profession depends on the company's line of business and the position or

functions performed by the employee. Finally, concerning the implementation of processes, experts point out that in Peru, there is a greater investment in cybersecurity and the use of Big Data due to their impact on the customer experience and the optimization of commercial budgets, respectively.

Likewise, they point out that the incursion of these disciplines has been accelerated due to their usefulness and the value contribution they offered to the country's economic deficit and social situation.

In the end, experts pointed out that it is necessary to change the mindset of employees regarding the use of technology to

improve and optimize its adoption. Part of the implementation success of a digital transformation process begins with the awareness of employees and understanding the organizational culture as a starting point within the company.

This research is exploratory, broad, and general study applied to various industries in different economic sectors in Peru. The experts interviewed have extensive professional experience in both public and private sectors, in the latter, in medium and large companies. Future research could focus on one of these sectors and conduct a descriptive study, using quantitative instruments to confirm the clues found.

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