



# 2021 Digital Trends

Shaping a  
new world



# Index

08 – 14

## Executive Summary

15 – 32

TREND 01

### The New Digital Journey

COVID-19 has brought about a global change in the way of life. With the rise of the Low Touch Economy, the interactions between business and consumer have undergone a complete revolution, giving way to an entirely digital Customer Journey. Companies must adapt their business and operational models to this new reality, where digital acceleration is the main solution.

33 – 52

TREND 02

### Digital Buyers Revolution

The pandemic has transformed the consumption patterns of millions of people, resulting in a total opening up to digital channels. To meet this type of demand, companies must develop a strategy to optimize their digital sales platforms, focusing on operational automation and business innovation. The way of selling must be reinvented.

53 – 65

TREND 03

### Technology Discovers Emotions

In an environment where 100% digital interactions are the norm, society needs more than ever that companies be able to humanize touchpoints. Technological advances in AI, Affective Computing and sentiment recognition are managing to decipher our emotions, allowing us to anticipate our needs and customize experiences as much as possible.

## 66– 81

### TREND 04

#### **Democratic Artificial Intelligence**

An intelligent technological ecosystem is one of the pillars of digital acceleration. In this sense, Artificial Intelligence and its diverse applications are an area that is becoming increasingly more democratic, becoming a tangible and tactical element, as a result of the progressive increase in knowledge about its operation, learning, evolution of skills and decision-making.

## 82 – 94

### TREND 05

#### **My Digital Self**

The digital era, driven by the new context, poses the following dilemma: why can't we do everything we do in physical form in digital form? In an ideal scenario, both worlds should offer the same scope. In fact, the digital ecosystem offers greater availability, portability and convenience. However, this situation involves a challenge: privacy management.

## 95 – 112

### TREND 06

#### **Digital Enterprise Architecture**

The blazing technological advance is encouraging the development of 100% digital business architectures. This approach enables the implementation of a business and operational model with maximum control, scalability, elasticity and cost reduction; where automation, a flexible data network and the deployment of modular business capabilities become essential aspects.

## 113 – 126

### TREND 07

#### **Other Digital Topics Trending**

# Editorial



**Rafael Conde del Pozo**

*Digital & Innovation  
Director, Vector ITC.*



The tragic and turbulent year we have lived through will mark the beginning of a 2021 full of uncertainties and challenges that the global economy and companies will have to face; but if there is one reality that no one doubts anymore, it will be a clearly digital year. The dramatic change towards a fully connected economy and society has accelerated changes in all areas, forcing **companies to transform themselves in order to readapt business models to the new reality.**

We are entering into a stage of continuous digital acceleration where the need to innovate and digitalize all interactions is becoming more and more demanding in a highly competitive environment that requires agility, speed and boldness to meet the needs, expectations and challenges of a completely digital client. The agility in competitive adaptation in a context where consumer habits have changed, forces to **reinvent the entire value chain to adapt effectively to digital channels** and the new rules imposed.

The technology allows us to know, track and personalize the interactions between customers, brands and products through the advanced exploitation of all the data generated in these touchpoints. Increasingly demanding expectations will force companies to move forward in automating all processes and **evolve digital customer touchpoints with a high degree of customization**, speed and proximity.

In the near future, customers will not only demand more technology in products and services, but will require a more **human and personalized technology, which generates unique and emotionally charged interactions**. It will be of vital importance to incorporate the power of data analysis, predictive analysis, Affective Computing, emotional recognition and all the capabilities offered by Artificial Intelligence in the simulation of human behavior. Technology must act as an ally in the humanization of digital interactions.

All these advances lead us to a context in which **AI is presented as a real, close and assumable opportunity** for all organizations. The industrialization of this technology through accessible, scalable and reusable platforms allows a global access to all companies, allowing to balance the competition between large and small organizations.

In short, the opportunities for organizations in this digital context are enormous, but they require a complete redesign of the business architecture that allows them to serve the new needs of interaction with customers, process automation, redesign of business models and efficiency in the operational model. The **need for a completely digital business architecture** becomes essential to meet the challenges imposed by the market and the opportunities that are generated in such a transcendental changing moment.

In this report we review some **emerging technologies that can generate exponential increases** in business in different sectors, as well as other trends that have been growing at an accelerated pace and provide specific benefits to different areas of the companies' value chain. We invite you to analyze them, with the aim of strengthening the desire to innovate and experiment to show the benefit they bring, not only to organizations but also to the lives of individuals and society.

The COVID-19 health crisis is already on the way to being solved thanks to the important progress made by the research efforts of the large pharmaceutical companies to achieve an effective vaccine. The economic crisis derived from this pandemic can only be overcome with an effort of innovation and digitalization that will bring us a "technological vaccine" that will allow us to immunize, strengthen and recover the vital systems of our companies, which have been so damaged by the situation. The most powerful and disruptive technology is ready to be implemented across all layers of the business.

Innovation is the only driver capable of **producing a real, lasting, sustainable and profitable transformation**, and in this scenario, technology is the most powerful resource we can use to drive us, something that is critical to business recovery and global economic restart.

# Editorial



**José Tam Málaga**

*Digital Transformation  
Vice President, Softtek.*



In 2020, the health measures implemented to control the pandemic led changes in the habits of millions of people, which in turn led to economic disruption and made business around the world more unpredictable. The COVID-19 crisis gave birth to a new generation of behaviors that will mark us for years to come. While the vaccine is now available, it will take at least **18-24 months for our society to change behavior patterns again, build trust, and begin recovery**. Then, what should businesses do in the meantime?

Throughout the year, the World Economic Forum has conveyed to us the **need to reflect on "restarting" our strategy**, considering the different types of restarts that have occurred: the social, produced by changes in behavior; the geopolitical, due to the interdependence of countries at the continental level; the economic, with businesses paralyzed and on the verge of bankruptcy (between April and July) and trying to reactivate themselves since August along with the millions of jobs lost; the environmental, centered on concern for hygiene and health measures; and the technological, based on the initiatives that companies are carrying out so as not to lose the connection with the business ecosystem, to continue with their operating processes and to enable digital channels that allow their clients to carry out the corresponding transactions and keep the economic cycle moving.

The unprecedented reality that we experienced in 2020 made the strategic plans previous to the pandemic obsolete; therefore, 2021 comes charged with challenges to try to understand a new and different future from everything experienced in our past history. The global situation we will find in 2021 offers greater confidence for recovery to the population as a whole. **This confidence will be generated if we manage to focus our efforts on people, which implies an exercise in reflection** to understand and know our customers in depth. At the same time, corporations must become organizations whose corporate culture is based at all levels on the Customer-Centric philosophy.

In this context, **new strategic business plans should reflect several evolutions:** from processes that are customer-aware to processes inspired, co-designed and led by consumers themselves; from a reality flooded by Big Data to a future driven by data intelligence; from the pursuit of perfection through long execution times to a future where flexible and fast solutions that learn from the customer and can iterate at high speed take precedence; and from isolated functions to interdependently connected processes as a basis for learning to develop ecosystems.

Similarly, digital transformation must also evolve to consider these premises. **Operations need to be optimized by taking full advantage of digitalization**, relying on processes, data, advanced analytics and smart sensors to reduce costs, speed up production time and offer integration capabilities and flexibility.

This improvement in operations will turn out into the possibility of offering simple, friendly, connected and exciting digital experiences; something essential if we want to retain our customers in this new hyper-competitive context. In this sense, incremental and disruptive digital innovation will allow us to generate new products and services that contain novel value propositions. Finally, it is critical to **develop trusted relationships between companies to jointly build digital platforms** that allow us to take advantage of the benefits of the collaborative economy and provide digital business models that accelerate recovery and scale globally.

# Shaping a new world.

## **To shape is to create.**

And, among all of us, we are creating a different environment in which to enjoy, work, consume, interact...

## **In which to live.**

We are shaping a new world, different from anything we have ever known.

Sometimes, driven by circumstances, and many others, by the desire to **innovate**.

## TREND 01

# The New Digital Journey

**C** OVID-19 has globally changed the way we live, not only at the individual level, but also at the corporate and governmental levels. It has caused a synchronized recession around the world and simultaneous disruptions in supply and demand. This impact has meant that the business value chain has also been greatly affected.

Due to the health precautions, companies operating internationally stopped the production and transportation networks were disrupted, causing an impact on the companies' supply chain. On the other hand, demand was reduced due to the economic slowdown, but at the same time, it suddenly increased in key products to curb the virus. All this triggered the risk of trade and investment policies.

To adapt to this situation, companies began to adopt certain measures to ensure business continuity, starting with the **reorganization of supply chains in search of resilience**. Diversification emerged as the main alternative, along with risk management strategies. To this end, ensuring transparency has been key.

The business response has necessarily involved digitalization, and **companies have seen technology as their key ally**, not only to maintain business continuity, but also to keep in touch with the customer.

The social distancing pushed users to interact digitally, even leading them to demand this digitalization in companies in order to meet their needs; **transforming all phases of the Customer Journey**.

This situation has promoted the generation of a 100% digital Customer Journey, which was already booming before the pandemic. With the confinement, social distancing and closures of many businesses, there has been a migration to online channels. In this context, **outdated touchpoints can be frustrating for the consumer** and become a company's greatest weakness.

Business-to-customer interactions have expanded and are constantly changing. Tracking every touchpoint is key, and technology can help. In addition, companies must ensure that they provide customers with ways to interact across different channels and technologies.

After COVID-19, physical touch points will be minimized in favor of digital ones and new ways of interacting will emerge. All companies (mainly those that had a High Touch model) must **adapt their business and operational model to the new Low Touch economic reality**. In this context, companies must interact with the customer digitally at all points of contact, in a differential and integrated way.

## TREND 02

# Digital Buyers Revolution

**T**he pandemic has highlighted the importance and the need to be linked to the customer by being present at all potential touchpoints. This has mainly affected SMEs, as their digitalization levels were low and they have had difficulties in accessing and adopting new technologies.

With the lockdown and restrictions, consumption routines have been altered, giving way to a migration from the physical to the virtual, creating new purchasing habits. Customers are **more willing to adopt and explore new digital experiences**, resulting in an extension of the digital consumer profile, including the most reluctant and older people.

Consumers, responding to the need to adapt to the situation, **have experienced changes in their behavior**: a greater focus on personal relationships; concern for health, care and sustainability; changes in the way they travel; a reduction in the time spent on leisure in enclosed spaces; changes in purchasing channels and points of sale; and the migration of training and work - both online and remotely.

The crisis and uncertainty have led to a reduction in average spending, with white labels and local stores taking precedence. **The new shopper buys fewer but more complete shopping baskets**. In addition, there is an increase in the preference for sustainable products.

Although overall spending declined, online purchases increased and so did the average ticket spend on them. This is due to convenience, price and trust, the main drivers that lead to the preference of *on* over *off*. In addition, consumers see digitalization as a way to maintain hygiene and prevention measures, while remaining connected to their environment.

In this context, agility in competitive adaptation is not optional. One example for maintaining business continuity is the transformation of B2B environments, giving way to B2B2C models. On the other hand, for companies with less online experience and less digitalized, **solutions such as e-commerce as a Service** have gained popularity, giving the opportunity to easily outsource different areas of e-commerce.

With a shopper focused on digital channels, efforts are being made to optimize online shopping operations with trends such as a-commerce, which **automates tasks, processes and campaigns intelligently**, optimizing financial, marketing and logistics aspects; or Headless Tech, technology that separates the Front-End layer from the Back-End to create personalized shopping experiences.

## TREND 03

# Technology Discovers Emotions

**N**ow more than ever, company-customer interactions are done through digital channels; however, the human being is a social being, and needs to find emotional and social factors along the different touchpoints present in the digital Customer Journey.

Companies must be able to **thrill the consumer through technology**, which must adapt to the human being and not the other way around, in order to achieve lasting and truly human connections.

In the digital era, brands must have the ability to connect with consumers on a personal level and for this, especially those with a strong technological component, must seek to **give a human touch to their interactions**. To achieve an emotional connection when the customer interacts with the company, it is not enough to have digital channels.

In this sense, combining technology with a human touch is key, and fields such as Affective Computing, Multimodal Emotion AI, gesture recognition or trends such as the Internet of Behaviors can help.

In order to simulate human emotions, they must first be recognized, interpreted and processed. This is possible thanks to Affective Computing, which can identify emotions through facial expressions and voice recognition, as well as detect patterns, analyze and classify them, and use these to anticipate possible emotional reactions.

However, in many cases people unintentionally or deliberately hide their true feelings, which makes the recognition of emotions through physiological signals more reliable and objective. This is where Multimodal Emotion Recognition comes into play, which not only extracts verbal and non-verbal signals, but also spatial and temporal features.

These technologies are based on **intelligent gesture recognition, both static and dynamic**, the use of which has been enhanced by the pandemic to enable low-touch interactions.

On the other hand, to better understand users, it is also necessary to obtain information about their behavior, interests and preferences. All this data makes sense with the Internet of Behaviors, which combines technologies that focus directly on the individual and **connects the data with associated behavioral events**, such as device usage. All this requires ethical responsibility, since the conclusions drawn can be used to generate effective actions aimed at modulating consumer behavior unconsciously.

## TREND 04

# Democratic Artificial Intelligence

**A**I platforms are becoming more secure, reusable and scalable, making AI and its applications increasingly democratized. This is an advantage in a society where open source has become popular and where there are few people with the necessary expertise in AI.

This democratization has occurred progressively as the **tools that automate the most complex AI processes increase** and the costs to build them are reduced, even through Plug & Play solutions.

In order to continue making advances in the field of AI, it is necessary to **improve the knowledge and understanding of how it works** and its capabilities, being critical to know its decision-making process before decisions are made, especially when they affect the lives of human beings. This is why Explainable AI is becoming increasingly important. It seeks to make internal logic and algorithms transparent and interpretable, which makes processes understandable and auditable. It also helps to address bias in automated decision making.

On the other hand, to be able to offer better solutions, the way in which AI learns must be improved, since, if it is more efficient, its response capacity will also be more efficient. In this sense, there is growing interest in Composite AI, which, by combining different AI techniques, improves the effectiveness of learning, increases the level of “common sense” and solves a much greater number of problems much more efficiently. **Its multi-modal approach allows it to generate more human-like decision making**, and it is also more effective when integrated into a complete enterprise software platform. Moreover, thanks to Generative AI, completely new and original content can be produced using Machine Learning.

Finally, the time factor is key, so **improving the time in which the AI is developed is an objective**. It is important to make the best decision as well as to make it at the right time. This is where the role of Continuous Intelligence comes into play, which manages to analyze all types of data (from various sources, structured and unstructured) in real time, allowing better, more accurate and informed decisions to be made as events occur. However, there is still a lot of data that cannot be accessed as it is not or cannot be hosted in the cloud. This is where Edge AI comes into play, a system that through ML algorithms processes data generated by a hardware device locally, helping to reduce costs and latency times.

## TREND 05

# My Digital Self

In the new digital era, a dilemma arises: if the digital world offers greater availability, portability and convenience, why is it not possible to do digitally everything we can do physically?

As digital technologies are integrated into everyday life, a digital version of people is being created. This “digital self” represents the set of data that can be aggregated around an online identity, which has become a **vivid representation of our desires, needs and motivations**.

In this paradigm, different ways of grouping, managing or using digital identity come into play, addressing aspects such as the creation of a Digital ID (even a Digital Health Passport) and concepts such as Digital Twins or BYOI.

The concept of Digital ID, brings together any existing online personal data that can be traced back to the “real me”. In this way a user can prove their real identity in the digital realm simply, quickly and securely. The creation and management of digital identities will help entities in various industries as well as consumers. On the other hand, there is a **growing demand from users to maintain control over their personal data** and manage it themselves, giving rise to solutions such as Self-Sovereign Identity (SSI), which gives them control over all their data and the ability to concentrate it into a single digital identity and store it on their personal devices.

In this sense, a secure way to access multiple digital services is BYOI, which allows users to use a **single credential to access accounts, managed by a provider** that does not transmit password information, but identity attributes, making it more secure. It also improves the User Experience.

In line with digital identity is the Digital Twins concept, which refers to the **digital representation of a company, product or system** in the real world. This is one of the major trends of Industry 4.0, as it allows to generate simulations, perform analysis and controls. The objective is to be able to capture and use data to represent the physical world, in addition to providing a real-time relationship between the physical and digital world, being able to share, analyze and merge information.

Privacy has become a critical issue. As a result, formal privacy models are being developed such as Differential Privacy, a field of AI research that works with aggregated user data to extract information while keeping individual user data completely private to the company. By anonymizing data through aggregation, companies have greater processing freedom.

## TREND 06.

# Digital Enterprise Architecture

The need to be competitive in this new context is causing many companies to consider defining a 100% digital corporate architecture. Digitizing all the operational processes of a company is possible through the appropriate software architecture, providing **maximum control, scalability, elasticity and cost reduction**. At the same time, autonomy is being sought to facilitate decision-making on processes.

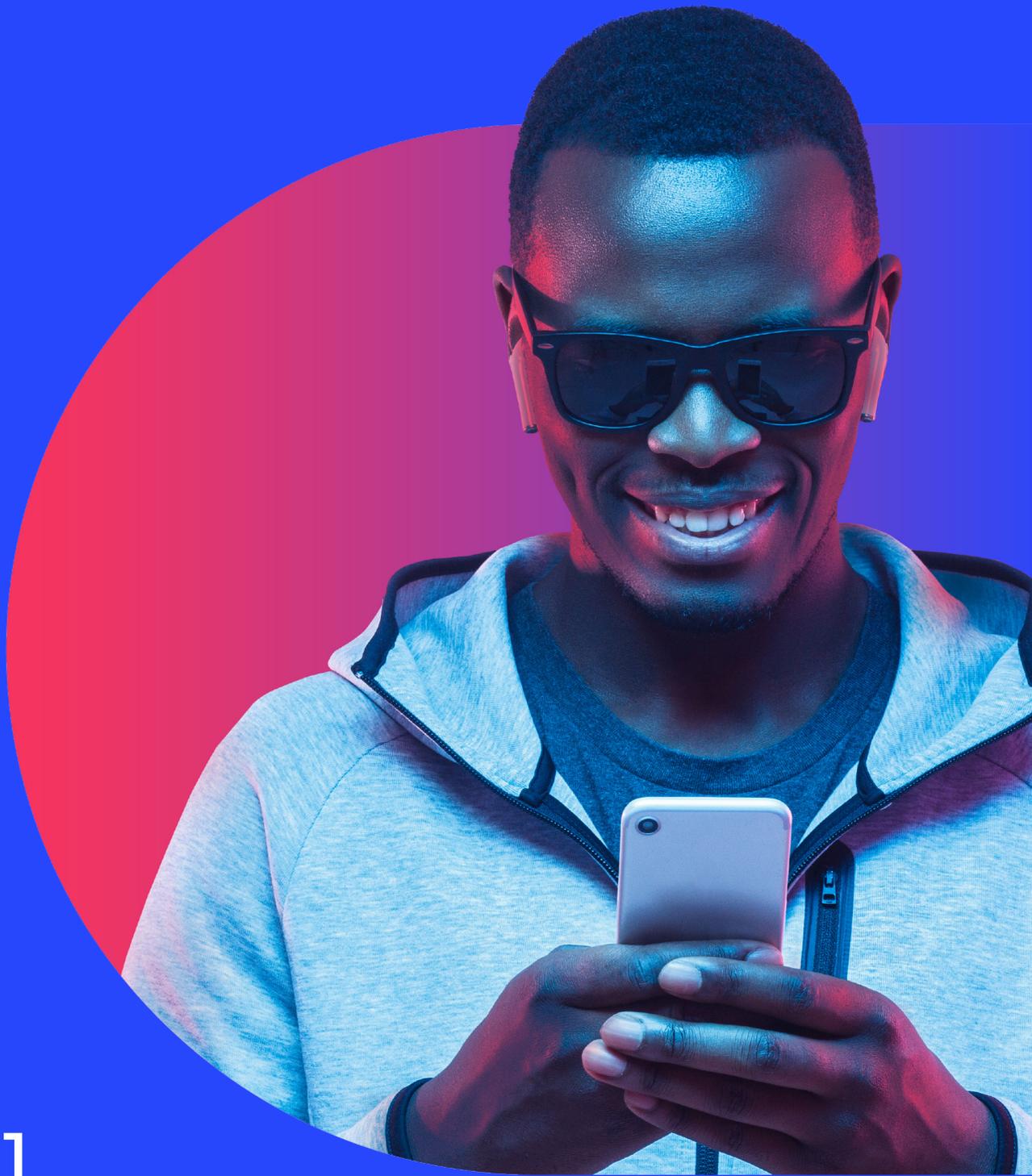
But for all of this, enterprises must gather the knowledge to determine the optimal way to modernize their architecture; and enable their business rather than simply change technology. The goal of a Digital Enterprise Architecture is to deliver **best practices, processes and governance systems** for enterprise architecture, establishing itself as a cornerstone for driving digital transformation.

With the arrival of the pandemic, it was noticed that businesses that were previously efficient stopped being so due to the lack of flexibility and adaptation. However, **companies with a more modular configuration, known as Composable Enterprise, were less affected**. These use Packaged Business Capabilities (PBC), which brings resilience and agility to the business through an adaptable, flexible and resilient architecture.

The modular organization allows companies to reorganize and reorient themselves as needed based on different factors, both external and internal. By not relying on any core technology, the architecture is distributed and highly collaborative.

Key to this strategy is the implementation of DigitalOps, which enables **rapid transformation and recomposition of operational models and components** by linking them directly to the strategy and business results. It is geared towards combining process monitoring, process modeling and task execution, rather than treating them separately. It stands out by improving operational efficiency, visibility and control of work, resulting in organizations that act proactively to address problems and respond appropriately to changes. In the long term, this trend could evolve into hyper-automated organizations.

In line with the digitalization of operations, AIOps, multi-layered technology platforms that **automate and improve IT operations through predictive analytics and ML** to solve problems and improve operations, are gaining relevance. The process consists of monitoring, collecting and dispersing data, and finally taking action on the findings through automated processes.



01

# The New Digital Journey



# Editorial

One of the pillars on which a successful and efficient business model is based is excellence in customer relations. Knowing their habits, satisfying their needs, anticipating their desires, establishing two-way communication at the right time and with the right message, etc., is vital to establish experiences that build loyalty and make an impact.

COVID-19 and the different prevention measures have generated a profound revolution when it comes to establishing a strategy for interacting with consumers. In addition to the challenge of defining a homogeneous and omnichannel approach, there is the challenge of digitizing all those points of contact that cannot be made in person, covering practically the entire value chain.

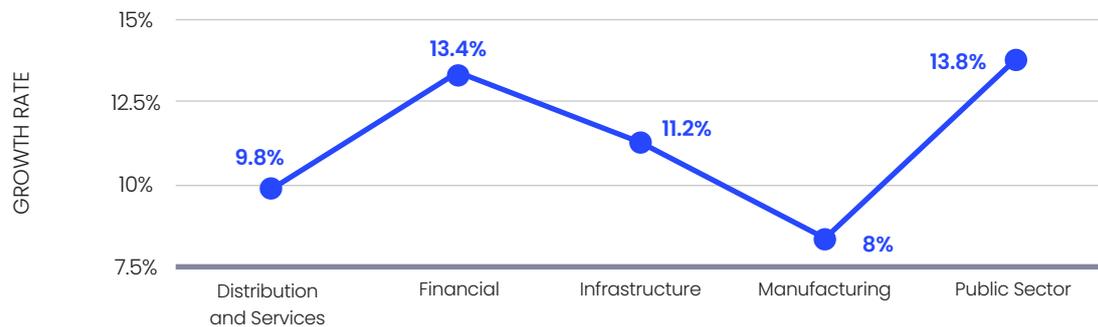
In the new Low Touch economy, the customer prioritizes convenience, ease, availability and speed, with a clear preference for digital channels to establish connections with brands. In this context, companies that want to obtain a higher economic performance must follow the path of digitizing their business model, using technological advances to shape their product and service offerings to what the post-COVID-19 consumer really demands and update their operations to make them more flexible, agile and resilient, key aspects to compete in this new context in which adaptability will play a key role.

The COVID-19 has brought about a global change in the way we live – at governmental, business and, of course, individual level–, which has revolutionized the processes of business–consumer interaction, giving rise to an increasingly digital Customer Journey, or even entirely digital in some sectors.

Social distancing, health concerns, the closure of many companies, temporary layoffs or salary cuts have led to **fundamental changes in the Customer Journey** and in the needs of customers, giving companies little time to prepare, react and adapt.

The reality, however, is that this business response has necessarily been through **digitalization**. In fact, data shows that some five years of progress has been made in digital adoption by both consumers and businesses in a matter of weeks, and global spending on digital transformation technologies and services is expected to increase by 10.4% in 2020 reaching \$1.3 trillion.

## Digital Transformation Spending Growth Forecast World Wide in 2020, post COVID-19



Source: Statista. World Data. Post-COVID-19

Consequently, the **supply chain has also been deeply affected**: logistical problems have come to light (both for the supply of raw materials and the distribution of products), and a clear lack of remote interoperability of operations systems has been observed.

As consumer behavior changes, organizations need to better understand customers. All companies (mainly those that had a *High Touch* model) must **adapt their business and operational**

**model to the new Low Touch economic reality**. In this context, in order to carry out the transformation from maximum physical contact to minimum contact, digitalization is key.

### WHITE PAPER

**Digital Acceleration in the Low Touch era.**

## THE IMPACT OF COVID-19

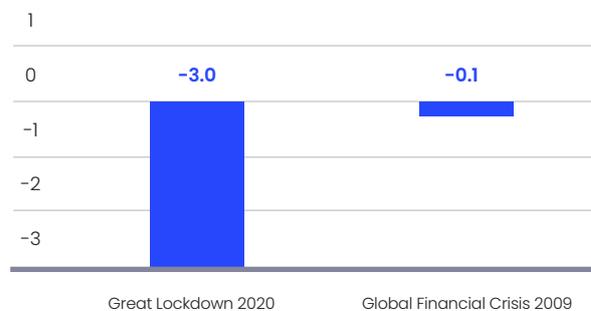
The COVID-19 crisis has caused a series of **political, economic and social disruptions** that are changing the traditional context for decision making. The problems, shortcomings and inconsistencies that have emerged in multiple sectors, from health and finance to education, have been exposed more than ever in a global context of concern for people's lives.

The **long-term consequences** for economic growth, public debt, employment and way of life will be impossible to ignore. Unemployment is soaring in many countries, for example, in the United States, one in four workers has filed an unemployment claim since March; and in Spain, the unemployment rate, today, is 16.26%, the highest since the first quarter of 2018.

In addition, the IMF expects the **global economy will contract** by 3% this year, down 6.3 percentage points from January 2020. This figure is the worst since the Great Depression.

### The world economy will experience the worst recession since the Great Depression:

(Real GDP Growth, year-on-year percent change).



Source: International Monetary Fund (IMF)

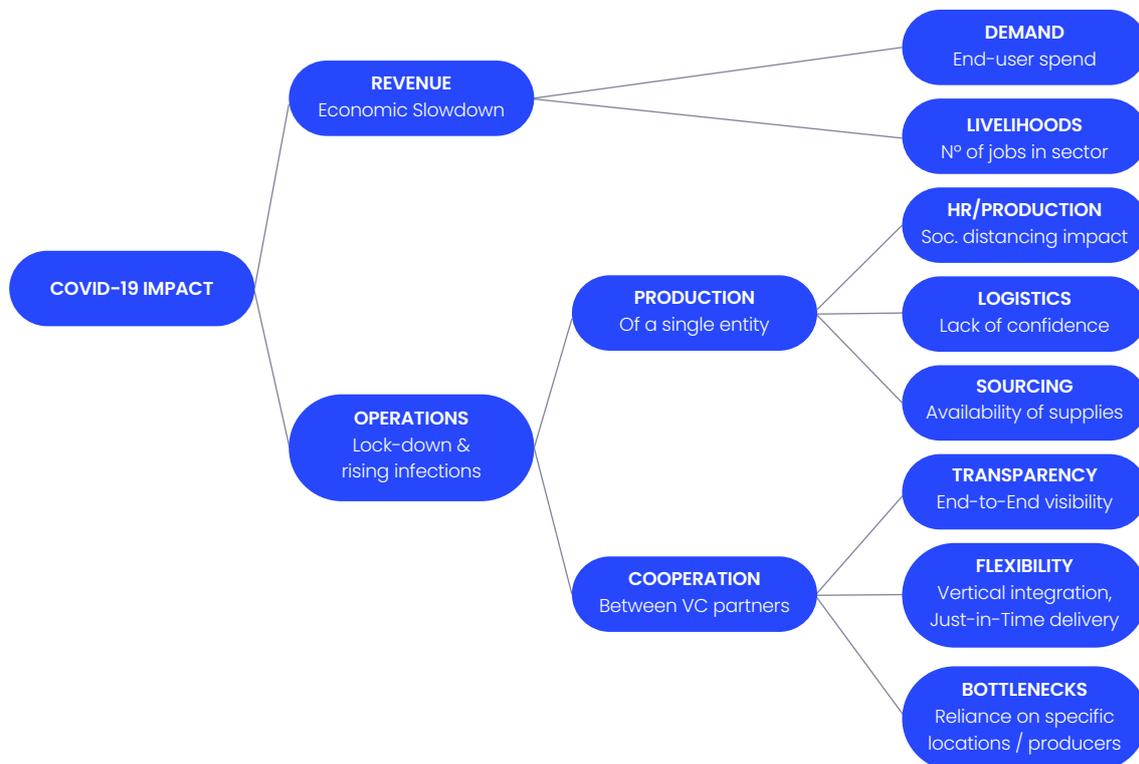
*For the first time since the Great Depression, advanced economies as well as emerging market and developing economies have had a synchronized recession in 2020. In addition, growth in advanced economies is projected to be -6.1%. Emerging market and developing economies are also estimated to have negative growth rates of -1.0% in 2020 and -2.2% if China is excluded. Per capita income is projected to decline in more than 170 countries.*

All this is mainly due to the **simultaneous disruptions that are occurring in supply and demand**. On the supply side, the number of infections, blockades, border closures, company shutdowns and social distancing generate a reduction in labor supply and productivity. On the demand side, layoffs and the fall or loss of income, and poor economic prospects reduce consumption and investments. These data suggest significant and persistent negative effects worldwide, as it is affecting all countries in the world and all economic sectors, to a greater or lesser extent. Some of them, such as commerce, hotels, tourism and entertainment, have nearly come to a standstill.

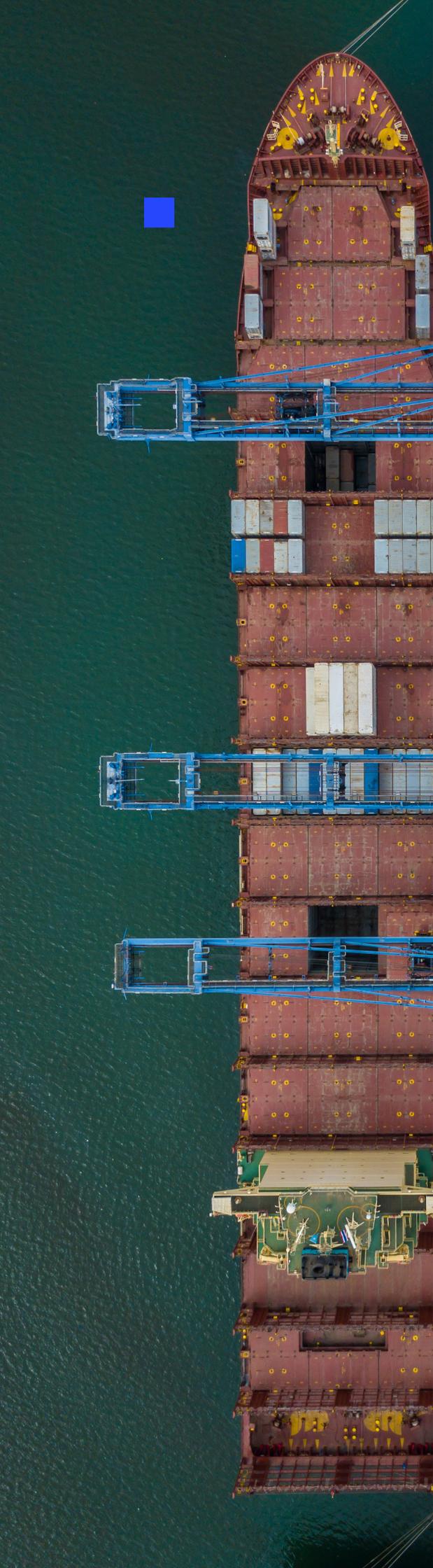
## CHANGES AND IMPLICATIONS IN THE VALUE CHAIN

In addition to the economy, the COVID-19 pandemic has also **impacted the business value chain**, revealing both strengths and weaknesses at the global level, due to measures taken by governments and companies to protect the lives of citizens and workers, which have halted economic activity, causing a decrease in production, an increase in unemployment and a drop in demand.

### Overview of the economic impact of COVID-19:



In fact, before the COVID-19 crisis, there was evidence of production defragmentation **due to a failure to properly calibrate risk exposure**. This has gotten worse with the arrival of the pandemic: the persistent uncertainty related to the evolution of the health crisis, which causes travel blockages, closures and travel restrictions, and the instability of production costs, hinder a full restart of business on a global scale, leading many companies to reduce or paralyze their production activities. In Spain, the loss caused by the COVID-19 crisis is estimated to reach 352 billion euros in traditional supply chains.



## Value chains have been affected by the pandemic in four ways:

### 01.

First, there is a direct impact when companies operating **internationally stop production** due to health precautions.

### 02.

Second, there is an **impact on the supply chain**. On the one hand, when production is affected because a company located in one place needs inputs from another that is located in another place that is more impacted by the lockdown. On the other hand, when international transportation networks are affected, leading to delays in deliveries or even undelivered products.

### 03.

Third, there are important **consequences for demand**. On the one hand, the impact on company revenues caused by the generalized economic slowdown, blockades implemented by countries or factory closures, confinement measures and changes in consumer behavior have caused both consumer and company demand to plummet. On the other hand, the sudden increase in demand for certain key supplies has been no less traumatic: masks, protective equipment (PPE), food, medicines, ventilators etc. This volatility has also affected national and global value chains.

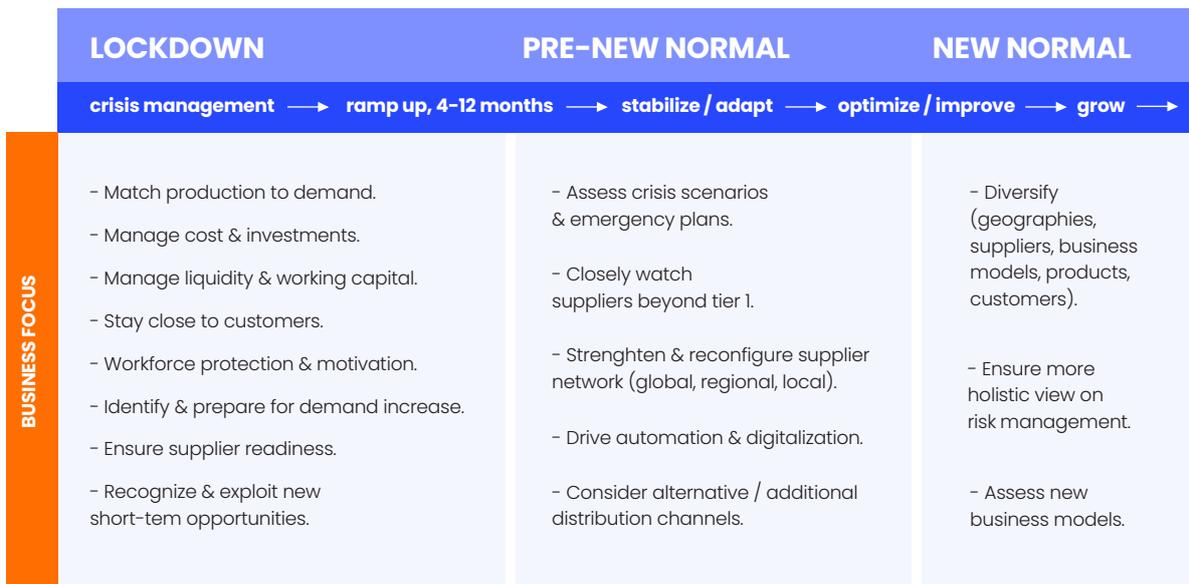
### 04.

Fourth, **trade and investment policy risk has skyrocketed**, as illustrated by the export bans implemented for key medical supplies and the growing pressure in some sectors to renationalize production in the belief that this will promote greater security of supply. While countries have generally committed to keeping markets open and ensuring a free, fair, transparent and non-discriminatory trade and investment environment, there is, however, a risk of uncertainty about the future of trade as a result of COVID-19 with undoubted impact on the organization of value chains.

# THE BUSINESS ADAPTATION

The adaptation process of companies goes through previous stages before the world restarts. These will act as a bridge between the confinement stage and the so-called "new normal".

## The Journey to the new normal:



In order to cope with this crisis, companies have adopted a series of **measures to improve their strength and resilience**. The reorganization of supply chains in search of resilience synthesizes the business changes that are operating in the current scenario. **Diversification** is the great alternative: diversifying supply chains to become less dependent on external production in critical sectors and, when dependent on external producers, ensuring that this dependence is diluted among a greater number of trading partners. This is a direct consequence of the obvious dependence on the Chinese market, since when production in China stopped, there was a domino effect in global value chains, causing delays in deliveries and stock-outs.

Another measure has been the **risk identification and assessment**. The companies have classified and evaluated the probability and potential impacts of each of them. In this case, the COVID-19 crisis has entailed a supply, and demand risk, and an operational and production interruption risk, since workers are exposed.

**Risk management strategies** with measures such as, for example, cancellation of orders to avoid unnecessary risks, producing or shipping goods once customer orders are received, diversifying suppliers and production locations, vertical integration with key suppliers, and enhanced security, for example, through shipment monitoring.

To find the right strategy, information about the value chain and the level of risk at different levels is key, so it is important to ensure **transparency**, with enough information about suppliers and input stocks. Many companies have digital technologies with which they can track, in real time, and identify and respond to potential risks.

The next block of measures is made up of those related to **intervention after the disruption has already taken place**. Companies have tried to mitigate the impact by rapidly assembling resources, relationships or capabilities. This requires increasing agility by companies to generate adaptive processes and structures that are capable of coming up with alternatives in the face of new situations. Companies have also implemented strategies to improve their resilience, in other words, their ability to try to resume operations after a disruption.



Broadly speaking, there are 4 basic actions that some companies have already taken, and others have yet to take to **address immediate customer needs** and to begin preparing for the future:



**Turning to stakeholder capitalism:** Seek the benefit of society, not from a marketing perspective and with a discursive commitment, but with a real commitment aligned with the company's values.



**Getting closer to where customers are:** As companies break contact with consumers, they must find ways to reconnect, either digitally (reaching homes), through delivery or physically with low touch interactions.



**Analyze possible scenarios:** With the downturn in the economy, both companies' and consumers' expenses will be reduced. Companies will have to look for solutions to reduce costs and prices by reinventing their strategies, but without reducing CX and even trying to improve it.



**Be agile:** To be agile in decision making and time-to-market, companies must be constantly informed of what is happening in the market and gain insights that help them develop their business. They must also learn from mistakes and be resilient.

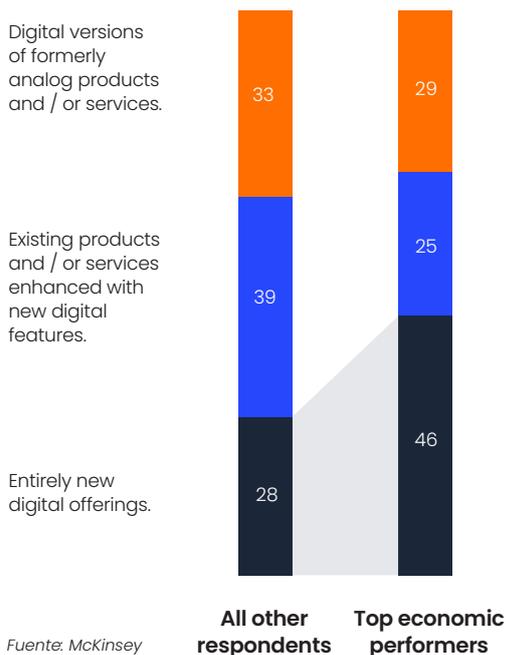




Companies have found a fundamental ally, **technology, to digitalize the enterprise and build autonomous and truly resilient value chains.** To remain competitive, companies need to transform their operating model from beginning to end. Technology is essential not only to recover from the current crisis and withstand the impact of others, but to survive in the new post-COVID-19 normality, to the extent that competitors in practically all sectors have undertaken this transformation, which will give them a competitive advantage in extraordinary, but also ordinary situations. To mention some examples: RPA, data analytics, closer collaboration with suppliers through Blockchain platforms, automated rate renewal, IoT for tracking, digital manufacturing, logistics 4.0, or autonomous supply planning.

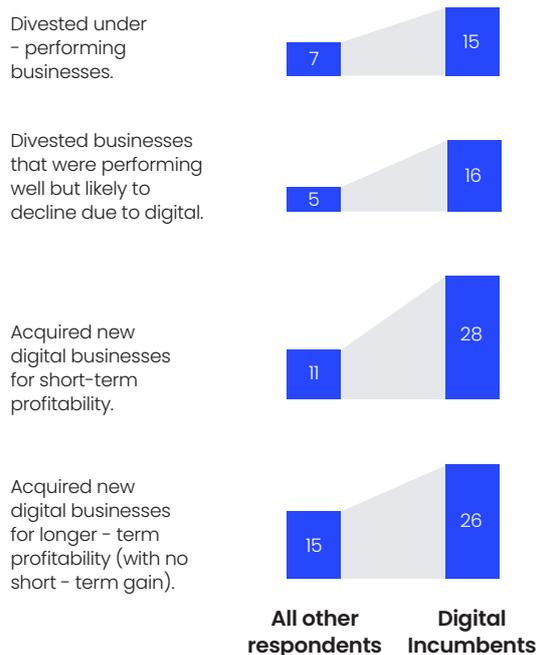
## Companies wishing to achieve a higher economic return must follow the path of digitalization:

**Organizations Digital Offerings**  
% share, by degree of novelty.



Fuente: McKinsey

**Business Portfolio Makeup**  
% respondents.



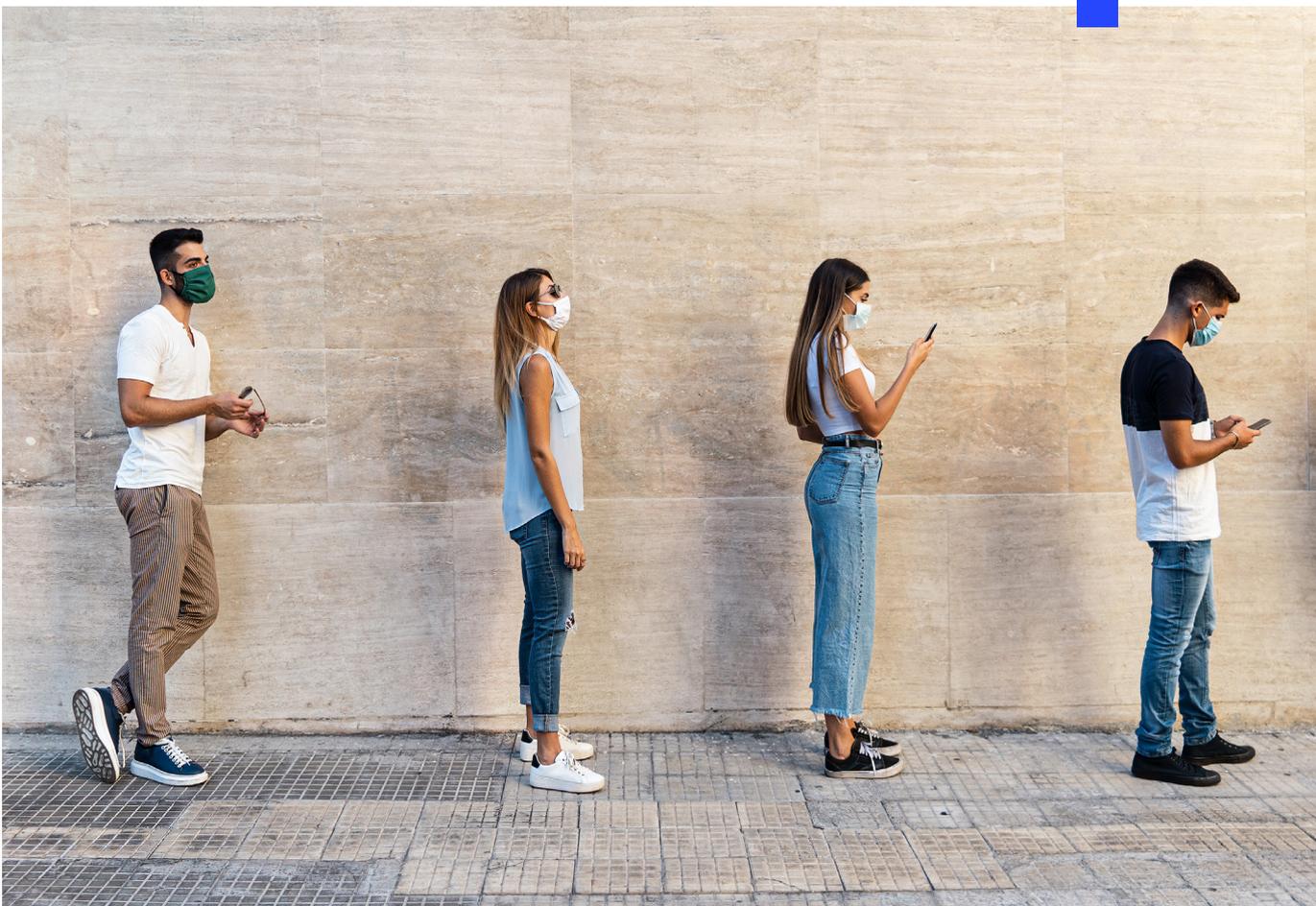
## DIGITAL ACCELERATION TO SOLVE CHALLENGES AND DIFFICULTIES:

This need to digitalize processes and relationships is not new, but it has certainly been accelerated by the pandemic. Mobility constraints and social distancing have pushed users to interact digitally in order to meet all their needs, which has particularly affected the Customer Journey, with permanent consequences.

This last fact is particularly relevant, because the Customer Journey that will prevail once the crisis is over will not be at all the same as before, but will be redrawn considering the new habits acquired. For example, the digital demands of customers are greater than before, but they not only demand the presence of brands in online channels,

but also put the platforms themselves to the test, with a significantly higher depth and intensity of use, which generates new demands in terms of usability.

In the traditional Customer Journey, the customer experience used to have a fairly well-defined beginning, middle and end; experiences were very linear. But that kind of Customer Journey has long since passed, as digitalization drastically changed the way customers shop: they started to research and inform themselves before starting any commercial process. **Experiences are no longer linear, but unpredictable and shared.** Consumers radically changed their habits, transforming the phases of the Customer Journey.



# Customer Journey post-COVID-19 (Automotive Sector):

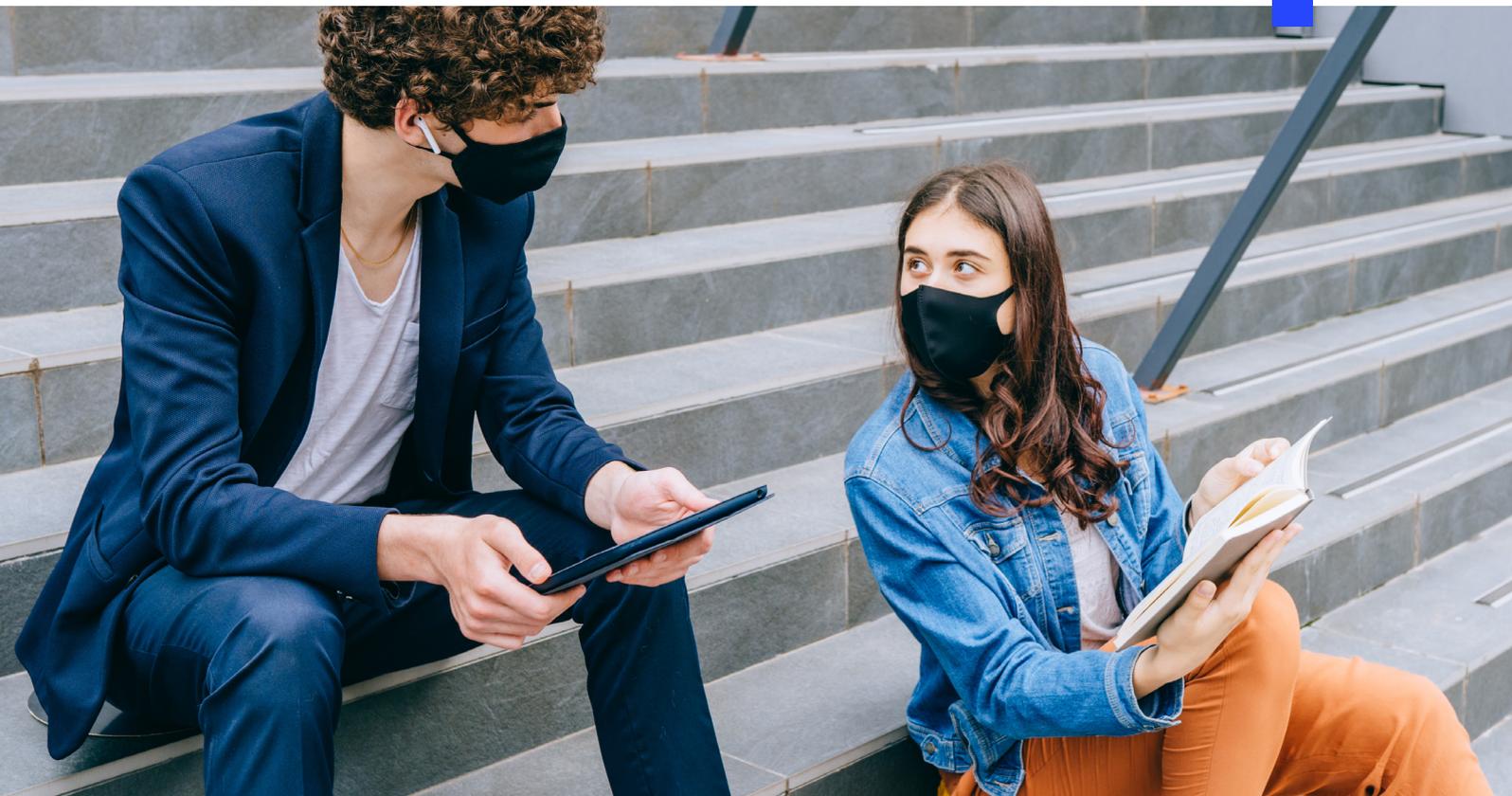
● Degree of digitalization and remote service delivery; complete = high.



### PRE - COVID-19



### POST - COVID-19



The actions of the Customer Journey stages will change according to the evolution of the healthcare crisis, and companies will have to adapt them to ensure business continuity.

## E.g. Communication Framework (Financial Services):

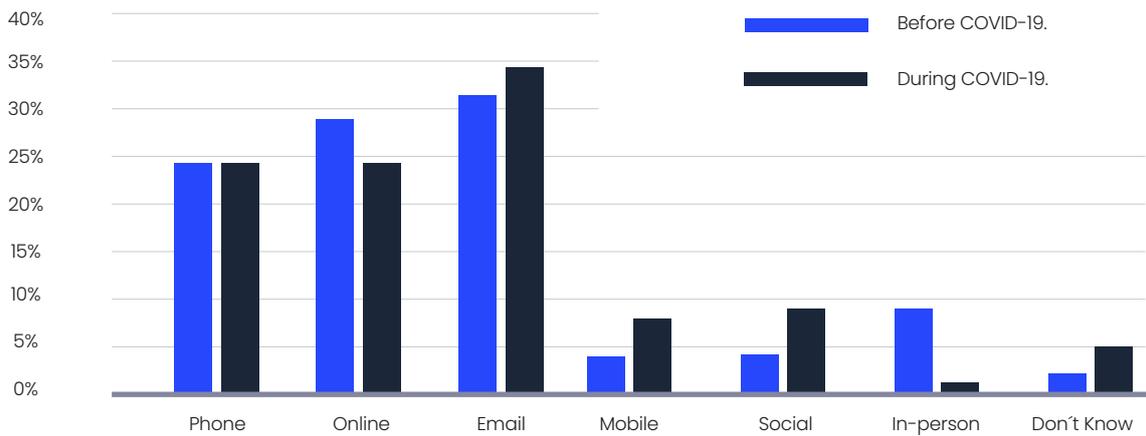
SITUATIONAL PHASES	TARGETED EXPANDED COMMUNICATIONS	TARGETED EXPANDED COMMUNICATIONS	NEW NORMAL
<b>CUSTOMER SENSIBILITIES</b>	Increased duress and reduced financial resilience. Reduced consumer ability to make payments, reduced spending, and increased reliance on credit.	Segments of customers begin to adjust or recover based on level of income security and financial reserves.	Customers accept and are accustomed to the new normal. Increased recovery.
<b>BUSINESS IMPACT</b>	Reduce/save churn, continue to capture the lower funnel, protect Customer Experience (CX) value, and stimulate loyalty.	Steal share from weaker competitors and fuel new growth from key customer segments with broader offers.	Establishing a new baseline of acquisition for product lines, segments, and cross-sell.
<b>ADQUISITION</b>			
<b>CHALLENGE</b>	Continued immobility and disruption of a large population focused on creating financial resilience.	Reaching addressable recovered audience and developing effective segmentation model.	Critical mass of the market regains full mobility and consumption behavior.
<b>DESIRED OUTCOMES</b>	Proactively target ideal segments to mitigate risk and maximize acquisition from efficient marketing spend.	Increase scale of new acquisition by increasing viable prospect pool and increase cross-sell of product offerings.	Maximize acquisition baseline, capture highest market share of new deposits and lines of credit, and refine segmentation.
<b>KEY USE CASES</b>	Targeting optimization, performance marketing precision, and CRO.	Expanded media, new look-a-like modeling, scaling targeted cross-sell, and continued CRO.	Re-operationalize full scale awareness and acquisition programs.
<b>ONBOARDING</b>			
<b>CHALLENGE</b>	New customers are joining slowly and need to be educated about offers such as mortgages or personal lines of credit.	New customers need to be educated on breadth of offerings and benefits, many of which are learning digital banking for the first time.	New DDA and credit customers expect world class CX and onboarding experiences.
<b>DESIRED OUTCOMES</b>	Seamless onboarding and early engagement to drive early retention behavior and expose to cross-sell options.	Boost knowledge of benefits and drive up-sell/cross-sell activity for key offerings.	CX to drive desired engagement and CSAT.
<b>KEY USE CASES</b>	Onboarding series including direct mail, selective outreach, and segmentation.	Education, engagement, and nudge programs.	Digital and mobile engagement.
<b>SERVICING</b>			
<b>CHALLENGE</b>	Customers may overload call center with questions and concerns. Customers may default. Movement away from travel rewards.	New consumers or expanded relationship consumers are unaware of self-servicing options. Transition of focus from travel rewards.	Volume of servicing engagement returns to standard levels.
<b>DESIRED OUTCOMES</b>	Maximize self-service, drive CX and customer satisfaction/Net Promoter Score (NPS).	Increased cross-sell, maximize digital engagement and self-service usage, and drive NPS.	Drive at-scale self-service containment to reduce operating costs and boost CX.
<b>KEY USE CASES</b>	Payment processing, pre-collections, self-service containment, CX engagement, and limited cross-sell.	Service-to-sales, scaling cross-sell, self-service adoption, engagement, and revised payment terms.	Self-service, digital engagement, and call center script optimization.
<b>RETENTION</b>			
<b>CHALLENGE</b>	Increased comparison shopping to drive personal financial resiliency, revisiting of private wealth relationships.	Customers seek "normalcy" and increased credit. Maintenance of low-interest deposit flows.	Competitive landscape becomes potentially confusing for customers.
<b>DESIRED OUTCOMES</b>	Maximize retention rates, alter terms vs. churn, and retention satisfaction.	Maximize retention rates, drive NPS in renewal process, and drive referrals.	Maximize retention rates and increase brand equity.
<b>KEY USE CASES</b>	Renewal series, call center script optimization, terms revision, and service-to-sales.	Frictionless cross-sell process, sequential messaging, referral program, and loyalty program.	Multivariate testing of renewal offers and aggressive cross-sell.

On the other hand, it should be noted that, given the decline in the purchasing power of the population and the tight budgets of companies, it is key that they look for ways to **save costs without sacrificing the Customer Experience**.

The COVID-19 pandemic has changed consumers' perception of a positive experience. Today, when a customer is asked to define the qualities that meet their needs, they **prioritize convenience, ease and speed**. In a world that is always active and connected, time has become the most precious commodity and the benchmark by which a brand is judged.

Other things are already known: online shopping has skyrocketed, the use of smartphones for practically every phase of the Customer Journey has become widespread, and brands have been forced to connect with customers digitally and adapt to their changing habits. Consumers now **prefer to connect with brands through digital channels** to solve their problems. The demand for speed, convenience and availability is driving consumers toward self-service.

### Preferred communication channel:



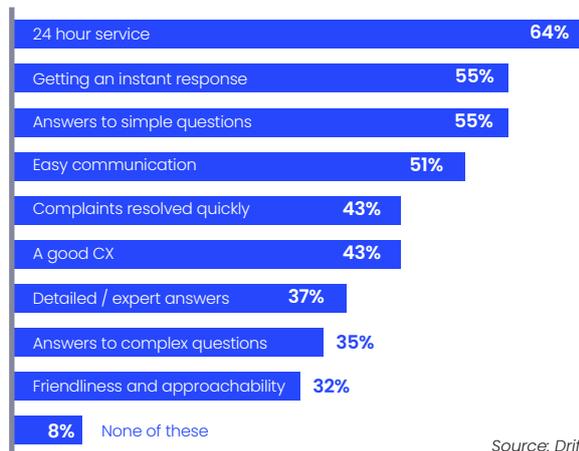
Source: Sitel Group



## Potential benefits of chatbots:

If chatbots were available and working properly for the online services you use, which of these benefits would you enjoy the most?

The level of customer demand for self-service solutions has been on the rise since 2018. More and more consumers value being able to find an answer to an issue or solve a problem on their own. This has become a crucial element of the customer experience, as consumers demand **speed and availability, without interruption and 24/7**.



Source: Drift

In short, digital engagement has accelerated tremendously and companies have had to innovate at great speed, out of necessity or convenience, to **replace or complement traditional Customer Experiences**.

In fact, 80% of companies globally are convinced that their core business model should be digitalized to remain economically viable.



This shift towards a digital Customer Journey, which was already booming, has increased with the arrival of the pandemic, where digital devices and platforms have played an essential role in users' lives. The consumption of news, social media, shopping, gaming and entertainment on digital platforms has experienced unprecedented growth at a time when people were confined to their homes and feared any high touch physical interaction.

With respect to e-commerce, during the first quarter of 2020 it accounted for 11.8% of total retail sales in the U.S., and in Europe, it accounted for 19.2%. However, as COVID-19 took hold, and measures of lockdown, social distancing and business closures were introduced, there was a large migration to online channels, with 76% of consumers adopting channels to purchase items they would normally obtain from physical stores. In addition,

**more than 57% of consumers who have shopped online throughout this pandemic now intend to continue to do so** once this crisis is over. Change has a permanent dimension.

The consequences of this change do not only affect e-commerce, but the shopping experience in general. In the context of the rise of digital channels, security has become a very important point along the entire Customer Journey, as part of the migration to online commerce is due to the need for low social touch (*Low Touch Economy*).

Finally, the **smart shopping trend has been reinforced by the pandemic**. Researching before making a purchase has become a critical phase, facilitated by e-commerce, and driven by increased awareness of health, wellness, cost control, and sustainability.

## Short-term resilience tactics:

### ONLINE SALES

- Product recategorization.
- Real-time response.
- Distribution adjustment (e.g. Dark Stores).

### SAFETY AND HYGIENE IN THE POS

- Store space redesign.
- Self-service.
- Contactless payments.

### CUSTOMER EXPERIENCE

- Frictionless experiences.
- Personalization and intelligent recommendation.
- Voice User Interface (VUI).

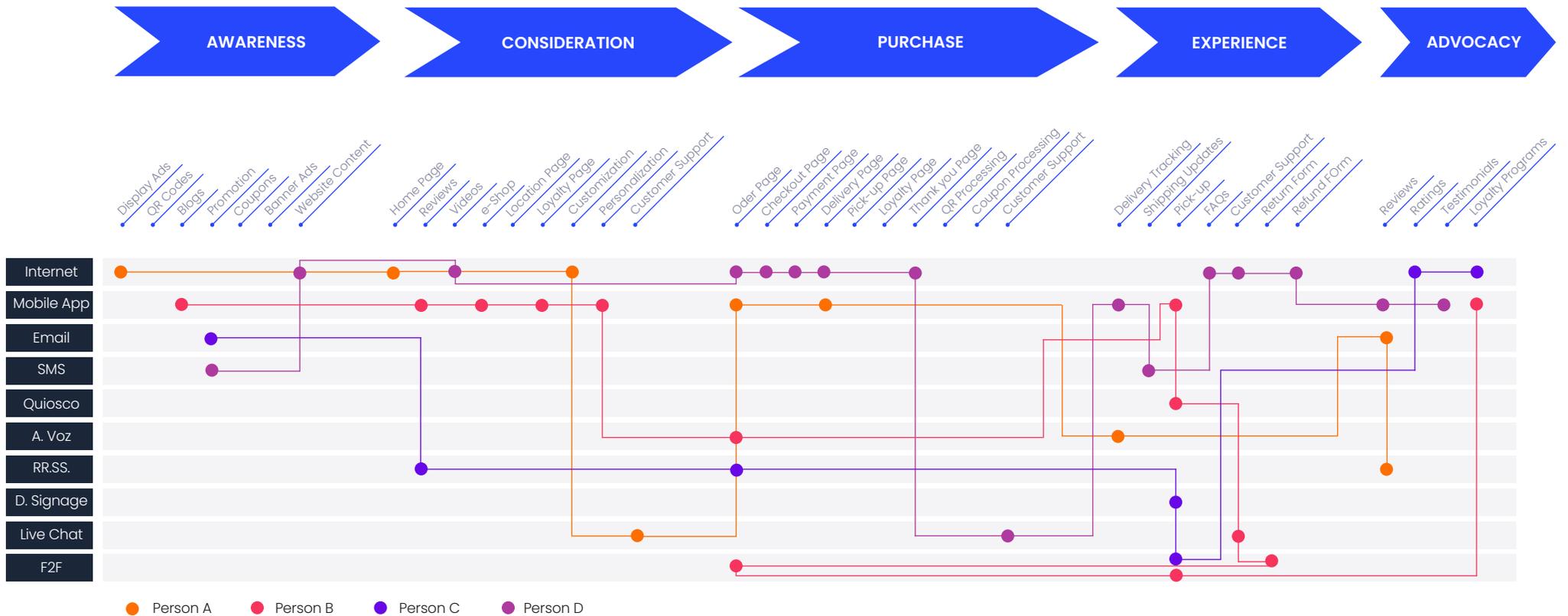
### DELIVERY ADAPTATION

- Partnership - Delivery Platforms.
- Agile adaptation to demand fluctuations.
- Flexible (time and place) and contactless deliveries.

# DIGITALIZATION OF TOUCHPOINTS

Adapting the customer experience to new circumstances, with a technological and digital base, presents challenges of all kinds, in the value chain and above all in the company's operations. As the Customer Journey increases in complexity and adds more options and touchpoints, an obsolete system can be frustrating for the consumer, and become a company's greatest weakness.

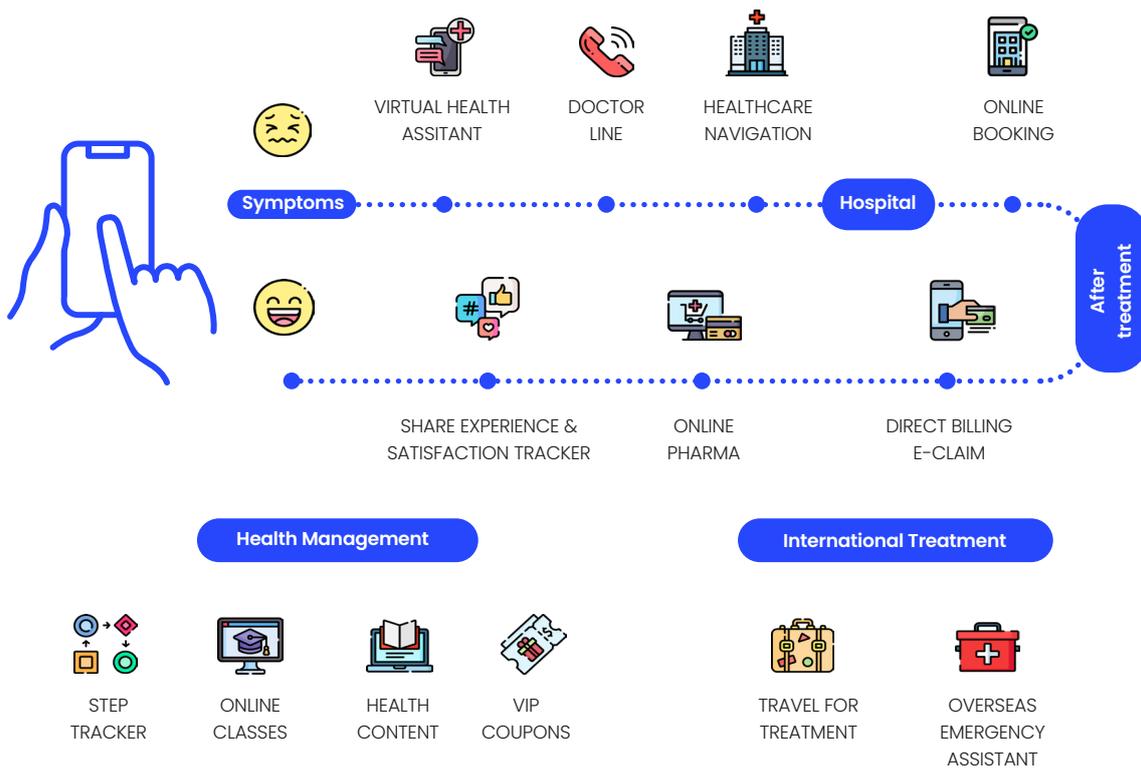
In the past, customers had a limited amount of touch points where they interacted with brands through phone calls, standard mail or face-to-face. With the advent of digitalization and smartphones, the number of ways in which companies can interact with customers is continually expanding and changing. But after the impact of COVID-19, incremental developments in this regard have proven to be entirely insufficient, and far greater demands have been made.



At this point, technology comes in handy to **track every interaction** between the brand and the customer. Technologies such as AI, Robotic Process Automation (RPA) or data analytics allow brands to gain insights and personalize the customer experience more than ever before. AI opens the door to new ways of connecting with the user at different touch points.

Technology has driven both the availability and popularity of digital customer touchpoints. Companies can interact with them through **different channels and with different technologies** to provide unique opportunities and surprise them with differential experiences. To do this they can rely on: mobile platforms, text messages, online advertising, reviews, chatbots and intelligent assistants (Alexa, Google Home, etc.), social networks, loyalty programs, virtual events, VR/AR systems, IoT devices, Digital Signage, Beacons or Wearables.

### Digital Journey Example (Insurance Sector):



It is clear that the effects of COVID-19 on consumer behavior will persist even after the crisis. Physical touch points will be minimized and new innovative ways of interacting with the customer will emerge. While the Customer Journey after COVID-19 cannot be accurately predicted, it can be assumed that change will be constant and innovation will focus on the idea of **digitally interacting with the customer at all touch points, in a differentiated but also integrated way.**



02

# Digital Buyers Revolution



# Editorial

The pandemic and its consequences have shaped a new type of consumer: they are willing to adopt and explore new digital experiences, they value the convenience, wide choice, price and availability of the online channel, and they see digitalization as a way to maintain hygiene and prevention measures while staying connected with the brands they usually consume.

In this sense, the response of the business ecosystem has not been long in coming: many companies have invested in strengthening their e-commerce platforms in order to offer their customers a multichannel and digital shopping experience and minimize the economic impact of the decline in traditional sales due to the health situation.

Once the pandemic is over, it will be the perfect time to fully exploit the possibilities and functionalities that digital channels allow, since the mentioned change in consumer behavior, even if it recovers and gets back to old patterns of behavior, will consolidate.

In this line, corporations must work on implementing a flexible digital sales system, with *as a service* solutions that allow a high level of customization, a quick update, a more agile and faster operation and cost optimization; highlighting the solutions that allow automating sales processes, executing tasks, processes and campaigns intelligently and at the right time by means of the use of predictive tools.

**T**he way of selling must be reinvented. In the pandemic, consumption routines were affected by the various restrictions, resulting in a need to migrate to the virtual, especially for SMEs that did not yet have a presence in this channel.

Overnight, consumers' purchasing behavior changed: from wholesale purchases to online shopping, people changed what they bought, when and how they did it. And indeed, confinement has brought **new digital consumers and new shopping habits**, consolidating and evolving online sales.

Those companies with robust online platforms and sophisticated data analytics have succeeded in connecting with consumers and offering them value-added services. Consumers are **willing to embrace and explore new digital experiences**: the majority of consumers who have been forced to shop online during the pandemic will continue to do so once the crisis is over.

*It is important to note that before the arrival of COVID-19 the e-commerce of products and services did not stop growing, in fact, in Spain, in 2019 the e-commerce turnover was around 50 billion euros, compared to 39 billion in 2018. But with the pandemic, e-commerce was one of the trends that accelerated the most, causing a growth of more than 20%. In fact, globally, it is expected that by 2021 there will be more than 2.14 billion people buying products and services through online channels, up from 1.66 billion global shoppers in 2017.*

## Impact on global online traffic (April 2020):

Sector	% Variation
Supermarket	135
Technology	128.5
Telecommunications	75.7
Media and communications	32.6
Household furniture / Do-it-yourself	26.2
Sports equipment	25.3
Cosmetic products	23
Fashion	17.3
Bank / Insurance	13.7
Jewelry and watches	-3.7
Luxury	-19.6
Tourism	-72.9

However, consumer buying habits have changed, and the **sectors that have seen the greatest growth and online turnover in recent years are those that have been most affected** by the COVID-19 crisis, such as travel agencies and tour operators, hotels and accommodation, air and ground transportation, fashion, decoration and the purchase of tickets for events and shows. All of them have seen how their sales have been significantly reduced due to the decrease in consumption by spending contention, travel limitations, social distancing, and the cancellation of events and concerts.

Furthermore, **sectors that did not have a significant level of sales through online channels before the crisis, have grown exponentially** with the arrival of the pandemic, increasing sales in some of these sectors by between 80% and 200% in recent months. For example, supermarkets and hypermarkets, sports equipment, personal care products, pharmacies and office supplies.

Many of these sectors, before COVID-19, did not even exploit online sales or had a presence in Marketplaces or specialized websites in that sector, they only offered their products through physical stores, or the relative importance of their digital channels was very low. But the pandemic has made them understand **the need and importance of being more closely linked to the customer, and to be present at all potential points of contact**. Even local businesses and SMEs have been forced to go online in order to keep their businesses afloat.

In 2017, the participation rate of SMEs in e-commerce was less than half the participation rate of large companies in most OECD countries. This adds to a low level of resilience and flexibility among SMEs to cope with reduced demand and virus containment measures. **Low levels of digitalization and difficulties in accessing and adopting new technologies** have meant that adopting measures such as teleworking or an e-commerce sales channel has been very difficult for some companies.

However, as companies have tried to understand how to benefit from technology and trends to cope with the crisis, they have also seen certain **habits and operations change radically**:



Promotion of **local commerce through the online purchase** of its products to help activate a sector that has been severely affected by the crisis.



Direct, in-person interaction with shoppers has been replaced by **virtual or contactless touchpoints**.



Increase in **purchases through social networks**.



Creation of **agile and versatile e-commerce platforms** to manage demand and customized promotions.



Physical stores have become small **logistics centers and pick-up points**.



Return of products processing requires **new security standards** to meet customer expectations.



Creating **multichannel strategies**. To ensure that the product is available where consumers shop, many companies have explored partnerships with marketplaces such as Amazon, eBay, Aliexpress, Google Shopping or social networks.



Use of **advanced analytics** to predict potential crises or new business opportunities.



In addition to the increase in supply, there has also been an **extension of the consumer profile**. One of the effects of the pandemic is that older people do not want to leave their homes for fear of infection, since they are the most at-risk group. For this reason, they take additional precautions, including a preference for online and contactless shopping. In fact, it is estimated that four out of every ten households that have started shopping online for the first time have been over 54 years of age.

For companies, e-commerce has been a vital alternative or complementary sales strategy that has allowed them to maintain their operations and service customers, despite the constraints. With the most acute phase of the pandemic over, now it is the perfect time for companies wishing to take advantage of the possibilities of digital channels.

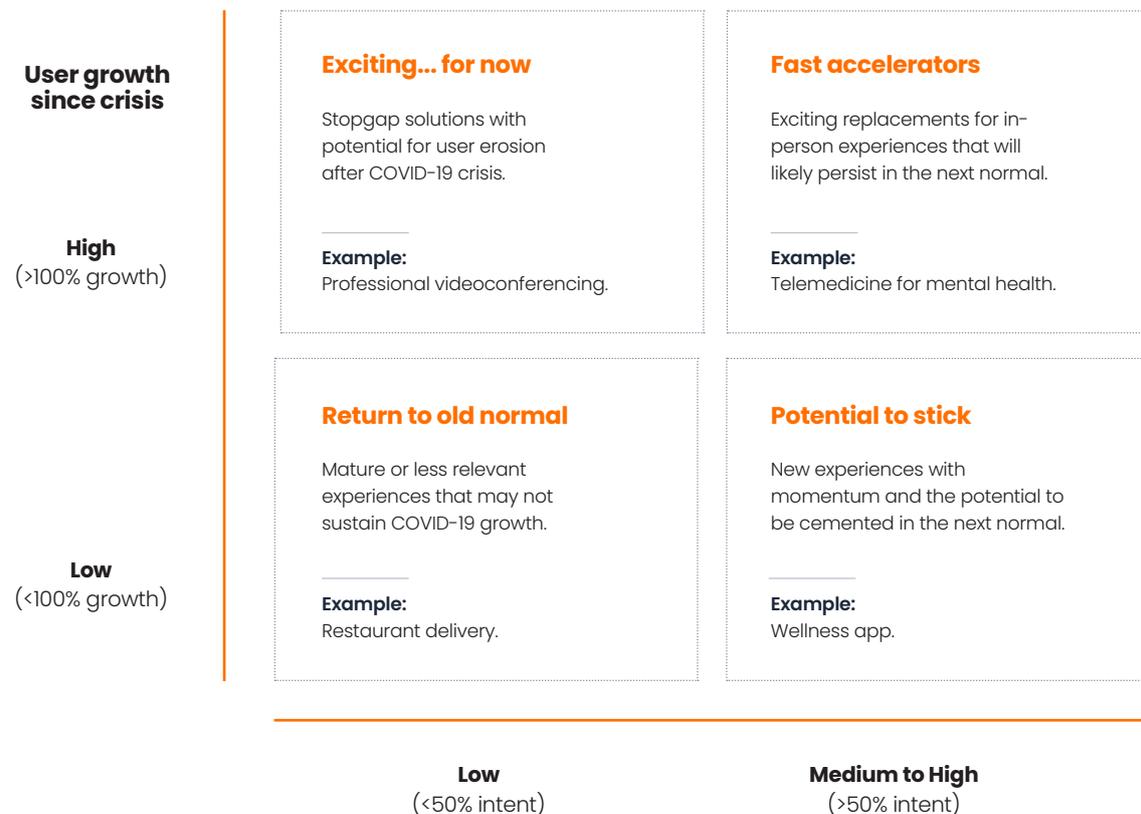
## THE NEW CONSUMER

Although with the standstill during the lockdown **plans were interrupted, 82% of the people plan to take them up again**, either when they can (60%) or by replacing them with other similar ones (22%), and those who do not take them up again will be mainly due to economic aspects or because they do not have the possibility of doing so, for example, due to limitations in mobility or events that will not be repeated.

Although 70% of the population plans to return to their pre-COVID-19 lifestyle, **their behavior will not be the same**. It will be affected in every way: increased attention to personal relationships; concern for health, care and sustainability; changes in the way they travel and reduced commuting; reduced time spent on leisure in enclosed spaces and with many people; changes in shopping channels and points of sale; and the migration of learning and working, both remotely and online.

### Not all changes produced by the pandemic will maintain high growth:

*XX% growth + XX% intent to continue = XX% potential usership in new normal.*



Source: McKinsey

**Intent to continue use after crisis**

# The new post-COVID-19 consumption normality and future behaviors:

**Main consumption center:**

HOME

**New learning of consumption:**

DIGITALIZATION + AWARENESS

**Purchasing methods:**

ONLINE + HOME DELIVERY

**Main objective:**

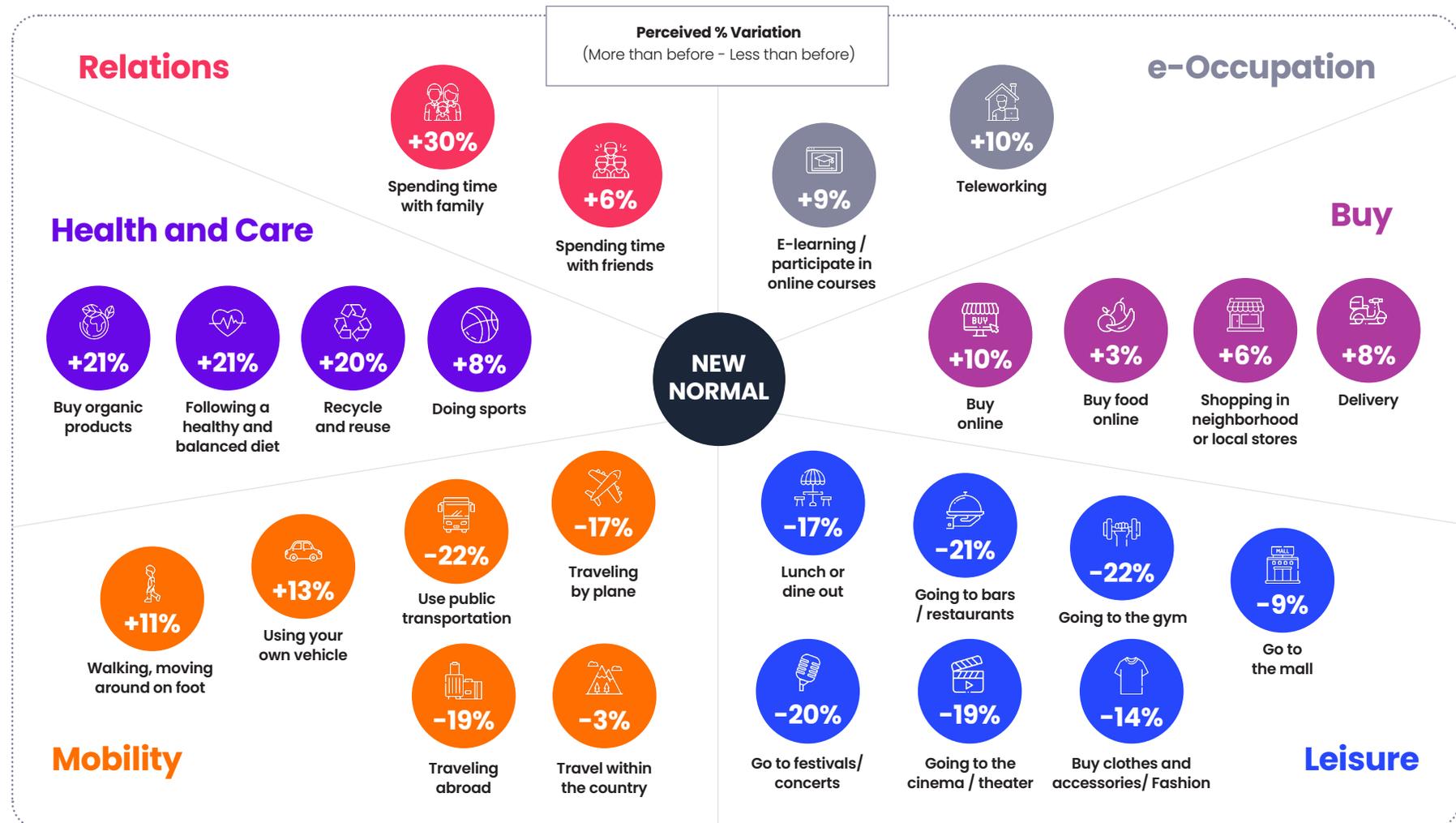
SAVINGS + WHITE LABELS

**Sellers of interest:**

LOCAL COMMERCE + BRANDS WITH SOCIAL COMMITMENT.

**Criteria:**

SECURE AND TRUSTED DIGITAL CHANNELS



As a result of the health crisis and the consequent economic crisis, most consumers will see a reduction in their income, so they will pay more attention to prices. This, together with the great uncertainty that is being experienced, means that **the estimates of the average expenditure have a reduction of up to 2/3** in the countries with the greatest impact on their economy.

This expenditure will be made in purchases in which **white label products and promotions will be prioritized, as well as in proximity stores**, which offer better quality and price and less crowds. In addition, as a result of the lockdown, the percentage of the purchase destined to the pantry has increased.

## The new shopper buys fewer but more complete shopping baskets:

<i>% share in value, per €100 spent:</i>	PRE	LOCKDOWN	POST
<b>Need</b> (less than 3 categories)	26,8	20,9	25,8
<b>Proximity</b> (from 3 to 8 categories)	26,0	19,0	23,0
<b>Routine</b> (from 9 to 14 categories)	22,2	22,2	22,2
<b>Pantry</b> (15 or more categories)	<b>25,1</b>	<b>38,0</b>	<b>29,2</b>

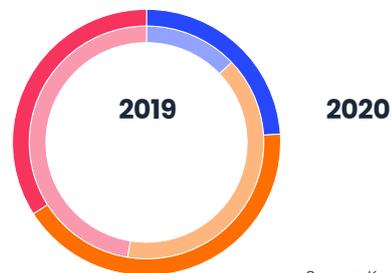


61% of households make pantry baskets at least 1 time per month after the lockdown (vs. 55% in 2019).

Source: Kantar.

## Eco-Actives\* already account for 25% of FMCG spending:

Depending on the impact of the crisis on the economy of each consumer, another trend that will gain importance is the **preference for sustainable products.**



Source: Kantar.

\*Eco-Actives: People who seek to reduce their levels of plastic waste on a daily basis by frequently adopting measures to improve the environment and adapting their purchasing behavior to this purpose.

**24%**

Eco-Actives  
18 B of €

**42%**

Eco-Considerers  
32 B of €

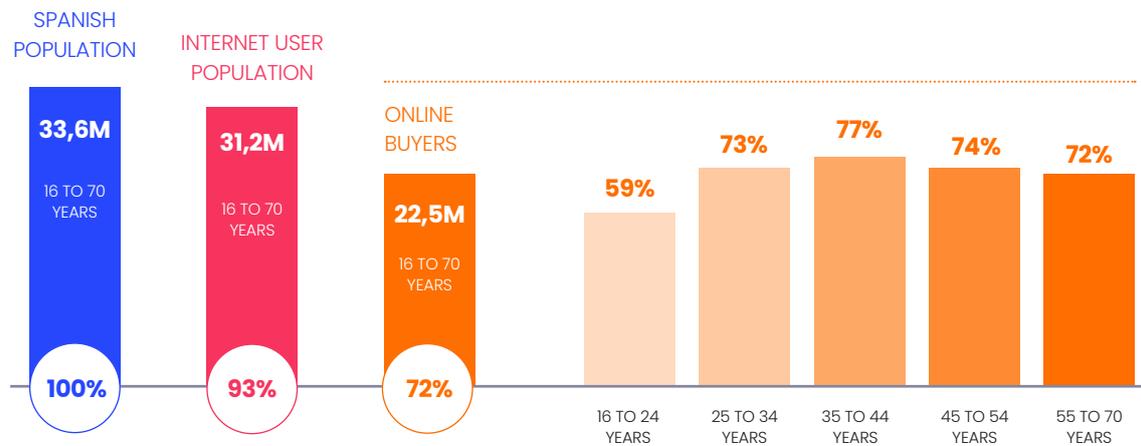
**34%**

Eco-Dismissers  
26 B of €



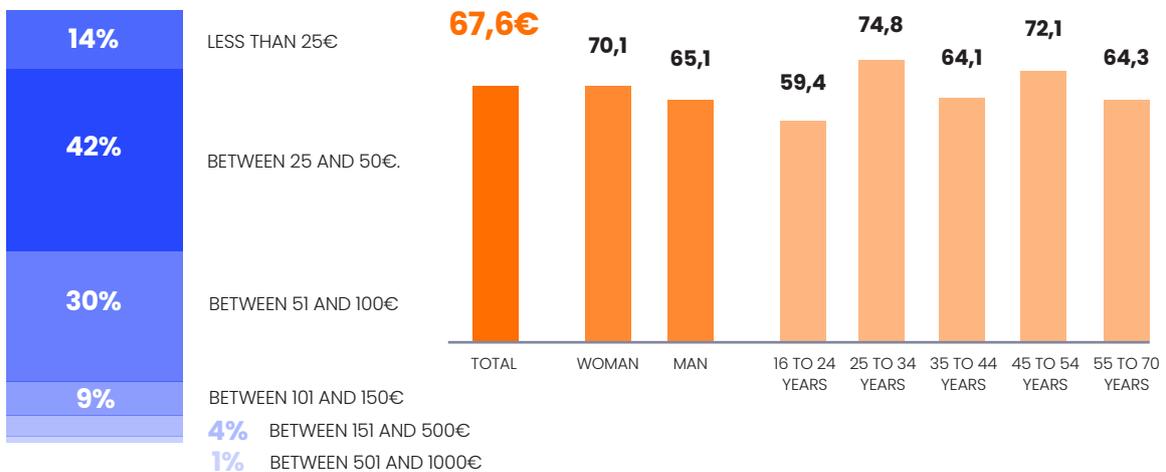
## The increase in online consumption:

As a result of COVID-19, consumers have not only opted for proximity shopping and neighborhood stores, but have also **increased online shopping and average spending**. It has also prompted older users to take the step to buy fresh products, and in view of the good experiences, it will no longer be exclusive to the lockdown.



## Profile and average expenditure:

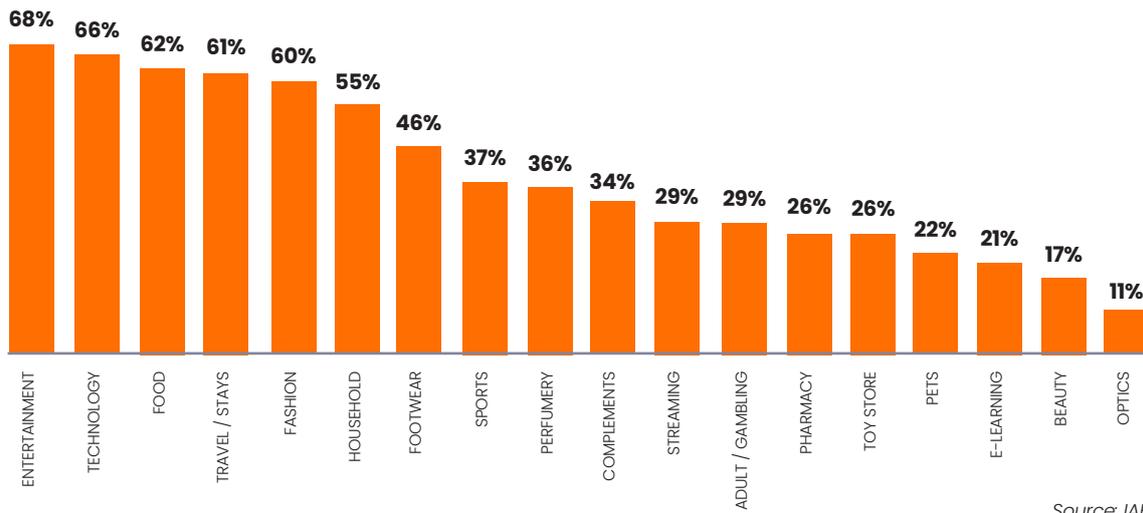
How much do you usually spend each time you shop online?



Source: IAB

With the pandemic, the order of **categories of products or services most purchased through the online channel** has changed, with food moving from fifth to third place, and the travel category dropping from second to fourth.

### Typology of products and services:



### Drivers of the online purchase:

Indicate your level of agreement or disagreement with each of the following statements. "I shop online because of the...".

The preference of the online channel over the offline one is not only due to health aspects, the main reasons are **convenience, wide offer, price and trust**.



Convenience



Wide offer and assortment



Price



Trust



Recommendation

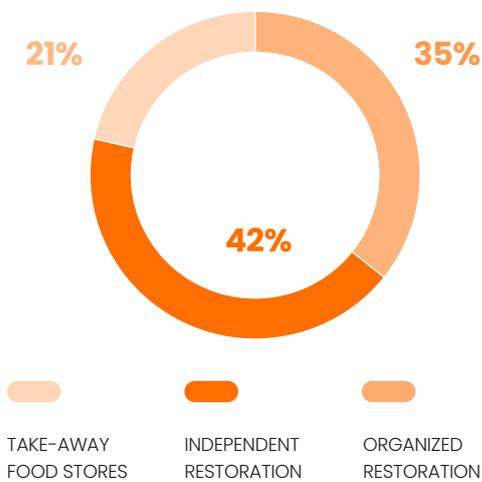


Online Advertising

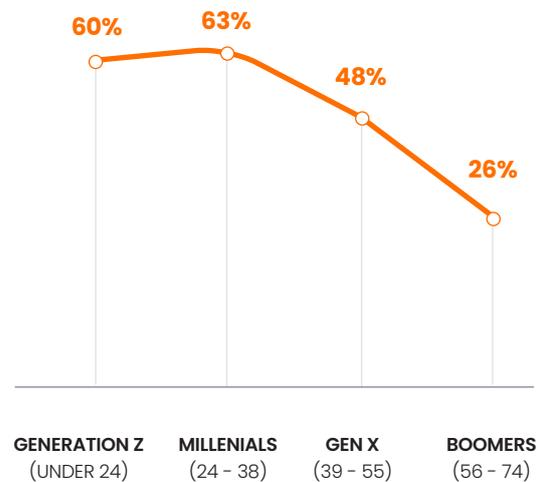
## Delivery has accelerated across all platforms, especially in takeaway stores:

Spending more time at home and feeling a lack of security inside establishments, **consumers have turned to food delivery orders.**

Total value of delivery in Spain, accumulated through August 2020.



Spain is the country with the highest number of home delivery orders in Europe.



Source: Kantar + Ipsos



## Digitalization and the new consumer:

The new consumer sees **digitalization as a way to maintain hygiene and prevention measures while remaining connected to other people and companies.** Examples of this are the increased use of contactless payments by card, mobile or wearables, or the adoption of online services such as online banking, telemedicine, online entertainment, etc. Consumers have become more connected thanks to the use of technology, providing them speed, convenience and instant access to any information and businesses.



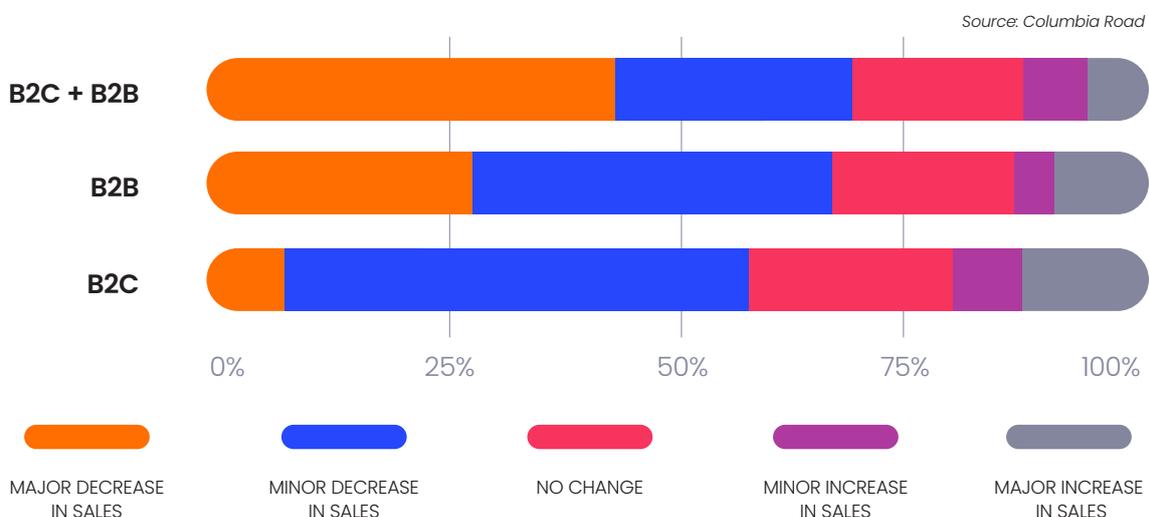
## CHANGES IN THE BUSINESS MODEL

One of the great lessons of COVID-19 is that **agility in competitive adaptation is not optional**, and that, in extraordinary circumstances, it is the only guarantee of survival. For example, many B2B companies have shifted to B2C business to stay afloat (permanently adding this option to their portfolio in case of success), while solutions such as e-commerce as a Service have become popular.

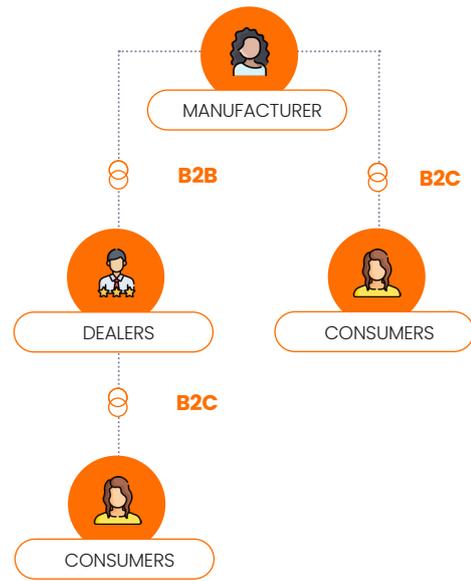
This context has accentuated the **transformation of B2B environments**, which in recent years have been adopting many of the B2C sales strategies, expanding their digital efforts, putting the focus on the customer and on sales, from lead generation to acquisition.

This trend was accelerated in 2020 with the arrival of the crisis. As events were cancelled, restaurants closed and stores emptied, B2B companies were indirectly affected. In fact, around 70% of B2B companies have reported a decline in traditional sales.

How have traditional sales been affected by the current situation?



The big trend, capitalized by companies such as Alibaba, Uber, Amazon, Google or Visa, is the overcoming of the dividing line between B2C and B2B, and the **generation of a B2B2C (Business-to-Business-to-Consumer) model**, a hybrid model that promises massive customer acquisition at a lower cost. With B2B2C sales, the first business (N1) accesses its customers through the second business (N2), but interacts directly with the customer, under the umbrella of its own brand. Customers are fully aware that they are shopping at N1 and, more importantly, N1 retains the customers and the data generated in each transaction. Properly implemented, this formula can maximize value contribution, and generate multi-stakeholder ecosystems that create value for the end customer and stakeholders.





On the other hand, in addition to shifting to a B2C business model, with the arrival of COVID-19, many companies have decided to adopt **e-commerce as a Service solution**, which offer brands the opportunity to leverage a direct-to-consumer, multi-channel sales strategy. Through this model delivered as a service, a brand has access to leading e-commerce technology and shared resources in key functions (IT, customer service, fraud management, analytics, compliance, finance, tax, etc.).

Setting up a new e-commerce business can be complex, time-consuming and costly, especially for brands that did not even have an online presence before the pandemic. By outsourcing certain e-commerce solutions such as web development, branding, hosting and maintenance, digital advertising, payment system, SEO, logistics and customer service, stock and product management, etc., brands can save time and resources, get their products to market faster and focus on their core business. This is why more than 68% of global brands worth less than \$1 billion outsource part of their e-commerce function.

#### **Main benefits of implementing e-commerce as a Service:**

- **Constant software updates**, so that the brand will always have the latest version.
- **Monthly subscription**, resulting more economical than buying a traditional e-commerce platform.
- **The provider is responsible** for maintenance, hosting, performance and speed. Upgrades are done automatically, saving time and money.
- **Fast installation**, which speeds up T2M.
- **Increased security** due to automatic updates. The platform will always be updated and protected against vulnerabilities, avoiding data loss or cyber-attacks.

## AUTOMATION OF THE SALES PROCESS

Companies, however, must not only adopt and optimize their e-commerce, but also take advantage of this adoption as a **driver for the reconfiguration of their operations**. Technology-based automation is an unstoppable trend, which obviously also affects online sales, simplifying the user experience and reducing costs for companies. In this context, the term **a-commerce (automated commerce)** appears. For customers, it means significant time savings by planning and automating purchases without the need to make them again in the future, eliminating repetitive manual processes. In other words, the technology helps to predict when a product will be out of stock, and takes charge of placing the order, based on users' consumption habits. This technology is especially useful for high consumption products that require frequent replenishment, such as personal hygiene, food, etc.

From the business point of view, this technology **automates tasks, processes and campaigns in an intelligent way**, to execute them at the right time, thanks to the use of predictive tools. These types of solutions are becoming increasingly important today because they help to respond to changing customer demands, personalize offers in real time, collect and analyze user behavior to improve customer acquisition strategies, maximize customer loyalty, and obtain all types of data to optimize the Customer Experience.



Considering the potential of this trend, it can be useful for different areas of the company, such as the following:

- **Financial Optimization:** automate the payment process, automate invoicing, rate/price management, real-time personalized offers, fraud prevention, etc.
- **Marketing Optimization:** automate the publication of content, daily management of e-mails, Newsletter Smart Lists, customer service, etc.
- **Logistics Optimization:** Locally Distributed Business, automated warehouses, Dark Stores, inventory management automation, people tracking through cart tracking, etc.

## What is a Dark Store?



It is a closed-door store, where e-commerce orders are prepared.



Its design is intended for a "picker" who quickly selects the products.



The order of items is based on frequency of purchase.



Once the order is prepared, it is shipped via in-house logistics or an external delivery platform.

THIS FORMAT ALLOWS YOU TO SAVE ON:



### DECORATION

There is no need to attract any customer.



### REAL ESTATE EXPENSES

Non-central properties are sought.



### STAFF

More people are attended simultaneously through chatbots.

Experts say that automation will shape the future of e-commerce over the next few years in the post-COVID-19 scenario. This transition to **smart e-commerce** where brands and consumers are increasingly connected is already underway, thanks to fundamental technologies such as Artificial Intelligence, Machine Learning, and data analytics.



## HEADLESS TECH

Changing customer demands are pressuring brands to expand their shopping experiences beyond their traditional e-commerce channels. In this regard, companies must be able to adapt, not only to the touchpoints being used today, but to any channel that consumers may potentially adopt in the future.

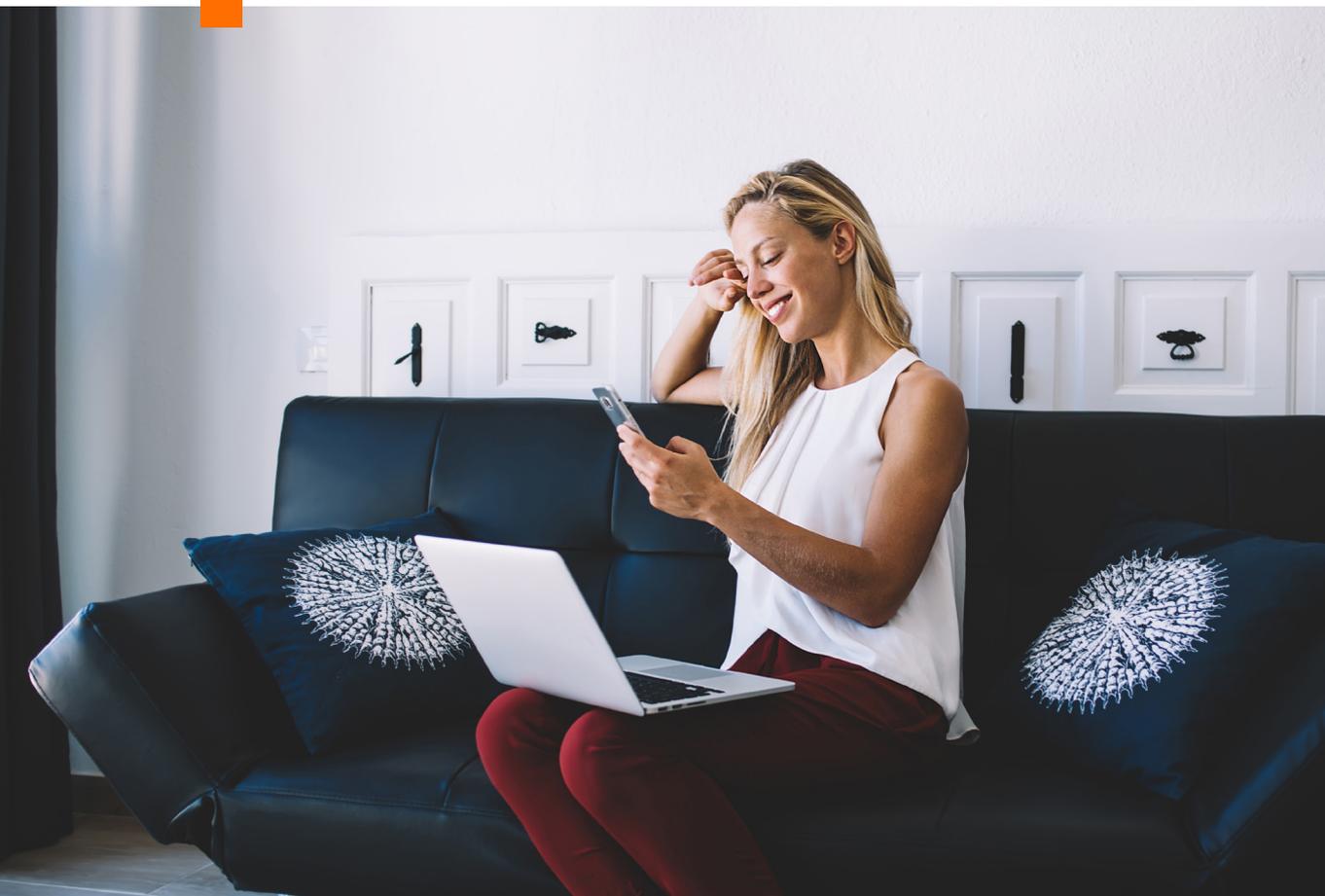
This is why more and more companies are taking advantage of Headless technology - COVID-19 has effectively accelerated the process - to generate a unique and differential shopping experience that provides value from the experience itself, beyond the product finally purchased. This technology **separates the Front-End presentation layer from the Back-End data functionality** to create unique and differentiated shopping experiences.

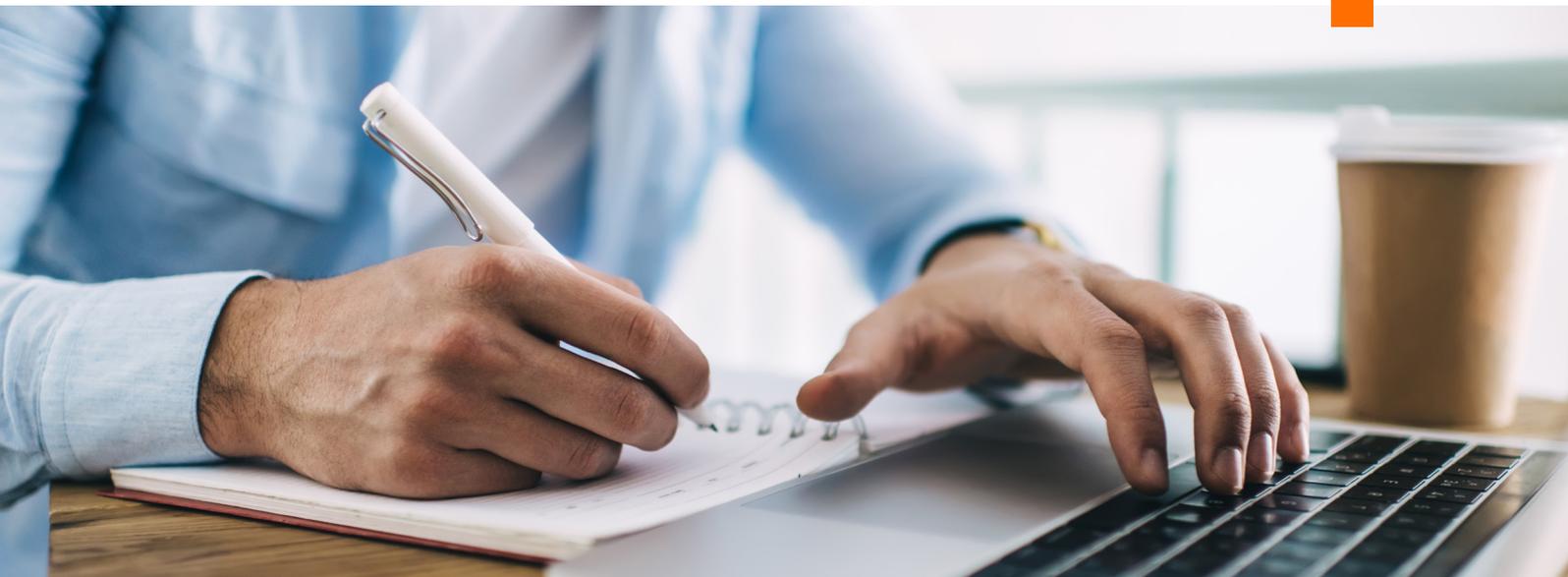
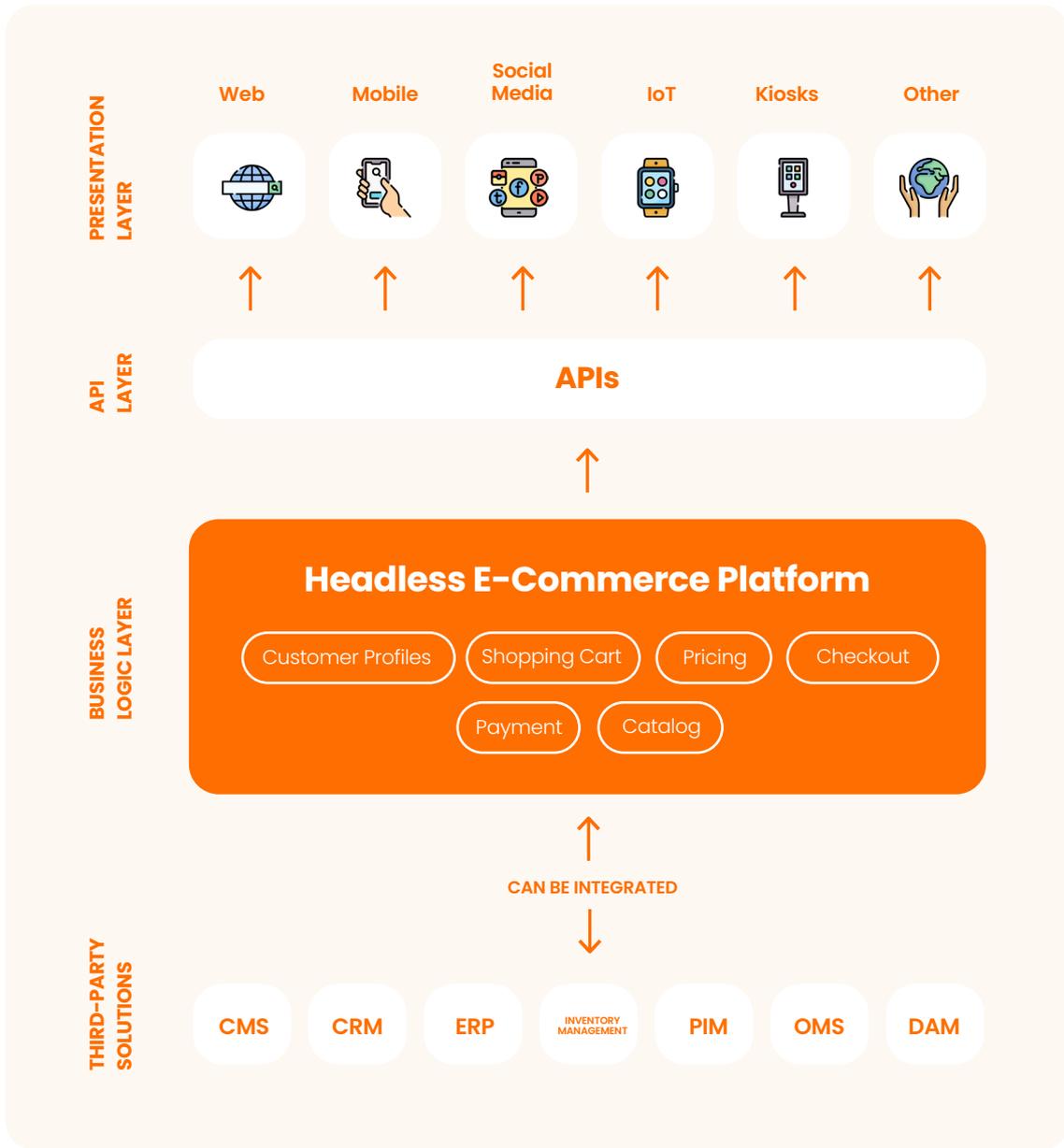
Developers can then use APIs to display, for example, product delivery, order

processing, blog posts or customer reviews on any screen or device. This allows the Headless e-commerce platform to be fully **customized, faster, more agile and continuously updated**.

Headless technology allows customers to interact with the brand from any device (*smartphone, tablet, wearables, voice assistants, etc.*), improving the user experience depending on the channel used, and the needs associated with that channel. The level of flexibility is much higher.

It gives brands the freedom to test cutting-edge technologies such as voice assistants, wearables or AI and ML, while continuing to use more traditional means to connect with customers, such as emails, social networks, etc. By basing the entire ecosystem on APIs, it allows for updates or experiments without affecting the entire platform.





In addition, the **universal compatibility** of Headless e-commerce ensures that the company's e-commerce platform is always available and accessible on all devices and display formats. There are several reasons why it is increasing popularity in the e-commerce field.



### OMNICHANNEL SHOPPING

Flexible technologies are needed to deliver content-driven shopping experiences across multiple channels. Without the integration of each of the different touchpoints, consumers will have a fragmented and disconnected shopping experience that is less commercially effective, so an omnichannel strategy **is imperative to deliver a unified and consistent shopping experience** across all touchpoints. An omnichannel marketing approach requires the use of API-driven software to build a robust, integrated digital platform, with content management, commerce and other functionality. Headless technologies allow you to build the interfaces you want, while managing them from a single point.



### HYPERPERSONALIZATION

The most innovative brands are using ML and AI technologies to **analyze customer behavior and tailor the interface, the offer and recommendations to their individual profile**. Headless technology enables hyper-personalization because API-driven software can more easily exchange data. This makes it easier to collect and aggregate customer information from a variety of touch points, and to leverage advanced analytics solutions with AI or ML capabilities to gain integrated insights into the target market.



### OPTIMIZATION AND INSTANTANEOUS CHANGES

As soon as a company introduces new content in its interface, **updates are reflected almost instantly**, unlike e-commerce built with a traditional architecture, which sometimes can take minutes or hours (with interspersed maintenance periods before all users can see the latest design or update of a platform).



### FASTER INNOVATION

It makes it possible to **quickly replace existing tools and applications** with others that meet the latest customer demands. What's more, new integrations can be applied, quick upgrades can be made and functionality can be introduced with less money and time spent. The speed at which a brand can innovate is becoming a differentiator in today's competitive landscape. Legacy e-commerce platforms do not allow brands to move fast enough, and they risk being left behind in the face of changes as drastic as the pandemic. Headless e-commerce, on the other hand, allows companies to innovate faster and take an iterative approach.



03

# Technology Discovers Emotions



# Editorial

In a world dominated by digital interactions and technological advances, is there space left for emotion-based connections?

The answer is yes, and they will play an absolutely critical role in being able to implement differential CX strategies.

Such connections must be facilitated by technology, so technology must adapt and evolve to be able to detect, process and analyze intrinsic human behavior and emotions. Recognition can be through visual, textual, auditory, etc. sources; but all of them pursue the same objective: to understand the emotional state of the consumer from both verbal and non-verbal signals; also including factors such as the analysis of facial expressions, physiological and gestural signals, etc.

Obviously, in order to make viable and feasible to develop and integrate these advances in our business model, it will be essential to make a strong investment in Big Data technologies and tools (due to the huge volume of data input that will be captured); and Artificial Intelligence (Machine Learning being key to establish patterns of continuous improvement and that the results are progressively more reliable and objective).

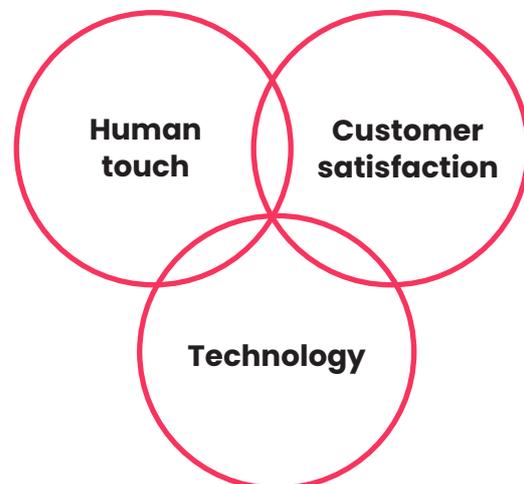
In conclusion, technology will be a key ally in the new digital era that will help us to increase the satisfaction of our consumers, driving the creation of lasting and human connections.

In the wake of COVID-19, and now more than ever, much of the interactions between brands and customers take place through digital channels. This creates opportunities for companies, which can position themselves in the same digital locations as their customers, and exploit new opportunities for interaction; but also for customers, who gain a more transparent view of business and demand an immediate response to any question or demand. However, digital experience is not the only thing consumers want.

The competitive environment is exceptionally aggressive, so a clear differentiation value is the ability to offer an exceptional omnichannel digital CX; anticipating needs and personalizing the product/service as much as possible. But companies must also be able to excite the consumer through methods such as: advanced segmentation and clustering, predictive analytics, recommendation and personalization, etc. The ultimate reality is that **technology must adapt to the human being, and not the other way around.**

In fact, in the past, technology was perceived as a cold and dehumanizing element; whereas in today's context, digital solutions are an excellent method to **establish long-lasting and human connections.**

The human being is a social being, and needs to find emotional and social factors along the different touchpoints present in the digital Customer Journey.



# THE IMPORTANCE OF THE HUMAN TOUCH IN THE DIGITAL AGE

There are many factors that influence the creation of a good customer experience, but the ability of brands to **connect with consumers on a personal level is crucial**. For example, nearly 75% of consumers globally say they choose one brand over another depending on whether its customer service is helpful and works well, resolving any issues in a short period of time. In addition, 90% say they remain loyal to brands that share their values and take a stand on social, environmental, political and cultural issues.

This need has increased with the advent of COVID-19. The situation of uncertainty, social and economic unrest makes connecting with customers on a more emotional and personal level more important than ever. It is important that brands with a strong technological component seek to give a human character to their interactions, and begin by creating products and services that adapt to the complicated situation that customers are currently experiencing. For brands to maintain a human touch in the digital era, it is important to implement recommendations such as:

## CREATE MEMORABLE EXPERIENCES THAT TRULY LAST OVER TIME:

Consumers remain attached to experiences that are engaging, rewarding, unique and memorable. Therefore, brands want customers to remember their experience and, as a result, be the first company they think of when they need a product.

## THE COMMUNICATIONS THROUGH THE SOCIAL MEDIA MUST BE PERSONAL AND HUMAN:

Most consumers understand that many of their interactions are with bots and that their data is processed through AI, but they do not want to feel that the interaction is 100% artificial.

## KNOWING CONSUMERS THROUGH CUSTOMER SERVICE:

This is an extremely valuable channel for creating personal engagement. Traditionally, this service was guided by a series of procedures, rules and objectives that were too rigid. To avoid such inflexibility, there is a tendency to give employees more freedom to vary their communication style and show a more human approach.



## THE COMBINATION OF TECHNOLOGY AND THE HUMAN TOUCH

Technology has contributed in recent years to generate a more complete, personalized and even human experience: automation and AI allow, for example, a more efficient service, with less administrative burden and 24/7 accessibility, compared to traditional customer services. However, to ensure that an **emotional connection is created when the customer interacts with the brand**, impersonal digital channels (even if they are very efficient) devoid of a certain humanity are not enough.

There are many digital areas that help to ensure that the combination of technology with human interactions generates both a unique experience and an emotional connection with the user.



### AFFECTIVE COMPUTING

Affective Computing, also known as Emotional AI, focuses on the study and development of systems and devices that can **recognize, interpret, process and simulate human emotions**. It encompasses computer science, psychology, neurobiology and cognitive sciences.

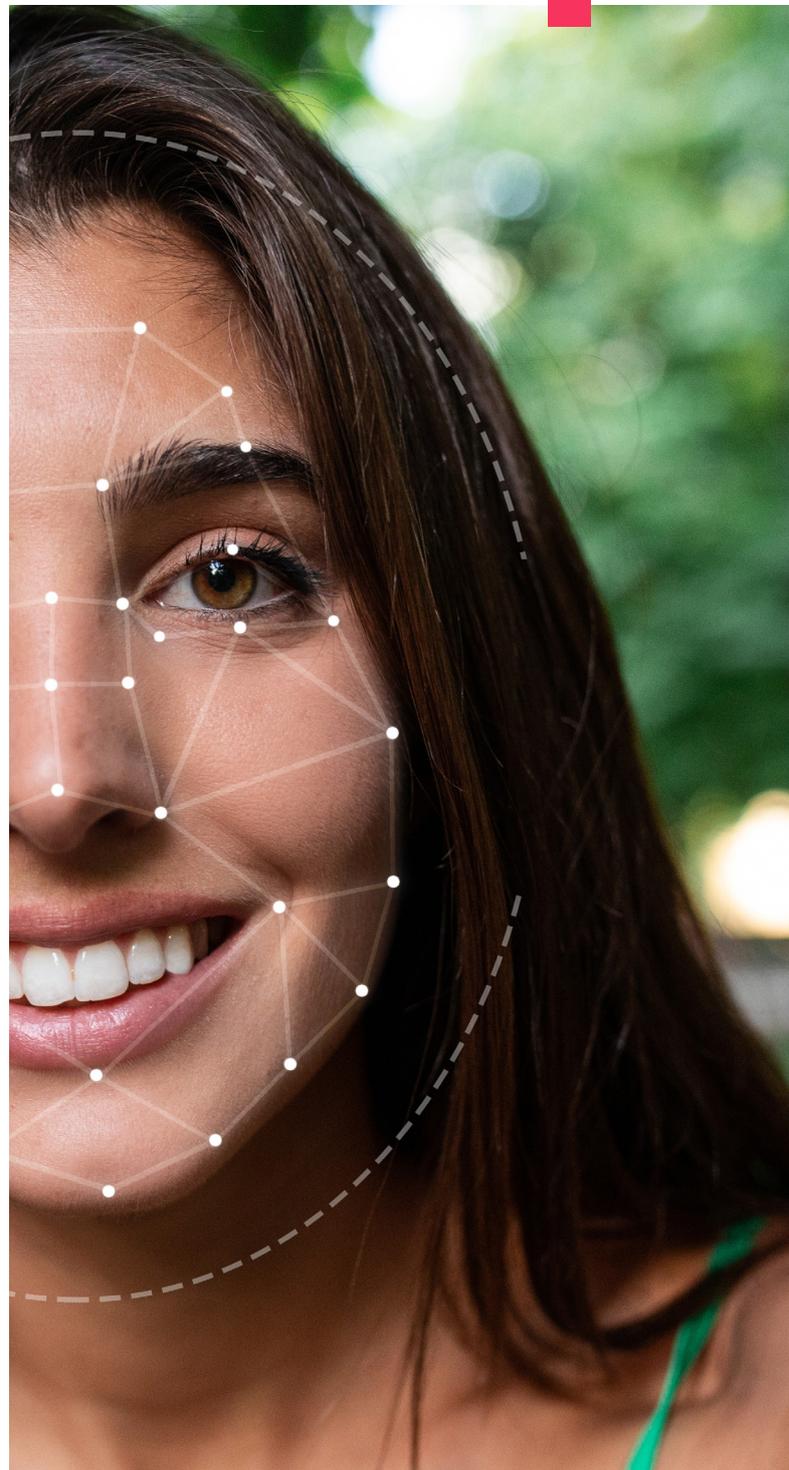
While it may seem unusual that machines be able to do something as human-like as simulating emotions, research shows that they achieve acceptable levels of accuracy in **recognizing emotions through visual, textual and audio sources**. With the information that AI extracts from these sources, companies can offer better services to their customers and make better decisions in processes such as customer service, sales or marketing. There are more and more areas and sectors that can benefit from the advances of Affective Computing, for example, in healthcare, education, insurance or personal voice assistants.

Affective Computing **can identify emotions through facial expressions and speech recognition.** Most such computing systems use labeled data to train their Machine Learning models, which identify emotions in speech or videos. Since people express their feelings in very similar ways in different cultures, AI can detect these patterns and analyze them to classify emotions quite accurately, and predict their specific needs and desires, as well as anticipate possible reactions to different situations (personality recognition).

This technology is based on the latest advances in high-resolution cameras, AI and Machine Learning. However, with the advent of COVID-19, the trend has accelerated: the size of the global Affective Computing market is estimated to grow from \$28 billion in 2020 to \$140 billion in 2025, at a compound annual rate of 37.4% during the forecast period.

This acceleration has to do with the adoption of imaging technologies to, for example, measure people's temperature to contain the virus spread, or even more, of sensors to measure their mood, due to the emotional and psychological impact of the pandemic, and the increased concern of consumers, institutions and companies for mental well-being. However, despite major advances, this technology still presents some challenges:

- **Algorithm and hardware design limitations.** Although accuracy is increasing, improvements in algorithm design and more advanced hardware are still required for the technology to be adopted beyond the experimental phase.
- **Ethical issues in video monitoring.** In order to be able to identify human emotions, the use of video surveillance or monitoring of social media for posterior analysis is required.



Nevertheless, and even being aware of these challenges, Affective Computing remains a tool with great potential, which can be very useful in a **wide variety of use cases**:

**MARKETING:** Companies can analyze which actions encourage their customers to get involved, and organize communication strategies accordingly. For example, customer reactions to campaigns can be measured to optimize successive marketing strategies. By analyzing reactions to new products, better commercial strategies can be devised, or more relevant content can be generated.

**CUSTOMER SERVICE:** Companies can detect the mood of customers from the beginning of the call, and depending on that mood, map a certain route, or direct it to certain employees who specialize in critical situations, if the customer is angry, for example. It can also help agents to direct the conversation based on speech patterns, and to measure the degree of satisfaction after the end of the call.

**HUMAN RESOURCES:** Used to conduct job interviews and measure how candidates express their emotions. It can also be used to coach employees who work directly with customers, helping them to improve their empathy and communication skills. Moreover, the HR department can track employees' stress and anxiety levels during the workday and observe whether they are satisfied with their current tasks and workload.

**HEALTH:** It can be used to monitor the physical and emotional well-being of patients. It can also help diagnose diseases such as depression, anxiety or dementia.

**INSURANCE:** Used primarily to detect potential fraud cases. With speech analytics, insurers can predict whether a customer is lying when filing a claim.

**RETAIL:** Focused on monitoring the satisfaction levels and reactions of consumers in a physical store while they are shopping there. With this information, retailers can take more effective actions to improve customer satisfaction.





**DRIVER ASSISTANCE:** Monitor the driver's emotional state while driving, and if he or she is overly tired, stressed, angry or sad, it can send alerts of possible unsafe driving. It can also be used to measure the performance of autonomous vehicles, using cameras, microphones, and integrated sensors to monitor passengers' emotions.

**EDUCATION:** Sensors such as video cameras or microphones can be used to learn about the emotional state of students during lessons, to assess satisfaction or frustration. This can help teachers adapt their lessons and get better results. The technology is also used to help autistic children recognize the emotions of others around them.

**TECHNOLOGY:** Affective Computing can be integrated into IoT and other smart devices to act on users' emotional states, detected through voice and face analysis. For example, if the customer appears to be very hot, the smart air conditioner could turn on automatically.

**RESPONSIVE RECOGNITION TECHNOLOGY:** The future integration of this technology with intelligent voice assistants, such as Google Home or Alexa, will offer extensive possibilities. By detecting the user's mood, they can generate personalized responses to positively influence the user: for example, playing soothing ambient music when detecting stress.

There is still a long way to go to get to the top in Affective Computing. Emotions are intrinsically difficult to understand, and there is often a disconnection between what people say they feel and what they really feel. But, although the way that humans interpret emotions is not without its own prejudices and opinions, which are difficult for an AI to reproduce, perhaps this could be an advantage in the long run.

## MULTIMODAL EMOTION AI

With the ultimate goal of providing machines with emotions, more and more researchers in the field of AI have conducted studies on Affective Computing in general and Multimodal Emotion Recognition in particular, making them an emerging and promising area of research.

Multimodal Emotion Recognition extracts not only the verbal or non-verbal signals of the subject to be analyzed, but also spatial and temporal characteristics, such as facial expressions, nervous system signals, physiological signals, gestures or postures.

Starting from the classical components of sentiment analysis (voice, speech, gestures, eyes, movements, etc.) it was extended to other relevant modalities such as video, audio, sensor data, etc. To achieve this, different techniques and methods such as semantic rules, Big Data or Machine Learning are combined. With all this, it is possible to build a new multimodal emotion recognition system on an AI-based model, designed to extract information about emotions. The most **classical and basic modalities** of emotion analysis are:



**TEXT ANALYSIS:** Identifying sentiments and opinions in text fragments (blogs, emoticons, forums, user comments, website reviews, community websites, etc.) allows to determine whether a text expresses a positive, negative or neutral sentiment towards a particular phenomenon. In addition, it allows to classify opinions/sentiments according to degrees of intensity. This can be used, for example, to categorize opinions about a product.



**DETECTION OF EMOTIONS IN SOUND:** The machine learns human emotions expressed from speech, such as intonation, articulation, etc. By recognizing the emotions of speech, it is possible to notice which type of emotion that dominates during the conversation. It is possible to recognize states such as: sadness, fear, embarrassment, terror, anger, etc. This data can be extracted from videos, recordings, calls, audio messages, etc. With this information AI can help, for example, in rapid decision making, customer service analysis, or the development of advertisements.

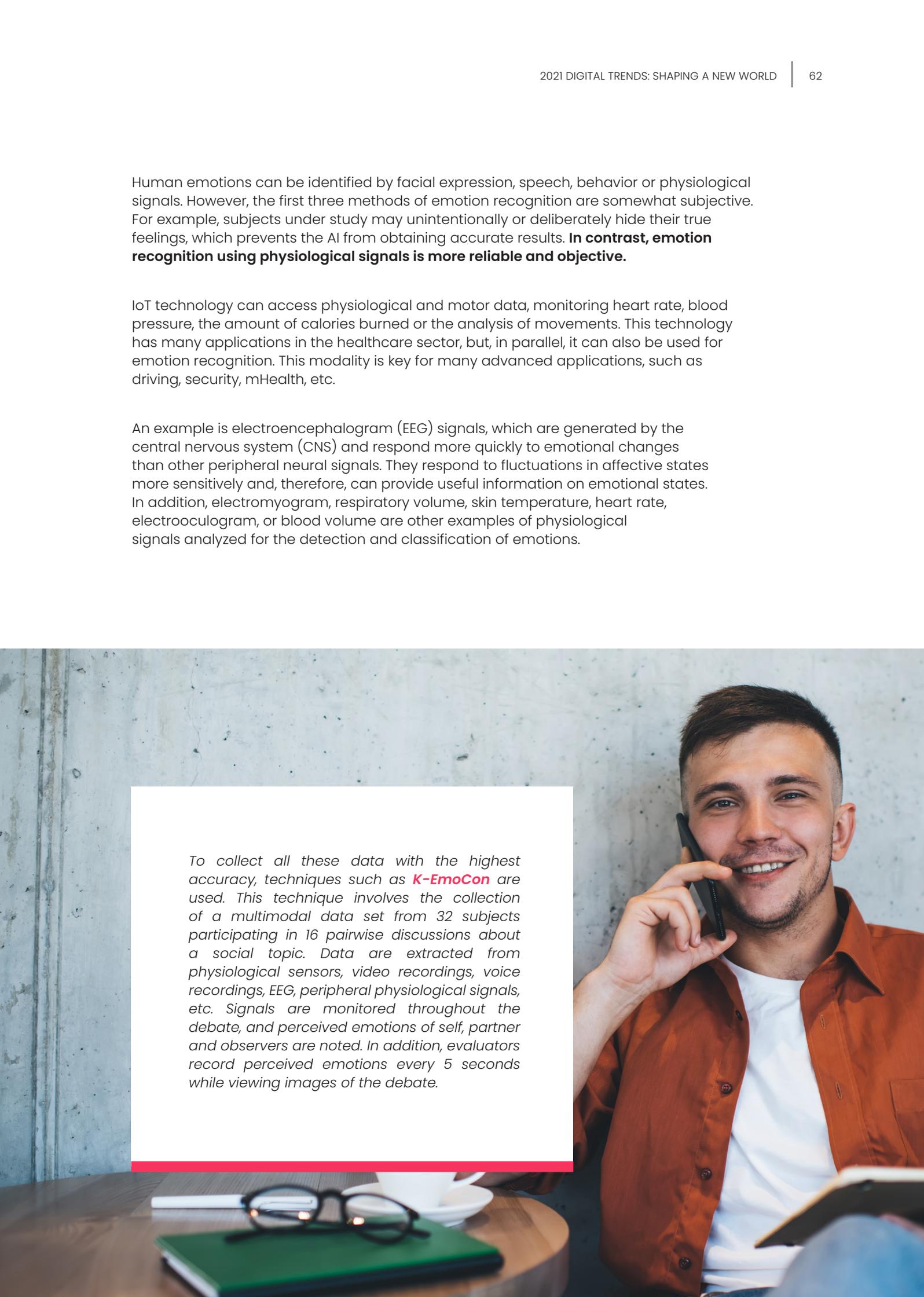


**IMAGE AND VIDEO:** The human face plays a dominant position in the study of emotions. It is possible to record facial information automatically in real time, without the need for specialized equipment beyond a video camera. The computer algorithm extracts the main features of the face (mouth, eyes, eyebrows, head posture, etc.) and analyzes the movement, shape and composition to identify facial action units. With this, it is possible to track small movements of people's facial muscles and translate them into universal expressions such as happiness, surprise, sadness, anger, etc.

Human emotions can be identified by facial expression, speech, behavior or physiological signals. However, the first three methods of emotion recognition are somewhat subjective. For example, subjects under study may unintentionally or deliberately hide their true feelings, which prevents the AI from obtaining accurate results. **In contrast, emotion recognition using physiological signals is more reliable and objective.**

IoT technology can access physiological and motor data, monitoring heart rate, blood pressure, the amount of calories burned or the analysis of movements. This technology has many applications in the healthcare sector, but, in parallel, it can also be used for emotion recognition. This modality is key for many advanced applications, such as driving, security, mHealth, etc.

An example is electroencephalogram (EEG) signals, which are generated by the central nervous system (CNS) and respond more quickly to emotional changes than other peripheral neural signals. They respond to fluctuations in affective states more sensitively and, therefore, can provide useful information on emotional states. In addition, electromyogram, respiratory volume, skin temperature, heart rate, electrooculogram, or blood volume are other examples of physiological signals analyzed for the detection and classification of emotions.



*To collect all these data with the highest accuracy, techniques such as **K-EmoCon** are used. This technique involves the collection of a multimodal data set from 32 subjects participating in 16 pairwise discussions about a social topic. Data are extracted from physiological sensors, video recordings, voice recordings, EEG, peripheral physiological signals, etc. Signals are monitored throughout the debate, and perceived emotions of self, partner and observers are noted. In addition, evaluators record perceived emotions every 5 seconds while viewing images of the debate.*

## GESTURE RECOGNITION

Gesture recognition technology helps interpret motion to identify people and perform actions, without requiring the user to interact with a touch screen. In this way, **the device's motion sensor can perceive and interpret the person's gestures as the main data input.**

This is a growing market, and in fact the market is expected to grow from 9.6 billion in 2020 to 32.3 billion in 2025. More and more companies are adopting this technology to make life easier for their users and improve the customer experience.

This trend has been reinforced with the advent of the pandemic, due to the growing concern for hygiene and the trend towards low touch interactions. In this context, gesture recognition is an ideal solution, because it provides real-time data to a computer to fulfill the associated commands, without any physical contact.

Most solutions of this type, feature a combination of 3D depth-sensing cameras and infrared cameras together with Machine Learning systems. ML algorithms are trained based on gestural images, allowing them to recognize hand positions and associate them with commands.

### IT CONSISTS OF THREE BASIC LEVELS:

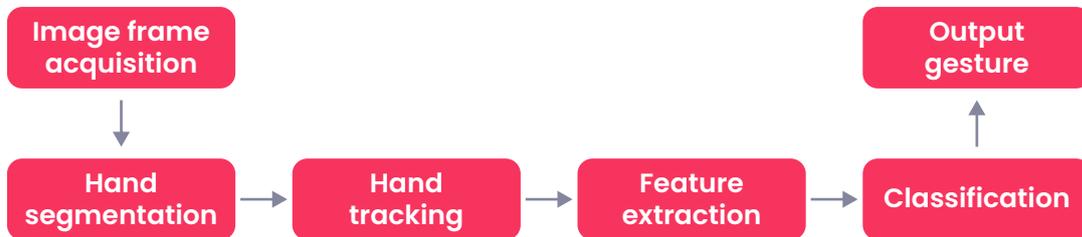
**DETECTION:** With the help of a camera, a device detects hand or body movements, and an ML algorithm segments the image to find edges and hand positions.

**TRACKING:** A device monitors the movements frame by frame to capture each displacement and provide accurate input for data analysis.

**RECOGNITION:** The system attempts to find patterns based on the collected data. When the system finds a match and interprets a gesture, it performs the action associated with the gesture.



## Gesture recognition process:



With new solutions based on tracking sensors, recognition systems are able to **recognize both static and dynamic gestures in real time**. In this last type of system, depth sensors are used to align computer-generated images with real images. The processed data provides information on fingertip angles, distance from the center of the palm, elevation of each finger, etc.

Some areas that are more actively adopting gesture recognition are **automation, Virtual Reality and home automation**. In recent years, the technology in question has penetrated more deeply into these areas due to advances in AI, Machine Learning, Deep Learning, IoT sensors and wearables, which have significantly increased its accuracy and availability.

Gesture recognition is part of the **Natural User Interface (NUI)**, along with other modalities such as touch or voice. These are considered natural interfaces because the user uses them on a daily basis, and technology simply recognizes them and uses them to make people's lives easier. Thus, with NUIs, computing devices adapt to users' needs and preferences, and not the other way around.

These are interfaces where the user interacts with an application without using command systems or artificial input devices, and instead uses gestural movements of the body or any of its parts, such as the hands or voice, as a control command. The advantage of NUI is that user interaction is easy and natural, adapts better to people and allows a wider range of possibilities than a more traditional graphical interface.



## INTERNET OF BEHAVIORS (IOB)

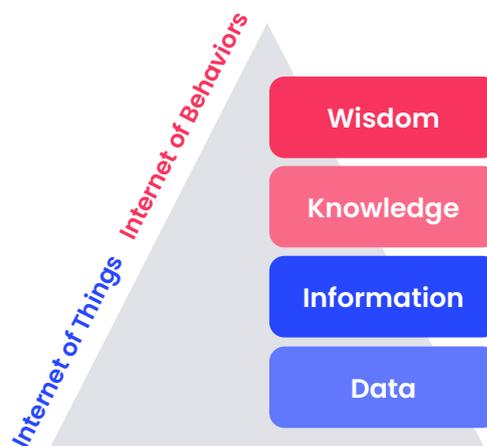
The Internet of Behaviors trend is growing in popularity, to the point that by 2023, the behavior of 40% of the world's population will be digitally tracked thanks to this technology. The IoT makes it possible to connect any device to the Internet, and has a high degree of maturity. Precisely the collection of data from these devices **provides valuable information on the behavior, interests and preferences of users**. This is what we know as the Internet of Behaviors, which gives meaning to the data collected by the different IoT devices, thanks to behavioral technologies, to learn more about consumers.

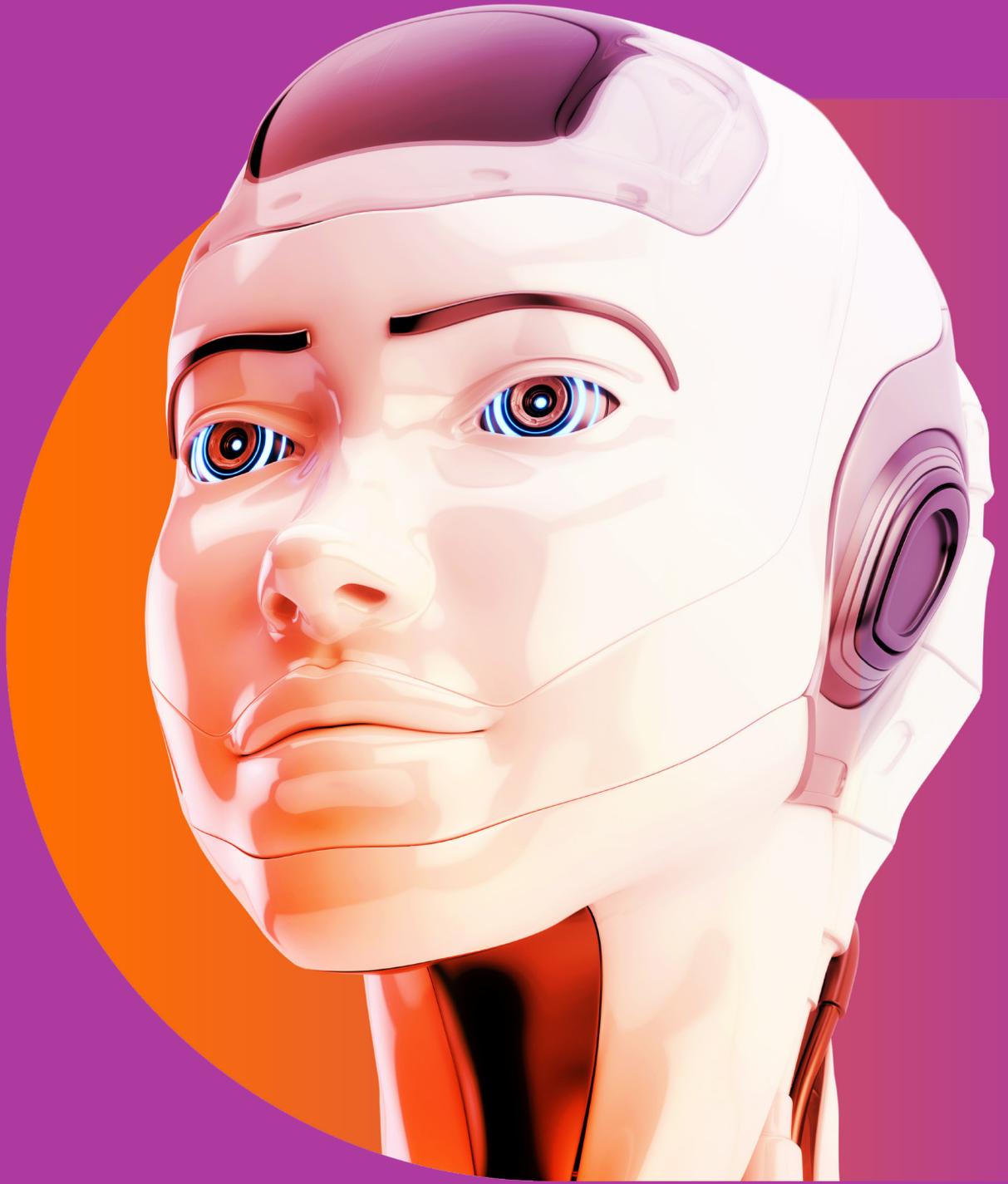
It combines technologies that focus directly on the individual, such as facial recognition, location tracking, data analytics, behavioral science, etc.; and connects the resulting data to associated behavioral events, such as cash purchases or device usage.

Brands know more and more about their users: what their interests are, their tastes, their opinions or the way they shop. With all this, they can offer a truly human and personalized experience. *Uber, for example, uses IoT data from its drivers, passenger locations and preferences to reinvent the end-user experience.*

However, any company that decides to design its products, services and marketing strategies through an IOB approach **must be aware of the responsibility that comes with it**. The use of personal data requires transparency, respect for people's privacy and strict regulatory compliance.

Extracting conclusions based on consumer behavior **allows effective actions to be taken to modulate that same behavior** in an unconscious way. A corporate ethical and legal commitment to IOB and a solid cybersecurity strategy are essential to avoid serious data breaches with potentially catastrophic consequences.





04

# Democratic AI



# Editorial

**F**or years, Artificial Intelligence has been surrounded by a halo of mystery, mainly due to the lack of knowledge about its operation and evolving capabilities.

That era has come to an end, because AI is currently undergoing a process of profound democratization: on the one hand, the volume of solutions available on the market is increasing, which greatly facilitates the implementation of this type of technology, partly solving the existing barrier to entry due to the limited availability of expert technical profiles in the market.

On the other hand, there are more and more commercial and tangible applications based on AI; such as advanced segmentation, automatic personalization, predictive analytics, process automation, etc.

Understanding in depth the learning processes, the internal logic of the algorithms and the decision-making mechanisms (given that the recommendations derived from intelligent systems ultimately affect the lives of human beings), is the next step to continue promoting AI as a technology that can generate value and impact on a business in the short term and at a consistent cost, given that development and integration times are becoming shorter and shorter.

**A**I and its applications represent an area of technology that is becoming increasingly democratized, mostly because its platforms are becoming **more secure, reusable and scalable**. Democratizing AI means encouraging this technology to become increasingly accessible to a greater number of companies and commercial users. This trend could prove positive in a society where open source has become popular, and both companies and users are prone to reduce the entry barriers to technology adoption.

However, today, **there are few people who have the necessary expertise** in AI and its applications. This is mainly because implementing this technology requires knowledge of complex techniques and skills, such as coding, statistics and data analysis, among others. There are therefore few qualified companies for the adoption of AI, especially if we refer to SMEs, taking into account the high cost for the company of such specialized and demanded profiles. In addition, large databases are needed to create advanced AI models. This implies having an infrastructure that requires a significant initial investment, which is unthinkable for many companies.

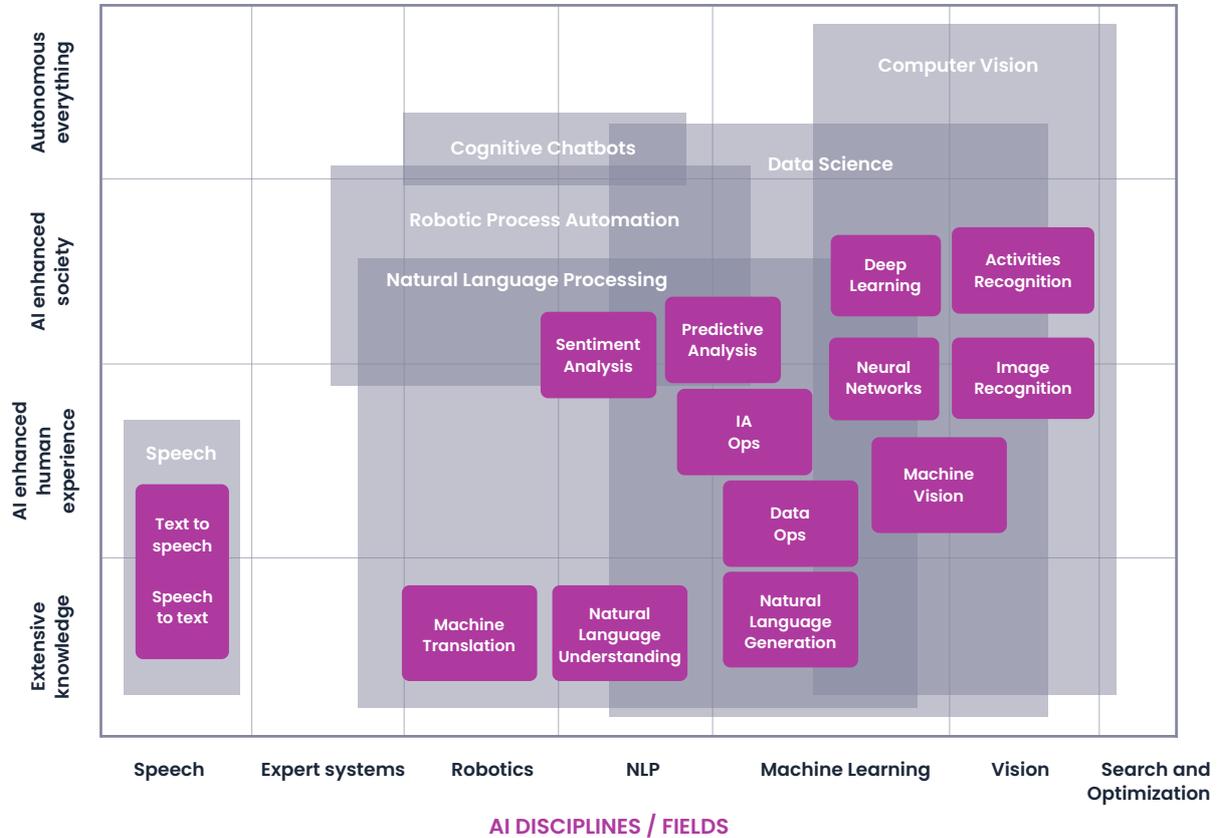
In this context, **the democratization of AI is occurring progressively**, as the number of tools available to facilitate the implementation of this technology increases, even for non-expert users. A good example of this are the platforms for building Machine Learning models for beginners, which have become popular in the last year. Thus, there are more and more self-service tools that allow non-technical employees to take advantage of the large volume of data generated in the company. These AI tools provide pre-designed algorithms and intuitive interfaces that make them easy to use for those with little experience. Companies such as Google, Amazon and Microsoft are contributing to the initiative to promote **tools that automate the most complex AI processes, including Plug & Play solutions** that provide immediate value.

Trends such as Natural Language Processing, the analysis and extraction of structured information from text documents, the analysis of customer sentiment through social media or call centers, or the use of conversational interfaces or chatbots, are having more and more commercial applications in common use. The same goes for Deep Learning used to obtain information, identify or classify data, automate tasks or improve decision making.

Such is the magnitude of this massive adoption that it is estimated that companies fully implementing AI by 2030 could double their revenues, while those that do not could report a decline of up to 20%. And the fact is that democratizing AI will bring great positive effects for those companies that are not experts or do not have enough resources. The reality is that **the cost of building AI solutions is falling** as communities of programmers and users begin to use and extend the required algorithms and tools.



## Categorization of AI solutions:



However, democratizing AI is not an easy or immediate process, and it is not without risks. In any case, there are a number of trends that encourage this tendency:



**Bringing light to the “Dark Side”.** A critical aspect of promoting AI as a practical element is to advance in knowledge and understanding of how it works and how its capabilities evolve. It is critical to know the AI decision-making process before making a decision, which is why Explainable AI (XAI) is becoming increasingly important.



**Improving its understanding.** To provide better solutions, the way AI learns must be improved, since if it is more efficient, its responsiveness will also be more efficient. This is where Composite AI comes into play. Moreover, the solutions offered by AI must evolve. This has become very relevant following the launch of Open AI’s GPT-3. The idea is that, although it is based on data and patterns, AI should be able to generate completely new and original content, and not just improve or modify what already exists.



**Improving the time it takes to develop.** The time factor is key. It is just as important to make the best decision as it is to make it at the right time. In this sense, Continuous Intelligence and Edge AI offer this speed.

## EXPLAINABLE ARTIFICIAL INTELLIGENCE

The sophistication of AI-driven systems has increased to such an extent that almost human intervention is no longer required for their design and implementation. But when decisions derived from such systems ultimately affect the lives of humans, the need to understand how and why AI makes those decisions arises.

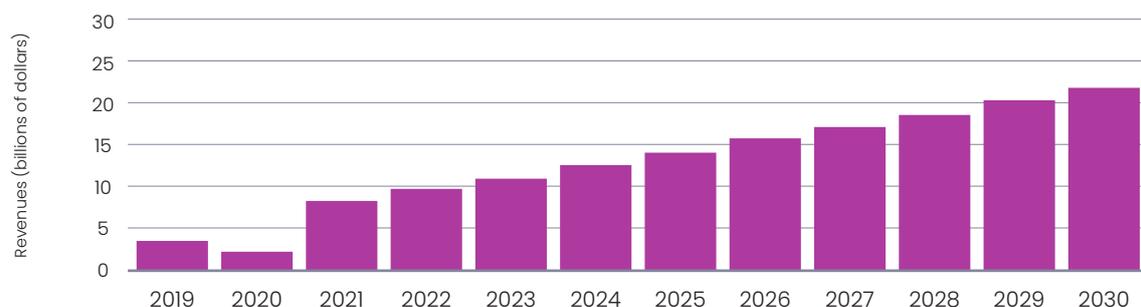
While early AI systems were easily interpretable, in recent years they have incorporated sophisticated mechanisms based on large amounts of data that are efficiently processed and synthesized into complex models, the so-called Black Boxes. These offer little or no discernible information on how they achieve their results. Due to their coding and level of complexity, many of these models are not accessible to users.

But as these complex models are used more frequently to make important predictions in critical contexts, the demand for transparency is increasing. The need for detailed explanations of their performance has been laid on the table. The democratization of AI attempts to make the models automated so that they can be universally accessible, but also that, with the help of Explainable AI, users can learn information about how they work.

Explainable AI (XAI) **investigates methods for analyzing or complementing AI models to ensure that the internal logic and algorithms are transparent and interpretable**, making these processes understandable and auditable. This means that it provides explanations of how and why the algorithm makes which decisions or predictions, and has the ability to justify the results it produces. Explanations can also be global or local.

These systems could have major implications for society and for the economy, **potentially enhancing human-IA collaboration** for more complex and high-impact implementations in areas such as medicine, finance, legal system, autonomous cars or defense. In fact, the global XAI market size is estimated to grow from \$3.55 billion in 2019 to \$21.78 billion in 2030.

### XAI market revenues (2019–2030):



XAI has also been proposed as a way to help **address bias and other potential problems in automated decision making**. Thus, organizations around the world are turning to this technology as a way to address a variety of ethical concerns related to AI.

- **From a social perspective** great emphasis is placed on protecting against the negative prejudices that exist about this technology, since everyone would have access to information about how and why an algorithm works.
- **From a regulatory perspective** it is believed that adherence to current frameworks such as GDPR and CCPA, as well as those that will emerge in the future, will be aided by the features of the XAI.
- **From a user perspective** understanding why AI models make certain decisions is also likely to increase their confidence in products based on this technology.

## Objectives of the XAI:

### **OPTIMIZE.**

The better the understanding of what the models are doing and why they sometimes fail, the easier it is to optimize them. XAI is a good tool for detecting model failures that generate user distrust. It also helps to improve automated decision making.

### **PRESERVE.**

XAI can help an organization maintain control over AI by monitoring performance, detecting errors and providing a mechanism to shut down the system. From a data privacy standpoint, XAI can help ensure that only authorized data is used, for a specific purpose, and make it possible to delete data if it is needed.

### **PROVIDING SECURITY.**

There are growing concerns about the safety and security of AI systems. This can be due to a variety of factors, from intentionally unethical design, to engineering oversights. XAI can help identify these types of failures, as well as detect potential cyber-attacks.

### **BUILDING TRUST.**

To generate that trust in AI, it is necessary to explain that the algorithms are making the right decisions for the right reasons. XAI can provide this transparency, so trust is generated by strengthening the stability, predictability and repeatability of the models.

### **COMPLIANCE.**

XAI complies with both ethical and regulatory responsibility. On the one hand, with ethics by assigning responsibility for an adverse event caused by AI. It is important to be clear about who is responsible for the decisions of an automated system. On the other hand, while AI is already regulated, legislation is probably going to be tightened as use becomes more widespread. Public agencies and institutions have put this issue on their agenda, and standard setting for governance, accuracy, transparency and explainability are at the top of the agenda.

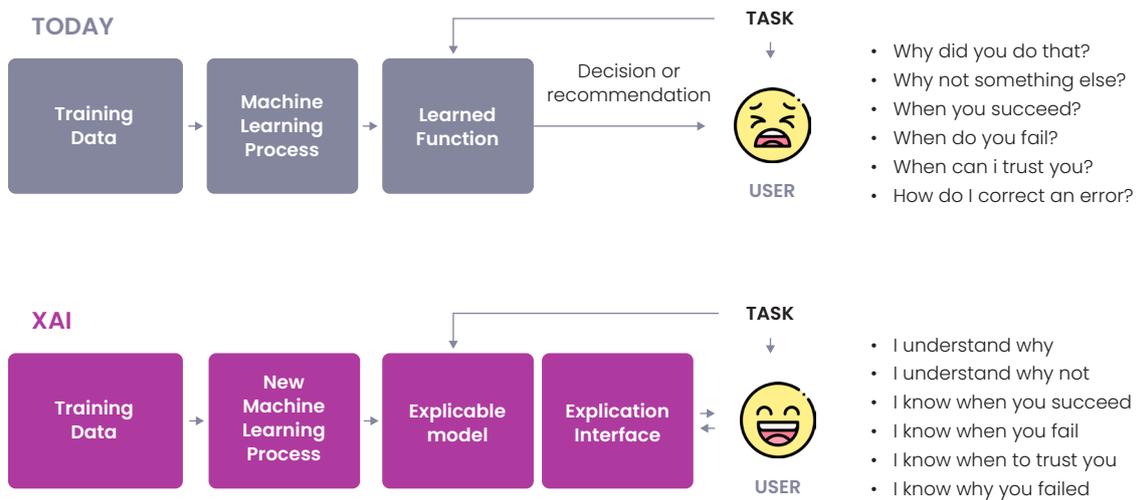
## NETFLIX

Netflix offers on its website a detailed description of how its recommendation system works in simple language, so that anyone who is interested can understand it.



For its part, Google is committed to creating transparent programs, such as the Google Explainable AI service, in which integrative and interpretable Machine Learning models can be created.

## Differences between a current process and one with XAI:



## COMPOSITE AI

Composite AI combines different AI techniques to improve learning efficiency, increase the level of “common sense” and ultimately solve a much wider range of problems much more efficiently. This trend can also be understood as AI’s path to becoming Artificial General Intelligence (AGI).

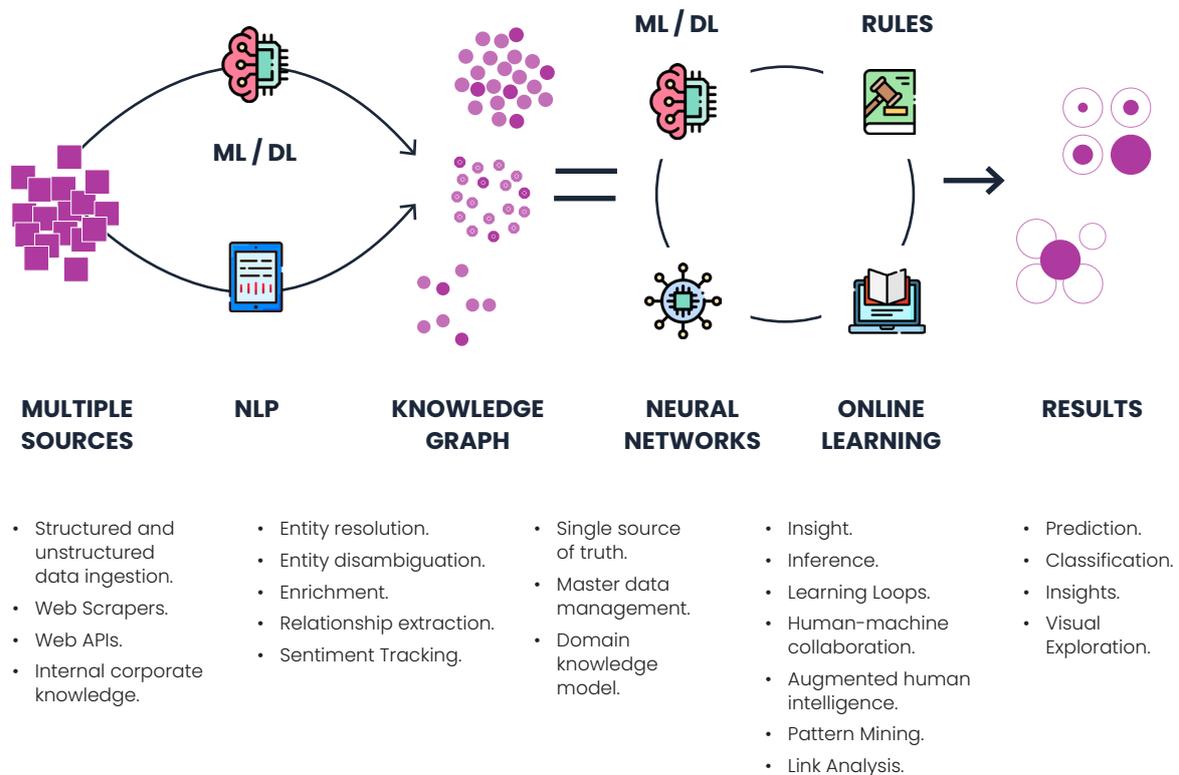
### **Composite AI offers two main short-term benefits:**

- The first, bringing the power of AI to a broader group of organizations that do not have access to large amounts of historical or labeled data, but have extensive human expertise. Composite AI is one of the strategies for dealing with Small Data.
- The second benefit is to help expand the scope and quality of AI applications so that more types of challenges can be incorporated.

Techniques applied in Composite AI may include: knowledge graphs, NLP, contextual analysis, Machine & Deep Learning, Symbolic AI and other methods. Natural Language Processing specializes in understanding language communication: in addition to extracting data from written texts, including audio transcripts, it is able to detect sentiment and causality, for example. Symbolic AI combined with graphs, allows the detection and evaluation of context, and provides a direction for a resolution path, similar to an expert person. For its part, Deep Learning excels in computational modeling of complex systems, prediction, imitation, scenario exploration, recognition and filtering. The combination of these technologies creates a system that capitalizes on their strengths and synergies to solve more complex problems, faster and with less training data.

This multi-modal approach paves the way for **more human-like decision making** in industries such as finance, medicine, governance, supply chain, customer experience and many others, with minimal need for data scientists and integration projects. It allows teams to focus on more difficult or value-differentiating tasks and decisions.

## Composite AI process to analyze data from multiple sources:



Likewise, Composite AI **is most effective when integrated into a complete enterprise software platform**, incorporating alerts and information-based workflows, data visualization, privacy policies, etc. This democratizes enterprise access to the benefits offered by AI and shortens the digital transformation of organizations from years of work to weeks or months.





## GENERATIVE AI

Generative AI or Generative AI is the most widely used technology in recent years to create Deep Fakes of videos and digital content. It is described as a subset of algorithms that can generate new content such as audio, images, text, video, music, voice, speech, even a combination of these, based on the analysis of existing, historical and training data. This technology has recently become very popular due to Open AI's GPT-3.

The algorithms of which this technology is composed are a variety of Machine Learning methods that learn from existing data and content to produce completely new and original content. They can enhance or modify existing content and create new elements, or even create their own data.

According to experts, Generative AI is one of the most promising developments in the AI world in the last decade, since it enables computers to learn the underlying pattern related to data or content, and then use it to generate similar content.

## Main use cases of Generative AI:

### GENERATE IMAGES.

It is possible to abstract visual patterns from artworks and then apply those patterns to reproduce photographic images with the characteristics of those artworks. It can also transform any doodle into a drawing that looks like it was made by humans. But certainly the best example is images of a human face generated by a machine, which look so realistic that it could look like a photograph.

### GENERATE VIDEOS.

Can modify the frames of a film to suit any style, lighting or effect the director wishes to achieve.

### GENERATE AUDIOS.

You can collect the voices of multiple audios or videos to generate a completely new audio that sounds as if it was naturally produced by a human. For example, for the voice of a customer service chatbot. It can also translate text to speech with astonishing naturalness.

### AUTOCORRECT IMAGES.

It can autocorrect photos by generating and superimposing any missing visual elements on the original. Transforms a low-resolution image into a high resolution one.

### IMAGE COMPRESSION.

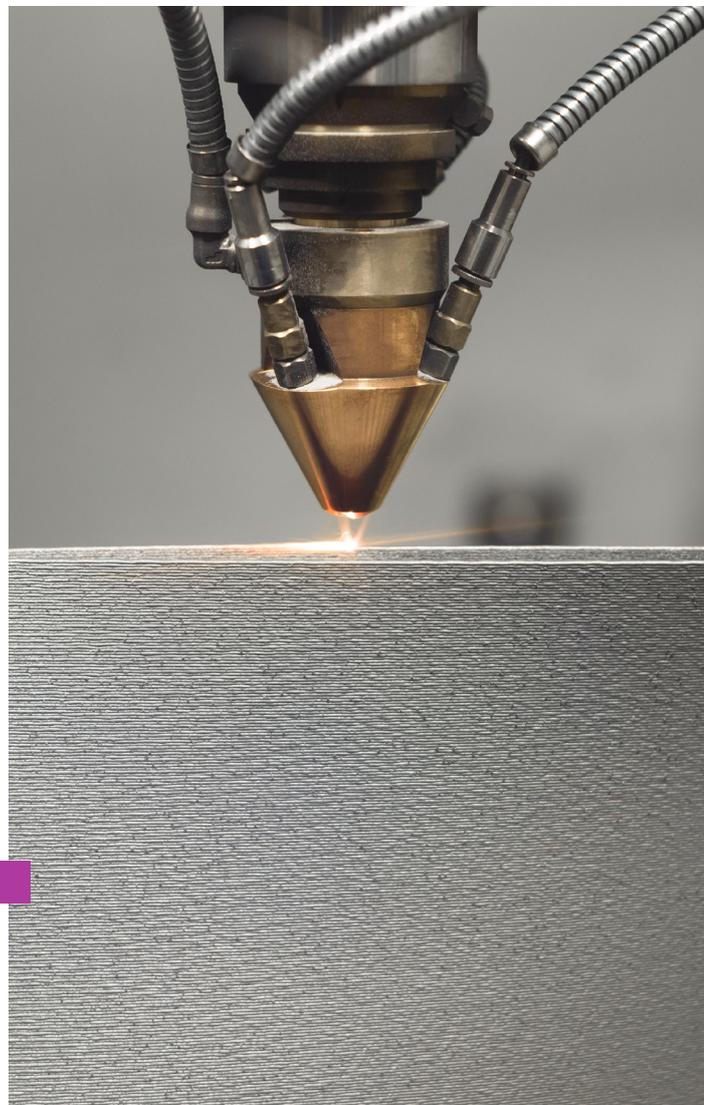
Machines are getting better and more accurate at recognizing objects in an image, thanks to sophisticated Deep Learning algorithms. Generative AI programs, which use image understanding, can not only reduce the time and cost of the design process, but can deliver much more accurate and specific results.

### TEXT SEQUENCES.

Generative AI can generate text in a way that makes it appear to be written by a human, by training and analyzing human-produced text. It can generate natural language content at high speed and with great variety.

### GENERATE MATERIALS.

It can even create prostheses, organic molecules and other elements from scratch when it is enabled by 3D printing, CRISPR and other technologies. General Motors or Under Armour have used this technology in combination with 3D printers to create optimal and precise materials.

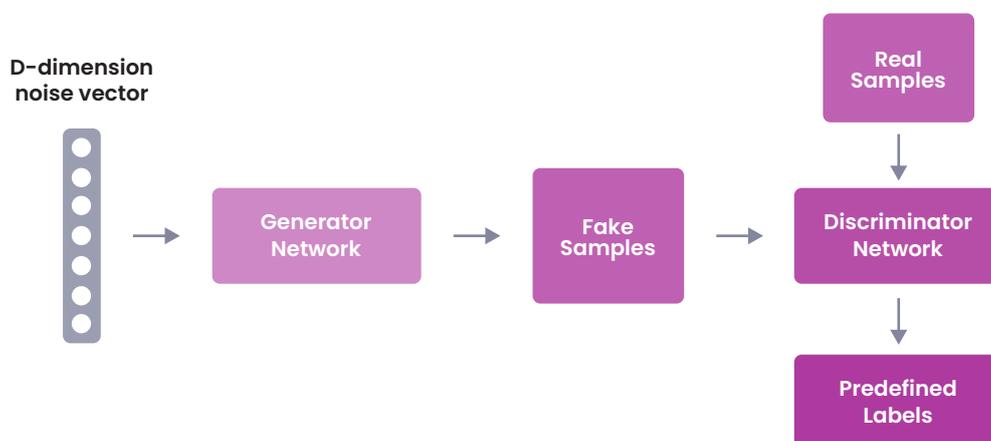




For some years now, more Generative AI solutions have come to the market, but with more cutting-edge approaches, known as **GANs (Generative Antagonistic Networks or Generative Adversarial Networks)** to algorithmically create digital and analog objects of all kinds, with high accuracy. GANs are a combination of two neural networks: the first acts as a generator, for example, creating an image that looks authentic; and the second acts as a discriminator, distinguishing between a real and an artificial image. These networks improve the quality of Generative AI, and more and more vendors are implementing GAN-driven tools in, for example, software programming, computer-aided design, web content development, music composition, image manipulation, video production and other creative disciplines.

Experts say the pace of advances in GAN technology is likely to accelerate even further in 2021, as well as Generative AI design techniques being incorporated into the basic curricula of data science, creative and engineering professions globally.

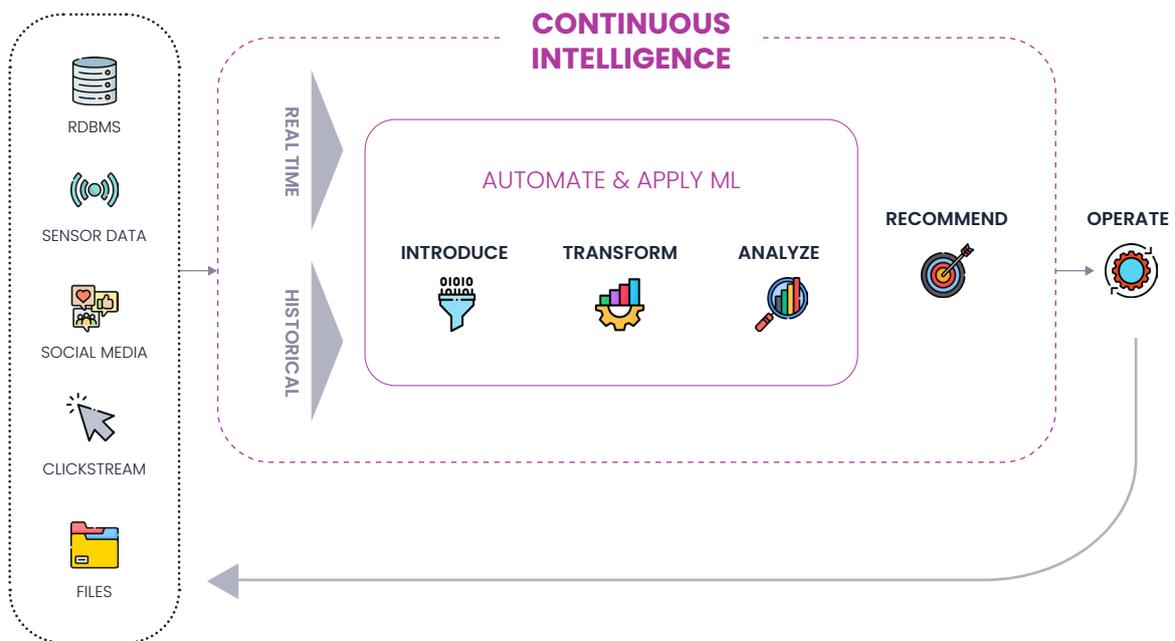
## Operation process of Generative AI:



# CONTINUOUS INTELLIGENCE (CI)

All these previous technologies are of great help to achieve the democratization of AI, but fast and continuously updated data analysis is also essential for this purpose. This is where Continuous Intelligence (CI) comes into play, which manages to **analyze all types of data (from various sources, structured and unstructured) in real time.**

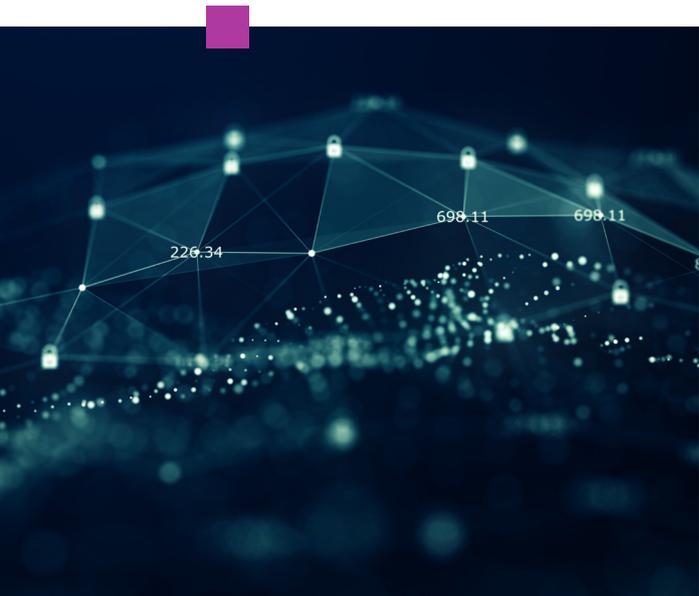
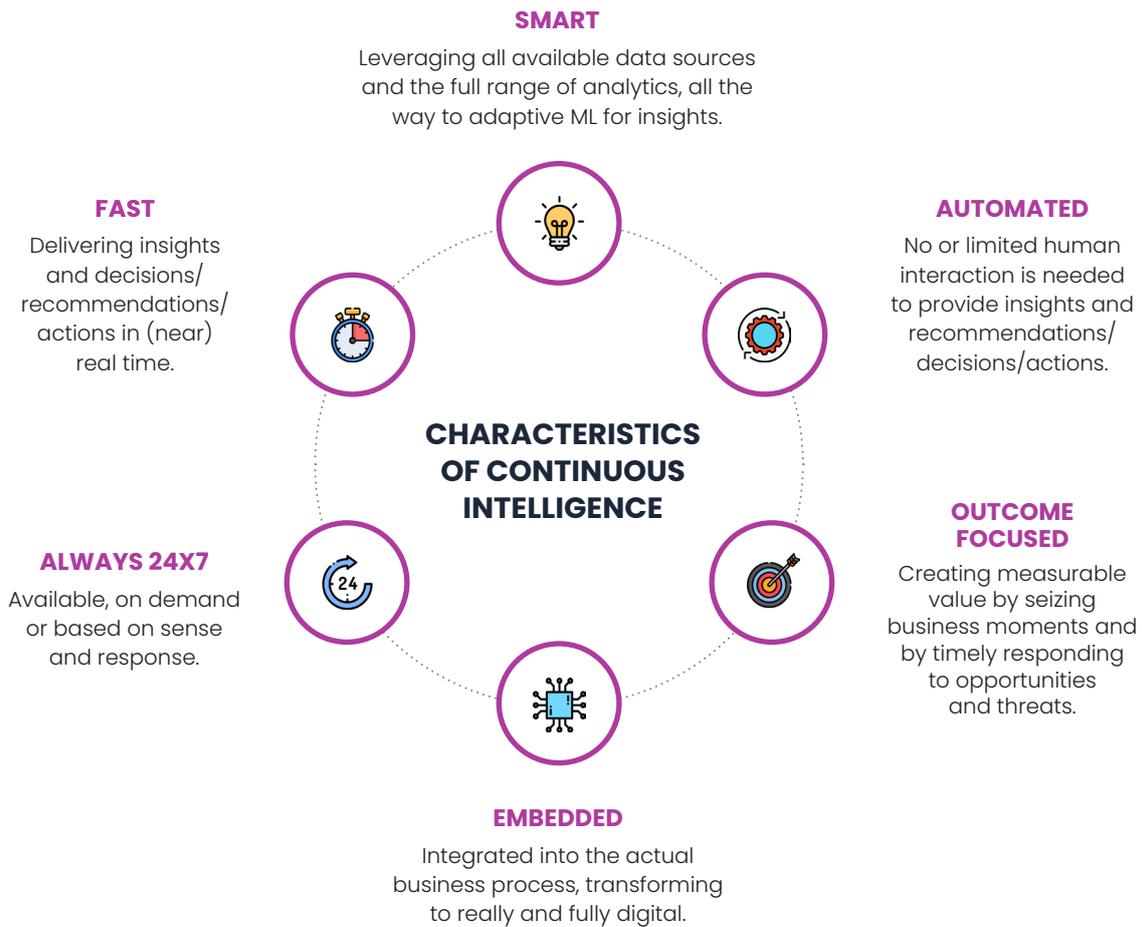
It is a design pattern in which data is analyzed in its entirety and in real time, in order to integrate it into the business operation and dictate actions that respond to the events that arise according to market variability.



Continuous Intelligence combines real-time data and AI to deliver advanced analytics that can answer business queries immediately. Companies increasingly have access to real-time data on products, customers, services, applications and infrastructure, and analyzing this data on a continuous way **allows for better, more accurate and informed business decision-making as events occur.**

By integrating historical and streaming data, it provides a more complete picture with information not only about what is happening now, but also why. By leveraging some technologies such as advanced analytics, optimization, stream processing, and Machine Learning, Continuous Intelligence can automate that support for decision making by reducing human intervention throughout the process.

When CI is **incorporated into business processes in hybrid and multi-cloud environments**, it can help companies optimize operations, process large volumes of data quickly while protecting businesses from potential overload, detect and fix problems before they arise (e.g., cybersecurity issues or fraud detection), save resources, increase ROI and ultimately improve the bottom-line results. In fact, this technology is so relevant that it is estimated that by 2022, more than 50% of major new commercial systems will incorporate Continuous Intelligence.



*The use cases for this technology are wide-ranging, highlighting the enormous potential it has to transform and innovate. An original and curious use case is Japan's famous smart vending machines, which collect data on pedestrian traffic, weather, time of day and much more, to determine what type of items to offer at any given moment.*

## EDGE AI

In recent years, the growth of AI has been exponential. One of the main reasons is the availability of a large amount and variety of data for processing. But there is still a lot of data that cannot be accessed, because it stays on peripheral devices or is private and cannot be hosted in the cloud. This acts as a barrier to many possible applications, including customization to users' needs. However, Edge AI can solve this.

Currently 91% of data is processed in centralized data centers, but by 2022, it is expected that around 74% of all data will need analysis and processing by Edge AI. In fact, the global Edge AI market is estimated to reach \$1.87 billion by 2025, and \$3.09 billion by 2027.

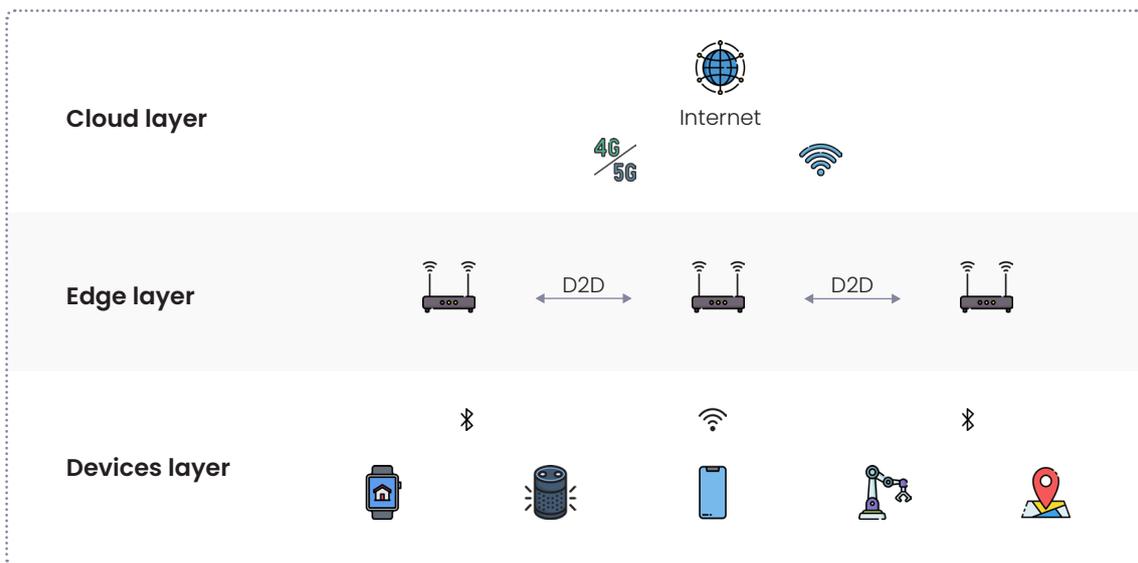
Edge AI is a system that uses ML algorithms to process data generated by a hardware device locally, such as smartphones, IoT devices, embedded devices, micro-controllers, etc., instead of Cloud processing. The algorithms use the data (photos, videos, sensor data, etc.) that is created on the device, and process it in real time from the device itself, without the need for an Internet connection.

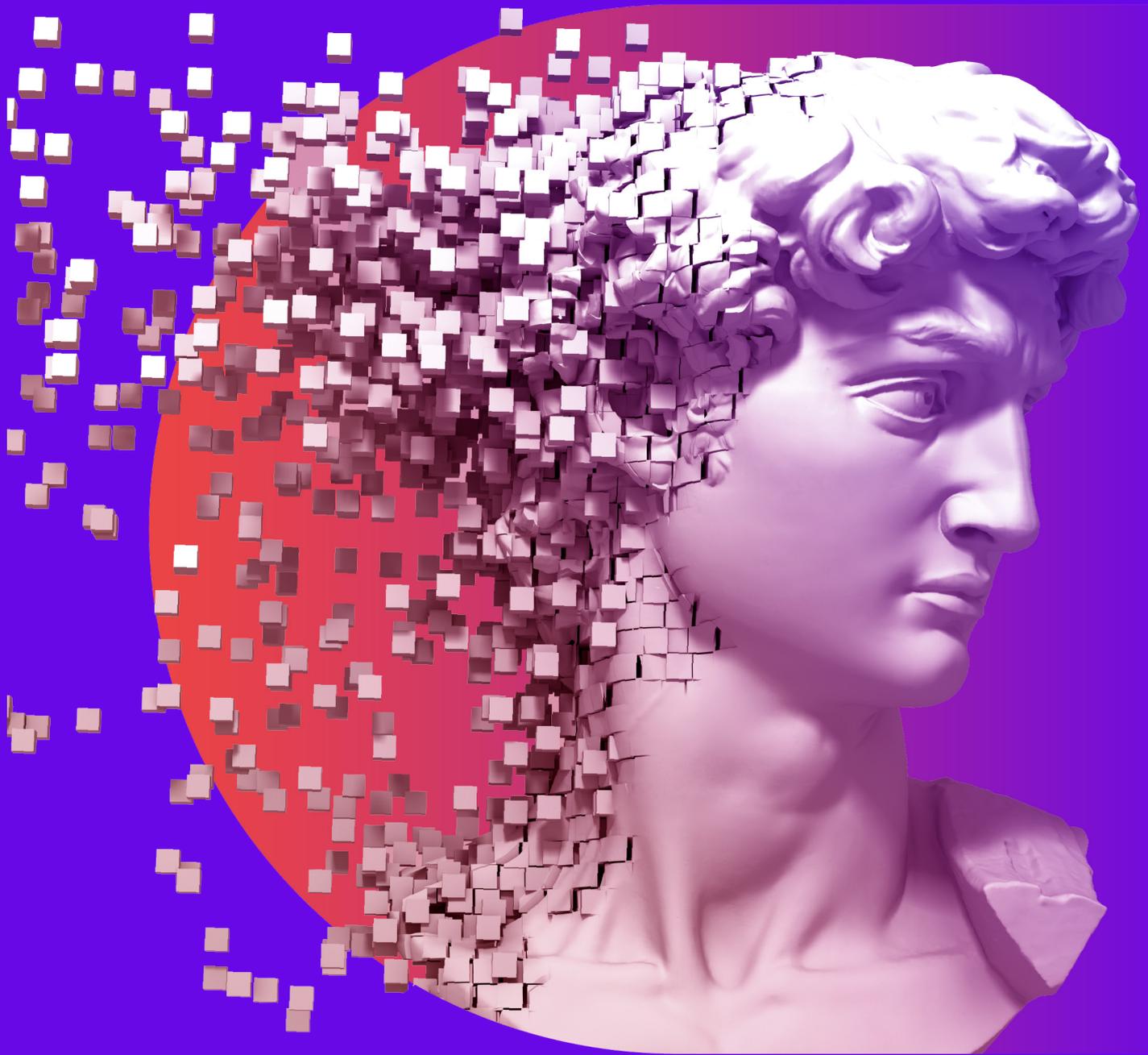
This technology **helps reduce costs and latency times since the data is processed locally** and does not need to be sent to the cloud. This allows algorithms to operate in real time. In addition, processing data locally also enables companies to offer more customized features, and increases the level of security in terms of data privacy. As the data does not need to be sent to the cloud, the bandwidth involved is significantly lower, resulting in cost savings. Also, Edge-enabled devices do not require specialized maintenance by developers. Graphical data streams are automatically delivered for monitoring, making it an autonomous technology.





The list of applications is extensive. Some current examples include facial recognition and analysis of people to identify the age and gender of the shopper, or to perform demographic analysis and brand and lifestyle preference analysis using images and video. Also, real-time traffic updates on smartphones, or vehicle tracking to detect, for example, possible crimes.





05

# My Digital Self



# Editorial

The barrier between the physical and the digital is becoming increasingly diffuse, and proof of this is the high volume of advances being made in areas such as Digital Twins or the latest developments in the biometrics market.

The long-term goal is clear: to make it possible for a person to carry out virtually any action in both the digital and real world. The cornerstone of this paradigm is our “digital self,” a vast collection of data (both personal and the result of our various online interactions and actions) that can be linked to a single identity.

Logically, one of the main challenges is to ensure the security and privacy of this digital ID, so significant advances are being made to guarantee the user a flawless authentication and full control over their personal data (highlighting, for example, the rise of Differential Privacy, a branch of Artificial Intelligence research that works with aggregated user data to extract information while keeping individual user data private).

In this sense, a verified digital identity will allow us to operate fluidly and perform a multitude of online actions easily and quickly, such as: contracting financial products, accessing all the services made available to us by a digitalized public administration, etc.

**T**he new digital era poses a dilemma: **Why is it not possible to do digitally everything we can do physically?** In an ideal scenario, the on world should offer the same scope as the off world. It is obvious that this point has not been reached yet, although the digital world already offers greater availability, portability and convenience.

As digital technologies become integrated into people's daily lives, users generate and feed a digital version of themselves, from multiple channels: their smartphones, social networks, navigation data, IoT devices (wearables, Smart Home, etc.), virtual assistants, etc.

The "digital self" refers to the set of data that can be aggregated around an online identity, which may have a greater or lesser degree of similarity with the real identity of individuals. It encompasses every interaction carried out through the network, however simple it may be: text messages, shopping preferences, geolocation, personal situation, state of health, trips taken, etc.

Our digital self has become a vivid representation of our desires, needs and motivations. As technologies evolve and digital possibilities take their course, more parts of our lives, even the most intimate, become part of that digital identity.

In line with this paradigm, we find trends such as Digital Twins, the creation of a Digital ID (even a Digital Health Passport), and the BYOI concept. All of them are ways of grouping, managing or using our digital identity. However, this situation poses a major challenge: privacy and sensitive data.



## DIGITAL ID & DIGITAL AUTHENTICATION

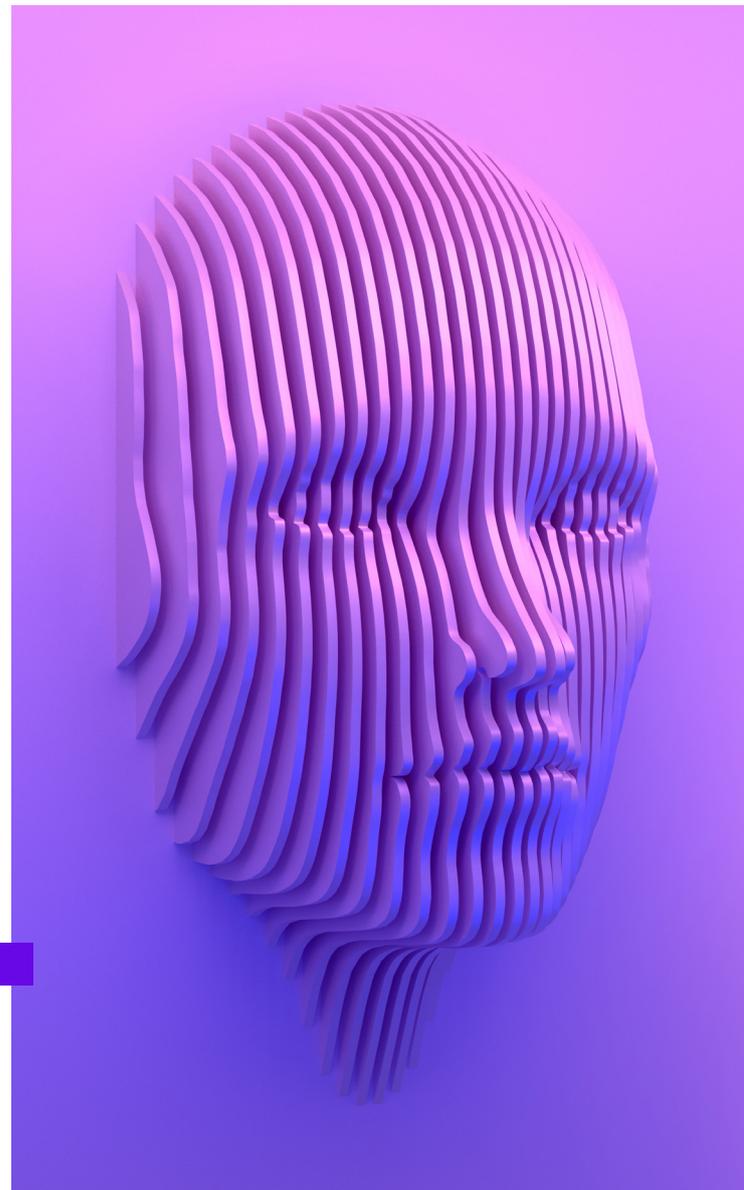
Digital identity is closely related to the concept of Digital ID, that is, **any personal data existing online that can be traced back to the real self and prove its identity**. It is all the data that a person generates through the actions he or she performs on the Internet. For example, photos uploaded on social networks, commented posts, bank account, search history, email, website profiles, video game accounts, e-commerce transactions, etc.

**Digital ID allows users to identify themselves and prove their real identity in the digital realm**, through proprietary attributes, captured and stored digitally, including biographic and biometric data capable of uniquely describing a person within a given context. Digital identification can unambiguously authenticate a user through a digital channel, unlocking access to banking, education, voting, healthcare, government services or any other online service.

Digital identity has the potential to generate significant economic and social benefits, including lower costs associated with identity verification, and greater social and political inclusion. Countries around the world are implementing Digital ID programs to drive adoption of certain services.

*Estonia has developed a very robust digital identity system: all citizens are required to have an electronic ID card, which gives them access to more than 2,700 digital services, from registering at university to obtaining a medical prescription. Singapore, for its part, has launched a biometric facial authentication program integrated into digital ID cards.*

On the one hand, this technology allows people to identify themselves in a simple, fast and more secure way to interact with companies, governments and individuals. It significantly simplifies the registration and authentication processes, thus saving time. On the other hand, for companies it is a great opportunity to save costs, combat fraud, improve productivity, formalize records, make transactions more secure, and interact with consumers by collecting meaningful data about them to provide them with more personalized experiences.



In the current context, digital identities have played a fundamental role. COVID-19 has compelled societies to avoid physical contact and is restricting access to both public and private services. Digitalization, hand in hand with digital identities, has been the only way to continue providing certain services during the pandemic. Strong and trusted digital identities promote security, both from a physical perspective, by allowing people to maintain social distance, and from a digital perspective, by facilitating accurate user identification. One such example is the Digital Health Passport, a digital health passport being tested by volunteers that provides standardized access to COVID-19 test results.

## Attributes for a correct digital identification:

**Authentication with a high degree of security.** Compliance with the standards of government institutions and different sectors is necessary for initial registration and subsequent acceptance of contracts.

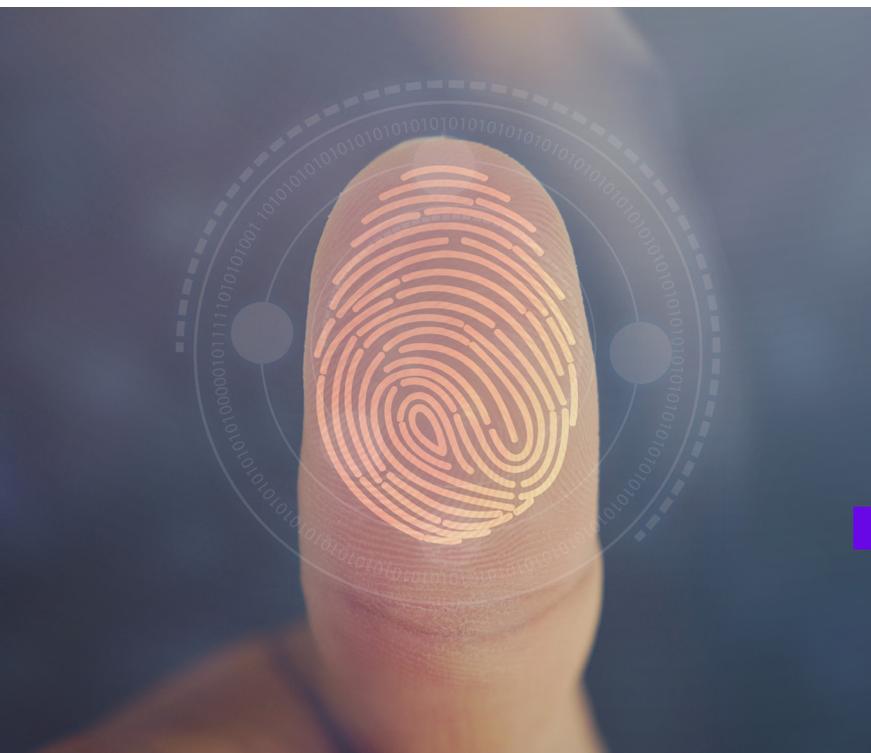
**Unique identification.** With a unique digital ID, an individual has only one identity in an area, and each identity corresponds to only one individual.

**Established with individual consent.** The creation of a Digital ID must be based on the user's knowledge of which personal data will be used and how it will be used. Even after consent has been granted, the highest standards of transparency and privacy must be maintained.

**Protecting user privacy and ensuring control over personal data.** Ethical, legal and technical safeguards must be in place to ensure privacy and security while giving users access to their personal data, giving them the choice to decide who has access to the data.

With the population's easy access to smartphones, the fundamental infrastructure that supports digital identification is progressively growing in scope and decreasing in cost.

**The creation and management of digital identities will help entities in different sectors as well as consumers.**



## Uses of digital identity:



### ENTITIES



### PERSONAS



### DEVICES



### THINGS



### SMART CITIES

To monitor devices and sensors transmitting data, such as energy usage, air quality or traffic congestion.



### TELECOMMUNICATIONS

For users to own and use the devices or for service providers to monitor devices and data on the network.



### FOOD AND SUSTAINABILITY

For farmers and consumers to verify the provenance of products or to enhance value and traceability in supply chains.



### TRAVEL AND MOBILITY

To book travelling or pass through border control between countries or regions.



### FINANCIAL SERVICES

To open bank accounts or to carry out online financial transactions.



### E-COMMERCE

To purchase; to conduct commercial transactions and secure payments.



### SOCIAL PLATFORMS

For social interactions or to access third-party services that rely on social media logins.



### E-GOVERNMENT

For citizens to access and use services: file taxes, vote, collect benefits.



### HUMANITARIAN RESPONSE

To access services or to demonstrate qualifications to work in a foreign country.



### HEALTH

For users to access insurance treatment; to monitor health devices, wearables; or for healthcare providers to demonstrate their qualifications.

A woman with long, wavy brown hair and glasses is smiling warmly at the camera. She is wearing a light blue and white vertically striped button-down shirt and light-colored trousers. She is holding a black smartphone in her hands, looking down at it. The background is a blurred office or studio setting with a grey wall and a blue pillar on the right.

However, there is a growing demand from users to maintain control over their personal data and to manage it by themselves. It is in this context that **Self-Sovereign Identity (SSI)**, the natural evolution of Digital ID, is born, giving users full control over all their data, as well as the ability to concentrate all data into a single digital identity and store it on their personal devices. The user is in charge of deciding what to do with their data and who to share it with at any given moment, quickly, easily and securely.

Likewise, SSI, together with Blockchain technology, can bring a degree of reliability never before achieved in any online interaction. In fact, these two technologies have been used by ten large Spanish companies, which have joined forces to create Dalion, a solution that will allow users to have a single self-managed digital identity with Blockchain technology.

## BIOMETRY

Biometrics is the digital authentication method most commonly used by companies to identify people reliably and quickly through their unique biological characteristics. There are different types of biometric data used by identification systems, such as fingerprint, hand geometry, veins, facial recognition, voice, iris recognition, retinal scanning (identifies the pattern of capillaries inside the eye), DNA, or even gait (stride patterns) or thermography (body thermal energy distribution).

**In the face of document fraud and identity theft, cybercrime and changes in international regulations, new biometric security solutions are being implemented.**

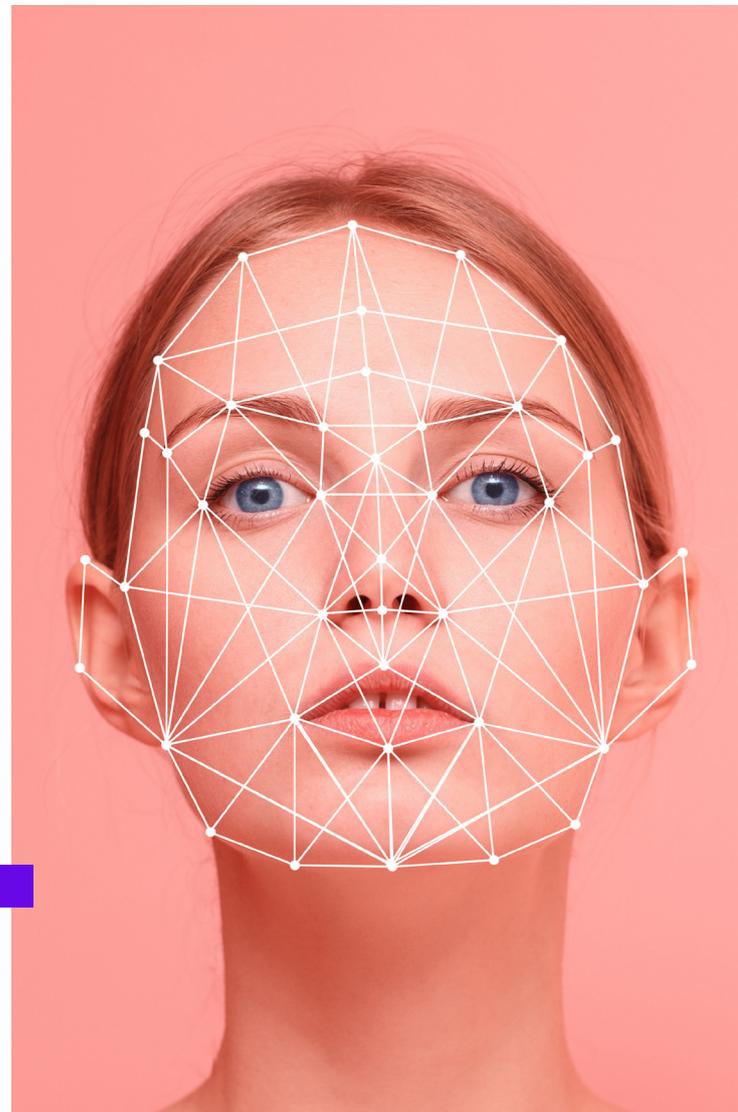
In this context, biometrics has established itself as the most efficient, accurate, reliable and fast means of user authentication. In fact, biometrics guarantees a degree of accuracy and security that is practically unattainable with traditional techniques. Unlike passwords, documents and other credentials, biometric data is extremely difficult to forge, steal or exchange.

While biometrics was previously used exclusively by governments and large corporations, it is now being adopted globally thanks to falling prices for biometric sensors and systems, huge improvements in accuracy, and the growing acceptance by users. In fact, the global biometrics market is expected to exceed \$50 billion by 2024.

This growth is also due to the impact of COVID-19. Fear of the spread and contagion of the virus has made people wary of touching objects, such as keyboards, card readers, and other devices used to verify identity.

Contactless biometrics, such as facial recognition or contactless fingerprint scanners, have gained importance due to their ability to avoid such contact. Facial recognition has made it possible to identify people even while wearing a mask.

Looking ahead, many experts point out that identity cards will gradually be replaced by a digital identity accessible through biometrics, which will give access to all associated documents, such as passports, health cards or credit cards, thus speeding up identification and control processes by the authorities.



## BRING YOUR OWN IDENTITY (BYOI)

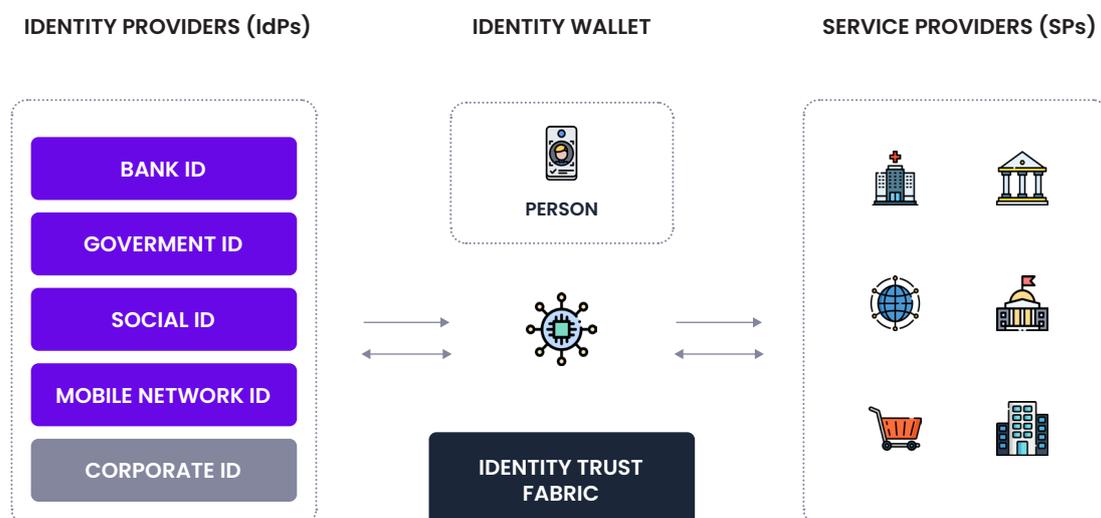
Bring Your Own Identity (BYOI) is a form of digital authentication that allows users to select and use a digital ID, such as a social profile or a higher security identity (such as a bank account) to access multiple digital services. **This digital ID is managed by a third-party identity provider (IdP) that is responsible for providing the best user experience and security.**

The average user is expected to have 207 online accounts by 2021, requiring them to either remember many different passwords and login combinations, or be forced to use the same credentials for almost every account. In fact, as few as 35% of people globally use different passwords for their accounts. This can lead to serious security problems that BYOI can solve.

BYOI allows users to use a single credential to access accounts, but because it is managed by an external provider, the service is much more secure. The IdP transmits the identity attributes, but not the password information to the service provider (SP), so it is not compromised in the event of a security leak.

For service providers, BYOI is an affordable way to provide authentication methods, as identity providers (e.g. Google, Facebook, LinkedIn, etc.) do not charge according to the number of authentication operations. In addition, it is an opportunity to improve the user experience, as it allows to register quickly using existing credentials and without the need to remember them, thus improving customer satisfaction, increasing the registration rate and reducing the abandonment rate, as more than 45% of users abandon the registration process if it is too complex or lengthy.

### BYOI provider types:



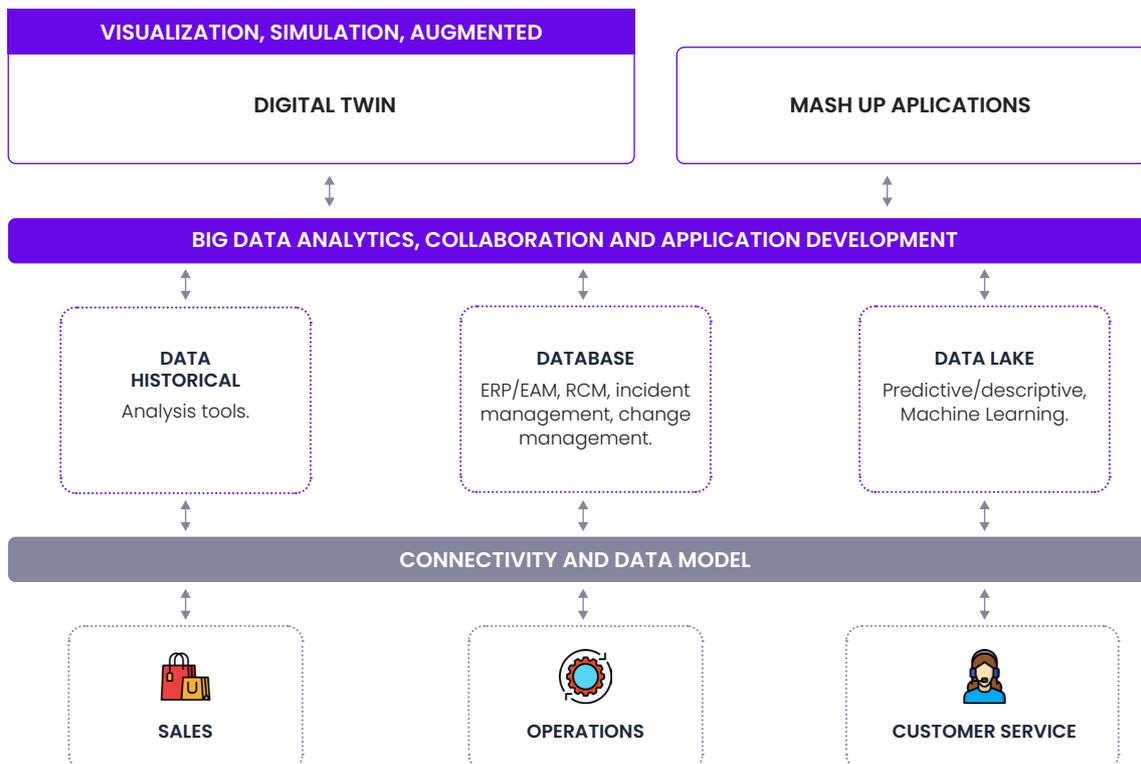
# DIGITAL TWINS

Digital Twin refers to the **digital representation of a real-world entity, product or system**. These representations are linked to their real-world counterparts and are used to understand the state of the connected object, test the response to changes, and add value by analyzing, simulating and controlling an asset throughout its lifecycle, from design to manufacturing, maintenance and decommissioning.

This technology is one of the major trends in the field of Industry 4.0, as it significantly improves operational efficiency and optimizes processes, enables predictive maintenance and drives new lines of business. Although it has been around since 2002, it is only now, thanks to IoT, that it has started to become profitable and massively adopted.

The global market is expected to grow to \$15 billion by 2023, at a 37% compound annual growth rate between 2017 and 2023.

Digital twins of physical assets combined with digital representations of facilities and environments, as well as people, companies and processes, will enable increasingly detailed digital representation of the real world for simulation, analysis and control. This enables research into solutions for product lifecycle extension, manufacturing and process improvements, and product development and prototype testing. In such cases, a digital twin can virtually recreate a problem to help devise and test a solution in a simulated environment, rather than in the real world.



The real power of a digital twin is that it **can provide a real-time relationship between the physical world and the digital world**. First, smart devices, which use sensors to collect data on status, working condition or position, are integrated with a physical element. The devices are connected to a cloud-based system that receives and processes all the data that the sensors monitor. This input is analyzed against historical and other contextual data. It is about breaking down organizational barriers and data silos by building a cloud data infrastructure with Microservices and APIs that allow companies to share, query, analyze and merge information between different data sources.

Its application is very heterogeneous, covering sectors such as industry, infrastructure, logistics and machinery maintenance. The benefits in these sectors are clear: optimizing processes, planning, predicting alerts, increasing efficiency in the supply chain and in operations, etc. Additionally, its use is becoming increasingly widespread:

**Some examples are:**

- **HEALTH:** digital modeling of hospitals to determine workflows and staffing, surgical training, etc.
- **RETAIL:** in addition to manufacturing and logistics, digital twins can be used to model CX by collecting real-time data and using it to improve business insight and forecast improvement scenarios.
- **MANUFACTURING:** creation of a digital replica of the factory, key to predictive maintenance.
- **INSURANCE:** new fraud detection and management systems.
- **ARCHITECTURE:** digital buildings can be recreated, which will be merged with the real ones through Extended Reality (XR).
- **SMART CITIES:** recreating a digital city provides key information for urban planning and decision making.



## DIFFERENTIAL PRIVACY (DP)

Massive data breaches are increasingly occurring, and this has forced both governments and organizations to reconsider privacy policies. Data containing sensitive or confidential information is constantly being used and shared. Improper disclosure of such data can have adverse consequences for the data subject, or even result in serious damages and invoke corporate liability. The development of formal privacy models such as DP is helping to address this problem.

Differential Privacy (DP) is a major research branch of AI that works with aggregated user data to **extract information while keeping individual user data completely private** to the enterprise. With DP, companies can access a large amount of sensitive data without breaching privacy, hence more and more companies are applying this methodology to protect sensitive information: personal information, payment data, real-time location, etc.



*Google and the University of Southern California developed the RAPPOR algorithm, which uses a local DP model, where data remains stored on the device rather than on a central server. This gives individuals full control over their data, while allowing organizations to collect useful statistics such as histograms, frequencies and category information. Google has implemented RAPPOR as a subscription mechanism for Chrome users. Approximately 14 million users participated in the study and RAPPOR allowed them to do so without compromising their privacy.*



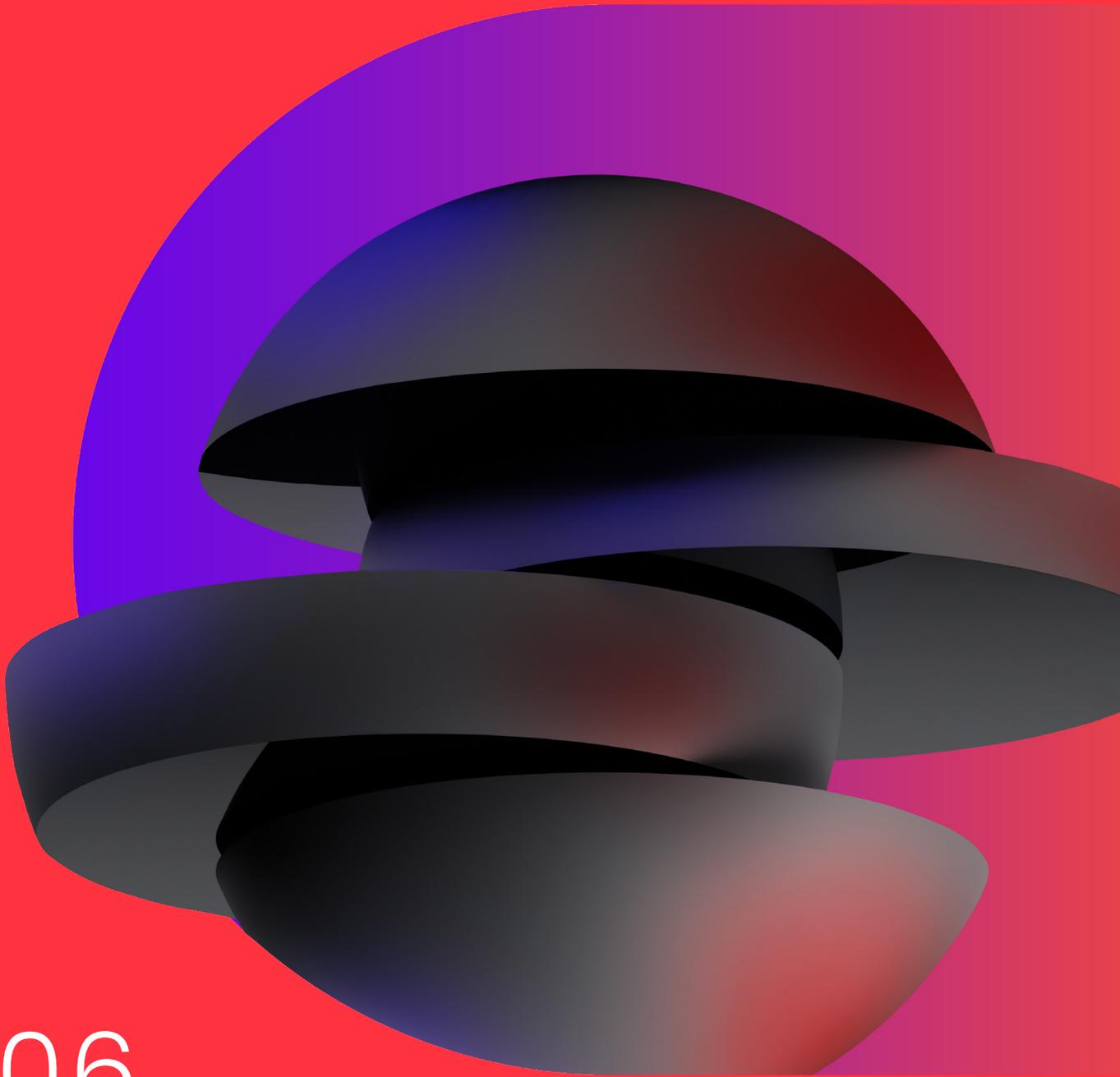


The DP could grant companies **greater processing freedom by anonymizing data through aggregation**. The laws governing aggregated data are significantly less stringent than the laws governing personal data. In addition, it could enable better models to be generated by increasing the generalization of the data they already have, also providing a way to directly quantify data privacy, allowing organizations to demonstrate that they are complying with GDPR. DP provides a mathematically demonstrable guarantee of privacy protection against a wide range of cyber-attacks.

However, if poorly managed, this technology can have disadvantages. For example, if the company stores the original data insecurely, despite using DP to analyze it, or if the data analyst uses little noise to protect the privacy of data subjects, the data may be exposed to a different class of privacy attacks.

This technology has also become very important during the pandemic, for example, with Google's COVID-19 community mobility reports, which collects aggregated data from those who have turned on location history and use Google Maps to determine how crowded certain locations are, or how much mobility has been reduced in a given area. This data has helped officials make effective decisions to combat the pandemic, such as increasing the frequency of certain transit lines if recurring crowds were detected.

It is likely that in five years these methods will not only be essential, but organizations that develop the ability to tune their algorithms to increase the value of their result sets will realize increasing returns.



06

# Digital Enterprise Architecture



# Editorial

**T**he impact of the pandemic has highlighted the critical need to have a resilient, flexible and scalable operating model. In this sense, more and more companies are focusing their efforts on reconfiguring their enterprise architecture with the aim of turning it into an ecosystem of modular and intelligent solutions, through the use of Packaged Business Capabilities.

To address this strategy, total digitalization is positioned as the best solution, since a DEA (Digital Enterprise Architecture) is prepared to combine the best practices and governance system of a traditional enterprise architecture with the optimal use of cutting-edge technologies. It allows companies to achieve the long-awaited agility, while at the same time driving innovation, becoming a critical element in corporate digital transformation processes.

Therefore, the trend is clear: the tendency is towards the creation of Composable Enterprises, based on intelligent enterprise ecosystems, with a distributed and collaborative IT architecture based on Cloud capabilities and APIs, to achieve a modular organization, whose infrastructure is easily able to adapt to new workloads or variations in demand. Another relevant part within the enterprise architecture is DigitalOps, which enables rapid transformation and recomposition of operational models and components by linking them directly to strategy and business outcomes. In conclusion, in the long term, as a consequence of the integral digitalization of a business, it could evolve towards hyper-automated organizations in terms of volume and capabilities.

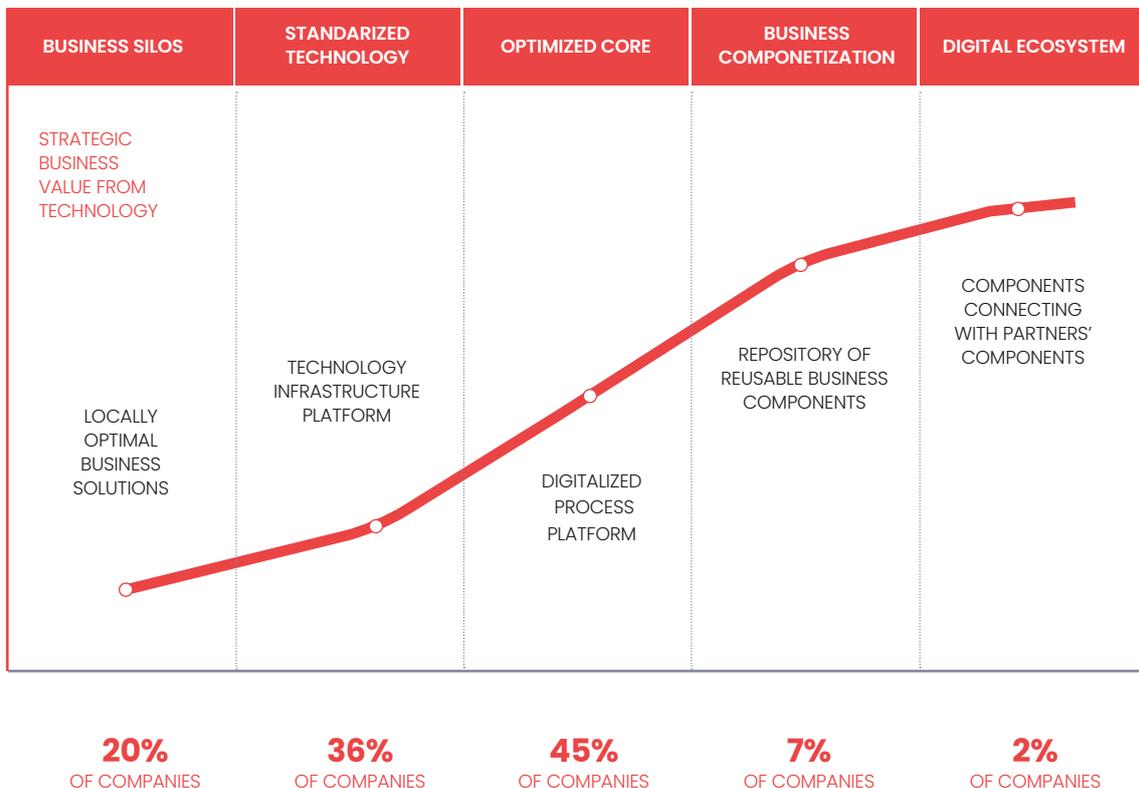
**T**he rapid progress in different technological areas is allowing many companies to consider a 100% digital corporate architecture. With the right software architecture, it is possible to digitalize all the operational processes present in a business model, allowing maximum control, scalability, elasticity and cost reduction.

**In parallel, to facilitate decision-making processes, the focus is shifting to autonomy:**

- Technology platforms should prioritize democratization and modularization, resulting in more personalized application experiences.
- Application vendors must move from individual solutions to pre-assembled collections of commercial capabilities.
- Business units must move from the deployment of packaged applications to assembly capabilities that offer more function-specific applications.

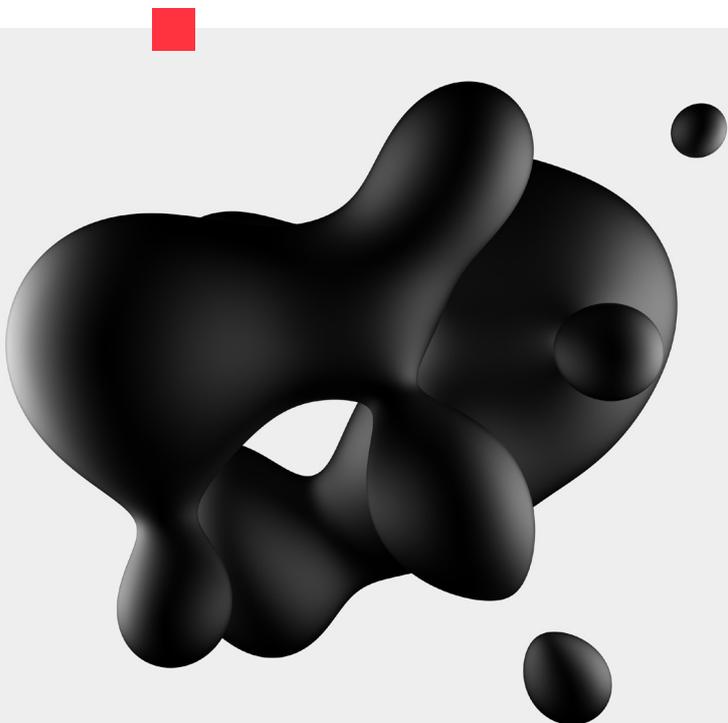
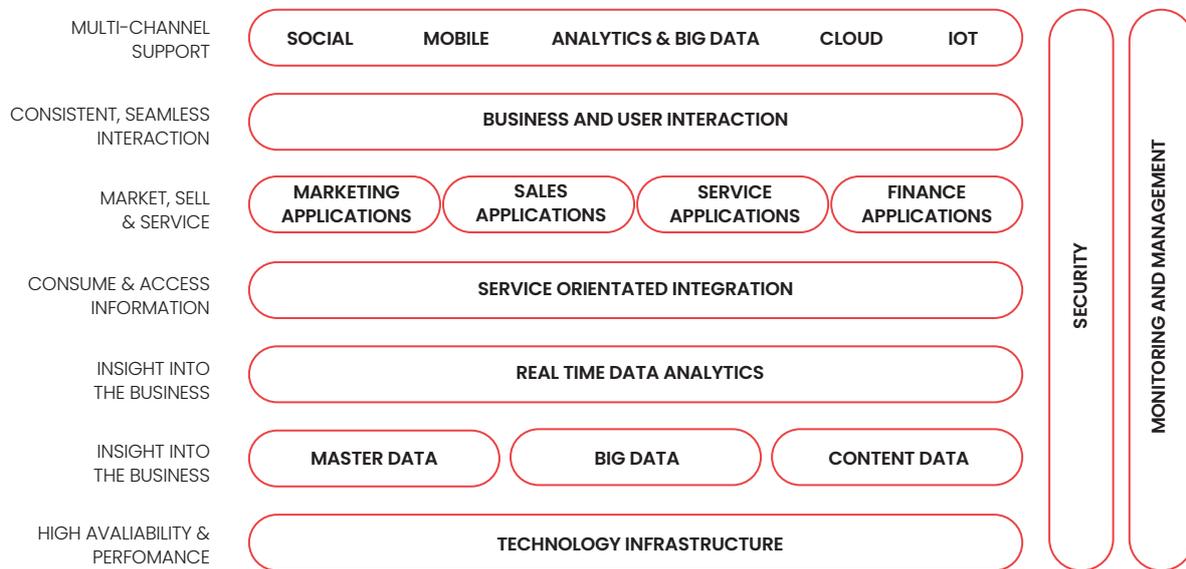
In order to achieve the above, organizations must gather the knowledge to determine the most optimal way to modernize their previous architecture by leveraging new technology trends, to develop, implement, execute and manage digital innovation at scale, and to enable their business rather than simply changing technology.

**Enterprise Architecture – Stages of maturity:**

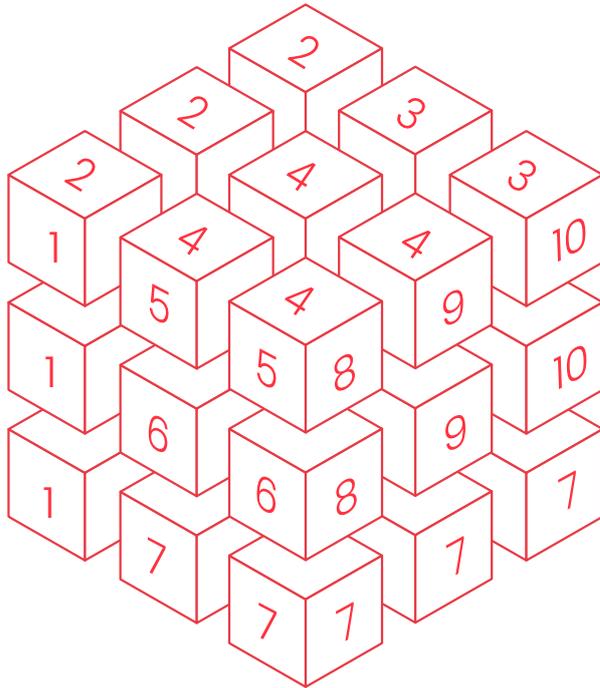


Implementing a Digital Enterprise Architecture (DEA) is critical to become extremely agile in a highly demanding competitive environment. DEA draws on the impacts of digital transformation and adapts to keep organizations ahead of the digital curve. It aims to **establish best practices, processes and governance system of the enterprise architecture**, along with the optimal use of IT infrastructure and applications, resulting in the ability to deliver through the different digital services an enhanced user experience (both internal and external).

## Key Capabilities - Digital Enterprise Architecture:



More than 70% of large corporations globally are restarting or revamping their enterprise architecture practices to transition to a DEA. It is also expected that more than 60% of organizations will rely on DEA to lead digital innovation internally. In addition to being able to monitor all of a company's systems and processes, **DEA is becoming a critical piece in driving digital transformation.**



- 1. **DIGITAL TRANSFORMATION MANAGEMENT**
- 2. **DIGITAL STRATEGY & GOVERNANCE**
- 3. **PLATFORM & ECOSYSTEM ARCHITECTURE**
- 4. **BUSINESS & INFORMATION ARCHITECTURE**
- 5. **APPLICATION SERVICES ARCHITECTURE**
- 6. **DATA & ANALYTICS ARCHITECTURE**
- 7. **CYBERSECURITY ARCHITECTURE**
- 8. **KNOWLEDGE ARCHITECTURE**
- 9. **TECHNOLOGY ARCHITECTURE**
- 10. **OPERATIONS ARCHITECTURE**



In order to thrive in digital business management, potential disruptive trends (technological, economic, social, political or environmental) must be proactively identified and assessed to determine the potential impact on the business. **To achieve this, it is necessary to pivot around these four ideas:**

### 1. REVIEW THE PRINCIPLES OF DEA

Enterprise architecture principles, policies and standards should be reviewed to enable the adoption of digital best practices and, more critically, emphasize customer focus. In a DEA the objectives should be simple, practical and concise, with a solid understanding of the digital landscape.

### 2. DESIGNING GOOD EXPERIENCES

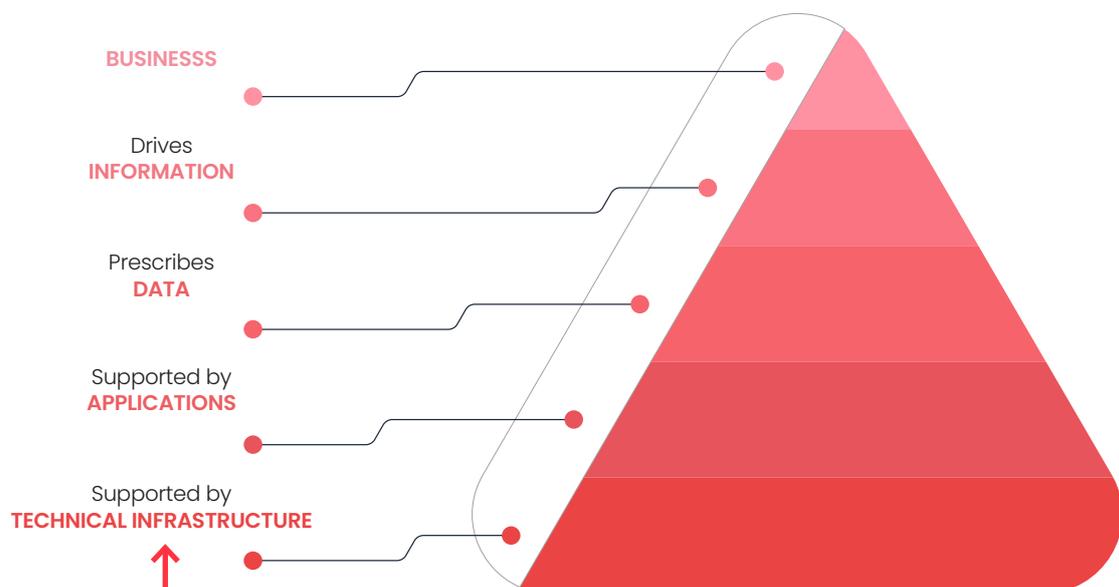
The key to DEA is to design the right and optimal customer experiences.

### 3. DO NOT BE AFRAID TO EXPERIMENT

Experimentation is a capability.

### 4. THE BUSINESS – TECHNOLOGY BINOMIAL

It requires an operating model that aligns all business processes with the needs of the company and, in turn, promotes the effective relationship between the business and digital technology trends.



# SMART COMPOSABLE ENTERPRISE

The arrival of the pandemic exposed the vulnerabilities of business models that for years had been focused on efficiency. Previously efficient organizations became fragile at a time when they needed to be more flexible and failed to adapt to the situation. On the other hand, companies with a better business intelligence ecosystem pivoted towards a more modular configuration, creating what is known as Composable Enterprise (CE).

**A CE enables you to deliver resilience and agility through the use of Packaged Business Capabilities (PBC) in an enterprise context:** the architecture of a business designed to be adaptable, flexible and resilient in order to cope with uncertainty. It facilitates the enterprise architecture to become more agile and able to deliver more value with lower T2M; building and adapting your digital solutions faster.

The modular configuration allows a company to reorganize and reorient itself as needed based on external or internal factors, such as a change in customer needs, a sudden change in supply chain or materials, etc. With a new extremely modular IT architecture approach based on Cloud and APIs, they manage to respond more agile to business needs, discard traditional hierarchical systems and processes (which are not compatible with PBCs), and radically rethink how digital technology can serve innovation, and how innovation can serve customers.

They are largely based on services that leverage technology through APIs provided by external vendors or through the company's internal data centers.

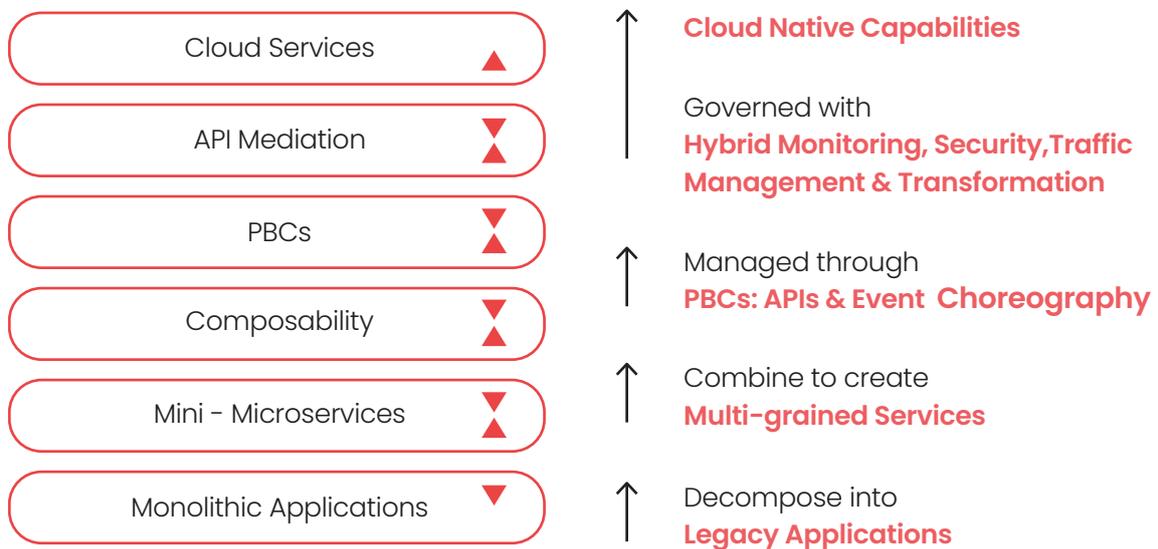
In this way, API-driven modular components represent specific capabilities, which serve to work with solutions tailored to specific business requirements, as well as integrate with other company applications.

## THEY HAVE THE FOLLOWING CHARACTERISTICS:

- Business processes are assembled by APIs.
- The organization's processes and data are opened up to partners and customers through APIs.
- Delivers new functionality faster for business users, external customers and partners.
- Development and change costs are reduced, so less code is written from scratch, less functionality is duplicated, and more and better integration is achieved.
- The architecture and infrastructure are highly scalable, capable of adapting to new workloads and requirements on demand.
- Safety is present in the entire infrastructure, in each of its components.

This new generation of companies moves quickly to adapt to changing realities and customer requirements, and does not rely on any one type of core technology. Therefore, **the IT architecture behind CEs is distributed and highly collaborative.**

## Composable Enterprise – Structure:



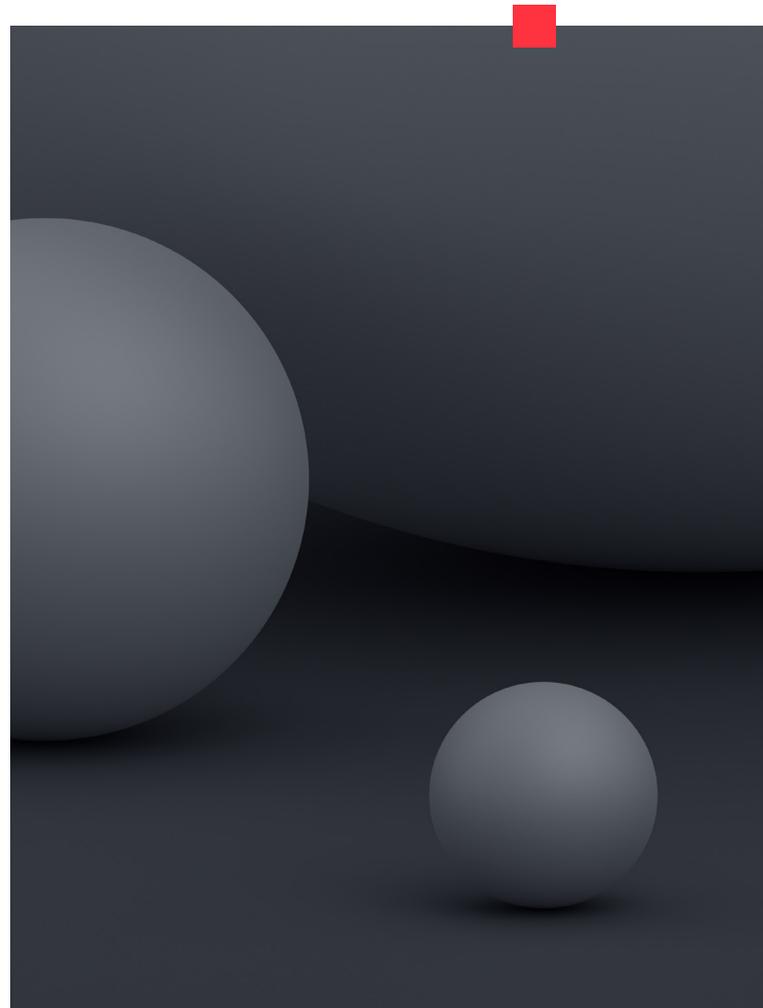
## Essential elements:

### MODULARIZATION

A CE enterprise evolves from its current state of inflexibility and monolithic applications to a portfolio that is more modular and adaptable to business change. Modularization is based on pre-assembled solutions that can be separated and recombined with the benefit of flexibility and variety of use.

### COMPOSITE ARCHITECTURE

It is an agile architecture by design and with the ability to respond quickly to a changing business environment. It is composed of the aforementioned PBCs, built on a flexible data fabric.



# DigitalOps

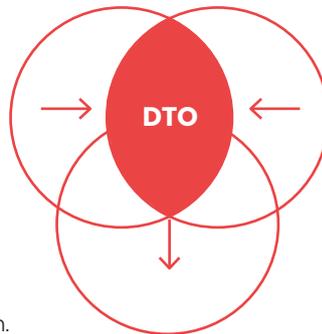
DigitalOps is another important part within Enterprise Architecture, enabling **rapid transformation and recomposition of operational models and components by linking them directly to strategy and business outcomes**. It also seeks to analyze the customer journey and identify areas where technology can be used to improve the quality and efficiency of processes, especially where manual intervention by employees is required. DigitalOps is the beginning of a business discipline to increase organizational agility. It encompasses a holistic set of methods and technologies associated with how the enterprise delivers value through a real-time digital platform.

## DigitalOps combines three domains:

### Process Modeling

Planning and Understanding Work.

- Process and Decision.
- Data and Events.
- Goals and Motivations.
- Machine Learning.



### Process / Task Execution

Supporting and Driving Work.

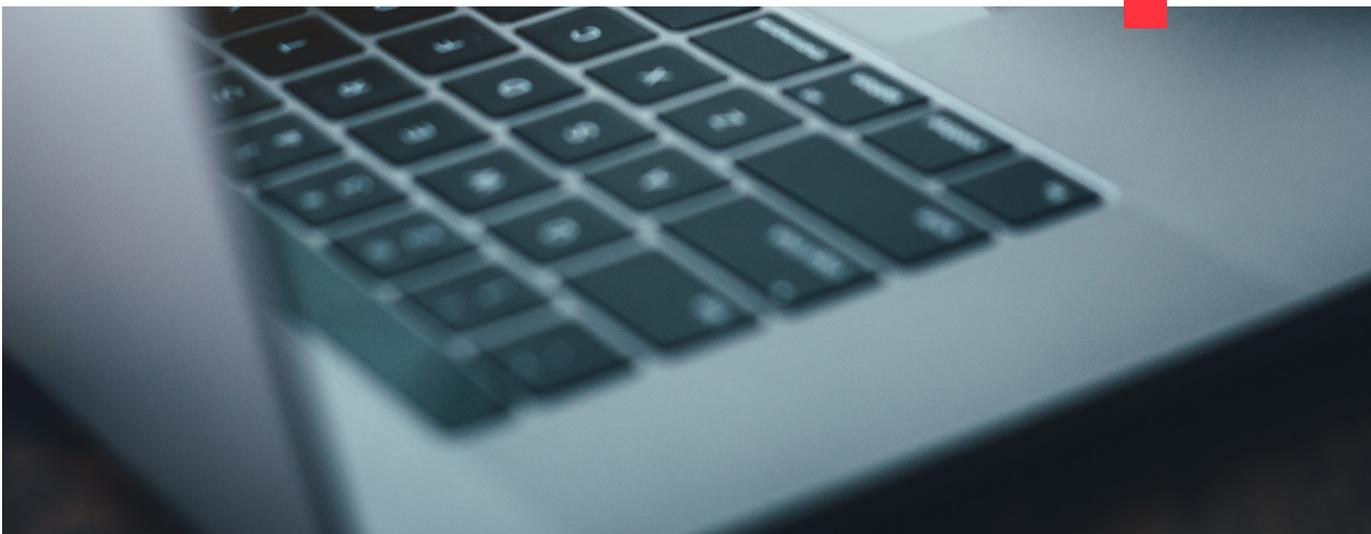
- Orchestration and Coordination.
- Process and Decision Execution.
- Event Management.
- Algorithms and Bots.
- Integration Interfaces.

### Process Monitoring

Knowing What Happened.

- Business Operations Monitoring.
- Business Performance Dashboards.
- Analytics, BAM and BI.
- KPIs and KRIs.

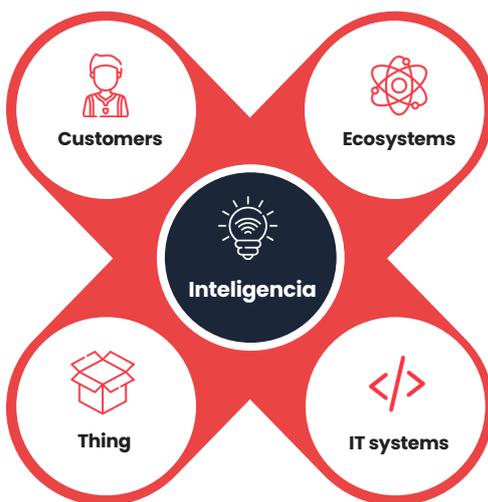
Organizations are moving toward combining these domains, rather than dealing with them separately.



It focuses on **exploiting the automation aspects of business process management** (BPM) and RPA, including decision management and event processing, along with agile methodologies for continuous delivery of business improvements in applications to provide a radical improvement in business agility.

BPM areas are growing every year by maintaining alignment between IT and business lines. At the same time, RPA tools are being used faster in business processes, replicating human behaviors, automating processes and achieving ROI faster without dealing with standard business methodologies. Both BMP and RPA jointly support DigitalOps processes and both are evolving to incorporate AI solutions into their workflows to handle, process and support unstructured data to recommend or make hypothesis-driven decisions and learn over time from the feedback.

## DigitalOps Toolbox:



Tools
RPA
Discovery Process
Mining Process
iBPMS
Low-Code
Business Rules Engine

These process automation improvements remove bottlenecks in business processes and enable companies to scale, while improving the overall customer experience. In addition, DigitalOps excels at **delivering improved operational efficiency, as well as enhancing visibility and control of work**, resulting in organizations being able to act proactively to address issues and respond appropriately to changes. It is also able to manage risks effectively, connecting the most complex supply chains. For example, if production needs to be ramped up or down, DigitalOps can mitigate supplier risks and create robust contingency plans.

As mentioned above, resilience and flexibility go hand in hand. DigitalOps enables companies to take a flexible approach to operating costs to support more consistent earnings and unlock the capital needed for unexpected investments. It also prepares companies to diversify and adapt as needed across their customer acquisition and retention strategies.

**Business Outcomes**

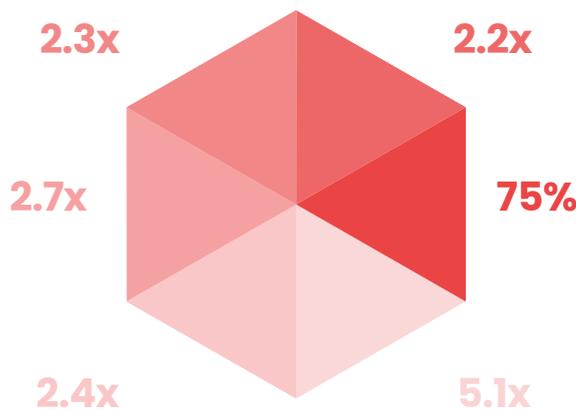
More likely to evaluate technologies based on the ability to contribute to business outcomes.

**Real Time Platform**

More likely to leverage a single, real time platform for IT, development, security and business operations.

**Proactive**

More likely to have the ability to predict performance incidents.



**Customer Centric**

More likely to have Customer Experience as a central focal point of IT.

**Intelligence & Automation**

More likely to take the approach based on AI, ML, advanced analytics, automation and knowledge management concepts.

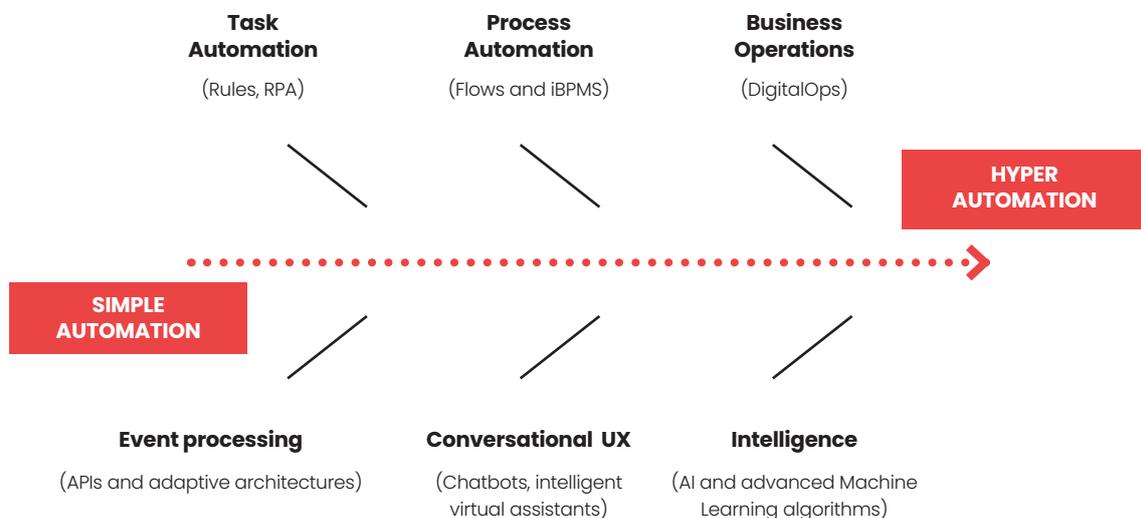
**Innovation Enablement**

Faster new applications releases as compared to all others.

Source: Digital Enterprise Journal

In the long term, by covering the entire business digitally, the trend could evolve towards hyper-automated organizations (in terms of volume and capabilities). This maximum hyper-automation would mean that there could be autonomous organizations, where all processes would be automated and the company would evolve according to changes in the market, thanks to DigitalOps.

The road to hyper-automation:



# AIOps

AIOps is short for Artificial Intelligence for IT operations. It refers to **multi-layered technology platforms that automate and improve IT operations through predictive analytics and Machine Learning** to solve problems and improve operations. AIOps is the evolution of IT operational analytics (ITOA).

## Technological components of an AIOps platform:

1



### DATA SOURCE & BIG DATA

Extensive IT data from disparate sources such as logs, job data, tracking, events, tickets, etc. Big data platform enables real-time processing of streaming IT data.

2



### PATTERN RECOGNITION & DATA ANALYTICS

Data are collected and transformed. Pattern recognition discovers the context while uncovering irregularities and normalities.

3



### DOMAIN ALGORITHM

The insights drawn from the data are used to make automated decisions. The information obtained from the data is used by algorithms to make the software react automatically.

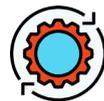
4



### MACHINE LEARNING & AI

Based on the new data created in the system, the existing algorithm is modified or a new one is created using Machine Learning.

5

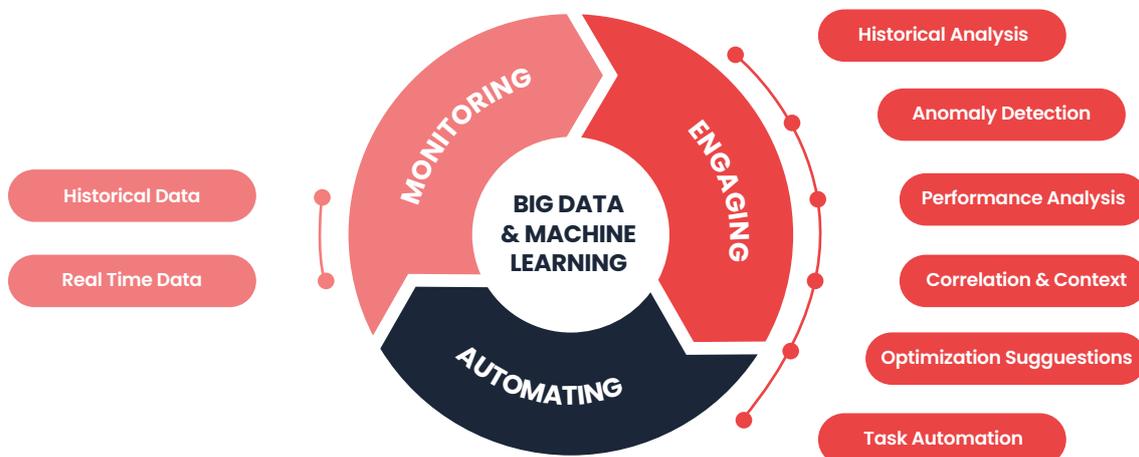


### AUTOMATION

And eventually automation uses the results generated by ML and/or AI to automatically create and apply a response for identified situation and issue.

## AIOps architecture:

It has two core components: Big Data and Machine Learning. The whole process starts with monitoring. An essential aspect of an AIOps architecture is that the tools can work with multiple sources and handle the immense volume and wide disparity of data in modern IT environments. Once all the information is accessible, an AIOps platform typically uses a data lake or similar repository to collect and disperse the data. After processing the data, AIOps systems gain insights through various AI-driven activities, such as analytics, pattern matching, NLP, correlation and anomaly detection. Finally it makes use of automation processes to act on the findings that have been produced.



## Top 10 expected benefits of adopting AIOps:

### **ANOMALY DETECTION**

It identifies unusual performance (using two detection techniques: univariate and multivariate) that could indicate problems leading to future performance and availability impacts, thus allowing preventive and proactive measures to be taken to correct these anomalies.

### **NOISE REDUCTION**

It applies Machine Learning to real-time and historical data to identify patterns and suppress unimportant events, which reduces noise, helping to ensure that critical alerts are addressed quickly and effectively.

### **PREDICTIVE ALERTS**

Apply predictive analytics to historical and real-time performance metrics to establish behavioral patterns, which help identify anomalies and generate predictive alerts.

### **AUTOMATED INCIDENT AND CHANGE MANAGEMENT**

It can take automated actions based on valuable information provided by Machine Learning and predictive analytics, freeing the IT team from routine tasks.

### **INTELLIGENT ALERT MONITORING**

By ingesting data from all sections of an IT environment, AIOps tools prevent a flood of alerts from causing a domino effect on interconnected systems. It also helps to prioritize problems accurately.

### **UNDERSTANDING THE CROSS-DOMAIN SITUATION**

Causal relationships are created while aggregating data, allowing a clear and continuous view of the status of the IT infrastructure.

### **AUTOMATIC ROOT CAUSE ANALYSIS**

Once an alert appears, an AIOps platform presents the main suspected causes as well as the evidence that led to such conclusion.

### **AUTOMATED PROBLEM SOLVING IN THE IT ENVIRONMENT**

AIOps automates the solution of problems that have already occurred several times. They use historical data from past problems to identify them and offer the best solution or solve them directly.

### **UNIFIED VISION OF THE IT ENVIRONMENT**

It correlates data across multiple data sources and analyzes them as one; eliminating information silos and providing a contextualized view.

### **ADVANCED ANALYTICS**

It brings together all system data in one place, allowing for a more meaningful, accurate and comprehensive analysis; making a substantial impact on the decision-making process.

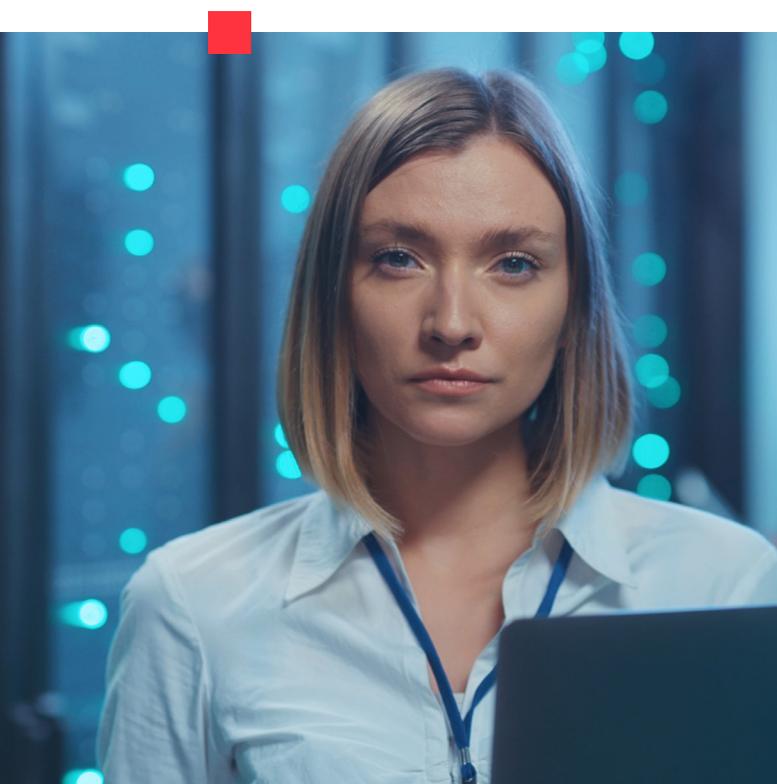
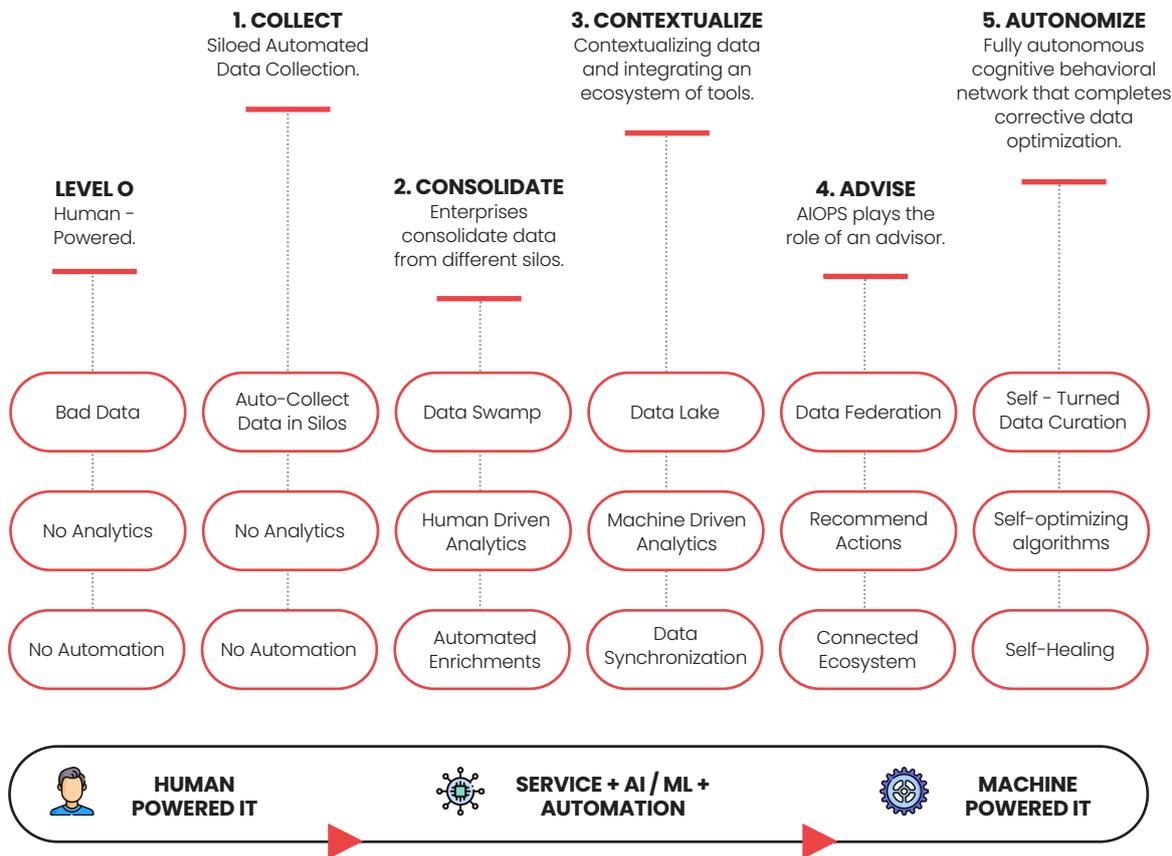
## Aspects that AIOps addresses and optimizes:



It is a challenge to evaluate how AIOps fits into the current IT landscape. It does not replace any existing monitoring, log management or orchestration tools. It exists at the union of all tools and domains, processing and integrating information across the entire IT infrastructure. In doing so, it converts partial perspectives into a 360-degree view of operations, synchronized and easy to monitor.



## Generating a journey to implement AIOps:



AIOps environments are made up of sets of specialized algorithms focused on specific tasks.

The cumulative effect of all these processes increases system stability and performance while preventing critical operations from being impaired.

## AIOps & DevOps

AIOps cannot be considered as a separate entity from DevOps, but rather as a set of technologies that complement the goals of DevOps engineers and help them adopt the scalability and speed needed in modern development. AIOps platforms can help automate all steps from development initiation to production release, projecting the effects of deployment and automatically responding to disruptions that occur in a dynamic IT environment. It can also help manage the velocity, volume and variety of data generated by DevOps Pipelines, sorting and understanding it in real time to keep application deployment stable.



## DevOps

- A mix of IT philosophies, practices, and tools.
- Delivers applications and services at high velocity.

### COMMON ISSUES WITH DevOps:

- Amount of data often goes beyond human scale.
- Staying clear of ideas if they look too risky.
- Developers tend to go for the same fixes first.
- Decisions are made based on experience.
- It is hard to keep up with the CI/CD toolchain.
- Getting bogged down by repetitive tasks.

## AIOps

- Multi-Layered platforms that enhance IT operations.
- Generates optimization insights while automating tasks.

### HOW AIOps CAN HELP:

- Easily handle extreme volumes of data.
- Test any idea in a quick and safe fashion.
- Quickly figure out an optimal fix to a problem.
- Make decisions based on real-time data.
- AIOps systems run and monitor 24/7.
- Automate simple and recurring tasks.

**KEY TRENDS****AIOps IS MOVING FROM ONE TYPE OF DATA TO SEVERAL TYPES OF DATA.**

Data scientists are designing AI algorithms to handle multiple datasheets at the same time. The ultimate goal is that time savings will be achieved, either through early warning systems, filtering out noise signals or through full automation.

**AIOps & OBSERVATION PLATFORMS**

Platforms that refer to a system's ability to provide visibility into what is happening within the system. Incorporating AIOps and automation into these platforms reduces the time needed to predict and fix problems before they affect the business.

**USE OF AIOps TO IMPROVE SECURITY**

By bridging the gap between IT operations and security operations, AIOps will further increase system uptime and reliability.



07

# Other Digital Topics Trending

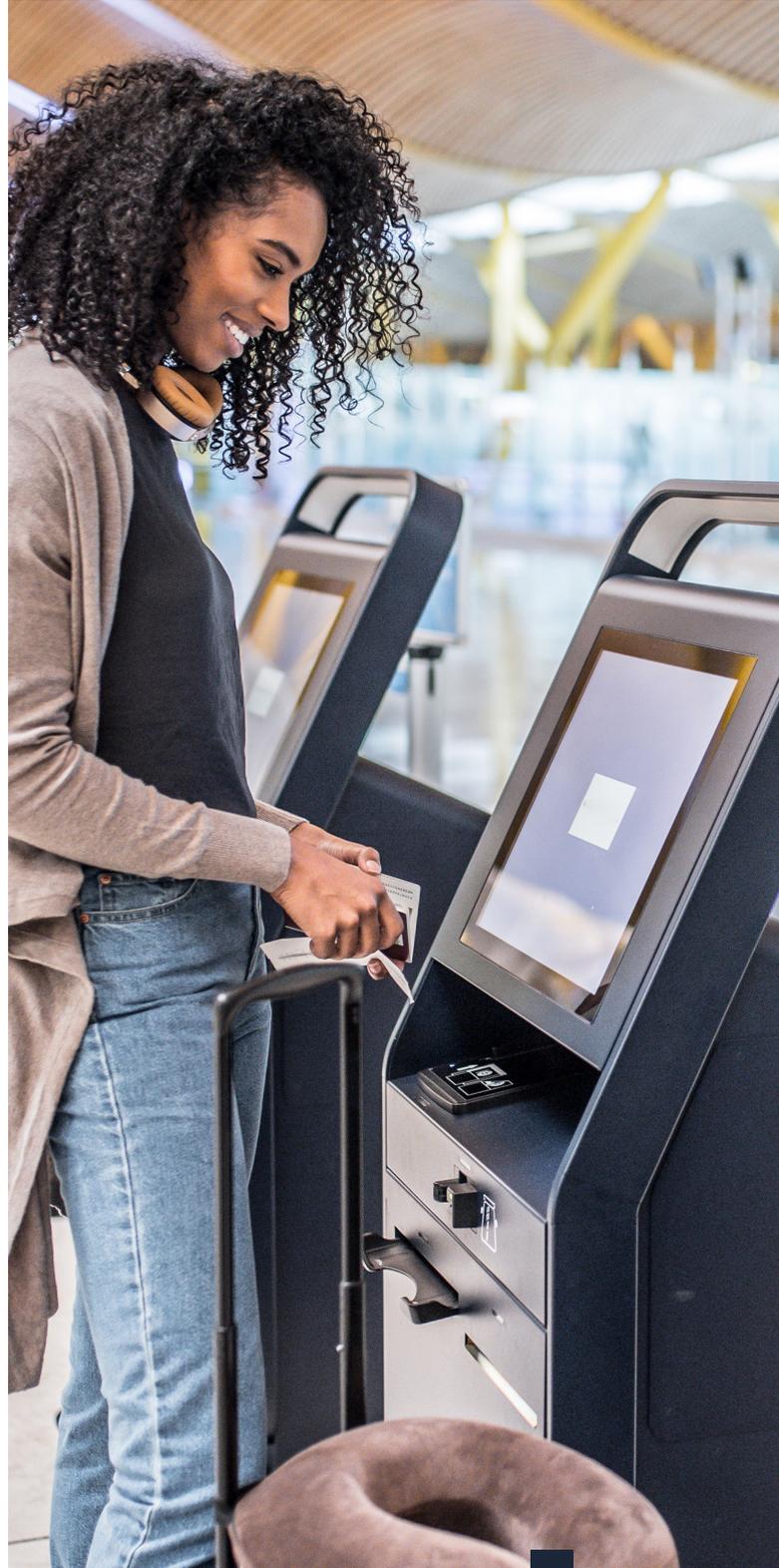
## DIGITAL KIOSKS

Digital kiosks are solutions that offer an **interactive customer service through a very intuitive interface**, usually located in areas of high human traffic. They are equipped with different technologies that allow offering a personalized service: from touch screens that facilitate navigation between menus, to sensors, microphones or cameras that help to improve accessibility and security options.

Many sectors have opted for their use. For example, in the banking sector, whose central point of interaction has historically been ATMs, the implementation of these kiosks greatly expands the options for accessing services. Thus, in addition to carrying out financial transactions, users can request appointments with bank staff or find out about the products marketed by their bank, for example.

The healthcare sector is also playing a key role in popularizing this trend. Hospitals and clinics have digital kiosks to make it easier for patients to make appointments or find out where a consultation room is physically located. A similar use is being offered in the transportation sector, especially at airports, where digital kiosks can sell flights, help passengers check in, provide information on schedules, and find the location of boarding gates.

In hotels, they are a great help in speeding up the check-in and check-out processes, and can also manage the process in different languages. They also offer access to extra services, such as car rental, show tickets or interactive city tours.





In the retail sector, digital kiosks can be used to offer a new sales channel, where customers can access the complete catalog, special offers and discounts, and even pay for products; in short, to offer a more fluid and integrated customer experience. In the education sector, they are a means for users to access different layers of information. For example, students can access their records, consult their timetables, reserve library books, etc.

There are multiple benefits, both for the institutions and for the users themselves. In the case of users, they can receive the desired service without having to wait in long lines. They can also access more information in a simplified way, thus obtaining a better user experience, as they have total freedom to navigate and locate the exact information they need, in the language of their choice. For the organizations, the clearest advantage is the possibility of reducing the workload for their staff, allowing them to dedicate themselves to other more qualitative tasks. In addition, they can better control the information provided to the user, since the messages are predefined. Similarly, from digital kiosks it is possible to obtain more reliable metrics and data from users, by the way they navigate through the information and services requested, which translates into the possibility of providing a more personalized experience, adaptable according to use, thus promoting loyalty.

The digital kiosk market is growing rapidly, with its market value expected to reach \$32.8 billion by 2025, up from a valuation of \$23.94 billion in 2019. Among the factors that are contributing to this growth are users' increasing comfort with self-service, and that the experience offered at these new touchpoints is becoming simpler, more agile and personalized. In addition, the physical elements that make up digital kiosks are now remarkably sophisticated.

# COGNITIVE RPA

Until now, RPA has been limited to repetitive tasks. But with the latest advances in cognitive technologies, AI, ML, computer vision, speech recognition and NLP, this limitation is disappearing, giving birth to Cognitive RPA. AI enables Cognitive RPA to **understand the more complex elements that are part of a process, and thus adapt to changing needs when necessary**, allowing for improved user and worker experience.

While RPA, thanks to its access to structured data, can handle routine and repetitive tasks which require rules established by humans to simply apply them according to various conditions, Cognitive RPA can handle more complex tasks by making autonomous decisions. Cognitive RPA can handle both structured and unstructured data, and at the same time it can create its own rules, thanks to the use of Machine Learning to find performance patterns, which reduces the need of human intervention and facilitates decision making.

Cognitive RPA **includes learning, reasoning and self-correction skills**. With these techniques it is possible to manage a large volume of information that once assimilated is understood as learned and used for decision making by choosing among the different existing options, and correcting itself in case the decisions taken or the information learned have been wrong with the course of events.



Being a technology that allows to reduce human intervention in certain processes, its application is transversal in multiple industries. For example, in the financial sector, where it is critical to have well-ordered and classified data, it is possible to apply Cognitive RPA to perform analysis on customers who need a loan or other banking services.

In the case of the insurance sector, it is being used for claims settlements or new policy requests, procedures for which it is necessary to review multiple documents provided by the client. This reduces the process to just a few seconds, saving time for both customers and the companies themselves.

In Retail, it allows to improve the processes in which data is collected, especially at a time when the commitment to omnichannel is basic, which generates multiple sources of data. In addition, it helps to control available inventory, to forecast sales figures, and even to generate customer profiles from the data collected in their interactions.

# MICRO FRONT-ENDS

The Micro Front-Ends trend is based on **decomposing Front-End blocks into smaller and simpler elements that can be developed, tested and deployed independently**, while still appearing to customers as a single, cohesive product.

This new trend follows the same approach taken in microservices architecture. In short, it is a development style in which each element can be driven independently, and once finalized, they are combined to give birth to an global product.

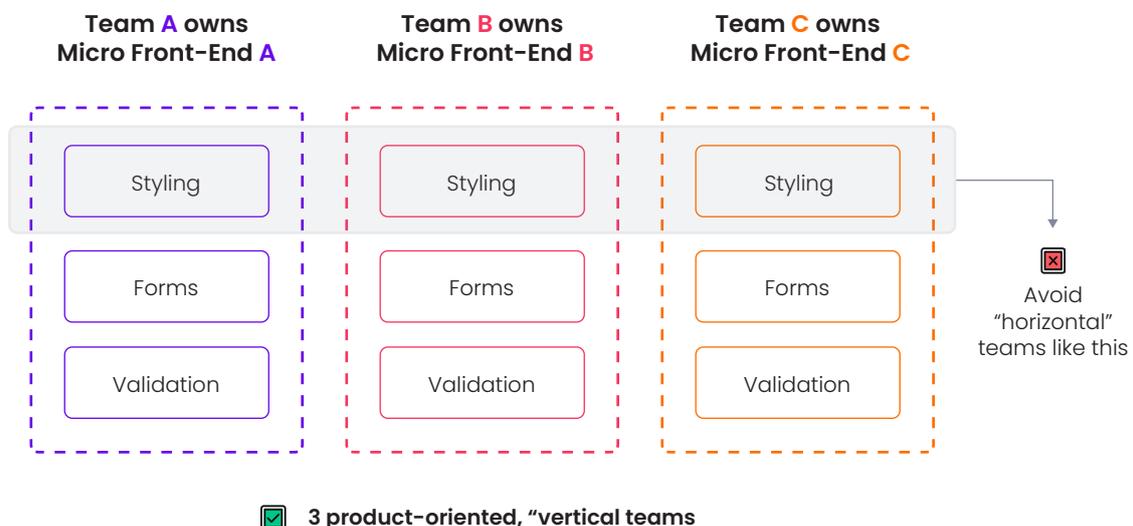
The benefits of this new form of development are diverse. On the one hand, there is now more freedom to make decisions when it comes to upgrades. Individual parts of the product are analyzed on a case-by-case and, in case a major change in the core model is required, each Micro Front-End can be updated autonomously,

instead of updating the entire interface simultaneously, which would require time-consuming development and server updates.

On the other hand, deployments are done independently: each Micro Front-End should have its own continuous delivery channel, which builds, tests and deploys it to the production environment. And if a given Micro Front-End is ready to move to production, it should be able to do so, with that decision depending exclusively on the team that builds and maintains it.

As a result, the teams are completely independent and can manage their section of the product from ideation to production. This allows them to move quickly and efficiently. In fact, for this to work, teams must be formed around vertical sectors of business functionality, rather than around technical capabilities.

## Organization of development teams :



Another benefit derived from this methodology is that **lines of code are reduced**. The code of each individual Micro Front-End will, by definition, be much smaller than the code of a monolithic Front-End. These smaller code bases are usually simpler and easier for developers to update. This technique is useful when the code is too long and different teams have to modify it, which can lead to delays in implementations that affect other completed developments.



*In 2016, at Spotify, faced with the fact that their web player had a lot of room for improvement to meet the needs of users, it was decided that it was time to turn the product around. At that time they realized that the architecture used until then was difficult to maintain and prevented them from building a better product.*

*After several attempts, they were inspired by the Spotify application for TV and game consoles, which is an application that uses the Spotify Web API, combining access to multiple microservices to create a unified interface. Having a simpler architecture allowed them to experiment faster and add features that did not exist in the old Web Player, such as Daily Mixes, video and audio podcasts, and Connect.*



# CUSTOMER DATA PLATFORM



There is a tool that can combine the benefits of a CRM and a DMP: the Customer Data Platform, a marketing system that unifies customer data to enable customer modeling and optimize the synchronization and targeting of messages and offers.

**A CDP must be able to collect customer data at the individual level and from different sources (both online and offline) in real time and regardless of size; and this data must be stored for as long as it takes to process it.** In addition, it must consolidate individual-level profiles while connecting attributes with identities, link multiple devices to a single individual once that person has been identified, and also eliminate duplicate records.

On the other hand, a CDP allows you to create and manage rule-based segments, but there is also the possibility of advanced segmentation, including automated segmentation, predictive analytics and propensity modeling. Finally, it enables the execution of planned campaigns, and has advanced support for filtering, suppression, personalization, A/B testing and recommendations.

The Customer Data Platforms market is an incipient market that has not yet seen a return on the investment made in its development. An example of this is that companies selling CDP technology have received more than \$1.8 billion in venture capital investments, however, the sales revenues of most of these companies do not yet exceed \$30M.

But beyond economic data, the interest in CDP is real, and this was demonstrated in a survey conducted by Gartner last year in the United States and the United Kingdom, where 12% of respondents stated that they had set themselves the goal of implementing a CDP in the next two years, and among these, 35% had already secured the budget.

For the majority of respondents, being able to fully leverage customer data was a challenge: more specifically, for 58% it was a significant or moderate challenge, and for 28% it was a small, but manageable, challenge.

## LOW CODE – NO CODE

Until now, in conventional software development, programmers wrote lines of code with the goal of creating the desired functionality of the tool or application. This process requires programmers to have an in-depth knowledge of computer languages, as well as development environments, deployment processes and testing protocols.

This, however, is a hindrance to the fast and agile development of applications and tools. Fortunately, however, this is no longer a problem thanks to the emergence of platforms that allow the creation of tools and applications without extensive IT knowledge. These are known as Low Code or No Code platforms.

These platforms bundle code work through visual tools that can be easily managed to create applications quickly. They make use of reusable components and drag & drop tools to facilitate the task. They allow users to create applications as if they were drawing what they want instead of writing lines of code for each desired function and capability. Users drag and drop visual blocks (containing the real code) into a canvas to create the applications.

But beyond the common purpose of these platforms, there are some differences between them. Low Code platforms still require some coding, so minimal knowledge is necessary, while **No Code platforms allow anyone to adapt an application to their needs without any programming knowledge.**

This difference means that Low Code platforms can integrate third-party systems, and also that the applications or tools developed are more complex and have a longer life cycle.

The advent of these platforms brings significant benefits. First, they accelerate the development and delivery of applications. In addition, they make it possible for non-IT professionals to have the options to solve problems quickly and easily, thus freeing professional developers from the lighter programming activities.

Among the challenges they present, there is the loss of perspective that can result from the ease and low cost of these tools, losing oversight of what is generated. Another challenge is managing, maintaining and scaling these applications, as well as the increased infrastructure and storage costs associated with the proliferation of development activity that these platforms enable. But perhaps the most difficult challenge to control is that users try to build tools that are too complex for the possibilities of these platforms, only to find out later that it is not possible to obtain the desired result, after investing time in trying, which can be a significant waste of resources for organizations.

Forrester estimates that the market value of Low Code applications will reach \$15 billion in 2020, with forecasts to reach \$21 billion in 2022. Moreover, Gartner forecasts that, by 2024, Low Code application development will account for 65% of all application development activity.

# DATAOPS

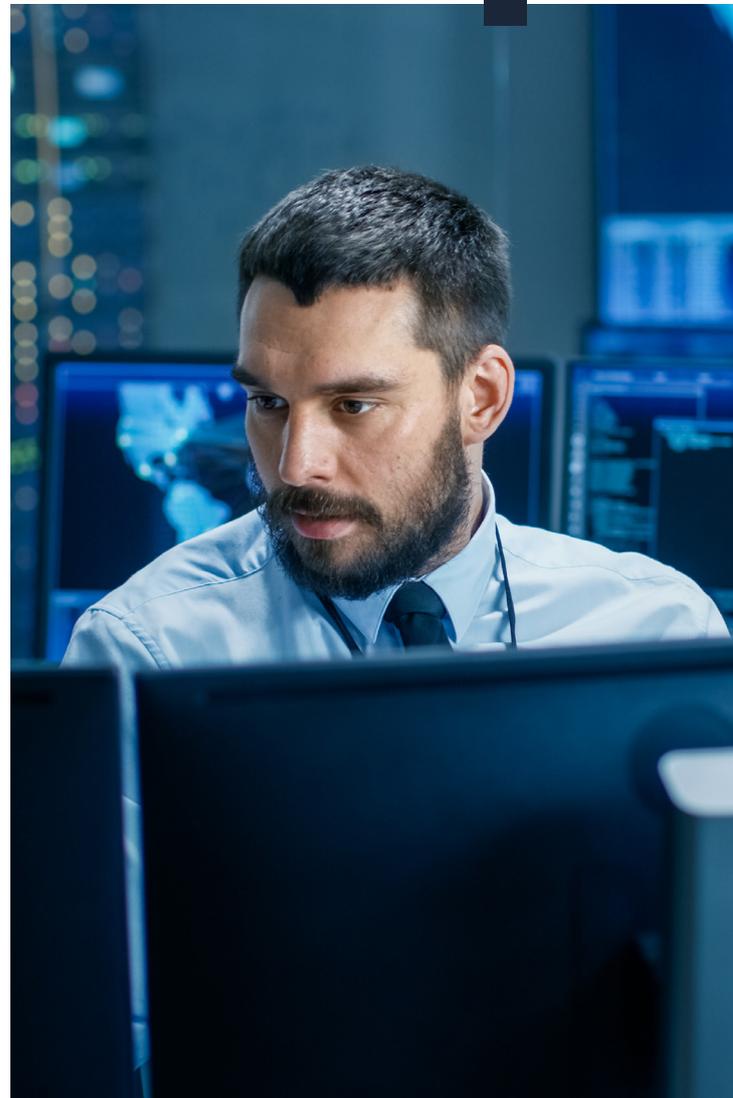
DataOps is **a collaborative data management practice focused on improving communication, integration and automation of data flows between data managers and data consumers in an organization.**

Its objective is to deliver value faster through predictable delivery and data model and change management. It uses technology to automate the design, implementation and management of data delivery with appropriate levels of governance, and uses metadata to improve the usability and value of data in a dynamic environment.

Once the methodology is adopted, information silos within the organization are reduced. Silos are often generated because departments with similar needs do not share data management models, so for a successful implementation it is essential to leave behind these cultural and organizational barriers. The separation between data operators (responsible for infrastructure, security and maintenance) and data creators (responsible for using data to drive new projects and innovation) needs to disappear.

Among the benefits of this new methodology, which takes from DevOps software engineering practices such as CI/CD, is the fact that the data supply chain is faster, more efficient, reliable and flexible. In this way, organizations can obtain greater benefits from data.

With DataOps, every data user in the organization will have access without time limitations and without relying on other actors to provide prior access to prepare and analyze the data. In turn, collaboration between different areas of the organization will be facilitated, which will help the identification of cost-effective and more reliable data. Reliability will be provided by continuous updating. In addition, the reuse of data is maximized, so that it does not have to be generated ad hoc for each application. Finally, with greater ease of automating, simplifying and delivering data, the data literacy of the organization will be improved, regardless of the previous skills of employees.



# CASHLESS SOCIETY

It has been a few years since Spain legislated that no payment of more than 2,000 euros could be made with cash. Any other method had to be used. But now, in the context of the pandemic, it has been society itself that has adopted a trend that had already been brewing for some time: **living without cash**. We are moving towards a Cashless Society. It seems clearer than ever that the future of society lies in saying goodbye to cash payments and embracing payment methods that avoid physical money.

When cash disappears, **electronic methods appear to replace it**. From traditional credit and debit cards, which have been in people's lives for many years, to electronic payment applications, especially useful for P2P payments. There is also the possibility of making use of mobile payment services such as Apple Pay, even cryptocurrencies, which are already used for certain money transfers. However, there are risks and regulatory hurdles that make them impractical for most consumers at this time.

There are already many signs that cash is going to disappear. The statistics on the use of cash are devastating. For example, in the case of the UK, according to data from UK Finance, in 2008, 60% of payments were made in cash, but by 2018 that figure had already fallen to 28%, and expectations for 2028 speak of 9% cash payments. In addition, the market for digital payments, which is valued at \$79.3 billion in 2020, is expected to reach \$154.1 billion by 2025.

**The benefits include more difficulty in committing crimes**, from robberies to financial crimes such as money laundering or tax evasion, given the complexity of hiding sources of income in a digital environment. Moreover, international payments are facilitated, insofar as it will no longer be necessary to exchange a physical currency when traveling to a foreign country. It will be the operators who will be responsible for making the exchange in the payment process itself.

On the risks and disadvantages side, there is the loss of privacy and the increased risk of cyber-attack. But there are also the operational risks: in the event of problems with electronic devices, such as loss of access to means of payment due to a lack of battery power. There is also the possibility that payment providers will start charging fees for their services as they consolidate their position of strength as the only payment vehicles. This may be compounded by the impact of negative interest rates.



# CONFIDENTIAL COMPUTING

Confidential Computing is a new security model that aims to **protect data while it is being used, not only in Cloud environments, but in any environment.**

To achieve its goal, Confidential Computing needs hardware-based techniques to help it isolate the data to be stored in a Trusted Execution Environment, known as TEE, which it must provide:

**DATA CONFIDENTIALITY:**

unauthorized entities cannot view the data while it is in use within the TEE.

**DATA INTEGRITY:**

unauthorized entities cannot add, delete or modify data while in use within the TEE.

**CODE INTEGRITY:**

unauthorized entities cannot add, delete or modify the code running on the TEE.

Its focus is on data security during execution, because despite all existing measures to protect stored data, many systems require unencrypted data when processing it, making this the point of maximum vulnerability.

Confidential Computing is taking its first steps in the market. Proof of this is that Gartner places Confidential Computing in the 2020 Cloud Security Hype Cycle in the launch position, and with a view that between five and ten years it will reach the productivity plateau.

As CC allows data to be processed without exposing it to other parties, there are several usage scenarios.

For example, to prevent money laundering: in this case, several banks share data with each other without exposing the personal data of their customers, and run agreed analyses on the combined confidential data set. These analyses can detect the movement of a client's money between several banks, without the banks having access to each other's data.

The pharmaceutical industry may also benefit from this technology, where each company works with large data sets individually, but could share them without compromising their confidentiality, with the possibility of speeding up research and obtaining faster and more effective solutions.



# DISTRIBUTED DATA MESH

Becoming a data-driven organization remains one of the main strategic objectives of many large organizations. In what we know as data-centric architecture and Data Lakes, today, the problem basically lies in three failure modes:



## 01 It is **centralized and monolithic data:**

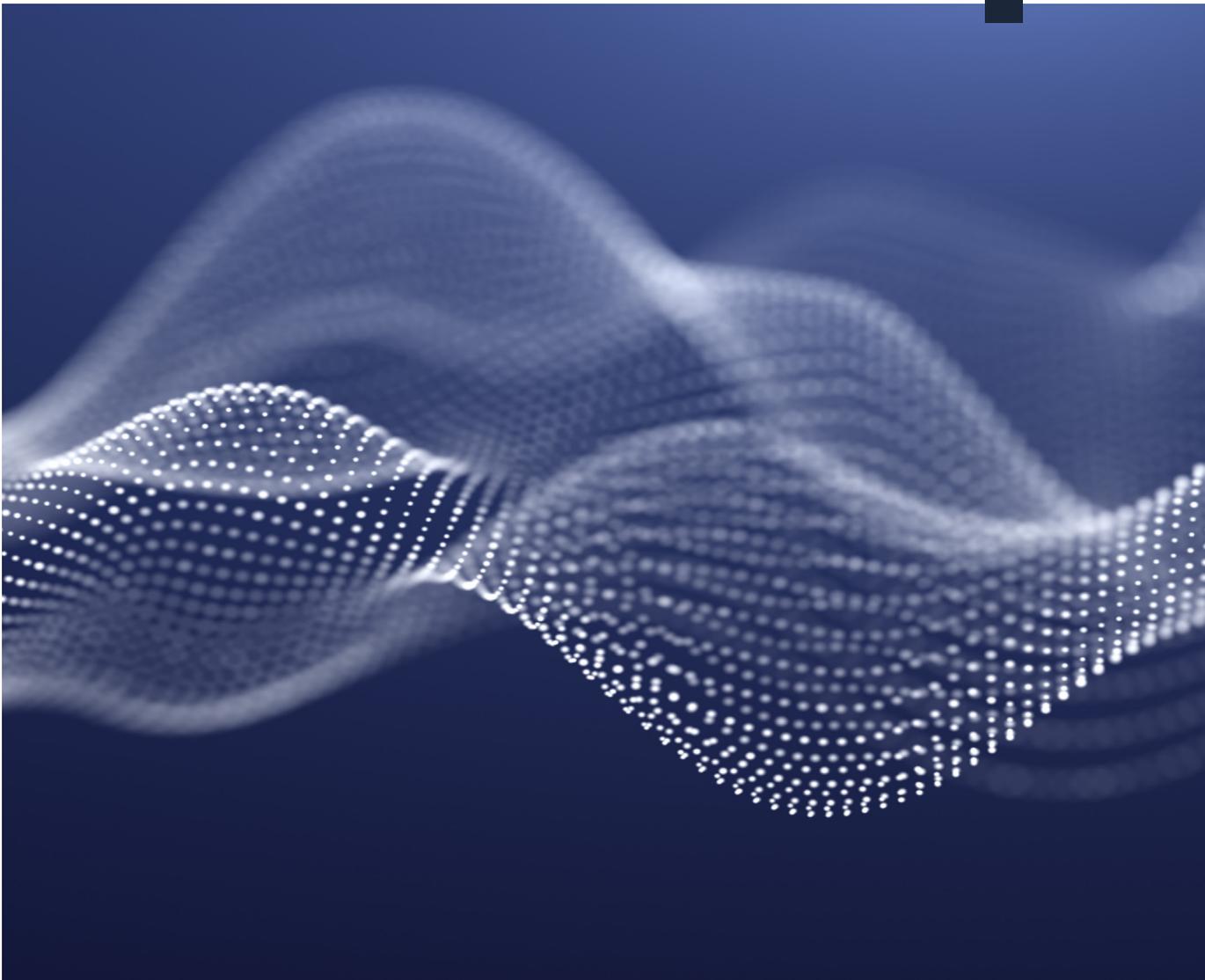
It is based on the union of all types of data. It can possibly work for the objectives of small organizations, but it does not achieve the desired purpose and efficiency if we orient it to companies with a large and diverse number of data sources, in combination with very heterogeneous sets of consumers of that data.

## 02 **Coupled decomposition of data:**

The second failure mode of a traditional data platform architecture is related to how we decompose it. Technical leaders in organizations break down an architecture in response to platform growth. This stems from the need to incorporate new sources or respond to new consumer demands in order to grow the platform. But to achieve this, architects need to find a way to scale the system by splitting it into thousands of evolving architectures. The motivation behind splitting a system is to create independent teams that can build and operate it, and to simplify the work between these teams to achieve greater speed and operational scalability. But, while this model provides some level of scale, by assigning teams to different stages of the process it has an inherent limitation: it slows down the delivery of cross-cutting functions.

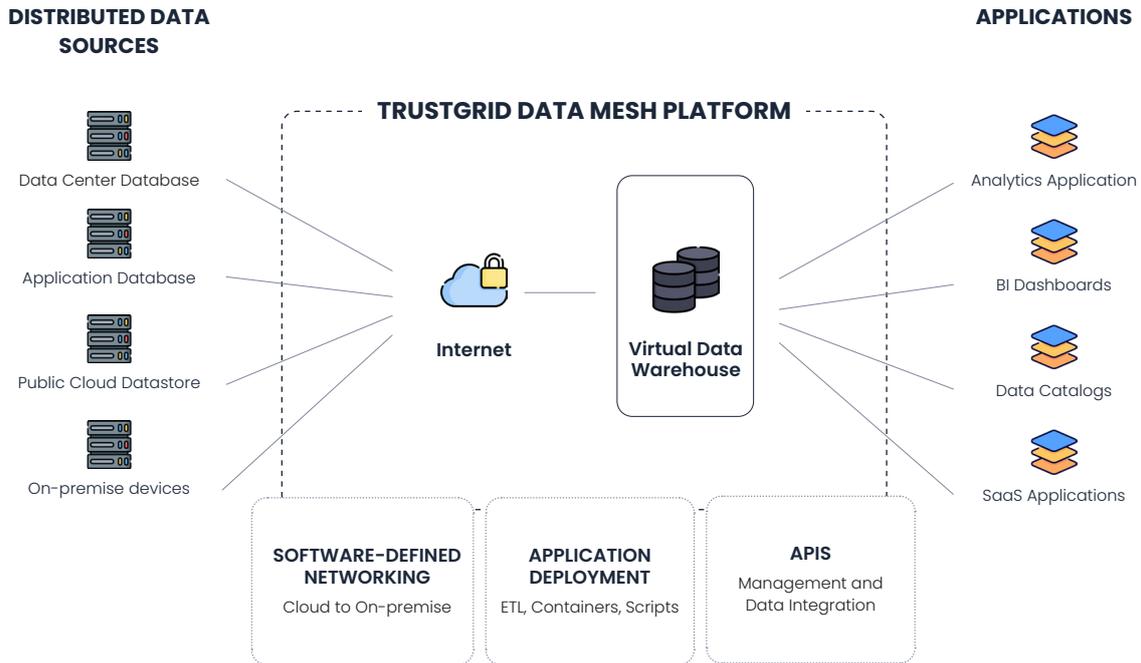
## 03 **Siloed and hyper-specialized ownership is another mode of ultimate failure:**

The architecture creates a centralized categorization of sources that provide data, which is then retrieved in a processed form by the teams. In the middle of the equation are the data specialists. While the two external groups are domain-oriented, the central team must be domain-independent.



The so-called “data mesh” is a new architectural paradigm that aims to connect and unlock large distributed data sets, thus **enabling large-scale data analysis**. A data mesh solves the problems presented by data lakes, as well as centralized, monolithic data warehouses, as they treat domain-based data as the end product and allow separate business domains to host and serve their datasets data sets in a way that is easily consumable by organizations.

That is, instead of building large, centralized data platforms, data architects should create distributed data meshes. This shift in focus requires a paradigm change. As data becomes more ubiquitous, **traditional architectures and Data Lakes become overwhelmed and cannot scale efficiently**. A Data Mesh approach can overcome these inherent inefficiencies by adopting domain-specific data ownership.



### DISTRIBUTED DATA MESH SHOULD BE CHARACTERIZED BY:

- To be an intentionally designed distributed data architecture.
- To consist of a fully centralized and standardized governance for complete interoperability.
- It must be enabled by a self-service data infrastructure with a shared and harmonized focus.

Thus, the Distributed Data Mesh is extremely far from being a landscape of fragmented silos of inaccessible data as found in traditional data platforms. This paradigm shift requires a new set of collaborative and distributed guiding principles accompanied by a new language, where one of the basic premises is to “serve optimized data and not ingest it”

In this sense, having a data mesh will allow us to have a truly data-driven organization, overcoming the problems derived from data lakes and data warehouses, replacing them with precise governance, access and total control of data, as well as increasing and enriching connectivity.

The Distributed Data Mesh will be a massive disruption in the data landscape. A paradigm shift that will move us away from the traditional focus on a voluminous and often fragile data flow to a world of decentralized autonomous data products.



**We are experts in digital services, products and solutions, technological innovation and agile transformation processes.**

With a team of **more than 2,500 professionals**, we have a national and international presence, with offices in the USA, Peru, Brazil, Chile, Mexico, Colombia, Paraguay, United Kingdom and Germany.

Our mission? To generate the greatest value for our clients, the economic sectors and society as a whole, through the design and development of initiatives based on cutting-edge technology, with the aim of driving digital change in a disruptive way.

**[www.vectoritcgroup.com](http://www.vectoritcgroup.com)**