2023

Fundación innovación bankinter.

Ahead of the future

Megatrends

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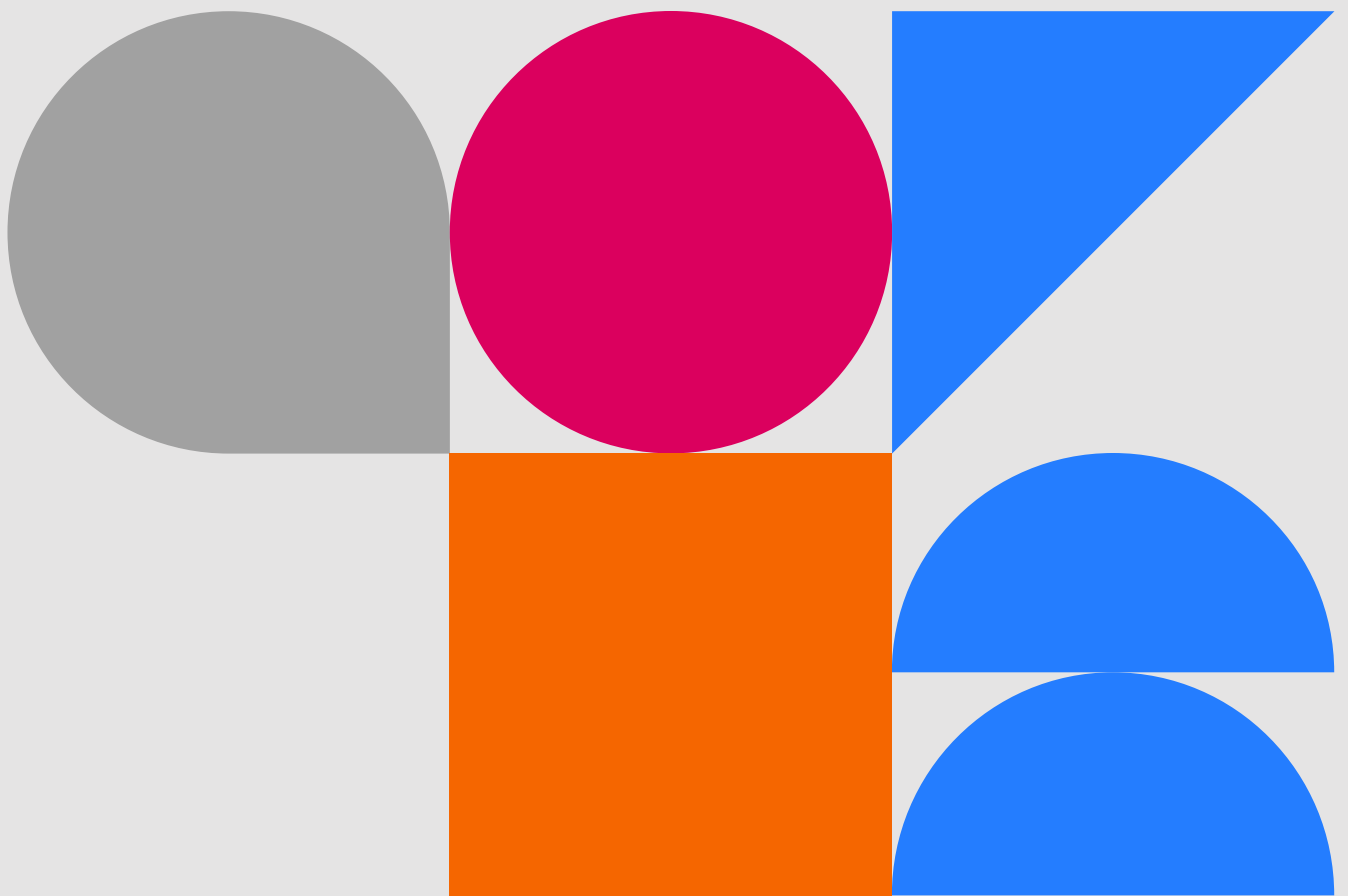
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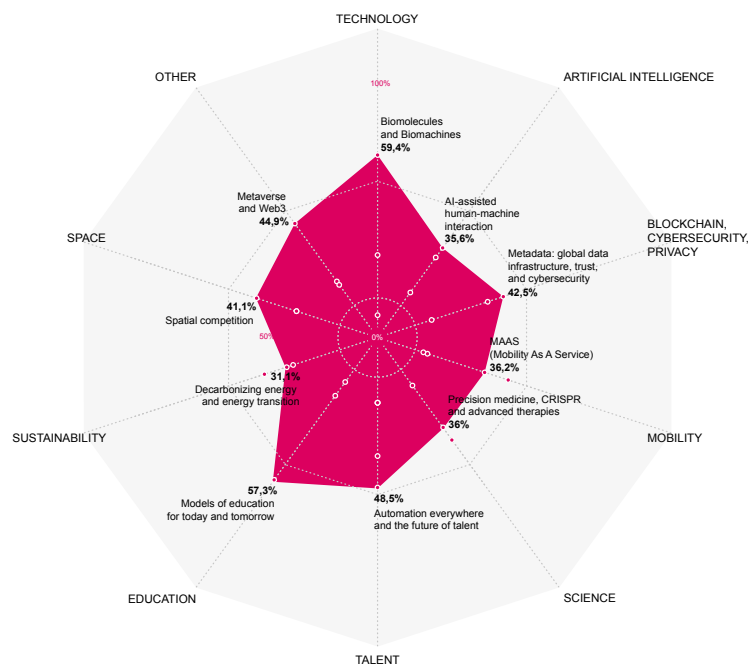
Editorial

Introduction

TECHNOLOGY

OTHER

ARTIFICIAL INTELLIGENCE

100%

Biomolecules
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59,4%

AI-assisted
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35,6%

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44,9%

BLOCKCHAIN,
CYBERSECURITY,
PRIVACY

SPACE

Metadata: global data
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and cybersecurity
42,5%

41,1%
Spatial competition

50%

MAAS
(Mobility As A Service)
36,2%

31,1%
Decarbonizing energy
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0%

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36%

SUSTAINABILITY

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EDUCATION

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TALENT

Introduction

In 1865, Jules Verne decided to launch a spacecraft into space in his novel "From the Earth to the Moon". The place chosen for the launch was in Florida, a few hundred kilometers from where the Apollo XI mission would leave for the same destination a century later. How could the French author know which was the optimal place for such a launch?

This is not the only time Verne seemed to see the future. There were many later inventions that the author had previously approximated in his writings. Verne did not have a crystal ball, but he was a great observer, very apt at analyzing the current signs of what would come later. This is precisely the exercise we have asked the experts of **Bankinter Innovation Foundation** to do.

The main task of Megatrends 2023 is to **observe underlying trends and their evolution.** Knowing how fields such as artificial intelligence, cybersecurity, space exploration or health are developing is key to anticipating what the world we will inhabit will be like. Innovation in **precision medicine**, in **educational models** that can speak to the future or in **renewable energies** undoubtedly have great potential when it comes to shaping our future.

These **Megatrends 2023** bring together the vision of world-class experts on innovations that will disrupt society in the coming years. These experts gathered in the international *think tank* **Future Trends Forum**, whose mission is to analyze the present to discover what lies ahead and be prepared for it.

With the publication of this report, we share with society the knowledge about those trends that, through innovation, are set to shape the future. The more than 700 experts of the Future Trends Forum have analyzed trends around four major themes: *Technology and Science, Emerging Trends, Economic Progress and the Future of Society*. They then **voted on the most relevant trends** to form a ranking.

Megatrends 2023 studies ten of these trends, their status in 2023 and also **their possible evolution in the coming years.** Some of these analyses make it possible to observe how trends already identified in 2022 have evolved.

The publication of the Megatrends report responds to our calling to discover, aided by brilliant minds, new clues to help us anticipate the future, but also to **monitor the evolution of certain underlying trends**. This observation work will enable us, like Verne, to get a fairly accurate picture of what the future will be like.

Trends
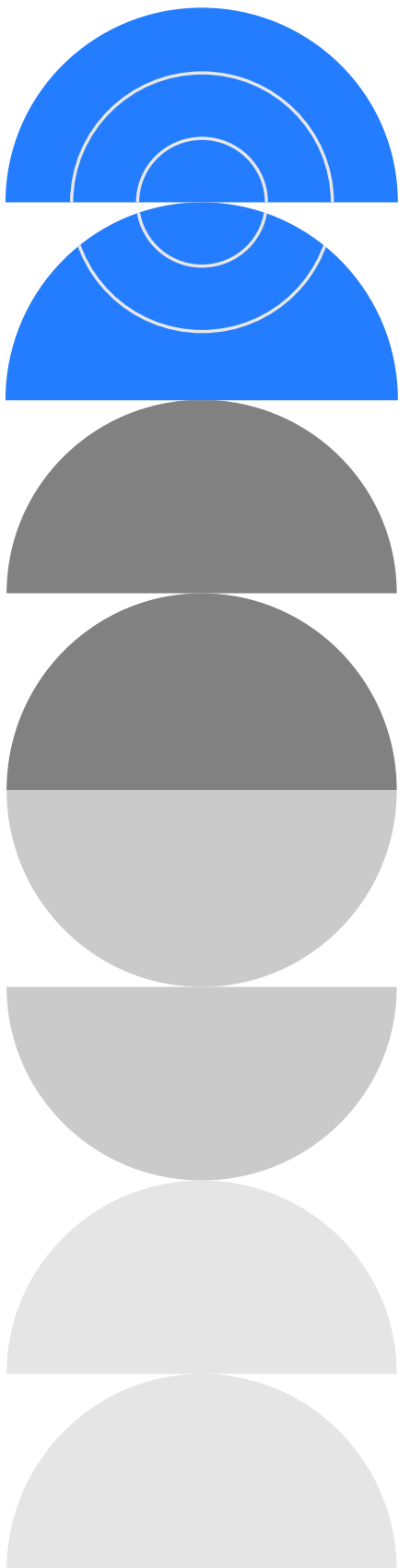
01

Technology to expand our

Human capabilities

"It's your birthday and you get a leather wallet—how do you react?" It may seem an innocent question, but it was much more than that for the replicants in Blade Runner. **That question was part of the Voight-Kampff test,** designed to find out if they felt empathy and, therefore, whether or not they were human. The film, released in 1982, was set in a dystopian 2019, where it was difficult to distinguish biological humans from artificial ones.

The replicants in Blade Runner were human-like in appearance, but had some enhanced capabilities, being as they were machines. For example, greater strength and agility.

Today, the possibility of technology-driven capability enhancement is not completely foreign to us. For years now, cochlear implants have been helping people with hearing impairments to perceive sounds. And there are already brain implants that improve memory.

Biomechanics, neurotechnology and other human enhancement techniques will be increasingly present in our lives. To the point where the traditional idea of body and mind will be increasingly contested.

Challenging the concept of body and mind

It is precisely areas such as neurotechnology that seek to expand our human capabilities by incorporating devices into our bodies. From brain implants that

allow a quadriplegic person to move a robotic arm, to brain-machine interfaces that bring about consistent improvements in skills such as working memory, sustained attention or processing speed.

At the moment, the possibilities are limited. However, in the future, technology-driven capability enhancement may reach unprecedented levels. Our nervous system will be able to interface with all kinds of external intelligence and technology as brain-machine interfaces evolve.

Machine-driven capability augmentation also **raises ethical dilemmas**. At what point will we be more machine than human? Are we sure it is us taking a decision, ultimately and not an algorithm to which we have connected? Will someone be able to access our thoughts to manipulate us? Will access to these technologies exacerbate inequality?

Philosophers, technologists, scientists and policymakers have a lot of work ahead of them to answer these questions.

Life forms or machines?

The confluence between life forms and machines is already finding interesting examples in biotechnology. This is the case of the development of biomachines from animal cells, one of the major trends brought to the fore by the experts of the Bankinter Innovation Foundation. These **organisms, halfway between a robot and a life form**, are capable—for the moment—of carrying out very simple tasks.

It is in this "halfway" where the most important dilemmas will be found, especially if the life forms that converge with the machines are human.

Rights, limits, privacy, monetization, cybersecurity or gaps between those who can access technology that enhances their capabilities and those who cannot are some examples that are worth reflecting on now.
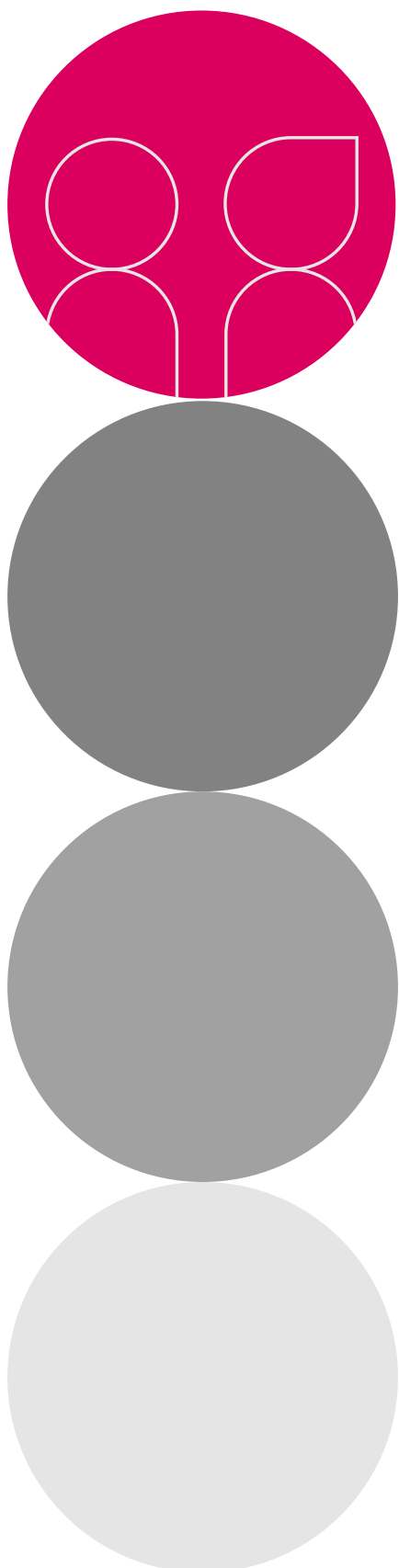
Related trends

Biomolecules and biomachines

Cyborgs and extreme body modifications

What lies ahead in biotechnology?

02

Artificial intelligence

In our relationship with machines

One million users in five days. Chat-GPT, a chatbot built on the GPT-3 artificial intelligence language model, came stomping in at the end of November 2022. It was only a prototype when it was launched, but it has managed to hook users all over the world. The reason? It can write anything: from a poem to a WordPress plugin. But above all, it's super easy to use.

Chat-GPT answers virtually any question with complete naturalness and nonchalance. Its ability to answer related questions, admit mistakes, discuss them and reject inappropriate requests is surprising and very attractive to users.

It is also disturbing: just as it is capable of writing essays that could save a lazy student's neck, it **can generate inaccurate, biased or outright false information.** Are we ready to interact with such a technology?

An increasingly close relationship

Artificial intelligence will make it easier and easier for us to interact with machines. This is especially true in fields such as IoT. Our experts expect that artificial intelligence analysis and its combination with different sources of sensor data will enable us to interact with machines and applications in a completely different way. Even without being aware of it.

Such ease to make the most of machines will, in turn, lead to an increasingly **intensive use of technology**. And this intensification of the relationship will multiply the challenges.

The boom in generative models—such as Chat GPT-3 or DALL-E—, which facilitate human-machine interaction to the extreme, are testament to it. After the initial *hype*, doubts soon followed. What data has Chat-GPT been trained with? How reliable are its responses? Is the image we are seeing on the screen real?

Transparent algorithms

The ethical implications of the relationship between advanced AI and humans were already mentioned in the 2022 Megatrends. The need to assess how to use this technology in a way that will have a positive impact on society was also highlighted.

In this regard, we have talked about algorithm auditing, which is the way the industry has found to check that the impact of an algorithm on our lives will be positive.

But something else is needed: if our relationship with machines is to become more intense thanks to artificial intelligence, **transparency is essential.** Figuring out how each algorithm works, what the data that feeds it are like, what purpose it pursues and how it handles our privacy must be straightforward. We also need to be clear about what is the work of artificial intelligence and what is not.

Did you make this?

As Calum Chace warned at the Future Trends Forum on Quantum and artificial intelligence, the next generation of generative AI will multiply the number of parameters it handles and will be much more sophisticated. As a result, it will generate results that will be increasingly difficult to distinguish from human creations.

There are already some tools that try to ascertain whether some contents have been generated by artificial intelligence or not. However, this may not be so important in the future. It seems only a matter of time before we end up integrating their use in all kinds of fields, from education to art, from our daily lives to our social relationships. We won't be fighting with robots for a job: we will be working alongside them.

Can we consider an opera composed by artificial intelligence as art? If artificial intelligence helps us compose it, how much of the opera's success can we ascribe to our instructions and how much to the machine itself? These are questions that await answers.
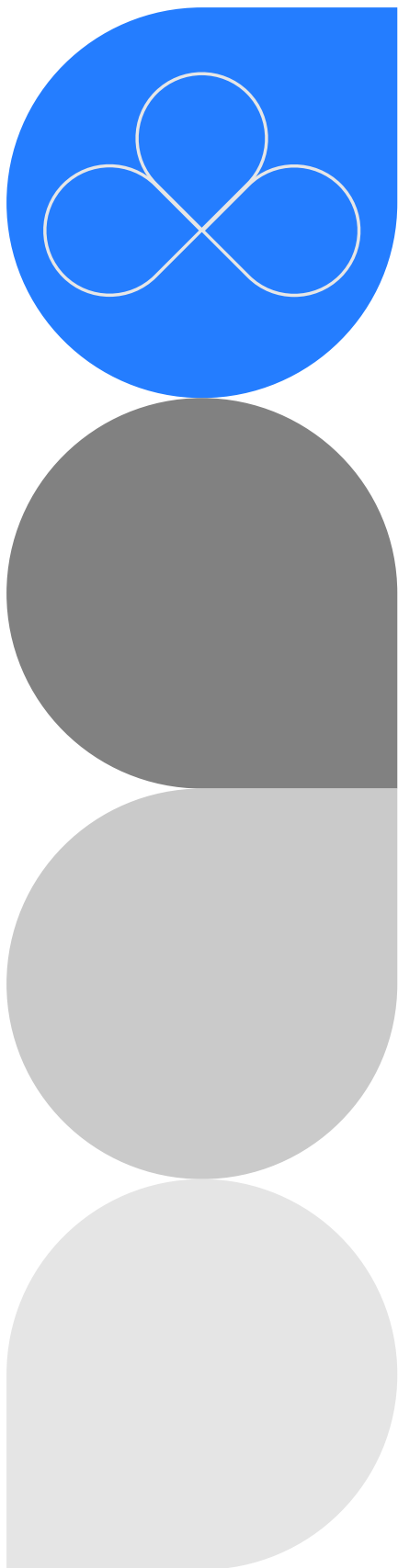
Related trends

- AI-assisted human-machine interaction

- Generative AI and natural language processing

- Ethics of artificial intelligence

03

Metadata and the cloud

Building the foundation for a hyperconnected world

By 2023, two-thirds of humanity will be connected to the Internet. The number of networked devices will be even greater: Cisco estimates that **some 29.3 billion devices will be exchanging information** worldwide, out of which 350 million will be in Spain.

With the connection of people and devices, the flow of data and the associated demands are also increasing. Cybersecurity, infrastructure, transparency, metadata, IoT… If we are going to live in a world in which we will produce and handle an ever-increasing amount of information, we must build a solid foundation on these issues. We need to process data, yes, but we also need to govern it properly.

Metadata galore!

How do we control an exponentially growing ocean of data, and the pipelines through which we try to channel it? Metadata—that is, information about the data itself—will be critical.

Research, industry and the public sector are increasingly dependent on data and its processing. The problem is that, as its magnitude increases, we run the risk of losing control over its channeling.

As our experts point out, collecting and organizing metadata facilitates the discovery, observation, operations and governance of the data itself. While

leveraging metadata in industry today is highly specialized and costly, **the future will be one of universal metadata.**

As part of data governance, the use for the common good must be guaranteed. We will need adequate regulation and players to ensure that data governance is appropriate. In this new ecosystem of trust, we will find independent managers, collectives and data cooperatives, which will help to preserve trust and achieve the greatest benefit for all.

A proper "infostructure"

There are some things with which we cannot gamble. Our health is one of those things. Taking care of it is no longer just a matter of exercising and eating right: now data also comes into play.

Thousands of Britons were unwilling test subjects in 2022. Their public healthcare system (NHS) suffered the consequences of a *ransomware* attack on a provider. Ambulance dispatches, emergency prescriptions and access to thousands of patients' records were affected. Their most intimate data, exposed.

What will happen when we all share our data in real time with all sorts of everyday objects? What will happen when the IoT is present in virtually every aspect of our lives?

Ensuring the confidentiality, integrity and accessibility of data is one of the main missions of cybersecurity. **This requires a good "infostructure".** This "infostructure" must be built on technology and skills— *networking*, processing, standards, enforceable rules and business models—that work together to protect information not as a tool, but as an asset in itself.

Cloud data ecosystems will also need to become more affordable. The more players that can access them, the closer we will come to developing technologies that are unimaginable today.

Will the next breakthrough against climate change be brewing in a startup born in the cloud? Will the key to curing ALS be hidden in a huge global dataset?

The future of people will be built on data, so it will need a solid foundation on which to build it.

Related trends

Metadata: global data infrastructure, trust, data sharing, cybersecurity

Data trust, data collectives

Cloud data ecosystems

04

Mobility
From the garage to the street

Residents of Kelheim, a district to the North of München, Germany, can now book self-driving vehicles on demand. This is the second phase of the KelRide project, which integrates these vehicles as part of the area's public transport system.

"Where is the automation of public and private transport heading?", asked Megatrends 2022. As explained by expert Raúl Rojas in the Innoverse podcast, the future of the self-driving vehicle **will find its meaning in a shared and intelligent mobility network.** A network that is beginning to take its first steps in projects such as Kelheim.

Mobility as a Service

Raúl Rojas talks about the presence of cabs shuttling us to the subway station. It is precisely in urban environments that a new form of mobility will increasingly expand—Mobility as a Service (MaaS).

Picking up a vehicle at one point in the city and dropping it off at another is one trend already shaping smart cities. In urban environments where space is increasingly limited, car sharing is one of the most logical responses.

The transition from the garage to the street will change our relationship with vehicles. Personal ownership will give way to **models such as pay-per-use or subscription.** A transition that will be

accelerated by the *millennial* and Gen-Z generations, as the latest Megatrends pointed out. They don't care about owning a car, or even driving.

Scooters, bicycles, electric cars and even unmanned vehicles will transform urban mobility—including the transport of people and goods.

For the moment, self-driving carts have already been seen passing through the sidewalks of Alcobendas (Madrid). Their mission is to bring home the groceries or a pizza. In the future, we will see such devices sharing the city with pedestrians, scooters, cyclists, cars, buses and delivery vans, and even drones—manned or not. How can we bring order to an increasingly intelligent and diverse system?

Technology to talk to vehicles and streets

MaaS management is one of the main challenges in urban environments. Places that, moreover, will increasingly concentrate more people, as our FTF report on Disruptive Cities warns.

The complexity of mobility in cities will increase considerably, as the number of urban dwellers grows. This, together with the concurrence of manned and self-driving vehicles, will increasingly complicate their management.

Connectivity will be key to coordinating this welter of vehicles and people as part of smart cities. The confluence of 5G, Internet of Things (IoT), *edge computing* and the cloud will be the enabler for

people, vehicles and infrastructures to communicate effectively. An **inordinate amount of data will need to be managed in real time** and in such a way that urban mobility runs as efficiently as possible.

When all this is done, getting from point A to point B in the city will no longer be a matter of going down to the garage, looking for combinations or calculating itineraries on an app. The city itself will tell us the best way to do it.
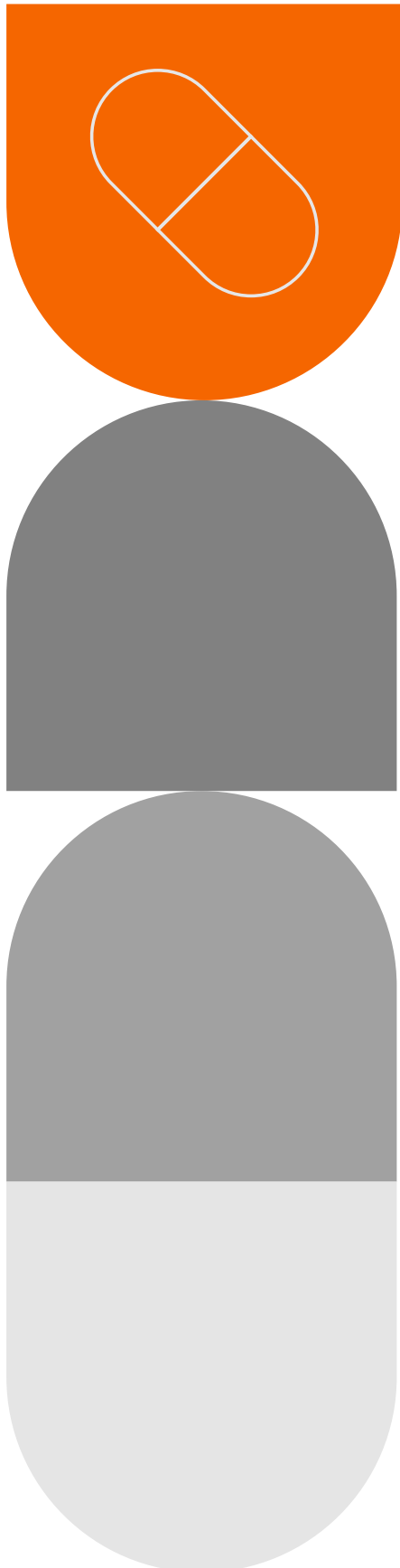
Related trends

MAAS (Mobility As A Service)

Cities and infrastructures of the future

Future of connectivity, 5G, IoT and beyond

05

Precision medicine

Advanced therapies that will adapt to us

We are not aware of it, but there are as many life forms in our body as there are humans on the planet. It is known as the second genome—and one of the most promising possibilities in the field of medicine. **We are talking about the microbiome**, one of the leading Megatrends 2022.

This group of tiny beings that populate our organism is a gold mine with an enormous amount of information, unique to each individual. A populous neighborhood that, in addition, has great influence on our health.

Studying it, as Megatrends 2022 pointed out, is a gateway to curing diseases. In fact, it has already facilitated the approval in the United States of the first pre-packaged fecal microbiota biopharmaceutical against a highly resistant bacterium.

We have already talked about how, in the future, deciphering the microbiome could help us to put an end to multiple diseases and to do so in a personalized way. Alongside this line of research, there are others that will set the standard in the coming years.

One person, one treatment

Viruses that modify the DNA of lymphocytes to improve their function. Biocapsules introduced into a tumor as a Trojan horse. Scissors that cut out erroneous genetic information and paste the correct one to cure diseases. These are examples of **precision medicine that provides** solutions tailored

to the patient and his or her disease. Some of them are still in the experimental phase. Others are already saving lives.

Precision medicine—with advanced therapies and CRISPR gene-editing technology—together with RNA-based drugs, are lining up on the road to hyper-personalization of treatments. It is the uniqueness of each person that will dictate the prescription needed to combat a disease.

In fact, precision medicine already makes it possible to apply personalized treatments to some patients against different types of cancer. For example, CAR-T immunotherapies—which combine cell therapy, immunotherapy and gene therapy—are completely changing the approach to some lymphomas and, with it, their prognosis.

Prevention is better

What if we could use our personal information to prevent problems before they arise? **CRISPR gene-editing techniques already point to this possibility.** These are genetic cut-and-paste tools that have been tested mainly to correct point mutations responsible for rare diseases.

In 2023, the American Eric Olson and his team succeeded in deactivating a protein that causes many common heart diseases. To achieve this, they modified the DNA of mice using CRISPR techniques. This finding opens the door not only to repairing damaged tissue after a myocardial infarction, but also to preventing such damage before it occurs.

RNA-based drugs

The pandemic made us all aware of the phrase: "messenger RNA". It was the foundation on which the long-awaited vaccine against COVID-19 was built. A breakthrough that led to a new generation of drugs. Its next goal: to prevent cancer.

The creators of BioNtech and Princess of Asturias laureates Ugur Sahin and Özlem Türeci hail that personalized nanovaccines against cancer will be a reality in a few years. They will be based on messenger RNA technology. It **does not matter that no two tumors are** alike: the drugs will be tailor-made for each one. Tiny pellets will carry to our cells the precise instructions to defeat it.

In the face of these advances, the questions are inevitable: What will happen when we decipher our microbiome and connect that information to precision medicine? What will words like "disease" or "treatment" mean then?
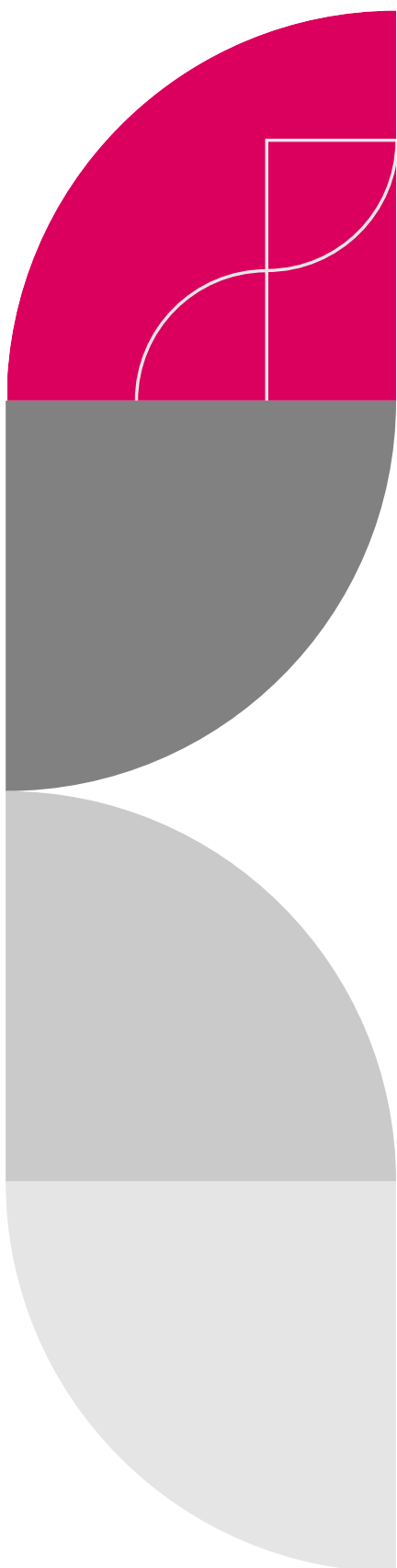
Related trends

Precision Medicine, CRISPR and Advanced Therapies

Technologies that will change our lives. Science and technology for good

RNA-based drugs and vaccines and gene editing

6

How to manage the
Talent of the future

"What do you want to be when you grow up?" This is a question we have all been asked when we were children. The answers were varied, but they all had one thing in common: they referred to professions that we observed around us.

The same goes for today's kids. "Mom, I want to be a *youtuber*," Megatrends 2022 pointed out. However, it is very likely that the same thing that happened to many of us will happen to these children: **they will end up doing a job that has not been invented yet.** They will remember with a smile when they saw themselves as *influencers* on a video-based social network.

What will the talent of the future be like, what will it need, what will leadership be like, what new professions will emerge, how will technological developments affect the labor market, how can companies prepare themselves today to deal with this talent? These are some of the questions that experts and companies are already trying to find out.

What do we already know about the talent of the future?

To paint a sketch of the workers of the future, it is useful to take a look at the certainties we already have in the present. One of them is the talent shortage: eight out of ten Spanish companies say they find it difficult to find workers with the skills and competencies they need.

That shortage explains several trends in the labor market. One, there is a gap between what talent has to offer and what employers are looking for. Two, companies are increasingly **struggling to retain and attract talent**. And three, those same companies are increasingly looking abroad for the talent they lack.

Our experts respond to the skills gap with more training. Alper Utku is, in fact, committed to making it permanent: *upskilling* and *reskilling*—that is, training to improve and add skills—will be the norm throughout one's working life. And it will be especially important to acquire the professional skills that cannot be automated.

As for the other two trends, they speak of the need for new leadership to help retain talent that will be increasingly diverse. A fluid scenario that companies (and their leaders) must know how to navigate.

Leading the talent of the future

In the future, hierarchical organizations will be history. The chain of command will change: it **will no longer go from top to bottom, but from side to side.**

Pamela Mead mentions that the new generations are already demanding lateral leadership. This leadership style is built on the ability to establish partnerships and negotiate among peers. These are two essential skills, as companies will establish relationships with very diverse talent, from digital nomads to employees from different backgrounds, genders and personal situations.

Jane Piper also believes that new leadership must focus on greater empathy. By understanding the barriers and difficulties encountered by professionals in performing their work, it will be easier for the leader to propose appropriate solutions. In this context, it will become increasingly common for companies to incorporate a comprehensive mental wellness strategy.

Increasingly, employees are looking for empathy, sympathy, complicity and understanding. They also want to share values with the company they work for. Companies that want to attract and retain talent must be able to connect with employees who want to feel part of a shared vision. As Tammy Erickson says, "you have to create an environment that people choose to join".

Related trends

Automation everywhere and talent of the future

Sustainable business models

Innovation, technology and new generations

07

Educational models

For today and tomorrow

Alper Utku said that educational institutions will face the challenge of teaching skills that you don't know you will need for jobs you don't know will exist.

With this paradox in mind, the education system is transforming. This is the **paradigm shift in education** identified as a Megatrend in 2022, which is occurring in response to a world of explosive change. It is about building educational models for today, but also for tomorrow, even if that "tomorrow" is not yet clear.

No lectures, no books

We have already discussed how, today, foreseeing future professions and prepare young people for when those professions exist is more important than providing formal education. **Problem-based learning** is one of the most widespread approaches.

At the London Interdisciplinary School there are no lectures: students only learn to solve problems related to different areas of knowledge at the same time. At Tokyo International School there are no textbooks: students investigate problems posed to them based on questions.

These are more flexible, liquid educational models that focus on enhancing skills, as proposed by Megatrends 2022.

Closing the gap with the company

If we want the education of the future to be effective, we must overcome a significant hurdle: the gap between what companies demand and what universities offer. This means developing agreements and learning models that encourage such collaboration.

Learning-by-doing is a good example of what educational institutions are already doing in this area. This methodology seeks to expand experiential education. **Students learn by experimenting in a real environment,** often through gamification and project-based learning. Working on real projects helps them to give meaning to their work and to motivate themselves.

Proposals such as the CODE University of Berlin and the **Tech Transfer** program of the Bankinter Innovation Foundation respond to this need to ensure that students and employers speak the same language.

Students at CODE University in Germany work hand in hand with companies on projects with real customers. They also help them to analyze and solve problems. On the one hand, students develop skills they will need in their future work in a motivating environment. On the other hand, companies gain access to talent trained in solving real challenges.

Digital-first in a hybrid environment

The adoption of technologies must contribute to making education more flexible. In an increasingly hybrid environment, the *digital-first* approach is gaining ground. By reducing the costs and constraints associated with brick-and-mortar facilities, access to education will become more universal.

Students at Morehouse College (USA) already attend classes in the metaverse. They take their History lessons on battlefields, travel inside the human body to explore it or experiment with molecules in three dimensions in chemistry courses. These metaverses are the natural evolution of digital campuses.

Educational content will also evolve, according to our experts. Thanks to its generation through artificial intelligence and new forms of human-machine interaction, **it will be easier to develop content tailored to the learner.** All this, in an educational environment where immersion and emotion will be key.

Related trends

Educational models for today and tomorrow

Learning-by-doing

Digital-first education

8

Sustainability

Energy for a net zero future

"Are we on our way to a zero-emissions world?" This was the big question posed in Megatrends 2022 on a key issue to mitigate—and adapt to—climate change.

The report highlighted the inaction of some relevant actors in the energy transition and the fight against climate change, in contrast to the increasingly relevant role of individual action in this area.

Then, an event woke up many of these major players who, until then, **had been dozing on the net zero target.** The war in Ukraine spurred countries' concern for energy security and, with it, investment in renewable energy sources to reduce their dependence on imported fossil fuels.

An unexpected change in the geopolitical situation revolutionized the complex global energy system. It did so by accelerating one of the pillars needed to build a net zero future, according to one of the latest Future Trends Forum reports: the shift from fossil fuels to renewable energies. The results were not long in coming.

The decisive *boom* in renewables?

The IEA's *Renewables 2022* report shows how the global energy crisis is accelerating the installation of renewable energy in unprecedented ways. Companies and governments have moved quickly to replace gas imports from Russia with alternatives that reduce their dependence on foreign energy.

As a result, the IEA forecasts that, in just five years, as much renewable energy generation capacity will be added globally as in the previous 20 years. Already by early 2025, these energy sources will replace coal as the main source of electricity production.

Will this be the decisive *boom* in renewables? Will this acceleration lead us to a decarbonized energy system that will help limit global warming?

The challenges of net zero energy

In the formula for this clean, inexhaustible and massive energy that will help us to tackle climate change, there are several variables that need to be cleared up—testing new renewable energy sources being a major one.

Advances in nuclear fusion and the interest of startups in globalizing geothermal energy bear witness to this. In the case of nuclear fusion, the Ignition Facility (NIF) at Livermore National Laboratory (USA) claimed to have produced for the first time more energy using this technique than was consumed in the process. Although large-scale utilization is still a long way off, it is a promising step.

Even the decarbonization of sectors that are difficult to electrify is being pursued through storage vectors capable of bringing clean energy to industries. Green hydrogen is the great promise. And it seems robust: Germany has already announced its intention to connect to the H2Med European hydrogen corridor, an underwater hydrogen pipeline that will link the Iberian Peninsula with the rest of Europe.

However, producing and storing clean energy will not be enough to enjoy its benefits. **Technology must be scalable and competitive**, it must be distributed efficiently, financed, and we should even move to capture the carbon that will continue to be emitted by fossil fuels in the coming decades.

This environment is causing a shift towards more efficient models of energy production, distribution and consumption. Trends such as the Internet of Energy, the increase in distributed generation and self-consumption or the tokenization of green energy are witness to the fundamental, permanent changes to our relationship with energy.
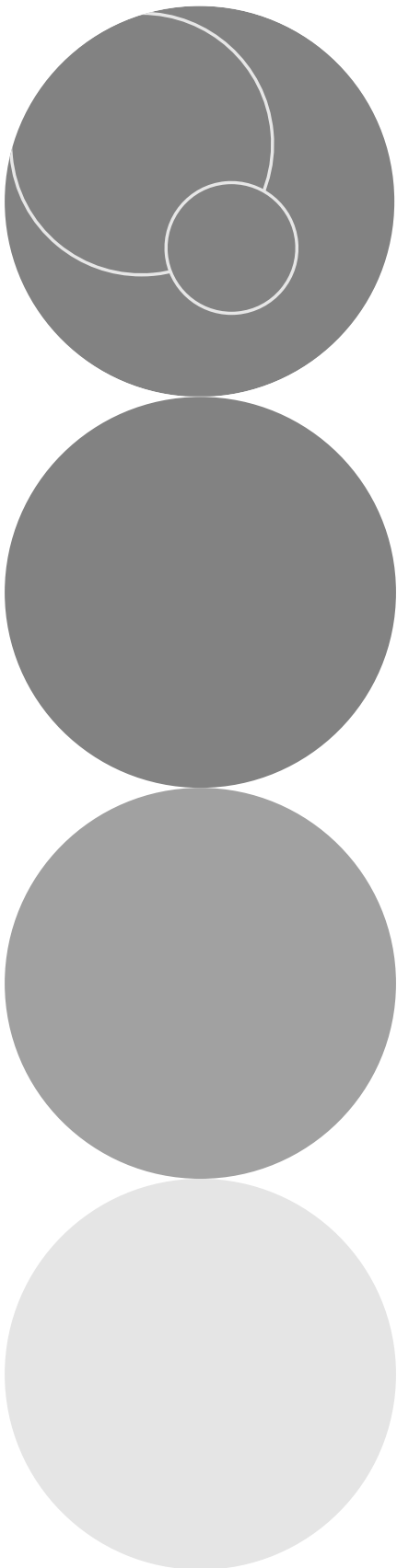
Related trends

Decarbonizing energy and energy transition

From mitigation to adaptation to climate change

Sustainable business models

9

Exploring space

To improve life on Earth

The answers to humanity's great questions have always been sought by looking at the sky. Not in vain, it was Galileo's eyes glued to a telescope that, more than 400 years ago, changed our notion of the world. The Italian scholar found in the sky a new way of understanding life on Earth. Before him, Copernicus, Ptolemy and Aristotle had already sought answers there, with the naked eye.

Several centuries of scientific and technological progress later, we are still searching the skies for ways to improve our life on Earth with one advantage: we can now **access space and we do so in an increasingly diverse way.**

Today, large space agencies such as NASA are no longer the only ones that can do so. The democratization of access to space has given rise to a growing ecosystem of private initiatives seeking to accelerate its exploration and industrialization.

Economy of space

Technological advances and scientific research are enabling the commercialization of space, the subject of one of our reports. Space exploration has become a standardized market in which government, industry and universities coexist.

This trend has led to a change in the model over the last 15 years: governments are no longer the sole providers and operators of space but have become **another customer that orders vehicles or crews**

from third parties. This diversification of demand is, in turn, driving the development of technology and, with it, space exploration and research itself, as pointed out by experts such as Jeffrey Manber.

In the new space economy, titanic projects by large government agencies coexist with small—but pioneering—private initiatives. In 2022, NASA's DART spacecraft demonstrated that it is possible to deflect the trajectory of an asteroid weighing more than 1,000 tons. And then, the James Webb telescope showed us a universe never seen before.

That same year, Michael Lopez-Alegria's startup Axiom Space took three space tourists to the International Space Station. It was the first fully private mission to get there.

A virtuous circle

The trend toward privatization and public-private collaboration in space is a virtuous circle. As governments behave like customers, private initiatives and private investment flourish.

This will be, precisely, the pattern that will set the pace for the future of space exploration. Experts estimate that there will be private international stations in five to ten years, where public agencies and organizations will be just a few more clients.

Until then, the ecosystem is promoting initiatives such as factories and space laboratories to develop experiments in microgravity or build tools for astronauts. Then, there is the logistics that these facilities will need: the Spanish PLD Space will launch in 2023 the Miura 1, **a micro-launcher that will pave the way for commercial launches to** carry satellites or cargo into space.

Here on Earth, people are also figuring out how to take advantage of what comes from space. For example, startups applying artificial intelligence to satellite data to fight climate change or researchers exploring Big Data omics to understand how microgravity can help us fight cancer.

Will we be able to stop disease thanks to a space laboratory? Will we bring resources from the Moon that are scarce on Earth? Only time will tell, but some people are already looking to the sky for answers.

Related trends

Spatial competence

The power of startups in value creation

Space technology

10

Metaverse and Web3

Are we ready for virtual worlds?

It is a pattern that is often repeated when bold technologies appear. A cycle of excessive expectations followed by disappointment for not meeting them and **a landing in reality**. Whether a disruptive announcement becomes a massive success, a niche curiosity or a flop is up to reality alone to decide.

Are we excessively optimistic?

That sequence is exactly what is happening with the metaverse and Web3. The hype caused by both in 2021 was followed by their cooling off in 2022.

The disappointments continue in 2023: Microsoft has decided to close the unit in charge of contributing to its metaverse.

However, there are those who remain confident in this technology. Mark Zuckerberg expects his investments in the metaverse to bear fruit in about ten years. Then, says his CPO Chris Cox, **walking with friends in virtual worlds** will be as natural as it is today to call them on the phone.

Many metaverses that will form a metaverse

Today, rather than talking about a single metaverse, we refer to different metaverses. Universities, companies and major technology companies are already experimenting with their own immersive worlds. They are serious about it: between 2023

and 2024, Google, Apple, Samsung and Meta are expected to present virtual reality glasses for *early adopters* to jump on.

We have already explained how, in order to navigate between metaverses, their interoperability must be promoted. This is the key that will allow us to **move from one environment to another without having to stop every now and then** to authenticate ourselves, exchange virtual currency or scrutinize what they intend to do with our data when we cross a virtual street.

Whether the metaverses will coalesce into a large, mature metaverse with a sufficient number of users, or whether they will remain an isolated and addictive experience for a few will depend on it.

Cybersecurity—as Megatrends 2022 anticipated—will be essential to achieve interoperability. And the solution lies in the technologies behind Web3.

The portfolio controls itself

What we know as Web3 is based on a series of technologies built on blockchain protocols, which support the development of a decentralized web and allow users to control their own identity, data and content.

These technologies will help us keep our identity (and our wallet) safe as we move through different immersive, decentralized and interconnected virtual worlds. We won't need to reach for our wallet from time to time to check that it's still there. The technology itself will take care of that.

It seems only a matter of time before Web3 and metaverse take off. Megatrends 2022 already pointed out that both are part of the evolution of the Internet.

These are two complementary ways of **conceiving the Internet of the future, more decentralized and immersive,** which aims to give power back to the users. Are we ready for it?

Ready for immersion?

Interoperability between metaverses raises other questions. It is one thing to create virtual worlds in Roblox and quite another to **walk through a parallel, immersive world available 24/7** in which we can work, study, shop or have fun. How will this affect flesh-and-blood society? And our lives?

What's more, Web4 is already in sight in the evolution of the Internet. Here, the user experience will be at its best. Saying "I want to order a cab" will be enough for a vehicle to come and pick us up. We won't even have to call.

This tendency to erase technological friction will further blur the boundaries between the virtual and physical worlds. So will the differences between our real and digital lives. Are we ready for this level of immersion?
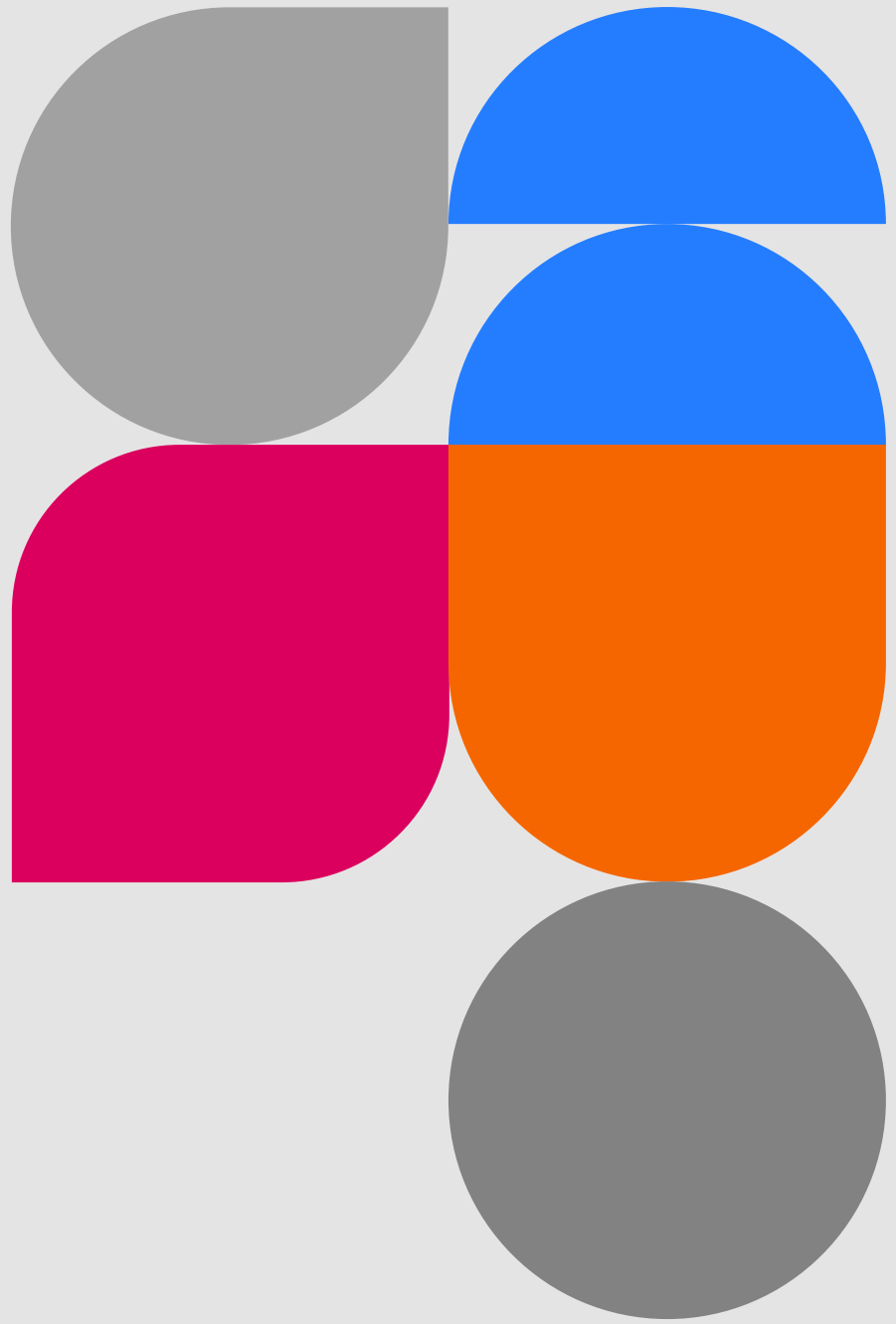

Related trends

Metaverse and Web3

The fragmented Internet

Sovereign personal identity

Editorial

2023

A year of grounded expectations

Today, the only constant is change. This was anticipated by Megatrends 2022 and has been confirmed over the past year. Just as we were beginning to settle into the *new reality* after two years of vertigo, the war in Ukraine shook the world order and, with it, the global economy.

This disruptive succession—to which we have grown comfortable—pervades everything. Innovation too: in 2022, surprising discoveries were interspersed with novel applications of technologies that had been years in the making. What they all have in common is the excitement they generate. And 2023 will be the year in which these expectations must begin to be realized.

Which of these trends will shape our future and how will they change our world? Through the **Future Trends Forum**, the experts at **Bankinter Innovation Foundation** identify the most important trends in each area to help us answer these questions.

The analysis of these trends shows us a future in which **education** will increasingly dispense with lectures and books. Universities will liaise increasingly smoothly with companies that will manage their future **talent** based on empathy.

At Bankinter Innovation Foundation we also see a horizon in which we will interact with machines in a more fluid and intense way, thanks to advances **in artificial intelligence, metaverse and Web3**. In a context in which even our daily **mobility** will depend on this interaction, **metadata and cloud** will be key to cement it on principles of transparency, privacy and security.

Technology will also help us to **enhance our human capabilities**, challenging the traditional concept of body and mind. Meanwhile, **precision medicine** will advance to offer increasingly personalized treatments. Increasingly efficient energy models will help us meet the great challenge of **sustainability**: building a *net zero* world.

All these trends leave questions hanging in the air. In 2023, we'll be looking for the answers with the help of world-class experts. Ready for the future?

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