ENGINEERING
THE DIGITAL TRANSFORMATION COMPANY

METAVERSE

TREND RADAR

FROM DIGITAL ECOSYSTEMS TO METAVERSES

TR METAVERSE

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CHAPTERS

“The current wealth of opportunities that advanced technologies provide enables us to imagine today our near future. We have been studying and developing this future to make it real and tangible, today. To build solid foundations for businesses to evolve upon. The Metaverse is part of this future and will likely transform the way we interact, through full immersive experiences that point towards a new digital economy.

Maximo Ibarra

CEO & GENERAL MANAGER

ENGINEERING

What is it?

First things first: it does not exist yet. It is a potential evolution of the Internet and of Digital Ecosystems as we know them. A virtual and immersive space where people will interact.

Instead of scrolling through pages and pages on the internet you will be immersed in it, using VR Headsets, AR glasses, Mobile Apps and other devices.

It could also simply be the space where digital and physical meet and blend. An evolution of every time you look into your phone to read an email, send a message, talk to someone, buy something, plan a trip or simply listen to music or have fun.

Today it exists only as a concept, imagined decades ago, that is now an evolving trend. Powered by data, XR, Blockchain, AI and a hunger of new human experiences.

At Engineering we have been studying and working on these trends and technologies for some time now.

META
BEYOND (TRANSCENDING) THE UNIVERSE
An immersive digital world for human leisure and work.

UNIVERSE
UNUS plus VERSUS
Everything headed in the same direction.
The totality of Matter, Energy and Space considered as a whole.

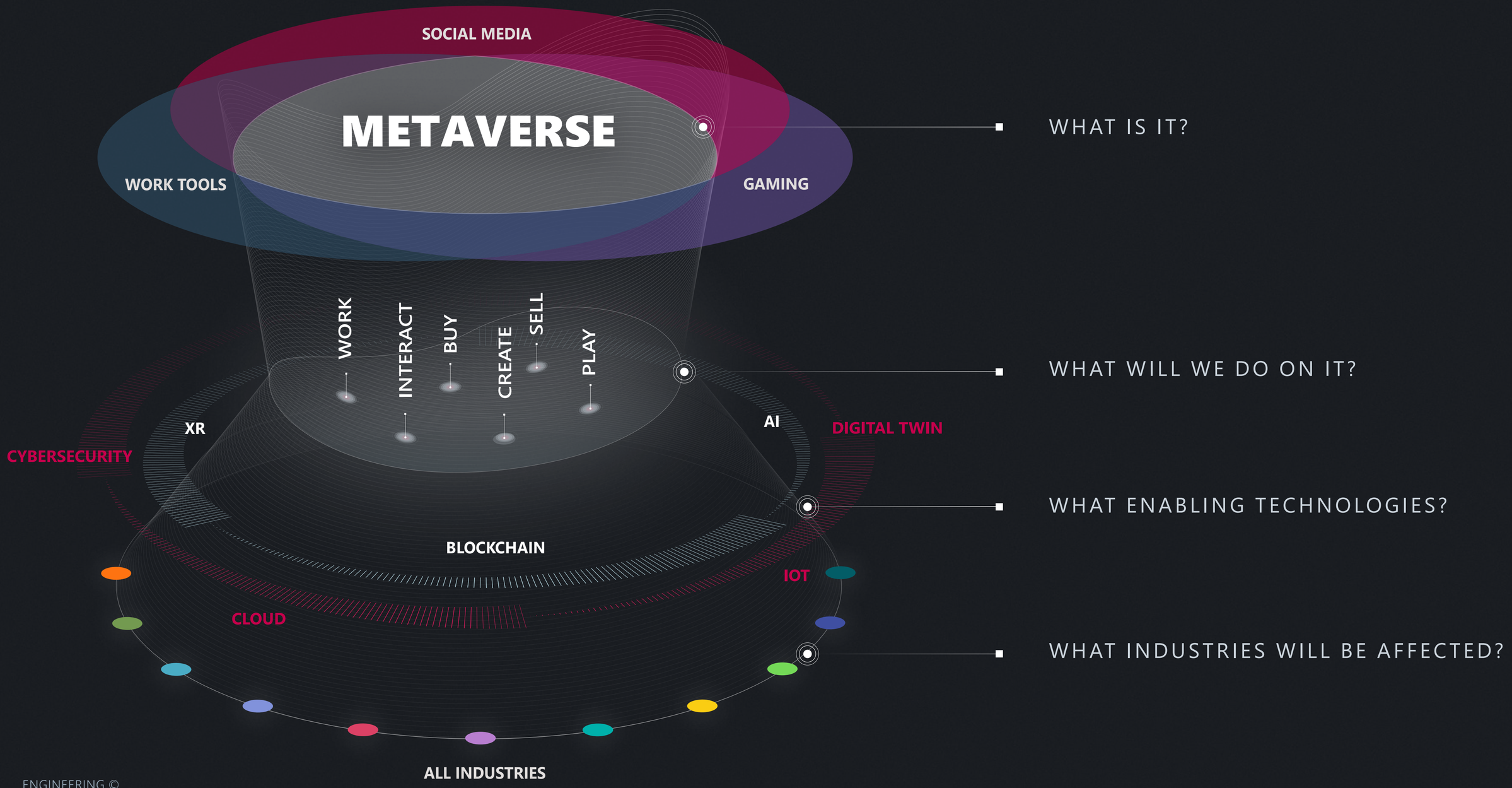
What will we do on it?

There is nothing terribly new about this concept. We came across it in Cyberpunk literature, then Sci-Fi movies and saw it taking form somehow (remember Secondlife? Or think Minecraft or Roblox). We even had a taste for a Digital Good hype a few summers ago (remember the PokemonGo craze!). Today NFTs of online art and digital property land grabs are making headlines on mainstream media as some companies jump the gun to get in ahead of the crowd.

We'll walk around, meet people, attend business meetings or concerts, enter shops, try on clothes virtually. Access or create digital services and goods, including digital property and art.

Create, Buy, Sell, Earn, Play, Work, Interact.

Currently, various companies are working on varying visions of what their Metaverse should look like and generally their focus is on their core business (socializing, playing, working). We can imagine the impact it could have on other industries, like education or healthcare for example, leveraging XR, IoT and wearables to enable remote consultations, research and unleash the power of quasi-infinite data and knowledge. Infinite data points to understand, predict and prevent events. There will be many Metaverses, each tailored to specific interests, but necessarily as usage matures, they will have to connect and interact.



What are the Business Implications?

Most organizations are already today witnessing how Digital Ecosystems are reshaping the world, composing solutions, combining experiences from different verticals and offering agile and tailor-made digital solutions and experiences. It is not far-fetched to imagine that the Metaverse is an evolution of this trend.

So, if Digital Ecosystems are still at an infant stage, greatly hindered by legacy technologies, lack of common standards and struggling with data privacy issues and security issues how realistic and viable is it for businesses to invest in the Metaverse today?

Here are some questions you no doubt are asking yourself:

1 Is this a hype or is it happening for real?

Hard to answer that today (it's probably a bit of both) but there are enough elements to start thinking critically and strategically on what posture you and your organizations should take. We believe two main factors contributed to this massive current visibility (of a "not so new" concept):

A

Covid sped up all transformative trends (see: The New Normal), and particularly digital transformation, forcing most of us, for nearly two years, to work digitally then purchase digitally and have fun and socialize digitally. This in turn forced companies to start engaging their clients differently, across multiple platforms and even beyond their typical reach. The appetite for a virtual world has increased and organizations are searching for new revenue streams, exploring new business models, enabled by the level of maturity and composability advanced technologies are providing, leading to a true Business transformation. All businesses are looking at other verticals to understand what trends, technologies and habits could be adopted to innovate the way they interact with their clients and partners.

B

Facebook and Microsoft announced their own specific Metaverse projects and related acquisitions. These two mega players have enough media clout to create a trend but ultimately, they are both exploring the evolution of their business. Retailers, Financial Institutions, Media Companies are all exploring this trend and launching projects.

2 Is this a natural evolution or will it be a cultural revolution?

There is an interesting thought trend that says that innovation is a prisoner of the limitations with which today you imagine your future.

A self-fulfilling prophecy of sorts. This leads innovations to be mostly evolutions. Today we are faced with great and unprecedented issues (Global Warming, Over Population, the ethics behind AI) but there are tools and technologies that can enable us to think and create in a way it was impossible to do so before.

Is this a time in which we should we re-imagine the future due to these new technologies?
The Metaverse could certainly be an evolution of the internet (buy, sell, meet, work, browse, socialize) but it could also be the basis of real revolution that could, in its most positive vision, provide a solution to issues of pollution, production, overcrowded mega cities, under developed corners of the world, all the way up to the fields of medical and scientific research. If the Metaverse remains linked to playing or working or socializing it may not have a big enough impact to be a revolution. If it manages to tap into something deeper, fulfilling deeper needs and wants then it could be a truly transformative force. Time will tell.

3 Is this the future of work or of leisure?

The Digital Transformation we are living in has completely blurred the line between private and professional domains. Work tools and leisure tools often are the same. The Metaverse could contribute to further join the dots combining elements of Digital Workplace to those of Digital Citizenship to those of Wealth & Commerce as well as Gaming and leisure activities.

The question remains as to which forces will guide this trend: Gaming, Business or Social? Will Hardware (Headsets, Wearables) evolve to sufficient levels of sophistication to fully support the advancements of Software?

We are 30/40 years into the Internet and we are still not grasping its full potential. We are still talking about Digital Divide within some of the world's richest economies. Like all tools, rapidity of adoption may deviate the way it evolves into mainstream usage.
A mature Metaverse is still far away and it is not clear today if this will be the evolution of digital human interaction (be it work or social) or of human leisure time (media and gaming).

4 What Industries are going to be affected?

Covid proved that organizations that struggled to digitalize their output suffered the most. Survival in the future seems to be intrinsically linked to the capability of delivering value digitally.

All organizations are focusing on the space where online and offline meet. We have seen this in Retail, Telco/Media at the forefront of this new era. But they are not alone. Digital Twin, AI, IoT e XR technologies are already revolutionizing Manufacturing, E&U and Transportation. Tech enabled business meetings, virtual classrooms, concerts, events and even digital medical surgeries are common knowledge.

Governments and Financial institutions are already focused on evolving the way they interact with citizens and clients but they will also be called upon to regulate this area. Digital identity (and citizenship?), taxations, security issues, value transfer. From new digital payment services to new business models there is potential for a complete overhaul of the way we do business. New Blockchain evolutions (NFTs) highlight potential new economies. With many businesses still struggling today to join the digital economy (as opposed to digital native companies being founded every day). Will they be able to perform this double jump into the future? Or could this be the end of them? Potentially all industries could be affected but digital transformation is still a hurdle to many.

5 What's the business case?

It's complicated to build a business case in a scenario where most of everything is still missing. Technology has made huge steps forward, but it probably is not at a level of maturity and adoption in all its necessary components yet (think about the headsets but also). There are still huge unexplored areas linked to Privacy, Data security, regulations. The millions of potential users are still mostly that: potential. The elements are here but their final combination is still to be seen. Those who believe this will be the future of internet, and as such, a huge part of tomorrow's digital economy are investing heavily on this. Those who view the Metaverse as a potential evolutionary alley for their activities should consider launching exploratory projects, leveraging recent experiences and technology advancements through partners, such as ourselves.
We believe frontier research should be continuously performed in order to gain knowledge, skills and insight, ahead of the curve, so that you can leverage when the time to accelerate becomes mature. This could be a good moment to start testing out these new paradigms as research projects to be battle fit down the line. Two fundamental questions may guide you at this stage: Is this investment worth the effort today (ie. Will the impact it has on my clients justify the effort it will have on my organization in terms of investments?) and Can I afford to ignore this (ie. Decide to not build an opinion/position on this trend). It will take a mix of balancing out the tactical approach to a more strategic approach, examining this as a lasting trend and studying how to best benefit from it.

6 What ESG Impact?

Core values have changed, Covid accelerated this trend dramatically and today investors, clients, citizens increasingly scrutinize sustainability and viability when making their decisions.
The Metaverse (or the Metaverses initially) will require massive computing power, stressing power and connectivity capabilities. However, a balance, that may be elusive initially, may be found if this leads to the full realization of Digital Transformation: a more sustainable way of living, working and producing.

A true revolution of working methods, reducing commuting, urban concentrations, potentially revitalizing depressed geographical areas, decreasing consumption of physical goods.

The Metaverse could enable a more balanced lifestyle ushering in a digital renaissance of sorts. Then again it could further alienate us one from another. As business sustainability and ethics are increasingly rising in the consumer choice radars, Businesses will have to try and understand what their footprint in the Metaverse will be and what actions they need to take to rebalance it.

Ultimately digital transformation, and business evolution, are closely linked to improving the world we live in and how we interact with it and each other.

Key Technologies and Trends

We are able to imagine the Metaverse today thanks to the maturing and increasing composability of the Digital Enabling Technologies at our disposal today.

The Immersiveness of the Metaverse is and will be linked to hardware objects and software that all make up what we call Extended Reality (XR) technology, such as Augmented Reality (AR) glasses, Virtual Reality (VR) Headsets that are already being used from Gaming to industrial Maintenance activities.

Blockchain technology is fast approaching its definitive coming of age, and consequent rise in trust, as years of experimentation are finally demonstrating how best to deploy this technology. Digital currency and value are linked to Blockchain technology as they guarantee unique transactions where virtual goods and identities can be purchased and exchanged across platforms. Among these, NFTs (Non Fungible Tokens) are considered to be the foundational element of the Metaverse economy. They enable a true market of digital assets within a virtual world where it is hard to define ownership and distribution rules.
The explosion of NFTs is considered to be the point of contact between the everyday world and cryptocurrencies. Among these a new paradigm of Decentralized Finance (DeFi) is arising. This, combined to the new decentralized version of the Web (known as WEB 3.0) enables user experiences that rely on distributed databases and distributed digital identity management systems as well new forms of communication.

These Metaverse “must have” technologies are all still facing issues though as they evolve towards maturity (think of the need for Energy linked to Blockchain, or the relative cumbersomeness of headsets that can induce nausea and are still limited in terms of mass adoption).
We expect to see many different Metaverses but in the long period the need and desire for interoperability will push these digital universes to connect. Common standards and interoperability are already today one of the main

Technology evolved from letter to voice, from voice to video and on to immersive meetings.

objectives of various international efforts (we are directly involved with agencies such as EIT Digital, IDSA - International Data Spaces Association, GaiaX in an effort to overcome this) powering up Digital Ecosystems. We expect these issues to be overcome in the coming years. By then widespread Cloud Computing (and the opportunities provided by 5G and Edge Computing), will guarantee scalability and flexibility. As all these trends converge, the mature Metaverse will begin to take shape.

A virtual world, with digital currencies and digital identities has been described as a potential Cybersecurity nightmare. No business transformation can happen without Cybersecurity being closely aligned. The need to ensure security and reliability will be fundamental to see widespread business adoption.

Finally, the technology that will be at the core of the Metaverse, creating and manipulating our virtual experience, will be AI. It is the combination of XR technologies, Blockchain and AI, underpinned by Cloud and Cybersecurity are what are allowing us to imagine this future.

Understanding how these technologies are evolving today, exploring new ways of combining them, co-designing solutions and products, combining deep industry knowledge to technological skills and awareness are a first step into sketching out what opportunities may lie ahead. For some time, we have been advocating the importance of giving equal importance to functionalities as well as to usability. We have come from decades of human behaviour bending to technological limitations.

Digital is reversing this trend and we need to adopt human centric design principles when building these new digital assets.

How Can We Help?

Engineering is an ideal partner to explore Metaverse-oriented Digital Transformation scenarios, because we combine our ability to research and plan how most advanced technologies will be deployed in the future with our in-depth knowledge of business objectives and processes across all the industry verticals where we operate.

Our ecosystem approach aims to provide a digital evolution to every aspect of our life and improve it: Digital Citizenship, Mobility, Energy Resources & Sustainability, Wealth & Commerce, Wellbeing. We are engaged in research and development with some of the most important international research groups internationally and contribute significantly to the advancement of new technologies. We study these technologies long before they become “mainstream” and have accumulated knowledge, skills and use homes that you can leverage to accelerate today.

A Selection of Our Experiences

We have been working on immersive and virtual environments for over two decades. Our first real "Metaverse" project dates back to 2016 when we designed the virtual space to navigate and enjoy the services of one of Italy's leading players in the Telco & Media sector. A VR headset (but also AR Glasses as well as screen) enabled you to explore 3D environments where you could browse through various media catalogues (music, films, games) across multiple third party platforms and buy the contents.

#

Click on links to find out more about these projects and solutions and the results obtained.

But the decisive acceleration towards the virtualization of our experiences certainly came from the Covid emergency.

Right from the start of the pandemic we collaborated with our clients to deliver quick and effective solutions (read The New Normal) to deal with the emergency, across all verticals such as Healthcare or Retail.
In these cases we had to balance out the opportunities offered by technological innovation with the level of digital literacy available to organizations.

Hence the choice to use readily available and easy to adopt technologies such as video communication tools. Remote users interacting on digital platforms to perform their tasks… Does this sound familiar? A pre-cursor of what the Metaverse could deliver.

Our Telemedicine solutions such as the one developed for the ASL in Foggia provided continuity to the monitoring and patient visits during the pandemic.

The Chat Boutique app virtualized shopping, recreating the interaction between sales assistants and customers in the clothing industry via 1-to-1 and 1-to-few video calls.

The pandemic inflicted hard blows also to the tourism industry, but some territories turned to XR technology to continue to welcome visitors, even if remotely, and were able to promote themselves in order to earn an advantage when things got back to normal. This is what happened with our Puglia project, a love story.

An immersive storytelling not only showcases the scenery and the tourist attractions of a region, but it can also help to rebuild and transmit its identity and cultural values to improve integration processes.

So Close will encourage local communities and recently arrived refugees to dialogue and share experiences and points of view, through interactive documentaries based on immersive video recordings.

In a similar fashion Urbanage enables simulations and experimentations on virtual representations of our cities (via Digital Twin technology) aimed at redesigning them to better meet the needs of an aging population.

The purpose of enabling the creation of increasingly immersive and engaging audio-visual content inspired Hyper360, a complete set of end-to-end production tools available to filmmakers to make interactive and augmented 360 degrees videos.

But the Metaverse revolution does not only touch the entertainment and retail industries: XR technology has already proved itself to be a formidable facilitator and accelerator of industrial production, maintenance and remote training processes.

Sipario, our innovative self-service, flexible and customizable platform, was created with the aim of building and helping to build Augmented Reality applications for Industry 4.0.

The protection of our physical environment and its sustainability can also benefit from this digital evolution: for example, our research project eDream uses Blockchain and Non Fungible Tokens (NFTs) to enable the purchase and sale of renewable energy produced in excess. Education was another pillar of social life that was greatly put to the test during the pandemic. Together with the University of Tor Vergata, however, we managed to guarantee access to lessons through Virtual Open Days and to promote the university and its spaces through Virtual Tours.

The value chain of all industries will benefit from digital transformation and Innovation. For this reason, we set out to work on interoperable platforms based on Blockchain and NFTs that could become the technological foundation for all industries in all Metaverses. For example, in the DAFNEplus research project we aim to build a platform for the creation and distribution of digital assets such as in-game assets, music and audio, 3D contents and Virtual Reality. At an ever-increasing level of technological evolution, the Metaverse will one day also be able to extend our senses and how they interact with intangible assets.

Virtual Taste is the app created for Vinitaly 2018 that combines augmented reality and virtual reality and adds value to a unique and irreplaceable sensory experience such as wine tasting. Wearing smart glasses, the tasting is accompanied by an immersive 360 ° visit to the vineyards and cellars where the wine was produced, listening to the narration of those who took care of the entire production process.

Virtual MAXXI is the virtual exhibition that cemented this National Museum of Arts as a reference point of the 21st Century in architecture and contemporary art, reaching out to a younger and technologically advanced audience. Extremely valuable and delicate models, built by internationally renowned architects, which could not be physically exhibited, were carefully digitalized into models that can be explored with VR headsets.

Recently due to office lockdowns, in Engineering we held performance reviews using headsets to achieve virtual closeness for these special meetings.

All these elements, combined, sketch out what we can expect from the Metaverse and are all invaluable starting points for organizations who wish to explore how best to harness this technology and imagine themselves in this new virtual Universe.

Watch Teaser

How Will it Evolve in the Future?

As technologies mature, they are being combined and used to build the foundation of this concept called metaverse. An immersive evolution of the great digital ecosystems we are building today: Digital Citizenship, Wealth and Commerce, Wellbeing, Energy & Sustainability. The New Normal and its acceleration to digital was a first step. Our offices, our shopping malls, our playgrounds, have all been digitalized. In the future various types of metaverses, will focus in varying degrees on different aspects of our virtual lives: Working, Playing, Interacting, Creating, Selling, Buying. However if this is to be a significant revolution it will have to meet needs and wants in a deeper way. Imagine a world where education, research, medicine are accessible to all independently from your geographic position. Where XR enables the renaissance of remote areas. Where IoT, Wearables are able to monitor your health and proactively guide you, leveraging millions of data points to assess, through AI, your current health. Where education is collaborative and digital. If this digital reality can be used to deploy the full powers of this digital evolution it will contribute in saving our planet, by improving the way we use resources, perform research, manage access to knowledge and medicine, uniting common interests. We need to embrace this paradigm shift to provide a prosper and sustainable future to the next generations. Market analysts cannot see any type of Metaverse maturity before the 2032. Hindered by obsolete business models, siloed approach, slow adoption of digital technologies, issues of data privacy and security, taxation, regulations. These past years of hyper digitalization of our lives have also highlighted the need for privacy, digital detox of real in person human interactions, a growing interest in taking care of the planet and each other. A shift of underlying core values that will drive business and technology edvolution down new paths. We are currently experiencing a digital evolution that is happening at an amazingly exciting rate. Our current (and past) imagination sketched a future where the metaverse looks like a gigantic digital city or a massive shopping mall with stores, cinemas, gyms, concert halls, restaurants. It may be able to provide a taste of some of the things humans have looked for since the dawn of time: Digital time travel (live in another era), Digital Immortality (interact with digital avatars of lost loved ones), Alternate realities… all the way to alternate nationalities and new business models. The absurdity would be to recreate a digital copy of our real world, with all its limitations and problems. It's time to explore new ideas and imagine a new tomorrow. The future is now. All the best technological revolutions lead to an improvement. It is yet to be seen if the Metaverse will be one of these.

Our responsibility today is to explore the frontiers, advance technology to enable a better and more sustainable way of living. Together.

Key Technology Trends

Total Internet Hits
+70%

XR
+890%
market size growth by 2025
with respect to 2021

Blockchain
$3.1 trillion
business value generated by 2030

Social Media
+115%
over the past 6 years

+23%
social network users
growth by 2025 CAGR

Work Tools
+31%
spending growth
between 2015 and 2019

+44%
market revenue growth by 2025
with respect to 2019

Gaming
+70%
market value growth by 2025
with respect to 2020

Cybersecurity
+20%
year on year

Cloud
+20%
IT & business service revenue
growth by 2025 with respect to 2020

+50%
of IT Spending will shift to cloud by
2025

Data displayed represents our elaboration of data coming from multiple sources (for example: STATISTA)

Engineering at a Glance

40
Offices
Global HQ Rome

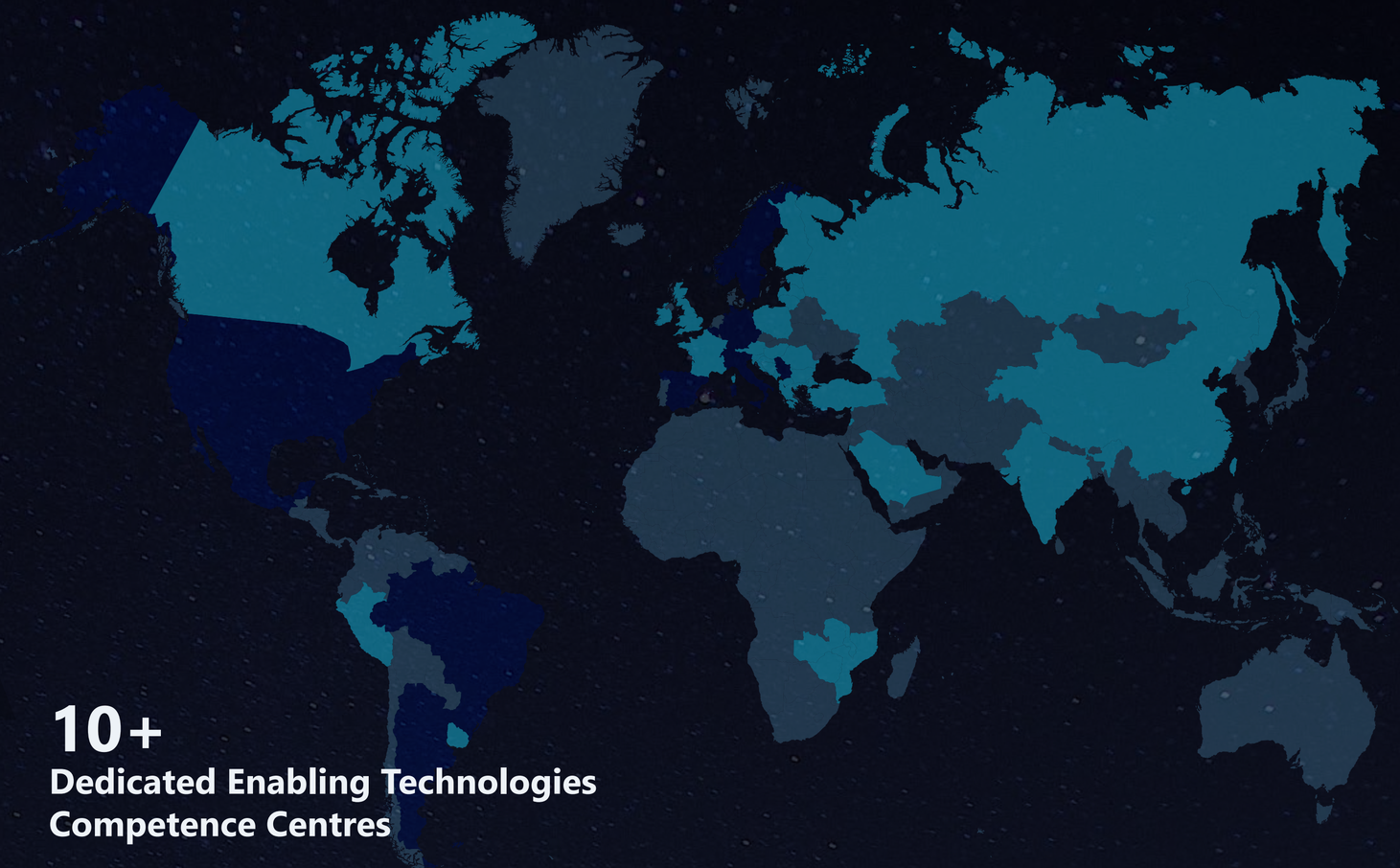
450+
Researchers &
Data Analysts

300+
Cybersecurity
Specialists

300+
Innovation
Network Members

16,000+
Projects/yr

11,600+
Associates



10+
Dedicated Enabling Technologies Competence Centres

UX & XR - Blockchain - AI & Advanced Analytics
Cybersecurity - Cloud - Digital Twin
and more...

PROJECTS
OFFICES

Our papers

Through our Papers, we explore how business and technology meet and evolve.

Corporate

- Digital Ecosystems & Composable Solutions
- Where Business Meets Technology
- Engineering The New Normal
- Engineering Innovation
- Digital Transformation

Our Portfolio

- Augmented City
- Digital Defense, Aerospace & Homeland Security
- Digital Finance
- Digital Industry
- Digital Media & Communication
- Digital Retail & Fashion
- E-Health
- Smart Agriculture
- Smart Energy & Utilities
- Smart Government
- Smart Transportation

Enabling Technologies

- AI & Advanced Analytics
- AR-MR-VR
- Blockchain
- Cloud
- Cybersecurity
- Digital Twin
- IoT - Internet of Things
- Robotic Process Automation

Instant Papers

- Automotive: Digital Sales
- Central Bank Digital Currency
- CRM: Customer Relationship Management
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- Digital Workplace
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