STATE OF PHYGITAL

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2021

Foreword

Physical world around us today is very different from the one 50 years ago – all due to technology innovation. It is hard to imagine how the world will look like in 10 years, though we can make educated guesses based on the technologies that exist today and the trends where we see the tech is going.

Digital has become huge for each of us, but in most cases, it is still separated from the physical world. Digital is tightly intertwined with the physical, you can hardly imagine any physical object operating without a digital component today. However, digital serves rather as an invisible hand, while we believe it should be vice versa – **any physical object from parcel box to largest real estate shall be constructed and utilized in accordance with the digital use-cases that can be applied to these physical objects.**

Despite its rapid growth in recent decades, the digital economy still accounts for less than **6%** of the total economy,[1] while offline dominates heavily. However, with the rise of digital natives we estimate digital will reach at least **50%** of the world GDP within the next **15-25 years** — that's a whopping **$100-200 trillion upside**.

On the other hand, we can see that the digital economy is under a huge threat itself as it will very shortly reach its full capacity in terms of user penetration worldwide. As of Apr 2021, **4.8 billion people** around the world use the internet (**60%+** of population), with **330 million new users** added over the past **12** months[2] (that's **990,000 new users** each day!). In the UK **95%** of population already use Internet,[3] **93%** in South Korea, **90%** in Germany and Netherlands, **86%** in France, **78%** in North America. If this tren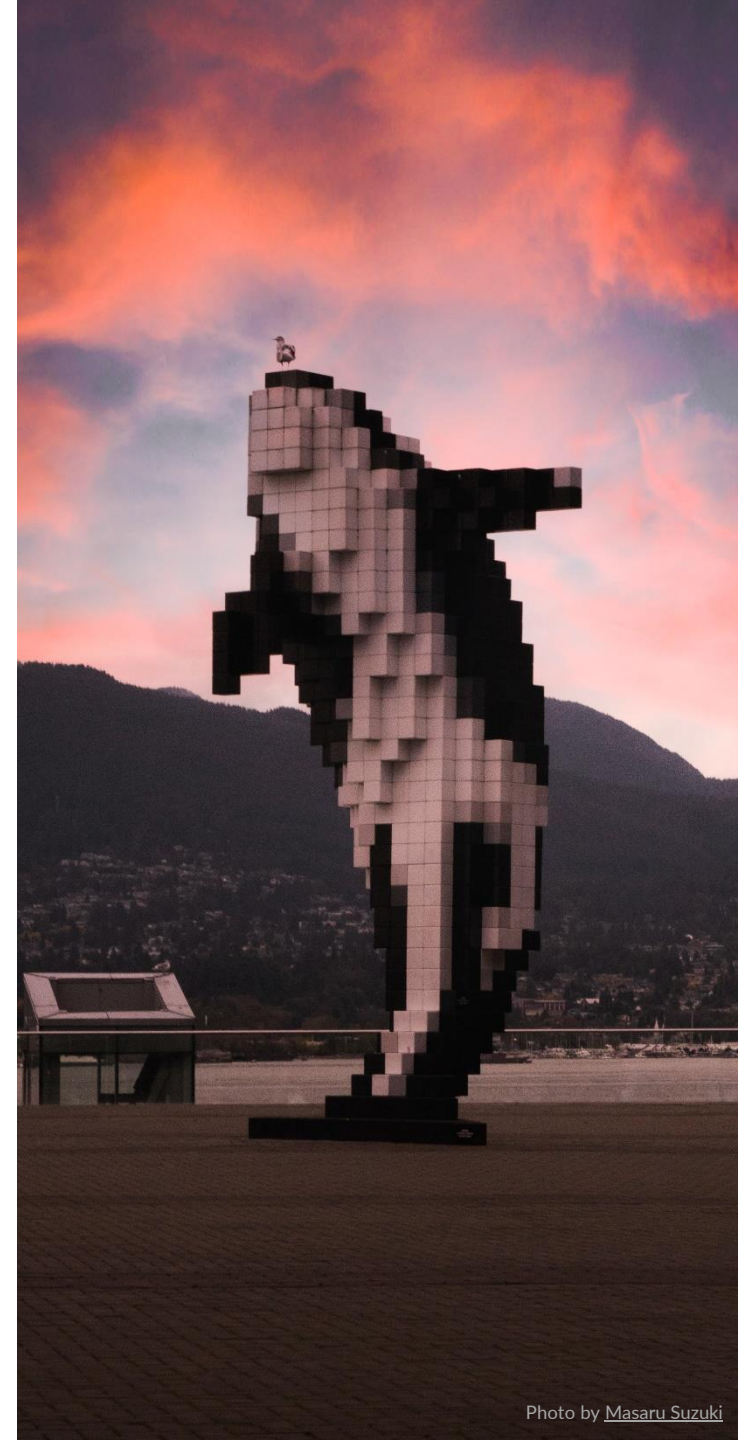d continues, we will have **100%** of the world population using the Internet in just over **10 years**. What will happen then? **The digital economy will start cannibalizing itself unless it expands offline.**

An average global internet user spends almost 6 hours online each day (3.6 hours on mobile, 2 hours on desktop/laptop and 0.7 hours on other connected devices)[3]. Given that on average a person sleeps for 8 hours a day, we have **up to 10 more hours** as an upside to be captured and utilized by Phygital.

We see Phygital as the philosophy of a new world order, where Phygital essentially enables the close integration of the virtual environment (digital) into real human life (physical).

Phygital is an innovation that creates an industry and subsequent new technologies, making it an especially important category. Some innovations are more transient and come and go very quickly, but the ones that really matter are the ones that generate whole new industries.

In this report, we will cover all things Phygital, paying special attention to the modern technology enablers such as Augmented Reality (AR), as well as showcasing the numerous use-cases of Phygital, some of which are already deployed, while others will soon be possible due to innovation in hardware, electronics and software development.

Photo by Masaru Suzuki

The digital economy will start cannibalizing itself unless it expands offline.

Photo by Raychel Sanner

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Photo by Ria Chou

Factors That Facilitate The Paradigm Shift

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We are living in extremely exciting times. Due to a combination of various critical factors that emerged in a single moment in time, we experience an unprecedented level of technological progress as never seen before.

At the same time, **due to the influx of information, most people confuse basic improvements and pseudo-innovation with fundamental paradigm shifts**, missing the broader picture of where we as humanity stand in terms of stages of technological development and what will be next.

While it is widely accepted that we are currently in a period of the "Third Industrial Revolution", or sometimes called "Information Revolution", which started in 1975 with the shift from analogue to digital electronics, **we believe that we have already surpassed this stage and are standing on the verge of the next one, which is Phygital**.

Today's technological and macroeconomic factors that lead to the paradigm shift

wide-spread popularity and access to high-quality engineering education worldwide

Internet penetration

accelerated network bandwidth

globalization and streamline of worldwide supply chain and logistics

rapidly decreasing costs to manufacture electronic components

R&D resources and budgets consolidated within largest corporations and countries

innovation in computer & electronics hardware (microprocessors, semiconductors, quantum computing, optics, storage, mobile & wearable devices, etc)

software development advances

Intensified competition and fight for market share and consumer dollars

increasing demand for tools & technologies that boost productivity, satisfaction and well-being

increased need for means of remote communication and collaboration

raising purchasing power of population and tolerance to adoption of new technologies

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Technological Revolutions: From Agricultural To Phygital

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Agricultural

Industrial

Steam engine

Heavy engineering

Automobile

Science
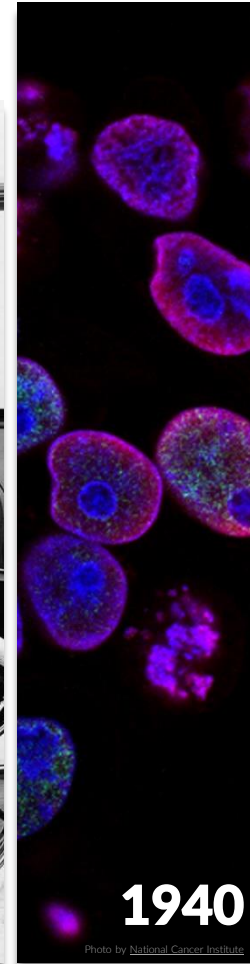
Information

Phygital

1650

1780

1810

1875

1900

1940
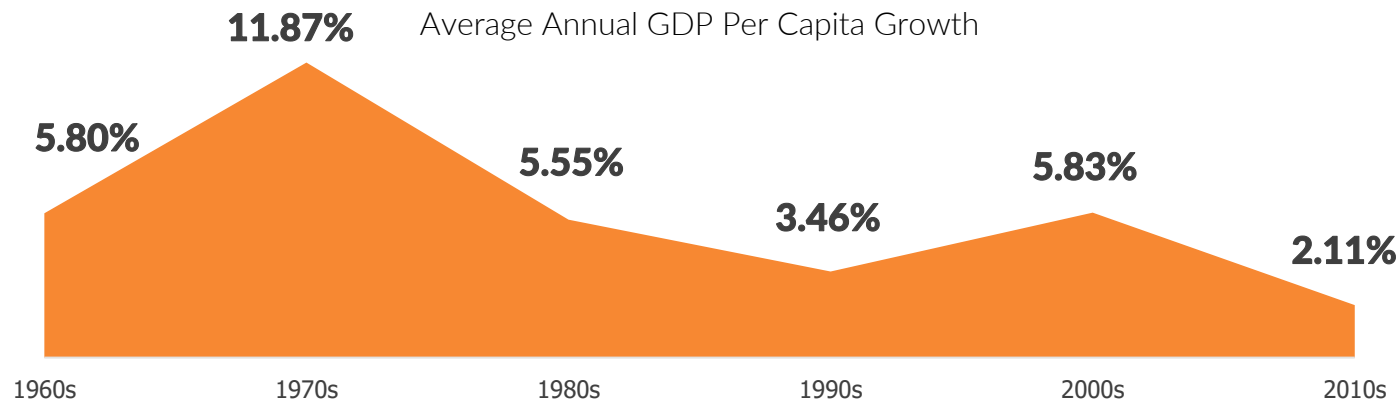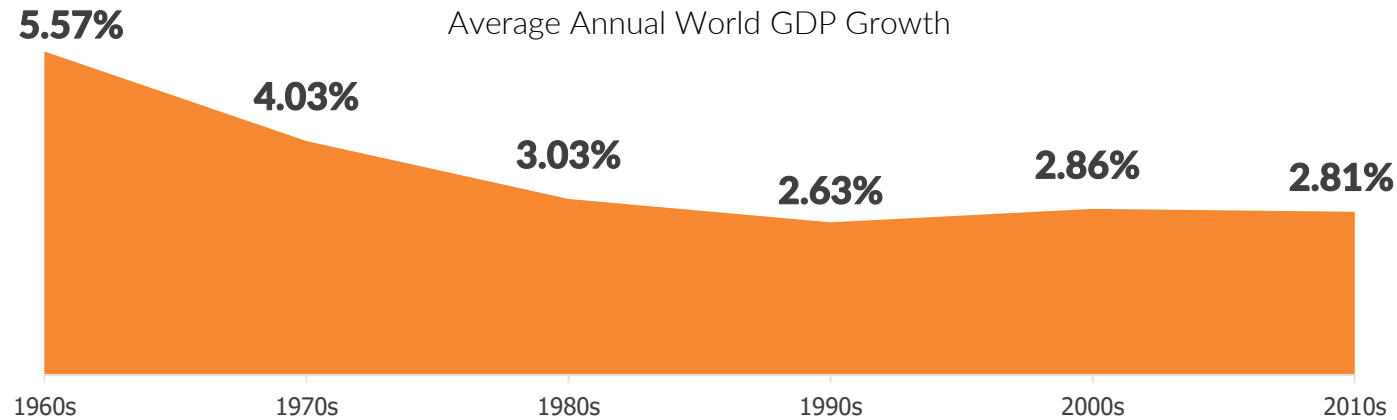
1975

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Phygital is an innovation that creates an industry and subsequent new technologies, making it an especially important category.

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Photo by Steve Halama

The World Economy Is Sick, Phygital Is The Vaccine

Average Annual World GDP Growth

5.57%
4.03%
3.03%
2.63%
2.86%
2.81%

1960s 1970s 1980s 1990s 2000s 2010s

Average Annual GDP Per Capita Growth

11.87%
5.80%
5.55%
3.46%
5.83%
2.11%

1960s 1970s 1980s 1990s 2000s 2010s

Given the amount of technological breakthroughs in the recent decades from IT and biology to manufacturing and science, which are considerably improving the way we work and live, **how come we see the world GDP (one of the major indicators of the world's wellbeing) has been plateauing in the past 4 decades?**[4] (as seen on the graph on the left).

Same goes for **GDP Per Capita — the growth has slowed down in the past decades,**[5] which is quite surprising seeing great developments in almost all aspects of our daily lives.

In order to find answers to the questions above, let's briefly analyze 2 things: what are the largest economic sectors that contribute the most to the growth (or decline) of the world GDP and what is their current respective state?

World's Largest Economic Sectors Status Quo

Financial Services. Between **2.5** and **3 billion adults** transact exclusively in cash, of which **1.7 billion** remain completely unbanked without an account at a financial institution or through a mobile money provider[6]; between **500 million** and **1 billion** people rely exclusively on retail agent network instead of established financial institutions; prohibitive regulation; proliferation of financial crime and fraud (according to PwC **50%+** of all companies globally experience fraud annually, **$42Bn** is the total fraud losses reported in **2020** alone)[7]; existing financial architecture isn't coping with fast transforming economy and business models.

Construction. In OECD countries (leading **38** developed countries) an average labor productivity in construction has been declining since **1987** for **1%** annually (meaning less output for the same amount of work)[8]. In specific construction sectors the decline looks as follows: **-1.2%** in single-family residential construction (RC), **-1.3%** in multiple-family RC, **+0.7%** in industrial building construction. As a result, global need for infrastructure and housing will be hard to meet. At the same time, the sector employs over **7%** of the world's working population.

Commercial Real Estate. If construction productivity were to catch up with the total economy, the industry's value added could rise by **$1.6 trillion** a year. That would meet about half of the world's annual infrastructure needs or boost global GDP by **2%** according to McKinsey[9]. In comparison, productivity in manufacturing, retail and agriculture has grown by as much as **1,500%** since the **1950s**, but productivity in construction has barely increased at all. The industry is extensively regulated, very dependent on public-sector demand, and highly cyclical. Informality and corruption distort the market.

E-commerce. Do you think eCommerce is huge? It has become very important indeed, though it still accounts for only **20%** from total retail sales[10]. What are some of the top eCommerce challenges on top of severe competition, low margins and monopolization of the industry? Logistics, distribution and other offline-related operations, as well as lack of visibility in the whole supply chain, which result in **$1 trillion** loss annually for the whole industry[11]. No matter how much you invest in digital experience and improve your mobile or Web app, when offline simply can't keep up with the increased volumes.

Life and Health Insurance. The World Health Organization estimates a projected shortfall of **18 million health workers** by **2030**[12], mainly in low-income countries, where the majority of population resides in densely populated areas, which might become hotbeds for new deadly diseases and epidemics. All due to inadequate healthcare spend in the past **5** decades, which averaged **5%** of total GDP spend in developed countries (same as for military spend, for example)[13]

Information Technology. Information Technology (IT) has grown **2.5 times** faster than global GDP over the past **15 years**.[14] IT outpaced the value-add contributions of goods-producing industries to gross domestic output for the first time in **2018** and is now on track to overtake services-producing industries which are still dominant.[15]
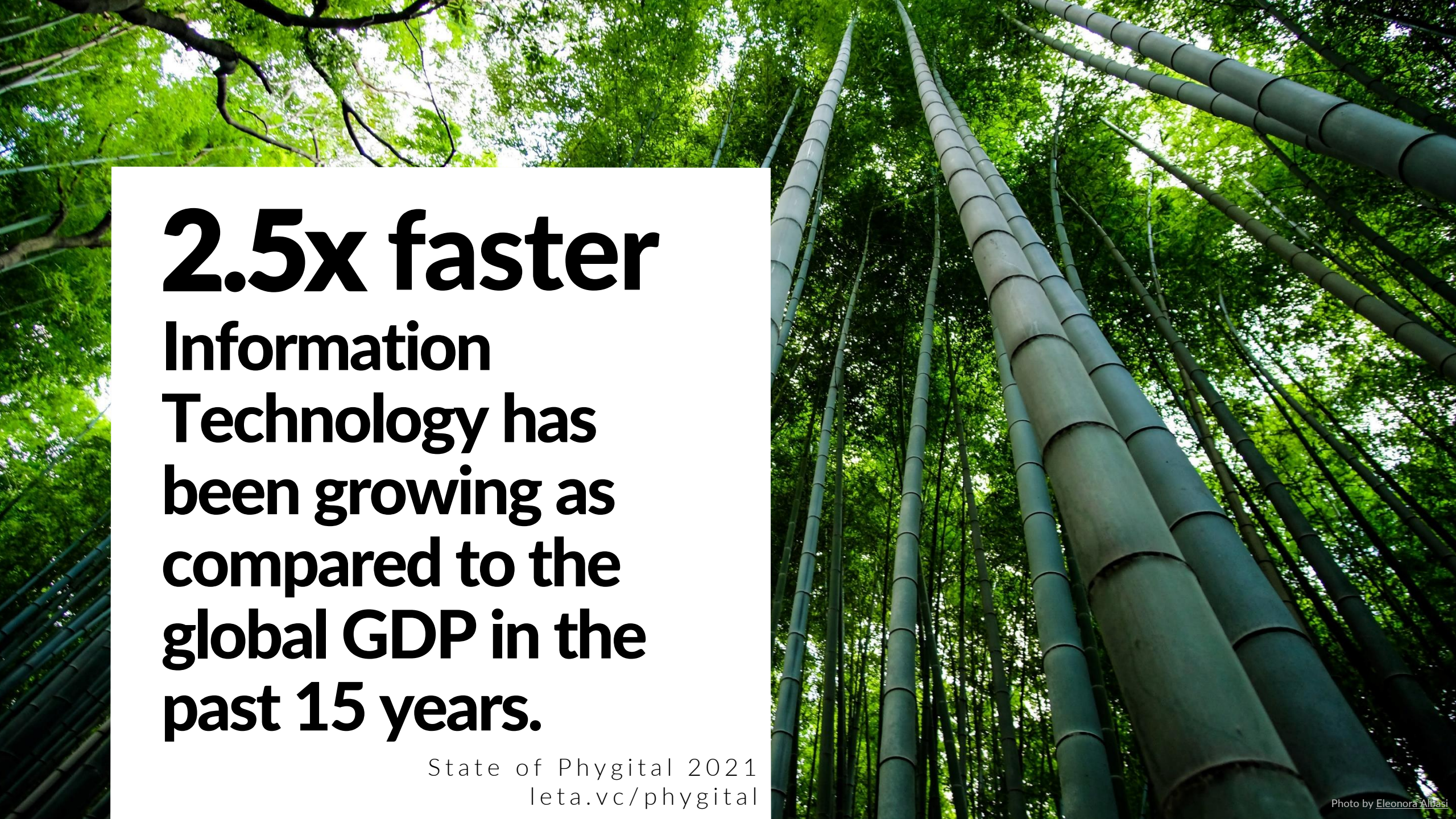
Food Industry. To give you the taste of how bad things have become in the food industry, let us present you just one number as a means of characterizing the current state of food sector: **690 million** — which is the number of people around the world who don't have enough to eat—and the number continues to rise, according to United Nations.[16]

Oil and Gas. With the current speed of global natural gas & oil consumption the gas reserves will last for the next **50** to **55 years** and oil reserves will last for 40 to **45 more years** according to the Energy Information Administration (EIA).[17] The market is likely to continue decreasing due to the growing popularity of electric cars and solar energy.

Automobile Manufacturing. **14 million people** are employed in Europe in the automotive industry, **8 million** in the US, as well as **5 million** in China.[18] At the same time, an industry's current average cash runway of the largest OEMs is less than **2 months** (meaning they have cash on hand for less than 2 months of operating expenses), which is quite horrifying. Such a working capital/liquidity deficit might result in a huge social & economic crisis given the complexity and its interconnections to upstream (e.g. steel, chemicals, textiles) and downstream industries (e.g. repair, mobility services).

Telecommunication. According to EY, telecom industry's revenue between **2010** and **2020** was growing at a compound rate of just **0.4%,** mainly due to OTT players (WhatsApp, Facebook, WeChat) luring traffic away from telcos.[19]

2.5x faster

Information Technology has been growing as compared to the global GDP in the past 15 years.

Photo by Eleonora Albasi

Technological Breakthroughs 1970-2021

To give you a taste of how far ahead IT has gone in a mere 30 years of its existence as compared to hundreds and even thousands of years of existence of other industries, let's look at the table below which showcases some of the technological breakthroughs in IT and technology over the past 30-50 years. Also please bear in mind that NONE of the things below were existent a mere 60-70 years or so ago other than in fiction books.

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	1970s*	2021*	Improvement over 1970-2021**
Computing efficiency *Number of watts needed per million instructions per second (Watts per MIPS)*	5W per MIPS	0.00001W per MIPS	x 500,000
Processing power (Moore's Law) *Speed and capability of computers increases every 2 years*	2,300 transistors on a microprocessor	39.5 billion transistors on a microprocessor	x 17.2M
Computational capacity for supercomputers *Number of floating-point operations (FLOPS) carried out per second*	124 billion (1993)	442,000 trillion	x 3.6M
RAM capacity *Random-access memory (RAM) - Computer memory typically used to store working data and machine code*	1-bit	128 Gb	x 1.024×10^{12}
Flash memory *Non-volatile storage chip can keep stored data and information even when the power is off*	256 Kb	8 Tb	x 8×10^9
Generation of semiconductor manufacturing process *Minimum size and spacing for features on each layer of the chip*	20,000 nm	5 nm	x 4M
Cost of computers *Brand-new personal computer costs*	$95,000 for HP 3000 ($610,000 today)	$1,000	x 610
Hard drive capacity *Where all files and folders are physically located*	0.01 GB	20 TB	x 2M
Digital camera resolution *Camera that captures photographs in digital memory*	10,000 pixels	80,000 megapixels	x 8M
Display resolution *Number of horizontal and vertical pixels on a display screen*	160×200 pixels	30,720x17,280 pixels (32K)	x 16.6k
Internet speed *Rate at which information is transferred from one place on the internet to another*	50 Kbps (1984) 56 Kbps (WWW 1993)	178 terabits per second (Tbps) (178,000 Gbps)	x 3.2Bn

Similar To What Penicillin And Insulin Did For Humanity Since 20th Century, Phygital Will Treat Most Economic Diseases of the 21st Century.

What have we learned from the aforementioned stats on the previous slides? One thing is for sure: **the world economy is sick**. Most of the legacy economic sectors are completely stuck in the old way of doing things.

But **the world has radically transformed in the past 30 years with the arrival of the Internet and computing**.

Legacy sectors in the way they were created and managed for ages are not suited for the sweeping progress of the IT sector, which is now the driving force of the world economy. If not for Information technology and innovation, we wouldn't be able to discover new opportunities as we do today.

At the same time, IT in its current form, can't solve most of the fundamental issues of the largest economic sectors, having an inert placebo effect, rather than a full therapeutic effect. **Similar to how Penicillin or Insulin drugs discovery in the 20th century saved and improved lives of the whole generations worldwide, Phygital is set to bring a whole lot of new experience and innovation in the 21st century and years to come.**

Internet In Its Today's Form Harms And Spoils Masses

The current model of Internet proves to be more harmful for users in the long run, rather than beneficial. There is now whole generations of people (Gen Z and beyond) who've been hooked on the online-only activities since the very early age, being cultivated by the major online platforms to spend as much time being online as possible, which is not natural for any human being, thus resulting in physical and mental problems early on.

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People all over the world experience various health-related issues such as depression, anxiety and sleep quality and blame the Internet platforms for aggravating the situation with the adverse factors such as bullying, fear of missing out, body image and more.

As a result, sadly enough, Internet in its existing form **gradually transforms from the most powerful facilitator to a killing machine**.

Phygital, on the other hand, thanks to its **combination of physical and digital**, has a much more organic and natural effect on humans, providing seamless experience and being as powerful and convenient as a purely digital interface.

3X
Children who were cyberbullied are 3x more likely to contemplate **suicide** compared to their peers.[23]

30%
of **18-44** year-olds feel anxious if they haven't checked Facebook in the last **2 hours**.[24]

55%
of cases where children blocked aggressors, the perpetrators quickly **found them again**.[25]

6X
Fake news spreads six times faster than true news.[26]

2021

What Is (actually) Phygital?

The term **"Phygital"** has been around for quite some time, though it is perceived completely wrong and in a very unfairly narrow sense.

In most cases "Phygital" is monopolized today by either omnichannel marketing, retail strategy or online-to-offline customer experience meanings. In fact, it is much more powerful and relates to every human being on Earth, as well as every corporation and the government.

So, what's the big deal with Phygital? And why should anyone care about it?

The answer is plain and simple and is pictured on the right: **you can think of Phygital as an evolution of everything that has been developed in computing, AR, VR and is set to dramatically change the way we live, work, communicate, travel, study, entertain and much more.**

As a result, all physical objects in the future will be Phygital, i.e. powered by a set of breakthroughs (AR, IoT, M2M, etc.), while online environments (Social media, eCommerce, etc.) that exist today in the digital form only, will finally merge with physical objects not just as an add-on, but rather as an integral part of it.

This will lead to a dramatic redistribution of wealth and assets, primarily disrupting the offline world and acting as a gateway to the offline economy for today's digital enterprises.

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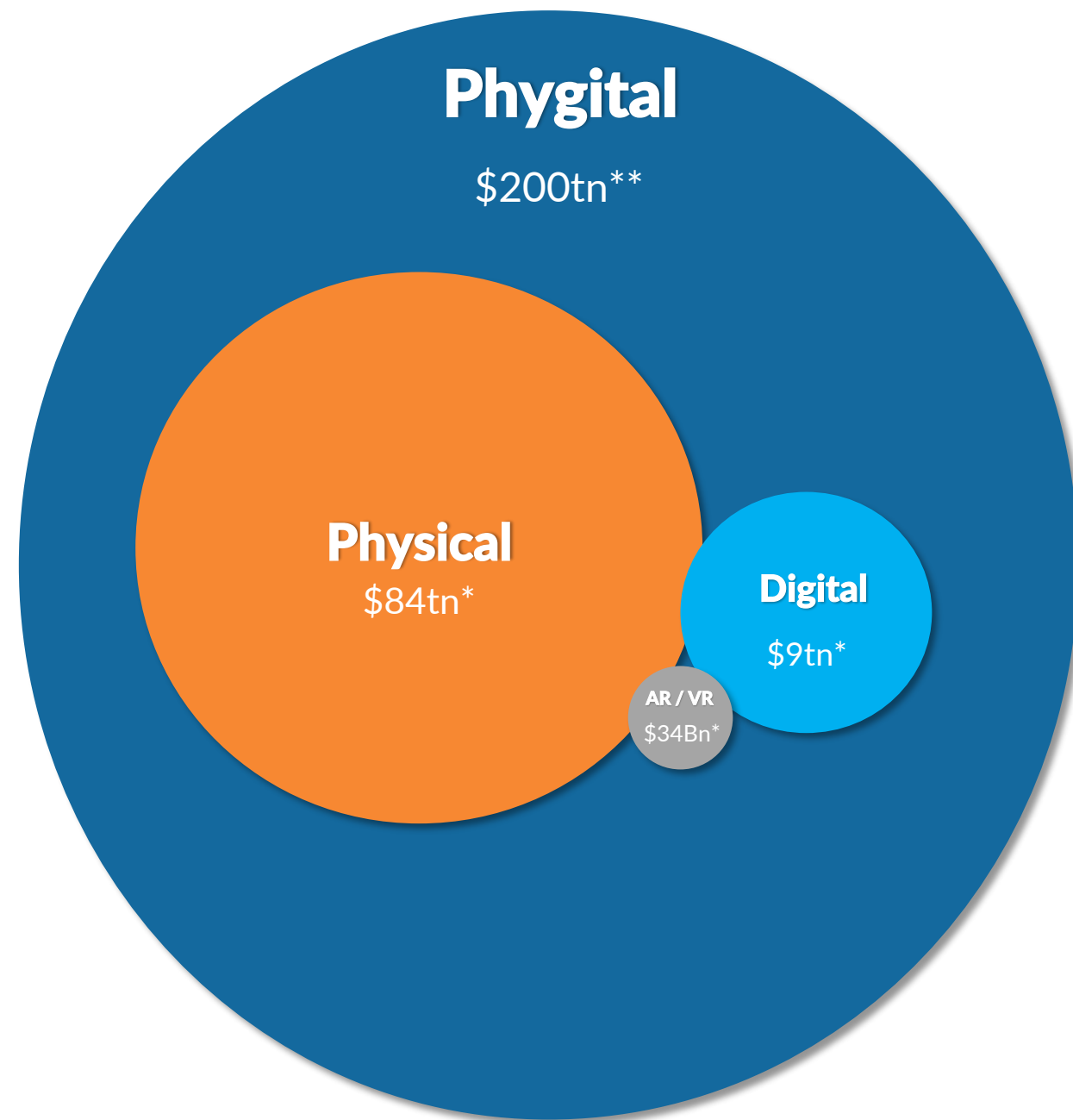
* Global Market Size in 2020, $US trillion
** Upside potential in the next 5-10 years, LETA Capital estimate, $US trillion

Phygital
$200tn**

Physical
$84tn*

Digital
$9tn*

AR / VR
$34Bn*

Phygital is an evolution of everything that has been developed in computing, AR, VR and enables the close integration of the virtual environment (digital) into real human life (physical).

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Photo by mkobr61

Potential Impact of Phygital on World's Largest Economic Sectors

Similar to the effect of the digitalization on legacy sectors and systems, Phygital is poised to bring enormous boost in efficiency and productivity across all the major economic sectors. Given that the essence of **Phygital is the combination of multiple technologies**, the upside is estimated to be disproportionately greater as compared to the effect from the digitalization.

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* **Global Market Size 2021, US$ trillion**
(Yahoo Finance, 2021 [21])
** **Upside potential for each market segment upon implementation of Phygital, US$ trillion**
(LETA Capital estimate based on OECD's report "Digitalisation and productivity: a story of complementarities", 2019 [22])

$30tr **

$20tr

$25tr

$21tr

$10tr

$18tr

$15tr

$23tr *

$13tr

$10tr

$9tr

$8tr

$7tr

$6tr

$8tr

$5tr

$5tr

$5tr

$3tr

$2tr

Financial services

Construction

Commercial Real Estate

E-Commerce

Insurance

Information Technology

Food

Oil & Gas

Automotive

Telecom

Phygital revolution will lead to a dramatic redistribution of wealth and assets, primarily disrupting the offline world and acting as a gateway to the offline economy for today's digital enterprises.

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Photo by Frederik Schönfeldt

Phygital Use Cases

But what makes us so confident that the Phygital revolution is around the corner? **It is the numerous existing use-cases of AR and XR that we see taking place globally and the amount of interest that AR & XR attract among both individual users and businesses.**

It is hardly possible to predict today how huge AR specifically and Phygital in general will become after dedicated mass market AR headsets will gain popularity.

Below you can find examples of companies that already implemented Phygital technologies into their products or processes (*Phygital Implementation* slides), as well as examples of the corresponding use cases across different sectors and some of the vendors that provide Phygital services.

Please note, that the information below is for information purposes only and doesn't constitute an offer or investment advice.

Among the companies which already implemented Phygital (AR, VR, XR and other complementing technologies) are some of the largest and most well-known organizations globally.

In addition, you will find below a few live examples of AR that you can try out yourself (*Phygital Use Case* slides). All you need to do is to scan QR code with the camera of your smartphone, go to your mobile browser and then either point the camera at the picture on the slide (Marker) or point the camera at any flat surface (SLAM). And Voila! You can see and experience the magic of AR right from your mobile browser thanks to the technology of WebAR. For a better experience we advice you to print out the Marker's slides so that you could see AR in action from the horizontal flat area.

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Phygital Implementation: Construction

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2021

Clients

Use Cases

- Safety training
- L&D, training
- Workplace manuals
- Real-Time Information
- Team Collaboration
- Progress capture
- Digital twin
- Project presentation
- Project Planning

- Remote Maintenance
- Data overlay on sites
- Human errors reduction
- On Job Site Inspection
- AR for BIM
- Equipment Monitoring
- Clash & errors detection
- Utility infrastructure locates
- Modifying Projects

Phygital Vendors
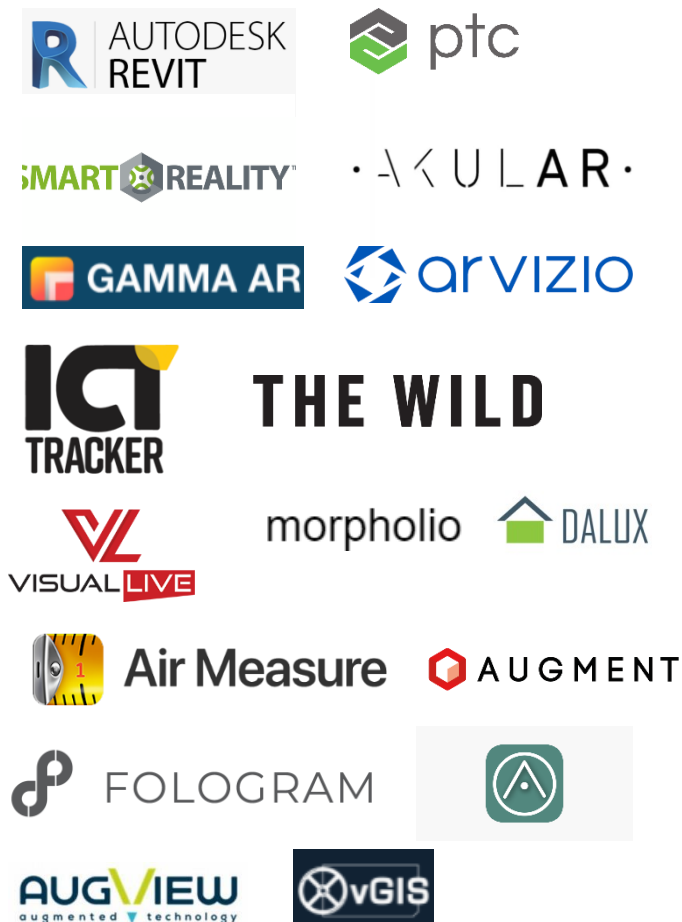
Phygital Use Case: Construction

Marker's scenes

1. Scan with your mobile camera to see live AR effects

2. Point camera to the picture

3. Or click and watch here

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Powered by MYWEBAR.COM
AR MADE SIMPLE

Phygital Implementation: Retail

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2021

Clients

IKEA · THE HOME DEPOT · GUCCI · LOUIS VUITTON · KENDRA SCOTT · SEPHORA · ESTĒE LAUDER

ULTA BEAUTY · KOHL'S · Levi's · BURBERRY · LEGO

miu miu · JCPenney · BOSS HUGO BOSS · PHILIPS

Dulux · NIKE · L'ORÉAL · Kellogg's · BACARDI

WARBY PARKER · WATCHBOX · asos

Use Cases

- Virtual fitting room
- Visualize product catalogs
- View product information
- Warehouse space optimization
- Combine B&M and eComm
- Enhance brand recognition
- Gamification
- Search for deals around you
- Educate customers about products
- Encourage interaction with the brand

- Collect information on consumers
- Object visualization at home
- Personalized product offering
- Omnichannel experience
- Post-purchase consumption
- Try before you buy
- Bring customers into the store
- AR advertising
- Product Configurator
- In-Store Navigation

Phygital Vendors

VUZIX · overly

StoreViz · Lens.io

threekit

SCANDIT · Sunvega 三维家

Cylindo · PERFECT

InContext · designhubz

ptc · VNTANA

Phygital Use Case: Retail

Marker's scenes

1. Scan with your mobile camera to see live AR effects

2. Point camera to the picture

3. Or click and watch here

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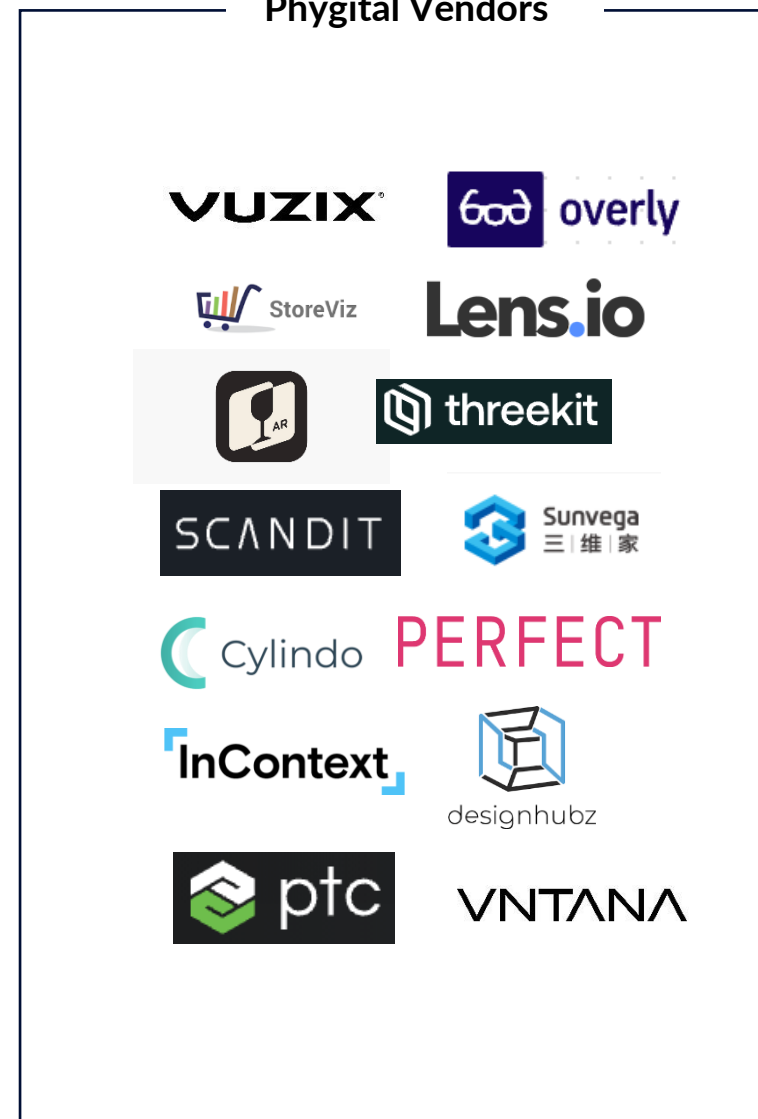
Powered by MYWEBAR.COM
AR MADE SIMPLE

Phygital Implementation: Healthcare

Clients

JOHNS HOPKINS SCHOOL of MEDICINE

UNIVERSITY OF ALBERTA

NOVARTIS

POLICLINICO DI SANT'ORSOLA

CVS Health.

UnitedHealth Group®

Anthem.

Imperial College London

SANOFI

Johnson&Johnson

RUSH UNIVERSITY MEDICAL CENTER

Humana

Use Cases

- Dentistry
- Training nurses
- Medical imaging
- Medical education
- MRI evaluation
- Vein detection
- Remote surgical expertise
- Pharma marketing
- Clinical researchers
- Virtual patient care
- Remote guidance
- Physical therapy
- Surgery virtualization
- Patient rehabilitation
- Enhanced telemedicine
- Medical device maintenance
- Visualize medical data
- Navigation in hospitals
- Advanced diagnosis
- Collaboration between physicians

Phygital Vendors

AccuVein®

VAST

AR NATOMY

EyesDecide

Anatomy 4D
MADE BY DAQRI

FUNDAMENTAL VR

KARUNA

Augmedics

SURGICAL THEATER

MediVis

Proprio

HEALTH SCHOLARS

VICARIOUS SURGICAL

TOUCH SURGERY

Phygital Use Case: Healthcare

SLAM scenes
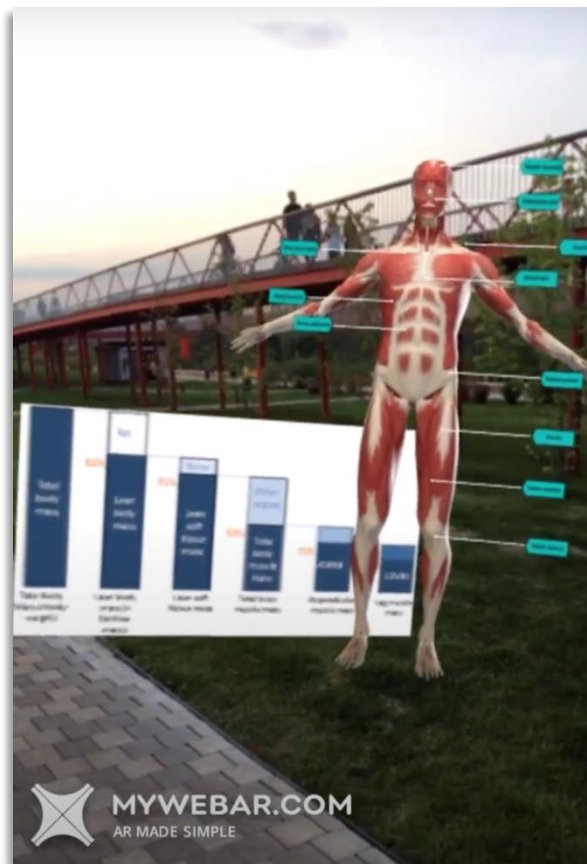
1. Scan with your mobile camera to see live AR effects

2. Point camera to the floor or your table

3. Or click and watch here

Powered by MYWEBAR.COM
AR MADE SIMPLE

Phygital Use Case: Education

Marker's scenes
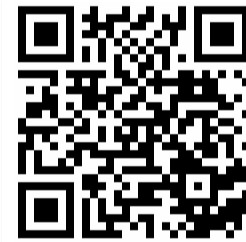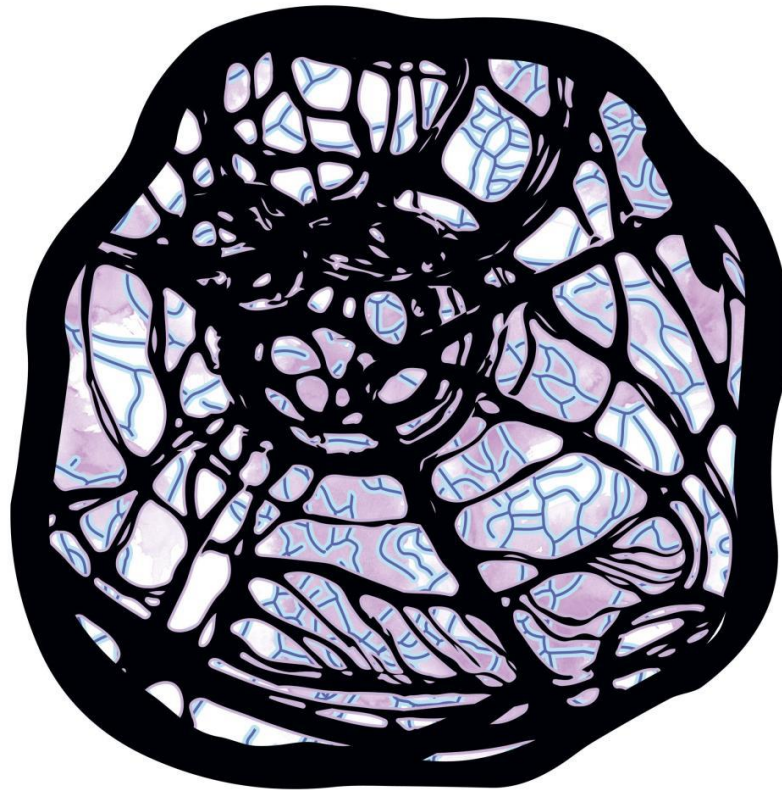
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1. Scan with your mobile camera to see live AR effects

2. Point camera to the picture
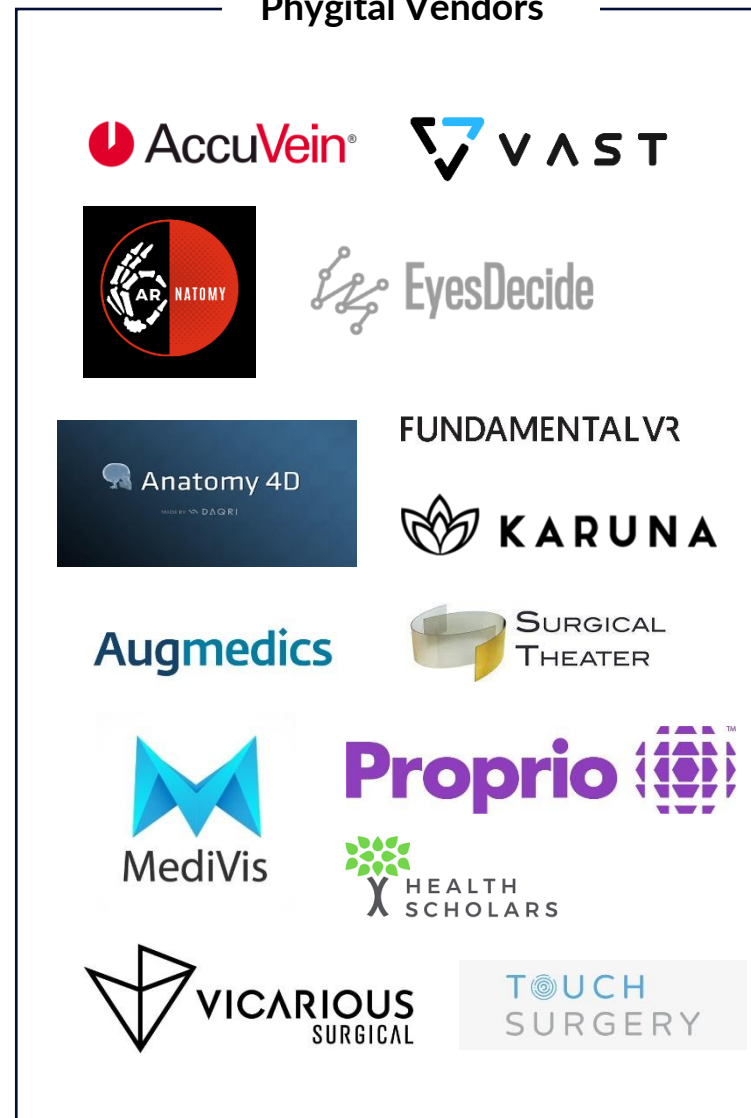
3. Or click and watch here

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AR MADE SIMPLE

Phygital Use Case: Fashion

Marker's scenes

1. Scan with your mobile camera to see live AR effects

2. Point camera to the picture

3. Or click and watch here

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AR MADE SIMPLE

Phygital Use Case: Travel

Marker's scenes

Issue 28   September 2021

ATLAS
A CLASSIC TRAVEL MAGAZINE

In this issue:
AROUND THE WORLD

Earth's top places to visit in reviews of travellers.

EXPLORING INDIA

CROSSING THE BOUNDARIES

C'EST LA VIE

1. Scan with your mobile camera to see live AR effects

2. Point camera to the picture

3. Or click and watch here

2021

Powered by MYWEBAR.COM
AR MADE SIMPLE

Phygital Use Case: Gaming/Toys-to-life

Marker's scenes

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1. Scan with your mobile camera to see live AR effects

2. Point camera to the picture

3. Or click and watch here

2021

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AR MADE SIMPLE

Phygital Use Case: Space

Marker's scenes

1. Scan with your mobile camera to see live AR effects

2. Point camera to the picture

3. Or click and watch here

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AR MADE SIMPLE

Phygital Use Case: Space

Marker's scenes

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1. Scan with your mobile camera to see live AR effects

2. Point camera to the picture

3. Or click and watch here

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AR MADE SIMPLE

Phygital Use Case: E-Commerce

SLAM scenes
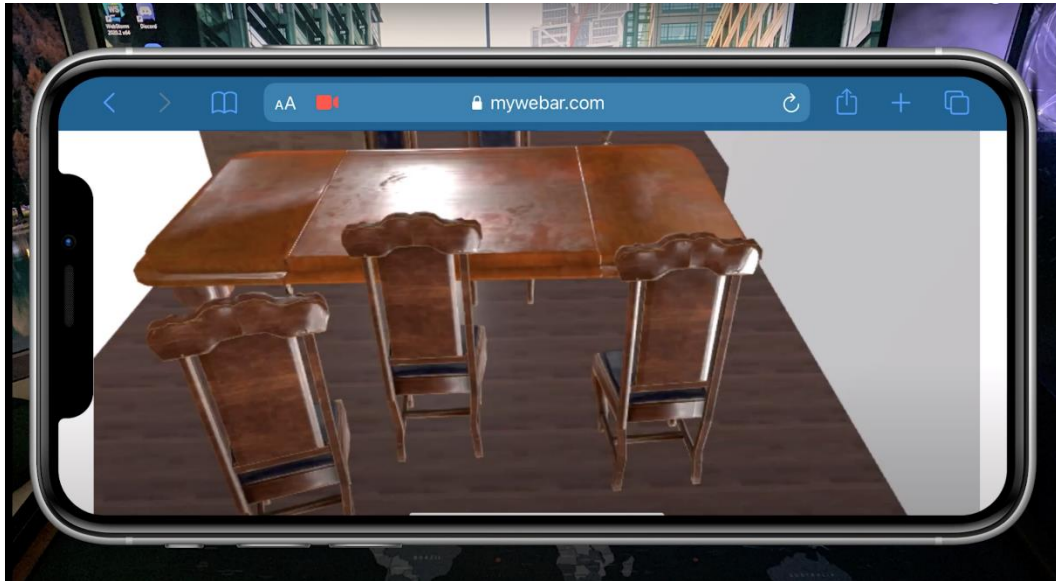
1. Scan with your mobile camera to see live AR effects

2. Point camera to the floor or your table

3. Or click and watch here

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AR MADE SIMPLE

Phygital Use Case: Food

SLAM scenes

1. Scan with your mobile camera to see live AR effects

2. Point camera to the floor or your table

3. Or click and watch here

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Powered by MYWEBAR.COM
AR MADE SIMPLE

Phygital Use Case: Pipe Repairs

SLAM scenes

1. Scan with your mobile camera to see live AR effects

2. Point camera to the floor or your table
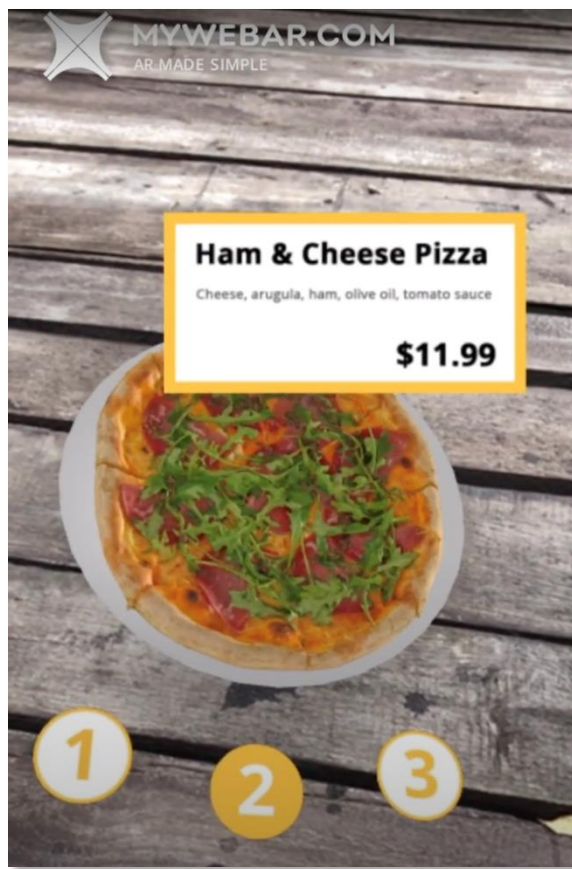
3. Or click and watch here

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Powered by **MYWEBAR.COM** AR MADE SIMPLE

Augmented reality promises to be as influential to our society as the smart phone

— Tim Cook, CEO of Apple

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AR/VR Patents Outlook

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AR and VR patent applications per year worldwide*

Year	Value
2010	5 400
2011	6 500
2012	8 600
2013	10 200
2014	13 600
2015	14 300
2016	18 700
2017	26 600
2018	32 100
2019	35 000
2020	37 000
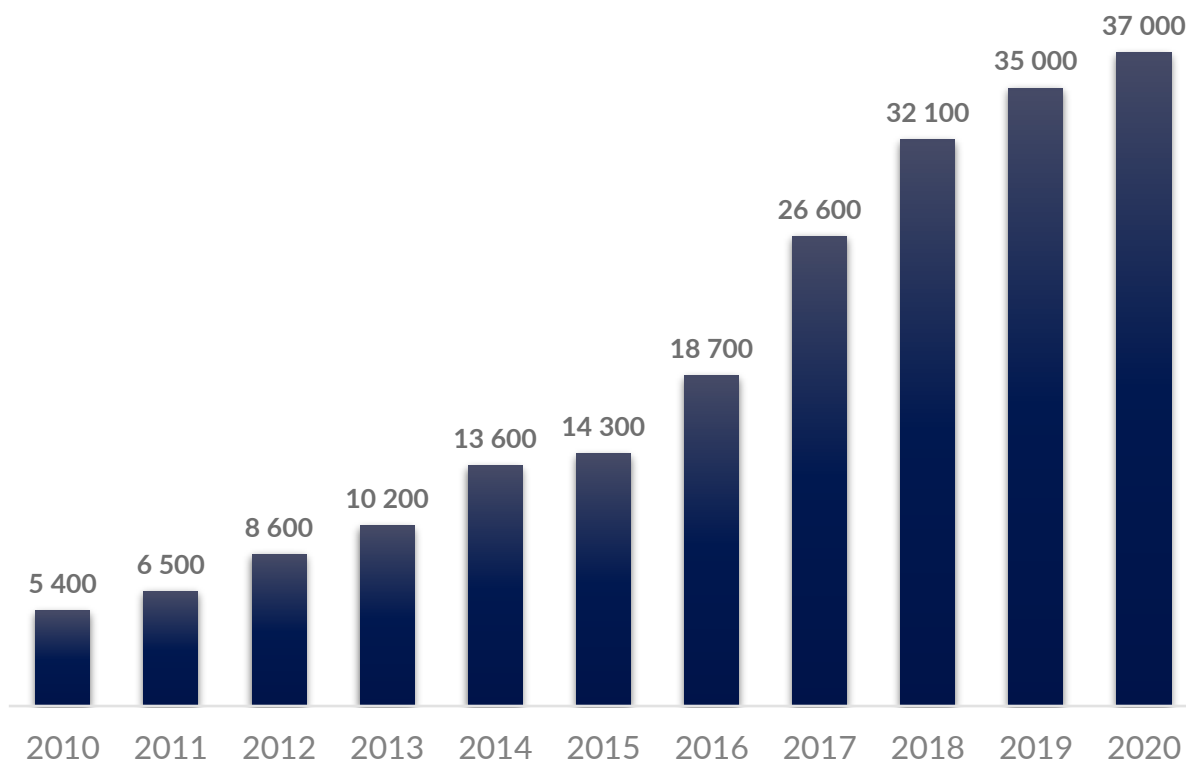
Leading global AR/VR patent owners and amount of patents owned**

Microsoft	intel	SONY
10,100	5,050	5,950
SAMSUNG	Google	IBM
4,600	3,100	1,900
Canon	Qualcomm	LG
2,300	3,300	2,000
PHILIPS	Apple	HUAWEI
1,400	1,100	2,000

2021

* Aggregate from USPTO, CNIPA, KIPO, JPO, EPO, WIPO; 2021
** Statista (https://www.statista.com/statistics/963685/worldwide-augmented-virtual-reality-patent-top-owners/)
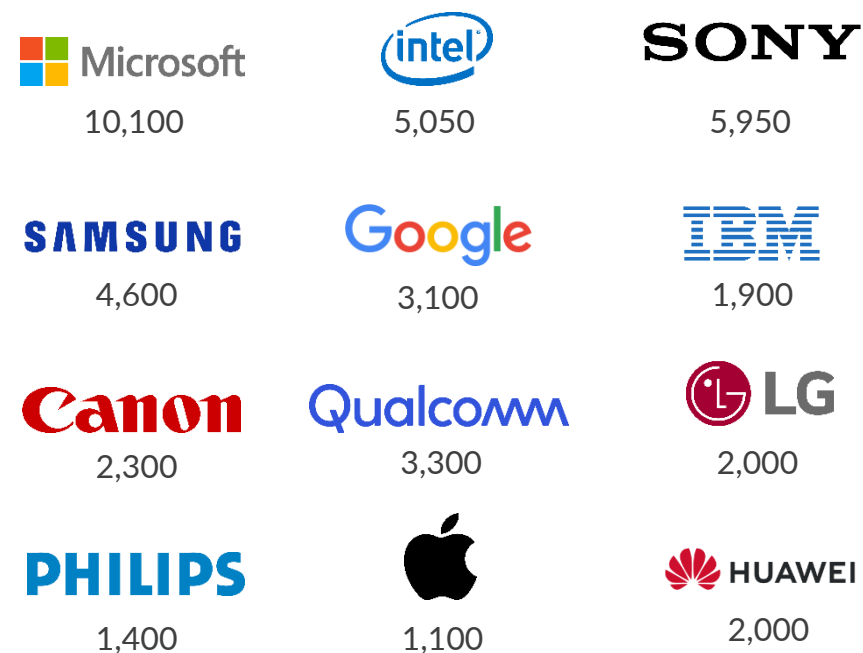
Augmented Reality Penetration 2021

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3.5 billion

total number of smartphones globally*

1.3 billion

total number of ARkit devices (iOS)

0.9 billion

total number of ARCore devices (Android)

3.1 billion

total number of devices globally that support WebAR

0.8 billion

total number of active AR mobile consumers worldwide

0.5 billion

total number of Snap lenses

2021

* https://artillry.co/intelligence/

Technologies That Form The Basis Of Phygital

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AR, XR accessories to deepen the experience

Augmented & Mixed Reality (headsets, lenses)

Brain Computer Interface, Whole brain emulation

Machine Learning, Artificial intelligence, Big Data

Wearables, Beacons

Cyber Physical Systems, Smart Infrastructure

IoT, Smart Sensors, Robotics

Human-machine interfaces, Digital Twins

5G, 6GHz Wi-Fi
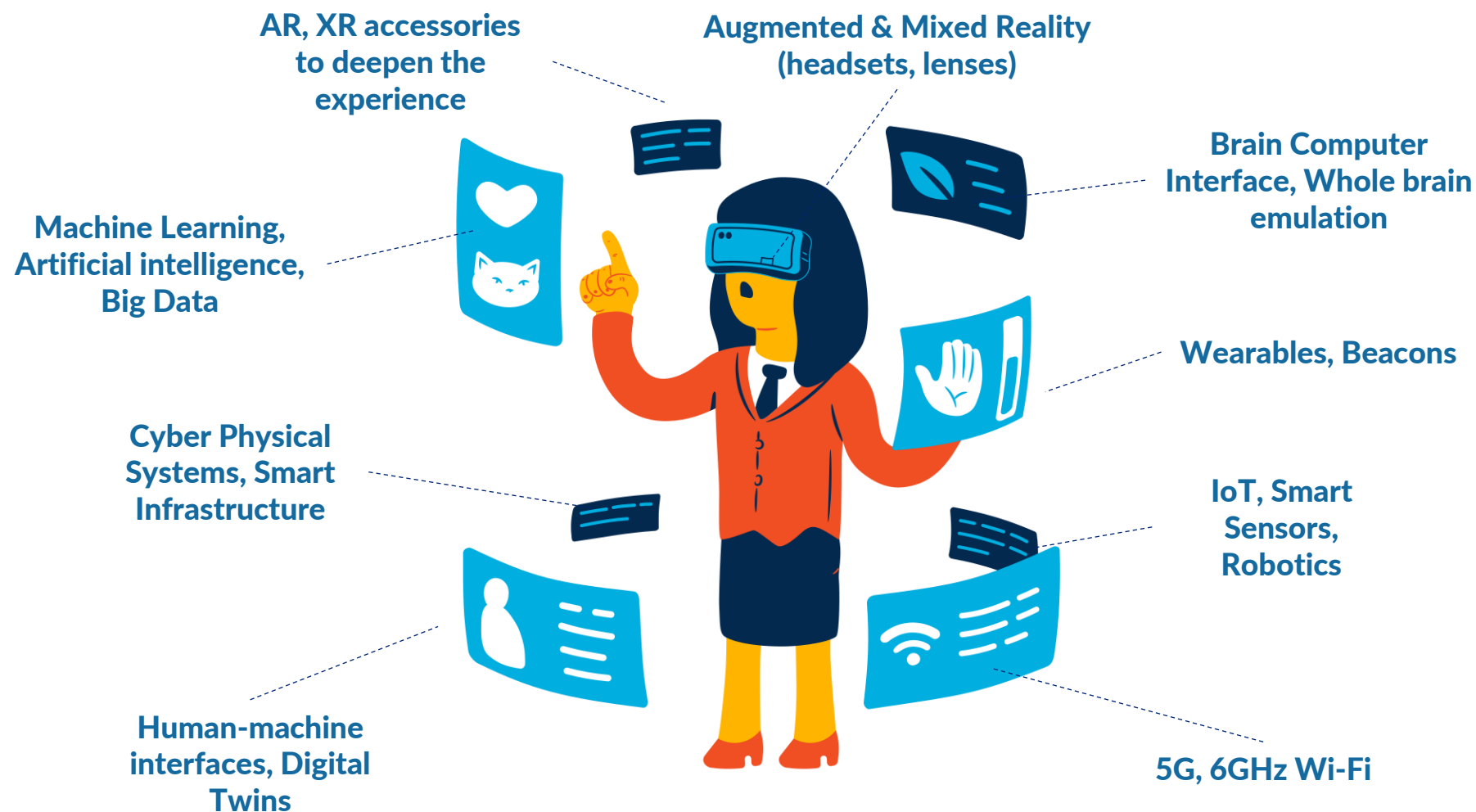
Phygital Hardware & Software Challenges

Transition from smartphone-first to **AR glasses-first mobile** computing.

Release of a **mass-market end user device** (**near-eye display device**, likely in the form of AR glasses) with the appropriate characteristics: wide viewing angle cones (field of view), long-lasting battery life, proper panel resolution, comfortable form factor, advanced imaging performance, brightness and resolution density among others.

The latter two tackle the issue of **displaying AR objects in bright light** or outdoor daylight, when the picture in glasses does not provide a sufficient level of quality.

Vergence-accommodation conflict (VAC): instead of a stereo sensation when viewing 3D objects in real life, AR glasses use fixed display plane where different rendered contents for each eye is adopted, which **leads to visual fatigue and discomfort, sabotages stereo acuity, and distorts perceived depth**.

Improving the quality of spatial tracking (SLAM) to ensure that **3D objects perfectly fit into any space** in a very fast and invisible for the end user manner.

Independence of tracking quality from **lighting conditions, movements and external shaking**: overall subjects stability is not lost, there is no shaking of objects and their displacements.

Enhancement of **device performance**, which can be solved by transferring all processing to the **cloud via 5G** (now processing mainly takes place on the edge device (smartphone), which causes restrictions in use.

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Phygital Market Predictions 2021-2022

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Facebook will have 50,000 employees in its division working on AR & VR (from 10,000 today)

Apple releases a visual search feature, AR walking and other AR enhancements.

Apple releases a feature of creating 3D models from a single photo among other AR enhancements.

Release of a consumer AR device from major technology players (Facebook, Apple, Samsung)

Many other companies release mass-market AR glasses (DAQRI, ROCID, Meta, EPSON, LENOVO, VUZIX, GLASS, RealWear, Unreal, etc.)

Proliferation of 5G, which reaches 1 billion users by the end of 2022

WebAR becomes truly mass-market, similar to what Wix did to website development.

More and more businesses apply AR and Phygital to their core offering, fast democratization of the technology.

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About Authors

+ LETA Capital

LETA Capital is a venture capital firm investing in Russian-speaking IT founders globally at late Seed, Series A and early growth stages.

LETA's investments cover a wide range of software startups focused on **international** markets. Our portfolio spans 40 companies including InDriver, Novakid, 365Scores, Buddy.ai among others.

LETA Capital is founded by a serial IT entrepreneur Alexander Chachava. To learn about LETA Capital investment approach feel free to read our Manifesto.

For more visit https://en.leta.vc/.

+ Devar

Devar is a Phygital company founded by Anna Belova and Andrey Komissarov. It has been creating augmented reality products and services for their creation for more than **5 years**. The company's main mission is to bring the Internet into the real world.

As a tech company DEVAR uses its own Artificial Vision technology stack. Today the company's IP portfolio includes **more** than **15 patents in the US, South Korea, Europe, China, India and Russia**.

Phygital products by DEVAR are translated into **25 languages** and are sold in more than **40 countries**. Its services and technologies are already used in **150 countries**.

For more visit https://devar.org/.

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Definitions

Augmented Reality (AR) - interactive experience of a real-world environment that overlays digital content and information onto the physical world by using the camera on a smartphone or Snapchat lenses. A system that incorporates three basic features: a combination of real and virtual worlds, real-time interaction, and accurate 3D registration of virtual and real objects.

Extended Reality (XR) - umbrella term that covers all of the various technologies that enhance our senses, whether they're providing additional information about the actual world or creating totally unreal, simulated worlds for us to experience. It includes Virtual Reality (VR), Augmented Reality (AR) and Mixed Reality (MR).

GDP (Gross domestic product) - a monetary measure of the market value of all the final goods and services produced in a specific time period.

GDP Per Capita - measures the average income earned per person in a given area in a specified year.

Mixed Reality (MR) - combines elements of both AR and VR, where real-world and digital objects interact. Example: Microsoft's HoloLens.

OECD (The Organisation for Economic Co-operation and Development) - an intergovernmental economic organisation with 38 member countries, founded in 1961 to stimulate economic progress and world trade.

Phygital – set of technologies which enables the close integration of the virtual environment (digital) into real human life (physical).

Virtual reality (VR) - implies a complete immersion experience that shuts out the physical world.

World Health Organization (WHO) - a specialized agency of the United Nations responsible for international public health.

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