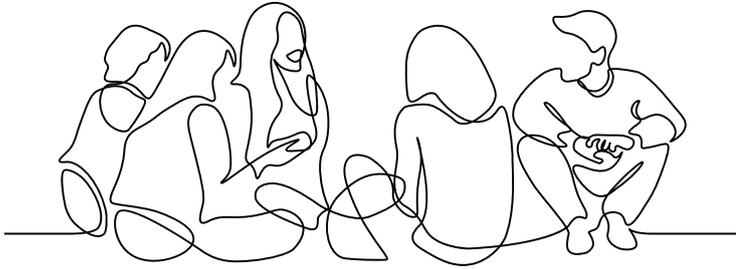


Future of humans

Changing lifestyles, **rising opportunities**





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Future of humans

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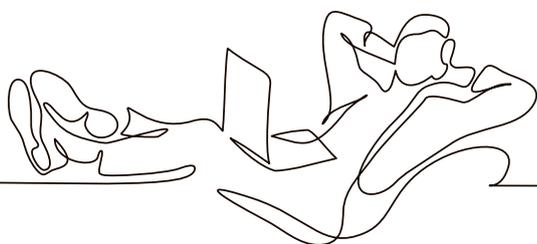
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Introduction

Humanity is facing two important trends. Over the next 30 years, our numbers will grow and our average age will increase. These demographic trends are taking place alongside huge structural shifts. The Fourth Industrial Revolution—powered by automation and connectivity—and the environmental credit crunch will dramatically alter the way the global economy works. All these issues are entwined.

Paul Donovan
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Physical strength has always been vital to many people's working life. Even after the First Industrial Revolution, a capable body was necessary to operate the spinning machines of textile mills. Male earnings peaked with their physique—it was all downhill after your mid-20s. The Fourth Industrial Revolution removes physical strength as a consideration. Robotics and automation enable working life to grow significantly longer. An aging population can continue to contribute to the economy.

Technology can make people more productive for longer, but this will require them to have the right skill level and the right sort of education. Rote learning produces workers whose skills become redundant as soon as the textbook they have memorized is out of date. As we explore in this report's **first chapter, "Education,"** people will need to learn to be flexible and to challenge the status quo. Education will no longer end with the attainment of a diploma or a certificate. It will become an ongoing process—through training at work, formal learning later in life, and even the educational merits of social media.

The drive to increase economic productivity puts great emphasis on the health of workers. As we outline in the **second chapter, "Healthcare,"** physical health becomes more important with an aging population. Mental health will no longer be overlooked, either. Structural economic shifts can be stressful to the individual as a result of changes to both personal circumstances and social attitudes. Stress damages productivity and can slow efficiencies. In addressing these issues, advancements in technology will provide a growing number of tools to not just extend our life spans but also improve our physical and mental form.

The shifts in the global economy mean that gross domestic product (GDP) is particularly ill-suited as a measure of economic well-being or human happiness. GDP was essentially designed to maximize wartime production. The increase in technological efficiency brought about by the Fourth Industrial Revolution does not count as a positive development in GDP terms. As the world becomes more virtual and humans' contribution to the economy becomes more focused on services, the measurement that GDP offers becomes less and less relevant. We will need a more diverse range of measures to understand economic well-being and human happiness. We explore these ideas in the **third chapter, "Happiness and consumer preferences."** We also examine how technology can enable a more diverse set of entertainment options that can add to human happiness—or detract from it—in ways hitherto unimagined.

The environmental credit crunch means humanity must learn to do more with less. Our current standard of living depends on a use of environmental credit that is no longer feasible for future generations. The growth in the global population puts an additional strain on resources. However, properly applied technological changes should result in efficiency. And as we also discuss in the third chapter of this paper, shifts in consumer preferences will drive increased demand for businesses that provide sustainable goods and services.



Executive summary

- *Future of humans* considers some of the biggest areas of change for humankind and the associated investment implications.
- The central threads of the report are that demographic shifts are the primary driver of change, and that technology is the primary enabler of change.
- We concentrate on three key areas where we expect changes to be largest. These are:
 - 1) education**—what, when, and how we learn;
 - 2) healthcare**—the rise of preventive care, health technology, and telemedicine;
 - 3) happiness and consumer preferences**—the roles of demography and technology in influencing our well-being.
- The opportunity set for private investors in these areas should increase significantly in a post-COVID world.
- In education, we see investment opportunities in public and private markets in education technology (“edtech”) and ancillary services, and companies that have a superior record than their peers in training and developing their employees. Investing in education aligns with UN SDG 4 – Quality Education.
- In healthcare, we consider investment opportunities in public and private markets through companies developing technologies or services that enable change (“enablers”), those that can use it to enhance their market positions (“beneficiaries”), and transformational technologies (“moonshots”). This investment area aligns with UN SDG 3 – Good Health and Well-Being.
- In happiness and consumer preferences, we focus on the opportunities resulting from more socially conscious and digitally savvy consumers—sustainable brands and digital entertainment like augmented and virtual reality (AR and VR) and esports. Within consumer preferences, the opportunities in sustainable brands align with UN SDG 12 – Responsible Consumption and Production.

Education

Changes in what, when, and how we learn

We see investment opportunities in public and private markets through companies that provide education, especially in education technology (“edtech”) and ancillary services, and companies that have a superior record than their peers in training and developing their employees. Related opportunities include businesses that provide education content and technology services; providers of education finance; and companies that own, develop, and manage learning infrastructure, such as student housing.



What you need to know

- In a digitalized era where humans work and compete with machines, learning will increasingly have to focus on flexibility, creativity and innovation, interpersonal skills, and mastery of technology.
- As knowledge gets outdated sooner and working lives grow longer, the university is no longer the final point of acquiring skills, as the need to learn will stretch into retirement.
- While we expect the overall education market to grow at a high-single-digit rate over the next decade, private education will expand even more rapidly as the public sector lags the rise in demand. The market for e-learning, for-profit postsecondary education, language learning, and test preparation should experience a high-teens rate of growth.

You can explore more
here about

- > Educational services
- > Future of the Tech Economy



What we learn

- The Fourth Industrial Revolution will compel humans to learn in areas that cannot be easily automated.
- In addition to technical skills, human learning will increasingly focus on flexibility, creativity and innovation, and interpersonal skills.
- Shifts in what we learn will raise the investment appeal of companies in edtech and education services.

An economy that is increasingly reliant on the service sector requires significant investment in human capital and the specialized training of workers. Today, a wide gap exists between the skills our current education system delivers and what the digital economy demands. In the current paradigm, we specialize in a narrow skill set from a very young age, seek lifetime employment in one industry, and hope to retire with a steady pension. Yet as we discussed in our “[Future of the Tech Economy](#)” report, the Fourth Industrial Revolution, driven by enhanced automation and connectivity, is transforming various industries. In the digital era, education needs to place more emphasis on developing skills that cannot be easily automated.



In our view, these are:

1. **Flexibility.** Rapid technological change means workers will have to update their skills and learn new ones to stay competitive.
2. **Creativity and innovation.** Workers will need the ability to solve problems through unconventional thinking and bring new solutions to market.
3. **Technology skills.** There will be a demand to build and apply new technological systems in ways that maximize both human and machine capabilities.
4. **Interpersonal skills.** Breaking down complex issues into easily understandable ones will increasingly involve working with others. Emotional intelligence, soft skills such as effective communication, and a diverse global perspective will be necessary to maximize productivity.

Changes in what we need to learn will raise the investment appeal of education technology and education services companies.

The future of the workforce— a Nobel perspective

Interview with Prof. Sir Christopher Pissarides,
Nobel Prize Winner in Economics 2010, Regius Professor of Economics, London School of Economics

Professor Pissarides, how do you expect job markets to change, especially after COVID-19?

I foresee three major changes.

First, I expect a faster pace of automation in manufacturing and some clerical roles. This trend may be positive, freeing up more time and money for workers to spend on leisure.

Second, however, I expect fear of future pandemics may slow the recovery in the personal service and hospitality sectors. The fear that the risk of respiratory diseases rises in close contact with one or many people may linger as it has done in parts of Asia after the SARS outbreak.

And third, greater appreciation and policymaker support of the health and social care sectors will persist after COVID-19.

What's the best way to support workers hardest hit by automation?

Education will be key. But new forms of training will be led by companies and not governments.

Government-run retraining programs have historically been unsuccessful. You need business-sector expertise and initiative to design and deliver the relevant employee skills

However, the required investment may be too much for business to bear alone. Employees are more mobile than capital machinery, so it's easy for them to switch jobs and take the sunk investment in their training with them.

Governments subsidizing corporate training will be critical to supporting job transitions and retaining employment in this period of structural change, as will new infrastructure—particularly if today's social distancing endures beyond today's epidemic.

And will this new training (or education in general) become increasingly digitalized?

There are some fields in which online education or education technology has been successful and can continue to grow: learning a foreign language, learning specific techniques, or delivery of some internal corporate training.

But I don't expect education technology to revolutionize traditional settings such as school classrooms or universities. We must remember the benefits of delivering pastoral care in person, especially to younger children. And physical delivery of education has another consequence: it can free up both parents to work outside the home.

This interview contains views which originate from outside Chief Investment Office Global Wealth Management (CIO GWM). It is therefore possible that the interview does not fully reflect the views of CIO GWM.



When we learn

- Demographic and technological developments will make lifelong learning imperative.
- Advances in technology will allow for greater personalization, engagement, and flexibility in learning.
- These trends bode well for the private higher education sector, edtech learning platforms, and companies that have a superior record than their peers in training and developing their employees.

Learning is no longer only for the young. Older generations are perfectly capable of contributing to the economy with the help of lifelong learning; their reschooling and ability to work longer will be an important part of tomorrow’s labor market. It now seems outmoded to put a “best before” date to a person’s physical and mental fitness when healthcare innovations make us dream about eternal life. With around 50% of the population in high-income countries being 50 years or older (Fig. 1), social systems can no longer justify retirement at 65 or earlier.

Accelerating technological change means postgraduate skills will have an earlier expiry date and demand workers to acquire new skills. If a specialist skill requires 10,000 hours to

master,¹ having a life expectancy of 100 years—873,000 hours—will call for recurring investment to gain new specializations. Given the rising proportion of the labor force with a college degree, greater longevity suggests the demand for continuous postgraduate education will grow as individuals retrain multiple times across their careers to “upskill” and “reskill.” As a result, acquiring education will shift from being heavily concentrated in the first 20 or so years of our lives to being more spread out across our professional career. At the same time, technology will facilitate a less capital-intensive delivery of learning with higher levels of personalization. These trends bode well for the private higher education sector, edtech learning platforms, and companies that have a superior record than their peers in training and developing their employees.

¹ Malcolm Gladwell, *Outliers: The Story of Success* (Little, Brown and Company, 2008)

Fig. 1

Older generations dominate more in high-income than in low-income countries

Population by generation (year of birth) in %



Source: UN World Population Prospect (2017), UBS

Will technology replace teachers?

The view from an expert

Interview with Vikas Pota,
UBS Global Visionary, philanthropist, Honorary Lecturer in Education, University College London, and Visiting Practitioner in Education, Harvard Graduate School of Education

Vikas, what will we learn differently in the future?

I'd rather focus on what won't change: the need for strong foundational teaching for children in core areas such as numeracy and literacy. For all the developments made in technology and availability of schooling, global benchmarks of education performance (like the PISA rankings) conclude that children are falling short of being able to read, write, and be numerate. We need to focus on effectiveness in these core areas before being too ambitious about future skills or alternate means of learning.

I'd add that primary and secondary-level education changes are slow-moving, as they require political decisions and societal change. Think about the impacts of COVID-19, for example, on the use of education technology. Has the pandemic led to an acceleration in the use of edtech to support homeschooling? Yes. But will it enable a permanent shift to home learning and away from the classroom? It's unlikely, as one role of school learning is to support societal structures like parents or caregivers working outside the home.

When will learning take place across our future lifetimes?

I'm a firm believer in the need for lifelong learning. The accelerated pace of change and disruption resulting from technological progress underscores its importance, but in reality we need to address its financial burden. Lots of employers, universities, and professional providers deliver continuous learning. But we need to share the costs or debts of funding this provision, so payment and outcomes are more equitable.

How will learning and teaching delivery differ in the future?

Education technology will likely be a more frequently used complement to the teacher—the "sage on the stage." But the effectiveness of edtech is just as important as the availability of it. Numerous studies, including from the OECD, suggest that education technology does not necessarily improve learning outcomes. The value of human teachers—through personal interaction and as facilitators of group learning—shows that the future of education lies in a mixture of technology and human inputs.

Going forward, I think education will have to adapt to focus on teaching with the whole child in mind. This holistic approach means we need to concentrate on education that helps humans to complement machines and build on human talents through the Fourth Industrial Revolution—as opposed to seeing humans and technology as being in competition. What we learn should be a blend of sciences to use technology more effectively and the humanities to encourage creativity, better human interactions, and the collaborative skills needed in the workplace. Indeed many employers today are actively seeking employees with arts degrees, as creativity and critical thinking matter alongside technical skills.

And above all, we need enlightened political leadership. In my work with former education ministers, I know that lasting change demands that heads of governments back their educators—the politicians and the teachers. Without this support, educational reform will be incremental at best.

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How we learn

- In the future, learning will not be confined solely to the classroom as technological developments make delivery possible through multiple channels.
- New enabling technologies will broaden access to learning and improve its quality at scale.
- Changes in how we learn open numerous investment opportunities in edtech companies and enabling technologies linked to artificial intelligence, big data, and machine learning.

The education industry has evolved from frontal teaching to a more comprehensive, less homogeneous method, and numerous products, services, and infrastructures are serving to meet the demand from this evolution. Until recently, convening students in one physical location has been the biggest impediment to scaling education. Today, technological developments are increasingly changing how the classroom looks and the learning delivered in it.

Technology enables education to scale efficiently, at a low incremental cost per student. Still at a nascent stage, the deployment of technology in the classroom—both physical and digital—is disrupting the marketplace as learning migrates from a capital- and talent-intensive brick-and-mortar business model into an experience built for the digital era. Technology will make it easier and less costly to deliver personalized education that will enable individuals to reskill over their lifetimes.

As education technology develops and platforms scale at a global level, learning will offer greater personalization, engagement, and flexibility. Through large-scale data processing, deep analysis of user behaviors, speech recognition, and automatic assessment, for example, artificial intelligence (AI) can make customized education available at a relatively low cost. At the same time, AI algorithms can tailor learning programs, including content and teaching methods, suited to individuals' different modes of learning. Meanwhile, increasing internet penetration broadens access via edtech, allowing students to study whenever and wherever they want. Edtech also supports ubiquitous lifelong learning by bringing education closer to the needs of companies and their employees.

The changes in how we learn will open investment opportunities in edtech companies and enabling technologies linked to AI, big data, and machine learning.

You can explore more here about
 > Enabling technologies



Edtech supports sustainable development goals

UNESCO estimates that 58% of primary and lower secondary school children lack literacy and numeracy.² In some underdeveloped communities, children in this age group already support their families' livelihood, leaving them with little time to go to school, or they live in areas without schools. The general trend, however, is that more youth are receiving education and more girls are attending school, contributing to the United Nations' Sustainable Development Goal of gender equality. Higher education will continue to matter.

According to the United States Bureau of Labor Statistics, the average weekly salary for a bachelor's degree holder in 2019 was USD 1,281, almost double the USD 749 earned by a worker with a high school diploma. The gap with a master's degree holder is even higher, at USD 810.³ However, greater access to education at all levels is just one part of the story. What, when, and how we learn must also change. The rise of edtech holds the potential to increase the quality of education we receive, and promotes reskilling for future jobs via online certifications, for example, while making advanced education affordable. Technol-

ogy has become key to accessing learning and skills development—a point highlighted by the COVID-19 pandemic.

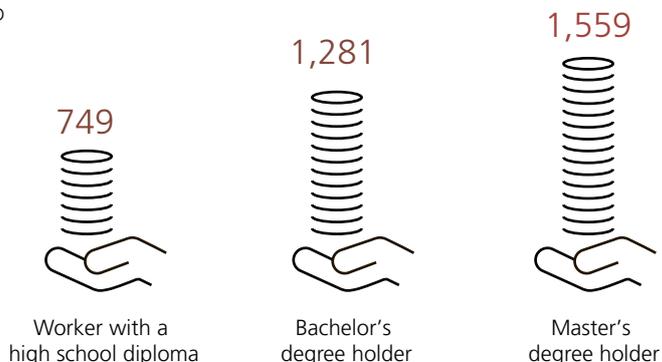
The lockdown measures put in place to contain the disease have been a game-changer in both developed and developing markets. With school closures, learning institutions have had to go online, surfacing the need for related solutions, training, and digital resources. It has

increased the awareness of the potential to complement public education with private instruction.

All these developments drive a better educated population and, by extension, higher standards of living. This is essential to social mobility, productivity, and health, each of which contributes directly to the success of the UN's sustainable development agenda.

Average US weekly salary in 2019

In USD



Source: US Bureau of Labor Statistics, UBS, as of October 2019

² UNESCO Institute for Statistics, "More Than One-Half of Children and Adolescents Are Not Learning Worldwide" (September 2017), <http://uis.unesco.org/sites/default/files/documents/fs46-more-than-half-children-not-learning-en-2017.pdf>

³ US Bureau of Labor Statistics, "Median weekly earnings \$606 for high school dropouts, \$1,559 for advanced degree holders," *The Economics Daily* (October 2019), <https://www.bls.gov/opub/ted/2019/median-weekly-earnings-606-for-high-school-dropouts-1559-for-advanced-degree-holders.htm>

The future of educational measurement—outcomes, not inputs

Interview with John Soleanico,
Program Director, Education, UBS Optimus Foundation

Transforming societies through education sounds great, but how can we determine if we're on the right track?

Education is an interesting area due to the general lack of a consensus around what defines a good education. Most people would agree that the ability to read and write (literacy) and the ability to work with and understand numbers (numeracy) are core components of a quality education. And most comparative educational assessments tend to focus on these factors. But once you broaden the scope of education to include important future skills, like teamwork and self-discipline, any consensus tends to disappear. Thankfully, there are organizations that are attempting to fill this gap by codifying the sets of skills young people need to succeed in life and developing simple and standard methods of measuring these skills.

Once you have identified the objective of education or the outcome that you are seeking—be it literacy, numeracy, or one of the skilling measures described earlier—it's important to look for a way to assess progress in that outcome. The gold-standard methodology for "proving" a causal link between a given intervention and a measurable result is the randomized controlled trial (RCT). But the problem with RCTs is that they can be time-consuming and expensive.

The challenge for the field, and especially in education, is to find alternative trade-offs between the robustness of results and the cost of evaluation. Alternative evaluation methodologies can

give an indication of causality, but at a much cheaper cost. One example from Southeast Asia is to compare the progress of youth undergoing training with the progress of youth that just missed the cut for admission into a program. This eliminates the need to randomize the "treatment"—the training program—but allows for measuring the impact of the program against a comparable group.

How has impact measurement enabled a broader shift to outcome-based financing, or "paying for performance"?

Outcome-based financing instruments such as development impact bonds bring multiple complex elements together. One of them is the ability to robustly and independently measure the outcomes being paid for. In order to commit to paying for improvement in outcomes, an outcome payer must be convinced that outcome improvements were actually achieved. The development and propagation of RCTs and other assessment methodologies have made such objective assessments of causality possible.

In addition to bringing new types of capital to education and other development sectors, outcome-based financing has raised the profile of outcome evaluation more broadly. As investors and outcome funders (including governments) enter the arena, they educate themselves not only on innovative financial mechanisms, but also on robust evaluation methodologies. They come to demand such evaluations in all their projects.

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So in a way, impact measurement has enabled outcome-based financing, and the growth of outcome-based financing has further promoted the use of impact measurement. It is a virtuous cycle whose ultimate beneficiary is the child, the recipient of higher quality education leading to superior life outcomes.

You can explore more here about

- > Educational services
- > Security and Safety



AI revolutionizes education

Artificial intelligence makes software “smarter” so that a user thinks the output comes from a human. One can perceive AI to be like a brain with the ability to make common-sense reasoning, form an opinion, or read social behavior. AI is at the center of the Fourth Industrial Revolution. Exponential growth in both computing power and available data continues to drive the AI revolution.

Education services, where IT spending has so far been low, will be a prime beneficiary of AI (Fig. 2). We expect IT expenditures in education to grow at high-single-digit rates, and spending on AI to rise significantly.

AI brings advantages to three key stakeholders. First, students can increase their productivity as personalized, on-demand education makes it easier to learn what they need, when they need it.

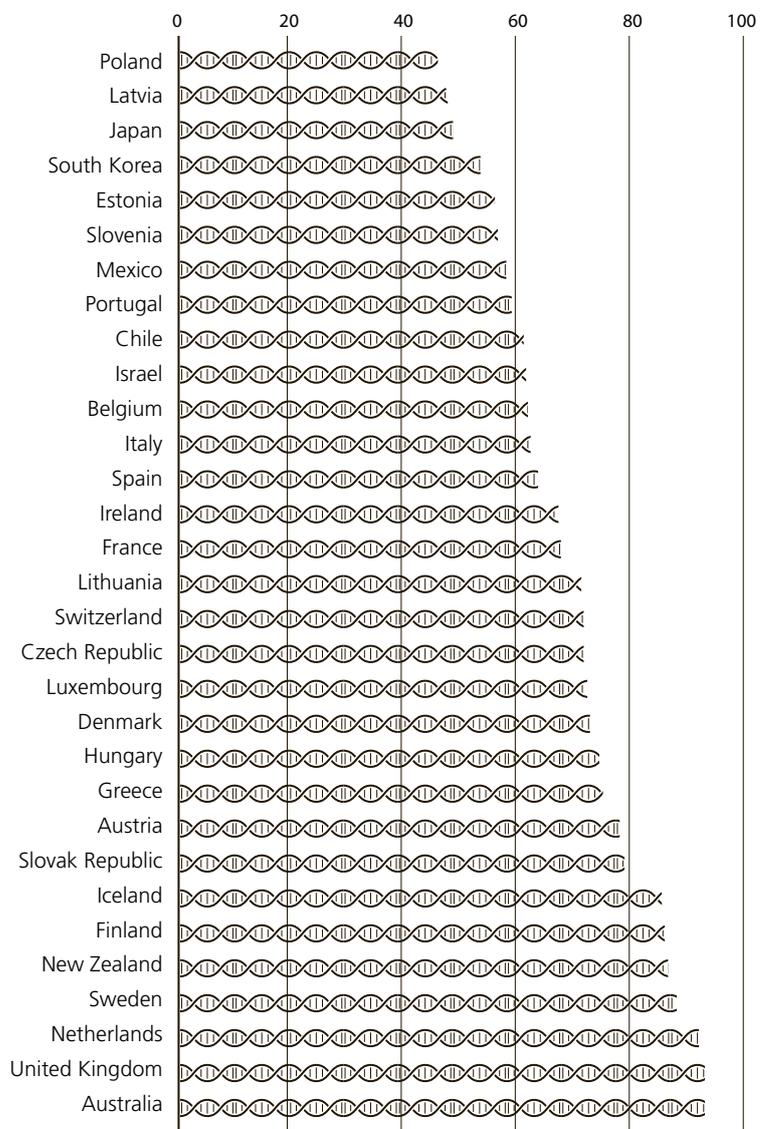
Second, educational institutions can save on costs and find new revenue opportunities from the automation of processes such as real-time assessments, as well as new online models.

And third, governments can, over time, provide education at a lower cost to taxpayers through scalable AI solutions.

Fig. 2

Technology infrastructure well developed in OECD countries but still a work in progress in developing and underdeveloped countries

Share of students reporting that a desktop computer, laptop, or tablet is available to them at school in 2015, in %



Source: OECD, “OECD Skills Outlook 2019: Thriving in a Digital World” (2019), <https://doi.org/10.1787/df80bc12-en>

By 2030, we expect AI adoption to broaden out from the early movers such as China and the US to more countries in emerging markets. Smartphones and voice assistants have shown how users can absorb information at their fingertips. Yet we see three challenges to wider adoption: sophistication, privacy, and relevance.

First, current AI tools are still in their early stages, and more investment is needed to bring out their full potential.

Second, the development of AI in education must coincide with better cybersecurity infrastructure to protect privacy. If artificial intelligence is the engine of the rocket that takes us to the next frontier, data is the fuel. The education industry needs to invest in big data tools, yet today's AI systems are vulnerable to cyberattacks. Our long-term investment theme "Security and Safety" explores this issue in greater detail.

Third, AI developments need to be relevant to a shifting job market. While AI can make some jobs redundant, appropriately developed AI tools should be able to augment the reskilling needed to fill future workforce gaps.

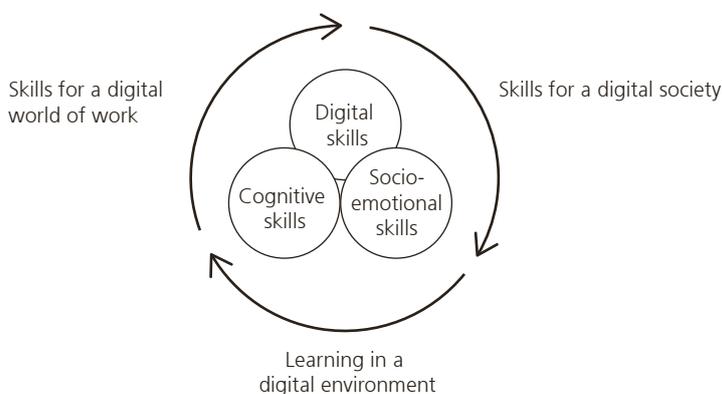
Relevant skills in the digital world

Humans will not be able to compete with AI in analyzing and processing data, but they can make better use of information that results from AI. This will feed automation and, in turn, increase the demand for specialists to operate complex systems. Humans also have a clear advantage in other parts of the job market, especially those that depend on soft, interpersonal skills. People generate enthusiasm, be it among workers or

between workers and customers, and, crucially, are able to understand different cultures.

We expect this "human touch" to remain a success factor in the services industry, including leisure. While a robot may welcome guests or serve food in a restaurant, the majority of tourists will likely still prefer their activity guides to be human.

Relevant skills in the digital world



Source: OECD, UBS, as of 2019

Race against the machine: Who has the edge in learning?

In some areas, the ways machines learn are a far cry from how humans do. Machines need thousands of samples to tell a dog from a cat; children need only a few. Machine learning is still more akin to rote learning. This will change with deep learning. Machines will be able to learn at an exponential rate, mimicking processes of the brain via iteration of mathematical models. Machines, however, will still make mistakes, as not all aspects of learning are “modelable.” We do not fully understand all aspects of learning due to the trillions of connections between neurons, and some processes do not follow deep learning. It

remains uncertain whether machines will be able to intuit, let alone experience consciousness, in a decade or more.

However, self-learning is in sight. Computers now easily beat humans in one specific task for which they are designed. This is especially true when the task is repetitive, choices are predictable and limited, and discovery requires access to a wealth of predefined data that would overwhelm human capacity. Humans still have the advantage of flexibility to multitask and prevail in unforeseen situations, not least because our brains are designed to ensure survival.

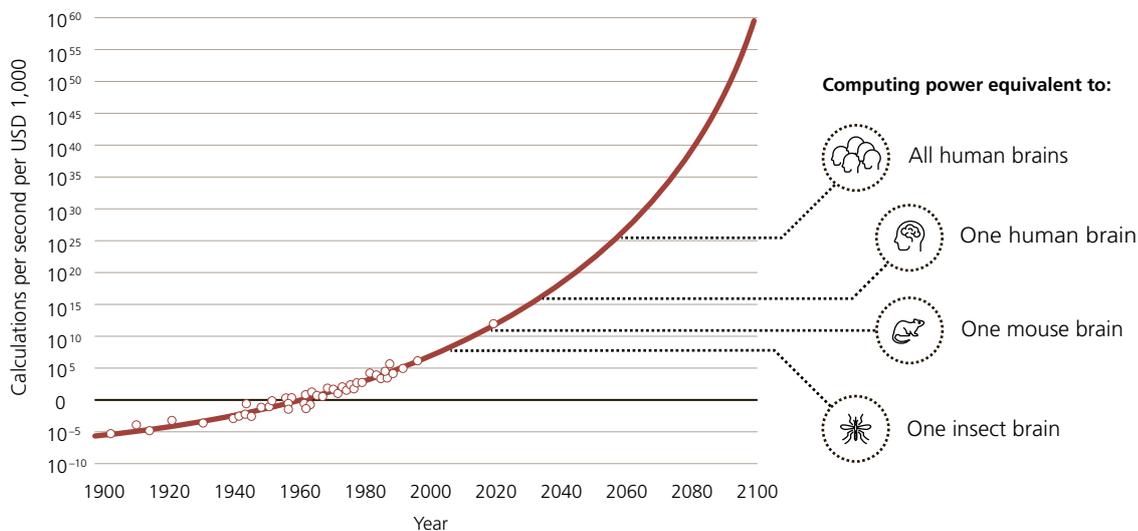
The recipe for success often combines the two. For example, corporate risk platforms can use technology to simulate scenarios and even suggest corrective action, but the final decision will still rest on humans. Looking ahead, the costs of computing power will continue to fall. A USD 1,000 investment today yields computational power between the brain of a mouse and that of a human, but by 2060 the same investment will yield the same capacity as that of all humanity (Fig. 3).

In the future, machines will further excel thanks to their more predictable and scalable learning patterns.

Fig. 3

The power of computing has grown exponentially

Calculations per second per USD 1,000 invested, 20th through 21st century



Source: BofA, UBS, as of June 2020

You can explore more here about
 > Educational services

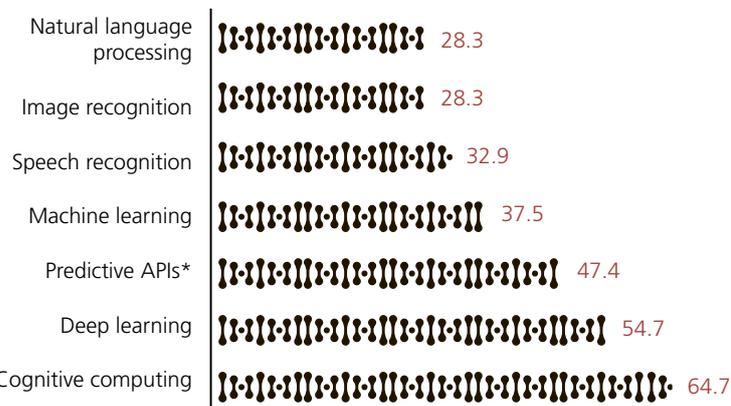


In humans, the same exposure to information will not produce equal expertise. By contrast, machines can benefit from simultaneous learning. For example, autonomous driving relies on all cars being connected to the cloud and learning similarly from big data. Machine learning will widen its advantage over humans if investments rise in areas ranging from data use to memory, processing, and more sophisticated algorithms. If these investments are made, we expect the market for machine educators to be vast (Fig. 4), with its ingredients being the outputs of chip designers and manufacturers at the core and algorithm and software developers at the periphery. As previously discussed, humans will need to shift emphasis and strengthen their skills in areas where they retain a competitive edge. Beneficiaries of new types of human learning will include education services companies whose service offerings will also depend on increasing use of AI and machines to provide flexible skills and training.

Fig. 4

All areas of “machine education” to see spending growth in high double-digits

Compound annual growth rate of spending for the decade between 2015 and 2025, in %



*APIs = application programming interfaces

Source: BofA, UBS, as of June 2020



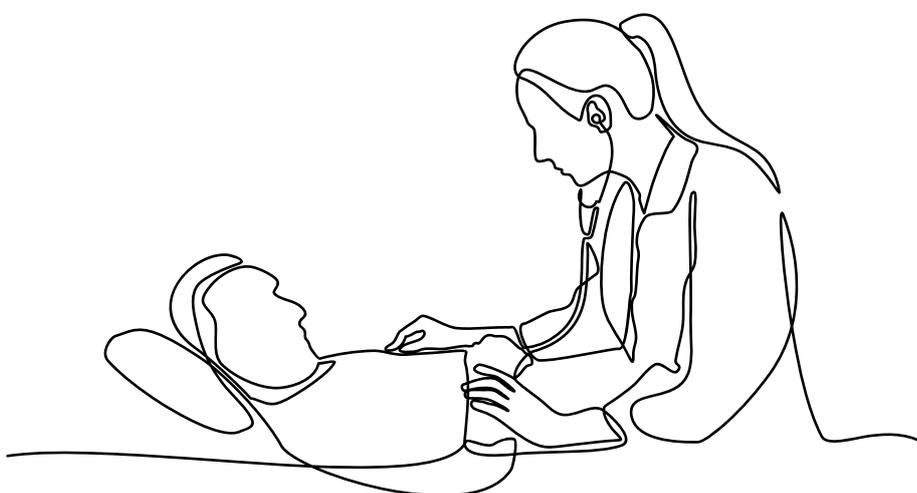
Summary

People will need to adapt what, when, and how they learn to survive and thrive in the Fourth Industrial Revolution. Education cannot be left to the public sector alone, and this opens up investment potential in both public and private markets. We see opportunities in edtech, ancillary services, and companies that have a superior record than their peers in training and developing their employees.

Healthcare

Reshaping our health for the digital age

We see investment opportunities in public and private markets through companies developing technologies or services that support change (“enablers”), those that can use it to enhance their market positions (“beneficiaries”), and, for investors with a long time frame and higher risk tolerance, transformational technologies (“moonshots”).



What you need to know

- Patients will take more financial responsibility for their health in the future. As “health consumers,” they will prioritize staying healthier for longer, transforming healthcare from an episodic service to a lifelong process of managing and maintaining their health.
- A more technology-driven healthcare ecosystem will enable this shift, opening up new ways to manage health. Digital disease management offers a glimpse of tomorrow’s personalized approach to chronic disease.
- The telemedicine boom points to a shift in the location of care, as remote technology facilitates more efficient treatment paths and fewer hospital visits.

A sustainable healthcare system needs more focus on preventive care

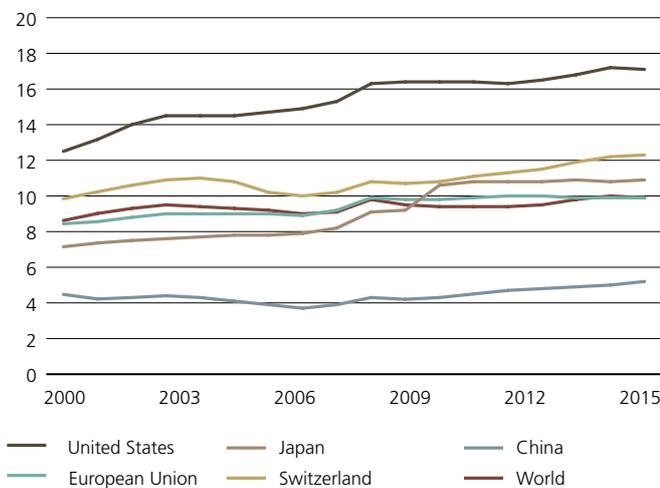
- To balance growing demand for healthcare with constraints on ability to pay, payers must spend more wisely, rather than simply spending more.
- As patients become health consumers, they will place more emphasis on staying healthy and preventing illness. Healthcare will no longer be just for the sick.
- Investors should seek out companies offering technologies or services that enable this change, and those that can bring them to market at scale.

Rising healthcare cost is a well-established trend (Fig. 5). With global health spending having reached USD 7.8 trillion—10% of GDP—in 2017, according to the WHO, and with the over-65 population likely to grow 60% to 1 billion by 2030, we expect the growth in healthcare spending to continue to outpace the expansion in GDP.

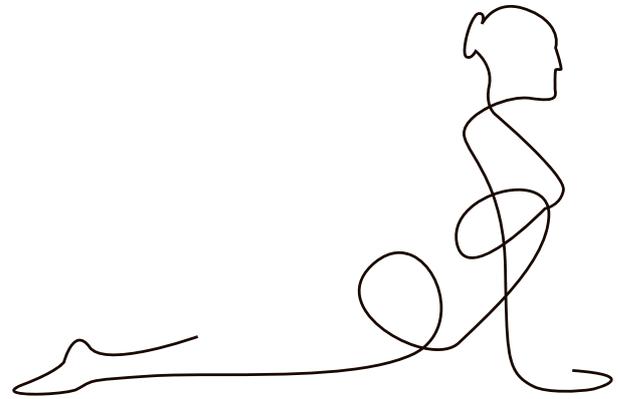
Fig. 5

Healthcare expenditures rising around the world

Healthcare spending in key regions, as % of GDP



Source: World Bank World Development Indicators, UBS, as of 2020



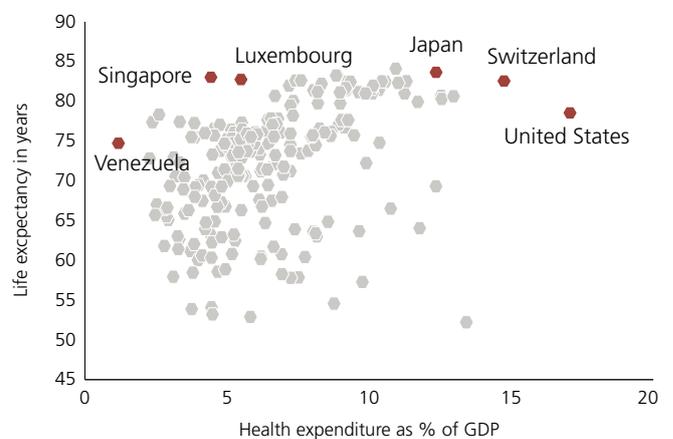
While higher spending does improve health outcomes, life expectancy improvements moderate at higher levels of spending, with several outliers (Fig. 6). The United States spends over 17% of GDP on healthcare, yet its life expectancy lags that of Western peers, while Singapore spends just over 4% of GDP for better results.

Part of the explanation is the inefficiency of many healthcare systems. A staggering amount is wasted on unnecessary and

Fig. 6

Life expectancy is only weakly correlated with more healthcare spending

Health expenditure as a share of GDP and life expectancy in years (2017)



Source: World Bank World Development Indicators, UBS, as of 2020

low-value care—between USD 760 billion and USD 935 billion in the US alone in 2019, according to one estimate, equivalent to roughly 25% of total health spending in the country (Fig. 7).

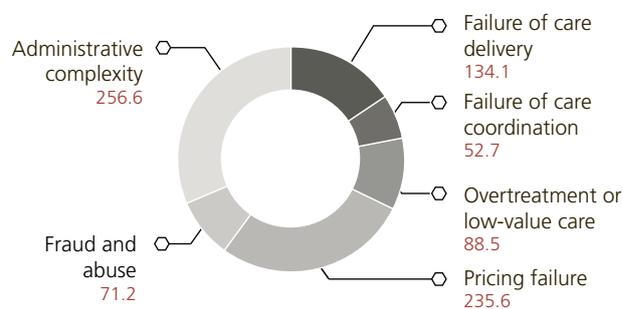
With constrained budgets, governments and other payers are likely to push more healthcare costs onto individuals. The rise of high-deductible health plans and growth of prescription copays in the US are a case in point. But as patients bear more of their drug costs, they become more price-sensitive and more likely to skip prescriptions (Fig. 8). This can have adverse medical consequences.

Healthcare delivery therefore needs to change, with implications for patients, payers, and investors. Technology and the “consumerization” of healthcare are key to this change. A more engaged “health consumer” will have greater incentive to focus on preventive health. The growth of wellness programs shows this behavior in action. We expect a further

Fig. 7

US healthcare waste by source

In USD billions, estimate



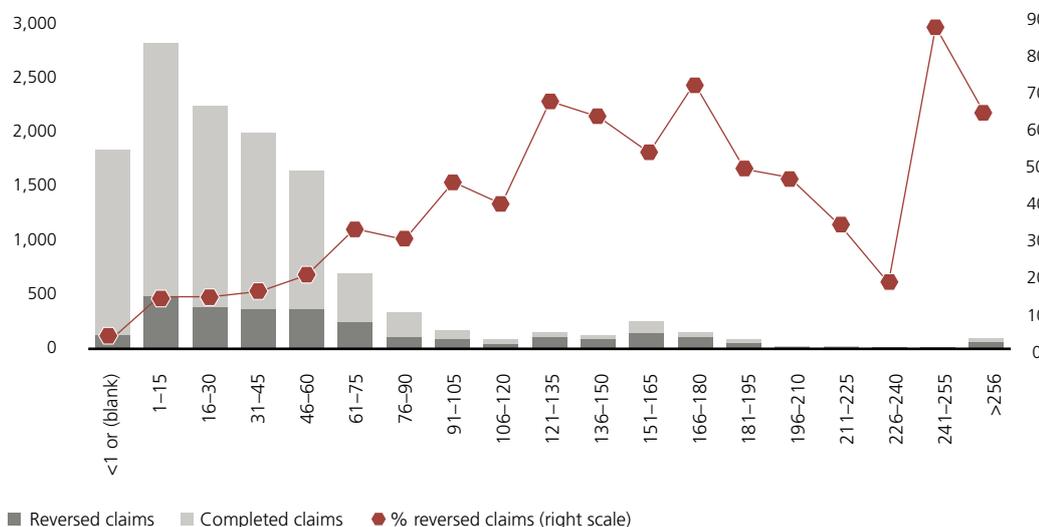
Note: Analysis based on midpoint of ranges

Source: JAMA Network, *Waste in the US Health Care System* (2019); UBS

Fig. 8

Patients abandon prescriptions as costs rise

Percentage of prescriptions rejected, by size of copay (x-axis, in USD)



Source: UBS Evidence Lab (2017)

You can explore more here about

- > Genetic therapies
- > Healthtech
- > Medical devices



blurring of the lines between these areas and healthcare products and services as people seek to live better, rather than just longer, lives.

Will everyone respond to these challenges equally? Perhaps patients willing to alter their behavior and reduce health risks are a self-selecting group, while some social or demographic groups may be less able to adapt. To ensure fairness, a mix of “carrot” and “stick” will be needed to drive change. Shifts in health delivery are likely to be gradual (we do not assume wholesale change in the US insurance-led model). But with chronic disease spending on the rise, better management and prevention of “lifestyle diseases” like obesity and heart disease could both save money and improve individuals’ quality of life.

The potential winners from these changes will fall into two groups, with different investment characteristics:

- **Enablers:** Companies developing technologies or services that drive change. The most successful will have large addressable markets and a competitive advantage in technology, service, or market access. Enablers are growth companies, with relatively high idiosyncratic risk, and may have speculative appeal.
- **Beneficiaries:** Incumbents who can leverage the enablers’ technologies to entrench or improve their market position. These companies are more likely to be stable compounders, but must beware the risk of being disrupted or disintermediated by the enablers.

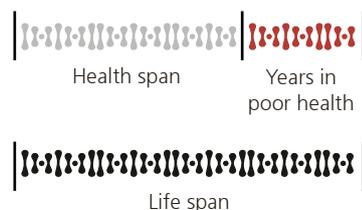
Conversely, it is harder to reduce the incidence of diseases linked directly to aging, so they are likely to remain a major burden on healthcare systems.

What is “health span”?

A person’s “health span” is the period of their life during which they are in generally good health. As individuals take more responsibility for maintaining their health,

the concept of health span is likely to gain traction. But unlike life span, which is precisely measurable, health span is much harder to define, as what constitutes “good” health may vary depending on who is asked.

Health span = life span less years in poor health



One approach is “healthy life expectancy,” a metric that counts a person’s years in “full health.” Using the latest data, global healthy life expectancy is only 63 years,⁴ while life expectancy is 73 years. This suggests that the average person born today can expect to spend 10 years, or 14% of their life, in an unhealthy state.

⁴ The Lancet, “Global Burden of Disease Study,” November 10, 2018. Accessed July 2020. [https://www.thelancet.com/journals/lancet/article/PIIS0140-6736\(18\)32335-3/fulltext](https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(18)32335-3/fulltext)

We expect continued growth in diseases of aging.

Will changes in healthcare delivery reduce the burden of “diseases of aging”?

Unfortunately, many such conditions will remain serious social and financial burdens. Cancer and dementia, for example, are both tied to aging by biological processes that we have limited ability to influence through healthier lifestyles. Cancer development is linked to the accumulation of mutations in our cells as we age, and while the precise causes of dementia are still being debated, its link with aging is well established. We expect the incidence of cancer and dementia to rise at two and four times the rate of population growth, respectively, over the next two decades as the number of elderly people increases.⁵

Drugs to treat cancer are already the largest and one of the fastest-growing segments of the drug market, exceeding

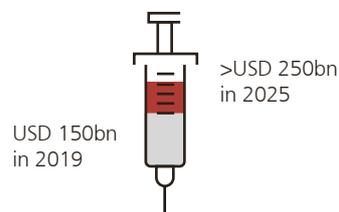
USD 150 billion in sales. We expect this to grow to over USD 250 billion by 2025, driven by pipeline development and new treatment modalities (more details in our “Oncology” theme).

Dementia treatments remain a significant unmet medical need, as current drugs are largely restricted to symptomatic relief, and the historical development success rate is low. A truly disease-modifying drug would create enormous demand and likely represent an immediate multi-billion-dollar cost to the healthcare system, but would reduce the currently large cost of nursing care, much of which is borne directly by patients and their families.

After many disappointments, several new Alzheimer’s drugs are currently in late-stage development, although their approval is by no means certain. The

most high-profile, aducanumab, is currently under FDA review and targets the buildup of amyloid plaques in the brain thought to contribute to the disease. In clinical trials, aducanumab reduced amyloid plaques and slowed patients’ rate of cognitive decline. An FDA decision is scheduled for early 2021.

Cancer drug market



Source: UBS

⁵ Alzheimer’s Disease International, “World Alzheimer Report 2018” (September 2018)

Will healthcare move from doctors to “do-it-yourself”? The view from a digital entrepreneur

Interview with **Matteo Berlucchi**,
UBS Global Visionary, social entrepreneur, CEO and cofounder of Your.MD

Matteo, should we expect widespread changes in how individuals manage and take control of their health?

There is universal need for healthcare, but the need for it is not universally distributed. And historically there has been a passive approach to taking care of one's health.

In the future, I see that the younger generations will not only anticipate their health needs but also increasingly expect healthcare to be delivered digitally. These generations—the ones that grew up with the internet and its instant accessibility through smartphones—will require more and more consumer services to be available digitally.

It would be wrong to say digital health is just for the young. Growing and aging populations will catalyze increased digital healthcare as a way to extend healthcare access. Today's systems are unsustainable and we cannot just train more doctors to meet expanding healthcare demand. In the UK, training a fully qualified doctor demands years of education and costs the state roughly GBP 500,000.

How will companies and governments encourage individuals to lead healthier lives?

First, governments and companies will increasingly encourage individuals to take control of their healthcare—and move away from expecting top-down healthcare delivery exclusively from the state. Technology will have to be a key enabler of this shift in mindset.

Second, we'll need to find ways to

incentivize a more do-it-yourself healthcare approach. The key to success will be to find the best tools to incentivize preventive healthcare or to offer support tools to encourage positive change and a greater emphasis on self-care.

Third, sustainable healthcare systems will need scalable adoption of technologies, such as big data analytics and artificial intelligence, to help drive individual changes up into more enduring societal or systemic changes.

And how will the importance of health shift for different age groups, especially in light of COVID-19?

In the very long term, we need to acknowledge the limitations to digitalization and healthcare innovation. If the fundamental driver of certain health inequalities is access to doctors, the economics of the problem don't massively change, and in fact digitalization might widen access to an already scarce resource: human expertise. Technology could exacerbate health inequalities for those parts of society that can only get better through human input or for whom technology is not accessible.

This interview contains views which originate from outside Chief Investment Office Global Wealth Management (CIO GWM). It is therefore possible that the interview does not fully reflect the views of CIO GWM.



Healthtech will open up new ways to manage our health as digital healthcare applications expand

- Healthtech enables a more efficient and holistic healthcare system, with better outcomes at lower cost.
- Personalized chronic disease management is an early-use case for remote monitoring and connected devices at a nascent stage of commercial rollout.
- “Moonshot” innovations at the intersection of tech and biology could revolutionize healthcare over the next decade.

We expect the adoption of digital health tools to grow significantly, driven by financial imperatives and changing social trends. Healthcare generates 5% of the world’s data, and healthcare data volumes could rise to 23 zettabytes by 2030.⁶

However, healthcare remains one of the least digitized industries (Fig. 9). Today’s inefficiencies create an opportunity for tech-enabled treatments that improve health outcomes at lower cost. Remote monitoring, telemedicine, and health tracking tools allow patients to take greater control of their own care.

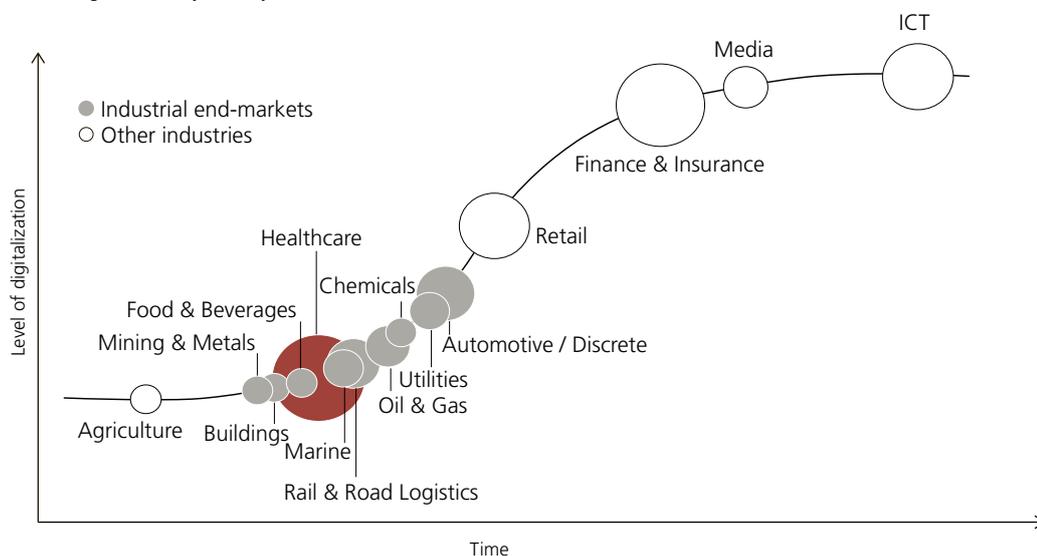
COVID-19 has illustrated the value of telemedicine, and healthtech more generally, with positive responses from both patients and doctors. Reimbursement and regulation have

6 UBS, “Longer Term Investments: HealthTech” (March 2020)

Fig. 9

Healthcare is one of the least digitalized industries

Level of digitalization by industry



Source: ABB, UBS, as of 2017

You can explore more
here about
> Healthtech



improved as governments have woken up to digital health-care. And millennials are more willing both to use digital health solutions and to share health data with technology companies, suggesting an adoption tailwind as they age. Privacy concerns must be carefully managed, however.

The adoption of wearables and digital health tracking is increasing (Fig. 10) as their capabilities improve. Smart watches now go beyond collecting fitness data to track sleep, measure oxygen saturation, and monitor for arrhythmias. Big tech companies are running trials to show that their devices can generate actionable health signals, despite not being approved as medical devices.

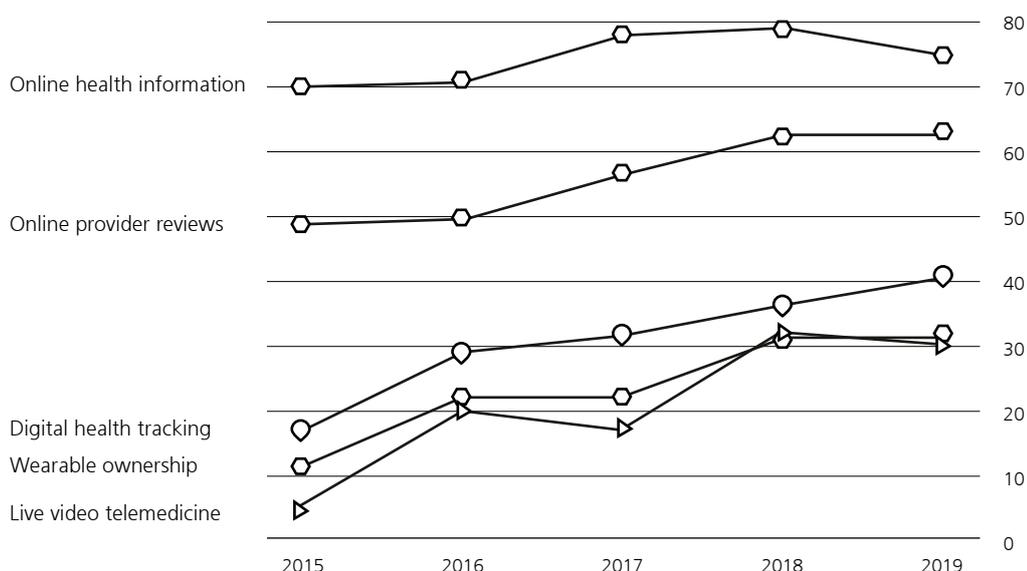
At the same time, medical-grade connected devices that measure blood sugar and pressure, and even home EKG monitors, are already available. Real-time data can be monitored for abnormalities that traditional intermittent diagnostics could miss. As data quality improves, these tools' clinical value will grow, integrating continuous diagnostics into personalized treatment plans and providing early warnings of exacerbation of disease to help avoid costly hospital treatment.

As an example, digital platforms for diabetes management have been shown to lower patients' blood sugar levels and risk of both hypo- and hyperglycemia, while reducing hospital visits. These platforms are just gaining commercial traction:

Fig. 10

Adoption of digital healthcare tools, 2015–19

Percent of respondents who have used each technology



Note: 2019 n=4,000; 2018 n=4,000; 2017 n=3,997; 2016 n=4,015; 2015 n=4,017

Source: Rock Health and Stanford Center for Digital Health, Digital Health Consumer Adoption Survey 2019; UBS

Using technology to improve access to care

Innovative technologies are at the forefront of improving access to healthcare for underserved communities. Drone technologies are used to deliver blood banks and essential medications to regions with limited transportation links, while mobile applications allow experienced doctors to guide surgeons during procedures in remote areas.

Sensor technologies are largely being implemented to take care of the most vulnerable: the elderly and children,

mostly at home. Coupled with telemedicine, these pioneering solutions would allow to scale access to prevention and treatments beyond what is physically possible with our current resources.

While some of these technologies still require significant financial investments, making them available in countries that struggle to provide access to healthcare to their poorest and least developed communities is vital and presents an

exciting opportunity for innovative companies and entrepreneurs.

One example is Zipline, launched in Rwanda in 2016. Zipline uses drones to rapidly deliver vital medical supplies. Health workers are able to place orders by text message and receive their deliveries in 30 minutes on average. Zipline's drones take off and land from Zipline's distribution centers, requiring no additional infrastructure at the clinics it serves.

We estimate that just 2–3% of the 34 million individuals in the US with diabetes use disease management platforms.⁷

This approach could expand to other chronic diseases as patients become more tech-savvy and willing to integrate management of their health into their day-to-day lifestyles. The insurance-driven US system serves as a test bed for many digital health innovations, but their benefits are relevant across developed economies, where chronic disease is a growing burden on healthcare systems. They could also improve access to care in less developed economies.

Telemedicine and remote monitoring were in the right place at the right time when the coronavirus pandemic struck. They already have a visible impact on care and are becoming widely

investable. Looking further ahead, we have identified a number of “moonshot” technologies, potentially disruptive but not yet ready for commercial launch (Table 1). If successfully developed, they could transform how we treat diseases and manage health. Given their early stage, private market investments may be the most suitable way to gain exposure. We also highlight how technology can improve access to care in emerging economies—a potential source of impact investing or philanthropy funding.

⁷ Diabetes Research Foundation. “Diabetes Statistics.” Accessed July 2020. <https://www.diabetesresearch.org/diabetes-statistics>

Table 1

Ten transformative technologies that could revolutionize healthcare

Technology	What it does	How it can be used	Where it is now
 Virtual and augmented reality	VR creates a simulated or virtual experience; AR mixes digital information with real-life images.	Therapeutic uses include cognitive behavioral therapy and distraction therapy for mental health and pain management. Potential use in post-stroke rehab. Surgical uses include remote and assisted robotic surgery, physician training.	Limited application in healthcare to date. Initial hype has died down and proof-of-concept established for clinical applications, but several years from widespread commercial application.
 Smartphone-enabled point-of-care diagnostics	Smartphone cameras or connected sensors can gather, store, and analyze data for point-of-care or home-based diagnostics.	Urgent care applications where rapid analysis improves treatment planning or triage. Ongoing follow-up of existing conditions.	Some approved products. Many ideas at research stage.
 Liquid biopsies for early cancer detection	Use blood or other fluid to detect tiny amounts of a pathogen or cancer cells circulating in the body.	Minimally invasive alternative to traditional biopsies could facilitate earlier cancer detection, improving survival. Genetic identification of cancers also points to the most appropriate treatments as cancer drugs are increasingly genetically targeted.	Liquid biopsy is already used in prenatal testing (NIPT). Use for cancer detection is significantly more complex and still several years from the market. Studies have shown low rates of false-positives but sensitivity must be improved prior to commercial use.
 Gene editing and prime editing	Gene editing permanently alters genetic material in a cell by inserting, deleting, or correcting an existing gene. Prime editing is a more precise technique that could correct up to 89% of known disease-causing genetic variants.	Correcting defective genes that cause disease	Gene editing treatments using CRISPR are just entering the clinic and could be commercialized within 3–5 years. Prime editing is at a much earlier stage of research with no initial target applications yet identified.
 Gene therapies for common diseases	Gene therapy introduces a functional copy of a gene into cells where it is either absent or defective. Inserting a gene that causes the body to produce proteins needed to fight the disease effectively turns the cell into a factory that can produce its own drugs.	One-off or long-lasting “functional cures” for diseases with causes that are not directly linked to a single genetic defect, including widespread chronic diseases.	Many gene therapies are in late-stage development and a few are marketed, but all are focused on diseases with single genetic causes (monogenic diseases). Early data have shown efficacy, producing antibodies to treat eye disease directly in the eye but translating to systemic diseases will take years. Manufacturing gene therapies at scale is also a major challenge to be solved before broad adoption.
 Regenerative medicine	Replacement tissues are grown in cell culture.	Greater access to stem cells and other tissue-derived material enable more clinical research at lower cost. With more affordable and customizable tissues, companies can offer more solutions genetically tailored to an individual, potentially encounter less immune resistance, making transplants safer, longer lasting, and eventually less costly.	Initial efforts in skin or wound treatments. Organ replacements are still years away from the market.

You can explore more here about

- > Medical devices
- > Oncology



	<p>3D bioprinting 3D printing using cells</p>	<p>Widely available 3D printer technology lowers cost and increases innovation, especially among smaller research companies.</p>	<p>Today, prosthetic limbs are customized using 3D printers. In the future, this technology could also be used for human organ replacement and more functional prosthetics.</p>
	<p>AI diagnosis Use natural language processing and evidence-based reasoning to piece together connections between data and symptoms.</p>	<p>Diagnosis is currently still a blend of knowledge, experience, intuition, and art. Using AI to aggregate the knowledge and experience from millions of physicians and researchers across the globe would enable AI learning on an unprecedented scale. A human diagnostician with access to such massively broad and deep knowledge would be able to diagnose more accurately and quickly. This should drastically improve outcomes by reducing errors and critical time spent finding the correct treatment regimen, as well as lower cost.</p>	<p>IBM Watson has had limited success in initial efforts. Building in human intuition and physician-patient interaction remains a challenge for AI diagnosis. Human trust of machines in medicine remains limited, although robotic surgery is gradually overcoming this fear. Still, widespread AI diagnosis is likely many years away.</p>
	<p>Spatial genomics Combines sequencing with imaging. Measures gene expression within specific tissues, identifying results spatially within the body, to understand variation between different groups of cells.</p>	<p>Further enables tumor mapping, better understanding tumor growth, and ability to evade therapy. A deeper understanding of an individual's tumor enables more targeted therapy, bringing better ability to shrink or eliminate the tumor.</p>	<p>Early use, but limited adoption to date.</p>
	<p>Care robots Deliver basic care, including activities of daily living (ADLs) and simple medical care and forms of therapy for the aged and people with significant disabilities.</p>	<p>Aging population and rapid growth in dementia are creating a much larger population that will need continuous assistance and care. For many of these individuals, constant human care or supervision is not necessary or available at affordable cost. A robot could fulfil many of the simpler ADL-related tasks, as well as offer some basic companionship and healthcare services, especially in early to mid-stage dementia. Robots would be cheaper than 24-hour human care and could be easily housed on-site, available on demand.</p>	<p>Early prototypes focus on companionship and cannot yet deliver rudimentary care. Combined with smartphone technology, more advanced robots could also be conduits for telehealth and help administer care (pill dispensing, checking vital signs, even basic diagnostic tests).</p>

Source: Industry data, Hydrogen Council, UBS

In less developed countries, the future of healthcare is bright

Contribution from Marissa Leffler,
Health Program Director, UBS Optimus Foundation

If your child was sick, but you weren't sure if it was something potentially severe and the nearest clinic was a five-hour walk away, what would you do? If you knew that a visit to the clinic would put your family in financial hardship, would you go? If you were experiencing symptoms of COVID-19 but the only place to get tested was in the capital city hundreds of miles away, to whom would you turn?

These are not hypothetical questions for a large portion of the world's population. Over 1 billion people worldwide lack access to basic primary healthcare. Poverty, geography, and a dearth of trained healthcare professionals all contribute to this limited healthcare access, which leads to morbidity and mortality within these populations from very preventable diseases and conditions. The need for timely, accurate healthcare is underscored further by the current COVID-19 pandemic.

Two solutions can help bridge this access gap: 1) community health workers—minimally trained health workers who go door-to-door providing health services in their communities; and 2) technology as the enabler that gives local communities the power to diagnose, treat, and prevent diseases. Countries around the world—from Ethiopia, to Indonesia, to the US—are establishing community health worker bodies. Companies are building mobile health technology that guides users to perform robust health assessments and identify if a patient is ill, what clinical conditions he or she may have, and what next steps to take.

These enabling technologies are accurate—the clinical assessments and triage recommendations match those of a physician in between 80% and 95% of cases. Each time the technology is used, it collects important geo-tagged health data that can aid organizations, governments, and healthcare systems to better understand the health of their populations, or identify disease or illness trends. Most importantly, the technology is scalable—it can be used by anyone, anywhere to improve decision-making and healthcare capacity at the point of care. UBS Optimus Foundation is working with organizations supporting community health systems in Liberia, Kenya, Mali, the Philippines, Togo, South Africa, and Uganda to integrate these technologies into their operations.

With technology and community health workers working in tandem, the future of healthcare, particularly in countries with poor access, is bright. Fewer children will die from easily treatable conditions like diarrhea and malaria. Fewer people will be pushed deeper into poverty because of the costs of accessing healthcare. And a disease outbreak like COVID-19 will be detected early—and prevented from becoming a pandemic in the first place.

This contribution contains views which originate from outside Chief Investment Office Global Wealth Management (CIO GWM). It is therefore possible that the interview does not fully reflect the views of CIO GWM.

A digital healthcare future—the view from an entrepreneur

Interview with a member of the UBS Industry Leader Network* operating in the healthtech sector

How is the ability to collect patient data through the use of technology changing healthcare provision?

Three areas stand out: First, telemedicine provision is growing and will grow in availability; second, better combinations of different data will allow smoother links between diagnosis and patient outcomes; and third, technology paves the way for real-time health reporting, so policymakers can understand public health challenges in a more timely way. COVID-19 will accelerate these three trends going forward, especially the awareness and urgency of collecting patient data to improve outcomes. And there will be a big focus on using telemedicine to reduce future contagion risks.

Precision medicine is another good example of what technology can achieve. Healthcare providers are increasingly rethinking processes and their old clinical approaches to include more patient data and provide more personalized care plans depending upon the patient's particular characteristics. Data gives new insights and guides doctors toward more effective, even multidisciplinary treatments, for example radio-nomics (radiology and genomics).

What key data sources are still not being integrated into clinical decisions?

The main lack of data is in clinical genomics, especially the collection of data through reports in old mediums like PDF or fax. Presenting reports rather than the full data set can lead to data loss and missed opportunities to improve patient outcomes. Broadening access to the data doesn't add substantial cost—

the labs have already gathered it. And using more of the data, with a one-time connection cost, is a “win-win” situation for patients and clinicians.

We're also missing out on environmental data. Think about a patient living in a spacious house in the mountains eating a healthy diet, compared to one living in a city apartment with a fast-food lifestyle. Gathering lifestyle data like the above could help drive more effective diagnosis and more personalized treatment. But gathering holistic patient information like this depends on having more sophisticated devices with greater numbers of sensors and interpretative power—and humans being comfortable with providing increasing amounts of personal data.

How will technology drive treatment changes for patients?

First, the widespread adoption of clinical genomics and its application across the whole genome will open up new standards of medicine. Data quality control, data privacy, and a lack of specialized knowledge among general clinicians will be obstacles to fast adoption, but the trend is in place.

Second, wearables and the data from them will enable us to learn and improve technologies that provide better patient outcomes.

And third, younger generations will use technology to take their health into their own hands. These groups are generally more aware of the science behind longer, healthier lives. They will increasingly take more personal responsibility to inform themselves about good health

*The UBS Industry Leader Network is a global group of UBS clients and prospects who are private business owners and executives. Their views may differ from those of UBS.

and act on this information. And healthcare systems or insurers may also take a more active role in pushing responsibility onto individuals as opposed to their overreliance on healthcare systems.

How will data privacy concerns be managed?

This is the big question, and I hope the current health crisis will be the catalyst for debating it in a more encompassing way. So far the people discussing the issue aren't necessarily the ones best placed to answer the ethical questions that should be at the heart of the debate. Philosophers, historians, and politicians are absent from the conversation.

Privacy concerns should be considered in the context of future technological developments, so society is prepared for accelerating technological progress. When new technologies allow for instantaneous communication of healthcare data, there will be no barriers to information and no time for people to debate which data should be shared and which should remain private unless patients explicitly consent to sharing it. In the end, sharing healthcare data will help us all, with the benefits outweighing the costs.

Telemedicine will break down the walls of the hospital as remote care takes off

- COVID-19 has accelerated the adoption of telemedicine across all age groups, but its penetration remains low in absolute terms.
- Delivering care outside the traditional hospital environment is cheaper, less asset-intensive for providers, and more convenient for patients.
- Minimally invasive and robot-assisted surgery will help patients recover faster from surgery, reducing the time spent in expensive hospital facilities.



Digital technology will make healthcare more personalized, but it will also change where care is delivered. The use of telemedicine has exploded since COVID-19, and we expect these higher utilization levels to stay even if a near-term slowdown is possible as economies reopen. One survey suggests that the number of US adults using telemedicine has tripled since the start of the pandemic, while half as many are interested to try it (Fig. 11).

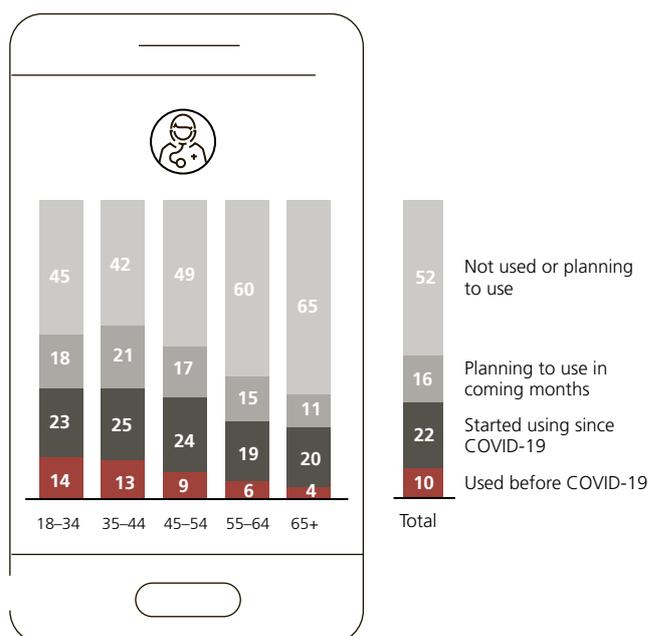
This is consistent with commentary from telemedicine companies and insurers. Older age groups, previously less keen on remote care, have also adopted telemedicine, perhaps due to their high-risk status during the pandemic. How sticky telemedicine is with this age group remains to be seen.

Despite the recent boom, telemedicine penetration is still low, but the scope for growth is significant. In the US, for example, we estimate that only 1% of the approximately 900 million annual individual physician visits used telemedicine prior to the pandemic.⁸ According to one estimate, the total US telemedicine market could grow by roughly 17% a year from 2019 to 2024, while the currently smaller Chinese market could grow at nearly 50% a year, overtaking the US in size by 2023 (Fig. 12).

Fig. 11

Significant increase in telemedicine utilization since COVID-19

Percent of respondents who have used each technology



Note: Citi survey question "Please indicate your experience with telehealth to talk to your physician via phone or web"

Source: Citi Research, UBS, as of July 2020

⁸ Jaiendra Singh, Jermaine Brown, Adam Heussner, "Telehealth Industry: Beyond the Pandemic" (June 2020), <https://ramaonhealthcare.com/telehealth-industry-beyond-the-pandemic/>

You can explore more here about > Healthtech



Telemedicine can save costs for the healthcare system, improve the utilization of physicians' time, and improve the patient experience. Better access to care in remote or rural areas is also a key benefit. In China, which lacks an effective primary care system, advanced, AI-driven telemedicine companies are stepping in to provide online primary care. More broadly, reducing hospital admissions through earlier and more remote interventions should help to slow the growth in total cost of care. Similarly, at-home alternatives to traditional clinic-based healthcare services should expand, as is currently underway with US dialysis services.

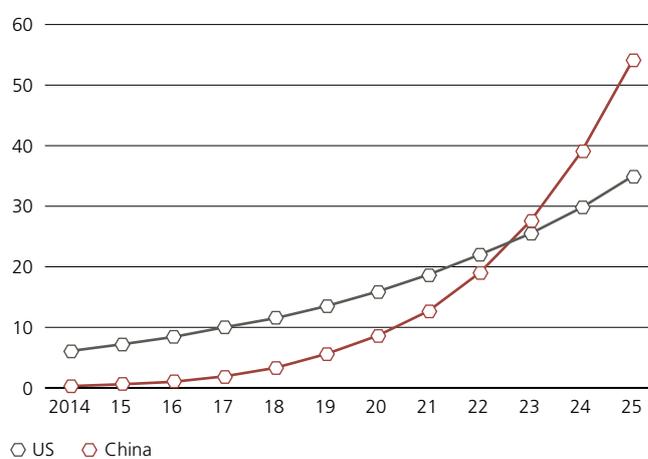
Hospitals will remain the mainstay of treatment for serious conditions or surgical procedures. But even here, we see a shift to more minimally invasive robotic and digital procedures. Their benefits include more consistent outcomes to complex surgeries, with faster recovery times allowing patients to recover at home instead of in hospital. Greater connectivity (5G) could even mean the surgeon operating the robot need not be physically present at the operation. Currently, only around 2% of applicable surgical procedures are performed robotically.

Companies providing telemedicine generally fall into the "enablers" group previously described. You can explore more about telemedicine as part of the broader [healthtech](#) trend.

Fig. 12

US and Chinese telemedicine market on the rise

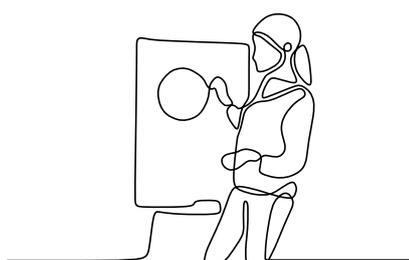
Market size projections in USD billions



Source: Frost & Sullivan, Statista, Bloomberg Intelligence, UBS, as of February 2020

Summary

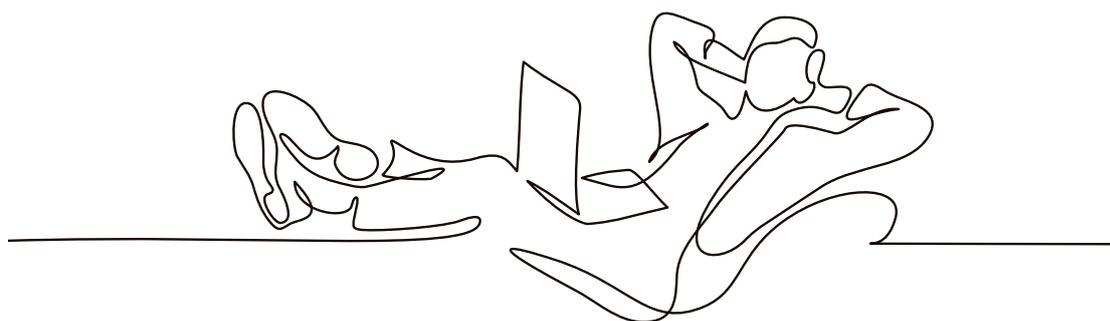
In this chapter, we explore changes to come as data, connectivity, and biology converge to reshape our health for the digital age. As patients become "health consumers," we expect healthcare to transform from an episodic service to a lifelong process of managing and maintaining health. Technology will enable both new ways to manage our health and a shift of the location of care, breaking down the walls of the traditional hospital.



Happiness and consumer preferences

Navigating a period of rapid change

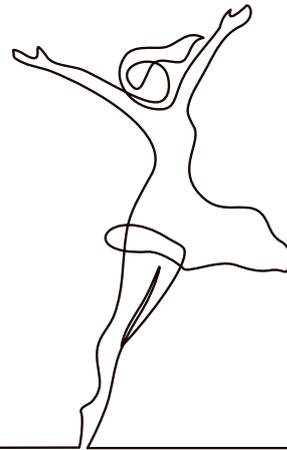
Demographic change and technological progress mean the investment opportunities in public and private markets are broad. We focus here on the opportunities resulting from more socially conscious and digitally savvy consumers—sustainable brands and digital entertainment like augmented and virtual reality (AR and VR) and esports.



What you need to know

- Several factors have consistently contributed to human happiness throughout the ages, but on the individual level, it remains a lifelong pursuit. We expect demographic developments and rapid technological change to influence the path to happiness in the decade ahead.
- The millennials and Generation Z⁹ will move into their peak earnings years and likely benefit from wealth transfer. These cohorts are broadly more conscious of their social and environmental impact. They often value experiences more than material ownership. Companies that produce goods and services that cater to these generations' social and environmental values are likely to benefit. Furthermore, companies that provide new consumer experiences through technologies like augmented and virtual reality can offer attractive investment opportunities.
- Technological progress has raised living standards. But at the same time, more hours spent in front of screens carries risks to well-being. Mental and physical health applications and platforms could benefit both consumers and investors.

⁹ For the purposes of this paper, we define millennials as individuals born between 1982 and 2000, and members of Generation Z as individuals born between 2000 and 2012. Readers should note, however, that these definitions are not universal and may differ from other sources.



Demographics and technology will shape our future happiness

- Demographic shifts and technological advancements will play a role in influencing our future happiness. Digital experiences will become increasingly popular, but screen time could weigh on mental health.
- Companies with strong employee well-being initiatives should see longer-term benefits including better productivity and lower healthcare costs.
- Technology can expand access to mental health and fitness tools, benefiting companies with exposure to data-driven wellness or fitness applications.

Over the past few decades, we have seen many factors related to happiness trend in the right direction. Economic prosperity is rising; access to critical resources and services has broad-

ened; and people are more connected than ever, at least in the digital sense. Despite these trends, mental health concerns are mounting. In the US, teen depression rose 63% from 2007 to 2017.¹⁰ And the World Health Organization’s report on mental health and COVID-19 estimates the global economy loses USD 1 trillion every year to depression and anxiety.¹¹ We believe demographic and technological developments will change our pursuit of happiness over the coming decade.

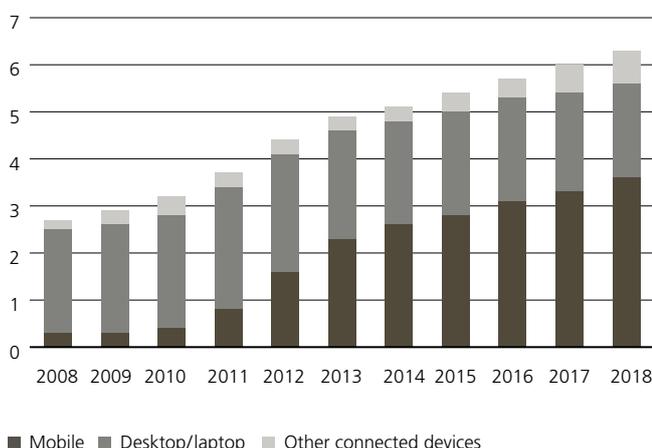
Over the next decade, millennials will begin to reach midlife, and greater numbers of Generation Z will reach adulthood. These rising cohorts are “digital natives,” and as this tech-obsessed demographic becomes a larger proportion of the population, we can expect to see hours spent on digital devices rise further (Fig. 13).

Unfortunately, more screen time could have consequences for well-being. But the relationship between technology and mental health is not straightforward. For instance, time spent learning online would likely have a different impact than time spent on social media. A study from the University of Pennsylvania found that spending less time on social media—which about 88% of 18- to 29-year-olds use some form of¹²—could decrease feelings of loneliness and depression.¹³

Fig. 13

Time spent on digital media rising steadily

Average number of hours per US adult user per day



Source: Ourworldindata, eMarketer, UBS, as of October 2018

10 Substance Abuse and Mental Health Services Administration, “Key substance use and mental health indicators in the United States: Results from the 2018 National Survey on Drug Use and Health” (August 2019)

11 United Nations, “Policy Brief: COVID-19 and the Need for Action on Mental Health” (May 2020)

12 Pew Research Center, “Social Media Use in 2018” (March 2018)

13 Melissa G. Hunt, et. al., “No more FOMO: Limiting social media decreases loneliness and depression,” *Journal of Social and Clinical Psychology* Vol. 37 No. 10 (2018), 751-768

On the positive side, technology is broadening access to experiences at a cheaper cost and expanding the options available for maintaining well-being. For example, virtual reality technologies will increasingly enable more of us to enjoy a concert or experience another country without leaving our homes.

In the healthcare space, health and wellness mobile apps are gaining traction and expanding access to mental health services. Similarly, we could see technology enable new possibili-

ties for improving physical fitness. Since the pandemic, for example, we have seen former gym-goers transition to internet-based fitness experiences. While it's too early to tell whether some of these self-directed health habits will stick, we outlined in the prior chapter that technology will continue to influence how we manage our health in a more preventive way going forward.

What makes us happy?

The pursuit of happiness is central to the human condition, but it's not easy to navigate. Research tells us that a vast number of factors influence human happiness.

First, economic well-being plays a role, but it isn't the full answer. Personal income and wealth levels, as well as overall economic prosperity, enable humans to meet their basic needs, achieve a quality standard of living, and enjoy their leisure time. But the relationship between GDP growth and happiness is not linear. In 1974, an economist named Richard Easterlin discovered that average life satisfaction in the US had stagnated between 1946 and 1970 even as GDP per capita had grown by 65% over the same period.¹⁴ This disconnect between GDP and happiness over the long term has been dubbed the "Easterlin paradox," and evidence from the UN

World Happiness Report shows that the paradox continues. For example, for the period 2005–08 relative to 2016–18, India saw one of the largest countrywide declines in happiness, while at the same time experiencing faster growth than most world economies.

So, what other variables influence happiness? Based on the UN's model, three-quarters of the variation in country happiness can be explained by six key variables: GDP per capita, social support, healthy life expectancy, freedom to make life choices, generosity, and freedom from corruption. Across the Harvard Adult Development study and others, some common determinants of personal happiness included social interaction and close relationships; giving to others and altruism; and physical health and fitness.^{15,16,17} Further, one study showed that spending money on others and on

experiences led to greater happiness than purchasing material goods for oneself.

Finally, while many of these studies focused on average levels of happiness over time, we now have the ability to track happiness in real time using smartphones. A research project called Track Your Happiness queried study participants about their happiness at random intervals during the day, and found that people are happiest when they are engaged in an activity and their minds aren't able to wander to unhappy thoughts. For example, people were happier when they were occupied with things like exercising, shopping, playing, and listening to music versus working and commuting and sitting at the computer, when their minds were more likely to wander.¹⁸

14 The Economist, "Economic growth does not guarantee happiness," March 21, 2019

15 Elizabeth Hopper, "How Your Social Life Might Help You Live Longer" *Greater Good Magazine* (June 2020). Accessed July 2020. https://greatergood.berkeley.edu/article/item/how_your_social_life_might_help_you_live_longer

16 Daniel Gilbert, Annie McKee, Gretchen Spreitzer, Teresa M. Amabile, *Happiness (Emotional Intelligence Series)* (Harvard Business Review Press, 2017)

17 S. Q. Park, et. al., "A neural link between generosity and happiness," *Nature Communications* (2017). Accessed July 2020. <https://www.nature.com/articles/ncomms15964>

18 Cassie Mogilner, Michael I. Norton, "Time, money, and happiness," *Current Opinion in Psychology* (2016), 10:12-16

It's more than the size of the paycheck.



According to a study cited by the Harvard Business Review, those "thriving" at work demonstrate:

30%

A 2013 Gallup poll found that only 30% of the US workforce is "engaged" with their jobs.

16%

better overall performance

125%

less burnout than peers

32%

more commitment to their organizations

Numerous academic studies support the notion that our happiness at work is not solely dependent on the size of our paycheck. From an investment perspective, considering the happiness of employees is important because happy people are generally better workers, and those who are engaged with their jobs work harder and smarter. Keep in mind that happy workers are not easy to come by: A 2013 Gallup poll found that only 30% of the US workforce is "engaged" with their jobs.¹⁹ So, what does make us happy at work?

According to a study cited by the Harvard Business Review, across industries and job types, those that are "thriving" at

work—defined as having a sense of excitement and meaning about their work, while at the same time learning on the job—demonstrated 16% better overall performance and 125% less burnout than their peers. Further, these employees were 32% more committed to their organizations. They also missed much less work and reported significantly fewer doctor visits, which meant healthcare savings and less lost time for the company.

Inclusivity may play a role in employee happiness as well. The Do Something Good project studied the impact of inclusive behaviors on feelings of well-being, and found that participants who acted

more inclusively overall felt higher feelings of well-being.²⁰

As investors, we can use a sustainable investment approach to focus on companies with practices that support a happier, healthier, and more inclusive workforce. Employee benefits and wellness programs can help companies recruit and retain talent, and when employees are satisfied with their wellness options, they tend to be more engaged. In addition to the study above, there is growing evidence that a healthier, more engaged work force can improve company productivity and reduce healthcare costs.

¹⁹ Hopper, "Social Life"

²⁰ Nathaniel Charlton, Karen J. Pine, Ben C. Fletcher, "Diversity and inclusiveness, wellbeing and openness to change: the effects of a Do Something Different programme in a global organisation," Do Something Different Ltd (September 2016)

The future of happiness—the view from an expert

Interview with Dr. Daniel Cordaro,
UBS Global Visionary and Chief Equanimity Officer at The Containment Foundation

What are the biggest determinants of happiness and how might these change?

Human beings have been talking about happiness for at least 4,000 years, but we still don't have a common definition. In one school, happiness is determined by access to things that maximize pleasure and minimize displeasure. This model, often called the "More" model because happiness depends on acquiring more things or experiences, depends on factors outside of ourselves. In another school, happiness is driven by our inner ability to ride the waves of human experience and cultivate internal wellness, even through turbulent times. In this model, often called the "Enough" model because happiness depends on saying we're enough as we are, happiness is driven from within. There are great differences in the individual and collective sustainability of the "More" and "Enough" models. I think of them being like coal power and solar power, respectively.

In the future, I believe happiness will depend more and more upon a reassessment, a questioning of what human beings want. The "More" model—a common one in many more developed economies—may come under increasing challenge. And our future happiness will be a function of our relationship with technologies.

Today's technologies are some of the most distracting ones to ever become available to humanity. Self-awareness of technology's impacts on our physical, and especially mental, well-being will become an even greater consideration than today. Problems like technology addiction—present before the COVID-19 pandemic and whose effects the crisis

has brought to the fore—may spur a similar mental health revolution to the physical health revolution experienced in the US during the 1980s. In fact, I would say that awareness of our mental health and active efforts to improve it will be one of the biggest drivers for our future happiness in the coming years.

How enduring will the consequences of the COVID-19 pandemic be, like greater social isolation and a faster transition to digital lifestyles?

COVID-19 may have accelerated existing trends like increased digitization. We've already seen that the pandemic and the speed of transformation in our daily lives have had negative implications for personal well-being. But I think a positive lasting consequence of the pandemic will be an even greater emphasis on mental health and wellness as the key to sustainable happiness.

COVID-19's isolating effects have made people question what it means to be on their own. It's also forced many of us into not looking for others to make us happy, but rather at what we can do to cultivate our own happiness, our own mental health and well-being. In the future, I expect that we'll develop completely new relationships with technology—away from the instant gratification and likes of social media, and toward using it as a tool for personal development and growth.

How will companies support their employees' mental health and well-being in the future?

First, I believe companies will provide universal access to acute support services for mental health challenges, either through technology or through in-person counseling.

This interview contains views which originate from outside Chief Investment Office Global Wealth Management (CIO GWM). It is therefore possible that the interview does not fully reflect the views of CIO GWM.

Second, I think firms will approach mental health with the same proactive, preventive approach that they do toward employees' physical health today. In the future, corporations will work to support prevention of mental health problems before they happen, through physical and technological means, as opposed to triaging problems only when they materialize. Individuals will follow the same, front-foot approach. They'll divert some of their health dollars toward investing in themselves—looking at their own mental health and feelings, identifying growth opportunities, and then investing in the tools to do the inner mental work needed to build more resilient minds.

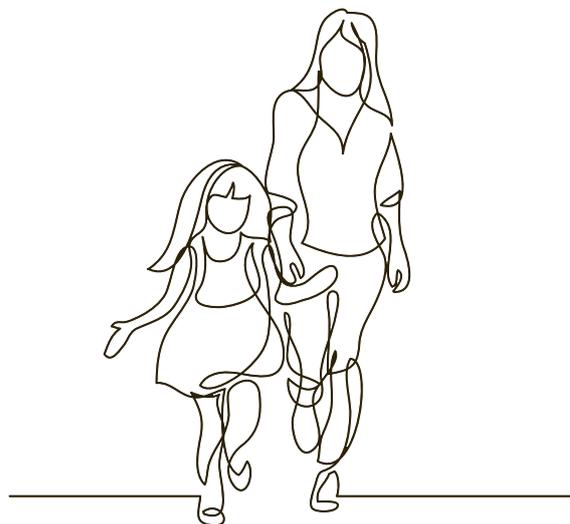
And third, businesses will increasingly think of themselves as systems of human beings—workers, customers, stakeholders. Maximizing business value will become more holistic, about creating mechanisms within the business to support stakeholders' physical and mental health if they want to build a healthy, profitable business for the long term. Companies will question whether they always have to focus on bottom-line returns or whether they put human beings at the center of what they do. As the empirical evidence grows linking happier employees to higher productivity, human-oriented systems will increasingly be seen as the only means to the end of higher profits.

The next generations and their shifting preferences for goods and experiences

- Millennials and Generation Z will see their spending power increase as they enter peak earnings years and inherit wealth.
- These cohorts will generally favor sustainable brands that reflect their social and environmental values. Companies offering sustainable products are set to benefit.
- Technologies like augmented reality and virtual reality are expanding digital entertainment options.

Consumer preferences will change alongside demographic and technological developments. Given their population and rising spending power as they enter peak earnings years and as a result of generational wealth transfer, millennials and Generation Z will increasingly influence consumption patterns. Companies will therefore need to consider these groups' social and environmental values and their preferences for sustainable brands, as well as their affinity for digital experiences. Consumers are increasingly seeking greater transparency from the companies they are buying goods from. Technology has played a role in making this data available, and, at the same time, demographics have tipped the balance in favor of sustainable products. We believe that companies that offer sustainably made products should be well positioned to capture future demand.

While demographics will influence preferences for physical goods, technology will enable consumers to pursue a wider range of experiences. In the next decade, we believe that augmented and virtual reality-based entertainment will take digital experiences to the next level. AR and VR can be thought of as "technology cousins." Augmented reality adds digital elements to a scene that is typically displayed on a smartphone or tablet. It enhances reality rather than replaces it and typically requires little up-front investment as most modern smartphones can provide AR experiences. Virtual reality is more immersive as it often replaces a user's entire field of vision and leads the brain to sense the virtual experience as fully real.



There are a number of future uses for AR and VR technology, spanning from education to healthcare, but currently we are seeing traction within the entertainment sector. The gaming industry, in particular, could be one of the fastest to adopt AR and VR due to their use of motion technologies. Even prior to COVID-19, AR had already seen early uptake in gaming, with the AR-based smartphone game Pokémon Go being a nearly overnight success. The retail industry has also been an early adopter—Ikea uses AR to enable customers to see a digital version of how new furniture would look in their home. Turning to VR, video gamers were early adopters of the technology and may draw more upon it in the future. The entertainment world is also exploring the use of VR to enable new movie and music experiences. For example, a movie watcher may be able to venture virtually through a scene or a set, leading to varied interactions and plot outcomes.

Looking ahead, we believe significant advances in sensor and graphics technologies should accelerate innovation and promote the use of AR and VR in significantly more areas. The combined revenues of the AR and VR industries are expected to grow from USD 8.6 billion in 2019 to USD 107 billion in 2025 (Fig. 14). While most of today's sales are hardware, the mix of both AR and VR software should rise substantially as devices become cheaper and the availability of software content increases.

The rise of sustainable consumers

Interview with Alexandre Mars, serial entrepreneur, General Partner and CEO of blisce/, a growth venture capital fund that helps entrepreneurs build mission-driven global consumer brands and technology companies

What are unique characteristics of the next generation of consumers?

Generations Y—the millennials—and Z are motivated by purpose. They would rather talk about meaning, purpose, and sharing. They want to know what the company will do with its profits; pouring them all into share dividends is not good enough for these cohorts.

These generations bring their values to their purchasing decisions, and the same can be said about employment. Surveys show that 88% of business school students think that learning about social and environmental issues in business is a priority, and 67% want to incorporate environmental sustainability into their future jobs. These statistics would have been unthinkable just 20 years ago.

The next generation also has the advantage of demographics on their side. Fifty percent of the world's current population is under 30 years old. Very soon, Generations Y and Z will represent half of the global workforce—and they will change the rules of the game.

Are consumers putting their money where their mouth is? Are they willing to pay a premium for sustainable brands?

Sustainability has reached a tipping point. As consumers increasingly embrace social and environmental causes, they seek products and brands that align with their values.

The numbers tell a compelling story about how consumer behavior is evolving. A survey from the Nielsen Company found that 68% of consumers were willing to pay more for a sustainable product, up from 50% two years earlier, and

sales growth by companies with a demonstrated commitment to sustainability was four times higher than that of competitors: 4% compared to less than 1%.

According to another study by IBM, nearly six in 10 consumers surveyed are willing to change their shopping habits to reduce environmental impact. Nearly eight in 10 indicate sustainability is important for them. And for those who say it is very or extremely important, over 70% would pay a premium of 35%, on average, for brands that are sustainable and environmentally responsible.

Of course, not all consumers are alike, but most fall into one of two segments: value-driven consumers, who are primarily concerned with getting their money's worth and select brands based on price and convenience; and purpose-driven consumers, who select brands based on how well they align with their personal values and are willing to “walk the talk” when it comes to sustainability, changing their behavior, and even paying more for brands that get it right.

What's clear is that customers are willing to change loyalty when presented with more ethical options that resonate with their values. While some large companies that prioritize profit at the expense of the collective good might maintain a slight competitive advantage today, a more ethical competitor arising tomorrow and providing the same service while accounting for its impact would likely attract customers and steal market share.

What is the competitive environment between startups and incumbents in using sustainability as a differentiating point?

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Startups have the advantage of being able to move fast, to test new ideas, and to pivot. That applies to sustainability as well—entrepreneurs are catalysts for innovation. That's not to say that large corporations can't also innovate, but they're not as nimble.

Many new startups have understood that consumer expectations have shifted dramatically: people want to buy from, and work for, companies that share their values. More and more investors are also taking issues like sustainability and ESG factors into account. New ventures have the advantage of being able to integrate sustainability and social impact into their business model from day 1, and to make it a key selling point. Understandably, this often resonates as more authentic than some multinational corporation's latest corporate social responsibility campaign. In other words, startups have the advantage of being able to build their company culture from scratch, whereas incumbents have to adapt to a changing context.

The good news is that incumbents are paying attention to what startups are doing in terms of sustainability. They're trendsetters that influence the conversation and push the economy in the right direction. It has become increasingly clear that businesses need not decide between profits and purpose; the two go hand in hand.

You can explore more here about

- > Enabling technologies
- > Gaming and esports



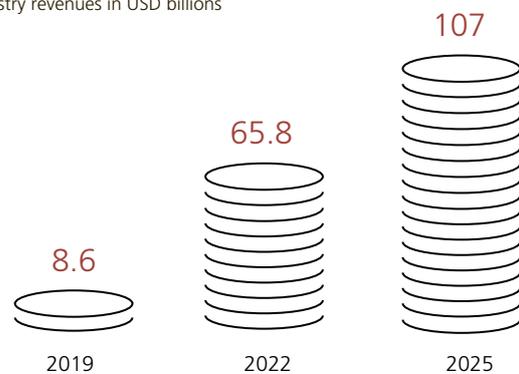
Additionally, we expect esports to continue to gain popularity and become a larger part of the overall gaming market. Today, according to Newzoo, Asia Pacific accounts for 51% of the estimated 395 million esports fans globally, but we're also seeing signs of increasing interest in other regions. Live events will remain essential to the industry's growth.

We expect to see further expansion of live venues such as the HyperX eSports arena in Las Vegas, and more leagues surrounding popular games. Gaming companies are looking to improve esports monetization by capitalizing on advertising, ticket sales, and merchandise. Epic Games earned more than USD 100 million a month through Fortnite in-game purchases, despite the game being free to download. We are still in the beginning stages of this esports trend, but growth should accelerate as the tech-savvy millennial and Generation Z cohorts increase their spending and as the technologies develop and scale. For investors, we see a range of opportunities—from video game publishers and technology companies, to media conglomerates expanding into the space (Fig. 15).

Fig. 14

AR and VR market to grow more than tenfold in five years

Industry revenues in USD billions

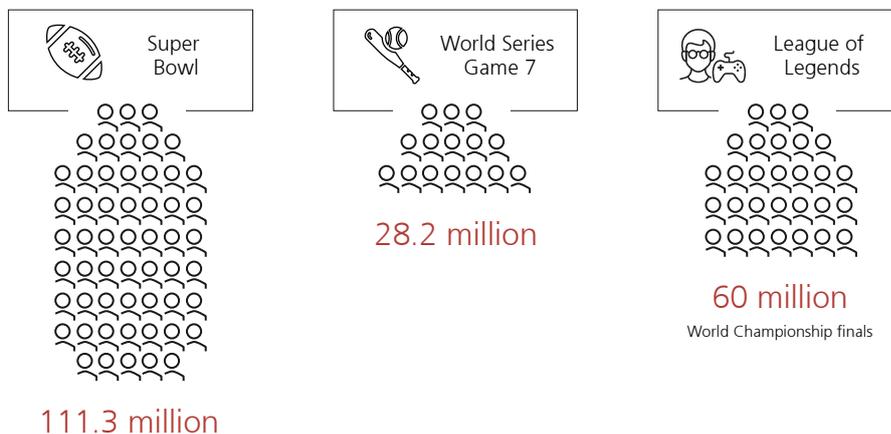


Source: eMarketer, IDC, Goldman Sachs, Bloomberg Intelligence, UBS, as of January 2020

Fig. 15

Major esports events poised to attract more viewers than traditional sporting events

Total unique viewers, 2018



Source: Nielsen Ratings, company websites, Bloomberg Intelligence, UBS, as of July 2018

The future of gaming—the view from an entrepreneur

Interview with a member of the UBS Industry Leader Network* operating in the gaming sector

What are the most notable developments in the gaming sector?

Esports is one area that has seen considerable growth and looks set to become more popular in the future. Competition lies at the heart of esports. As a result, there will be greater professionalization as sponsorship and prize monies increase. And the volumes of events and sponsorship will lead future e-gamers to invest in more sophisticated hardware and higher standards of training—including teams providing coaches and even dietitians to ensure players have the right diet—in order to be competitive. E-gamers will become more like athletes. The most developed esports countries in Asia are South Korea, China, and Japan in particular, while in the West you have the US leading the way, followed by France and Germany.

Within traditional gaming, the variety of formats will continue to expand. The marketplace for “hypercasual” games will likely expand further. These are free-to-play games, often for mobile, that have simple mechanics and are instantly playable. Developers tend to build a portfolio of such games, rotating between them as tastes quickly evolve. The revenue models for hypercasual games will look increasingly different to mobile mid- and hardcore games—those where you make money mostly through either comparatively large one-time ticket prices or continuous “in-app” purchases.

Developers will monetize hypercasual games by creating more “reward videos” or adverts where users are rewarded for viewing them by receiving game credits or rewards, including tools that help them play their game faster.

This revenue model is likely to become more important over time, as games increasingly become services rather than products.

How do you expect augmented reality and virtual reality to change gaming in the future?

I think there is still a lot of potential in AR and VR despite many such applications not yet matching the hype of their launches, nor paying off the considerable investments made in them when the technologies first emerged. User experience and cost have prevented AR and VR from moving into the mainstream already. But when the hardware improves and becomes cheaper and friendlier for consumers, these technologies could take off.

The catalyst for bigger AR and VR adoption could be a blockbuster game, or if AR and VR help create an experience that seamlessly mimics the real world. A more gradual change driver could be applications of AR and VR to travel, learning, or business in a world after COVID-19. Above all, AR and VR applications will have the winning competitive edge as and when they produce a user experience that is impossible in the real world and truly differentiated compared to everything that has come before.

*The UBS Industry Leader Network is a global group of UBS clients and prospects who are private business owners and executives. Their views may differ from those of UBS.

On latency

Contribution from Mattia Balsiger, Anna De Mezzo, Markus Iofcea, Elias Lingnau, and Baker Wardlaw, UBS Y Think Tank

“Latency: the state of existing but not yet being developed or manifest; concealment”²¹

“Latency is a time interval between the stimulation and response, or, from a more general point of view, a time delay between the cause and the effect of some physical change in the system being observed.”²²

Future paradigms of production and consumption are increasingly thought to revolve around ideas of “on demand.” In the coming decades, consumers may witness a revolution in on-demand, localized production. It may seem inevitable that the producer and consumer will become one and the same; a highly personalized, hyperlocal factory on the go. People will become printers. But what if, instead, our highly sensoric environment produced everything we needed? What if production became ubiquitous and part of our surroundings? What if the world became a printer?

In this paradigm, which is one of many possible futures, production can take place anywhere, at any moment; instead of on-demand, it is ambient. Trillion sensing allows objects, humans, and their environment to communicate seamlessly as part of the vast network. Capabilities and latencies can be identified everywhere and in everything. We know that products, services, people, and moments have latent potential that can be productively used and distributed. Time latency will still be necessary for

some products—a wine, a book, a building—to come into fruition. But other products may gain or lose value from this temporal delay. The widespread awareness of this latency and its implications are not part of our present lives. But new paradigms of supramization²³ and trillion sensing networks could allow a future of latent resources and their potential configurations becoming attainable to vast networks of objects and individuals.

Future thinking as the practice of imagining and creating futures can provide a glimpse into the nature of latency. First, it has significant temporal latency. There is a lag between first ideas emerging and the finalization of a concept or a scenario. That period of time enables a “product” to really come to fruition, since ideas need time for maturation, testing, and discussion that reveals their true meaning or use cases. At the same time, future thinking also highlights the second meaning of latency in the sense of hidden potentials. It can generate a better understanding of what is going on in the present, foster openness and tolerance, and open untapped sources of novelty. Finally, the interaction between the two forms of latency becomes visible—the time lag (temporal latency) provides the opportunity and the space for more hidden potentials (latent potentials) to emerge.

In a future where the world is a printer, a consumer’s experiences look completely different from today. A trillion sensor network might recognize a latent

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potential for mobility in the area. Being part of the net, your timely desire to move is recognized. What if, out of your environment, a Magowaggon²⁴ appeared, almost organically maneuvering the terrain through the intelligent matching of your needs and the latent potential of mobility in a trillion sensing environment?

The consumer encounters the product, uses it, and leverages its untapped potential. Afterwards, the productive latencies become data in networks, with the potential for this information to be used differently by other parts of society. All products and services become ambient—they are constantly capable of being activated, yet not always materialized.

This becomes possible through humans’ sense of responsibility. In this future paradigm, there exists a willingness to make space for latency, uncertainty, and ambiguity as a breeding ground for hidden potentials. This enhances human agency rather than reducing it since the loss of control is exceeded by the richness of new, unique, and surprising experiences. What if the time spent waiting for this future was time spent making it?

21 “latency.” Lexico.com. 2020. <https://www.lexico.com/definition/latency>

22 “Latency (engineering).” Wikipedia. July 18, 2020. [https://en.wikipedia.org/wiki/Latency_\(engineering\)](https://en.wikipedia.org/wiki/Latency_(engineering))

23 A type of optimization that also prices in and allows for second and third order variables and effects.

24 The “Magowaggon” is a fictional representation of the emergent nature of production (in this case, the production of mobility).

You can explore more
here about
> Space



Space tourism takes off

While digital technologies will take our minds to new places, we believe the ultimate experience of the future will be space tourism. In the next two years, we will likely witness the first commercial space tourism flights to low-orbit space. Since the advent of space travel in the latter half of the last century, 550 people have been to space, and 35 have been in the last three and a half years. The cost of going into space for individuals has fallen from USD 20 million—the amount Dennis Tito paid in 2001 to fly to the International Space Station—to USD 250,000.

The key to successful space tourism is rocket reusability, with the two key players pursuing this route through their latest rocket models. A typical space flight will take six passengers, fly 110 kilometers into suborbital space, and offer four minutes of weightlessness. Following over a decade of test flights, one of the key players expects to launch its maiden commercial passenger service to suborbital space within 12 months.

These first forays into commercial space tourism flights, in addition to the anticipated launch of the first satellite internet

service, will be important catalysts for the space economy, awakening consumers and investors to the commercial possibilities of space. Investment exposure at this early stage is best gained via listed companies in the aerospace, satellite, and communication segments. New space startups may offer opportunities in private markets as well.



Summary

Demographic shifts and enabling technologies will play a greater role in shaping human happiness—potentially for better and worse. A more socially and environmentally conscious consumer will boost growth for sustainable brands. These same digitally savvy consumers will also seek out more digital entertainment experiences, like AR, VR, and esports. More time spent in the digital realm could impact mental health, fueling demand for tech-enabled wellness tools.

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