

Complex disruptions to the Future of Work

Macro trends, realities and market insights that shape the future of work



Research Overview

WBCSD has reviewed a broad spectrum of research and perspectives to provide condensed insights into the future of work, tailored to a business audience. This research provides a common entry point for companies to cut through the noise, navigate the future of work-related issues and engage with the current debate.

The results of our research and analysis focus on two areas:

- 1. The context for the future** - *To provide a shared understanding of the current situation and the imperative for action. What are the macro trends and realities that are impacting the future of work?*
- 2. People and market insights** - *To uncover the demand and market readiness for positive action. How are people's needs and desires changing, and how are they showing up in the job market and workplace?*

To produce this analysis, we analyzed reports published by leading organizations on the Future of Work (see [here](#) for summaries of key reports). From those reports, we identified the trends being highlighted as major forces driving changes in the world of work.

We built upon the details of these trends and their implications for business with insights from a wide range of sources including technology-focused organizations, academic reviews, polling organizations, media and consumer insight organizations, and mainstream news channels.

Information sources for WBCSD research:

Key reports from:



A wide range of additional sources (not exhaustive):



Analysis of trends & insights

Existing research and insights indicate that the future of work is facing complex disruption at the hand of three inter-connected forces: rapid technological change, global socio-economic polarization and a shift in worker's expectations. Effectively navigating this turbulent time is imperative to avoid jobless growth, income inequality and social instability. Along with concerns comes the potential for companies to create a preferred future in which work is designed in a way that increases both value & meaning and efficiency & productivity. Disruptive developments provide game-changing opportunities to engage and empower the workforce and to use technology to generate valuable benefits for business, workers and society.

Rapid technology evolution

The unprecedented pace of development and adoption of new technologies – most notably robotics, artificial intelligence, the internet of things, platform technologies and blockchain – are raising concerns of mass job displacement and job losses while rapidly changing tasks and work patterns and challenging how companies and commerce function.

Global socio-economic polarization

Technology transformation is further exacerbated by global socio-economic polarization – driven by climate change, rising inequality, shifting demographics, migration pressures, increasing urbanization and political backlash against globalization – all of which have an impact on the global labor market.

Shifting workers' expectations

Meanwhile, the expectations of the workforce are shifting. Income security, transparency, inclusion and equity are now fundamental requirements, while the ability for companies to provide meaning, flexibility and opportunity are becoming critical differentiators.



Rapidly evolving technology

- Robots & Artificial Intelligence
- Communication & collaboration technology
- Platform economy
- 3D/4D printing, Immersive Tech, IoT and Blockchain



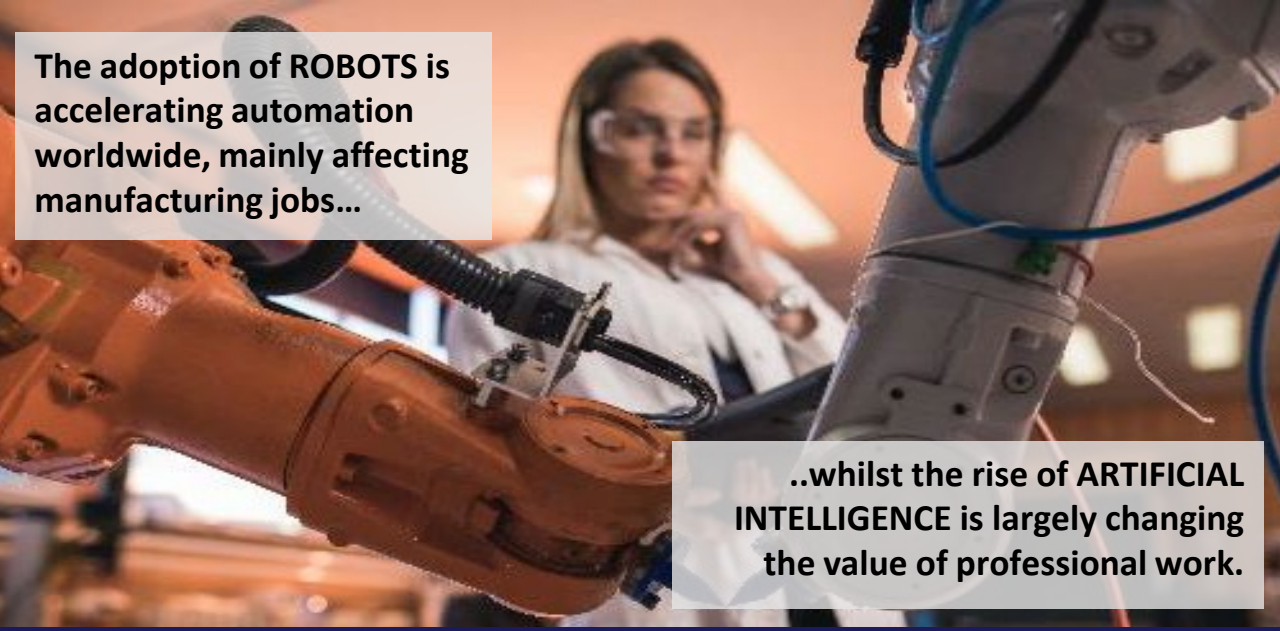
Socio-economic polarization

- Climate change
- Income inequality & job polarization
- Global skills gap
- Demographics
- Migration
- Urbanization
- (De-)globalization
- Political backlash



Shifting workers' expectations

- Income & job security
- Meaning
- Community
- Personal growth
- Opportunity
- Flexibility
- Autonomy
- Fairness
- Social concern
- Employment confidence
- Trust in business



The adoption of **ROBOTS** is accelerating automation worldwide, mainly affecting manufacturing jobs...

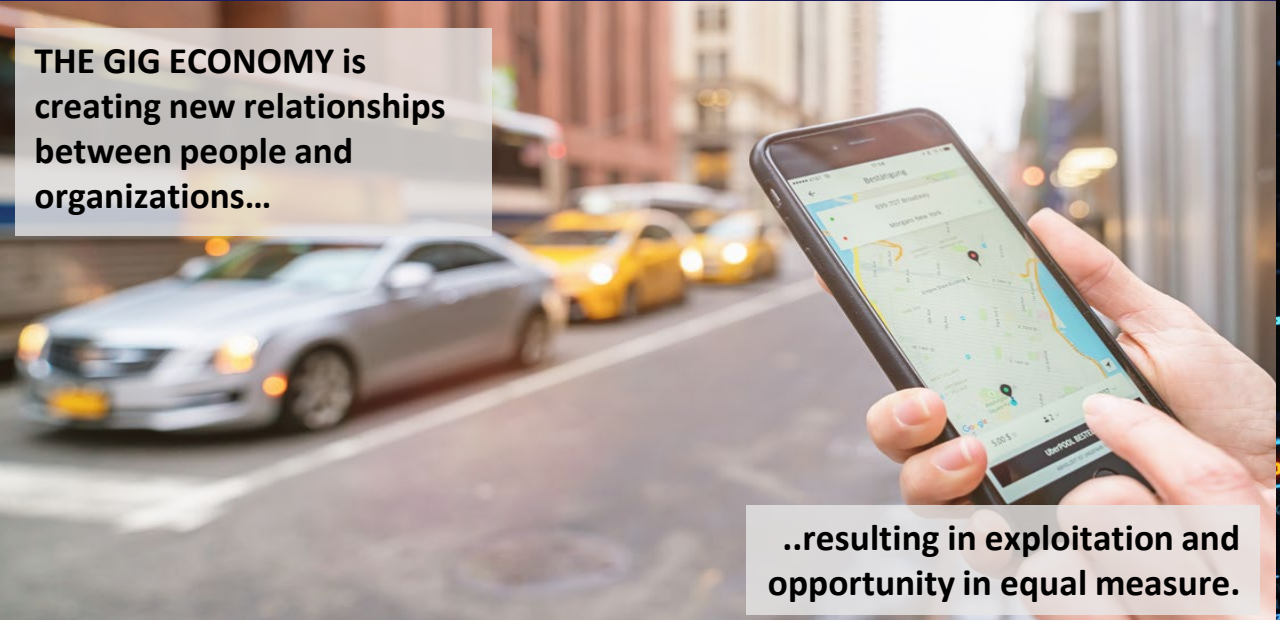
..whilst the rise of **ARTIFICIAL INTELLIGENCE** is largely changing the value of professional work.



Meanwhile **ADVANCED COMMUNICATION & COLLABORATION TECHNOLOGY** accelerates changing work patterns..

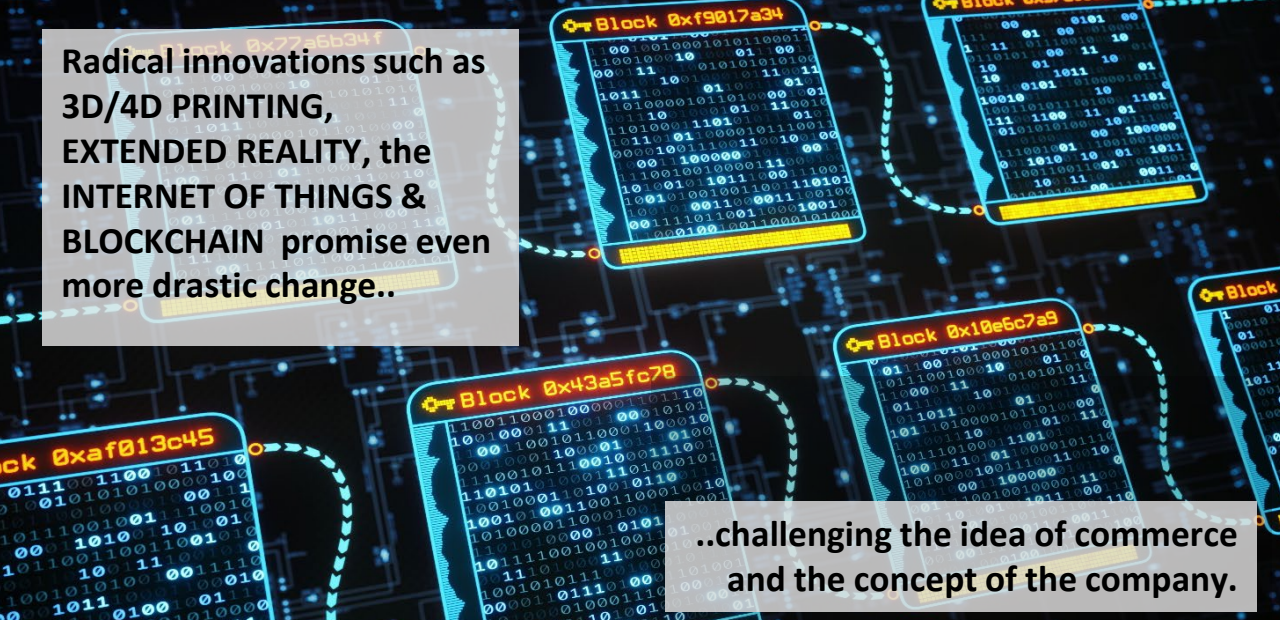
..leading to a rise of **REMOTE WORK.**

Emerging technology is transforming the world of work...



THE GIG ECONOMY is creating new relationships between people and organizations...

..resulting in exploitation and opportunity in equal measure.



Radical innovations such as **3D/4D PRINTING, EXTENDED REALITY, the INTERNET OF THINGS & BLOCKCHAIN** promise even more drastic change..

..challenging the idea of commerce and the concept of the company.

THE ADOPTION OF ROBOTS IS ACCELERATING WORLDWIDE..

Automation affects millions of blue-collar jobs

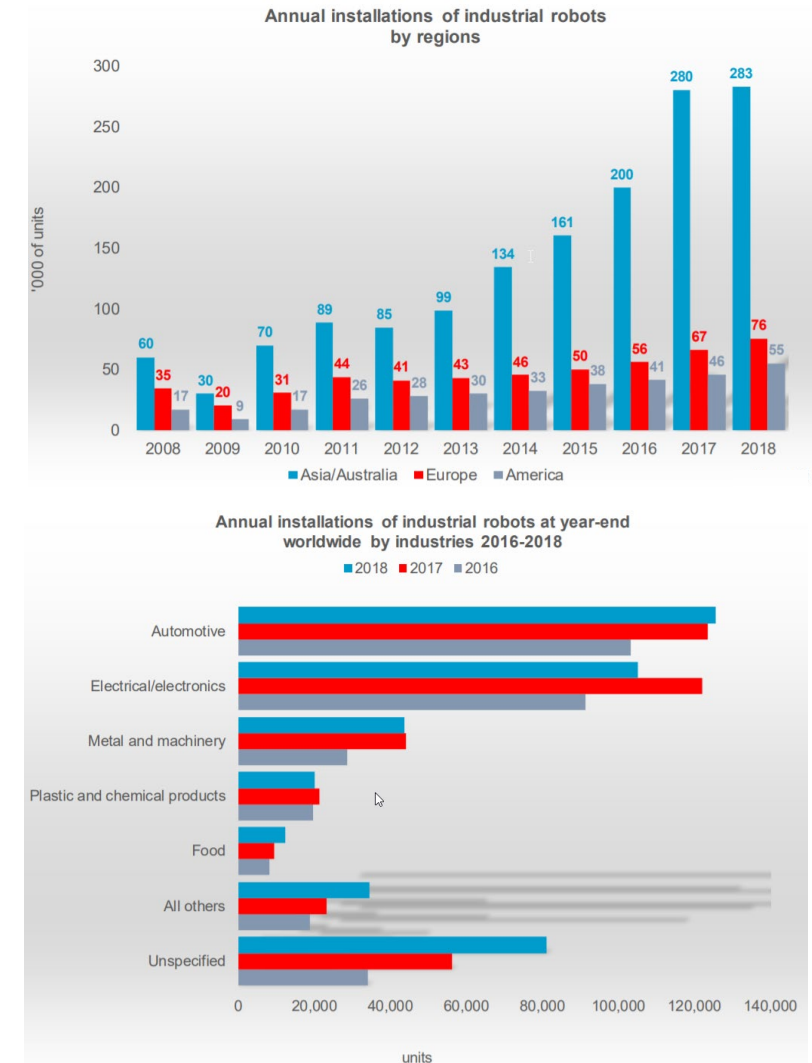
Since 2010, demand for industrial robots has increased significantly due to the growing trend of automation and continued technical innovations. Industrial robots are predominant in the manufacturing industry, with rising numbers of robots put into operation across all regions.

In 2018, there were on average 99 robot units per 10,000 employees; globally, industrial robot installations increased by 6% to 422,271 units, worth USD 16.5 billion. Asia is the world’s largest industrial robot market – two out of three robots (67%) newly deployed in 2018 were installed in that region. Just five countries account for 74% of global robot installations: China, Japan, the United States, the Republic of Korea, and Germany. The automotive industry remains the largest customer industry with 30% of total installations, ahead of electrical/electronics (25%), metal and machinery (10%), plastics and chemical products (5%) and food and beverages (3%) ([IFR 2019a](#)). [IDC \(2019a\)](#) estimates that worldwide investment in robotics and drones will reach USD 128.7 billion in 2020, an increase of 17% over 2019.

The number of professional service robots, such as autonomous guided vehicles, inspection, maintenance or medical robots, sold in 2018 rose by 61% to more than 271,000 units, up from roughly 168,000 in 2017. The sales value increased by 32% to USD 9.2 billion ([IFR 2019b](#)).

Despite dire predictions of wide-reaching job losses and humans being set to be replaced by robots (see [McKinsey 2017](#) as an example), these concerns are on balance unfounded and not supported by evidence so far ([World Bank 2019](#)). MIT Technology Review (2018) created an [ongoing chart](#) of all studies which have predicted how many jobs will be lost and created due to automation, robots and AI. Their conclusion: “We have no idea how many jobs will actually be lost to the march of technological progress.”

Nevertheless, in some advanced economies and middle-income countries manufacturing jobs are being lost to automation. Machines replace workers most easily when it comes to routine tasks that are “codifiable”. And yet, technology has provided flexible solutions and opportunities to create new tasks, jobs and sectors, to increase productivity while improving the quality of work and protecting and freeing workers from performing unsafe, repetitive and tiring tasks ([World Bank 2019](#)).



Source: [International Federation of Robotics \(IFR\) 2019](#)

..WHILST ARTIFICIAL INTELLIGENCE CHALLENGES THE VALUE OF PROFESSIONAL WORK

AI transforms an ever-widening number of white-collar tasks

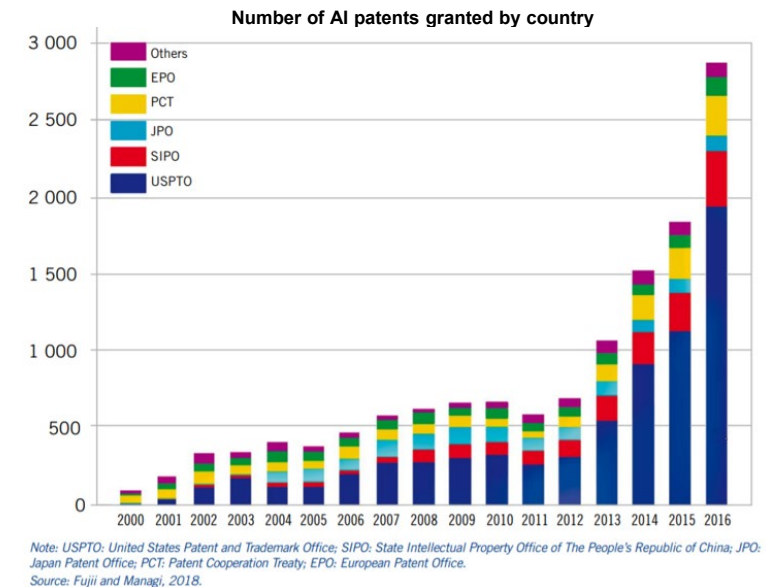
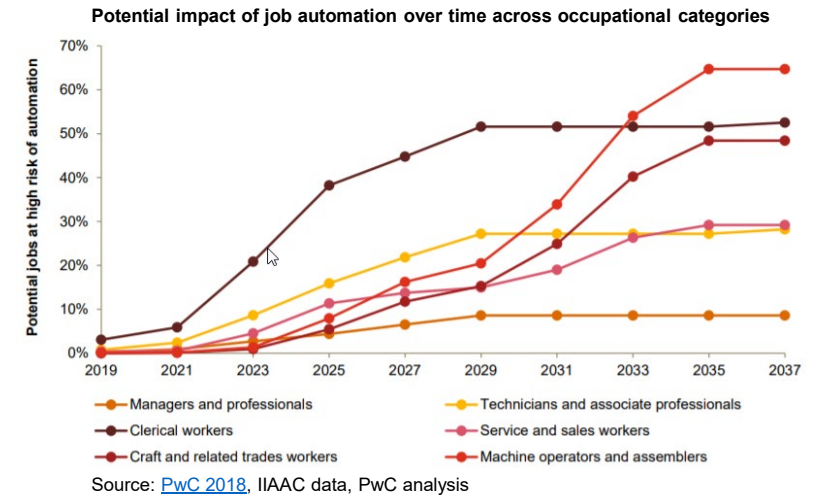
Whilst robotic process automation in the workplace has focused attention largely on the impact on manual labor, AI and the growing power of software promises perhaps even greater disruption to a range of office jobs from clerical to professional roles.

Key areas of development around AI that figure prominently at work and in daily life include bots, speech and image recognition, natural language processing and machine translation, automatic text generation, or customer tele-assistants. More sophisticated applications are medical expert systems (medtech and telehealth), automated review of legal contracts (lawtech), self-driving cars or trucks, and the detection of patterns in stock markets for successful trading (algorithmic trading).

These applications all concern tasks that require specific human capacities related to visual perception, speech, sentiment recognition and decision-making. This means that AI is replacing cognitive or mental tasks rather than physical ones, which were targeted in previous waves of mechanization ([ILO 2018](#)).

In recent years, there has been a rapid growth in AI patent applications across different patent offices worldwide. Many new services and products appeared, leading firms to adopt smart algorithms across many domains of business practice. This rapidly growing market quickly overtook large, well-established companies in traditional business lines. Within only 15 years, companies such as Google, Apple, Facebook and Amazon have belittled historic giants like Walmart, General Motors or General Electric. ([ILO 2018](#) & [Randstad 2019](#)).

In the future, AI will most likely be ubiquitous in a broad range of domains, such as enterprise resource planning, incl. planning human resources, customer relationship management, but also in factories, fostering enhancements in production, design and even predicting future demands or quality issues ([B20 2018](#), [Randstad 2019](#)).



MEANWHILE, THE RISE OF ONLINE COMMUNICATION AND COLLABORATION SPACES..

The evolution of communication technology..

An earlier wave of technology innovation – fibre optic broadband, wireless mobile communication, mobile computing, and VoIP services – has led to a widespread adoption of voice, video and chat communication technology, allowing consumers and workers to communicate more efficiently online and in real time from anywhere in the world with decent Wi-Fi.

5G, the fifth-generation of mobile networks, is further revolutionizing mobile high-speed connections, and will be needed to meet the demands of increasing data-intensive applications, such as the internet of things (IoT), cloud services, virtual and augmented reality experiences, and more. Robust 5G networks have the potential to spread to more people globally, fostering digital inclusion of so far marginalized groups ([Brookings 2019](#)).

..and workplace collaboration tools

Workplace collaboration tools belong to the chief beneficiaries of this evolution; video conferencing and enterprise chat applications are becoming ubiquitous in modern offices. Supported by the rise of low cost, high fidelity cloud computing services provided by the most reputable technology companies in the world, employers have taken the leap into the cloud allowing them to store big data in order to reap the benefit to productivity of employees working simultaneously on shared pieces of work.

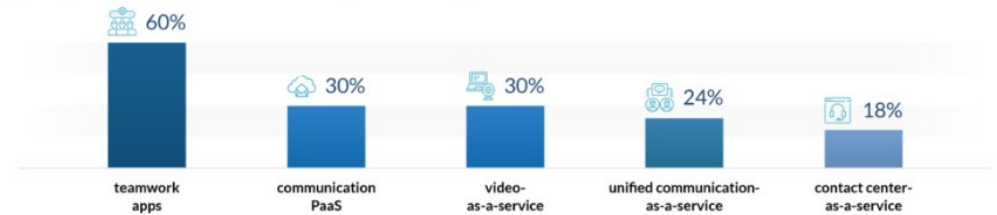
According to [Gartner \(2019\)](#), the global market for social software and collaboration in the workplace is expected to nearly double its size from an estimated USD 2.7 billion in 2018 to USD 4.8 billion by 2023 – collaboration software such as Slack, Microsoft Teams, Zoom, and others are booming.

3 Key Online Collaboration Statistics You Should Know

FinancesOnline
REVIEWS FOR BUSINESS

1 Highest collaboration growth segments

Source: Synergy Research Group



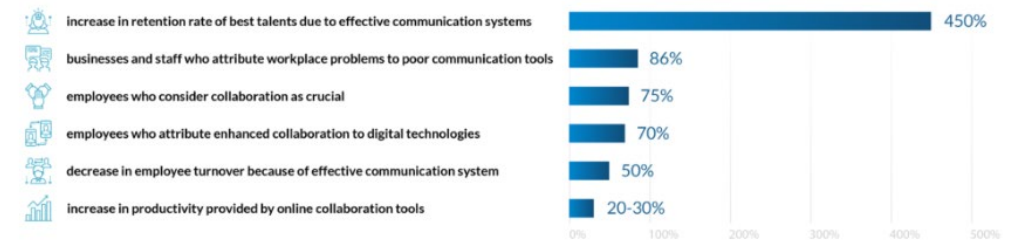
2 Tools preferred by teams using message-based platforms

Source: McKinsey



3 Benefits of collaborative tools

Sources: Wrike, McKinsey, ClearCompany, Salesforce, RoomToEscape, Anuba



Source: [Finance Online 2020](#)

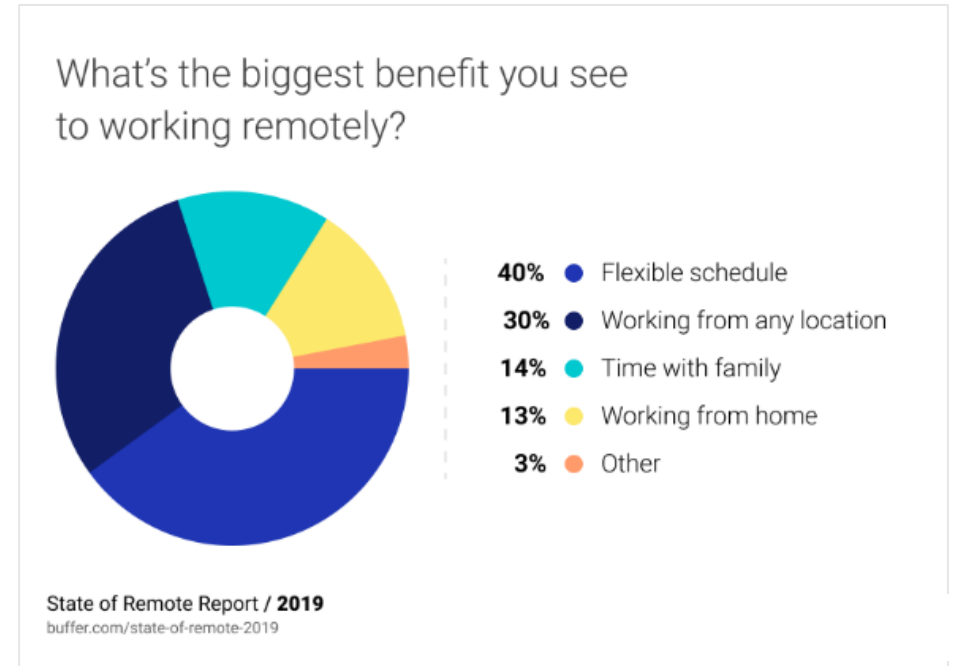
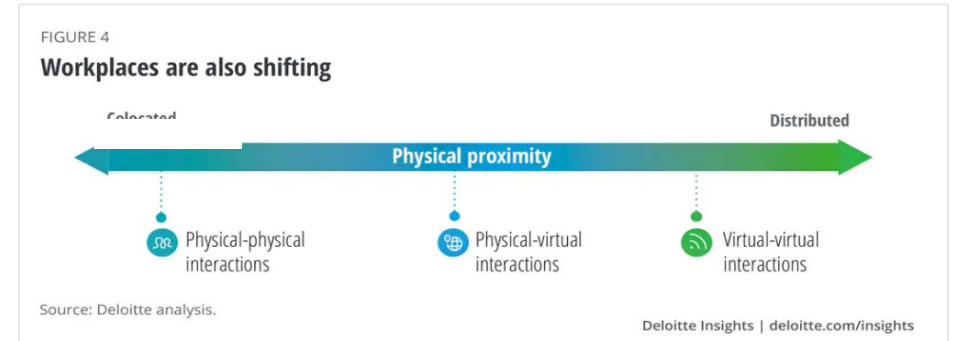
..IS LEADING TO A RISE OF REMOTE WORKING..

Work is leaving the office

Where once physical proximity was required for people to get work done, the advancements of digital communication technologies and collaboration platforms have allowed for an accelerating trend of remote working – a phenomenon known as telecommuting – and created the opportunity for more distributed teams ([Deloitte 2019](#)).

According to [IWG 2019](#), over half of professionals worldwide already work remotely at least 2.5 days per week. Moreover, in the past two years alone, there has been a 78% increase in LinkedIn job posts advertising flexible work arrangements ([Remote Year 2019](#)). These statistics indicate that remote work is here to stay and is not only a temporary trend in the labor market.

The rise of remote work is due to both push and pull drivers – employees who increasingly demand flexibility that comes from working-from-anywhere, and employers who reduce fixed costs, expand talent tools, retain workers for longer and gain increased productivity, innovation and business results.



PLATFORM BUSINESSES HAVE CREATED NEW RELATIONSHIPS BETWEEN ORGANISATIONS AND WORKERS

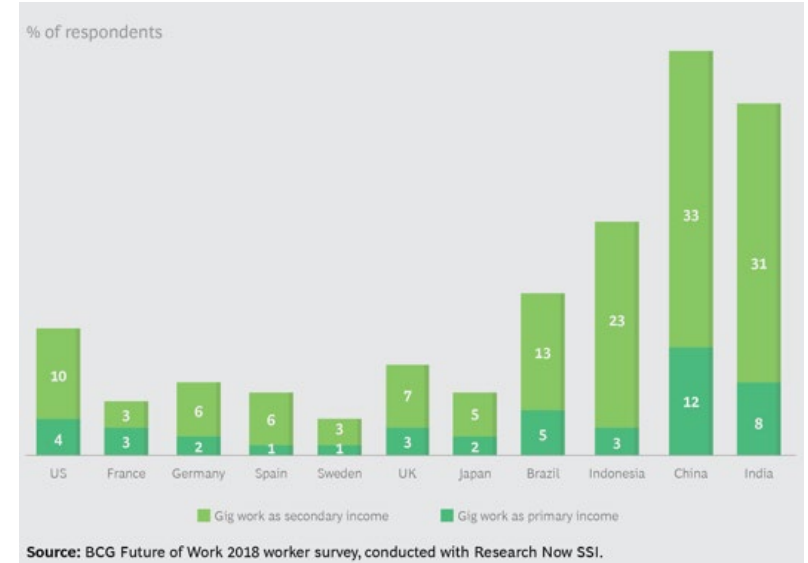
Rise of the 'gig economy'

There is an increase in new ways of work that differ from the traditionally large group of full-time workers with permanent contracts. A particularly salient new way of work has been reflected in the rise of the online gig economy, which is a labor market that brings together supply and demand for a set tasks or projects (which can take place online or offline). Distinct from times when workers and employers had to find each other through job adverts and recruitment agents, so-called online gig workers are on-boarded by independent platform businesses and then matched to work opportunities by the platform, who typically also handles the rate, service delivery standards, cash collection and payment ([Randstad 2019](#)).

From generalists like Upwork, Amazon Mechanical Turk, TaskRabbit, Fiverr, to specialist niche platforms like Paws (vets), Urban Massage (masseurs), Treatwell (beauticians), Uber and Lyft (transport), Deliveroo (food delivery), and to expert platforms like Lexoo (lawyers), Toptal and Catalant (computer software & business consulting) CoMatch (management consultants), Helping (cleaning) – online platform businesses are increasingly emerging across industries.

While the gig economy is often described as a large and rapidly growing global phenomenon, platform-mediated work in developed economies is still relatively rare, particularly in mature markets where only 1% to 4% of workers cite gig platforms as their primary work source. However, gig work's portion of the overall labor force was greater in four developing markets – China, India, Indonesia, and Brazil – where 3% to 12% of workers said they earned their primary income through digital platforms. While this certainly reflects the larger proportion of informal employment in emerging markets it also shows that workers in those countries have adopted labor-sharing platforms faster than those in developed markets ([BCG 2019](#)).

The use of the gig platforms was greatest in the four emerging economies surveyed.



Projected Gross Volume of the Gig Economy (Billions USD)

The Gig Economy is projected to grow to \$455B by year-end 2023 in Gross Volume transactions.



Source: [Mastercard 2019](#)

..LEADING TO OPPORTUNITY AND EXPLOITATION IN EQUAL MEASURE

Types of gig workers

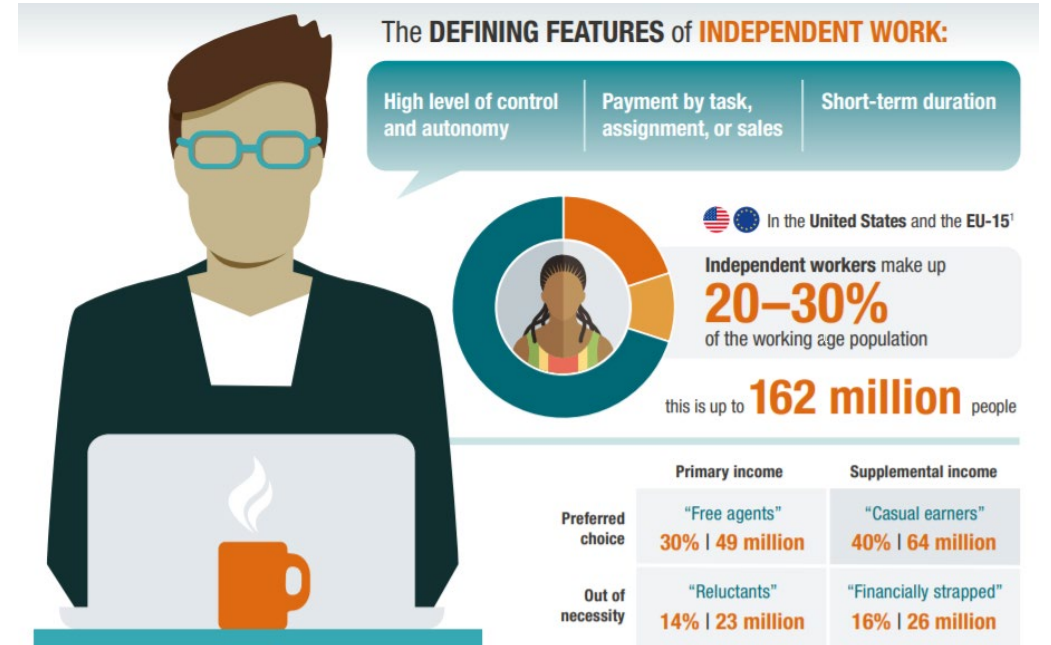
Depending on the definition, the gig economy is broader than the previously described gig economy platforms. Non-traditional or gig work consists of income-earning activities outside of traditional, long-term employer-employee relationships. Gig work tends to be temporary or project-based; workers are hired to complete a particular task or for a certain period of time. These types of arrangements are often called alternative or nonstandard work arrangements, and may include freelancing, temp agency work, self-employment, and subcontracted work ([Gig Economy Data Hub](#)).

The Gig Economy Data Hub estimates that there are between 25% to 30% of gig workers globally. That is a lot and the number is growing. However, only about 10% of workers rely on gig arrangements for their main job ([Gig Economy Data Hub](#), [Harvard Business Review 2018](#), [OECD 2019](#)).

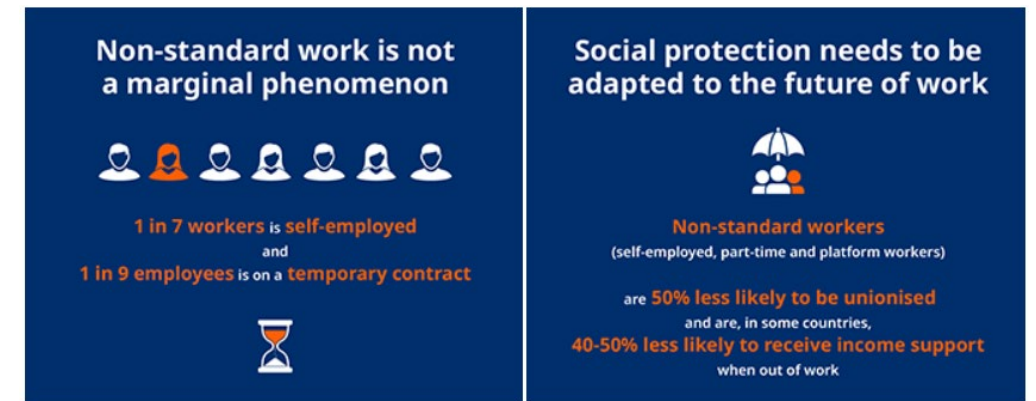
The story of exploitation can readily be told as gig workers lack employee rights and protections such as paid holiday and paid sick leave, as well as regular hours and consistent income.

However, it seems that many gig workers want to work in this way, tempted by the flexibility, the lack of monopolization of time, the earnings potential and the lack of management overhead. For many, a gig is not a career, but a 'side hustle', an opportunity to generate revenue whilst other priorities with family, education or even other work projects take precedence.

We now know that we have different types of gig worker who often occupy different economic categories and have had different career trajectories. Consequently, their attitude and desire for gig work is often divergent and we are beginning to deepen our understanding of these different groups and build a more nuanced view of these new types of worker and their needs.



Source: [McKinsey 2016](#)



Source: [OECD 2019](#)

RADICAL INNOVATIONS PROMISE EVEN MORE SWEEPING CHANGE (1)

3D / 4D printing and key applications

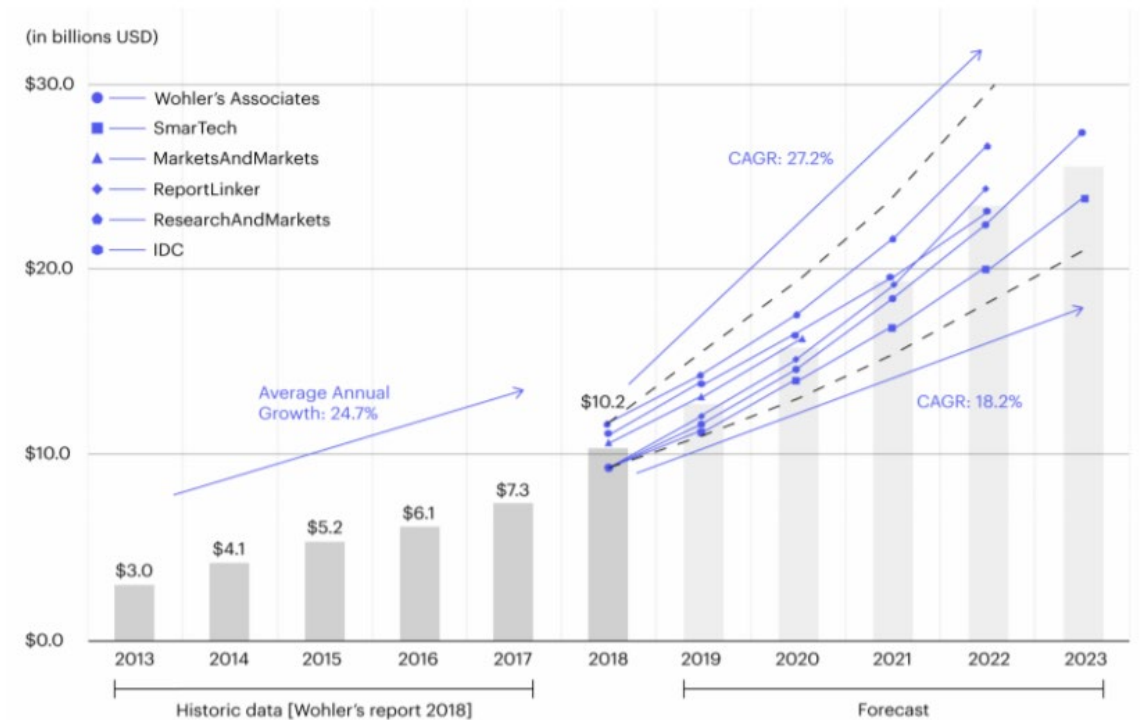
3D printing is the deposition of material in successive layers to create a 3D object. As the progression of 3D printing, 4D printing uses the same process but adds the dimension of transformation over time, where the printed object is programmed to react to the environment (i.e. heat, water, light) and change its shape or properties after it has been printed.

3D and 4D printing are set to have a big impact on the world and are already transforming many traditional manufacturing processes in both b2c and b2b industries. These technologies facilitate faster and cheaper manufacturing and can create complex products, materials and infrastructures at scale.

Projections for the overall size of the 3D/4D printing market shows compound growth. The [Wohlers Report 2019](#) forecasts for 2020 is USD 15.8 billion for all additive manufacturing and 3D printing products and services worldwide. It expects that revenue forecast to climb to USD 23.9 billion in 2022, and USD 35.6 billion in 2024.

The possible applications of 3D and 4D printed objects are manifold and cover many industries, including housing, construction, manufacturing, transport and logistics, clothing, etc. - even trade / commerce itself ([B2B International 2019](#)).

3D Printing Market Size & Forecast



3D printing market size predictions [Image credit: 3D Hubs, The 3D Printing Trends Report 2019]

Source: [AMFG 2020](#)

RADICAL INNOVATIONS PROMISE EVEN MORE SWEEPING CHANGE (2)

Immersive Tech is expanding beyond entertainment

Virtual reality (VR), augmented reality (AR) and mixed reality (MR) – three immersive technologies that fall under the category of extended reality (XR) – have been expanding throughout the past decade. In recent years, their presence began to be increasingly felt beyond the fields of gaming and entertainment, where they initially gained popularity. According to a global survey by [WEF 2018](#), more than half (58%) of companies are likely to adopt VR and AR by 2022.

As per the [XR Industry Insight 2019-2010 report](#) collated by [VR Intelligence \(2020\)](#), immersive technology has started to conquer the field of enterprise solutions. The survey found that 65% of AR companies are working on industrial applications as opposed to merely 37% working on consumer products and software. The maturing of this space has also been confirmed by the [2019 Augmented and Virtual Reality Survey Report 2019](#). Admittedly, as in previous surveys, gaming is still ranking top with over 50% of respondents expecting the most investment directed to the development of extended reality technologies in the next 12 months. But just behind, 43% of respondents chose healthcare and medical devices; and the education, military and defense, and manufacturing and automotive sectors were also selected by at least 20% of respondents.

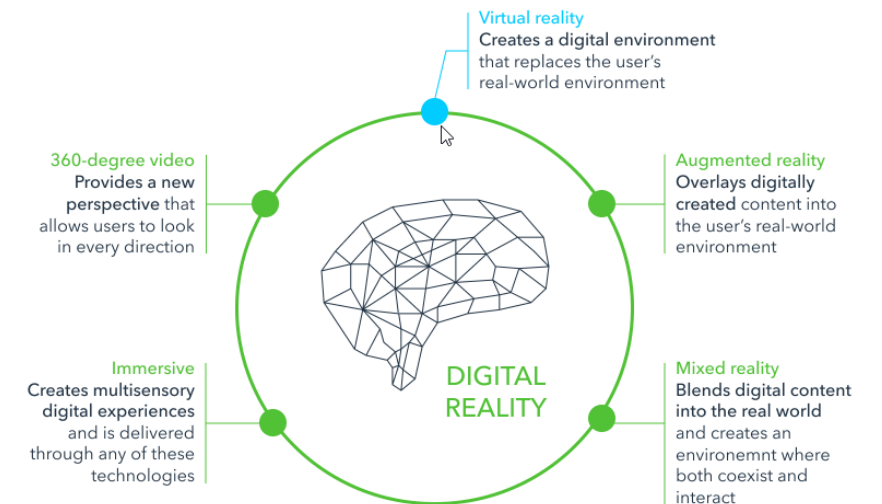
Many professionals can expect to work with immersive technologies very soon. Particularly promising in the future of work context: the application of XR shows to be of great interest as it applies to the development of the workforce. When asked about the top workforce development benefits for XR, respondents unveiled a connection between providing access to all information in real time, facilitating training and mirroring real-life experiences and enhancing creativity in product design and development ([Perkins Coie and XR Association 2019](#)).

Use cases in the world of work

There are already some interesting case studies in the use of immersive technology in the world of work. In job advertising ([Jaguar Land Rover / Gorillaz](#)), in job assessment ([Lloyds Banking Group](#)) in job training ([Walmart Black Friday simulator](#)), in employer branding ([WeWork AR video](#)) and in even in the creation of an entirely virtual organisation ([eXp Realty virtual office island](#)).

VIRTUAL REALITY IS A TECHNOLOGICAL COMPONENT OF DIGITAL REALITY

VR can help solve real-world business problems and create competitive advantage.



Data source: Deloitte Insights

IFLEXION

Source: [Iflexion 2019](#)

RADICAL INNOVATIONS PROMISE EVEN MORE SWEEPING CHANGE (3)

The Internet of Things (IoT) is changing production lines

“The Internet of things (IoT) is a network of physical objects — devices, vehicles, appliances — embedded with sensors, software, network connectivity and computing capability that enable them to collect, exchange and act on data, usually without human intervention.”

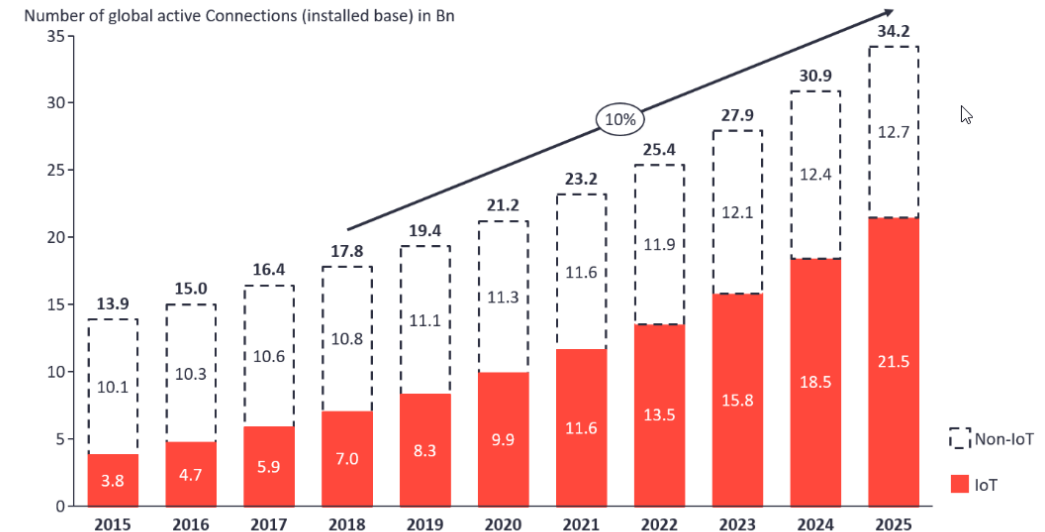
([PwC website](#))

A growing number of companies are already using IoT solutions to handle everyday tasks, with a scope that ranges from smart devices to smart buildings. According to IoT Analytics Research (2018), there will be 9 billion IoT devices by 2020 (vs 7 billion in 2017). Worldwide spending on software and hardware around the IoT is projected to grow rapidly, from USD 726 billion in 2019 to USD 1.1 trillion in 2023, according to the International Data Corporation (IDC). The three commercial industries that spending the most on IoT solutions throughout are Discrete Manufacturing, Process Manufacturing, and Utilities. Together, these three industries account for nearly 40% of worldwide spend total in 2019 (IDC [2019b](#) & [2019c](#)).

Within companies, IoT can produce operational efficiencies, enhance the customer experience, improve employee safety and productivity, develop new business models, and generate additional revenue ([PwC 2019](#)).

IoT will aggravate the digital skills gap that many companies are facing. As traditional IT skills translate only partially to the IoT sphere, workers will need a substantial level of retraining and upskilling to deal with IoT. Knowledge of protocols, hardware, security, privacy and the cloud are a starting point for IoT implementers ([WEF 2019](#)).

Total number of active device connections worldwide



Note: Non-IoT includes all mobile phones, tablets, PCs, laptops, and fixed line phones. IoT includes all consumer and B2B devices connected – see IoT break-down for further details
Source: IoT Analytics Research 2018

73%

of companies are making IoT investments today;

47%

say it will be the most important tech for cutting costs.

Source: PwC 2017 Global Digital IQ Survey

CHALLENGING EVEN THE IDEA OF THE COMPANY ITSELF

Blockchain is taking the business world by storm

Blockchain technology can be thought of as the key connector across a massive flow of data - a list of evolving records which use sophisticated cryptography to link back to each other and contain transactional data allowing market participants to execute transactions without the need for a centralized third party (i.e. a bank). It provides a radical new way of how we pay for goods and services and how we verify who owns real and virtual assets. Blockchain data is meant to be resistant to modification and secure as a record of transaction.

In 2019, [Deloitte \(2019b\)](#) conducted a global blockchain survey showing how the adoption of this technology has reached a turning point shifting from a rather explorative “blockchain tourism” toward the maturation of practical business applications. The survey reveals continued strong investment, with those willing to invest USD 5 million or more in new blockchain initiatives over the next 12 months, holding steady at 40%. Worldwide [spending on blockchain solutions](#) is expected to grow from 1.5 billion in 2018 to an estimated 11.7 billion by 2022 [\(Statista 2019\)](#).

The financial sector (fintech) is a leader in blockchain development, while organisations in other industries – such as technology, media, telecommunications, life sciences and health care, and government – are also expanding and diversifying their blockchain initiatives.

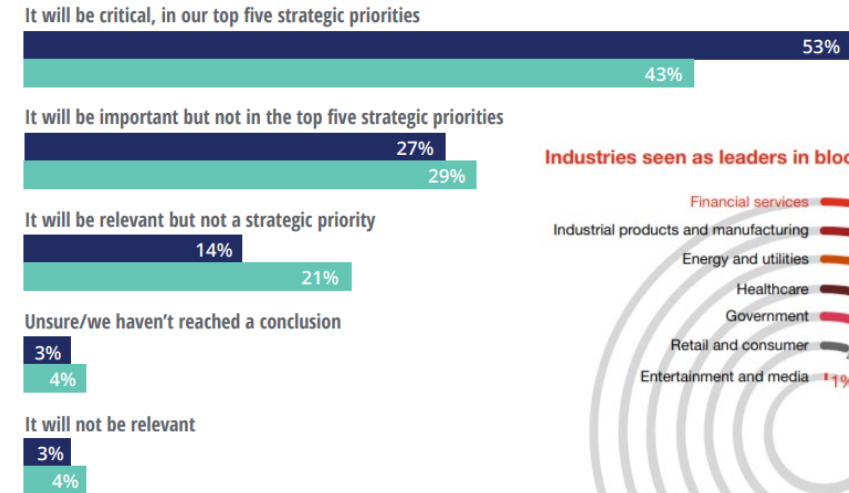
The potential applications for blockchain are nearly endless. Simply put, it can be used for any transaction requiring a contract or one regarding the need for a verified chain of activities and/or product ownership. For instance, smart contracts and other token-based transactions can help ensure that artists, agents, producers and other creatives receive their share of revenues generated by their work, no matter how it is used or repurposed. Applications range from digital rights (music), healthcare (secure healthcare records), government (especially in validating electoral votes), banking operations (secure transactions) to professional and personal identity (passports, certifications, qualifications).

Views of blockchain’s relevance within organizations (2019 vs. 2018)

Most respondents now see blockchain as a top-five strategic priority, a jump of 10 percentage points over 2018

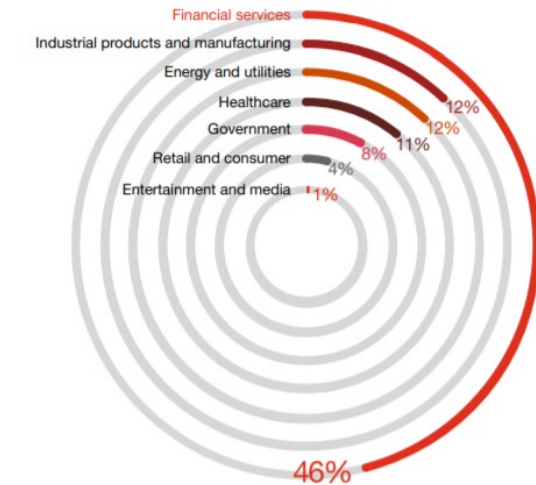
Survey question: Which of the following best describes how you currently view the relevance of blockchain to your organization or project in the coming 24 months?

■ 2019 ■ 2018



N=1,386 (2019 global enterprise); N=1,053 (2018 global enterprise)
 Note: Some percentages may not total 100 percent due to rounding.
 Source: Deloitte's Global Blockchain Survey, 2018 and 2019.

Industries seen as leaders in blockchain



Note: Base: 600.
 Q: Which of the following industries are the most advanced in developing blockchain today?
 Source: PwC's Global Blockchain Survey 2018



Climate Change



Income Inequality & Job Polarization



Global Skills Gap



Demographics

...complicated by global socio-economic trends...



Migration



Urbanization



(De-)Globalization



Political Backlash

THE CLIMATE IS CHANGING

The shift to a green economy highlights the need for a ‘just transition’.

Climate change resulting in soil degradation, floods and extreme weather events poses serious risks and disruptions to the jobs and livelihoods of millions of people, disproportionately affecting vulnerable groups and low-income countries ([ILO 2019](#)).

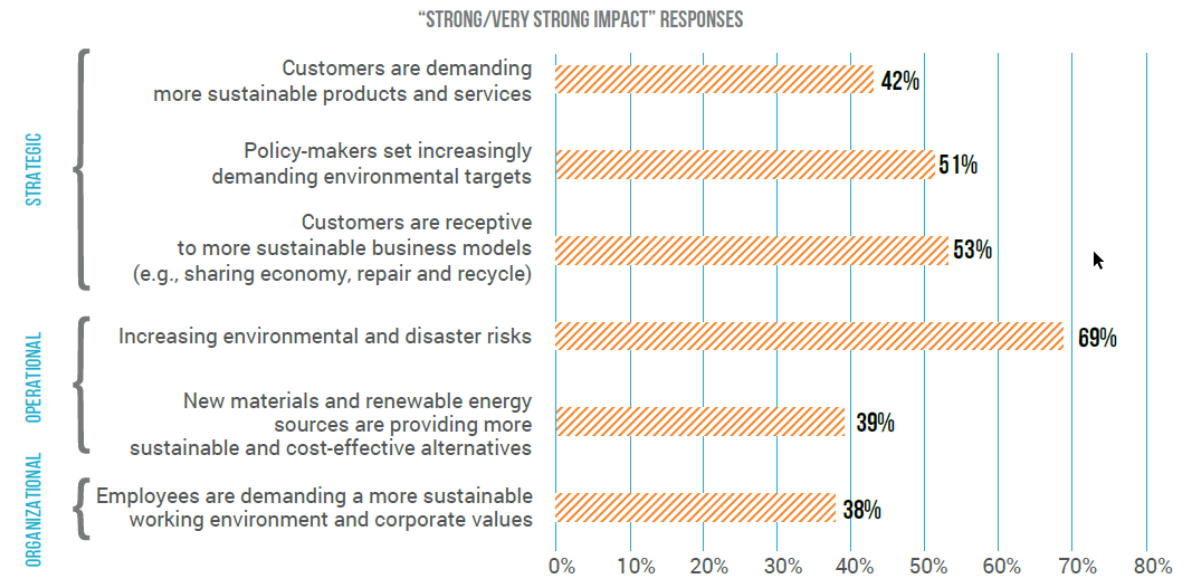
Yet, as companies are increasingly pressured to become sustainable, growing exposure to environmental risks comes alongside opportunity and innovation ([IOE and ILO 2019](#)). In fact, transitioning to a green economy is expected to create a net job growth with great potential to advance an inclusive future of work. According to the [ILO’s World Employment and Social Outlook 2018](#), 24 million jobs could be created, against 6 million jobs being lost in transitioning to a green economy.

Major investment and innovation opportunities await in renewable energy sources and environmentally sustainable materials, construction and retrofitting, with significant job creation and reskilling impacts. Micro-, small and medium-sized enterprises are especially important partners in designing local adaptations to climate change ([ILO 2019](#)).

Despite this rather optimistic outlook, structural transformation and significant adaptation of businesses and the workforce will be unavoidable. Profound transformations are especially necessary in oil, coal and heavy industries as those have the potential to leave many workers and whole communities stranded.

In this context, the international community has recognized the importance of a “just transition” for all actors in the world of work that carefully shifts the economy towards environmental sustainability without losing sight of the need to create decent work opportunities and quality jobs ([OECD 2019](#), [ILO 2019](#)).

Figure 5.1 From the following list of business consequences relating to sustainability, please assess the impact each has on your business.



Source: Oxford Economics, ACTEMP/ILO, IOE survey.

INCOME INEQUALITY & JOB POLARIZATION ARE GROWING

Technological advancements will disproportionately affect already vulnerable groups.

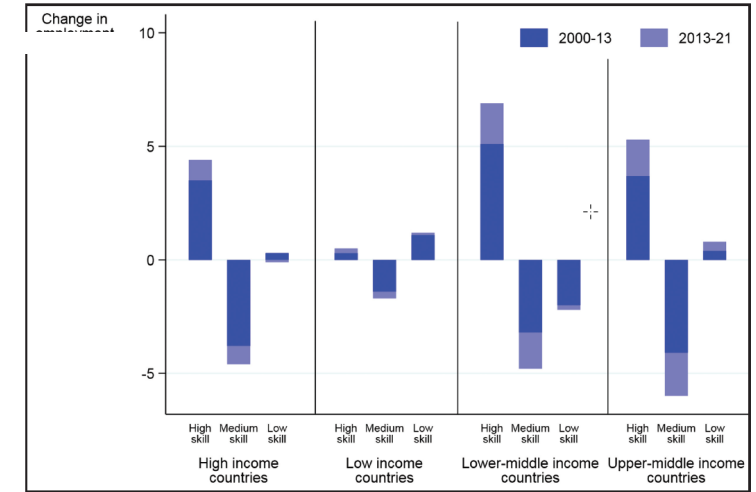
Despite global economic growth over the past decades – mainly thanks to emerging economies catching up – shared economic development continues to be a pressing challenge. Key pillars for inclusion, such as decent work opportunities, the satisfaction of basic needs for all and the elimination of social discrimination still remain unsolved. In fact, country-level income inequalities in OECD states are at the highest peak of the past half century and seven times higher than 25 years ago (B20 2018). According to the ILO (2019), the richest 1% of the world’s population received 27% of global income growth whereas the poorest 50% received only 12% between 1980 and 2016.

Many research analysts are warning that progress in automation, robotics and AI “could potentially lead to significant job losses or job polarization and hence widen income and wealth disparities” (Ernst et al. 2018). While the actual impact of new technologies on the labor market is yet unclear/unknown, job losses or reduction in pay or work hours due to automation are expected to be particularly prevalent among workers in part-time or non-regular employment, low-skilled or lower educated workers, women and young people (Pew Research Center 2017). And as middle-skilled jobs have been losing ground and disappearing disproportionately in the rich world (being replaced by software and robotic automation), inequality and socio-economic polarization are being pushed even higher on political agendas (OECD 2019, Randstad 2019).

Women’s economic participation and opportunity, measured as one of the WEF Gender Gap sub-indexes, remains the dimension that will require the longest time (202 years) to close completely. The global gender pay gap is still at 20% and as women remain underrepresented in tech-related education and jobs, their future chances of participating in a highly digitalized world are being curbed further (ILO 2019).

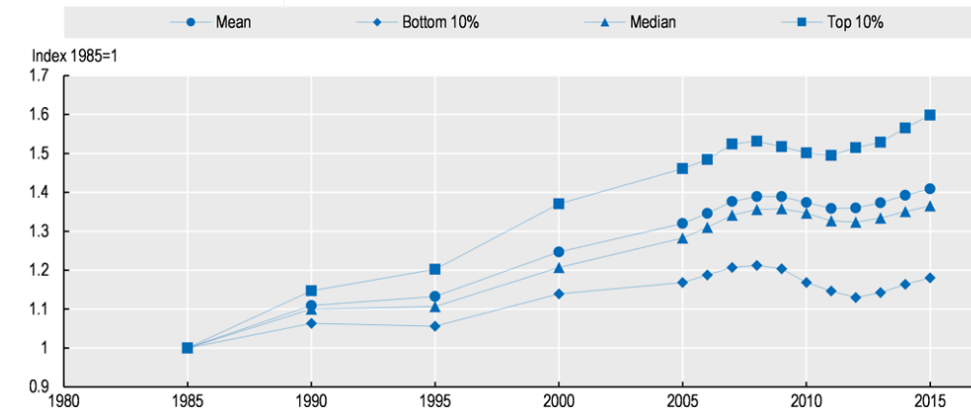
Globally, around 70 million young people of working age (15-24) are looking for a job (13%), and more than 160 million are working, yet they continue to live in poverty (ILO Decent Jobs for Youth). Considering the large cohorts of young population ready to enter the labor markets in developing and emerging countries, equipping them with relevant skills and ensuring job growth will be crucial to avoid growing inequalities and social frustrations.

Figure 3 Job polarization around the world, 2000–2021



Note: Change in employment shares, in percentage points; forecasts after 2016.
Source: ILO, Trends Econometric Models, Nov. 2016.

Figure 2.16. Income inequality is growing rapidly from the middle and top of the income distribution since the 1980s, OECD-17



THE GLOBAL SKILLS GAP IS WIDENING

The global skills gap is at an all-time high.

Digital divide is broadly understood as unequal access to internet and technologies. Currently, only 53.6% of all households have internet access. In emerging countries, the share is only 15%. Directing investment to high-quality physical and digital infrastructure and meeting global connectivity is necessary to close this divide, support high-value services and enable a digital environment that has a positive impact on welfare within societies ([ILO 2019](#), [B20 2018](#)).

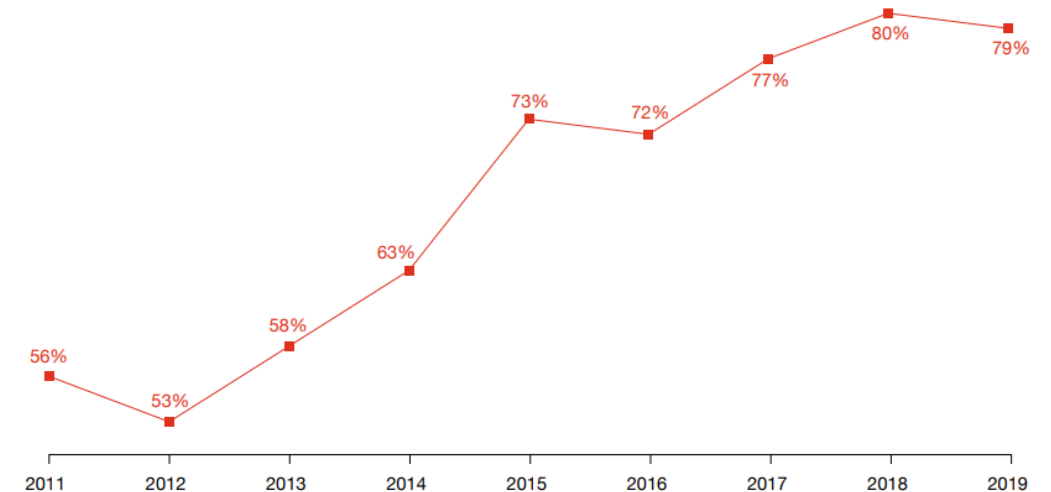
The global skills gap, i.e. the difference between jobs required to carry out a job, and the skills workers actually possess, is one consequence of this digital divide and is reaching an all-time high in [Manpower's 2018 Talent Shortage Survey](#). 45% of companies reported difficulties in finding the right candidates, with the number ballooning to 67% for companies with more than 250 employees. In [PwC's Talent Trends 2019](#), four out of five CEOs (79%) are concerned that their employees lack key skills and identified that as a threat to growth. Similarly, [IOE, ILO 2019](#) found that 40% of employers noted lack of skills as the main reason for entry-level vacancy, and 60% stated that new graduates were not adequately prepared for current work. The majority of executives believe matching the curriculum to the economy's needs would provide the skilled employees they need. Moreover, they want to see business playing an active role in shaping educational systems to boost skills. [B20 \(2018\)](#) also states that in order to avoid skills mismatches in the labor market, close cooperation between businesses and relevant government agencies and institutions is key to ensure that the curricula of training systems are in line with labor market needs.

In the context of fast automation and technological change, companies are struggling to attract and find candidates with a good mix of technical and human skills ([Manpower](#)). As the pace of changing skill sets speeds up, this challenge could grow even further, dampening economic growth and further exacerbating inequalities ([WEF 2018b](#)).

How global CEOs' concern over the availability of skills has risen

QUESTION

How concerned are you about the following threats to your business? (Showing those who responded 'extremely concerned' or 'somewhat concerned' regarding availability of key skills.)



Source: PwC, 22nd Annual Global CEO Survey

Base: All respondents, global (2019=1,378; 2018=1,293; 2017=1,379; 2016=1,409; 2015=1,322; 2014=1,344; 2013=1,330; 2012=1,258; 2011=1,201)

DEMOGRAPHICS ARE CHANGING

The current world population of 7.7 billion is expected to reach 8.5 billion by 2030, and 9.7 billion by 2050. Declining fertility rates and rising life expectancy are leading to an aging population globally, although with variations between regions and countries. It is projected that in 2050 the 1.5 billion people aged 65+ years worldwide will outnumber adolescents and youth aged 15 to 24 years (1.3 billion) ([UN 2019](#)).

Population growth in developing countries will lead to a labor surplus..

Economies with large proportions of youth entering the labor market face increasing demand for jobs and rapid urbanization rates. Regions such as Sub-Saharan Africa and Latin America are dealing with questions on how to take advantage of the youth dividend and its potential economic benefits while managing pressures on labor markets and society. Often, in these countries investment in human capital, especially in health and education systems is inadequate, limiting the country's productive potential ([IOE, ILO 2019](#)).

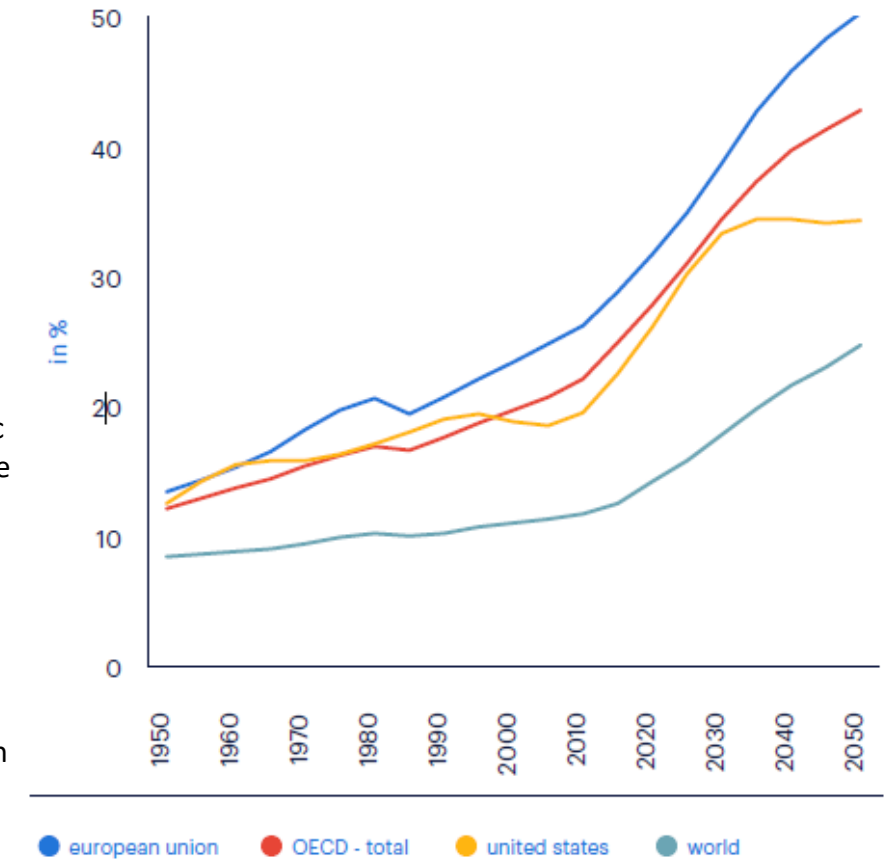
..while aging populations in developed countries will lead to labor shortages

On the other hand, countries with aging populations face shrinking labor supply and increased pressure on public finances and social security systems, placing a burden on the economy's productivity. In some regions such as the OECD and ASEAN economies the shifting demographic dynamics and declining working-age population are expected to reshape the long-standing fundamentals of work, retirement and savings ([IOE, ILO 2019](#)).

Demographic changes are closely related to other key trends highlighted in this paper: for instance, countries with older workers such as Germany, Japan, and South Korea adopt robots more rapidly as they see **automation** as one of the possible solutions to address shrinking workforces in aging societies and boost productivity and economic growth. Furthermore, shifting demographics are diversifying the workplace calling on businesses to manage a **multi-generational workforce and the diverse professional expectations** of baby boomers, generation X and millennials. Another interaction takes place between demographics, **urbanization and migration patterns**: as younger workers are increasingly moving to the city, and no longer moving out, urban regions are aging more slowly than less densely populated rural areas. Perhaps the most significant change is the **inclusion of women**, who are entering employment at historic record levels ([IOE / ILO 2019](#), [Randstad 2019](#)).

historical and projected old-age dependency ratios over time

old-age dependency ratio is defined as (age 65+ / age 15-64 * 100%)



Source: OECD Statline, Historical population data and projections (1950-2050)

MIGRATION PRESSURES ARE INCREASING..

Migration brings opportunities and challenges.

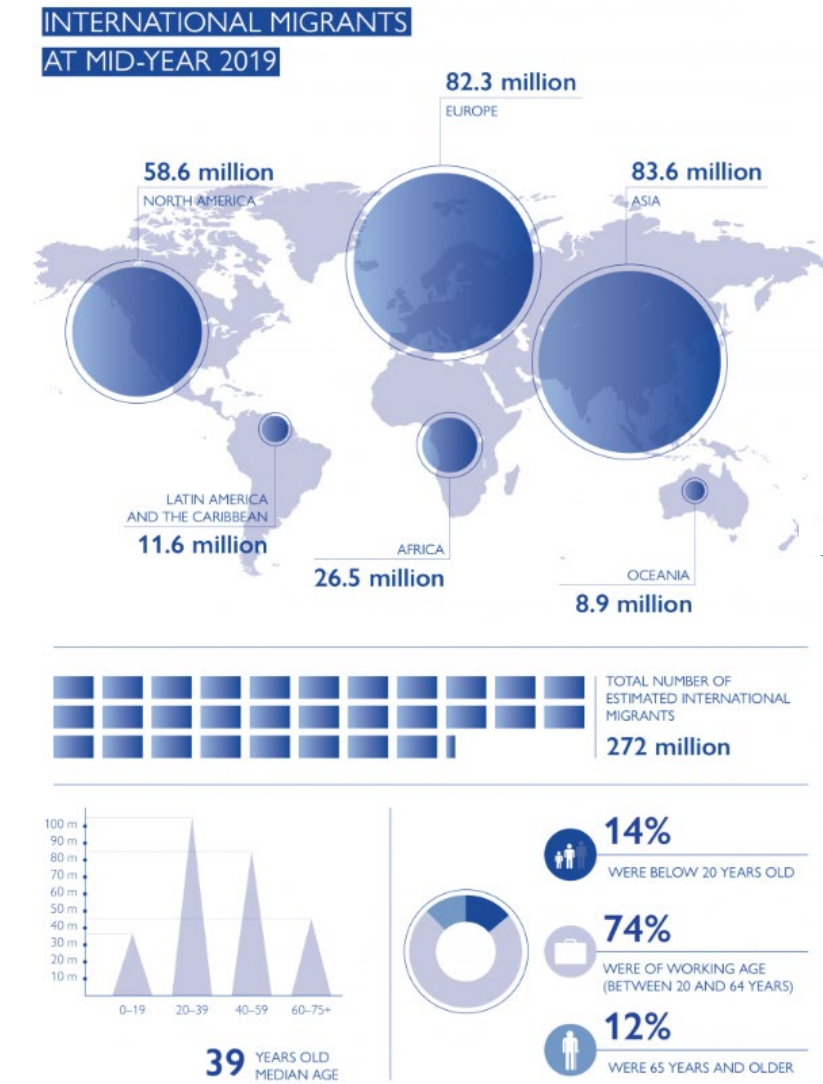
Based on estimates from [UN/DESA 2019](#), the number of international migrants worldwide increased between 2000-2019, reaching 272 million in 2019. During this period, the international migrant stock grew by an average of 2.3%. Despite the increase in absolute numbers, the share of international migrants in proportion to the world's population has remained relatively stable at around 2.2 to 3.5%.

The latest available estimates from 2017 indicate that there are roughly 164 million migrant workers around the world, accounting for nearly 64% of the (then) 258 million global stock of international migrants. 70% of all international migrants of working age – regarded as 15 years of age or older (234 million) – are migrant workers ([ILO 2018c](#)).

Migrants face challenges in perception, as people consistently overestimate the number and unemployment levels of migrants, while underestimating their levels of education and financial independence ([New York Times/Harvard University 2018](#)). In destination countries, however, the labor force participation rate of migrants is higher (70%) compared to non-migrants (61.6%). Most evidence suggests that regular migrants make a positive net contribution to the economies and societies in which they live and work ([ILO, IOE 2019](#)). And according to the UN, the total amount of remittances sent home in 2016, are estimated in US\$ 413 billion. Therefore, labor migration in line with labor market needs could provide an opportunity to economic development ([B20 2018](#)).

Furthermore, migration has often been considered a way of counterbalancing ageing populations. Indeed, demographic changes in developed economies will demand an increase in migration from developing nations, as economies such as the U.S., Canada, and the EU require young workers to contribute labor and tax in the future ([ILO, IOE 2019](#)).

Nevertheless, migration can also create resistance among local workforces. Especially newly arrived workers face a number of challenges such as lower wages, longer work hours, high rates of unemployment, and sometimes open racism and xenophobia. This increases pressure on the social contract, leading to political and social backlash, particularly in countries with representative democratic systems of government. Therefore, governments and also businesses have a role to play in responding to the perceptions that foreign workers undercut wages and job opportunities for native workers, and that migration is associated with unacceptable labor conditions and abuses ([ILO, IOE 2019](#)).



Source: United Nations, Department of Economic and Social Affairs, Population Division (2019). International Migrant Stock 2019 (United Nations database, POPDB/MIG/Stock/Rev2019). See <https://bit.ly/Migration2019>.

© IOM's GMDAC 2019

..ALONGSIDE WITH URBANIZATION

Megacities are rising relentlessly.

More than half of the global population (55%) currently lives in cities. Maintaining their growth trends, by 2050 cities might be hosting 68% of the population, with almost 90% of this growth happening in Asia and Africa ([World Bank 2019b](#)). At the same time, the 600 biggest urban areas already account for 60% of global GDP, and this will only rise higher as cities become larger and more prosperous. In fact, experts estimate that up to 80% of future economic growth in developing regions will occur in cities alone ([WEF 2019b](#)).

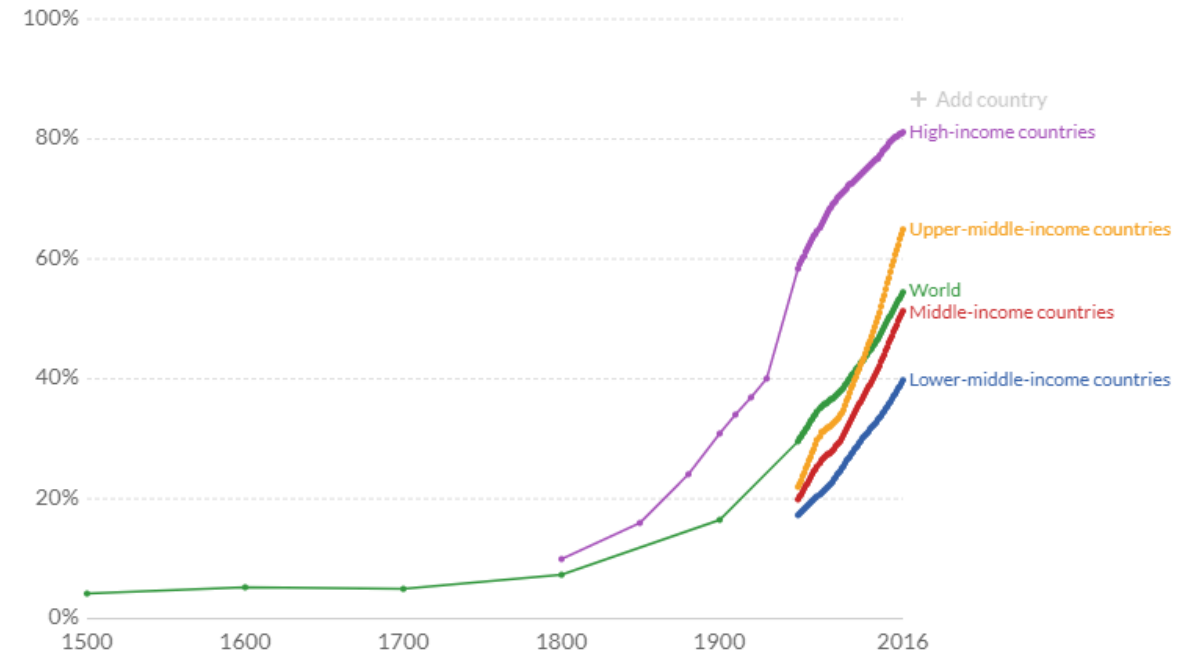
However, the speed and scale of urbanization brings many challenges, including meeting accelerated demand for affordable housing, well-connected transport systems and other infrastructure, basic services, as well as jobs – particularly for the nearly 1 billion urban poor who live in informal settlements to be near opportunities. In this context, urbanization is also known for exacerbating (income) inequality. Lower-income families typically move to a city's periphery in search of affordable housing. Yet the further they get from the city center, the more difficult their lives can become. Families at a city's edge will spend twice as much money and three times as much time commuting as families closer to jobs and schools in the city center. Once these kinds of urban land development patterns begin, they have long-term effects on access to opportunities, productivity and quality of life ([World Bank 2019b](#)).

Furthermore, internal movement of people from town to city creates a number of second order effects – higher property prices, greater labour market liquidity, higher demand for innovation, greater consumer density, industry network effects – all in all, a greater concentration of economic power.

Urbanization over the past 500 years

Share of the total population living in urban areas.

Our World
in Data



Source: OWID based on UN World Urbanization Prospects 2018 and historical sources (see Sources)
Note: Urban areas are based on national definitions and may vary by country.

CC BY

(DE-)GLOBALIZATION AND POLITICAL BACKLASH

Relocation from low-income to industrialized countries

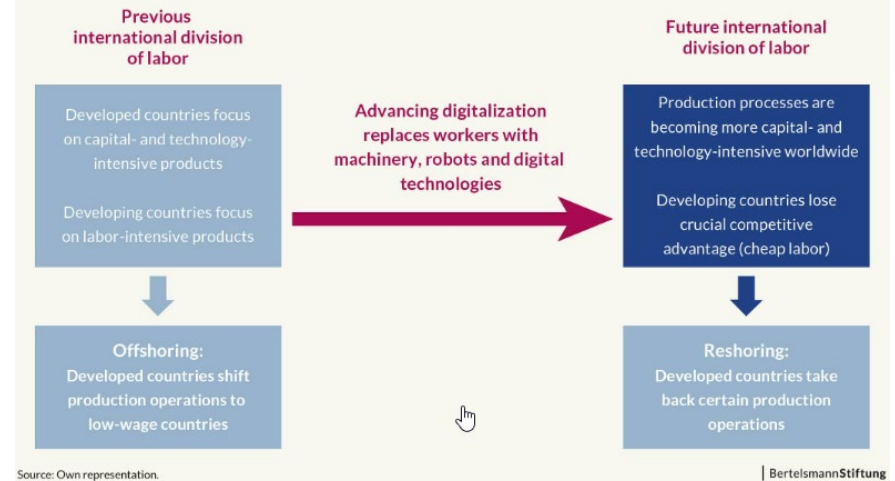
Globalization has been a defining feature of the world economy leading to the internationalization of production, finance (including remittances), trade and migration. As such, globalization has been the main driving force behind the creation of global supply chains, and during the technological progress over the recent past, developed countries have relocated many work operations and low-skilled jobs to low-wage countries. The increased use of digital technologies is now leading to a partial relocation of production sites back to the developed industrialized countries bringing significant challenges to developing countries, as they face both automation and re-shoring of existing tasks and thereby lose their advantage of lower labor costs ([ILO 2018](#), [GED 2019](#)).

Political backlash against globalization and democracy

Simultaneously, we cannot deny the emergence of a global backlash against globalization, especially in the heartlands of those countries who promoted it. Perhaps starting from the financial crisis of the 2008, followed by a decade of austerity born by those least able to afford it, along with the sense that the 'elite' used systemic power to avoid penalty and continue much the same as before: the ideas of free trade, and free movement of labor and finance, previously sacrosanct, are under assault from left and right in an increasingly polarized political environment.

The idea of democracy as an inherently sensible system of government is also under assault, again from both left and right. With populist leaders in US, Hungary, Poland, Austria, along with traditionally authoritarian states like Russia, Turkey and China, we are seeing the erosion of the pillars of democracy in favor of strong man leadership. There have already clearly been implications for the future of work through the manifestation of populist policies ([Congressional Research Service 2018](#)).

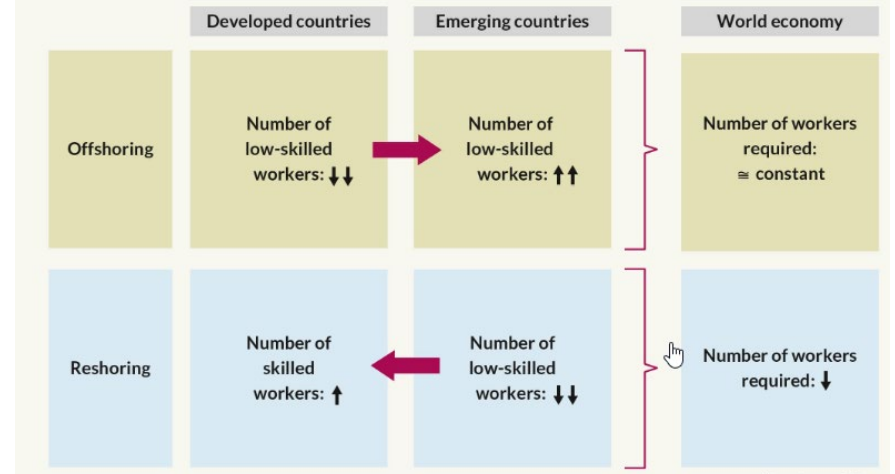
FIGURE 1: From Offshoring to Reshoring.



Source: Own representation.

| BertelsmannStiftung

FIGURE 2: Labor market effects of digitalization.



Source: Own representation.

| BertelsmannStiftung

...Making it harder to meet people's shifting expectations.



Job & Income Security



Meaning



Community



Personal & Professional Growth



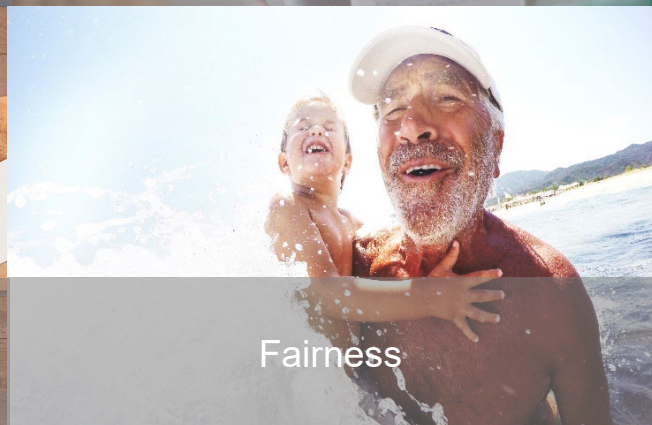
Opportunity



Flexibility



Autonomy



Fairness



Social Concern



Employment Confidence



Trust in Business

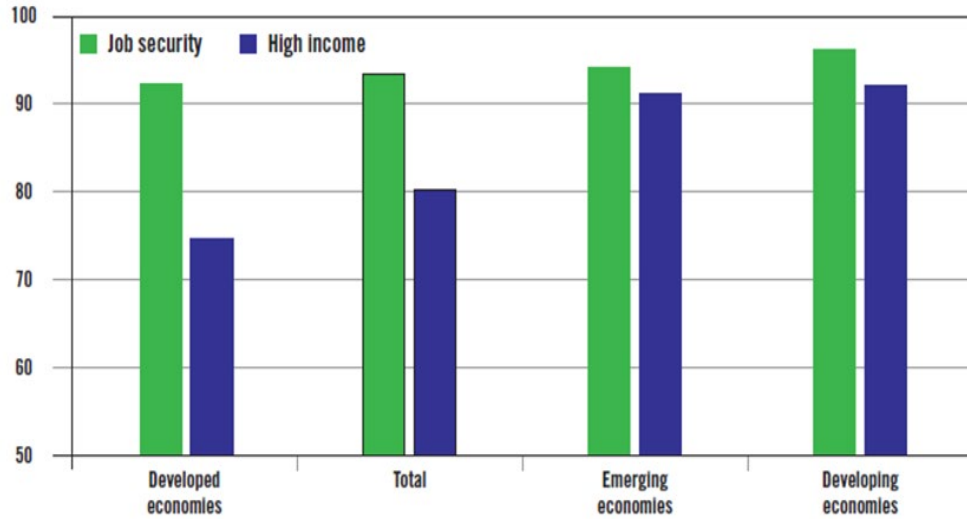
ONE NEED IS UNIVERSAL: JOB & INCOME SECURITY

People’s motivations for work vary across the globe, but job & income security are fundamental.

Regardless of where people come from, “job security” is seen to be very important and is consistently ranked as more important than “high income” ([ILO Inception Report on the Future of Work](#)).

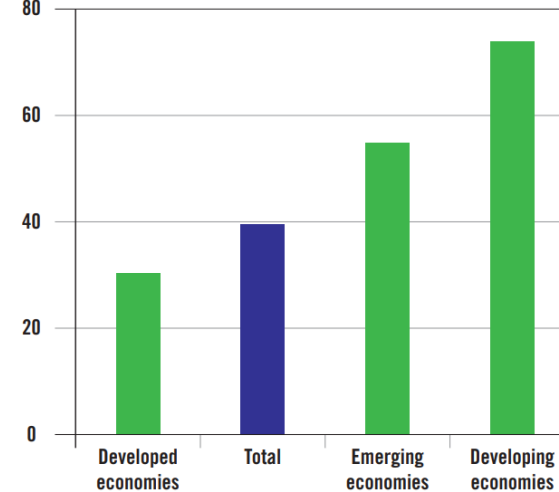
In developing and emerging economies, work is strongly associated with the need to make a living. However, if we were to remove the necessity of a job to satisfy material needs, we see significantly smaller variations across the world. Globally, around 60% of people would enjoy having a job even if they did not need the money.

Share of individuals who see “job security” and “high income” to be important or very important in a job.

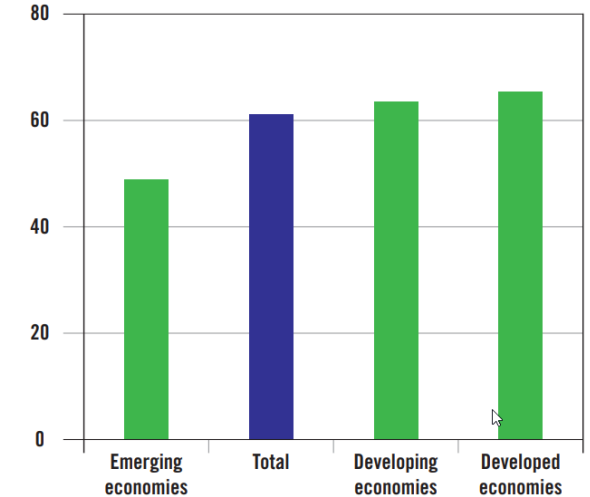


Source: ILO (2017): Inception Report for the Global Commission on the Future of Work

“A job is just a way of earning money – no more.”



“I would enjoy having a job even if I did not need the money.”



Source: ILO calculations based on International Social Survey Programme (ISSP), 2015

WORKERS ALSO INCREASINGLY SEEK MEANING IN THEIR WORK

The need for meaningful work

It's not news that going to work is often the dominant waking activity in most of our lives. For many of us, work plays such an important role that we often include it as a central building block for our personal identity.

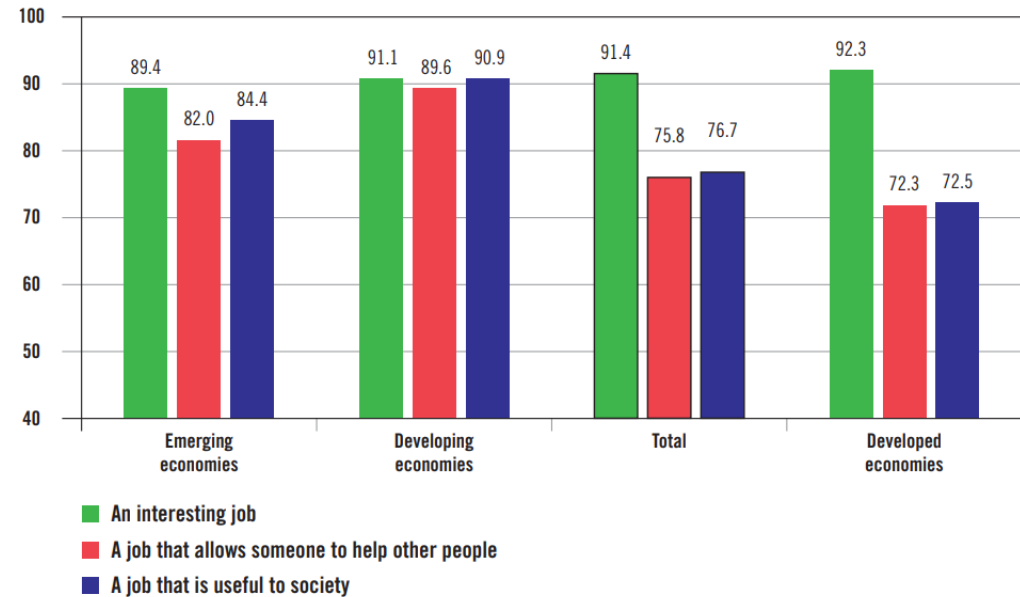
Providing '[good work](#)' is becoming an important consideration for companies and governments. And, increasingly, people seek for meaning in their work - to understand how it contributes to society and the organization they work for the organization they work for ([HBR](#)).

Motivation, productivity and performance are tightly linked to a worker's ability to find this meaning. It is important that employers understand how to connect the tasks their workers do with the outcomes of that work.

In the modern, globalized, tech enabled economy with its focus on profit and productivity, work is often disaggregated into repetitive tasks where the final output is remote and distant to the supply chain of workers creating that output.

For this reason a company's mission, culture and purpose have received growing attention in recent years.

Share of individuals who feel “an interesting job”, “a job that allows someone to help other people”, and “a job that is useful to society” are important or very important characteristics in a job, 2015 (percentage of respondents)



Source: ILO (2017): Inception Report for the Global Commission on the Future of Work

AS WELL AS A SENSE OF COMMUNITY AND ENGAGEMENT WITH OTHERS

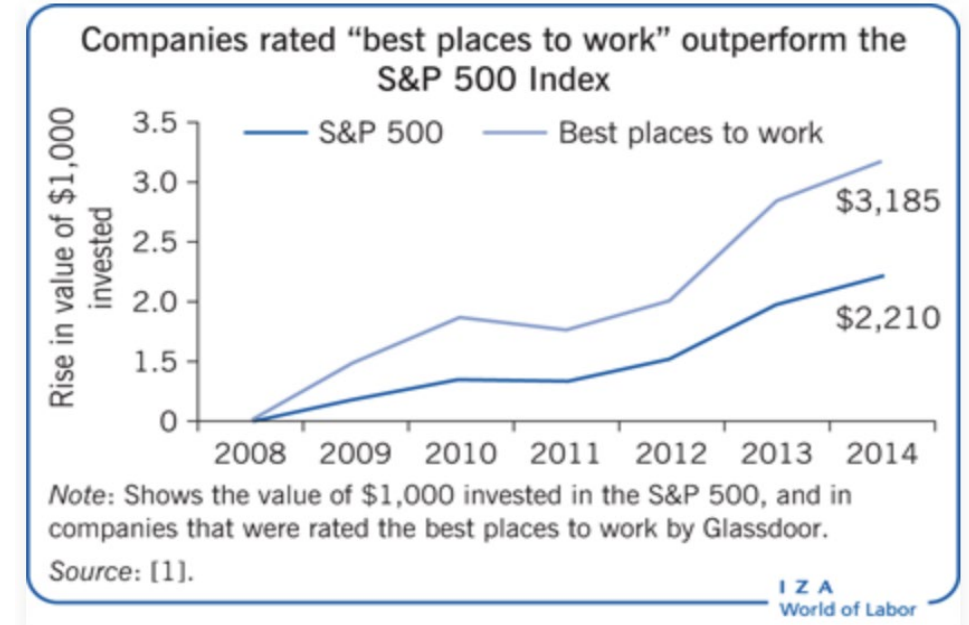
Dangers of a disengaged workforce

Disconnected workplaces have been linked to nearly 40% higher rates of absenteeism, 50% higher rates of bodily accidents and 60% higher rates of avoidable errors.

Further studies have shown that a connected and engaged workplace fosters higher rates of self reported job satisfaction, improved job performance and increase rates of retention.

Workers increasingly recognize the value of an employer which fosters engagement across the workforce. A big part of fostering happiness in the work environment means creating opportunities for meaningful connections between co-workers, even if they do not have operational proximity.

Finally, a recent study on Millennials, who will soon become the largest segment of the workforce, revealed that being connected in an authentic way with peers, colleagues, family and friends was an essential criteria for them when selecting an employer.



PERSONAL AND PROFESSIONAL GROWTH

People value professional and personal growth.

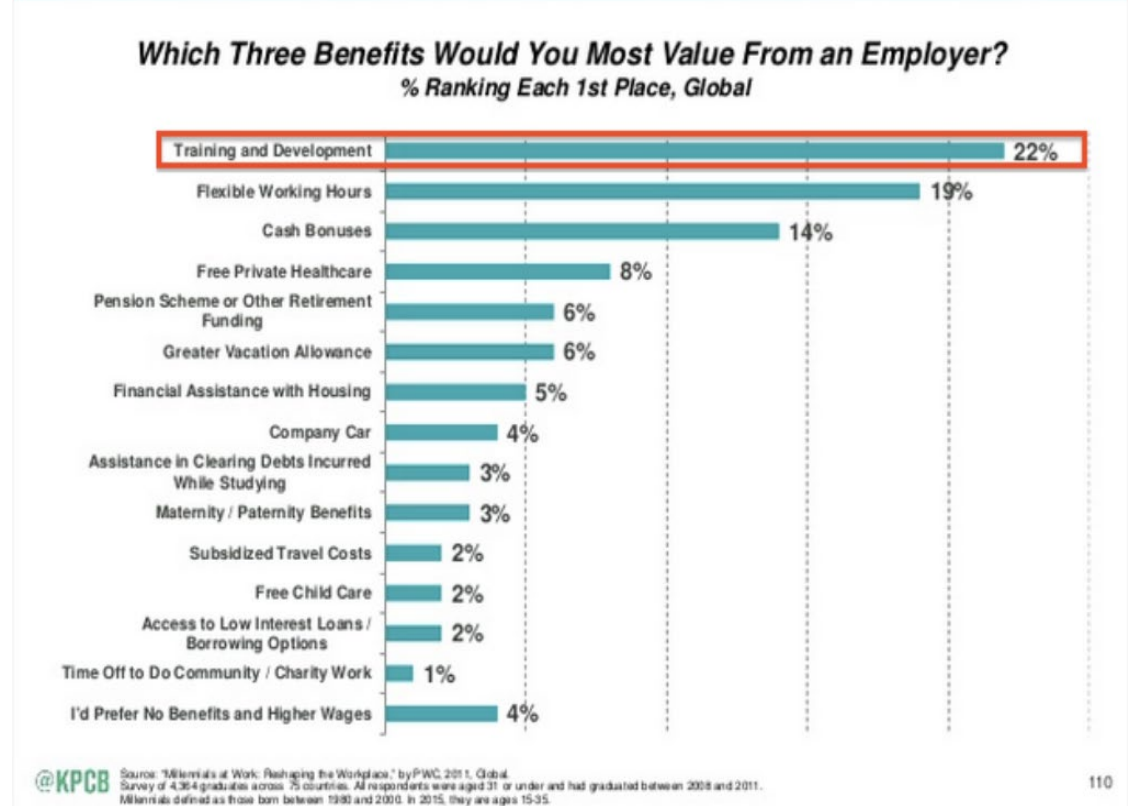
Workers, especially those who are committed to their chosen career path are deeply interested in professional development and becoming an expert in their field. Motivations might come from the respect and recognition that comes from career progression, to the financial benefits that go with it. It might also be that developing individual strengths and feeling capable in the performance of challenging tasks is its own reward.

Worker morale is also tightly bound to utilization - the feeling that being fully utilized to the maximum potential. Studies have shown that it is demotivating for many workers to be under-used and under-challenged in their work.

Finally, workers increasingly understand that in a world of accelerating technological change, new skills acquisition and development is their best defense against technology disintermediation.

It is worth mentioning that research evidence does not support claims of the attitudes and values of Millennials (those born between 1982 and 2000) at work being different. Differences between generations of workers have existed throughout history and can in fact be attributed to specific ages rather than specific generations ([HBR](#), [CNBC](#)).

Millennials' Most Valued Work Benefits = 1) Training & Development 2) Flexible Hours 3) Cash Bonuses



EMPLOYERS THAT SUPPORT CONTINUOUS OPPORTUNITY

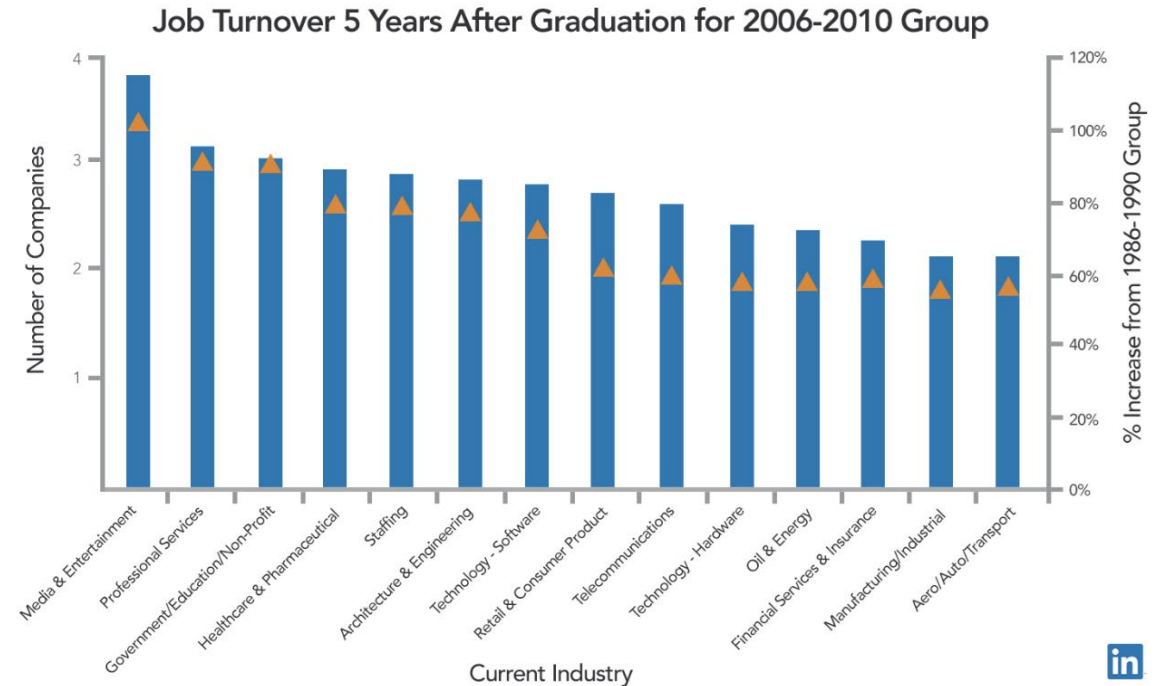
It's not the job today, but the job tomorrow

People increasingly understand that the 'job-for-life' social contract is now no longer realistic or even desirable in the modern world. They increasingly want to work with employers who can provide future opportunities in the mid and long term, beyond their current role.

As job search shifts from an episodic mode of opportunity-seeking in fixed cycles to a more persistent mode of network building and the continuous acquisition, if not acceptance, of new opportunities, the rate of 'churn' for workers is increasing. Workers today are expected to have at least [10 jobs before they reach 40 years](#) old as Millennials begin to dominate the workforce.

The increase of churn is eroding the stigma behind switching jobs. 'Job hopping' - with its attendant connotations of rootlessness and lack of loyalty - is fading away as an accepted term to describe worker decision making.

Employers who are organizationally agile, with low bureaucratic overhead, which facilitates both horizontal and vertical movement of employees, hold a competitive advantage for the recruitment and retention of future talent.



GREATER FLEXIBILITY ON WHERE AND WHEN TO WORK

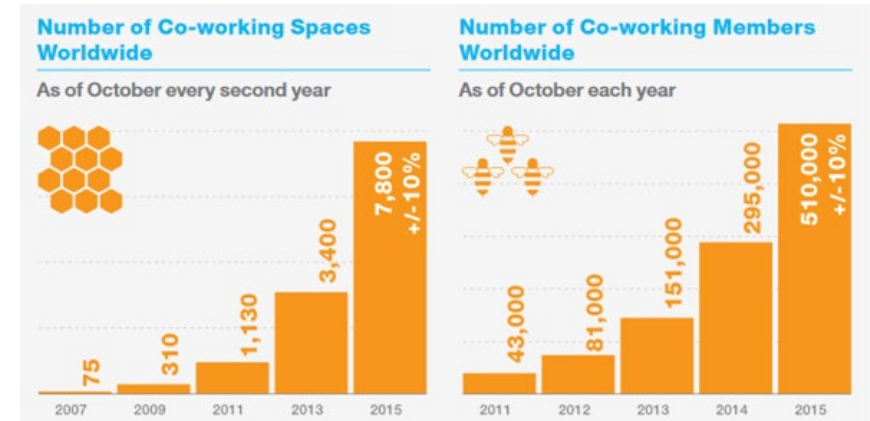
People are seeking increased flexibility and connectivity..

The rise of the internet, cell- and smartphones, videoconferencing and cloud computing have given rise to a significant movement around telecommuting. Working from home and co-working spaces are its most prominent expressions, and give workers the choice and flexibility to adapt to their respective needs and wishes, from spending more time with family members and reducing unpleasant commuting time, to connecting and working with like-minded people on joint projects.

..but are concerned about work-life balance.

Despite recent progress and international regulations, balancing time between work and private life remains a challenge, especially in developing and emerging countries and for female workers worldwide.

While tech provides greater autonomy, it is also associated with higher levels of work intensity and insecurity. Intermittent work, unemployment and underemployment have profound consequences for the well-being of workers and their families and communities. Developing countries have now ranked psychosocial risks second, after injury and accident prevention, among workplace issues requiring urgent attention ([ILO Inception Report on the Future of Work](#)).



Source: Knoll (2016): The Rise of Co-Working

Benefits and Perks

Gap between the percent of employees who say they would leave a job for a perk and the percent of employees who say their company offers that perk

	Employees who would change jobs to have	Employees who say their company offers
	%	%
Flexible working location where you can choose to work off-site full time	35	12
Profit-sharing	40	20
Flexible working location where you can choose to work off-site part time	37	24
Retirement plan with a defined benefit (pension)	51	43
Monetary bonuses	54	47
Flextime	51	44

Source: Gallup (2017): State of the American Workforce

AND GREATER AUTONOMY ON HOW WORK IS DONE

Autonomy & Empowerment

In the past, traditional organizational cultures have called for strict oversight over how work is performed.

However, studies show work environments that are more autonomous in nature have not only higher job satisfaction amongst the employees, but also better productivity. In Results-Only Work Environments, or ROWEs, employees are empowered to make local decisions on such matters as tools, team collaborators, process and tempo. With management shifting from ‘micro-managing’ worker tasks to the provision of oversight on the operation and the outputs, workers have the opportunity to deliver the results in a way which they often know best.

Employee autonomy has also [shown benefits](#) in employee happiness and consequently, employee retention. Workers who have a greater sense of autonomy naturally accrue responsibility for their work and increasing become more invested in a successful outcome.

“I like agile working as it increases my productivity, creativity and job satisfaction (i have more autonomy in how I work)” (%)

	Global average	APAC average	China	Malaysia	Hong Kong SAR	Singapore
All	81	90	92	92	89	87
Men	81	90	91	92	89	87
Women	81	90	93	92	89	86
18 - 34	82	91	95	91	88	85
35 - 54	81	89	88	92	90	88
55 - 67	79	89	93	100	82	86

“At my employer, we still work in a traditional manner; everyone works at the office during opening hours.” (%)

	Global average	APAC average	China	Malaysia	Hong Kong SAR	Singapore
All	68	79	81	77	85	76
Men	68	78	78	74	83	77
Women	67	81	85	79	86	74
18 - 34	71	81	80	80	84	81
35 - 54	67	77	81	72	84	72
55 - 67	61	80	100	78	86	75

Source: Randstad Work Monitor [Q1 2018 results](#)

FAIRNESS WITH COLLEAGUES, COMPANIES AND IN SOCIETY

We all want a fair share.

Humans appear to have a [hard-wired sense of fair play](#).

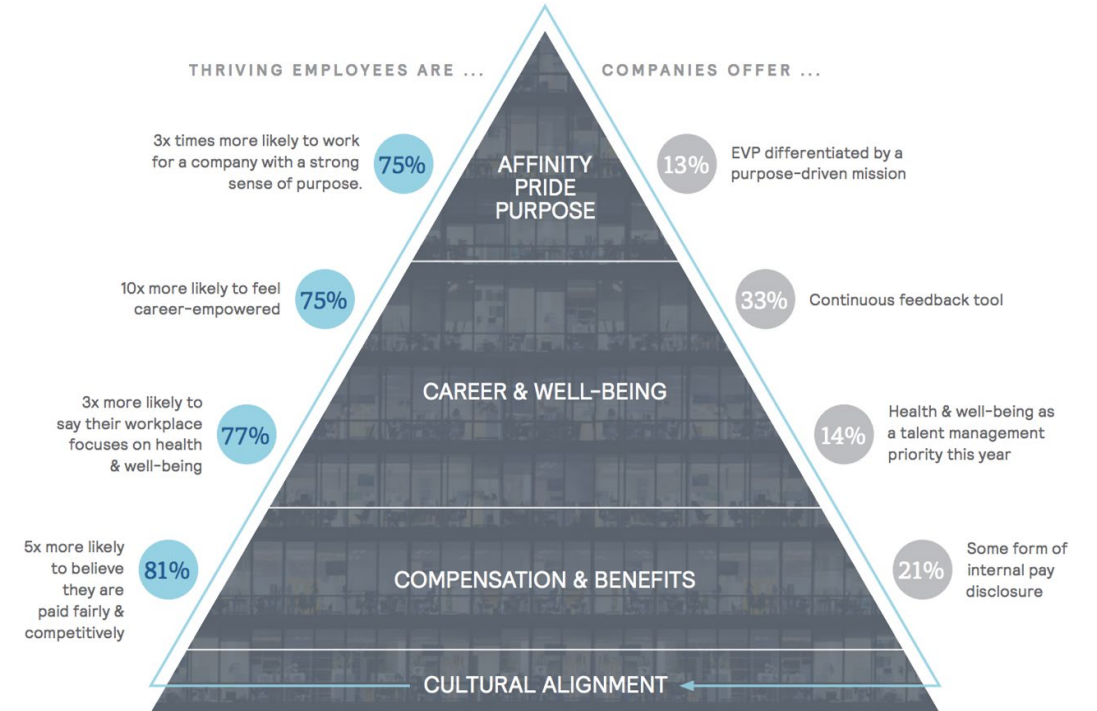
From an [evolutionary perspective](#), this predisposition is important for us to be able to help each other. Human cooperation, after all, is based on reciprocal altruism.

We can often forget this in the world of work, where we can mistakenly believe that the economic exchange of wages for labor is the only relationship that runs between employer and employee. In order to cooperate effectively, we must be able to do more - to track input / output and create trust amongst the employees that the system will distribute rewards and penalties fairly.

Employees' perceptions of workplace policies for rewards, pay, promotion, and assignments can be critical to productivity, happiness and even [employee health](#).

It is important to note that fairness is not about giving employees what they want. It is about ensuring transparency in how decisions are made, keeping and maintain common rules, avoiding exceptions, consistent policing of infractions and an inclusive, empathetic approach to new initiatives.

WHAT EMPLOYEES CRAVE FEW COMPANIES OFFER



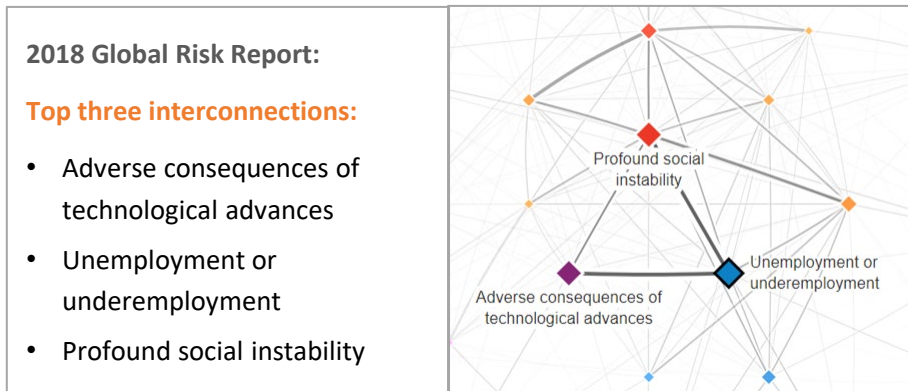
Source: Mercer 2018 [Global Talent Trends Study](#)

PEOPLE ARE WORRIED ABOUT IMPACT OF TECHNOLOGY ON SOCIETY

High social concerns

Studies indicate that people are more concerned about the impact of technology on society in general, rather than on their own job. Respondents to a study by the [Pew Research Center](#) expect inequality and unemployment to rise, and show low confidence about possible positive impacts of technology on people and the economy.

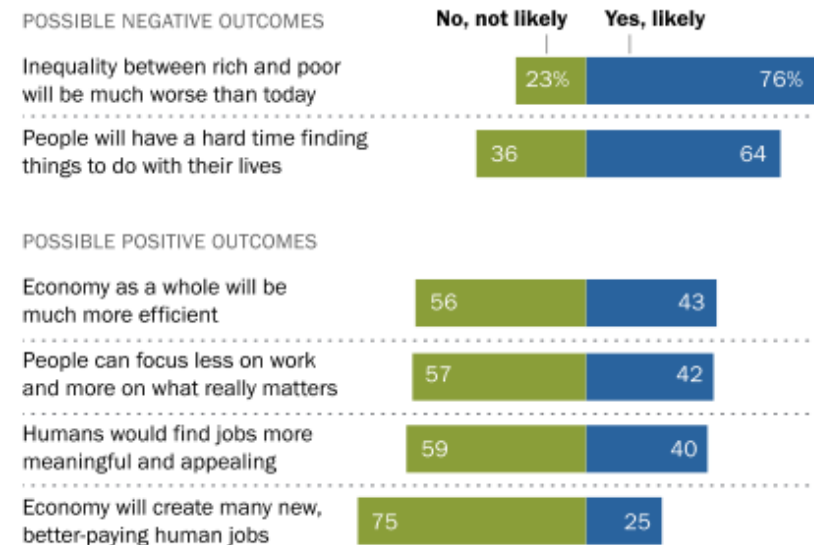
In general, higher educated and white-collar workers seem to be more optimistic than blue collar workers about their employment opportunities in a more automated and digital world. Unemployed people and those who already experienced a reduction in pay or work hours or even job loss due to automation tend to be more pessimistic about the impact of technology on their job ([PEW](#), [Gallup](#)).



Source: WEF (2018) "[The Global Risks Report](#)"

Public expects more negative than positive impacts from widespread automation of jobs

% of U.S. adults who say ___ is likely to result if robots and computers are able to perform many of the jobs currently done by humans



Note: Respondents who did not give an answer are not shown.
Source: Survey conducted May 1-15, 2017
"Automation in Everyday Life"

PEW RESEARCH CENTER

AMERICANS WHO SAY AI WILL ELIMINATE MORE JOBS THAN IT CREATES

73%

NORTHEASTERN UNIVERSITY/ GALLUP

BUT FEEL CONFIDENT ABOUT THEIR FUTURE EMPLOYMENT

Employment confidence

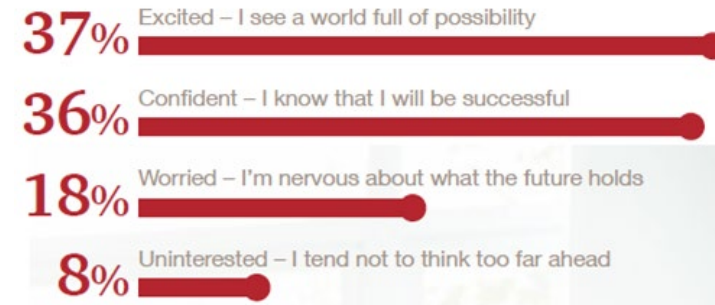
Despite the media attention and myriad of reports estimating how many jobs could potentially be lost or displaced due to advanced technologies, the majority of people seems to be confident about future employment ([Eurobarometer](#), [CNBC](#), [PwC](#), [Inc.](#)).

Most of us have extensive exposure to technology in our private lives, and welcome its perks. Technology is viewed by many as assisting our work (vs replacing it) and allowing us to shift our focus to more important, valuable, productive and fulfilling tasks.

In addition to shifting humans to more inspiring activities, automation allows dangerous tasks to be carried out by robots, reducing occupational stress and accidents.

Besides the benefits in terms of making work safer or more engaging, several economies embrace automation to address specific societal challenges like shrinking workforces ([Reuters](#), [CNBC](#)) or already have systems in place that help mitigate the impact of automation on people and society ([New York Times](#)), both factors that build people's confidence in future employment despite automation.

Figure 1: When you think about the future world of work as it is likely to affect you, how do you feel?



73%
think technology can never replace the human mind.

37%
are worried about automation putting jobs at risk – up from 33% in 2014.

Source: PwC (2018) Workforce of the Future

AMERICAN WORKERS WHO WORRY ABOUT LOSING THEIR JOBS TO AI

23%

NORTHEASTERN UNIVERSITY/ GALLUP

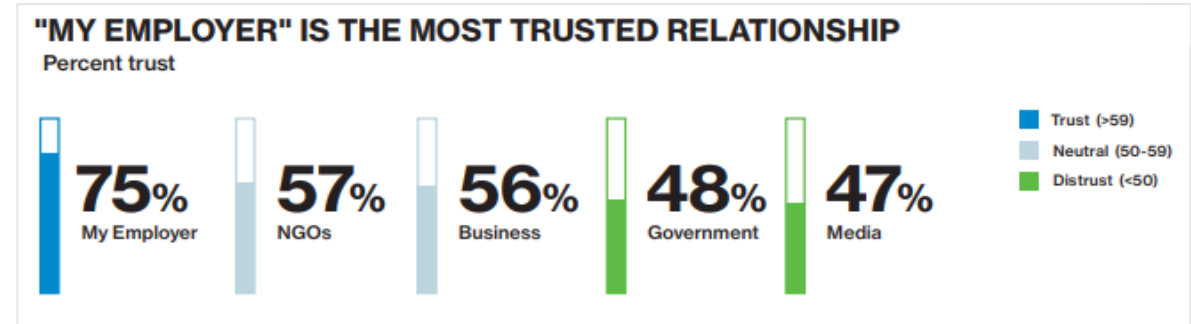
PEOPLE TRUST THEIR EMPLOYER AS A PARTNER FOR CHANGE

People trust their employer, but have high expectations

The [2019 Edelman Trust Barometer](#) shows that trust has changed significantly in recent years. People have more and more shifted their trust to the relationships they can control. As a result, 75% of people worldwide trust their employer to do what is right, significantly more than NGOs (57%), business (56%) and media (47%). “People have low confidence that societal institutions will help them navigate a turbulent world, so they are turning to a critical relationship: their employer.”

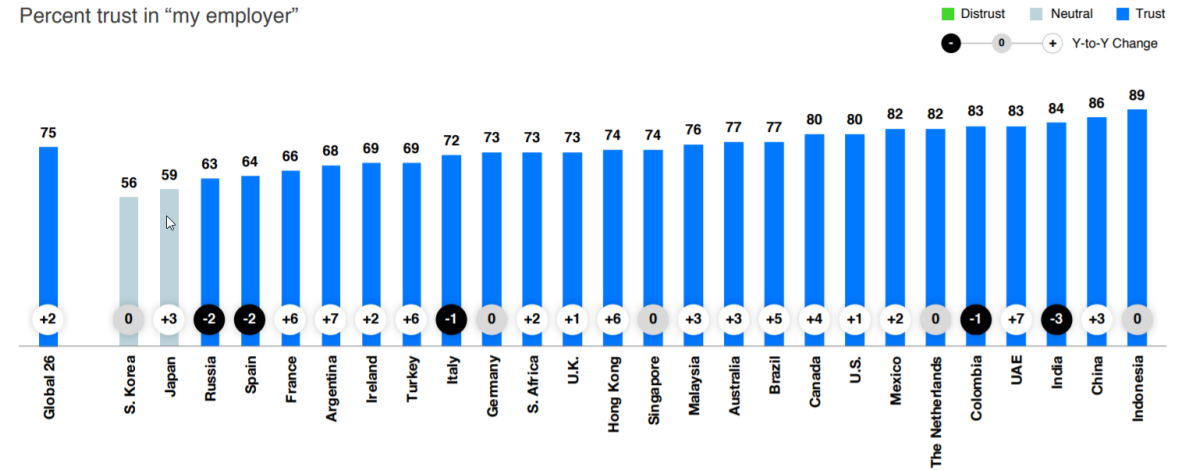
However, people’s readiness and willingness to trust in their employer is accompanied by high expectations: trust has to be earned through more than “business as usual.” 67% of employees expect that prospective employers will join them in taking action on societal issues. This ratio is almost as high as their expectations of personal empowerment (74%) and job opportunity (80%).

Moreover, 71% of employees are convinced that it is critically important for their CEO to be responsive during challenging times. Over 76% of the general population say they want CEOs to take the lead on change instead of waiting for government to impose it.



STRONG RELATIONSHIP WITH MY EMPLOYER AROUND THE WORLD

Percent trust in “my employer”



Source: [2019 Edelman Trust Barometer Global Report](#)

Lead.
Transform.
Succeed.

WBCSD Contacts

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