

Human value in the digital age

*Chief Economist
Office*

December 2017





Contents

Introduction	3
Effects of digitalisation	5
Different skills required	9
Do we all benefit?	12
Shifting to purpose and values	15
Leadership in a digital age	19
How will we organise the costs, benefits and dilemma's?	21
Key questions	22
Literature	23
Contact information	24

Introduction

Since a number of years, several studies have warned us about potential job losses, across all sectors, due to advances in ‘smart automation’ – combinations of artificial intelligence, robotics and other technologies that are rapidly and widely disseminated due to globalisation. These studies predict that digitalisation will fundamentally alter the quantity – and the quality – of the workforce needed for the advancing production processes. Digitalisation will therefore drive massive skills and labour market transformations across the globe.

While some studies focus on the skills revolution needed, few studies shine a light on the human-machine interaction and the value that humans do bring to the workplace in the digital age and what is needed to unleash this potential.

Digitalisation and automation are already fundamentally transforming the way we work. For example, data analytics, the Internet of Things and drones are already used in many industries to make production processes better, faster, more accurate, cheaper and to make them available 24-7.

As both tasks and jobs change as a result of digitalisation, organisations look for different capabilities and skill sets from their employees. Many organisations currently focus on the cognitive skills humans bring to the workplace.

However, smart automation and artificial intelligence allow computers to automate cognitive skills. Computer algorithms and deep learning already outsmart the cognitive human brain.



The question is therefore not just whether and how machines will replace humans, but rather how humans and machines will complement each other, and what value people will add to the workforce of the future besides their cognitive skills.

Other skills, such as adaptability and creativity, are already becoming very important, a notion which seems to be well understood by CEOs all over the world.¹ But also empathy, care, integrity and imagination are values that are needed to build the bridge between technology and increased prosperity and wellbeing.

At PwC, we recently started a journey to make our purpose as a firm within the economy and society more explicit and to rethink the values we need to enhance in order to demonstrate our purpose.



Many businesses are also recalibrating their values. Our PwC CEO Survey¹ showed that 92% of the world's CEOs agree that in an increasingly digital world it is becoming ever more important to have a strong corporate purpose. Within PwC, we found that a sizeable majority of our 220,000 people voted for a more human values based culture for the future, instead of the rational, more cognitive values we have been embracing and fostering for many years.

So when it comes to the future of work, two trends seem to be coinciding at the moment.

Technology crowds out human work for various tasks while emphasising the need for those skills which computers will – for the foreseeable future – not be able to compete on, creating new balances between humans and machines. At the same time, work needs to be meaningful to be attractive, which means that there is a strong demand for purpose-led organisations and workplaces and therefore a need to define and adopt values based work.

In this report we will explore how digitalisation and automation are transforming the labour market, and our society.

We will explore the value that people can add to the digital economy to increase welfare and to gain the full benefits of digitalisation. We will discuss the skills needed for future jobs, the challenges we currently face and how to respond to these issues; as a business, as a citizen and as a society. Last but not least, we will explore the role of leaders along this journey.

Jan Willem Velthuisen
Chief Economist

Wendy van Tol
Partner People and Organization

1. PwC (2017) CEO survey
PwC

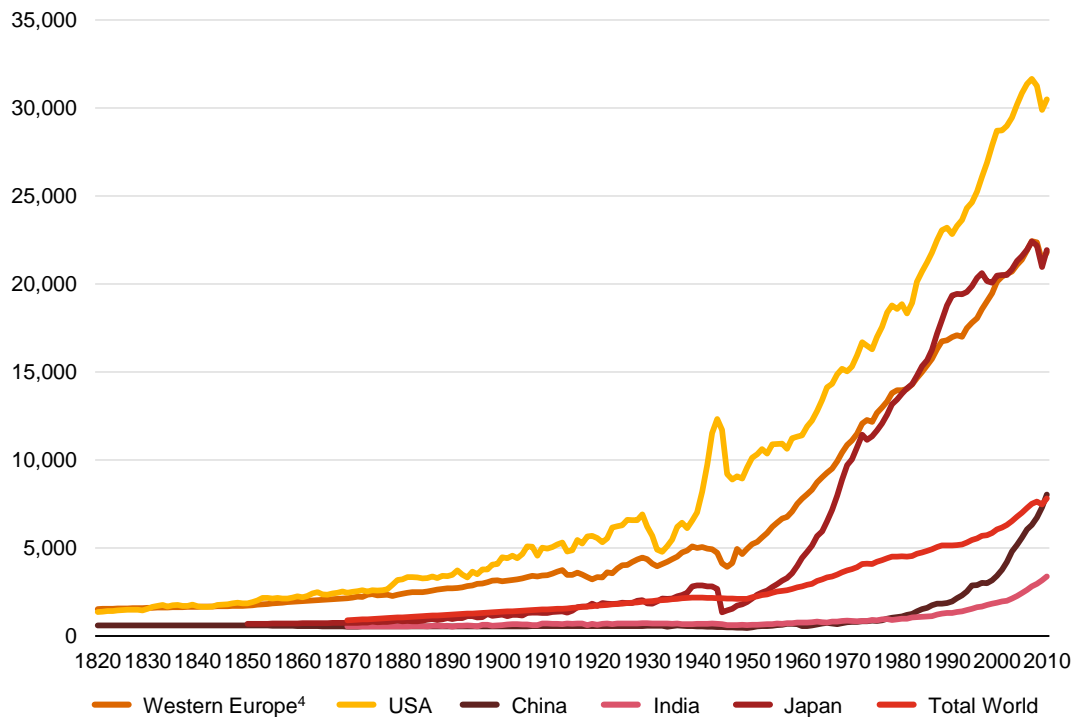
Digitalisation increases prosperity ...

Technology increases prosperity

Technology has had a positive impact on our society. Global GDP has risen steadily as a result of industrialisation in the late 1800s, the rise of robots in the 1970s and the widespread use of personal computers and the internet in the 1990s. Research from Oxford Economics shows that technological progress has been the main contributor to the eightfold rise in per capita income.¹ The CEP estimates that industrial robots increased labour productivity, value added and wages.² The contribution of the increased use of robots to economic growth has been substantial, towards 0.37 percent, based on conservative estimates. This accounted for just over one tenth of aggregate growth.

Graph 1.

Global wealth has increased since the beginning of industrialization in the early 19th century (in GDP per capita (1990 Int. GK\$))³



1. PwC (2017) UK Economic Outlook March 2017

2. CEP (2015) Robots at Work

3. Madison projects, PwC analysis

4. Western Europe refers to Austria, Belgium, Denmark, Finland, France, Germany, Italy, the Netherlands, Norway, Sweden, Switzerland and the UK.

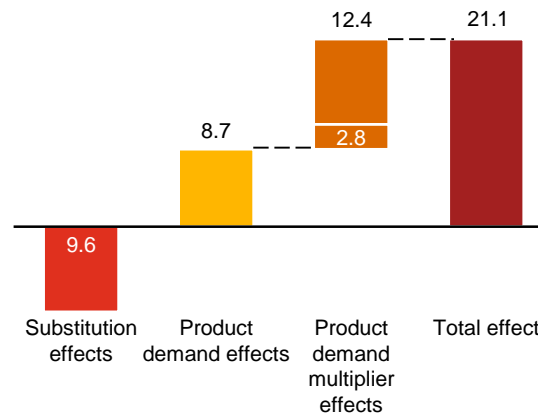
... and destroys and creates jobs

However, many fear that the new wave of robots, digitalisation and smart automation is different from previous waves of automation. They fear the relentless pace of digitalisation and the ways it affects jobs in all industries will threaten millions of workers. After the initial study by McAfee and Brynjolfsson, many reports have been published about the number of jobs that are potentially under threat of becoming obsolete due to digitalisation.

Research from the ZEW¹ shows that in Europe the demand for labour in industries such as manufacturing, transport and logistics, and the financial sector decreased by 9.6 million jobs between 1999 and 2010. Technology has restructured production towards routine tasks and has substituted manual labour in these routine tasks.

However, in the same period, the demand for labour increased by 8.7 million jobs due to increased product demand.

Graph 2.
Jobs lost and created due to technology



The ZEW estimates that between 2.8 and 12.4 million jobs are additionally created due to local spillover effects into other industries as lower goods prices lead to a higher demand for products, thereby increasing labour demand, and because the rise in product demand spills over into industries which are not directly affected by technological progress, creating additional labour demand in these industries.



Digitalisation will transform labour markets

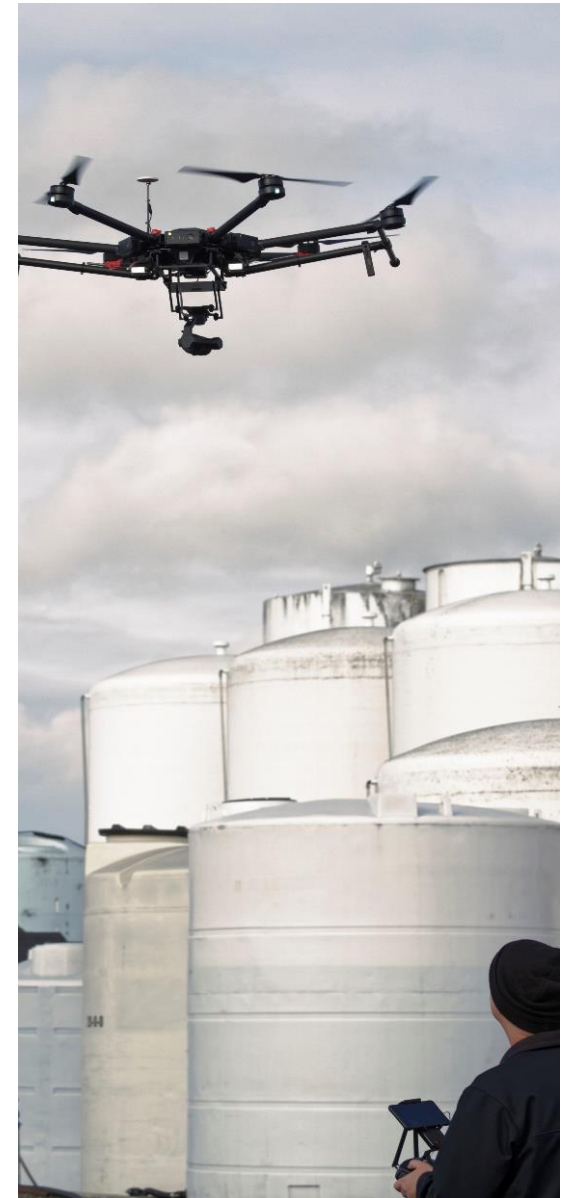
Historical evidence¹ suggests that automation and digitalisation in the digital age will lead to:

- Higher average real income levels across countries as a whole due to higher overall productivity.
- Generally similar overall rates of employment for human workers, although the distribution of jobs across industries and types of jobs will be different.

To explore to what extent digitalisation and smart automation will change the distribution of jobs across industries, and which jobs are at risk and which are expected to gain, PwC UK's Chief Economist team analysed the labour markets of several countries.

They found that the potential impact of job automation in countries such as the UK, the US, Germany and Japan is driven by the industry composition of the country (i.e. employment ratios across sectors) and the relative proportion of jobs at high risk of automation in each of those sectors.

In Japan, 21% of jobs are at risk of being automated, in comparison to 30% of UK jobs, 38% of US jobs and 35% of German jobs. Japanese employees perform less manual tasks compared to employees in other countries. In Japan, robot density is amongst the highest in the world, suggesting workers may already perform relatively fewer tasks susceptible to be automated².



1. PwC (2017) UK Economic Outlook March 2017

2. IFR (2016) World robotics report 2016

The effect of digitalisation on the labour market differs per type of job

Shifts within industries

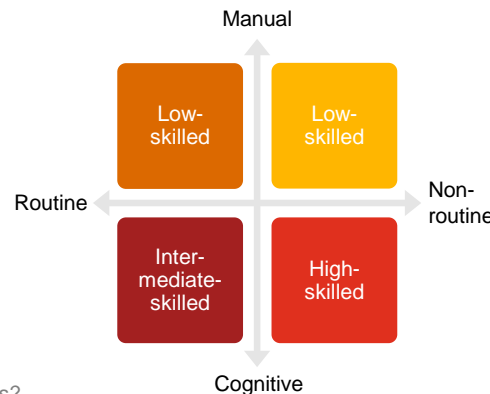
The risks of jobs being automated are highly dependent on the industry those jobs are in. The risks appear highest in sectors such as transportation and storage (56%), manufacturing (46%), and wholesale and retail (44%), but lower in sectors like health and social work (17%).¹ Employees in high automation risk industries, such as transportation and manufacturing, spend a much greater proportion of their time engaged in manual tasks that require physical exertion, or routine tasks such as filling in forms or solving simple problems.¹

Autor and Dorn² show that US regions that were initially relatively intense in routine jobs experienced both greater adoption of information technology and a greater reallocation of low-skilled workers from routine task intense jobs to non-routine service jobs.

Manual and cognitive routine tasks

One of the main drivers of a job being at high risk of automation, is the composition of tasks conducted. According to Autor, Levy and Murnane³, 'routine tasks that are either manual or cognitive are more susceptible to automation than non-routine manual and cognitive tasks'. Routine manual and routine cognitive tasks are mostly performed by employees with secondary or vocational education (see figure 1).

Figure 1.
Routine model of Autor, Levy & Murnane



Studies by Oxford Economics⁴ and IZA⁵ suggest that the proportion of employment has primarily evolved in favour of lower- and higher-skilled occupations since the 1980s (i.e. when ICT technologies started to be rolled out), at the expense of intermediate-skilled occupations.

In developed countries, we already see an increase of the service industry, supported by platform technology.

1. PwC (2017) UK Economic Outlook: Will robots steal our jobs?

2. Autor & Dorn (2013) The Growth of Low Skill Service Jobs and the Polarization of the U.S. Labor Market

3. Autor, Levy & Murnane (2003) Skill Content of Recent Technological Change

4. Oxford Economics (2016) Robots and employment

5. IZA (2015) Rise of the Machines: The Effects of Labor-Saving Innovations on Jobs and Wages

To augment technological advancement we actually need more of several human skills

In the digital age, as technological advancements speed up and the potential of artificial intelligence and deep learning is unleashed, certain types of jobs of highly educated workers could be automated as well. For example, in the UK, the estimated potential risk of automation for those with only secondary education or lower is as high as 46%, while for those with bachelor degrees or higher it is 12%.¹

Look for human skills that add value

As digitalisation and smart automation progress, many will see their jobs altered. Advances in automation technologies will mean that people will increasingly work side by side with robots, smart automation and artificial intelligence. Humans and machines combined can generate more value than either one alone.

More than two thirds of global CEOs think robotics will create new and exciting opportunities for their employees by automating repetitive tasks.² Businesses will look for employees who are good at the

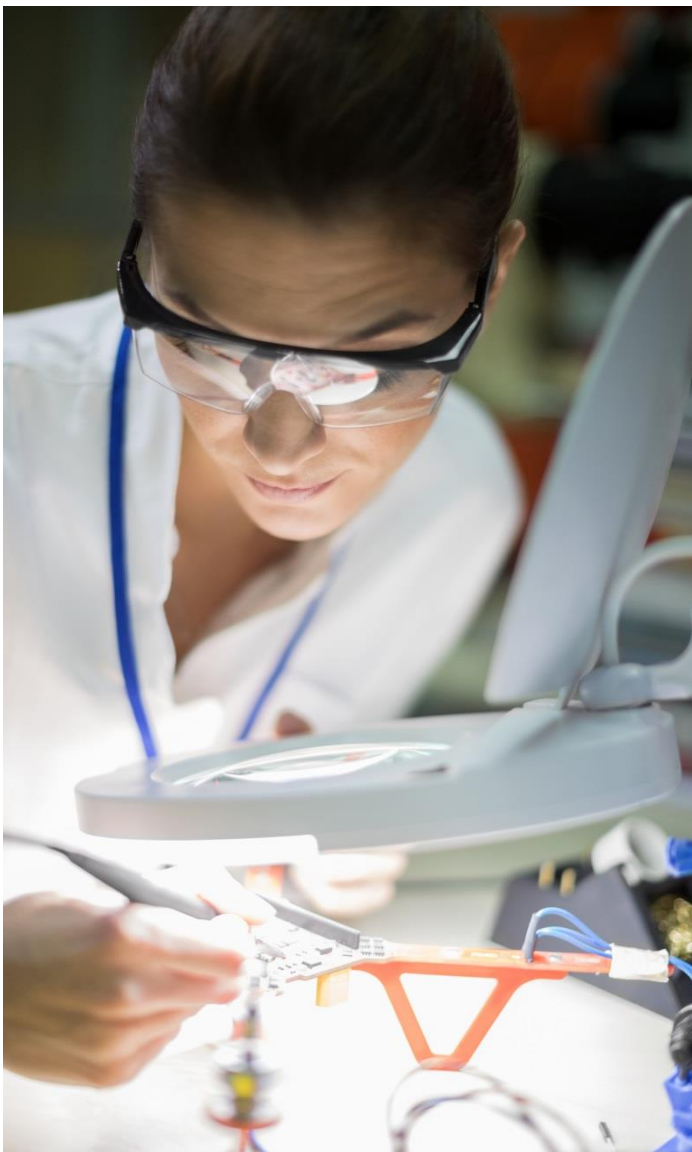
tasks that smart automation struggles to do and that add value to the use of smart automation. Relatively abstract and higher-educated skill sets, such as social and creative intelligence, will be in greater demand. Low-skilled workers performing non-routine tasks that require social skills, such as hairdressers, personal trainers and other service providers, will also remain in high demand.

According to The Guardian, a Japanese insurance company has recently replaced 30 of its medical insurance claims representatives with an AI system based on IBM's Watson Explore. The software can analyze and interpret data faster than a human can, and can reduce the time needed to calculate payouts.



1. PwC (2017) UK Economic Outlook: Will robots steal our jobs?

2. PwC (2017) CEO survey



New jobs and new versions of jobs

New automation technologies in areas like artificial intelligence and robotics will create new jobs in digital technology. Research by Oxford Economics¹ found that more than one million ‘digital jobs’ could be created in the UK in the next two years. Goos et al.² already estimate that ‘every high-tech job in a region creates five additional low-tech jobs in that region’ in Europe.

Technology will create jobs for people who can design, monitor, maintain and fix technology; jobs for people who can optimise human-technology interaction, e.g. behavioural economics; jobs for people in sectors that benefit indirectly from technology; and new versions of ‘old-world’ jobs. Witness the rise of on-demand companies

that match customers with contractors, selling everything from taxi services to accommodation.

A study by PwC³ has found that around 6% of all UK jobs in 2013 did not exist at all in 1990. In London, this proportion even rose to around 10% of all jobs. These were mostly related to – then new – digital technologies, such as computing and communications. Similarly, by the 2030s, 5% or more of UK jobs may be in areas related to platforms, robotics, artificial intelligence or other technologies that do not even exist yet.

Digitalisation and automation are already transforming the labour market. We see shifts in the structure of employment: industries, tasks, educational levels and skills.

1. Oxford Economics (2016) Robonomics – how automation will change

2. Goos e.a. (2015), Employment Growth in Europe: The Roles of Innovation, Local Job Multipliers and Institutions

3. PwC (2017) UK Economic Outlook: Will robots steal our jobs?

.....

Artificial intelligence in human capital: less bias

Technology could improve performance management, providing effective new tools for managers. Artificial intelligence and data analytics could be useful for making unbiased decisions in HR. For example, despite the best efforts of many people, mentorship, promotion and compensation decisions are undeniably political. Study after study has shown that deep biases impact the way in which groups, like women and minorities, are managed. Women in business are often described in less favourable ways than men are and receive less helpful feedback. Minorities are less likely to be hired and are more likely to face prejudice from their managers. These defects and inequalities in the system hurt organisations as leaders are less able to nurture the talent of their entire workforce and to appropriately recognise and reward performance. Artificial intelligence can help bring impartiality to these difficult decisions. For example, artificial intelligence could determine if one group of employees is assessed, managed or compensated differently. Just imagine: 'Alexa, does my organisation have a gender pay gap?' Of course, AI can only be as unbiased as the data provided to the system.

.....

Digitalisation affects business models, what skills we need and how we organise and engage

Businesses could gain a lot from automating and digitalising tasks and processes. Besides obvious results, such as reduced labour costs, outputs may include increased reliability and lower maintenance costs; new quality levels, with fewer human errors; and higher productivity and efficiency.

Automation and digitalisation are affecting the workforce composition of businesses. Integrating automation technologies into a company is a lengthy process. Existing tasks should still be performed, even if they become obsolete in the future. Employees with new skill sets should be hired, for both technical jobs and jobs in which one works closely together with smart automation. Strategic workforce planning should be applied to identify skills gaps. Retraining talent and skill-raising programmes will be important to help workers shift to new roles and take on new activities.

Above all, automation and digitalisation will change business models and organisational structures. In the past, most businesses had assets, human capital and products and/or services. New technology-based businesses, such as Uber and Airbnb, have turned our ideas on how businesses should operate upside down. Operating as a platform has become the new business model of the 2010s. This platform model could fundamentally change labour relationships – the relationship between employer and employee – in the future. Digitalisation will increase employee flexibility, autonomy and responsibility: i.e., where, when and how people work will be independent of their physical location. This will also have its effect on the quality and fairness of remunerations, labour hours, lifelong learning and social security and pension savings.

We already see working contracts becoming shorter and more flexible, and self-employment has risen sharply in the past decade. The economic crisis triggered this trend; digitalisation and automation increased the speed with which it happened. Digitalisation and automation will also change the employee value proposition. As workers will increasingly work together with smart automation, artificial intelligence and robots, and as working contracts become more flexible, employers will need to adapt their employee value propositions. Employers will need to give their employees the opportunity to innovate and to bring their personal values into the workplace. Offering a work environment that fosters intuition, empathy and imagination will need to be included in the employee value proposition.

Do we all benefit?

Digitalisation is creating ethical dilemmas for businesses

As we mentioned earlier, digitalisation is driving massive labour market transformations. The labour market and – in its backwash – our society are changing fast. We already see the first effects of digitalisation and automation. These effects are raising new dilemmas, both for businesses and for society.

For example, who will own the data that will be created by new technologies? A growing proportion of the data that management teams are using to manage their businesses is now generated outside of their companies and is thus beyond their control. Technology suppliers, customers, consumers: who is involved in the creation at what stage, who pays for it at what stage and who ultimately owns the data?

This same management information is also available to people outside of the company, including customers, investors, suppliers, owners and society as a whole. These people are drawing on these data to inform

their own decisions, whether for investment, employment, supply chain or purchasing purposes. This range of data also provides a basis on which to scrutinise how management teams handle issues ranging from strategy to ethics and environmental impact.

Many dilemmas are related to the workforce composition. Should I keep investing in people who may become obsolete in the near future? What would be the best mix of permanent and flexible employees? How should I fulfil my moral duty towards my employees? And what effect would this have on my brand reputation? What shape will the future workforce composition take? Will workers with science, technology, engineering and mathematics (STEM) profiles become highly sought-after and scarce? What will be the effect on remuneration? And what impact will this have on the behaviour of these workers? Can we predict possible future risks?



Employee disengagement as a major threat

How do we keep employees engaged? And how do we engage the people that do work in highly automated and digitalised jobs? Management guru Charles Handy¹ wrote that 80% of employees are disengaged and don't care. 25% of that 80% would actively sabotage the organisation for which they work. A recent IBM survey² confirmed that 60% of cyberattacks came from within the organisation; 75% of these are malign. Employee disengagement is real and is often provoked by a lack of care.

1. Handy (2015) The Second Curve
2. IBM (2016) Cyber Security Intelligence Index
PwC

Do we all benefit?

Digitalisation is creating ethical dilemmas for society

We see several dilemmas arising from automation and digitalisation for societies as well. One very fundamental question is: who really benefits from 'robotification', smart automation and digitalisation?

PwC research¹ suggests that digitalisation and automation could quite possibly lead to a more skewed income distribution. With higher-skilled workers and capital owners in a better position to capture most of the productivity gains linked to automation, the distribution of income and wealth could become much more unbalanced.

Several reports suggest there may be an increasing inequality between users of digital technology and others. Research from the US found that there is a distinct underuse of digital tools and mobile apps among low-income families, due to their costs.²

As technological developments progress and the costs of new technology rise, even if only marginally, the gap between the technological 'cans' and 'cannots' may only increase further.

New technologies could increase the inequality between men and women. Smart automation will create many new jobs, many in industries that are related to technology and engineering.

A disproportionately large percentage of workers in these industries are men. Of every 1000 women in the EU with a degree, only 0.4% work in the technology industry.³ It is plausible therefore that women will benefit less from the new jobs created by automation and digitalisation, thus further increasing the inequality between men and women.

Focus on STEM for men and women alike

Many countries have already put policies in place which encourage girls and women to pursue STEM courses and careers.

The Netherlands, for example, has seen the number of female participants following STEM courses more than double between 2005 and 2015.⁴

Other female opportunities relate to the soft skills required to connect technology with people.

Research from Hay indicates that women outperform men in most of the key emotional intelligence competencies, such as collaboration, adaptability and inspirational leadership.⁵

According to the World Economic Forum, these are the skills that will be crucial in the digital age.

1. PwC (2017) UK Economic Outlook March 2017

2. Rideout and Katz (2016) Opportunity for all? Technology and learning in lower-income families

3. Technology Pact (2016) National Technology Pact 2020

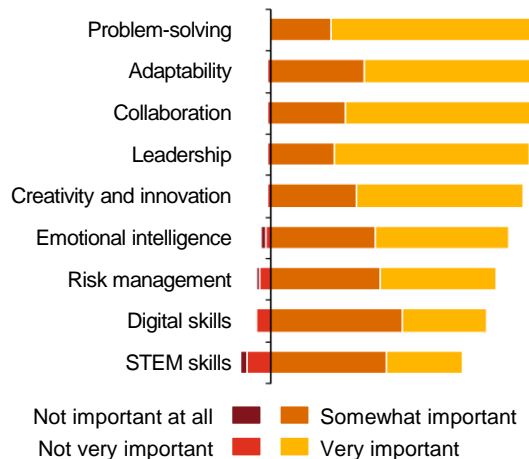
4. Technology Pact (2017)

5. Hay Group (2017)

Digital transformations require emotional agility

Smart automation and artificial intelligence already allow computers to automate cognitive skills. As smart automation and artificial intelligence systems evolve, the need for people to scrutinise and analyse data may become obsolete. In the short-term, this may only concern relatively simple problems, but as technologies progress, even difficult analyses may be performed by artificial intelligence and smart automation.

Graph 3.
Importance of specific skills to CEOs



So what skills will people have to offer employers if smart automation or artificial intelligence can perform all or part of their core tasks more efficiently in the future? What will employers still want from people rather than from machines? What skills will be needed alongside machines to make them work? Our 2017 global PwC CEO Survey revealed that problem-solving, adaptability, collaboration, leadership and emotional intelligence are very important skills to our respondents. These skills are considered crucial for future jobs.

In 2016, the World Economic Forum published an overview of 21st century skills that are necessary for workers in the digital age. Competencies such as problem-solving and communicating are already very important in many jobs, where being able to critically evaluate and transfer knowledge, as well as collaborating in a team, has become the norm. In addition, character qualities such as adaptability, persistence and empathy² will become even more important in the digital age as these qualities ensure greater resilience and success in the face of a changing working and social environment.

21st century skills¹



Foundation literacy

Literacy | Numeracy |
Scientific literacy | ICT literacy |
Financial literacy | Cultural
and civic literacy



Competences

Critical thinking | Problem-
solving | Creativity | Innovation |
Communication | Collaboration



Character qualities

Curiosity | Initiative | Empathy |
Persistence/grit | Adaptability |
Leadership | Social and cultural
awareness | Emotional Agility

1. World Economic Forum (2016), PwC insights

2. McAfee & Brynjolfsson (2017) Machine, Platform, Crowd, Harnessing our Digital Future

Shifting from cognitive skills to character qualities means restyling the way we organise

In the digital age, competencies and character qualities will become much more important. This is different from what we've asked before – and are asking even now – from our employees. Most employers prefer intelligence and cognitive qualities above all other qualities. However, in the digital age, we will need qualities such as curiosity, empathy, adaptability and emotional agility to reap the benefits of digitalisation and smart automation. With these qualities, workers can add value to the use of smart automation.

To unleash their full potential, these qualities will need a different managerial style. Where cognitive skills can be managed in a traditional hierarchal organisational model, managing character qualities will require a different approach. Businesses should shift their focus from norms towards purpose and values, from rules and procedures towards providing meaning behind the rules, and from hierarchy towards more autonomy.

Values form an organisation's expectations, aspirations and intentions towards how it wants its people to work with each other, its clients and society.

Currently, many organisations are hierarchal and based on power. Many other organisations are rules and process driven. These organising principles will not release the full potential of the character qualities and values that we need in the digital age.

In recent years, new organisational forms have been emerging that are highly adaptable and better suited for an ever-changing environment. These organisations truly understand what it takes to unleash the potential of human value. They have proven to be the most sustainable¹, and are also the most appealing to workers in the digital age. These organisations are purpose led and values driven.

Purpose is about a deeper emotional connection - it defines the human needs and desires that a company's products and services ultimately fulfil. Given the inherently human aspect of purpose, we see purpose as a core element of organisational culture. It provides a sense of meaning to why we do the things we do.

From	To
Rules and procedures	Purpose
Uninvolved stakeholders	Involved stakeholders
Internal focus	External focus
Acting in silos	System thinking
Hierarchical	Networks

They focus on the true purpose of the organisation, on engaging the workforce, and foster autonomy and agile working. This autonomy and agility are the foundation for innovation and are necessary if you want to survive in the digital age. These organisations offer a truthful narrative about their purpose (the why), the actions they take (the what) and their values, behaviours and capabilities (the how). They communicate the role their business has in the world, the way in which they are relevant, the difference they can make and the value they create. In these companies, their purpose and values form the source of all innovation.

Purpose-led and values-driven organisations are already outperforming their peers

PwC Strategy& reports¹ that 84% of leaders see culture as critically important to business success. Its research has shown that organisations with a distinctive culture are:

- 1.9 times more likely to grow revenue faster than competitors.
- 1.7 times more profitable than their industry peers.
- 2 times more likely to quickly translate important strategic and operational decisions into action.

An organisation's purpose and values set the foundation for its culture and are key to doing business. In fact, they are the enablers of strategy execution. For culture to become an asset in one's strategy execution, the purpose and values must be central to the decisions, conversations and behaviours across all levels. Only then can a company be authentic and deliver the wealth of the benefits its culture promises.

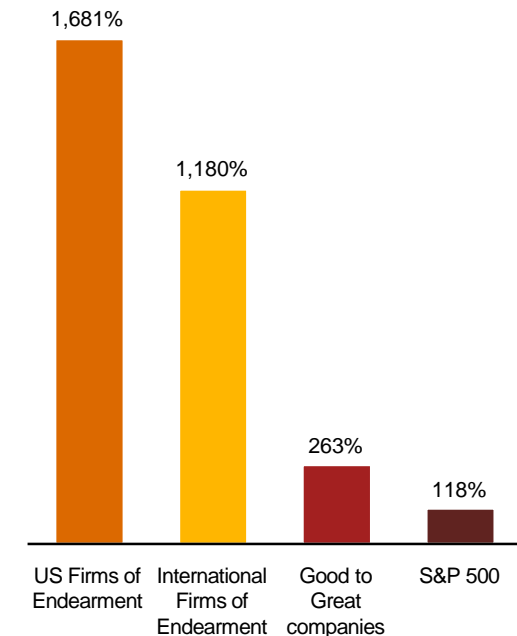
Now, more than ever, companies must cultivate the power of purpose and values if they are to succeed in a world where the opportunities – and responsibilities – of businesses have never been greater.

From a financial perspective, research¹ shows that being purpose led and values driven makes commercial sense. Businesses that are purpose led and values driven are more profitable, in comparison with the overall stock market (see graph 4). Purpose-led and values-driven firms outperform their peers because they are able in this digital age to:

- Attract talent and create employee engagement in the war for talent.
- Create positive stakeholder engagement, because they clearly communicate what they stand for.
- Reinforce a strong branding and positioning in the market.
- Provide a strong guidance for decision-making.
- Lay the foundation for a culture that makes the desired behaviour very clear.

Graph 4.
Purpose-led firms significantly outperform profit-focussed firms²

Cumulative returns 1998-2013



1. Strategy& (2013) Culture's role in enabling organizational change

2. Sisodia e.a. (2014) Firms of endearment

True human values help reach the highest potential in the digital age

Values matter. Purpose and values are the enablers of strategy execution. People can bring unique human values to their workplace, thus creating a culture that is more successful in the digital age. What values are we talking about? Why are they important? And why can they not be computerised (at least no yet)?

To us, values such as giving meaning, care, creativity and lifelong learning are most important.

Sense-making and giving meaning

People are born to live a life leading towards self-expression and self-actualisation. We can make a difference by understanding our environment, balancing the interests of all our stakeholders and using our moral compass in our decision-making. This desire to look around and see where you can make a difference cannot be replicated by machines.

Figure 2.
Percentage of employees who feel their organisation performs well¹



Care and empathy

Emotional strength is a key differentiator of humans. Machines cannot have real empathy – at least not yet. We might be able to create artificial intelligence that mimics empathy, but it still lacks the energy that is generated by a real human connection.

This is important because a lot of business is done not only because we trust one another, but because we feel a connection at an emotional level. In the digital age, businesses need their employees to connect even better with co-workers and customers on an emotional level to understand their deepest needs and create trust in the relationship.



Innovation and creativity

Innovation and creativity are processes that smart automation and artificial intelligence are still learning to mimic. We can dream, we can sense, we can use our intuition in deciding what path to take. In general, artificial intelligence systems tend to be passive vessels, dredging through data in search of statistical correlations; humans can sense which unfulfilled needs could drive innovation.

Neuroscience shows that creativity comes from brainwaves below the alpha bridge – theta brainwaves. When in theta, people dream up creative and unexpected solutions, resulting in many innovative and creative ideas for businesses.

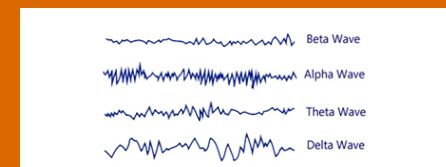
The current innovation processes are aimed at improving efficiency. Can leaders in the digital age provide the tranquillity and opportunities that are necessary to shift from replication to creation, even if it might decrease productivity in the short term?

Lifelong learning

Most people have an innate need to learn, grow, develop and – with their skills – make a difference to their customers and to society. Lifelong learning supports this need. Humans can reflect and feel what happened in their interactions with other humans. They can sense what they need to learn from that situation to continue to grow.

In the future, performance reviews, compensation models, and job markets will need to adjust to emphasise human values, rather than only the technocratic and cognitive elements that can be done better by computers.

Theta waves generate creativity



Research¹ shows that four different categories of brainwaves have an impact on the state of a human being.

- When the brain is actively engaged in mental activities, it generates beta waves.
- Where beta represents a high level of activity, alpha represents a state of mental rest. A person who has completed a task and sits down to rest is often in an alpha state.
- The next state, theta, represents a state of semi-consciousness, which often occurs during tasks that don't require a lot of thinking such as taking a shower, jogging or brushing your teeth. In theta, we are often in a daydreaming state. This is when we access our imagination, intuition and the information that lies beyond our normal conscious awareness.
- The final brainwave state is delta. Delta waves are generated when we are in a deep, dreamless sleep.

1. <https://www.scientificamerican.com/article/what-is-the-function-of-t-1997-12-22>

What can leaders do to bring the human value in the digital age to its full potential?

Retaining the human element in an increasingly digital world will be vital for future success.

We believe that what it takes for leaders to create enduring value in their organisations and communities is shifting considerably. Business leaders should be able to connect with a higher purpose and ultimately create the conditions for themselves and others to flourish in a digital age. Leaders should have the ability to place an organisation's mission and purpose above everything, including personal wins and achievements.

Business leaders need to help their employees to make the transition towards digitalisation and automation. They can support this transformation by creating a narrative and a purpose and a culture that inspires people and helps the workforce manage the transformation.

Leaders need to inspire their employees according to the purpose of their business and give their employees the freedom to create value. When your employees feel supported in satisfying their needs, they respond with high levels of engagement and willingly bring not only their intelligence, but also their commitment, intuition and creativity to work.

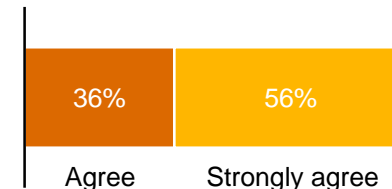
“People were created to be loved. Technology is created to be used. The reason why the world is in chaos, is because technology is being loved and people are being used.”

- Adopted from John Green

In the digital age, people will continue to want to create value in their work. Thus, their skills will need to contribute to value creation. Businesses should increasingly look at future work skills, proficiencies and abilities required in the digital age.

Whether it's digital skills, adaptability or empathy, business leaders need to stimulate employees – in financial, practical and motivational ways – to keep investing in themselves by training and education. Life-long learning will become even more crucial than it already is. Businesses need to take accountability for the learning journey of their employees.

.....
Graph 5.
Already 92% of global CEOs feel that it becomes more important to have a strong corporate purpose, that's reflected in their values, culture and behaviours.
.....



What qualities should leaders have to bring the human value in the digital age to its full potential?

When we look at the values that workers need in order to reach the highest potential in the digital age, it becomes clear that the digital age requires different qualities from business leaders as well.

We assessed the newest research¹ on this topic and composed a list of the three most critical leadership capabilities of the future. These capabilities will be the ones that differentiate successful leaders in the digital age. Embracing these capabilities will be critical for leaders to take the leap into the future. For future leaders, they will be career defining.



Mindful tech-savvy humanist – In the digital age, technology will be ever-present. Leaders will need to understand technology well enough to see how technology supports people, but they should also be able to get humans to be more human to get the best value out of technology. They should make sure people find ways to ‘switch off and be offline’ so as to tap into lower brain frequencies and a level of imagination and creation instead. Leaders should be able to lead people towards responsible behaviour with technology, for themselves and their environment.

Fostering systemic intelligence – The ability to share the role of leadership at different levels in the organisation will become essential, especially to those leaders who directly work with key stakeholders such as (internal) customers, suppliers, government and other society representatives. Instead of controlling these leaders through top-down decisions, processes and hierarchy, we can achieve better results by empowering them and providing the level of guidance, resources and trust they need. In this way these leaders can act more autonomously and achieve better results. They can perform their work and apply their knowledge as they think best, on a strategic, tactical and structural level. Fostering systemic intelligence involves leaders to stimulate collaboration, create a culture that stimulates autonomy and encourage decision-making based on input from different stakeholders from inside and outside the organisation.

Building trust – In a changing environment with diverse teams where technology is omnipresent, it is imperative for leaders to consistently display authenticity of thoughts and actions. This will build trust and create an environment in which individuals feel respected and comfortable to take risks, learn and grow. Leaders should continuously develop their self-awareness and curiosity. This will allow them to know what they don’t know, to consider and integrate multiple perspectives and to be aware of their impact on their ecosystem. They will need to harness inner sources of wisdom to navigate through moral and ethical dilemmas of data privacy and ownership to understand whether their decisions hold ground in public debate. This desire to look around and see where you can make a difference cannot be replicated by robots.

1. PwC analyses, based on PwC (2017) Reimagining leadership, Oxford Leadership (2017), Fast Company

How will we organise the costs, benefits and dilemmas?

Digitalisation and smart automation are key drivers for labour market transformation. Digitalisation and automation will create opportunities for many, but will also threaten others. To prevent further polarisation between the 'cans' and the 'cannots', i.e. the lower-skilled and higher-skilled, our society should ensure that everyone can benefit from digitalisation and automation.

Governments should tackle upcoming mismatches between supply and demand in the labour market. They could also implement policies that help workers and businesses adapt to the impact of digitalisation and automation on employment.

For instance, education, training and lifelong learning are very important ways in which to prepare and retain (future) workers for the labour market. From a young age, people should be made aware that their future may not consist of just one career, but possibly more.

Flexibility and adaptability should be stimulated from a young age. In order to align skills, supply and demand of workers, a close collaboration between governments, businesses and education is necessary, at a local level. As labour markets become more globalised, skills recognition and alignment at the global level could help workers to access international labour markets.

Special attention should go into STEM education. Some argue that programming skills will be necessary for the future. Either way, STEM studies will undoubtedly increase skills that may be highly sought-after in the coming decades.

Strategies to decrease the gender gap will stimulate female students and workers to take up studies and jobs which are future-proof.

Income support and safety nets for those who will become redundant may be required, as well as transition support.



Both governments and businesses should ensure solutions for a humane transformation to a new labour market.

In the digital age, leaders should provide employees with tranquillity and opportunities to shift from replication to creation. By stimulating employees to tap into the lower brain frequencies, leaders can create a better balance and more wellbeing for their employees, while increasing their creativity and innovativeness.

Digitalisation and automation will transform the labour market. If we focus on the value of people, then technology and humans together could create a bright future.

Key questions for businesses



- Can we be sure that our technologies are improving peoples' lives?
- What meaning do we have and what lasting impact are we creating as an organisation? And how do we measure this?
- How can we support welfare with what we create?
- How can we further combine purpose and profit?
- Do we know what data we own, create and use, and do we know their effects on people?
- How can we help our employees reach their full potential, now and in the future?
- Are we educating people adequately for the future?
- Is there anything pulling me back to the old paradigm?

Literature

- Accenture (2017) Technology for people
- Accenture (2017) Harnessing revolution, creating the future workforce
- Autor & Dorn (2013) The Growth of Low Skill Service Jobs and the Polarization of the U.S. Labor Market. *American Economic Review*, 103(5):1553–1597.
- Autor, Levy & Murnane (2003) Skill Content of Recent Technological Change
- Atos (2017) The future of work
- Briken e.a. (2017) The New Digital Workplace: How New Technologies Revolutionise Work
- CEBR (2017) Impact of automation
- CEP (2015) Robots at Work
- Degryse (2016) Digitalisation of the economy and its impact on labour markets
- Economist (2017) Politicians cannot bring back oldfashioned factory jobs
- EPTA (2016) The Future of Labour in the Digital Era
- Eurostat (2017)
- Forrester (2017) The Future Of Jobs, 2027: Working Side By Side With Robots
- Freeman (2015) Who owns the robots rules the world
- FT (2017) Poorer workers hardest hit by strong arm of robotics
- Goos e.a. (2015), Employment Growth in Europe: The Roles of Innovation, Local Job Multipliers and Institutions
- Handy (2015) The Second Curve
- Hay Group (2017) <https://www.kornferry.com/press/new-research-shows-women-are-better-at-using-soft-skills-crucial-for-effective-leadership>
- IBM (2016) Cyber Security Intelligence Index
- IFR (2016) World robotics report 2016
- ILO (2016) Digitalization and structural labour market
- IZA (2015) Rise of the Machines: The Effects of Labor-Saving Innovations on Jobs and Wages
- Korn Ferry Institute (2016) Future of work is human
- KPMG (2017) The rise of the humans and the future of digital labour
- LNR (2016) How
- McAfee & Brynjolfsson (2014) The Second Machine Age
- McAfee & Brynjolfsson (2017) Harnessing our digital future
- McKinsey (2017) A future that works
- Oxford Economics (2016) Robonomics – how automation will change
- Oxford Economics (2016) Robots and employment
- Oxford Leadership (2017) Leadership 4.0: A Review of the Thinking
- Purpose+ (2017) Purpose+Profit
- PwC (2017) CEO Survey
- PwC (2017) Workforce of the future: the competing forces shaping 2030
- PwC (2017) UK Economic Outlook: Will robots steal our jobs?
- PwC (2017) Accelerating Labour Market Transformation
- PwC (2015) UK Economic Outlook, March 2017
- Rathenau Instituut (2015) Working on the robot society
- Rideout & Katz (2016) Opportunity for all? Technology and learning in lower-income families
- SER (2014) People and technology: working together
- Sisodia e.a. (2014) Firms of endearment
- Strategy& (2013) Culture's role in enabling organizational change
- Technology Pact (2017) <https://www.kennisbankbetatechniek.nl/home>
- Technology Pact (2016) National Technology Pact 2020
- Universiteit Utrecht (2015) Op weg naar een duurzame arbeidsmarkt
- WRR (2015) De robot de baas: De toekomst van werk in het tweede machinetijdperk
- World Economic Forum (2016) Future of jobs
- ZEW (2016) Racing With or Against the Machine? Evidence from Europe

Human value in the digital age

Contact information



Jan Willem Velthuijsen

Chief Economist

T: +31 (0)88 792 75 588

E: jan.willem.velthuijsen@pwc.com



Wendy van Tol

Partner People and Organization

T: +31 (0)88 792 76 06

E: wendy.van.tol@pwc.com



Anita Hagen

Researcher

T: +31 (0)88 792 50 69

E: anita.hagen@pwc.com