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Digital Ethics

Orientation, Values and Attitudes for a Digital World

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Preface

Dear readers

Digitalisation is shaping our present. It will determine our future and offers enormous economic potential; but this comes with great responsibility. In this context, trust is becoming a central resource in the digital world. If we want to win trust in society, responsible and ethical working are critical success factors for our clients' digital transformations. Working in this way enables companies to set themselves apart from the competition and achieve sustained success.

This white paper provides an overview of the challenges and opportunities for responsible companies in the digital world. We shed light on the significance and potential of digital ethics, identify the areas of conflict between different values, and present voices from the business world that suggest options for dealing with these challenges.

We aim to contribute to public discourse through this white paper, and to encourage companies to proactively address digital ethics and anchor the topic in business activities – both in company strategy and operations. In addition to a PwC survey of 300 companies from various industries on digital ethics, a university study and interviews with relevant stakeholders from research and business, we have brought together our project experience and expertise to take a nuanced look at the subject and discuss the broader topic of digital ethics.

I hope you have an enjoyable and thought-provoking read. Let's open an exciting dialogue on the topic and shape our values-oriented future. I'm looking forward to interesting discussions with you; please feel free to get in touch.

Best regards

Robert Paffen

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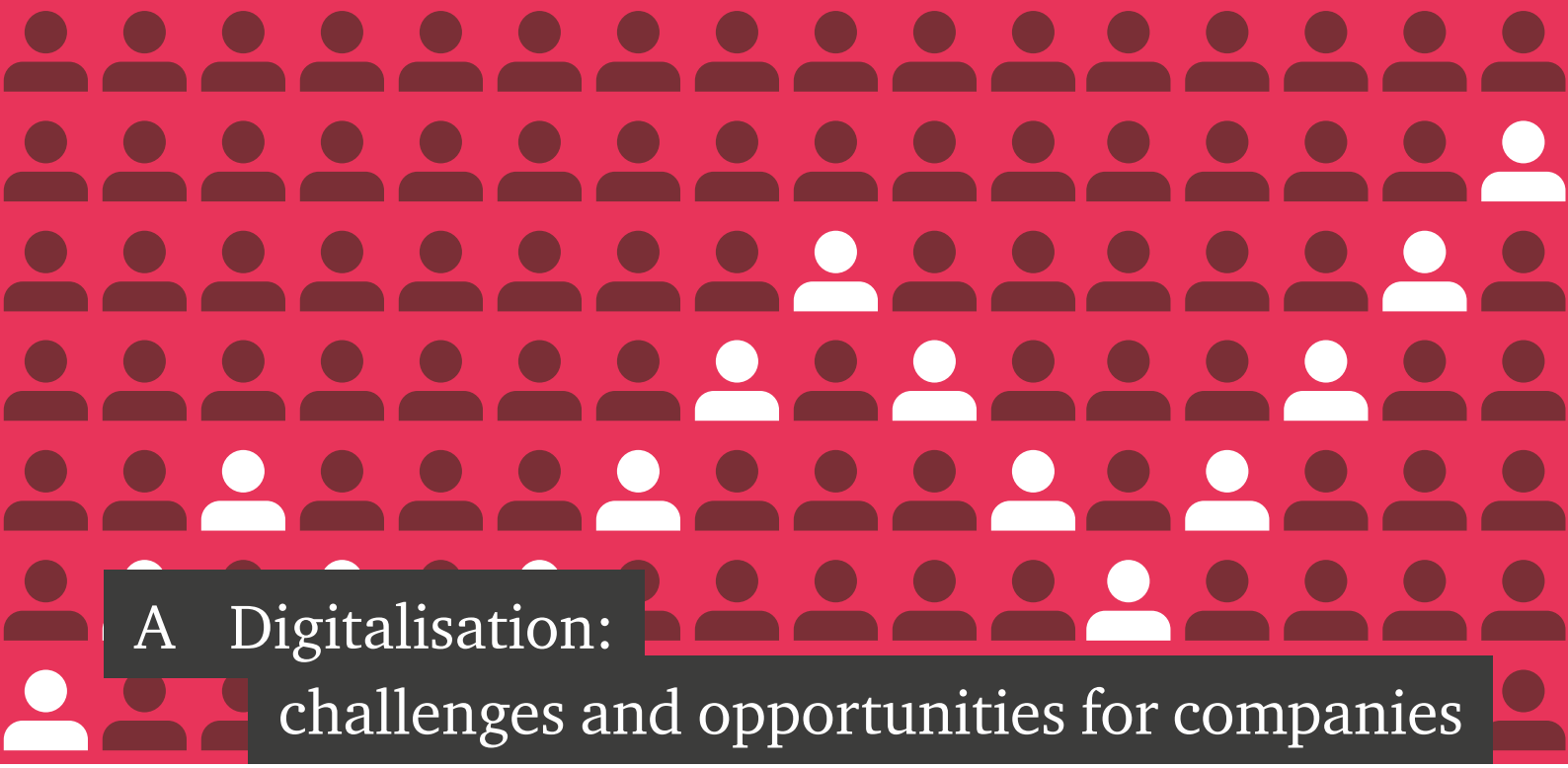


A Digitalisation: challenges and opportunities for companies

Digitalisation shapes our present and will determine our future. Innovations such as artificial intelligence (AI), blockchain and systems for algorithmic decision-making have enormous economic potential. Automation of industries and services significantly increases efficiency and speed. According to a PwC forecast, AI will lead to an increase in German Gross Domestic Product (GDP) of more than 11% by 2030.[1]

However, the rapid pace of digitalisation and the associated changes are also raising concerns. In Germany and other European countries in particular, there is considerable concern that digital products and services could unintentionally access private information, or create user profiles without proper authorisation. Recommendations generated by algorithms can optimise processes; but at the same time, they classify and evaluate their users – with far-reaching consequences, such as deciding whether to grant credit or insurance. The lack of transparency in such technologies leads to great uncertainty, and there is a lack of accepted ethical rules to build trust in the digital economy.

Trust is a central resource in the digital world. Broad social acceptance is essential for new technology and business models to succeed. Gaining social acceptance requires companies to oversee value-driven digital transformation. Technology in and of itself is neither good nor bad; what matters is how it's used. As a result, companies should create transparency about the technology they use and ensure they are using data responsibly.

Taking an ethically guided approach to digitalisation shouldn't be seen as a chore or a liability; rather, it forms a sustainable basis for interaction with customers, employees and other stakeholders. But which tools and values do companies need for exploiting the enormous innovative power of digitalisation, while also keeping the broader social consequences in mind?

> Digital ethics concerns the question of which values we want to live up to in a digital world, in order to positively shape society through technological innovations.
>
> Manuela Mackert
> Chief Compliance Officer, Deutsche Telekom AG

[1] Cf. PwC Germany (2018), Auswirkungen der Nutzung von künstlicher Intelligenz in Deutschland.

Status quo: laws and initiatives

Lawmakers are already taking steps to regulate the digital market – for example, through the European General Data Protection Regulation (GDPR). However, these regulations lag behind technological development. The development of digital technologies is extremely dynamic, and therefore requires learning and adaption on an unprecedented scale.

The Ethics Commission of the German Federal Ministry of Transport and Digital Infrastructure, for instance, is dealing with the challenges arising from increasing automation of mobility. For example, driverless cars, controlled by algorithms, can become involved in accidents where personal injury is unavoidable. Topics such as the rules these systems should be subject to, and whether such significant decisions can routinely be made by computer programs, are the subject of controversial discussions.

Although self-driving vehicles are currently in focus, questions regarding digital ethics are far more diverse and affect every company – including both manufacturers and users of digital products. For example, use of algorithms in personnel selection can have unintended consequences that are ethically unacceptable and are contrary to the goal of a fair selection process.

An ethics committee cannot and will not be convened for every digital ethics question, so companies must develop expertise and select instruments for themselves in order to avoid problems with everyday digital ethics issues. Guiding principles or 'signposts' for digital ethics would be a helpful framework for companies to use in building up the expertise they need.

Digital companies operating at a global level have now started to implement tools for digital ethics. Nevertheless, corporate social responsibility (CSR) and sustainability reports from DAX 30 companies have yet to show any strategies for corporate digital responsibility.[2] Small and medium-sized enterprises are also making little investment in dealing with the ethical aspects of digitalisation. In Germany, topics regarding digital ethics are primarily picked up by industry associations such as Bitkom and the German Association for the Digital Economy (Bundesverband Digitale Wirtschaft), by foundations such as the Bertelsmann Foundation and the New Responsibility Foundation (Stiftung Neue Verantwortung), or think tanks such as Algorithm Watch and iRights Lab.

> We have to ask ourselves: what is our attitude towards responsible use of technology? What are we committing ourselves to? Do we want to commit ourselves? We need to set the framework ourselves and define principles.
>
> Manuela Mackert
> Chief Compliance Officer,
> Deutsche Telekom AG

[2] Cf. Thorun et al. (2018): Ethik in der Digitalisierung: Der Bedarf für eine Corporate Digital Responsibility. Available online at: https://library.fes.de/pdf-files/wiso/14691.pdf, accessed on 11.03.2019, p. 3.

What is digital ethics?

Digital ethics questions the standards of morally correct action under the conditions of digitalisation. It examines the social, ecological and economic compatibility of digital technology in its development and application.

As a result, it does more than just examine data protection and privacy, or consider what's required for humanistic IT system design. Changes to conditions of production in complex supply chains, the effects of technology on users' everyday lives and impacts on working conditions also come under the umbrella of digital ethics. Accordingly, both risks and opportunities arise in every single company around digital ethics.

Digital ethics principles, via a set of values and standards, can guide the process of digital transformation. These guidelines are context-specific, and need to be adapted to each company and its culture.

Digital ethics is a core component of integrity-driven corporate management. Integrity represents values-oriented compliance and the willingness of companies to take responsibility for adherence to their own values.

Although the extent of current innovations was almost unimaginable until just a few years ago, questions surrounding digital ethics are not new.

As early as the 1940s, the Russian-American author Isaac Asimov established rules for machine-human interaction – the so-called Three Laws of Robotics:

0. A robot may not injure humanity, or, by inaction, allow humanity to come to harm.
1. A robot may not injure a human being or, through inaction, allow a human being to come to harm.
2. A robot must obey the orders given it by human beings, except where such orders would conflict with the First Law.
3. A robot must protect its own existence, as long as such protection does not conflict with the First or Second Laws.

> Companies should not try to invent new ethical frameworks or principles, but build on existing ones, such as the European Commission's. Only the 'square' comprising the public and private sectors together with the general public and civil society can be the successful basis for sustainable solutions.
>
> Luciano Floridi
> Director, Digital Ethics Lab

Digital ethics: a whole-company issue

Today, there are various initiatives and organisations working on criteria to ensure responsible development of digital systems, such as the Institute of Electrical and Electronics Engineers (IEEE). A resulting code of ethics would be comparable to the Hippocratic oath for medical practitioners, or the codes of conduct for journalists. Nonetheless, these sets of rules have a limited scope. They are often only aimed at a small group of people such as programmers and engineers. But questions of digital ethics concern all levels of all companies, including both developers and users of digital technologies.

The European Commission instructed an independent group of experts to develop guidelines for reliable artificial intelligence. At a national level in Germany, the Federal Ministry of Justice and Consumer Protection has launched a corporate digital responsibility initiative in cooperation with Deutsche Telekom, Miele, Otto Group Holding, SAP, Telefónica and ZEIT Online. Its aim is to develop guidelines on digital responsibility for companies. Advisory bodies to the German Government have also been formed through the Ministry's Data Ethics Commission and the Federal Government's Digital Council.

About this white paper

This white paper gives an overview of challenges and opportunities for responsible companies in the digital world. It highlights the significance and potential of digital ethics in detail, describes areas of tension between different values in digital ethics, and offers suggestions for dealing with these challenges. It also presents a number of success factors for implementing digital ethics, providing a toolkit for companies in the digital age. What expertise needs to be developed? How can companies use digital ethics to add value?

We aim to contribute to public discourse through this white paper, and to encourage companies to proactively address digital ethics and to anchor the topic in business activities – both in company strategy and operations. In addition to a 2019 survey[3] of 300 companies from various industries on digital ethics, a university study and interviews with relevant stakeholders, we have brought together our project experience and expertise to shed more light on this topic.

[3] Cf. www.pwc.de/digitaleethik.

B Digital ethics in business practice: between ethical and economic value creation

To create digital trust, companies must act sensitively with regard to the effects of technological transformation. They must be prepared to align their business activities with the values of digital ethics, and to form a code of practice that promotes digitalisation for the common good.

> Our present (old) understanding of ethics must be adapted. For us as a company, this means taking responsibility: for the environment, the individual and society.
>
> Stephan Engel
> Principal Corporate Responsibility, Otto Group Holding

This is not always easy. In practice, digital ethics often conflicts with other goals: for example, the demand for transparent and coherent use of algorithm-based decision-making can conflict with data security or data protection. Tensions also arise when economic and ethical values come up against one another. Respecting privacy when handling users' personal data can have negative effects on company performance. Automating processes will usually increase efficiency, but this can come at the expense of traceability, public welfare or fair decision-making. Therefore, there isn't always a 'right' answer to existing challenges. Digital ethics is not an issue which allows black-and-white solutions; instead, it requires careful consideration of economic indicators and responsible corporate action.

To establish a credible digital ethics strategy, pursuit of profit must not be allowed to take priority over observing ethical principles. Rather, the aim should be to meet demands for digital ethics while maintaining economic value creation. Accordingly, a digital ethics strategy is integral to establishing trust and acceptance and can also promote business success.

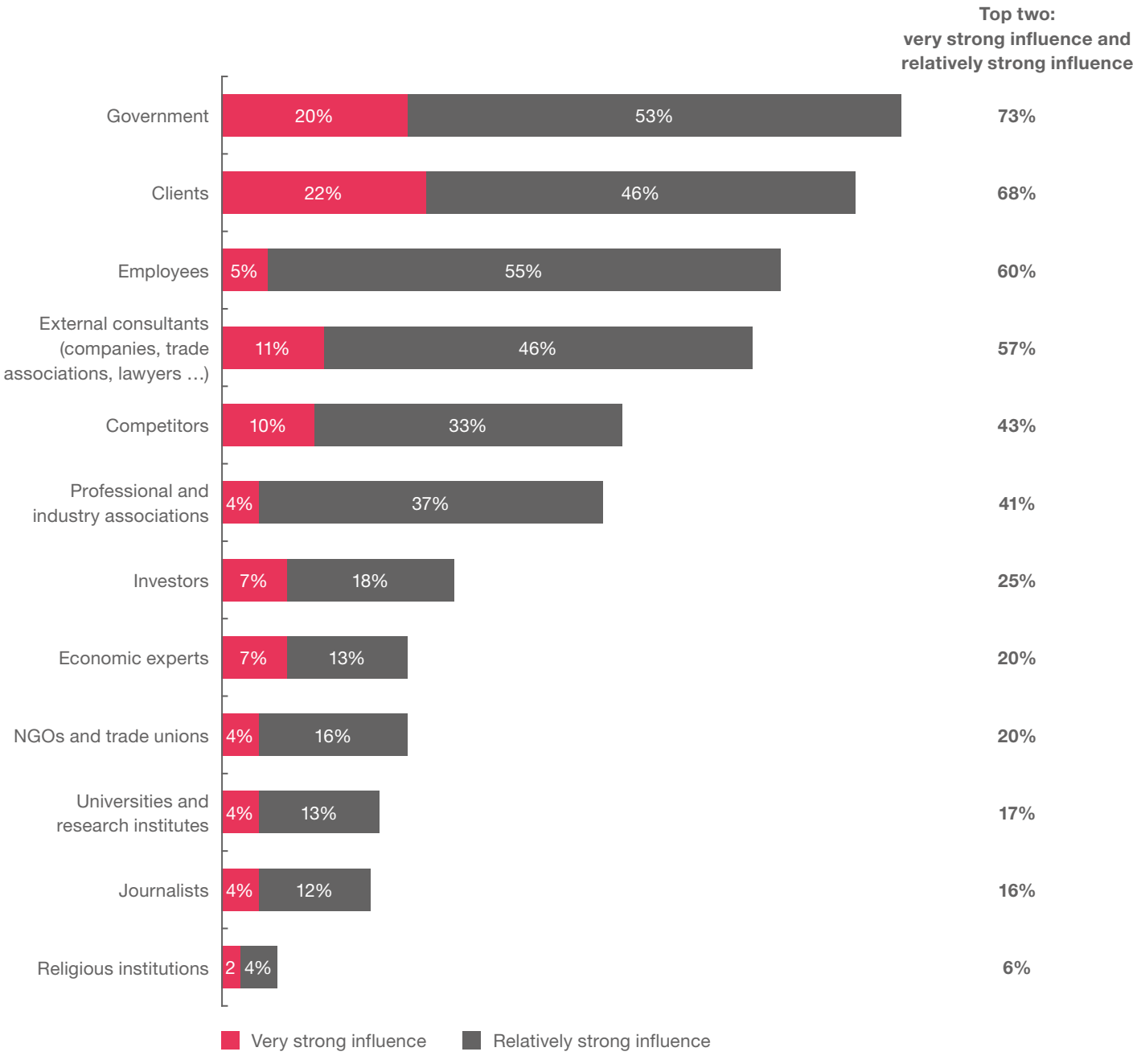
> Firms should be clear about what role they want to play as 'good citizens' and members of society, because they are among the most important drivers of social improvement and economic growth.
>
> Luciano Floridi
> Director, Digital Ethics Lab

1 Over-regulation versus lack of regulation

Loss of confidence in the digital economy as a whole is often caused by just a few corporations engaging in irresponsible business practices. Failure to apply digital ethics is often encouraged by the lack of governmental regulatory instruments.

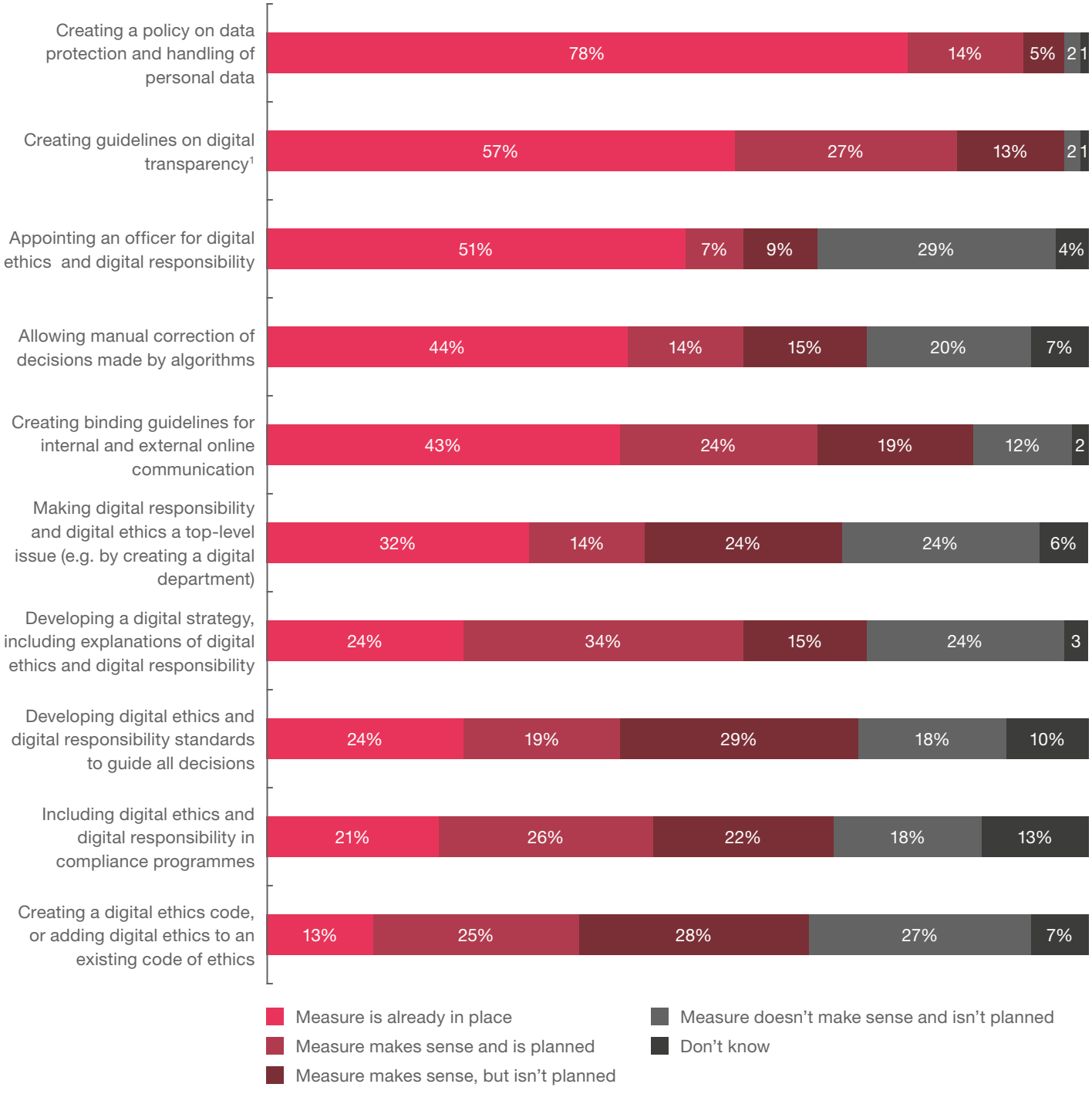
Nevertheless, almost three quarters of the companies surveyed still see the government as the main party responsible for developing digital ethics standards (see Figure 1). However, legal frameworks to govern the use of rapidly evolving technologies are often created retrospectively. These frameworks can be very restrictive, and sometimes affect market participants who are not directly involved.

Fig. 1 How strong an influence do these stakeholders have?



Self-regulatory measures can function as a practical framework and provide a way for companies to avoid the risk of over-regulation. However, many companies see commitments of this nature as a competitive disadvantage, standing in the way of business. This could hardly be further from the truth: a framework for digital ethics should be considered an opportunity, especially in a competitive environment. This is particularly true when working in close cooperation with other companies. Cooperation, industry associations and exchange on common standards can enable companies to efficiently create transparency for their customers and stakeholders. Over half of the companies surveyed by PwC stated that guidelines on transparency in digital issues are a key enabler for further development (see Figure 2).[4] A practical example illustrates this very well.

Fig. 2 Which of these measures is your company implementing or planning to implement?



Other measures implemented: 3% (mainly training)

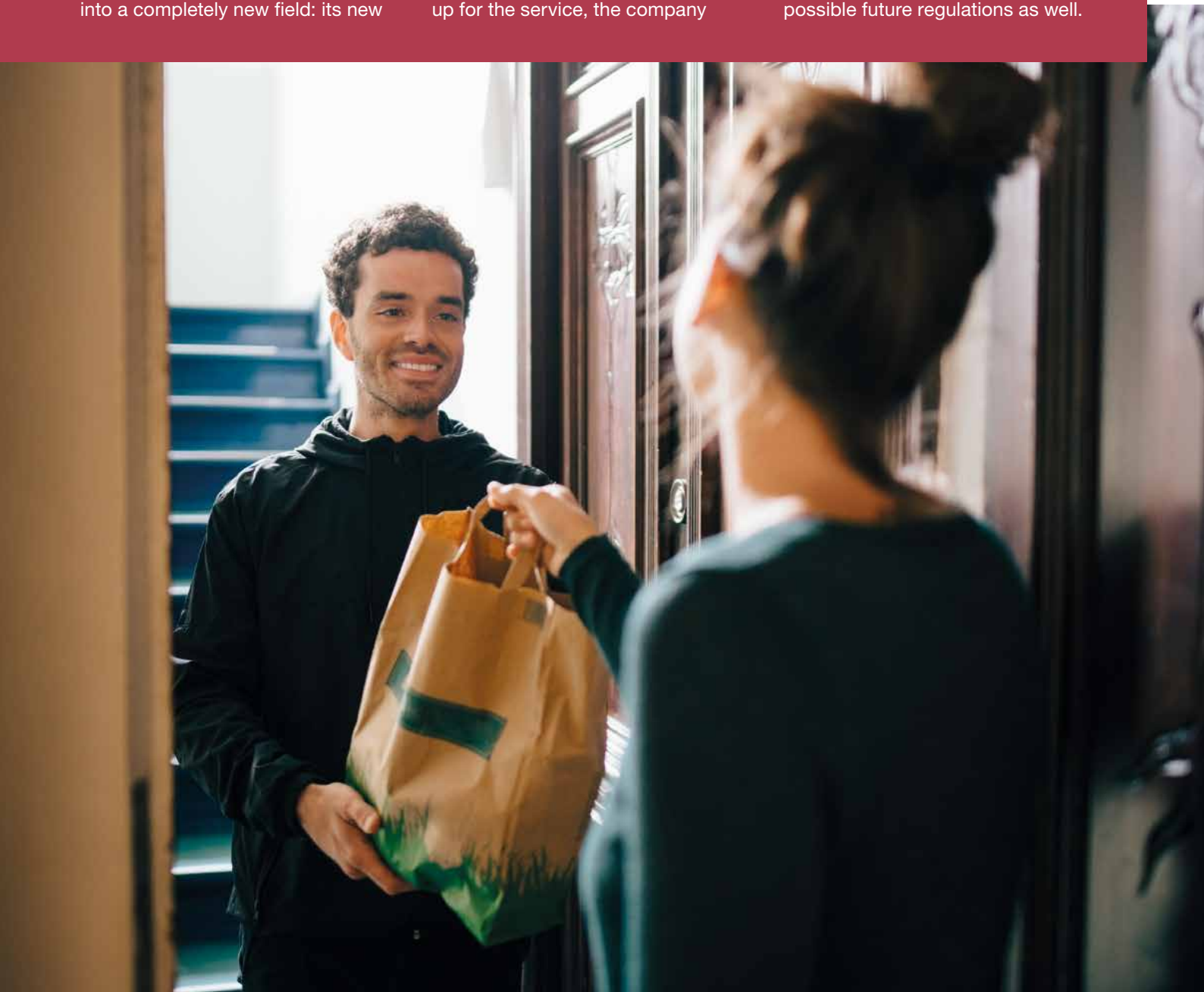
[1] e.g. data security, processing of personal data

[4] Cf. www.pwc.de/digitaleethik.

Case study 1
Wait for regulations or take action?

A German household appliance manufacturer is developing a new digital business model: refrigerators with sensors which automatically record consumption and notify a retailer when food is used up. An assigned service provider then delivers the food required to the customer on the same day. The service will work on a pay-per-use model, with the appliance manufacturer earning money each time food is ordered. However, this expansion of services to grocery deliveries also takes the company into a completely new field: its new services are controlled by artificial intelligence, working with the internet of things (IoT). The business model for these services is based on cooperation with data processors and suppliers, as has long been standard in the platform economy. This inevitably confronts the appliance manufacturer with digital ethics issues, both internally and regarding its external partners.

Although customers routinely agree to collection and transfer of data from their homes when they sign up for the service, the company needs to decide whether to develop its own ethical principles for using and processing this information, or wait for the government to bring in regulations. The company's management doesn't want to wait, so they decide to work with other manufacturers to introduce a digital trust label: this would state criteria for responsible data use, data protection and so on, highlighting the company's digital ethics principles in a way that customers can understand. This allows the manufacturer to set its own ethical guidelines and to anticipate possible future regulations as well.



Success through proactive and value-oriented action

Companies should be proactive about fulfilling their digital responsibility, rather than waiting for new regulations. It is important to ensure responsible handling of customer data and to strengthen trust in products through transparency, right from the very start of the development process. Other industries have demonstrated that self-regulation can be effective: food producers, for example, created product labels to indicate quality standards to consumers some years before legal regulations were introduced.

This experience can serve as a model for companies in the digital economy. Experts are already working on a seal of approval for AI applications. Professional associations for IT have worked extensively on guidelines and quality criteria for developing digital applications. These initiatives can serve as starting points for companies to develop their own digital ethics focus. It is important that measures such as guidelines, quality criteria or voluntary commitments can always withstand scrutiny. In order to win the trust of customers and stakeholders in the long term, companies should therefore introduce transparent certification and recertification processes.

Although global companies have already taken steps to make values-based commitments, these initiatives often lack credibility. The credibility of digital strategies can be enhanced by ensuring that these strategies demonstrate good integrity. Innovative corporate action and corporate values can coexist, provided that the ethical aspect does not just exist on paper – it must be put to the test and proven in daily practice.

The lack of convincing digital ethics strategies among global companies also offers an opportunity for European and German companies to set themselves apart from their competitors by playing a pioneering role. A credible commitment to digital ethics standards could become part of the brand essence of European companies, and create a countermovement to the digital crisis of confidence. However, this requires integrated business strategies for digitalisation that work for the greater good of society.

As a result, effective self-regulation by market participants can even be better than waiting for governments to take control. This means that economic efficiency and ethics are not a contradiction in terms; rather, they go hand in hand.

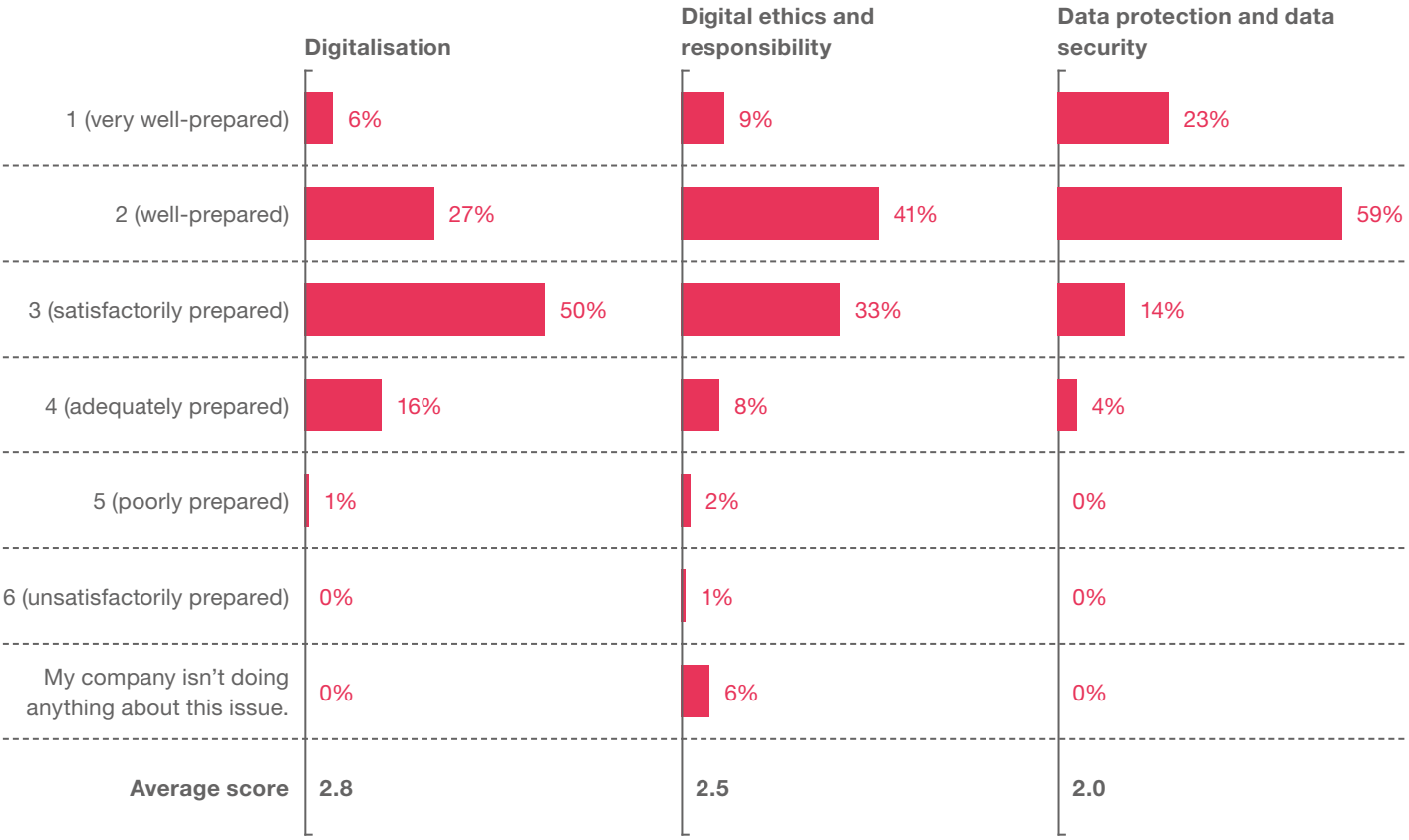
> Without sensible and respectful interaction with people, business partners, and society in general, technological change will not work.
>
> Stephan Engel
> Principal Corporate Responsibility, Otto Group Holding

> Above a certain market position and company size, governments should actively regulate. They could then implement regulations similar to those in the food industry. Monitoring/testing could be carried out through a kind of ‘roadworthiness’ inspection for technology. The data protection authorities could take on this role and also certify new technologies, so that products are not allowed on the market unless they meet certain ethical standards.
>
> Sarah Spiekermann
> author of the book ‘Ethical IT Innovation: A Value-Based System Design Approach’ (Droemer, 2019)

2 Use of data versus protection of privacy

The GDPR, which came into force in 2018, is intended to ensure protection of personal data. Implementing the GDPR posed challenges for many companies. However, according to the PwC survey on digital ethics,[5] 82% of the companies surveyed consider themselves to be well- or very well-prepared regarding data security and data protection (see Figure 3). Nonetheless, conflicts with an ethical dimension can still arise, even if a company has met all regulatory requirements. An example from the chemical industry illustrates this problem.

Fig. 3 How well-prepared is your company regarding digital issues?



> ‘Ethically Aligned Design’ deals with specific problems, overarching ethical principles and application-oriented recommendations. It provides specific guidance for standards, certification, regulation or legislation for design, production and use of systems which demonstrably aim to benefit the whole of society.
>
> Clara Neppel, Senior Director
> IEEE European Business Operations

[5] Cf. www.pwc.de/digitaleethik.

Case study 2
Taking potential impacts seriously

The CEO of an international company returns from a congress in Asia on smart factories, full of enthusiasm. He tells his board colleagues about the topic and shows them how big data could be used to increase energy efficiency on factory premises in Germany. Empty rooms would no longer need to be air-conditioned, transport routes could be optimised, and alternative means of transport such as e-bikes and self-driving hydrogen buses would be provided where needed. This would result in significant CO2 savings, making the company premises more sustainable, greener and smarter. The company would make a notable contribution to the common good, and would considerably boost its public image. At least, this is how the CEO outlines his vision. Among other things, the project would require the company to introduce access controls using facial recognition, along with tracking and monitoring of people and material transport. Employees' personal data would of course be protected by compliance with all data protection regulations, and the company would obtain explicit consent from its employees.

While the board members at the meeting are initially impressed by the euphoric description, doubts soon arise. The human resources manager has serious concerns: even if anonymity of the data could be guaranteed, the risk of employees feeling like they are under surveillance is immense. This could risk employee identification with company values, and in the worst-case scenario could even lead to resignations and recruitment problems. The CEO's colleagues from the marketing department also flag up risks: the company could even get a reputation of acting like a police state, which could have unforeseeable consequences. The disappointed CEO has no choice but to withdraw his project.

Data protection as a first step towards digital ethics

The PwC survey on digital ethics[6] shows that around 78% of companies surveyed see implementing the GDPR and proper management of personal data as essential measures for digital responsibility (see Figure 2). However, only half of the companies said that they were well- or very well-prepared regarding digital ethics and digital responsibility (see Figure 3). Compliance with data protection laws therefore doesn't guarantee successful use of digital innovations. Ethics is a far-reaching topic, going beyond legal requirements. Nevertheless, implementation of the GDPR and its regulations can work as a good entry point for companies to start addressing digital ethics.

When processes are digitalised, questions inevitably arise regarding the origin of data used, use of data by third parties, data security, backup, storage, and archiving. Companies, employees, customers and stakeholders have different interests with regards to the origin, use and security of data, which must be aligned and agreed upon. Comparisons between countries can reveal different perceptions of privacy, particularly when it comes to handling personal data. This aspect of developing digital ethics strategies is comparable to context-sensitive adaptation of corporate strategy to match cultural values. This allows the company's economic goals to be reconciled with trustworthy and transparent handling of data.

Encouraging employees and customers to provide personal data may be acceptable for useful technological applications. In medicine, there may even be an imperative to provide data if this can be used for purposes such as developing new diagnostic procedures. People are more willing to share their data if they can see the purpose or benefit of doing so. This is especially true when users themselves can decide whether to share data, such as when using social networks or messenger services. It remains up to companies to gain maximum possible acceptance through transparency in balancing (economic) benefits against protection of privacy.

Big data therefore offers great potential for companies, as our practical example demonstrates. However, companies must strike a balance between data use on the one hand, and the privacy of employees, clients and other stakeholders on the other. An internal ethics policy agreed with various functions and stakeholders – such as the data protection officer, the department responsible for compliance, and the workers' council – is one way of documenting the company's awareness of the issue.

[6] Cf. www.pwc.de/digitaleethik.

3 Automation of decision-making versus fairness

The most common areas of application for automated systems relate to recurring and standardised activities. These include both routine production processes and decision processes performed or supported by algorithms.

For example, AI can be used in human resources to significantly increase the efficiency of the recruitment process. However, a practical example shows that AI must not be allowed to work unchecked.

Case Study 3
Candidates are more than their CV

A large food producer requires many specialists in the short term to staff a startup. A long-standing and experienced HR employee is to lead the project. However, the head of HR suggests an unconventional procedure for selecting the new personnel: using AI to support the recruiting process. This will optimise job advertisements regarding job category, keywords and job portals. Simple and frequent questions at the initial point of contact will be answered by a chatbot, which can also suggest more suitable positions to the applicants or put the applicants in contact with HR staff. The system will evaluate all data submitted by the applicants, or publicly available data relating to the applicants (CV parsing), and qualified applicants will automatically be invited to interview. AI will also be used to match candidates from the database with job advertisements, based on previous experience.

The head of HR hopes this automation will lead to a considerable increase in efficiency. In practice however, it causes problems: the system's decisions are based on the company's existing recruitment profiles, causing it to predominantly suggest men with a background in economics. This reduces diversity of gender, age, ethnicity, education and social background. However, this not only creates an unfair selection process; it also makes the start-up unable to build up a workforce with a variety of experience and values. More pitfalls soon become apparent, as another important factor – good interpersonal relationships – cannot be mapped by AI at all. As a result, the applicants selected by AI have to be tested in additional interviews, eliminating the efficiency gains that the head of HR had hoped for.

AI is only as good as its data sets

The example above illustrates the opportunities and limitations created by automated recruiting processes. AI systems can be very helpful in the initial selection phase. In the consequent stages, however, experience, intuition and empathy are also crucial. It is difficult to imagine that these qualities could be secured in the future without any human involvement. Besides the lack of human qualities, AI applications can only ever be as good as the data used and the parameters for decision-making. There is a risk that bias may even be unconsciously introduced into the system during development of the algorithms. This would lead to both a less fair and a less effective decision-making process. As a result, it is essential to check both the data used and the software's decision-making criteria to ensure the most objective results possible. Bias – for example, due to socio-demographic characteristics – could be avoided by excluding criteria such as age, gender or cultural background from the decision-making process. All this means that the limits of automation must be borne in mind when using AI.

4 Human contact versus use of AI

Technological advances are making AI an increasingly useful way of automating customer interactions. Chatbots have particularly great potential, and are currently among the most frequently used AI applications in companies. But challenges can arise as well, as illustrated by another practical example.

Case study 4
Chatbots are not human

The sales manager of a pharmaceutical company faces the problem of not being able to provide her team with enough leads or qualified contacts from the medical profession. In order to generate new contacts, she plans to automate the telephone contact system and improve the customer experience at the same time. During the annual customer feedback programme, she had learned that the existing automated (but not AI-based) chatbot was hardly being used. Customers found the chatbot unhelpful, and preferred to talk to specialists instead of a machine.

On this basis the company invests heavily in AI, and has a chatbot developed that gives the caller the impression of talking to a real person. The chatbot arranges appointments for sales representatives and can even introduce new medication to customers. The sales manager is very happy with the development and is enthusiastic about the new chatbot: the number of new customers is increasing significantly, as is the number of appointments. Sales are also rising. But suddenly, the company starts to get complaints from the doctors. At first, they had thought that they were talking to a real person. When they realised that they had been talking to a machine, they felt deceived and personally cheated. This disappointment leads to a noticeable drop in demand.

Automated interactions require transparency

This practical example shows one of the key challenges of using chatbots. It is important that companies consider the exact circumstances. Chatbots certainly have their advantages: they are always available, work quickly, offer a consistent quality of service, and are always polite. In many cases, they can even provide more reliable information than their human counterparts. It is therefore reasonable to expect that as this technology develops, customer preferences will also change and chatbots will become more popular. What matters from an ethical perspective, however, is that users should always be clear about whether they are talking to a human or a machine.

5 Efficiency versus transparency

Modern AI applications can imitate intelligent behaviour. Instead of following simple decision routines, they are intelligent systems, which can not only follow rules, but learn from previous decisions, transfer their knowledge to new problems, and use this ability to develop new solutions. In order to complete specific tasks, AI applications are trained using huge databases – a procedure which turns self-learning algorithms into very efficient tools. For example, AI can already outperform experienced doctors in evaluating image data for medical diagnoses. However, even the best digital systems are never perfect, and thus present a challenge of their own: the answers or decisions of an AI system are not always comprehensible to humans. Algorithms often operate in the dark, making them something of a black box. This can become a particular challenge for companies whose products and services are used in sensitive decision-making.

The example in case study 5 demonstrates that black box problems need to be avoided; AI systems must be accountable. In principle, their results must be transparent, otherwise they cannot be reviewed. Ensuring accountability is more than just a question of liability; it has far-reaching digital ethics implications as well. Whether in medical diagnostics, image recognition or autonomous machines – trustworthy AI applications must be efficient and transparent.

There are various ways of solving black box problems. Firstly, transparency requires that users are aware of both the explanatory power and the limitations of algorithms. Difficulty in explaining automated decisions can also be overcome by modifying AI system architecture: explainable AI, for example, aims to create solutions that guarantee both efficiency and traceability.[7]

Furthermore, machines should never be given the sole power or responsibility to make far-reaching decisions. Therefore, it will be necessary for humans to monitor or regulate decisions made by algorithms to reduce their error rates ('human in the loop'). However, PwC's digital Ethics survey[8] found that currently only four out of ten companies surveyed can manually correct automated processes. There is currently a lack of strategies for responsible integration of self-learning systems into corporate processes.[9] These would not only guarantee the effectiveness of AI in companies, but would also leverage the potential of collaborative intelligence between humans and machines.

Case study 5
Transparency in cancer diagnosis

A startup wants to revolutionise skin cancer screening with an app that provides answers in seconds, instead of patients having to suffer long waiting times for an appointment with a dermatologist. Users simply install the app on their smartphones and upload a photo of any abnormality in their skin. The app analyses the photo, and gives a result as good as that of an experienced dermatologist with just a single click. To achieve this standard, the startup uses self-learning algorithms that have been trained with large amounts of oncology image data. This means the app can draw on far more experience than any human being. But this training has its pitfalls – even the programmers cannot understand the patterns the AI recognises and why it comes to a particular conclusion. Medical diagnoses, especially cancer, are always very sensitive data.. As a result, uncertainty arises in the startup about how to deal with this lack of clarity about the algorithms used and how to explain this to users.

> It is important to define responsibility in order to create traceability and transparency for all parties involved.
>
> Clara Neppel
> Senior Director, IEEE European Business Operations

[7] Cf. PwC UK (2018), Explainable AI – Driving Business Value through Greater Understanding.
[8] Cf. www.pwc.de/digitaleethik.
[9] Cf. www.pwc.de/digitaleethik.

C Recommendations for responsible digitalisation

An app that accurately diagnoses skin cancer using AI might seem to be a medical blessing. A refrigerator that saves its owner having to go shopping may be a convenient innovation. A smart factory that checks resource efficiency of its processes can increase sustainability of production. An automated hotline saves on personnel and offers reliable customer service. Experience in the field illustrates the enormous potential of the digital economy. On closer inspection, however, these examples also reveal challenges related to responsible use of data-driven technologies.

Data is the oil of the 21st century, making it the new raw material of industrial and social developments. However, this comparison conceals the central ethical aspects of the ongoing digital revolution. Supplies of data won't run out; they will grow. Data can be produced by anyone in almost unlimited quantities, it has the potential be freely exchanged, and it can be replicated. The use of data therefore brings fundamental new challenges for our system of values, too: these include issues around acceptable data use, data protection, and responsible capitalisation of data.

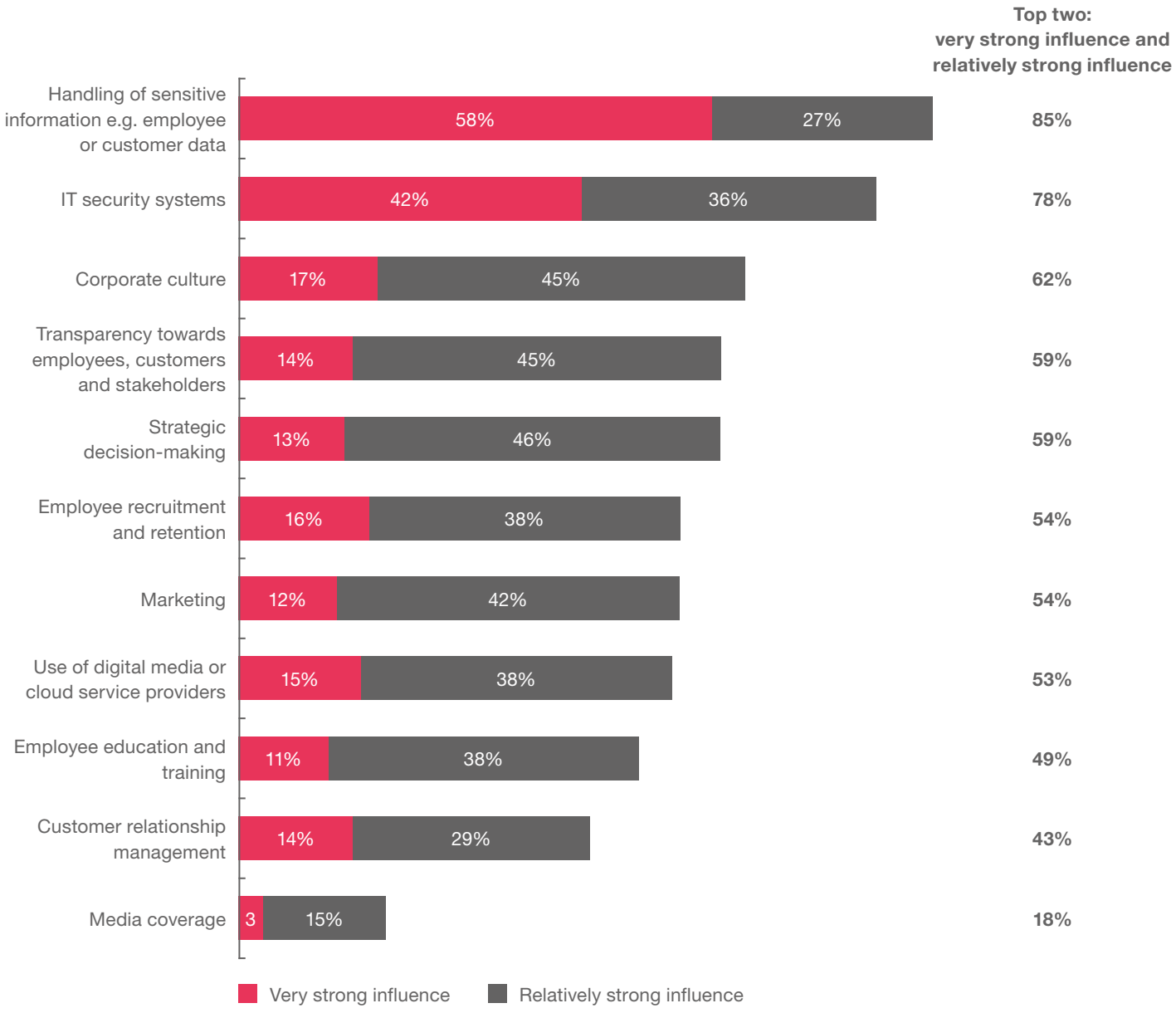
As with the use of natural resources, data management and technologies driven by digitalisation must be guided by ethical criteria. Technological innovations are problematic if they are not beneficial for people. Customers, employees and other stakeholders have a justified right to expect that technology and data are used in a secure, competent, responsible and sufficiently comprehensible way.

> It is important that companies have the courage to use their own innovative strength and to cooperate across borders on digital responsibility.
>
> Manuela Mackert
> Chief Compliance Officer,
> Deutsche Telekom AG

> My recommendation for companies is ethical design thinking. This is a process in which companies have to think about creating value for their customers and for society – value not just in the material sense, but in the ethical sense as well.
>
> Sarah Spiekermann
> author of the book 'Ethical IT Innovation: A Value-Based System Design Approach' (Droemer, 2019)

According to PwC's survey,[10] around 85% of companies surveyed stated that management of information such as client data is particularly important among digital ethics issues (see Figure 4). At the same time, around half of those surveyed regard lack of awareness of digital ethics as a whole as one of the greatest challenges (see Figure 5). A distinct level of sensitivity is required to capture the wide-ranging impact of technological transformation on people, society and nature. Companies will only be able to build expertise to responsibly manage digitalisation if they are aware of the consequences of innovative technologies.

Fig. 4 How strong an influence does digital ethics have on these topics?

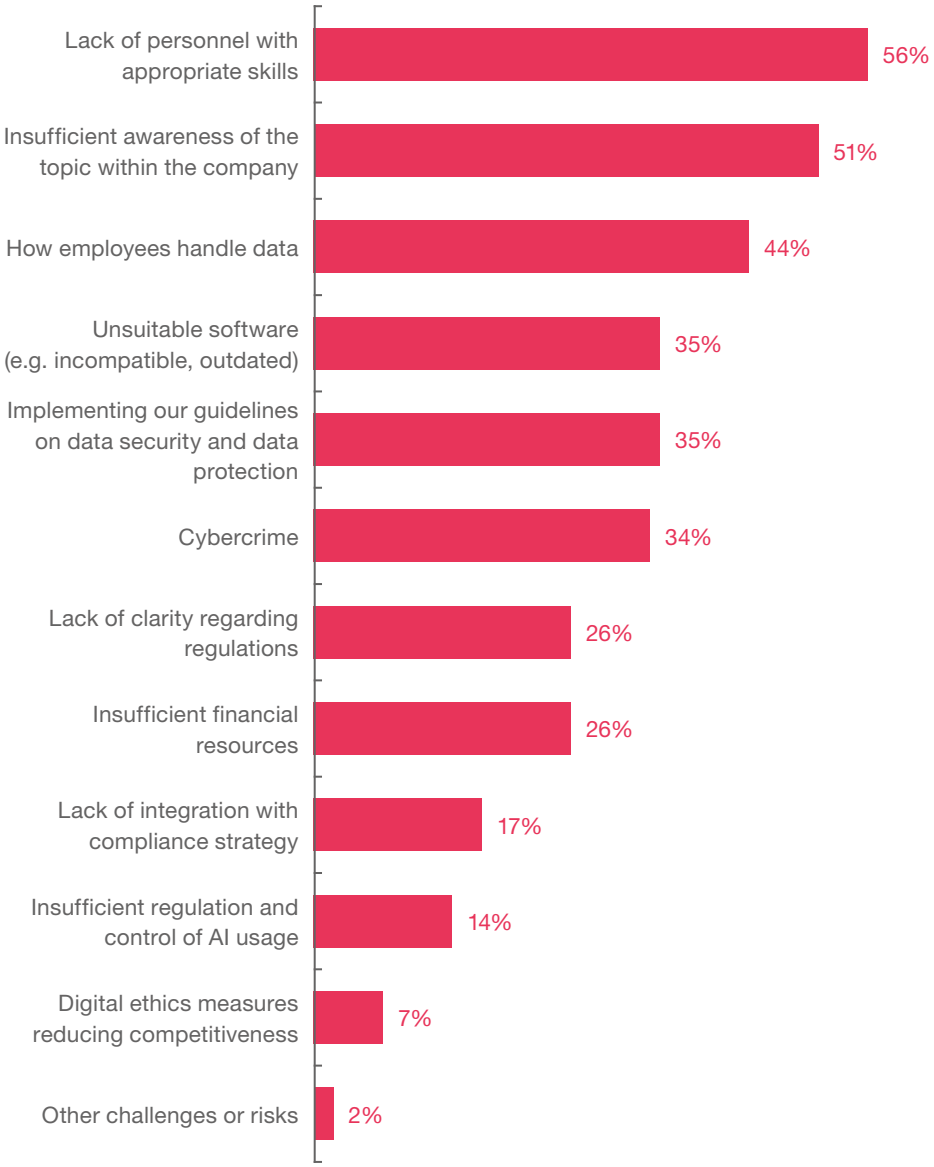


[10] Cf. www.pwc.de/digitaleethik.

Digital ethics strategies help companies to consider the consequences of digital business processes, products and services. This allows digital ethics to underpin a socially acceptable corporate strategy and also become a significant economic success factor. Indicators such as the Digital Trust Index show a clear correlation between trust and customer interest in digital products. This is also true when comparing countries: despite differences in mentality between Germany and other countries, particularly those outside Europe, building trust among users is the key success factor for the digital economy. As well as meeting customer expectations, the introduction of digital ethics strategies also counteracts regulatory risks and avoids damage to the company's reputation.

There are various success factors which can enable companies to exploit the opportunities of digital transformation, and to recognise and master the challenges this creates. Our practical experience has shown that there are five key steps that companies should take.

Fig. 5 What are the greatest challenges?



1 Take responsibility

Combining a strong system of values with structures that promote integrity within the company is essential for making the most of the opportunities offered by digitalisation. If a company can succeed in creating this combination, it will also create a credible digital corporate responsibility strategy.

> The topic of digital ethics is always closely linked to the topics of trust and responsibility.
>
> Manuela Mackert
> Chief Compliance Officer, Deutsche Telekom AG

Sustainable implementation of digital ethics in the company is crucial. A code of digital responsibility can serve as a guide for management and demonstrate a clear commitment to corporate responsibility. According to PwC's survey,[11] more than 60% of companies surveyed have already established guidelines for effective digital ethics as part of their corporate culture. However, guidelines do not guarantee success. Roles and responsibilities must be defined within the company, and following the code of digital ethics must become embedded in everyday processes.

An appropriate approach to stakeholders is also vitally important. The lack of credibility among players in the digital economy is often caused not by data-based business models, but by contradictory or inconsistent corporate policies. Customers have a very good feel for when corporate actions and public presentation are not consistent. Successful image management therefore acknowledges the importance of integrity: corporate actions and communication must be in line with the relevant digital ethics values.

The question of which values should be a company's key values cannot be answered in general terms. However, digital ethics initiatives, experts and commentaries provide useful information on proven guidelines for corporate responsibility. A university study commissioned by PwC shows convergences of seven categories of digital ethics values.

The use of AI and the automation of processes is still observed with scepticism, especially in Germany. Loss of jobs or violations of privacy are widespread fears. Companies can help reduce misplaced scepticism regarding technology by successfully embedding digital ethics values within their corporate structures. If they fulfil their corporate digital responsibility, their external communication can credibly underscore the potential of digital innovations for society.

> The aim is to forge alliances in order to develop good ideas for digitalisation, for the benefit of society, of Germany as a business location, and Europe, in close collaboration with the institutions that set standards and promote culture.
>
> Stephan Engel
> Principal Corporate Responsibility, Otto Group Holding

[11] Cf. www.pwc.de/digitaleethik.

2 Leverage existing structures

Implementation of strategies for digital ethics should build on existing resources and expertise, and make appropriate use of them. Digital ethics must not be considered 'alien'; it needs to be linked to proven processes for staff and anchored in existing operational structures. For this to succeed, the values of digital ethics should be given a permanent place in existing management systems, such as risk management, compliance and HR measures.

Such an integrated approach is highly efficient, as it avoids parallel structures. Integrating digital ethics into existing structures increases acceptance within the workforce and raises awareness of the challenges of digital ethics among all staff.

To support this transformation, PwC has developed integrity-driven performance (IDP), an approach for sustainable, values-oriented development in organisations. By consistently aiming for integrity in structures and processes, companies can improve both employee performance and their identification with company values, increasing economic value creation.

IDP regards integrity as the essential lever for successful, values-oriented business. Acting with integrity means complying with both obligations and voluntary commitments, and anchoring ethical values in corporate culture to win the trust of stakeholders in the long term. This means more than just compliance with laws and regulations; corporate values are intended to provide guidance even when there are no explicit rules.

At the same time, the disruptive potential of new technologies and widespread automation are potentially risky: companies may end up lost in the transformation process and overlook threats to digital ethics. Therefore, companies should reduce the complexity of the task at hand and focus on scalable solutions for specific use cases, particularly before initiating large-scale digital projects. Carrying out potential analyses can identify the best opportunities for transformation within organisations at an early stage and allow the stages of implementation to be converted into controllable development processes.

> Guidelines (a code of ethics, for example) on the subject must exist and must have a direct effect. To this end, spaces that promote dialogue are required, as well as investment in digital and digital ethics skills sets.
>
> Stephan Engel
> Principal Corporate Responsibility, Otto Group Holding

> Digital ethics is a topic that needs the utmost attention from management, and therefore should be on the C-suite agenda. This would make the importance of the topic visible, both to the whole company and from outside.
>
> Luciano Floridi, Director, Digital Ethics Lab

3 Digital ethics upskilling

Developing knowledge and expertise at all levels of the company is crucial to avoid unnerving or overburdening employees when dealing with digital ethics challenges, and to prevent mishandling of these challenges. The more strongly an awareness of digital ethics is anchored within the workforce, the better prepared the company is for digital transformation.

The PwC survey[12] illustrates how difficult it is to achieve this: according to the survey, a lack of staff with relevant skills and too little awareness of digital ethics and integrity are the greatest challenges in implementing strategies (see Figure 5). Only employees who are well-informed about digital ethics have the skills of sensitivity and problem-solving needed to address the many different digital ethics problems.

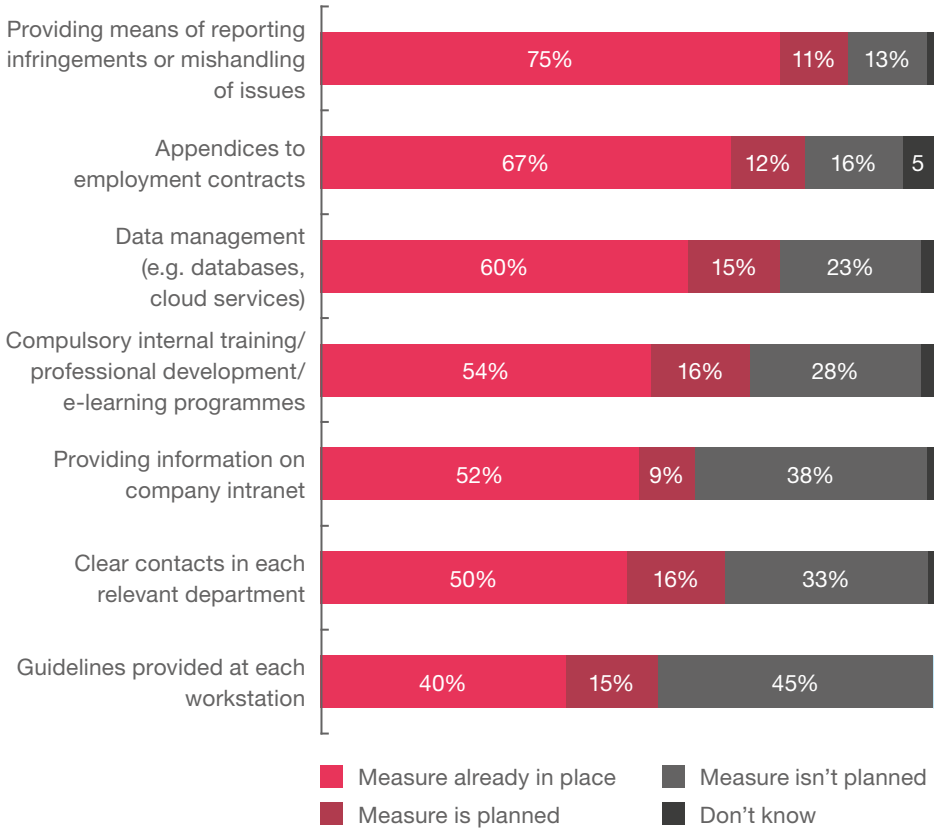
Therefore, suitable human resources development strategies that address the various corporate structures and processes are needed. Care should be taken to ensure that the values of potential employees match the company's culture, right from the start of the recruitment process. A major success factor is development of digital ethics expertise among managers. Managers should not only bring the company's actions into line with the relevant values, but also function as role models for the entire workforce and encourage broader enhancement of digital ethics skills.

However, continuous technological change equally requires a continuous learning process throughout the organisation. Awareness workshops or training courses consolidate corporate values in the long term and sharpen awareness of how these can be emphasised in new contexts. Half of companies surveyed used mandatory training to try and ensure

[12] Cf. www.pwc.de/digitaleethik.

that employees consider and comply with regulations on digital ethics in their work (see Figure 6).[13] However, traditional advanced training or e-learning programmes are often not enough to support structures promoting integrity through personnel development. Digital upskilling must strike out in new directions. Apps can be used to find fun ways (e.g. gamification) of raising the necessary awareness in the workforce and increasing digital well-being. Digital ethics should also become an integral part of internal communications, such as by addressing them on the company intranet, in employee magazines and in videos or on posters in offices. A clear tone at the top also provides the necessary support for change from company management.

Fig. 6 How does your company ensure compliance with regulations?



4 Ethics in business processes

Strengthening employee competence is an important component of digital corporate responsibility. However, staff sensitivity to the values expected by the company is often not enough to build an effective digital ethics strategy. The example of the appliance manufacturer underlines that it is almost impossible to distinguish between internal risks and risks arising from other market participants in the age of the platform economy. Supply chains become blurred, exchange between each link in the chain increases, and the boundaries between companies become hard to discern. As a result, digital interconnection also increases the demands on companies. It's important to keep this interdependence in mind when considering digital ethics, as digital due diligence obligations run through the entire supply chain. If a manufacturer of smart refrigerators uses algorithms and computing power from external service providers, sensors from third-party companies and provides suppliers with customer data, the manufacturer is fully responsible to the buyers for their product and the service provided. External risks from business partners can quickly become internal risks, especially regarding data protection or data security.

Only a few companies have experience in dealing with requirements like this through complex value chains. However, there are reliable tools which can help to enforce digital ethics standards. A digital ethics heatmap, for example, can illustrate risks within corporate divisions and external suppliers that may endanger values, enabling preventative solutions. A code of conduct makes it possible for a company to transparently communicate its own corporate requirements to stakeholders. A lack of in-house expertise in monitoring supply chains can also be compensated for by external consulting. In almost six out of ten companies, consultants are already helping to develop internal regulations on digital ethics itself or management of digital ethics (see Figure 1).[14]

[13] Cf. www.pwc.de/digitaleethik.
[14] Cf. www.pwc.de/digitaleethik.

5 Value-oriented product development

The desire for increasingly agile make product development processes doesn't make incorporating ethical values any easier. Nevertheless, companies should define specific responsibilities for their employees to guide each step right from the start of development and ensure responsible implementation of digital ethics during product development.

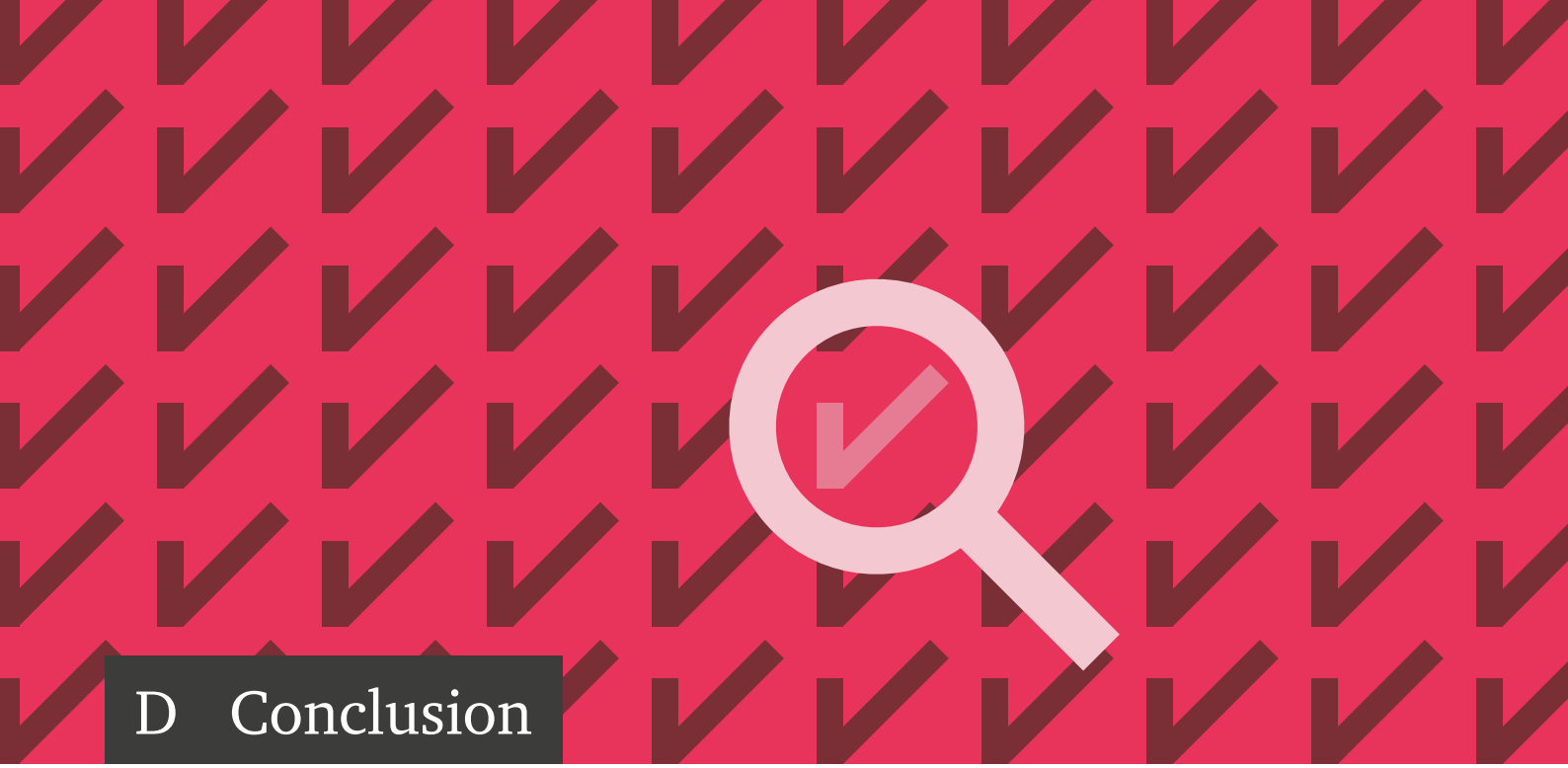
But how do we build morality into our machines? Humans make decisions and bear responsibility for them. Machines, on the other hand, have no morals and computer systems do not follow moral values; they can only follow decision-making patterns that they have been programmed or trained to follow. This means that a machine cannot be held responsible – but its manufacturer or user can. It is therefore crucial to incorporate ethical principles into the design and development of digital technologies.

Human-centred design and key aspects of data protection must therefore guide the development process from the very beginning. For example, it would not be acceptable to do nothing about bias in algorithms before starting to use them. Sensitivity towards digital ethics is required right from the data selection and conception stages. Known as ethics by design, this enables us to prevent risks at an early stage, instead of just reacting to risks as they emerge. A number of national and international initiatives are now also following these approaches. The IEEE's global initiative is particularly worthy of note, having produced the Ethically Aligned Design (EAD1e) report. Written by experts in the field, this report comprehensively covers values-oriented development of autonomous and intelligent systems.

This process of values-based product design should be supported by experts who are involved in the development process at an early stage, and who check products for their social acceptability and compliance with established standards (e.g. human rights, ecological sustainability). Such a function must be arranged so that it reports directly to management. Another crucial driver is certification, which provides protect companies from risks in the long term and sets them apart from their competitors.

> The use of an ethics board can be helpful. However, its tasks and responsibilities must be clearly defined, and there must be clarity over how it will work with the other divisions of the company.
>
> Clara Neppel
> Senior Director, IEEE European Business Operations

> There is a need for value experts in companies. These are experts who are involved in the product development process from the very beginning and who review products for compliance with values and ethical standards. This function must be granted the powers it needs, and there must be a reporting line that goes all the way up to the executive board.
>
> Sarah Spiekermann
> author of the book 'Ethical IT Innovation: A Value-Based System Design Approach' (Droemer, 2019)



D Conclusion

Economic and social development without digitalisation as a driver is unthinkable today. Digitalisation has huge economic potential, but also brings challenges and creates uncertainty. Development of the digital economy has been significantly slowed down in recent years by data leaks, misuse of user data and breaches of privacy, making it more difficult for companies to realise their digital potential. At the same time, this loss of trust has also become an obstacle to the wide-ranging benefits that innovative technologies can provide to people and society.

Accordingly, digital ethics plays a key role in technological transformation. Corporate digital responsibility is more than just a buzzword or sales argument: digitally responsible companies strive to do what is right, and strive to ensure responsible action in the digital age – for the benefit of all. Digital ethics can provide companies with a responsible and credible way through the process of technological transformation.

Companies that use digital technologies in their business models must therefore ensure that their actions have a positive social impact to create trust in their products and services. Trust is the central resource in the digital age, and is most effective means of overcoming current scepticism towards new technology. In order to achieve these goals, companies must take measures to ensure careful use of digital technology on the one hand, and the pursuit of value creation on the other.

Successful digital ethics for companies rests on three pillars: competent and values-conscious employees, effective organisational structures, and responsible process design. The more consistently digital ethics is considered at all these levels of the company, the more credible the company is to its customers, business partners and other stakeholders.

PwC's survey[15] has demonstrated central challenges to sustainably anchor digital ethics strategies: workforce expertise, awareness of the topic within the company, and responsible handling of data. This creates a need to develop digital ethics skill sets and expertise, both at management level and within other departments. However, this alone is not enough: the challenges involved are complex, and they may have social consequences that are unforeseeable both for individuals and for the company.

Digital ethics can be sustainably anchored within a company using the tools and measures presented in this paper – by focusing on integrity. These tools include digital ethics safeguards, integrity-driven performance and ethics by design. To ensure that ethical value is created as well as material value, companies should implement ethical design thinking processes. Digital ethics considerations should be incorporated into the development of new technologies as well as into their everyday use. Failure to make the investment that this requires not only runs the risk of the company being at the centre of the next scandal, but may also lead to increased regulatory control and tighter guidelines for entire industries. Companies that seize these opportunities to set standards, on the other hand, will be able to gain trust and take the lead in shaping the market.

[15] Cf. www.pwc.de/digitaleethik.

Contacts

Dr. Robert Paffen
Risk Consulting Leader, PwC Europe
Tel: +49 160 93602712
robert.paffen@pwc.com

Daniela Hanauer
Partner, Digital Ethics, Compliance and Integrity
Tel: +49 1511 1720054
daniela.hanauer@pwc.com

Steffen Esche
Senior Manager, Digital Risks and Digital Ethics
Tel: +49 160 90772624
steffen.esche@pwc.com

Markus Vehlow
Partner, Trust and Transparency
Tel: +49 160 713-9416
markus.vehlow@pwc.com

Hendrik Reese
Director, Responsible AI and Trust in AI
Tel: +49 151 7042-3201
hendrik.reese@pwc.com

Angelika Pauer
Senior Manager, Digital Ethics and Responsibility
Tel: +49 151 5670-6058
angelika.pauer@pwc.com

Dr Srdan Dzombeta
Partner, Cybersecurity and Privacy
Tel: +49 30 2636-5234
srdan.dzombeta@pwc.com

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Armand Zorn, Dr. Charley Choe, Cosima Geyer, Eva Müller, Isabelle Körner, Izabel Rose Gibson, Dr. Julian Klinkhammer, Manuel Geppert, Paul Czech, Ann-Sophie Stoppelkamp, Saskia Becke, Melissa-Sophie Ley

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