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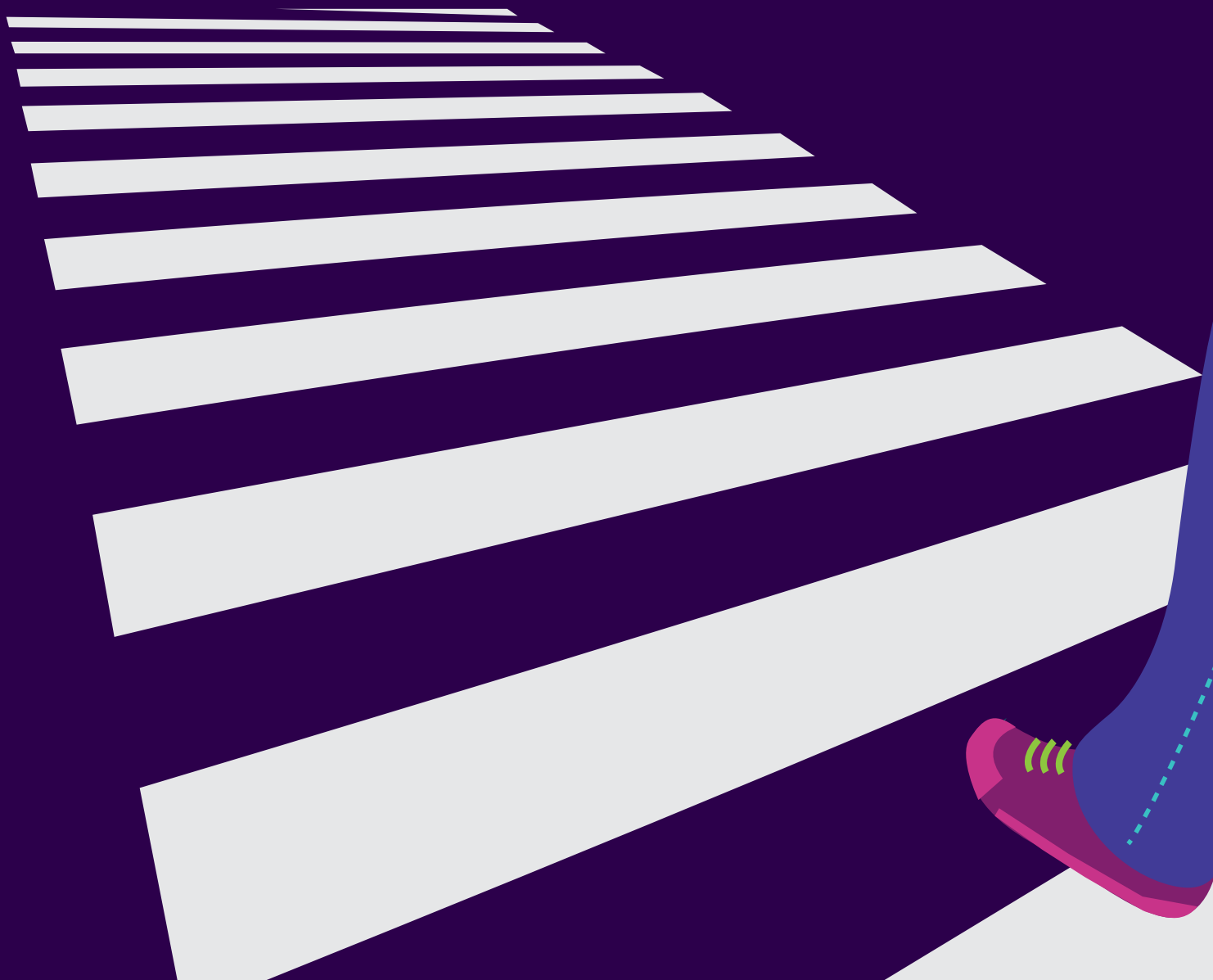
AI and the Ethical Conundrum

How organizations can build ethically robust AI systems and gain trust



> Technology in general, and AI in particular, is not value-neutral. The design decisions that are taken while developing AI impart certain values to AI whether we want them to or not. The key is to bridge the gap between high-level principles and design of AI systems.

Steven Umbrello, Managing director for the Institute for Ethics and Emerging Technology

Executive Summary

The unprecedented events of 2020 are bringing the role of artificial intelligence (AI) into sharper focus as governments leverage AI across the public sector and in healthcare as they respond to the COVID-19 pandemic,[1] while the use of digital and AI-enabled interactions with customers[2] multiply, as customers seek contactless or non-touch interactions with organizations. As the use of AI-powered innovations such as facial recognition increases, the ethics of AI come under increasing legal and societal scrutiny.

In this research, we investigate the fundamental trust and ethics issues, drawing on a survey of over 800 organizations and 2,900 consumers. We examine the risks that organizations face with regards to the trust they share with key stakeholders – from customers to employees; the extent to which organizations have operationalized ethical principles, such transparency, and fairness; and how far they have evolved their internal practices to reflect the importance of ethics in AI.

Key findings include:

Customers are increasingly trusting and willing to reward positive AI engagements

- Today, close to half of customers (49%) say that they trust AI-enabled interactions with organizations, up from 30% in 2018. However, customers also expect AI systems to clearly explain any results to them and for organizations to be accountable if their AI algorithms go wrong. (Note: An experience is considered positive when customers enjoyed it, received the expected benefit, or started forming trust with an AI engagement.)

While organizations are ethically aware, progress in ethical dimensions is patchy

- More organizations are working on enforcing an ethical charter and their awareness of ethical biases and transparency issues has improved. However, accountability is still patchy: only 53% of organizations have a leader who is responsible for the ethics of AI systems and only half of the organizations have a confidential hotline/ombudsman to enable customers/employees to raise ethical issues with AI systems.
- Organizations are making progress on the "explainability" of AI algorithms, but they struggle to make them transparent or auditable.
- Internally, understanding of ethical parameters is siloed – there are differences, in particular, between AI developers, such as, data and IT professionals, and AI users, such as, sales, marketing and customer relationship teams.

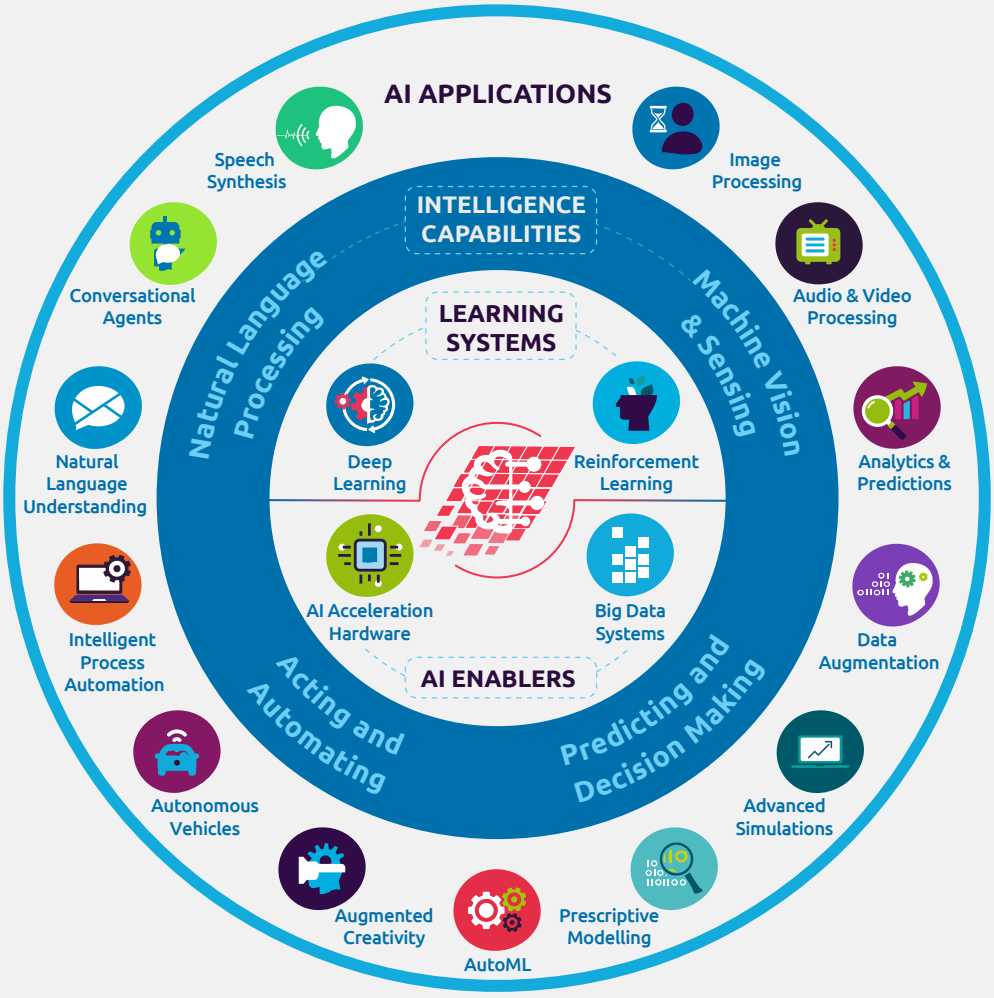
The cost of being an AI ethics laggard is high, with organizations risking losing trusted customer relationships

- Close to 60% of organizations have attracted legal scrutiny and 22% have faced a customer backlash in the last two to three years due to decisions reached by their AI systems.
- Customer adoption of AI will suffer, with added costs to organizations, as close to 40% of customers say they will shift to a human interaction if they have a negative AI experience.
- Customers believe organizations are not doing enough about some key ethical issues: the share of customers who believe that organizations are being fully transparent about how they are using their personal data has fallen from 76% in 2019 to 62% today.

Based on these findings and themes, this report highlights seven key actions for organizations to build ethically robust AI systems, which need to be underpinned by a strong foundation of leadership, governance, and internal practices:

- Clearly outline the intended purpose of AI systems and assess their overall potential impact.
- Proactively deploy AI to achieve sustainability goals.
- Embed diversity inclusion principles proactively throughout the lifecycle of AI systems.
- Enhance transparency with the help of technology tools.
- Humanize the AI experience and ensure human oversight of AI systems.
- Ensure technological robustness of AI systems.
- Empower customers with privacy controls to be in charge of their AI interactions.

Artificial Intelligence



Source: Capgemini Technnology, Innovation & Ventures.

Artificial Intelligence (AI) is a collective term for the capabilities shown by learning systems that are perceived by humans as representing intelligence.

These intelligent capabilities typically can be categorized into machine vision and sensing, natural language processing, predicting and decision-making, and acting and automating.

Various applications of AI include specch, image, audio and video processing, autonomous vehicles, natural language understanding and generation, conversational agents, perspective modelling, augmented creativity, intelligent process automation, advanced simulations, as well as complex analytics and predictions.

Technologies that enable these applications include big data systems, deep learning, reinforcement learning, and AI acceleration hardware.

What do we mean by ethics in AI?

According to the European Commission, the ethics of AI is a subfield of applied ethics and technology that focuses on the ethical issues raised by the design, development, implementation, and use of AI. Accordingly, per the ethics guidelines for Trustworthy AI issued by the European Commission High-Level Expert Group on AI, AI systems should encompass seven principles throughout their lifecycles:[20]

The 7 Principles

- **1. Human agency and oversight**

  AI systems should support human autonomy and decision-making. AI systems should both act as enablers to a democratic, flourishing and equitable society by supporting the user's agency, foster fundamental rights and allow for human oversight.

- **2. Technical robustness and safety**

  AI systems need to be resilient and secure. They need to be safe, ensuring a fall back plan in case something goes wrong, as well as being accurate, reliable and reproducible.

- **3. Privacy & Data governance**

  Besides ensuring full respect for privacy and data protection, adequate data governance mechanisms must also be ensured, considering the quality and integrity of the data, & ensuring legitimized access to data.

- **4. Transparency**

  AI systems should be based upon the principle of explainability, encompass transparency and communication of the elements involved: the data, the system and business models

- **5. Diversity, non-discrimination and fairness**

  Involves avoidance of unfair bias, encompassing accessibility, universal design and stakeholder participation throughout the lifecycle of AI systems apart from enabling diversity and inclusion.

- **6. Societal and environmental wellbeing**

  AI systems should benefit all human beings, including future generations. It must hence be ensured that they are sustainable and environmentally friendly.

- **7. Accountability**

  The requirement of accountability complements other requirements and is closely linked to the principle of fairness. It necessitates that mechanisms be put in place to ensure responsibility and accountability for AI systems and their outcomes, both before and after their development, deployment and use.

Introduction

The last few years have seen numerous ethical issues emerging with the rise of AI applications. AI systems designed without due concern for ethical issues have led to biases and discrimination against people of color,[3] women,[4] and other minorities.[5] A Capgemini report from last year (2019) on AI and ethics found that most executives were uncertain about the ethics and the transparency of their AI systems. The report also found that nine out of ten organizations were aware of at least one instance where an AI system had resulted in an ethical issue for their organization.[6]

Since the COVID crisis has accelerated reliance on AI because AI-based innovations play a critical role in dealing with the pandemic, addressing these issues and building trusted and ethical AI has never been more important, especially when it comes to:

1. **Touchless interfaces:** Voice-based interfaces have become integral to health-and-safety-conscious customer experiences. For example, when Starbucks reopened some of its stores in the US after lockdowns, the availability of voice-based ordering was critical to keeping customers and employees safe.[7] Our research (conducted in April–May 2020) found that 77% of consumers expect to increase their use of touchless technologies to avoid interactions that require physical contact.[8]
2. **Healthcare and public services:** Governments and tech companies turned to AI tools to predict the spread of the pandemic and to guide policy decisions and healthcare services.[9] Autonomous robots were used to disinfect healthcare facilities using UV light and limit exposure of medical staff.[10]
3. **Delivery robots and services:** As conventional delivery services underwent heavy strain or stopped altogether during lockdowns, delivery robots and even drones played their part in supplying essentials such as food, groceries, and medicines. Starship Technologies, which builds autonomous delivery robots, saw a sudden surge of interest as the pandemic spread. By April 2020, their robots had completed over 100,000 autonomous deliveries, travelling over 500,000 miles in the process.[11]

This underlines the increasing importance of the need for ethical AI. Unless consumers and society feel they can trust the use of AI systems by organizations, it will be difficult to build on these advances. There have been a number of developments that point to disquiet and concern, which in turn, will challenge and slow AI progress:

1. Several cities, including San Francisco and Boston, have banned the use of AI-powered facial recognition[12] and a number of tech vendors have said they will not supply the technology to police forces for surveillance.[13] Yet, as the COVID-19 pandemic spread, facial recognition found new uses and has been deployed, for instance, to identify people not wearing masks on subways.[14] Addressing concerns about privacy and inaccurate profiling will be critical.
2. Use of AI in analyzing the spread of diseases,[15] and creating alerts and contact tracing through mobile apps has raised concerns over inaccuracy, data privacy and security, malicious use, and unwarranted surveillance.[16,17]
3. The racial equality movement in general – and the Black Lives Matter Movement in the US in particular – have focused attention on fair and unbiased use of AI applications. Research shows that AI-based risk assessment tools in the criminal justice system produce racial disparities, as they are based on biased historical data.[18]
4. Indirect side-effects of the pandemic – such as over-reliance on digital modes of interaction – have resulted in newer ethical issues. For instance, when students' exams were cancelled in the UK because of lockdown, the government used an AI algorithm to automatically assess students and award them grades in a way that was discriminatory against students from underprivileged backgrounds.[19] After a major public storm, the AI-mandated results were abandoned entirely, and teacher assessments were used.

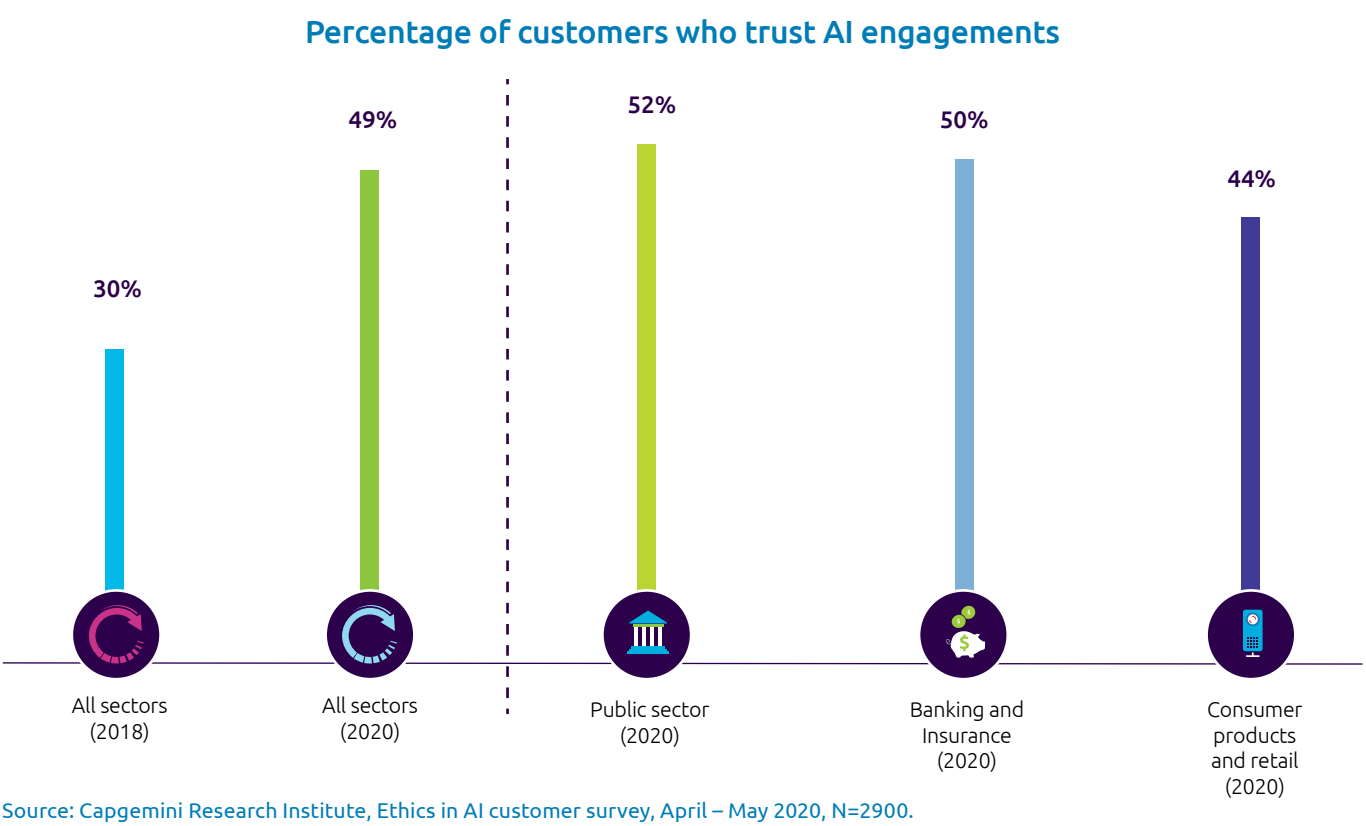
To examine the state of ethical AI today, and understand how perceptions and practices have changed since our 2019 study, we launched this latest research with a survey of both industry executives and customers. In this report, we answer several key questions:

- How can ethical AI interactions benefit organizations?
- What progress have organizations made on different ethical dimensions in AI ? We focus on the four key dimensions of AI – explainability, transparency, fairness and auditability here to understand the progress compared to 2019.
- How far have organizations evolved in terms of ethics governance and awareness; and do they have an ethics leader, a code of conduct, defined policies and practices, and deeper awareness of ethical issues?
- How can organizations move to AI systems that are ethical by design?

Customers are becoming increasingly comfortable with AI

Customers are increasingly engaging with smart systems. In our July 2020 research, "The art of customer-centric artificial intelligence,"[21] we found that 54% customers claimed to have daily AI-enabled interactions with organizations, including chatbots, digital assistants, facial recognition, and biometric scanners. This is a significant increase from 21% in 2018. We also find that, as interactions and familiarity increase, customers are more willing to trust this interaction. In 2018, just 30% of customers found AI interactions to be trustworthy. In 2020, the number increased to 49%; a significant increase, albeit still a minority (see Figure 1).

Figure 1. The share of customers trusting AI interactions has increased significantly, although it is still less than half



Source: Capgemini Research Institute, Ethics in AI customer survey, April – May 2020, N=2900.

In 2020, 50% of customers say that they benefitted from personalized recommendations and suggestions, up from 26% in 2019.

There are increasing expectations from customers that any decision that is made using an algorithm needs to be explainable, and the MAS (Monetary Authority of Singapore) guidelines are very clear that the explainability and accountability of a decision need to lie with a human being at some point.

Paul Cobban, Chief Data and Transformation Officer at DBS

Customers expect transparent and fair AI interactions, and with clear accountability

A significant majority of customers expect organizations to provide AI interactions that are transparent and fair, and they also want organizations to take responsibility if something goes wrong (see Figure 2):

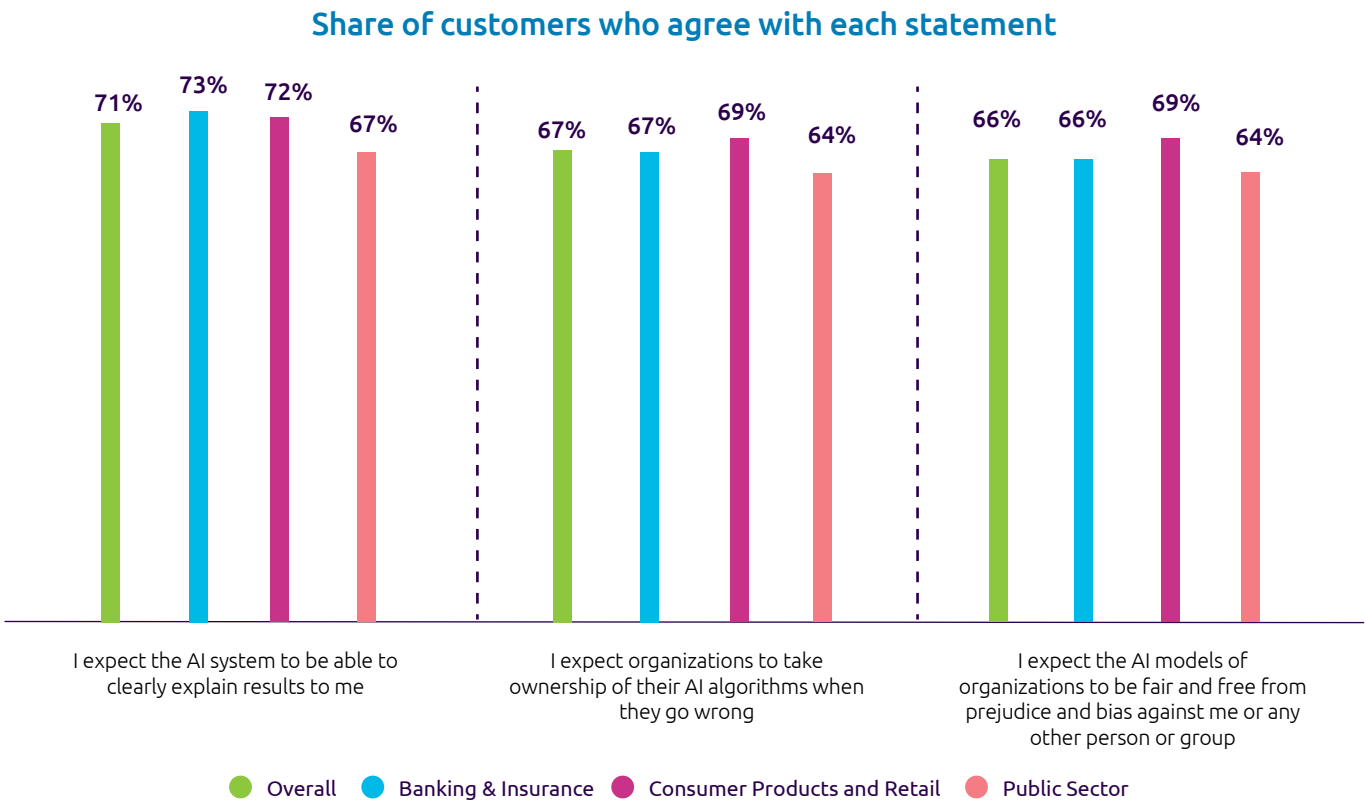
- 71% want a clear explanation of results. For instance, the GDPR states a "right to explanation," in which customers are entitled to receive meaningful information about the logic involved in automated decisions including those made by AI.[22] As Figure 2 shows, the expectations for clear explanation of AI outputs is higher in sectors, including banking and insurance, which deal in high-impact decisions for customers such as credit sanctioning.
- Two-thirds (66%) expect AI models to be "fair and free of prejudice and bias against them or any other person or group."
- 67% expect organizations to take ownership of their AI algorithms when they go wrong.

Guidelines issued by the US Federal Trade Commission (FTC) in early 2020 call for transparent AI. The guidelines state that when an AI-enabled system makes an adverse decision (such as declining credit to a customer), the organization should show the affected consumer the key data points used in arriving at the decision and give them the right to change any incorrect information.[23]

Apple, for instance, advances transparency in AI interactions by taking a privacy-first approach. The firm ran the risk of being seen as potentially intrusive and unsafe when accessing customer data to understand how they use their phones. To avoid this issue, Apple uses "local differential privacy" – a technique that helps mask a user's personal data before it is even shared with Apple. This allows them to understand the behavior of its user community without learning about individual users.[24] Such an "arm-length" approach to handling sensitive data can help reassure customers about their privacy and enhances trust.

Paul Cobban, Chief Data and Transformation Officer at DBS told us, *"There are increasing expectations from customers that any decision that is made using an algorithm needs to be explainable, and the MAS (Monetary Authority of Singapore) guidelines are very clear that the explainability and accountability of a decision needs to lie with a human being at some point. We recognize this as a very nascent area, and we will need to continue to iterate as we learn."*[25]

Figure 2. Customers expect fair and transparent AI systems, and with clear accountability



Source: Capgemini Research Institute, Ethics in AI customer survey, April – May 2020, N=2900.

While organizations are more ethically aware, progress in ethical AI is still underwhelming

More organizations are defining an ethical charter for AI development and show improved ethics awareness

There is a significant increase in organizations that have a defined AI ethics charter for how these systems are developed and used. In 2019, just 5% of organizations had one, in 2020, 45% have defined an ethical charter to provide guidelines on AI development, reflecting the fact that organizations are making increased use of AI in consumer interactions. For example, the framework for responsible AI developed by fashion and design organization H&M Group is centered around AI being fair, beneficial, transparent, and secure, among other qualities.[26]

Our research found that organizations are now more aware of ethical issues:

- In 2019, 32% of executives said they were aware of explainability, today this stands at 78%.
- Previously, 36% were aware of transparency in AI engagements, today this is 69%.
- Last year, 35% were aware of the issue of discriminatory bias with AI systems, and this currently stands at 65%.

Dedicated programs to build this awareness seem to be helping: 58% of organizations today are building employee awareness around AI issues. Salesforce's AI platform alerts its enterprise customers to any sensitive fields or their proxies – including age, race, and gender – that may lead to biases in decision making.[27]

Organizations are also more careful in their data handling practices, especially with regard to the GDPR:

- 62% of organizations say that they adhere to all data protection regulations applicable in their region (e.g., the GDPR in Europe) vs 48% in 2019. .
- This is higher in European countries where the GDPR is top of mind (68% in Italy and 67% in Germany), but drops to 43% for India (where no such data protection law exists).

The GDPR enables data privacy when deploying AI, which in turn supports transparency and fairness. For instance, the GDPR has laid out guidelines for organizations to use, such as assessing customer data or privacy risk when organizations are processing customer data. Apart from data privacy, GDPR also serves as a key building block for ethical AI. The draft guidelines of the EU's High-Level Expert Group on AI covers requirements like awareness, fairness, explainability, human oversight that are already built into the GDPR.[28]

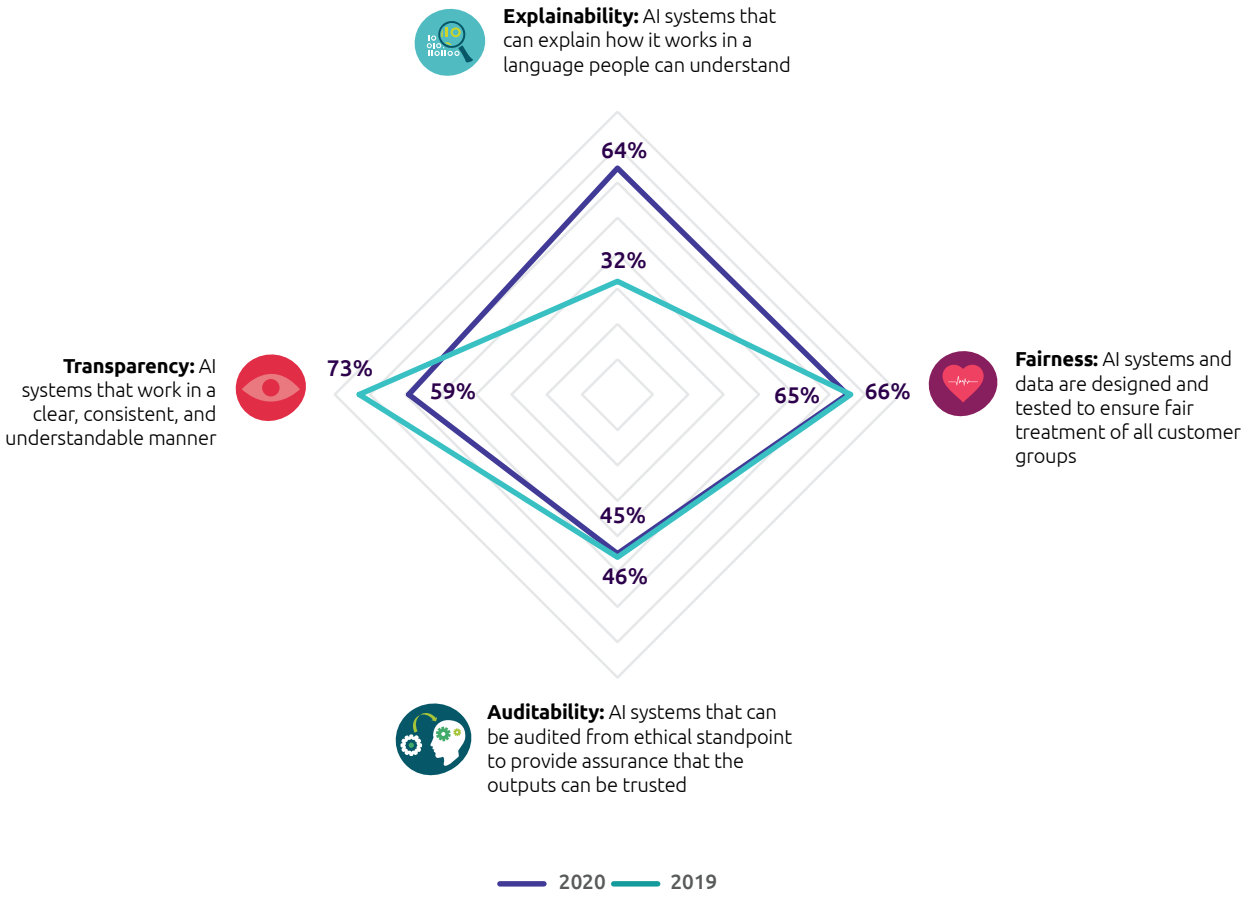
However, barring "explainability," most other dimensions of ethics are underpowered or failing to evolve

To understand how organizations are progressing on their AI ethics journey, we analyzed the responses of the 800 executives who took part in our survey against four dimensions: Explainability, Fairness, Auditability, and Transparency (see Figure 3). We believe that these four dimensions exhibit counter push-pull, are interlinked with each other, and need not necessarily follow a sequence in adoption.

Barring explainability, which organizations have improved on since last year, most other dimensions have either remained the same or worsened. This is a cause for concern as, broadly speaking, AI systems' explainability of results seems to have improved without a corresponding improvement in being able to "show" how they work (transparency) or "prove" how they work (auditability). If organizations can generally explain AI results better without showing or proving them yet, they are probably over-optimistic about explainability or are relying on explanations far more than on concrete proof. Research published by Partnership on AI – an independent, non-profit organization – has also found that explainability in practice, is falling short of enhancing transparency and accountability for external stakeholders – such as, the end users and customers – as it currently serves the interests of internal stakeholders, such as engineers and developers.[29]

Figure 3. Organizations' progress across most ethical dimensions is either modest or non-existent

Organizations have progressed on explainability but progress is disappointing in certain other ethics dimensions



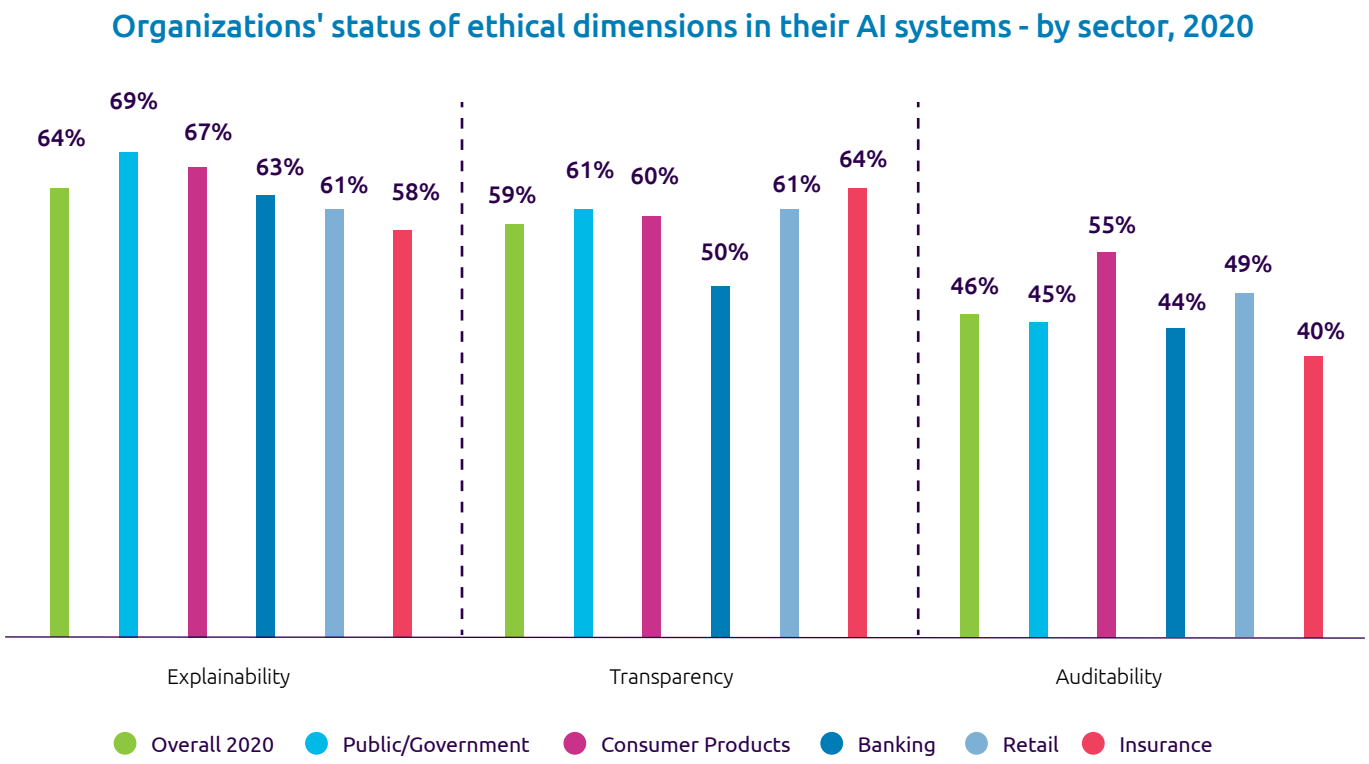
Source: Capgemini Research Institute Artificial Intelligence executive survey, March–May 2020, N=884 executives; Ethics in AI executive survey, April-May 2019, N=266 for explainability and transparency; N=456 for fairness and 722 for auditability.

There is a disconnect between transparency, interpretability, and keeping trade secrets. What if a company found out that their licensed complex model was as accurate as a very simple model? A less transparent model is an easier-to-keep trade secret

Cynthia D Rudin,
Professor of Computer Science at Duke University

Figure 4 shows how different sectors perform against these dimensions.

Figure 4. Public sector ranks high on explainability, banking ranks one of the lowest in transparency and auditability



Source: Capgemini Research Institute Ethics in AI executive survey, March – May 2020, N=884 executives

The share of organizations making their AI models explainable is on the increase

We found that 64% of organizations explain to users why AI gave a certain output, and the process and data used for this conclusion, vs 32% in 2019. AI becomes "explainable" when the algorithm shows a user how its output, decisions, and recommendations are reached. Examples of this approach include:

- When providing viewing recommendations, Netflix's algorithms consider variables such as viewing history, the preferences of similar profiles, and time and duration of viewing rather than demographic variables such as age or gender.[30]
- Likewise, Spain-based financial institution BBVA uses a "digital twin" of their customer profile to come up with counterfactual explanations in its AI models for loan rejection. Variables like age and transaction patterns in the digital-twin are altered until the loan is approved, which helps the bank to explain the decision of its AI model by comparing the differences between the real consumer whose loan was rejected and their digital-twin whose loan was approved.[31] Financial institutions especially are evaluating approaches such as SHAP (SHapley Additive exPlanations) based upon game theory for explainability.[32]
- AI product organizations are developing solutions that offer clarity on how their models work. For instance, Google's "Explainable AI" offering quantifies how each data point contributes to an outcome.[33] Similarly, Microsoft's "InterpretML" pinpoints the primary factors that drive how its machine learning models reach a decision.[34]

Explainability has been generating widespread interest and progress:

- The "Explainable AI" space is seeing many players emerge[35] and attracting significant funding. US-based Kyndi, a startup that builds explainable AI platforms for government, financial services and the life sciences sector, secured $20 million additional funding in July 2019.[36] Fiddler Labs, another US-based explainable AI startup, raised $10.2 million funding in September 2019.[37]
- "Explainability" is also a critical regulatory requirement in some countries. The GDPR requires organizations to provide adequate explanations to customers on outcomes of automated systems.[38]

Despite this progress, according to Cynthia D. Rudin, professor of computer science at Duke University, explainability is yet to fully serve its purpose, especially in high-stake decisions impacting people's lives (for example, healthcare, banking and insurance, automotive, aerospace, and criminal justice), as opposed to low-stake AI decisions (for instance, advertising) where the impact on people's lives is considerably lower. In the context of high-stake decisions, she says, *""I think companies are trying to explain their black boxes, but this is to achieve some combination of troubleshooting and understanding what the black boxes depend on. But I am not sure how seriously they are taking this because of the flaws with explanations of black box models."* Research by Dr. Rudin suggests that the recent "explosion" in "explainable ML (machine learning)" has been fueled in part by approaches that explain complex models (for instance, those with deep learning neural nets) by creating a second model to explain the first model by replicating its behavior. This is a problematic approach as such explanations are often not reliable and can be misleading. According to Dr. Rudin, creating models that are inherently interpretable i.e. provide their own explanation in line with what the AI model actually computes, is a potential solution.

While progress on explainability is encouraging, other areas lag behind or remain the same.

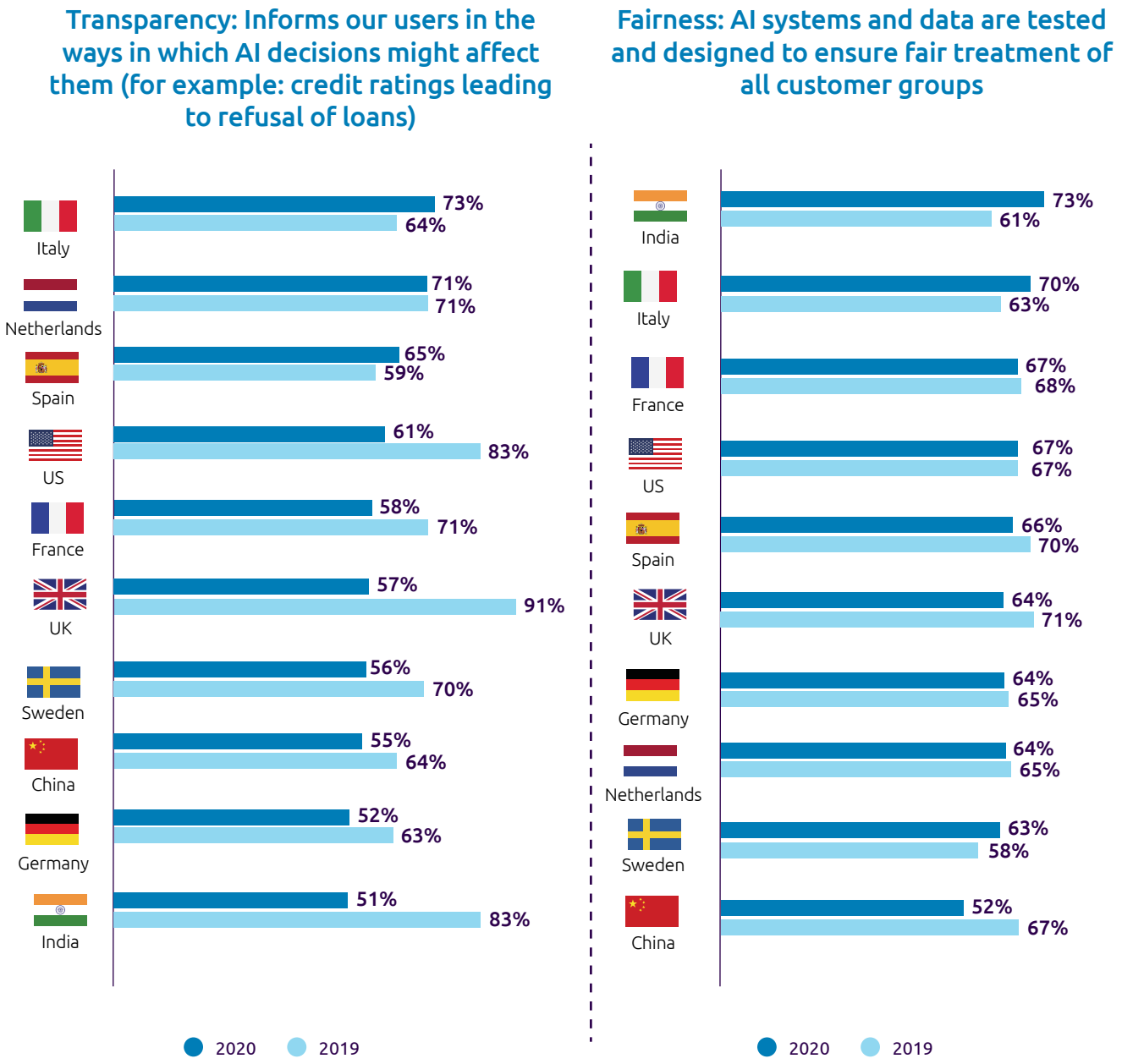
1. **Insufficient actions on removing bias from data sets and design of AI algorithms impacts fairness:** The share of organizations who test their AI systems and datasets to ensure fair treatment among all groups has almost remained the same as 2019's level. At the same time, bias-related incidents in AI engagements continue to be a problem:
   – Multiple credit card and loan issuers have come under pressure after it was found that their credit limit algorithms were biased against specific cohorts.
   – Racial bias was discovered in a major healthcare risk assessment algorithm that is used with over 200 million people in the US.[39] The system reportedly classified black patients as having lower risks on average than white ones, despite having more chronic illnesses. This made the AI less likely to flag eligible black patients for high-risk care management.

   Outcomes that are biased and unfair to certain groups – such as women or the elderly – could have their origin either in the fact that biased data was used to train the AI system, or because of lack of developers' sensitivity to demographic variables during the design and development of the AI system, among other issues. While 47% of executives said they did not use demographic variables – such as gender or race – when training their AI systems, this means that the 53% majority could allow these variables to influence their AI algorithms. Even if the datasets include or exclude these variables, care should be taken to avoid bias that may emerge from other variables influenced by demographics. Chafika Chettaoui, chief data officer at Suez Group, a French water and waste management company, stresses the importance of datasets that are representative. *"You need to really be careful about the datasets before launching the model. If the risk or the impact is high, do not deploy the model without being sure of the bias. And if the risk is low, begin small and show value first. Depending on the project and on the risk, put more time on the data management instead of the model before getting the model live,"* she says.

2. **Increasing Transparency:** The ability of AI systems to operate in a clear, consistent, and understandable manner has reduced in the last year. In 2019, 73% of organizations informed users about the ways in which AI decisions might affect them. Today, this has dropped to 59%. A number of factors could lie behind this:
   – Firms intentionally keep solutions non-transparent to guard business practices. Dr. Rudin says: *"There is a disconnect between transparency, interpretability, and keeping trade secrets. What if a company found out that their licensed complex model was as accurate as a very simple model? A less transparent model is an easier-to-keep trade secret."*
   – The growing complexity of new AI models also makes transparency challenging. For instance, US-based OpenAI announced its "GPT-3" AI system, a deep learning NLP (natural language processing) system that considers about 175 billion parameters, considerably higher than the previous version. Marcin Detyniecki, chief data scientist at AXA Group, points out to the importance of interpretability in the context of transparency: *"We focus our research on interpretability instead of transparency as machine learning tends to produce complex systems. If you bring in transparency, it will enable anybody to see the rules, but you will not necessarily understand anything – especially if you have millions of them. We work on interpretability to make sure that people can understand the impact of decisions made by an AI system."*
   – The COVID-19 pandemic and the change in consumer behavior have also brought about short-term disruptions the functioning of the AI algorithms in the short term. The new inputs and lack of enough training data for similar situations in the past, affected many pre-existing AI systems.[40] Organizations facing this issue are redesigning their AI and including factors suited to the new reality, leading to less transparency vis-à-vis the pre-pandemic situation, at least in the short term.

As Figure 5 shows, India, UK, France, and the US demonstrate the greatest declines in transparency. China shows the most decline for fairness.

Figure 5. Transparency in AI systems has fallen sharply in the UK, while China shows biggest decline in fairness



Source: Capgemini Research Institute Ethics in AI executive survey, March–May 2020, N=884 executives; Ethics in AI executive survey, April–May 2019, N=266 executives for transparency and 456 for fairness.

3. **Challenges in end-to-end reproducibility affect auditability:** Less than half of the organizations undertake audits for AI systems from an ethics perspective. Today, just 46% have the ethical implications of current AI systems independently audited, which remains largely the same as 2019. Auditability requires:

a. End-to-end reproducibility, involving the ability to reproduce the output of AI with same or similar inputs – sometimes difficult to achieve due to increasing complexity of AI systems.

b. Documenting the full map of how the AI was built, how the data was collected, how it was tested, and how it makes decisions so that it can be used in the right context and its limits and potential pitfalls are well known.

Director data science and artificial intelligence at a large, US-based consumer goods corporation points out the challenges, *""One of the important challenges with AI algorithms is auditability. There is no real institution or organization that is creating standards in audit trails for AI as it goes to market,"* he says. However, auditability is an area that will increasingly receive scrutiny and attention. For instance, the US's Algorithmic Accountability Act, introduced into Congress last year, would direct the Federal Trade Commission to require impact assessments of automated decision systems – such as those enabled by AI – from "entities that use, store, or share personal information", once it becomes a law.[41]

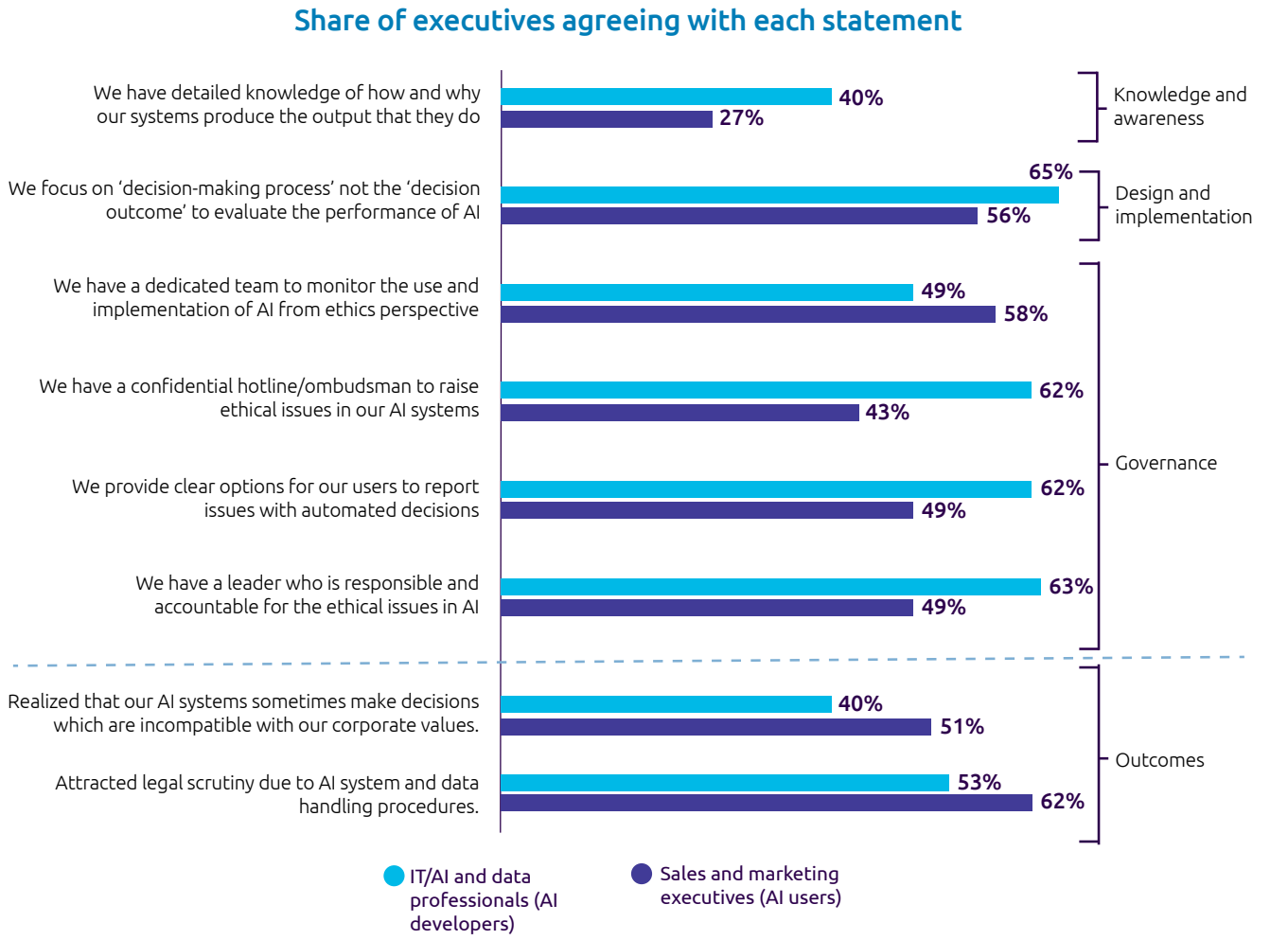
Organizations also lag in developing the strong internal practices needed for ethical AI implementation

Our research shows that there is a disconnect between the in-company teams that use AI, such as sales and marketing (AI users) and between those who develop and run the AI infrastructure within companies (AI developers). 51% AI users feel that their AI systems have made decisions that are incompatible with the organization's values. But only 40% developers feel the same, suggesting that front-end problems are not filtering back to the people who develop the systems. This could also be due to differences in level of understanding of ethical parameters between AI users and developers especially in the areas of knowledge, design, and governance as Figure 6 shows.

For example, 40% of AI developers, such as IT or data professionals, have a detailed understanding of why their AI systems produce the outcomes they do. But only 27% of AI users, such as sales and marketing executives, have the same.

The discrepancy among the AI developers and AI users also shows that the AI tools are yet to emerge to be more user-friendly and understandable from the users' point of view.

Figure 6. Significant differences exist in the understanding of ethical issues between AI developers and AI users



Source: Capgemini Research Institute Ethics in AI executive survey, March–May 2020, N=884 executives. Note: The executives surveyed are highly aware of how AI is used by their companies in different customer interactions.

The lag in internal practices to drive ethical AI implementations is also reflected in other parameters:

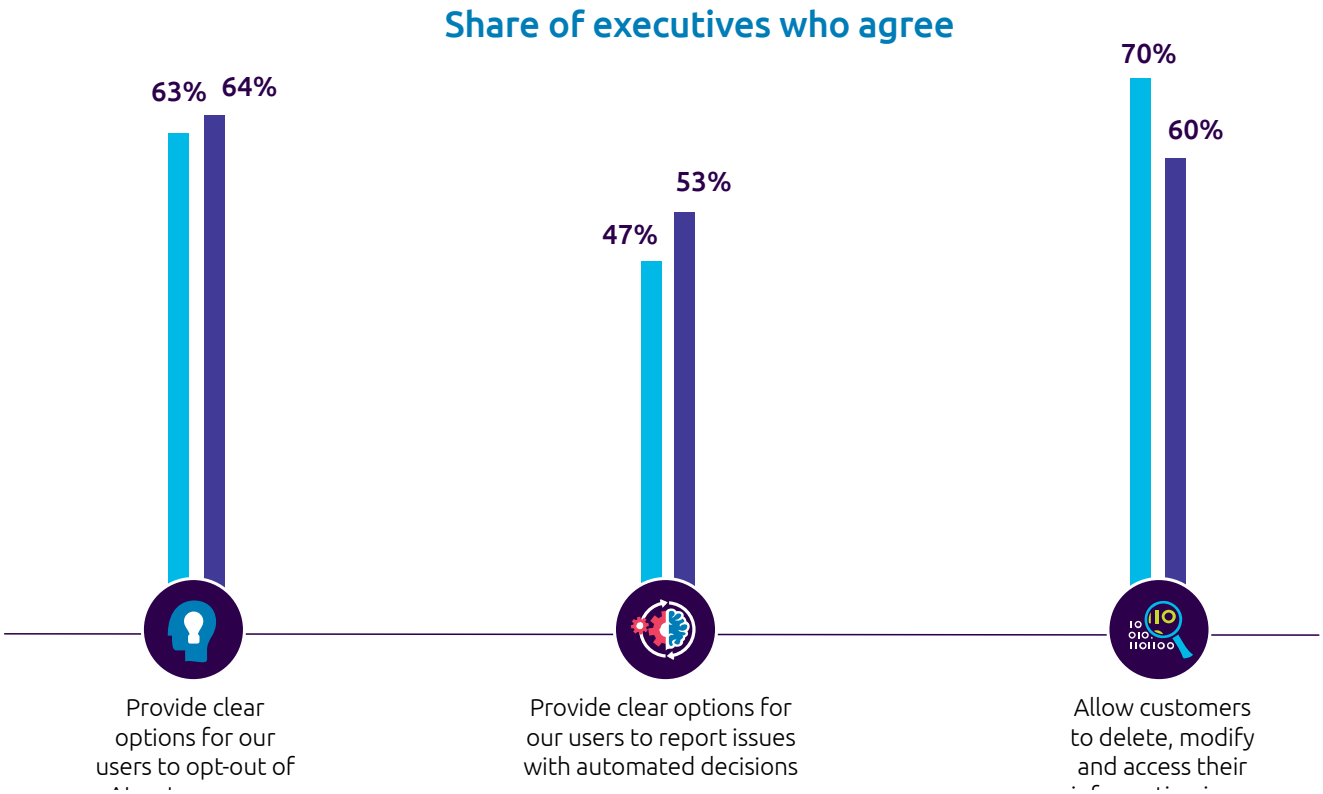
- **Leadership:** Only 53% of organizations have a leader who is responsible for the ethics of AI systems. Tech leaders including Microsoft and Salesforce are establishing a lead: Microsoft has an AI ethicist role[42] and Salesforce hired an ethics chief in early 2019.[43] In some firms, ethics responsibility is not a standalone area but is delegated to the chief data officer.[44]
- **Accountability:** Cynthia D. Rudin, professor of computer science at Duke University, confirms that lack of accountability is a significant issue: *"There is very little accountability if, for instance, someone loses a database of biometrics data or financial data on individuals that is used for AI, or if a company allocates resources in a racially biased way. If there is no penalizing, the there is no accountability."* Our research shows that:

a. Only half said they had a confidential hotline/ombudsman to enable customers/employees to raise ethical issues with AI systems.

b. Regarding KPIs, our research found that 75% of organizations predominantly use metrics such as "customers served by AI interactions" when measuring the success of AI engagements. It is critical to expanding them to include trust-based KPIs, for instance "the number of satisfied customers," or "the number of customers willing to share data," or "the number of customers trusting the AI decisions," to better measure customer trust.

- **Incorporating "controllable AI" to empower customers:** The number of organizations empowering customers when it comes to AI systems has either only marginally increased or reduced in 2020 compared to 2019 (see Figure 7). From the perspective of geographies, the share of organizations "providing clear options to users to opt-out of AI systems" grew to 72% in Europe in 2020 compared to 62% in 2019. This may be the result of GDPR compliance requirements. The US saw a 10% decline, however, and China saw a 38% decline.

Figure 7. Customer empowerment metrics have remained roughly the same as 2019 or worsened



Source: Capgemini Research Institute Ethics in AI executive survey, March–May 2020, N=884 for "Allow customers to delete, modify and access information in easy manner"; N=239 for "provide clear options for our users to opt-out" and "provide clear options to report issues with automated decisions"; Ethics in AI executive survey, April–May 2019, N=266 executives.

Feedback loop in AI is almost non-existent and building a consumer feedback loop is important. If it's not there, then it's not a mature industry.

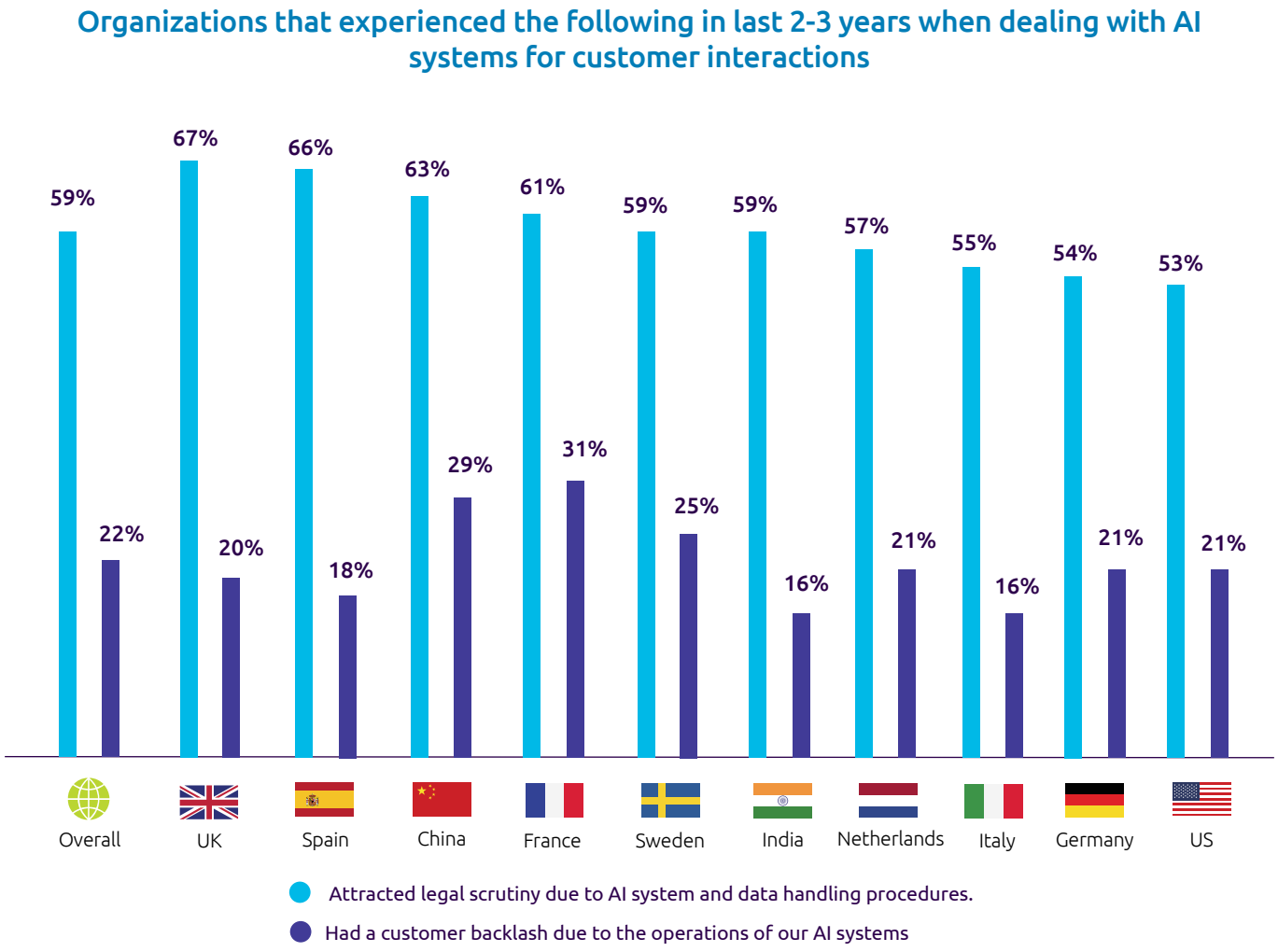
Pam Dixon
Executive Director,
World Privacy Forum

This patchy response means organizations risk losing customers' trust

If interactions are perceived as unethical or negative by customers, organizations risk losing hard-earned trust. Our research shows that many organizations have found their AI under public scrutiny:

- Close to 60% say that they have attracted legal scrutiny of their AI systems and data handling procedures in the last two to three years (see Figure 8).
- 22% say that they have faced a customer backlash as a result of their AI systems operations (in France, this climbs to close to a third – 31%).

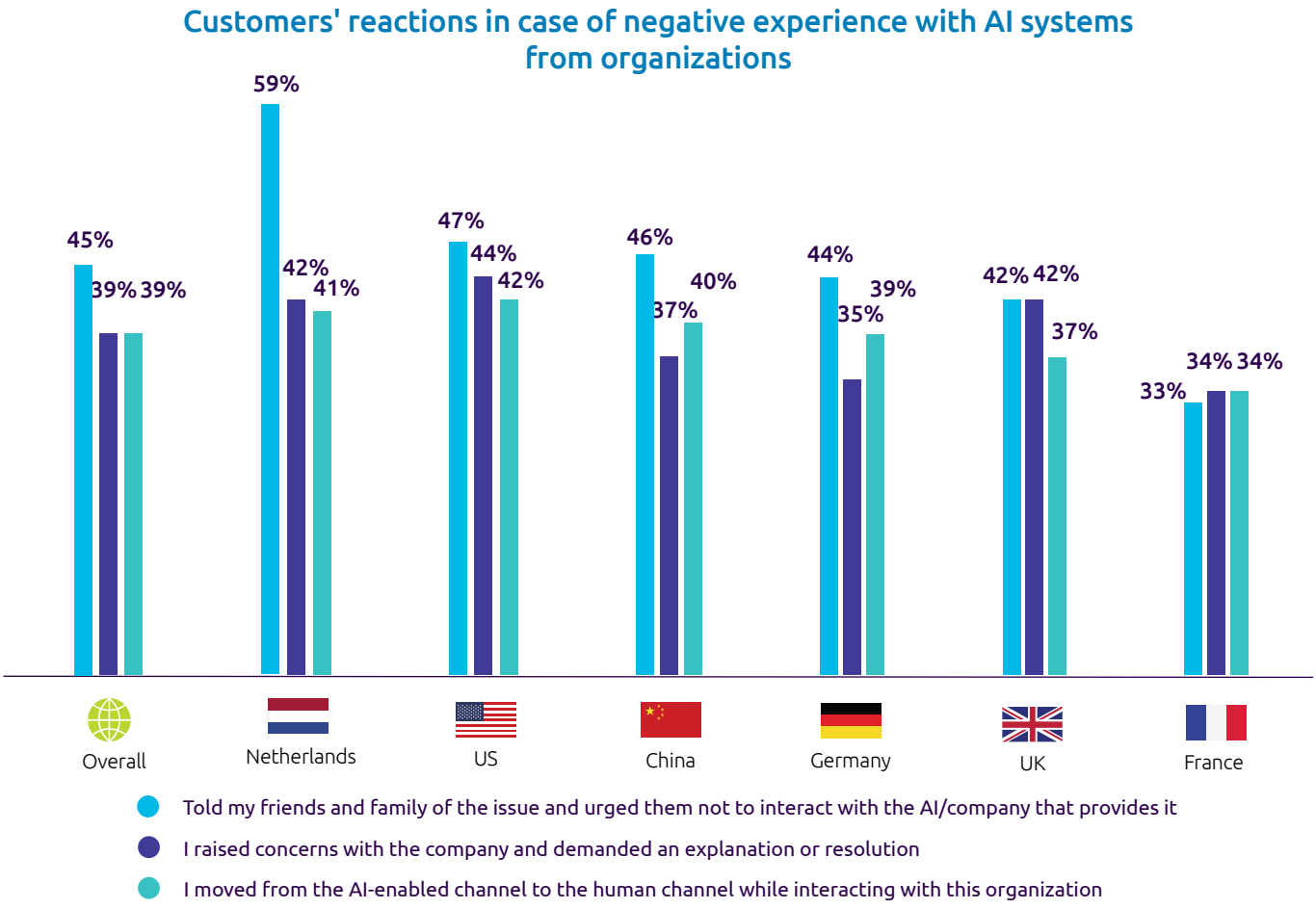
Figure 8. Close to 60% of organizations have experienced legal scrutiny in 2020 owing to ethical issues arising from AI systems



Source: Capgemini Research Institute, Artificial Intelligence Executive survey, April – May 2020, N=644.

A negative AI experience incurs a high customer cost for the organization, as Figure 9 shows. Many customers will share their negative experiences with family and friends and urge them not to engage with the organization (45%), raise their concerns with the organization and demand an explanation (39%), or switch from the AI channel to a higher-cost human channel (39%). Over a quarter (27%) of consumers say they would stop dealing with the organization or trust it less.

Figure 9. Negative word of mouth resulting from customers' negative AI experiences, a major problem



Source: Capgemini Research Institute AI in CX customer survey, April – May 2020 N=2900.

Technology in general, and AI in particular is not value-neutral. The design decisions that are taken while developing AI impart certain values to AI whether we want them to or not. The key is to bridge the gap between high-level principles and design of AI systems.

Steven Umbrello
Manging Director, Institute for the Ethics and Emerging Technology

Customers are less keen on AI interactions that are seen as “intrusive”

Driven by the increased preference for non-touch technologies, 58% of customers said they preferred to use facial recognition-enabled approaches during the pandemic. However, this preference drops to 42% in a post-pandemic future. This finding is striking because it bucks the trend we are seeing with all other touchless interactions, such as conversational interfaces, which continue to remain popular even in a post-pandemic environment. This could be due to conversational interfaces being triggered voluntarily by the customers as opposed to facial recognition, which is often involuntarily and therefore considered intrusive.

Organizations are increasingly aware of this societal and customer disquiet and some are reacting. As the number of facial recognition cameras in China grew from 176 million in 2017 to 626 million in 2020, it started to spark concerns.[45] In a survey conducted by the state-owned China Daily in November 2019, 65% of respondents said they were “against the use of facial recognition in public spaces.”[46]

Customers believe organizations are not taking enough action on ethical issues

Our 2019 Ethics in AI research study revealed the top ethical issues that customers faced with AI interactions. In this paper, we look deeper into those issues to understand how the customer experience and regulatory picture has evolved, to gauge what progress is being made since then (see Figure 10).

The findings reveal that little progress has been made. For example, in 2019, 76% of customers believed that organizations are being transparent about their use of customer data. However, this perception has declined, with only 62% currently saying that organizations are transparent in this area.

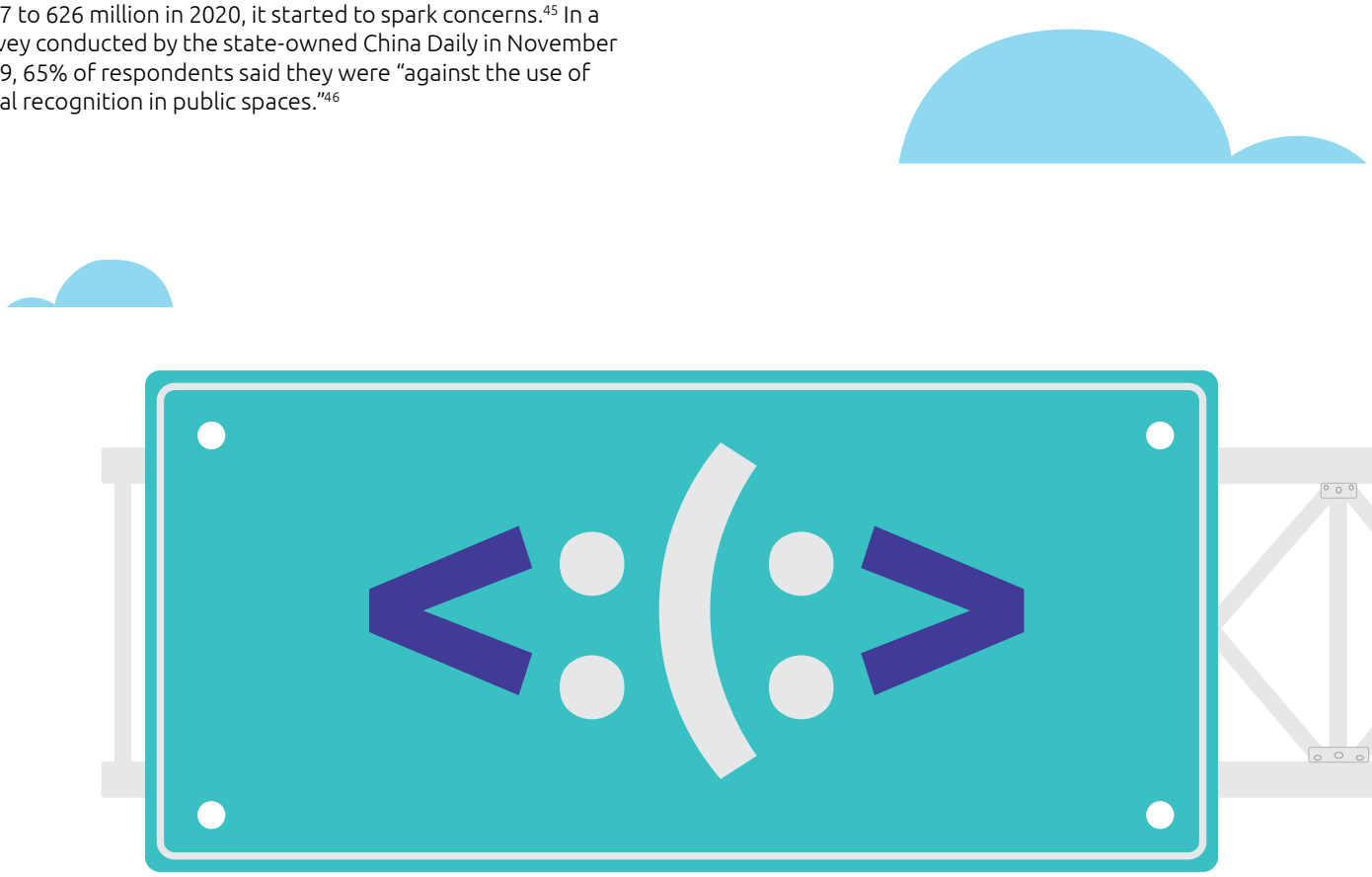


Figure 10. Customer perceptions – and evolving regulatory guidelines – on emerging ethical AI issues

Top ethical issues emerging from AI faced by customers (2019)	Current customer perceptions or evolving regulatory guidelines around these issues
Processing personal data in AI algorithms for purposes other than for which it was collected	**Customers' expectations of transparency have increased** The number of customers who believe that organizations are being fully transparent about how they use customer data has fallen from 76% in 2019 to 62% in 2020.
Collecting and processing personal data in AI algorithms without consent	**Customers believe organizations are informing them less when collecting data** The number of customers who feel that organizations inform them when they are accessing personal data at every stage of interaction has fallen from 72% in 2019 to 62% in 2020.
Reliance on machine-led decisions without disclosure	**Customers expect more clarity on AI decisions** The percentage of customers who believe that organizations inform them about how AI arrived at a decision that affects them has dropped from 77% in 2019 to 62% in 2020, pointing to increased customer expectations for more clarity from AI decisions and growing complexity of AI models impacting transparency in decisions at the same time.
Data privacy: Collection and use of personal data, such as biometrics, by an AI system	Along the lines of the GDPR, data privacy laws are coming up from different US states. California's data privacy law came into effect during July 2020,[47] while Nevada's data privacy law came into effect in October 2019.[48]
Biased/unclear recommendations from an AI-based system for diagnosis/care/treatment	Explainability in healthcare is gaining importance: the FDA's proposals for regulation of AI-enabled medical devices makes the explainability of the AI/ML solutions used in healthcare assessment compulsory.[49]
Use of facial recognition technologies by police forces for mass surveillance	Amazon suspends police forces' use of its facial recognition technology until ethical rules for facial recognition are established by government.[50]

Source: Capgemini Research Institute Ethics in AI customer survey, March–May 2020, N=2900; Ethics in AI customer survey, April–May 2019, N=5,415.

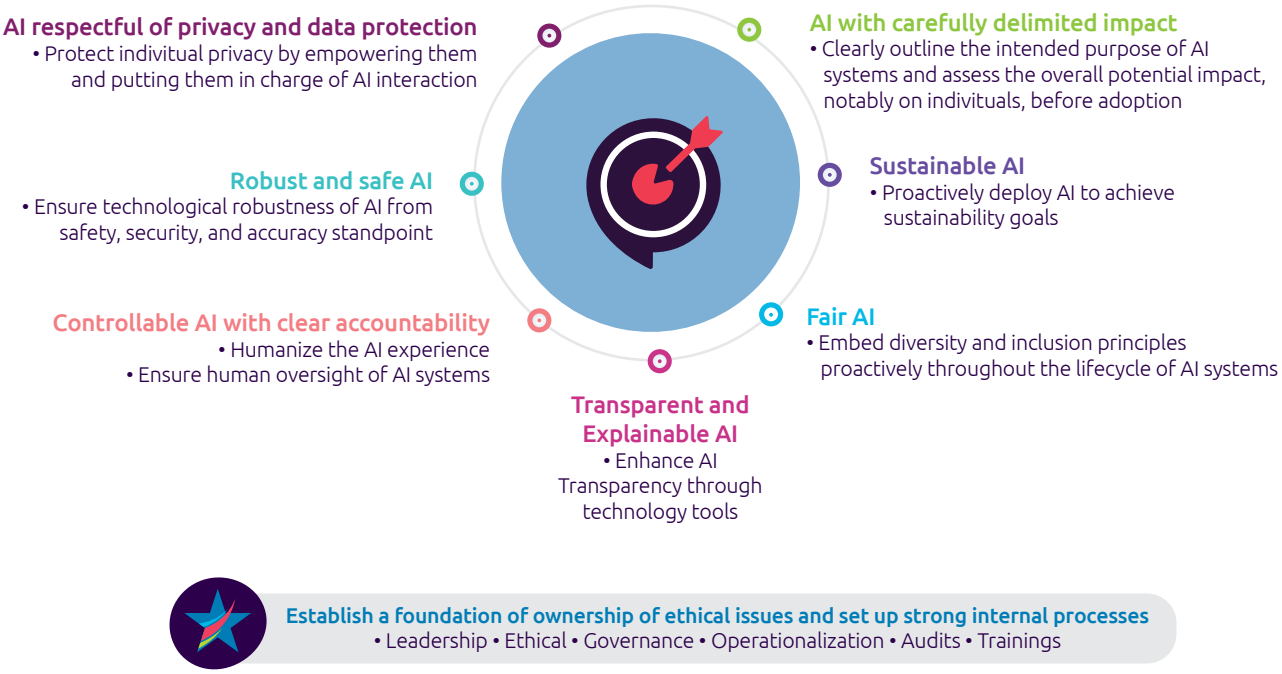
How can organizations move to ethically robust AI systems?

From our discussions with industry leaders, experts, and academia, and from our experience of working on AI issues with large, global clients, we believe that organizations can devise and deploy ethically robust AI by taking a set of actions pertaining to each of the seven key dimensions of ethical AI, which is underpinned by a strong foundation of leadership, governance, and internal practices (see Figure 11). The seven key dimensions of ethical AI are derived from the seven principles for ethical AI as defined by the European Commission (see "What do we mean by Ethics in AI?").

The seven key actions are:

1. Clearly outline the intended purpose of AI systems and assess its overall potential impact.
2. Proactively deploy AI to achieve sustainability goals.
3. Embed diversity and inclusion principles proactively throughout the lifecycle of AI systems.
4. Enhance transparency with the help of technology tools.
5. Humanize the AI experience and ensure human oversight of AI systems.
6. Ensure technological robustness of AI systems.
7. Empower customers with privacy controls to put them in charge of AI interactions.

Figure 11. A framework to build and use ethically robust AI systems



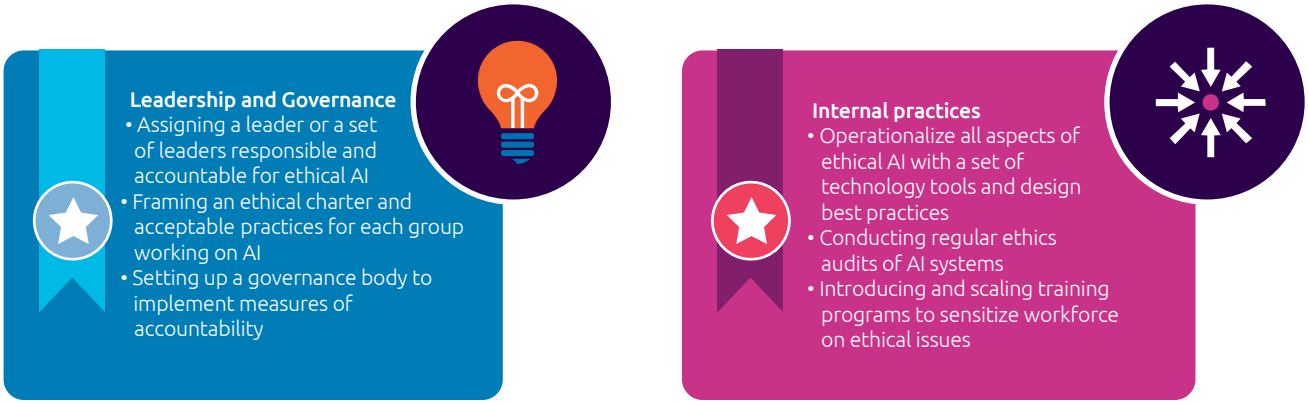
Source: Capgemini Research Institute Analysis.

Establish a foundation of ownership of ethical issues and set up strong internal processes

"We have prioritized the topic of Digital Trust including security, privacy, ethics, compliance, reliability and explainability, so that we can continue advancing AI and other digital technologies at pace but do so responsibly. We are monitoring the regulations and policies in this area, but recognize that these take time to emerge and that industry needs to take action meantime. We are continually revising our internal processes around risk management, testing and validation, data anonymization etc, and we translate policies into executable instructions and guidelines as they become ready" – Lilybeth Go, IT director for Artificial Intelligence at BP

A series of steps can help organizations establish strong internal structures and processes for ethical AI (see Figure 12):

Figure 12. Laying down a strong organizational foundation for ethics in AII



Source: Capgemini Research Institute Analysis.

a. Assign a leader responsible and accountable for ethical AI. As we saw earlier, only 54% of organizations have a leader who is responsible for AI systems ethics, such as a Chief Ethics Officer. It is crucial to establish leadership at the top to ensure these issues receive due priority. You also need to make leaders in business and technology functions fully accountable for the ethical outcomes of AI applications. This responsibility is often either not defined at all or loosely defined, which translates to ethics being neglected.

b. Frame a comprehensive ethical charter or code of conduct for defining AI purpose, development, and use. Ensure that your organization's values and purpose are at the heart of this charter. This code of conduct is a vision document for your entire organization to look up to – and take inspiration from – before designing any system. It should become a must-read document for all employees, especially those involved in the design, development, and use of AI. Once a charter is in place, it is important to translate the charter into acceptable practices for each group of stakeholders. For instance, teams handling data collection for training AI systems must be made responsible for ensuring that they follow ethical practices e.g., respecting customers' privacy, consent, autonomy, as well as ensuring that it is not biased for or against any particular group of customers. Rolls-Royce recently published its AI ethics framework and a checking system to ensure that the outcomes of AI systems can be trusted. This framework and its trust process have been peer-reviewed by subject matter experts from technology companies, academia, government, and other sectors.[51]

While there are no universal guidelines for ethical AI yet, several important guidelines have been published in the last year:

- The European Commission's ethics guidelines for trustworthy AI,[52] and a detailed whitepaper on AI[53]
- The German Data Ethics Commission's opinion on general ethical and legal principles concerning AI and algorithms[54]
- The Alan Turing Institute's report on understanding AI ethics and safety[55]
- The OECD's recommendations for 36 countries.[56]

These guidelines offer valuable resources to all organizations globally to ensure their AI systems are robust from all dimensions – technology, impact on society, and environment among others. A comprehensive publication by the Berkman Klein Center for Internet & Society at Harvard University outlines 47 ethical principles under eight high-level themes, which provide a good starting point for building awareness and understanding of ethics principles for AI.[57]

c. Set up a governance body to implement measures of accountability to give customers and employees the means to raise any concerns with AI systems through ombudsmen, grievance redressal authorities, and regulators. In addition, organizations must give employees the means to highlight issues with AI that is under development or in use. It includes creating internal hotlines and channels where employees can raise potential issues with AI systems. This body must also take ownership of conducting regular trainings of the workforce and partners, and manage effective communications with customers, on ethics-related issues.

d. Operationalize all aspects of ethical AI with a set of technology tools and design best practices to ensure the code of conduct becomes an actual reality in the way your organization designs, builds, deploys, monitors and uses AI models. Unless your teams are equipped with tangible tools and methods they can use to actually implement an ethical approach to AI, the code of conduct will only yield to anecdotal actions based on goodwill.

Cloud platform vendors, niche providers, and open-source communities and have made available various tools, libraries and frameworks for ethical AI. Just as for your database engines and front-end development frameworks, these tools must be part of the capabilities that development and operations teams know, master and use daily. Requirements associated with ethical AI also must be part of the non-functional requirements of any AI-based application, to make sure the ethical principles are enforced, and clear responsibility is ensured.

e. Ensure that ethics audits are conducted at key stages of AI development lifecycle and at regular intervals thereafter to ensure no unethical outcomes go unnoticed.

i. Deploy AI ethics flying squads – agile and cross-functional, "vigilance" teams who conduct audits of AI applications for adherence with ethical AI principles. The squad can potentially include senior AI architects, domain and functional experts, and ethics experts, who deeply review an AI project's purpose, business processes and their implementation, typically in a span of a week or two depending on scope. These squads can be deployed at various stages of an AI system lifecycle, e.g., in its proposal stage, before initial development or during its deployment. They fill a crucial gap when leadership, governance, and/or accountability measures are still at a nascent stage or non-existent.

ii. Ensure that the pre-trained or plug-and-play AI models are suitable for use in the organization's specific context. The limits of their functioning must also be clearly understood before deploying them.

Auditing an AI system should not only focus on its deployment and use but also on decisions that are made while designing it – what those were, who made them, and for what reasons. Steven Umbrello from the Institute for the Ethics and Emerging Technology suggests the importance of auditing from a design perspective: *"You need to be able to trace every AI design decision right from pre-design phase all the way to deployment of the system. Along with that, we also have to track the relevant moral reasons for the variables along this design history."*

e. Introduce and scale training programs to sensitize the workforce on ethical issues. Our 2019 survey found that the lack of relevant training for developers building AI systems was one of the top five organizational reasons for bias, ethical concerns, or lack of transparency in AI systems. Organizations must invest in building skills and educational resources necessary to upskill not only AI developers, but also users and general management groups to be more mindful of ethical issues in AI. More specific and formal training programs such as those related to data bias, cognitive biases, value-sensitive design or human-centered design should be instated according to the role of designers and developers in building AI systems. For example, Google recently trained more than 5,000 of its customer-facing cloud workforce on ethical AI.[58]

I. AI with carefully delimited impact: Clearly outline the intended purpose of AI systems and assess its overall potential impact

The very first and fundamental ethical question to be considered is the intended purpose of the AI system and its impact on humans. Like with any general-purpose technology, AI solutions can both enable and negatively affect human fundamental rights. Hence, it is paramount to clearly lay out the intended purpose of an AI system – what the AI system will deliver, for whom, and to whom – and the AI system should then be used accordingly.

To this end, organizations must ensure that:

a. The intended purpose of the AI system is beneficial. The core idea driving an AI system must foremost be to benefit or improve the lives of humans, and neither aggravate existing harm nor create new harm for them. In this respect, every AI system must be conceptualized with respect for universal fundamental rights, and in particular, the Universal Declaration of Human Rights and the UN Global Compact. According to Steven Umbrello, managing director for the Institute for Ethics and Emerging Technology, a value-sensitive design approach is key to ensure AI systems are grounded in human values. He says: *"Technology in general, and AI in particular, is not value-neutral. The design decisions that are taken while developing AI impart certain values to AI whether we want them to or not. The key is to bridge the gap between high-level principles and design of AI systems. If AI systems are designed in a way that incentivize only certain economic values such as profit maximization and have no consideration for human values such as empathy, it will be no surprise to see that the outcomes of such AI systems will lack a human connection."*

You need to be able to trace every AI design decision right from pre-design phase all the way to deployment of the system. Along with that, we also have to track the relevant moral reasons for the variables along this design history.

Steven Umbrello, managing director for the Institute for Ethics and Emerging Technology

b. They are transparent about the intended purpose with all stakeholders. The clarity of the intended purpose must be supported by communicating it to various stakeholders externally as well as internally within the organization. Externally, this should involve individuals for whom the system is being developed – vendors, partners, contractors, and regulatory and government bodies, as needed. Internally, the leaders overseeing AI implementations – development teams, functional teams such as sales and marketing, and risk and compliance, should have complete knowledge of the purpose.

c. They identify and prevent potential accidental or malicious misuse. As a fast-emerging technology, the higher-order effects of AI (e.g., the socio-economic effects) are only now becoming apparent. Hence, it is absolutely essential to assess the overall impact of AI – the likely benefits as well as foreseeable risks in its implementation – before adopting it. In situations where there is any doubt about a potential risk of affecting fundamental rights, a fundamental-rights impact assessment must be undertaken to ensure that such a risk is eliminated.

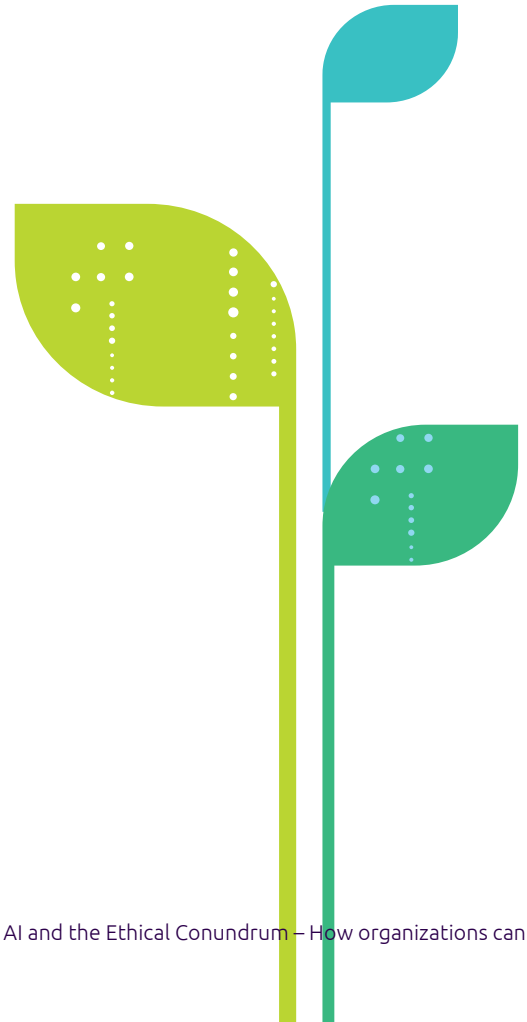
II. Sustainable AI: Proactively deploy AI to achieve sustainability goals throughout the value chain

AI is a transformational technology with the power to positively influence sustainable development. The world is facing mammoth challenges with regards to the environment, biodiversity loss, unsafe levels of air pollution and resource scarcity. Particularly concerning is the climate crisis – rises in the Earth's temperature, melting of ice caps, extreme weather events such as wildfires, hurricanes, and flash floods. Here the advances in AI can serve as an enabler for achieving sustainable goals faster. For instance, sustainable AI solutions are expected to improve global productivity, equality and inclusion, environmental outcomes such as reducing pollution, and organizations' climate footprint among others, both in the short and long-term.

Leading organizations that possess the AI capabilities, a wealth of data, and a clear corporate purpose for sustainability, can apply AI to achieve sustainable goals throughout their value chain. Steven Umbrello outlines how its team used an AI design approach that is focused on the greater good: "We want to promote AI for doing good. The design requirements should operationalize AI not only to avoid doing harm but also to actively do good. For that, we use the UN Sustainable Development Goals as one of the higher-level sources of values for designing artificial intelligence." Examples of using AI for sustainability include:

1. Organizations are using AI being used to mitigate the adverse impact of climate change on their operations and vice versa. For instance, in power generation. Electricity systems contribute about a fourth of greenhouse gas emissions every year. Machine learning-based systems have found applications in mitigating emissions from power plants running on fossil fuels, and from transportation of fuels.[59] Bosch used AI to predict future energy consumption, avoid high peaking loads, and adjust its patterns of consumption. It was able to cut emissions from one of its plants by 10% in two years.[60] AI has also been successfully used in predicting water demand and chances of drought in Southern California, saving around $5 million for the utility.[61]
2. AI can also help in ecological conservation. For instance, Sveaskog – Sweden's largest forest owner – has used AI and satellite imagery to quickly and accurately identify forest areas affected by ravenous spruce bark beetles and to prevent them from spreading.[62] In another example, farmers can use AI tools to determine farming patterns and get tailor-made advice to optimize crop production.[63]

Furthermore, AI cannot support a sustainable future if it is not itself sustainable by design. In this respect, the carbon footprint of AI itself must be considered right from the ideation stage as several large deep-learning-based AI models have been found to have a sizeable carbon footprint.[64]



III. Fair AI: Embed diversity and inclusion principles throughout the lifecycle of AI systems

a. Build diverse teams for developing, deploying and overseeing AI algorithms, drawing from a variety of racial, gender, educational, and demographic backgrounds. A recent research published by the AI Now Institute, estimates that only 18% of authors at some of the biggest AI conferences are women.[65] It also highlights links between the lack of diversity in the current AI industry and the discriminatory behavior of AI systems. Salesforce, the US cloud-based software company, is committed to building a workforce that reflects society. They recently appointed Tony Prophet as the chief equality officer[66] and have been reporting their diversity data annually.[67]

You cannot opt out of financial lending models or credit scoring. You cannot easily opt out of online advertising. Same with models built by insurance companies, or models used in the justice system.

Cynthia D Rudin, Professor of Computer Science at Duke University

Salesforce claims to have 44% of its US workforce as made up of made up of underrepresented groups (women, black, latinx, indigenous, multiracial, LGBTQ+, people with disabilities, and veterans), and 23.5% of women in its tech workforce globally. In addition to diversity in people, diversity in discipline must be encouraged – that of different viewpoints, educational backgrounds, and perspectives, to come together seamlessly during AI design to ingrain sensitivity in AI systems.

b. Screen the data used to train the AI system for bias. One indication of existence of bias is high correlation of output variables with demographic variables (e.g. race, gender, age, etc.). IBM's AI Fairness 360 is an open source library in Python programming language, encompassing several techniques for evaluation of fairness, and identification and correction of bias.[68] FairML is a Python toolbox for auditing machine learning models for bias.[69] Organizations have an opportunity to proactively correct bias in datasets by focusing on the training data. Defining what is fair and ethical and programming the algorithms as per the definition helps in controlling historical inadequacies and human bias.

Organizations must also account for demographic testing of AI. The objective here must be to identify which segments of customers or groups of population might be adversely affected by the outcomes of your AI application, in case there are large variations in accuracy and reliability of outcomes. Use this step to also ensure that AI outcomes do not drastically change for different input conditions or user cohorts.

IV. Transparent and explainable AI: Enhance transparency with the help of technology tools

As organizations have made least progress on transparency, it should be the core point of focus among all other ethical dimensions and they should leverage cutting-edge technology tools. Although the use of technology tools to identify and combat ethical issues in AI is on the rise, only 43% of organizations currently use them compared to 36% in 2019. Recent research initiatives have led to the development of several tools that support transparent and explainable AI.

Simple outcome explainability is now provided by the vast majority of machine learning frameworks, based on the LIME or SHAP concepts. Large cloud vendors such as Amazon, Microsoft and Google provide explainable AI-as-a-service. Specialized vendors such Dataiku and DataRobot have also extended their tools to provide explanations on outcomes. Third-party tools such as Cognitive Scale's Certifai can provide explanations on top of third-party libraries.

One step beyond is "whole model" explainability, which is provided by Microsoft's InterpretML library, as well as other classes of models such as decision trees, ML-generated rules and the likes of Adaptive Explainable Neural Networks. Further progress is expected in this area due to the expected increase of regulations on model management and transparency, especially for critical decisions.

Google's "model cards" is a good example of a tool that helps enhancing global transparency of AI models, beyond the model structure and its outcomes.[70] Model cards provide a benchmarked evaluation of an AI model under various conditions. It is designed to give a detailed look into the origin of the model, its use, limitations, which can benefit developers, users, and regulators.

Consumers are only now becoming aware of some of the impacts of AI. But when data is being collected, in particular, for example, when building their credit profile or purchase history, most consumers do not yet fully realize how deeply that data is being utilized on the back end for various purposes.

Pam Dixon, Executive Director of World Privacy Forum

V. Controllable AI with clear accountability: Humanize the AI experience and ensure human oversight of AI systems

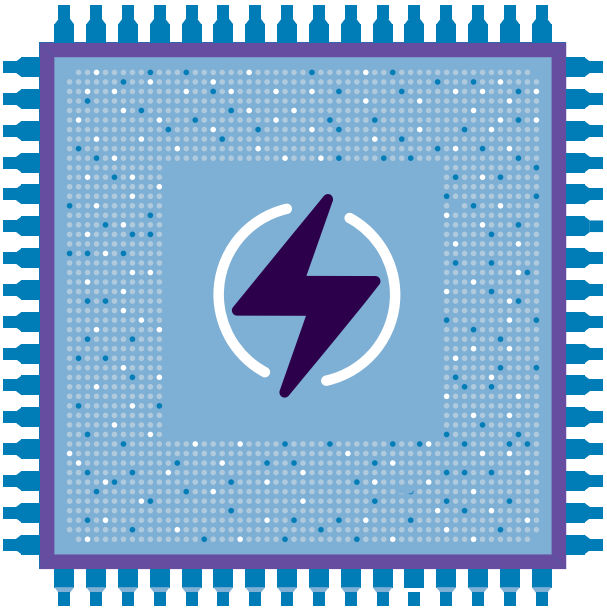
Many issues can be avoided by introducing humans to take over when issues emerge (or better yet, when there are early signs of any imminent ethical issues, before they cause any problem). For instance, with Google's "Duplex" – a voice assistant service that allows customers to book reservations with salons, restaurants, etc. – about 25% of the calls start with a call center-based human agent, and 15% of the calls that begin with the virtual assistant have a human intervention at some point.[71] In our 2020 executive survey, only 22% of organizations said that they maintain significant human oversight of AI systems at an appropriate level.

The ethics guidelines for trustworthy AI drafted by the EU High-Level Expert Group on AI lists "Human Agency and Oversight" as one of the seven requirements to be implemented and evaluated throughout the AI system's lifecycle.[72] It recommends that impact assessment exercises be undertaken before the development of AI systems to ensure they don't pose a threat to users' fundamental rights and human agency/autonomy. With respect to the human oversight, it recommends that, "Oversight may be achieved through governance mechanisms such as a human-in-the-loop (HITL), human-on-the-loop (HOTL), or human-in-command (HIC) approach."

VI. Robust and safe AI: Ensure technological robustness of AI systems

Like any tools or systems, those using AI must be fit for their intended purpose, and resilient and secure from a technical perspective. From this arises the challenge to foresee measures to safeguard against any risks, such as unlikely mishaps or malevolent intent, that might prevent the AI from delivering the desired benefits. Examining the technical robustness of AI applications is crucial to ensure:

- **Security** to protect the AI model or its data from falling into malicious hands. AI systems should be resilient to attacks and include, when feasible, fallback plans in case of failure of the AI system itself.
- **Accuracy** as clarity and consistency of AI results is a core requirement for maintaining its transparency. This also requires a trade-off between underfitting and overfitting of AI models to enable practical and beneficial application.
- **Reproducibility** as it is a key requirement of the auditability of a given AI algorithm.



A framework developed by the Center for Democracy & Technology – a Washington DC-based non-profit organization – helps designers and developers identify most of the ethical areas of concern during the design and development of AI applications.[73]

Every dataset used in AI development should be accompanied by a datasheet that documents key variables such as composition, collection process, and recommended uses. This will help AI developers to facilitate better communication with the users of the AI algorithms, such as those in sales and marketing, and help them understand the impact of AI decisions.[74] For instance, for sensor data collection in automotive for Advanced Driver Assistance Systems (ADAS), there is no clear data standard that exists that can bring uniformity in data collection and consistency in datasets. In such instances, Dataset Nutrition Labelling is a technique that can be leveraged across industries to produce standardized datasets.[75]

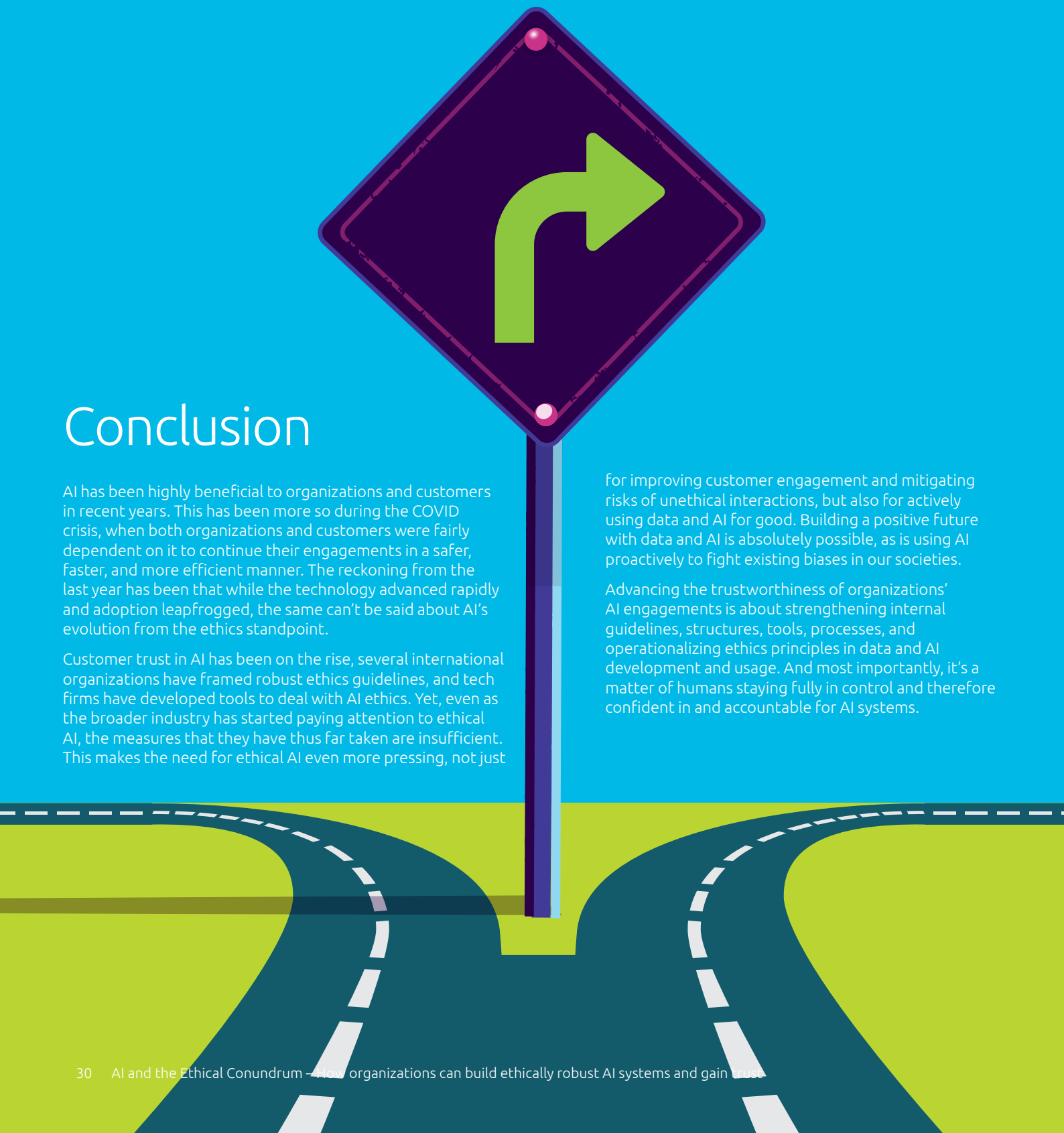
Additionally, the MLOps approach extends the DevOps practices to cover the specific requirements of AI to bring the benefits of software craftsmanship to AI: robustness, resilience, agility, manageability. Testing and monitoring are of paramount importance, as they allow checking whether AI models are behaving as expected, before go-live and after. Just like DevOps, automated testing and monitoring allow agility with rapid and low-cost updates, by providing a safety harness when pushing new models and their versions to production.

VII. AI respectful of privacy and data protection: Empower customers with privacy controls to put them in charge of AI interactions

Pam Dixon of the World Privacy Forum told us about the need for stronger data protection and privacy practices: *"Consumers are only now becoming aware of some of the impacts of AI. But when data is being collected, in particular, for example, when building their credit profile or purchase history, most consumers do not yet fully realize how deeply that data is being utilized on the back end for various purposes."* As we have seen previously, since the customer empowerment metrics have largely remained the same: ensure that your organization is fully empowering users and customers to put them in complete control of their AI interactions. The GDPR offers several best-in-class guidelines to allow customers to exercise a number of data-related tasks with regards to their personal data[76], such as the ability to:

- View/download a copy of their data
- Make changes to data that the organization has on them; or even allow users to selectively increase or decrease "weights" of individual attributes to help AI update AI output e.g., in recommendation systems to get more relevant recommendations
- See how and when their personal data is used and for what purpose
- Opt-out of the AI-based system and request a human intervention
- Have their data removed or transferred to another organization
- Make complaints of or seek clarification on any suspected data privacy breach
- Be involved during the design, development, and improvement of AI systems.

Organizations in other geographies can emulate these standards to offer superior data protection and customer empowerment. Customers in many countries, however, do not yet have the means to take control of their data privacy and algorithmic decisions made on their personal data. Cynthia D. Rudin of Duke University says: *"You cannot opt out of financial lending models or credit scoring. You cannot easily opt out of online advertising. Same with models built by insurance companies, or models used in the justice system. Even though you are subject to decisions made by those models, you have no control over them, and often, you do not even see them."* Pam Dixon of the World Privacy Forum adds: *"A feedback loop in AI is almost non-existent and building a consumer feedback loop is important. If it's not there, then it's not a mature industry."*



Conclusion

AI has been highly beneficial to organizations and customers in recent years. This has been more so during the COVID crisis, when both organizations and customers were fairly dependent on it to continue their engagements in a safer, faster, and more efficient manner. The reckoning from the last year has been that while the technology advanced rapidly and adoption leapfrogged, the same can't be said about AI's evolution from the ethics standpoint.

Customer trust in AI has been on the rise, several international organizations have framed robust ethics guidelines, and tech firms have developed tools to deal with AI ethics. Yet, even as the broader industry has started paying attention to ethical AI, the measures that they have thus far taken are insufficient. This makes the need for ethical AI even more pressing, not just for improving customer engagement and mitigating risks of unethical interactions, but also for actively using data and AI for good. Building a positive future with data and AI is absolutely possible, as is using AI proactively to fight existing biases in our societies.

Advancing the trustworthiness of organizations' AI engagements is about strengthening internal guidelines, structures, tools, processes, and operationalizing ethics principles in data and AI development and usage. And most importantly, it's a matter of humans staying fully in control and therefore confident in and accountable for AI systems.

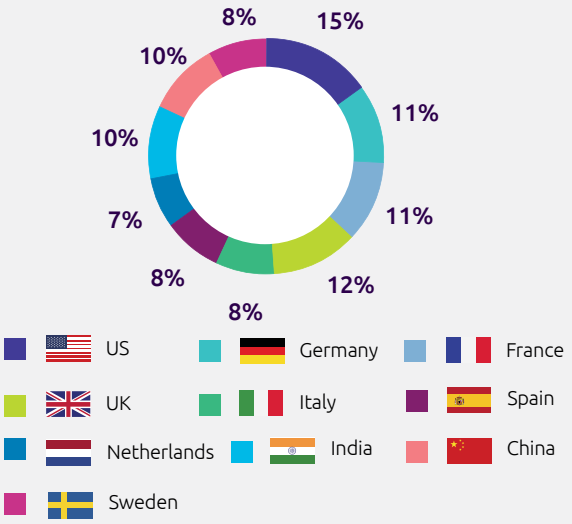
Research Methodology

We conducted a global consumer and executive survey during April–May 2020. The consumer survey polled 2,900 consumers in six countries, while the executive survey polled 884 executives in 10 countries. We compared these survey results with the 2019 consumer and executive survey data from the same countries, sectors, and functions. A detailed breakdown of these cohorts is provided below. We also conducted in-depth interviews with a number of industry executives, academics, and subject-matter experts in the area of ethics in AI, during August–September 2020.

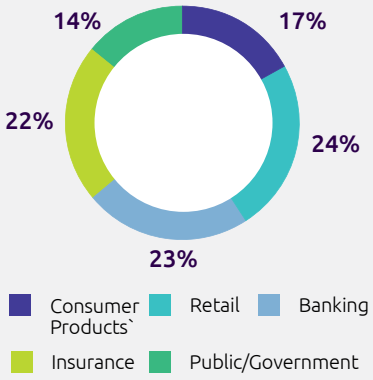
Executive survey:

- The sample size is 884 executives for 2020 and 722 for 2019
- Functions include:
  - Information technology- which includes AI developers and data scientists who are aware of their organization's AI infrastructure and engagements
  - Sales and marketing functions including customer service.

Executives by country 2020

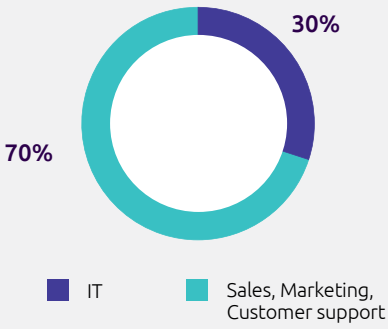


Executives by sector 2020



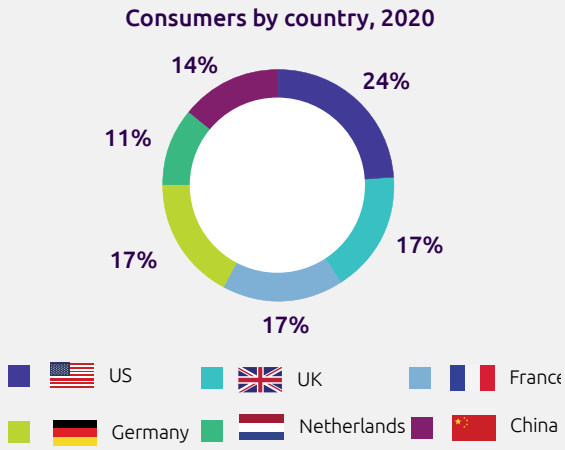
Source: N= 884

Executives by function 2020

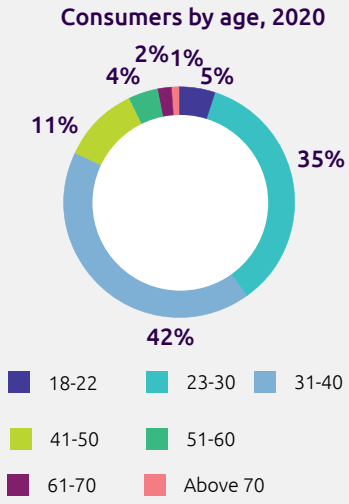


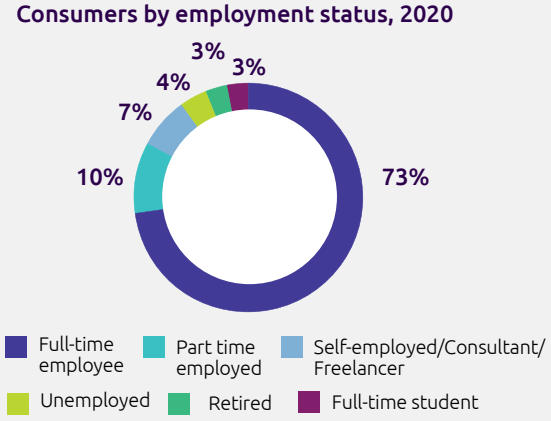
Source: N= 884

Consumer survey



Source: N= 2900 for 2020





Source: N= 2900 for 2020

Leverage AI's transformative potential with Capgemini

Perform AI

Activate data, Augment intelligence, Amplify outcomes

Artificial Intelligence (AI) has crossed the threshold of pilots, proofs of concept and entered into the scale market. 53% of organizations have scaled AI but only 13% overall have rolled out multiple AI applications across numerous teams.[1]

Perform AI, Capgemini's comprehensive portfolio of strategic and operational services, means your organization can use AI at scale. By activating data, you can turn it into insights, decisions and actions, which will augment your human intelligence, and amplify the business outcomes you expect.

Data & AI for trusted business outcomes

Leading organizations are today already leveraging the transformative power of Data and AI to amplify business outcomes like designing and launching new products, services, business models, even going after new markets. It's also finding efficiencies, optimizing processes and reducing costs. Perform AI teams have a proven track record of globally delivering tangible business outcomes at scale across industries and sectors:

- **Increased sales:** Organizations successfully scaling AI have seen more than a 25% increase in sales of traditional products and services.
- **Faster customer insights:** Some of our global consumer products clients, get customer insights that have double the impact in half the time for half the cost.
- **Better customer service:** For one of the world's largest biotech companies, our award-winning (link to the actual award - to follow) virtual assistants are able to automate and make outbound telephone calls in 24 languages.
- **Operational excellence:** For a leading maker of packaging and paper, our AI deployment has reduced its cost of handling queries by 90% per query, and 40% overall.
- **Cost savings:** For a major international retailer, our AI-powered solution to optimize sales forecasting made it 8% more accurate, translating into €100m of inventory costs savings.
- **Fraud detection:** For a European government agency, our AI-powered fraud detection systems have already delivered a 10x return on investment.

The right team to scale Data & AI

With 25,000 Data AI at scale practitioners of Capgemini's 270,000 people, for more than 800 clients worldwide, supported through AI Centres of Excellence in all regions, our capabilities are unmatched. We show clients what's possible with AI, not just in data science, but end-to-end, from strategy, design, through to build, deployment and operations, in order to create real, trusted business value.

Do good with Data & AI

Because we are convinced about the transformative potential of Data & AI to build positive futures for humans and society, we partner with you to leverage Data & AI in an ethics by design and human-centered way. We partner with your teams to develop the right data and AI powered leadership, mindset, culture and ways of working that fits your organization's values.

We help you balance operational excellence with business innovation to be resilient to current and future crisis, to overperform in your market and protect your workforce.

It's time to shift gears, scale trusted Data & AI solutions, and take your business to the next level.

[1] See our report *The AI-powered enterprise: Unlocking the potential of AI at scale.*

Capgemini Perform AI

Capgemini Group Portfolio to deliver value for business outcomes with Trusted Data & AI at scale

CP & Retail	Public Sector	Manufacturing, Automotive & LS	Telco Media Tech	Energy Utilities & Chemicals	Financial Services & Insurance
Augmented operations and immersive customer engagement	Infusing AI to better serve citizens and governments	Augmented operations for operational efficiency & risk reduction	Deep Customer Engagement and Operational Excellence	Sustainability powered by Data & AI and Operational Excellence	Right Product, Right Price

Data & AI for

Immersive Customer Experience	Risk, Fraud, Trust And Compliance	Intelligent Corporate Operations	Intelligent Industry	Augmented Work force & Org	New services, New markets, cross-sectors

Intelligent Applications for the Intelligent & Resilient Enterprise

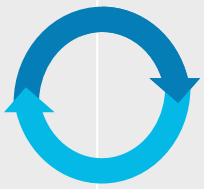
Strategy

AI Activate

Transformation Target and foundations for execution of AI @Scale

AI Reimagine

Disrupt, Invent and Implement "the next" business, "AI First"



Build, Deploy, Manage, Operate

AI, Analytics Data Science & 890

Scalable, Trusted AI and Augmented BI & Data Viz solutions

Intelligent Process Automation

Intelligent Automation for human & machine collaboration

AI & Data Engineering

Hybrid Cloud Technology platforms for Trusted Data & AI @Scale transformation

 Privacy  Trust & Ethics  Security  Sustainability

Capgemini Invent

A preferred partner to help you solve ethical and trust challenges using AI and data.

Value proposition and approach

Our Invent for Society “Developing trust in an intelligent world” pillar is all about pioneering trustworthy AI technology solutions including championing unbiased data sets that deliver a positive impact on society. Have a look to our dedicated “TRUST” presentation

Why us ?

As a globally renowned technology and digital leader, Capgemini inherits the responsibility, the ambition, and the means to contribute to solving major societal questions that shape our world – and at Capgemini Invent we are contributing to making this ambition a reality. Invent for Society showcases how social impact is part of the fabric of what we do for our clients every day. For more information, please visit our Invent for society page

Want to know more about what we can do for you ?

Please contact

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Capgemini's Solutions and Tools for Ethical AI

I. Sustainable AI:

Capgemini is deeply engaged to harness AI for a sustainable economic growth. Sustainable AI is based on 3 pillars:

1. Building GreenAI for our clients by implementing the most resource efficient solutions and driving immediate mitigating strategies for energy consumption and carbon emissions.
2. AI for a positive impact on climate change by becoming an AI climate champion. AI for tackling climate change is evolving rapidly and playing an important role in scaling sustainability solutions, by bringing together AI capabilities, wealth of data, to drive your sustainability strategy.
3. The proliferation of artificial intelligence (AI) is having a significant impact on society, changing the way we work, live and interact. As AI technologies become increasingly prevalent in the workplace, our goal is to place workforce well-being at the center of this technological change and resulting metamorphosis in work, well-being, and society. For instance, in ensuring that the introduction of AI technologies goes hand-in-hand with a commitment to workforce well-being.

II. Fair AI:

Sogeti's **Artificial Data Amplifier (ADA),** an AI-driven synthetic data generating solution, aids in combating and mitigating bias by generating synthetic data that can rebalance the original dataset, providing a more fair representation of minority groups in the data. (Sogeti.com/ADA)

Another tool developed by Capgemini, **SAIA – Sustainable Artificial Intelligence Assistance,** helps prevent discrimination and make AI decisions transparent throughout the AI lifecycle. It identifies potential biases and analyzes bias behavior. It also provides recommendations on ways to correct algorithm biases and simulates the impact of these corrections.

III. Robust and Safe AI:

Glassbox leverages open source libraries to check data sufficiency, quality, validates AI models against preset industry benchmarks, and measures a model's resilience towards perturbations in inputs. Reports generated by the solution can help developers and users of AI fine-tune their models for accuracy, recalibrate them for new environments, and retrain them for new features and algorithms, thereby improving their resiliency.

IV. AI respectful of privacy and data protection:

Sogeti's **Artificial Data Amplifier (ADA)**, an AI-driven synthetic data generating solution, in addition to advancing fairness in AI allows companies to protect data and comply with legislative policies. With ADA, synthetic data is generated without containing any personal, private, or confidential information while retaining underlying relationships and structures of the authentic data. This ensures that the synthetic data is interchangeable with the real data and can be used in various applications such as credit scoring models. (Sogeti.com/ADA)

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Anne-Laure leads Perform AI, Capgemini's Artificial Intelligence & Analytics group offer. She works with clients to scale Artificial Intelligence so it infuses everything they do, and they become AI-driven, data-centric and innovative. With 20 years of experience in big data, analytics and AI systems, from design to production roll-out, her passion is to bring companies what they need to transform themselves into intelligent enterprises. Anne-Laure is committed to guiding clients to increase activating their data, while cultivating the values of trust, privacy and fairness. This is the foundation on which technology, business transformation and governance come together, to leverage the positive business outcomes of AI.

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Anne-Violaine is Capgemini's Group Ethics Officer: Building on the company's commitment to its 7 core Values, she is responsible for developing a sustainable ethical culture. She leads Capgemini's Ethics program and supervises the worldwide network of Ethics Officers. Her topics include the SpeakUp ethics helpline and the development of a Code of Ethics for AI. Capgemini is among the World's Most Ethical Companies® as recognized by the Ethisphere Institute in 2020.

Before taking on this role in 2018, she was a member of Group Corporate Social Responsibility board, responsible for the first 3 Integrated Reports. Since she joined Capgemini in 1995, Anne-Violaine has held various executive positions in the finance, corporate, and operational functions.

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Ashwin is global head of Industrialization for Capgemini Group. In addition, Ashwin is also Capgemini India CEO. In his role as Head of Automation, he is responsible for developing new frameworks, methods, tools and solutions leveraging AI and emerging technologies for intelligent automation. In this role, he drives improvement of productivity, effectiveness and quality of Capgemini services and enables clients in improving the efficiency and reliability of their operations and processes. Ashwin has more than 25 years of industry experience in various enterprise applications and new generation technologies and worked internally with several large Fortune 500 companies.

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Yannick has been working in IT and Data science for over 20 years. From his past experience, he has built a broad outlook on solving business problems with innovative technologies. He is convinced that the combined use of Data Science and Machine Learning along with sound software engineering is the new disruptive force for businesses and communities. After having founded a fintech startup applying data science to combating financial crime, Yannick has joined Capgemini in 2019. He is helping Capgemini's clients to scale AI while basing

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Isabelle leads the Data Privacy & Ethics offer. She has helped many clients with privacy and GDPR operational transformation, alongside its related topics around security and data management, in various sectors such as Financial Services, Oil & Gas, Industry, Customer Product and Citizen Services. She has then focused on how to make privacy respectful AI and more generally on how to build a trusted, ethical and sustainable AI.

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The Capgemini Research Institute is Capgemini's in-house think tank on all things digital. The Institute publishes research on the impact of digital technologies on large traditional businesses. The team draws on the worldwide network of Capgemini experts and works closely with academic and technology partners. The Institute has dedicated research centers in India, the United Kingdom, the United States, and Singapore. It was recently ranked Top 1 in the world for the quality of its research by independent analysts.
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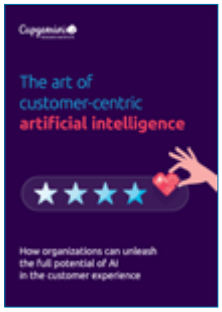

The Art of customer centric Artificial Intelligence
Raising the bar in customer experience

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Conversations
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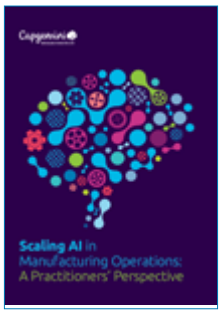

Scaling AI in Manufacturing Operations:
A Practitioners' Perspective

Emerging technologies in sports
Reimagining the fan experience

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How can auto manufacturers provide a superior in-car voice experience

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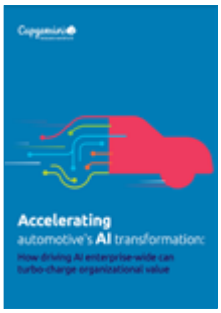
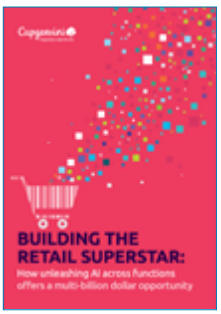
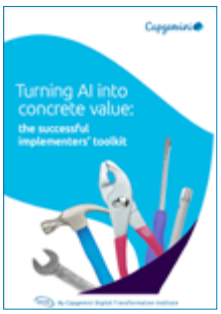


Accelerating Automotive's AI Transformation: How driving AI enterprise-wide can turbo-charge
organization value



Building the Retail Superstar
How unleashing AI across functions offers a multi-billion dollar opportunity



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