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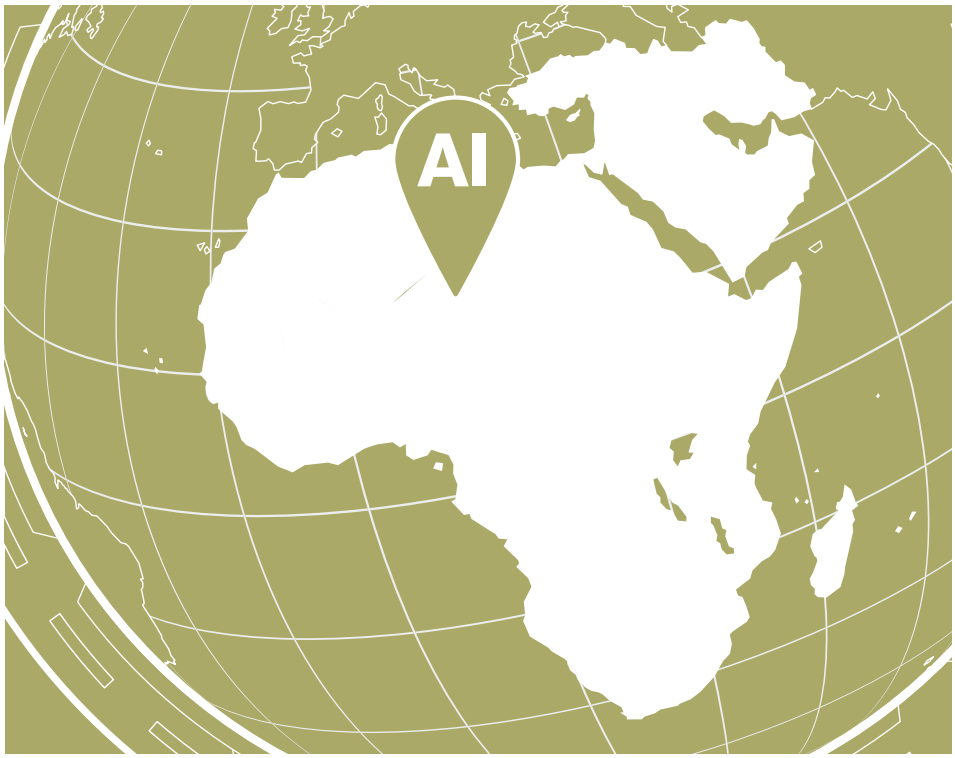
Trends in AI adoption, leading use cases, challenges, and the future of data sharing in the Middle East and Africa

The global AI agenda series

The global AI agenda: The Middle East and Africa



The Middle East and Africa are unique settings for AI, compared to Western regions—and to each other. The wealthier Gulf Cooperation Council (GCC) nations are exploring AI as part of broad economic transformation plans to wean themselves from oil and reinvest surpluses into innovation, while in Africa, above and below the Sahara, AI efforts are more bottom-up, often through partnerships with global tech companies and local startups, tackling social challenges including health care and food security.

In the richer Gulf nations, AI is now part of national development plans, including Saudi Arabia's Vision 2030 initiative. The country has assembled institutional supports as well, forming an intellectual property agency in 2017 and opening a National Centre for AI, an AI regulator, a National Data Management Office, and delivering its first AI college.

The country is also an investor in AI-driven tech companies through its stake in the Softbank Vision Fund and outlays through the national public investment agency, including into Uber, Facebook, IBM, and Cisco. The neighboring United Arab Emirates (UAE) has positioned itself as a digital innovation hub for public services and plans to use blockchain technology for 50% of government transactions by 2021.

Africa's dynamics are different, with innovation driven by bottom-up efforts especially in health care and logistics, where home-grown innovators are tailoring technologies to solve local problems. Examples include natural language processing—Africa accounts for 30% of the world's languages—and image recognition for wildlife conservation.[1] Agriculture has also been a major focus as the region seeks to improve food security by increasing yield. The operational landscape is hard and local companies are well-adapted to it; one commentator likens big US tech companies to F-16 fighter planes that are highly efficient but need perfect conditions to take off, contrasted with African companies as MiGs, which can take off anywhere and don't require the same maintenance.[2]

This regional summary explores how executives in the Middle East and Africa see AI and its benefits, based on an MIT Technology Review Insights global survey of 1,004 senior executives worldwide. The headline findings show strong engagement with AI adoption, solid returns on investments so far, and projected increases in utilization going forward, with customer services, logistics, and fraud being the key uses cases. Challenges include a lack of data scientists and limited engagement so far in data sharing.

An AI-engaged region

The survey shows widespread AI adoption, with 82% of large companies across the region having launched AI programs by the end of 2019. While the speed of adoption slightly lags other regions, a quarter of survey respondents expect AI to power more than 30% of their business processes in three years' time.

The region's prominent businesses have been early AI adopters and are now creating industry-leading use cases. According to Dirk Jungnickel, senior vice president, enterprise analytics, digital, and innovation at Emirates Group, early attempts taken by his company in 2015 and 2016 to build AI capabilities did not make it beyond the proof of concept or pilot stage. That began to change in mid-2018 when, he says, the firm began to "operationalize" AI development efforts and "industrialize data science."

About The global AI agenda

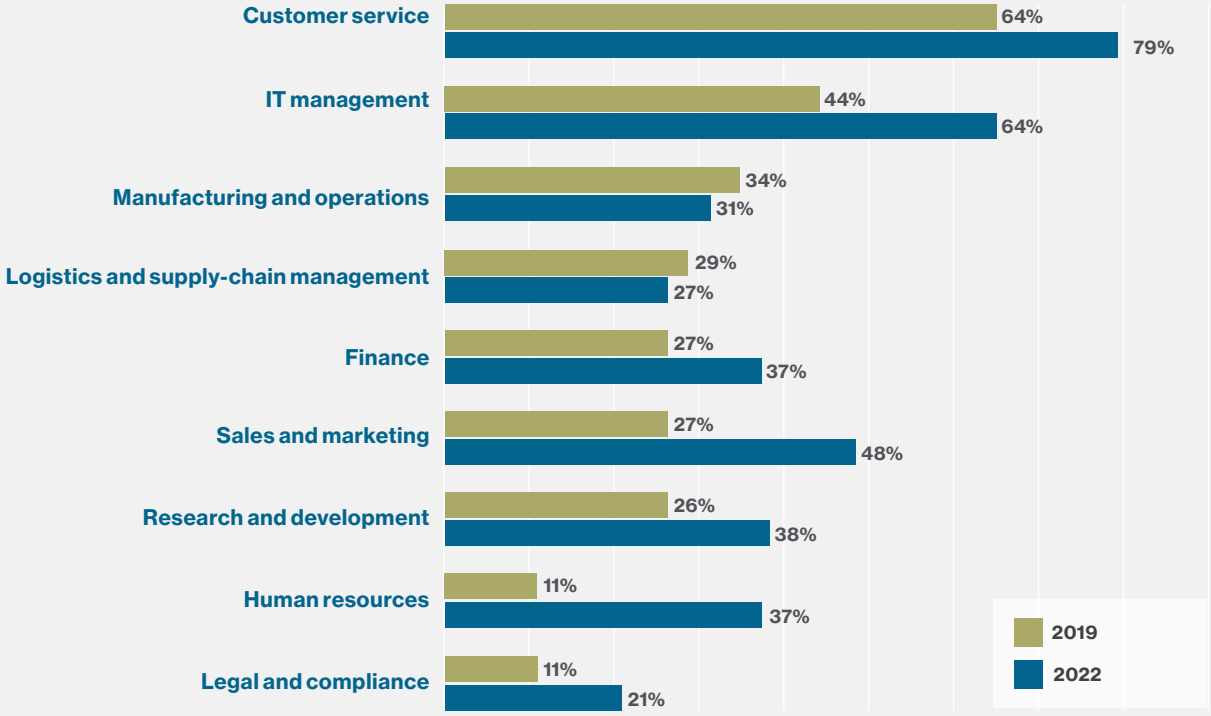
This report is part of "The global AI agenda," a thought leadership program by MIT Technology Review Insights examining how organizations are using AI today and planning to do so in the future. Featuring a global survey of 1,004 AI experts conducted in January and February 2020, it explores AI adoption, leading use cases, benefits, and challenges, and seeks to understand how organizations might share data with each other to develop new business models, products, and services in the years ahead.

The respondents are evenly distributed globally, with 20% based in each of North America, Europe, Asia, Latin America, and the Middle East and Africa. Some 26% of respondents are C-level executives, 30% are directors, 16% heads of AI, and 10% heads of data or analytics. Over half (55%) of the organizations they represent are large, earning annual revenue of $1 billion or more; nearly one-third (32%) generate revenue of $5 billion or more.

Of the 11 sectors represented, the largest contingents come from manufacturing (15%), IT and telecommunications (14%), consumer goods and retail (13%), financial services (11%), and pharma and health care (10%). The other sectors in the survey are professional services, energy and utilities, transport and logistics, travel and hospitality, media and marketing, and government.

In addition, MIT Technology Review Insights conducted in-depth interviews with leading AI experts globally, from organizations such as the World Economic Forum, Emirates Group, Vodafone, Walmart, Bank of Singapore, Lemonade Insurance Company, and Loom.ai, among others.

Figure 1: In what parts of your business are AI technologies being used most actively today and three years from now (% of respondents, Middle East and Africa)



Source: MIT Technology Review Insights survey, 2020

Customer service is currently the most active department in using AI, cited by 64% of respondents, and set to rise to 79% in three years. The financial service industry is a leading adopter, especially through chatbot technology. Emirates NBD, the UAE-based bank, has developed Eva, the first AI-based personal banking assistant in the Middle East. Liv, Emirates NBD's lifestyle banking arm, also offers a conversational chatbot and the bank also uses a "Pepper" customer service robot in its Dubai branch.

Wealth management is another area seeing increased investment by financial services players servicing the high-net-worth demographic. Robo-advisory platforms that offer advanced investment services at low cost by using AI and automation to allocate and manage funds and allocations are emerging, with notable players including UAE-based Sarwa.[3] Chatbots are also supporting customer service in social sectors in the likes of Saudi Arabia. The nation has developed an innovation platform, the FekraTech national AI initiative—one proposed invention in the first round of the scheme was an AI-based chatbot called Nahla that helps people with chronic diseases like diabetes to better manage their condition.[4]

AI for inclusion

In Africa, where per capita incomes are lower and many are excluded from mainstream financial services, AI-driven customer service is focused more on enabling inclusion. One domain is credit scoring. Lack of credit bureaus and people's exclusion from many financial products is an ongoing obstacle to accessing loans, and mainstream banks have little incentive to produce risk assessments for low-income customers.

"You can do creative credit assessments using alternative data sets and AI," says Solomon Assefa, vice president of IBM Research for Africa. "Many people have no track record in areas like purchasing a house, but they are interacting regularly with mobile money products. You can leverage that data to understand behavior and do credit management." The same approach can be applied to small shops and businesses, working in partnership with

telecommunications companies and banks, he says. Nigerian fintech Carbon is one company using machine learning to evaluate credit applications, and MyBucks, the first African fintech to be listed on the Frankfurt Stock Exchange, uses algorithms to estimate loan repayment risk and proactively reduce likelihood of missed payments by raising flags based on behavioral and transaction trend analysis.[5]

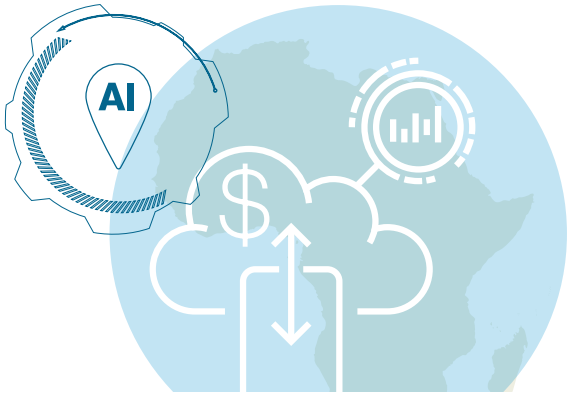
Ride-hailing is another customer convenience that has taken root in the Middle East and Africa. Uber's recent $3.1 billion acquisition of UAE-based Careem has given the US company access to mobility, delivery, and payments businesses across the region, including in Egypt, Jordan, Saudi Arabia, and the UAE. Observers have flagged the acquisition as a sign of the UAE's ability to produce home-grown, high-value companies.[6]

In Africa, local innovators are also adapting ride-hailing platforms to solve specific challenges. Kenyan AI startup UTU, for instance, has developed a "trust-building" app that provides personalized recommendations and allows service providers in mobility, peer-to-peer lending, housekeeping, child care, and e-commerce to increase conversion rates. For ride-hailing, it matches passengers with drivers who have been used and rated by friends. Another Kenyan ride-hailing app, Little, uses AI to assess driver performance.[7]

Fraud detection is another leading AI use case, according to our survey, selected by 41% of participants. One sector ripe for fraud reduction is health care. The UAE, in particular, has been dogged by malpractice, with an estimated 10%-20% of claims through its private-insurance system thought to be fraudulent.[8] One Swiss software company trialled a system that spotted nearly 37,000 suspicious claims made by over 4,000 doctors in what would amount to $5.7m, by using AI to detect prescription patterns and abnormal treatment options.[9]

Changing processes to make efficiencies

More than half of surveyed businesses in the Middle East and Africa (52%) are benefitting from improved operational efficiencies and cost savings, as a result of their investments in AI. Emirates Group provides an example of savings generated from a specific AI use case: premium-class meal catering. Jungnickel explains that AI algorithms predict, for each individual flight on each day, the volume of food that will be consumed by its business class passengers. "In premium classes, customers' first choice of hot meals must be met, which ordinarily requires stocking up to three meals per passenger. The associated costs are not only in meals but in the additional fuel consumed in supporting the weight lift. The predictions that the algorithms generate help us to prevent over-catering and reduce meal and fuel costs. On the scale that we operate, that translates into significant savings." Other leading benefits cited in the survey include better risk management (45%) and management decision-making (45%).



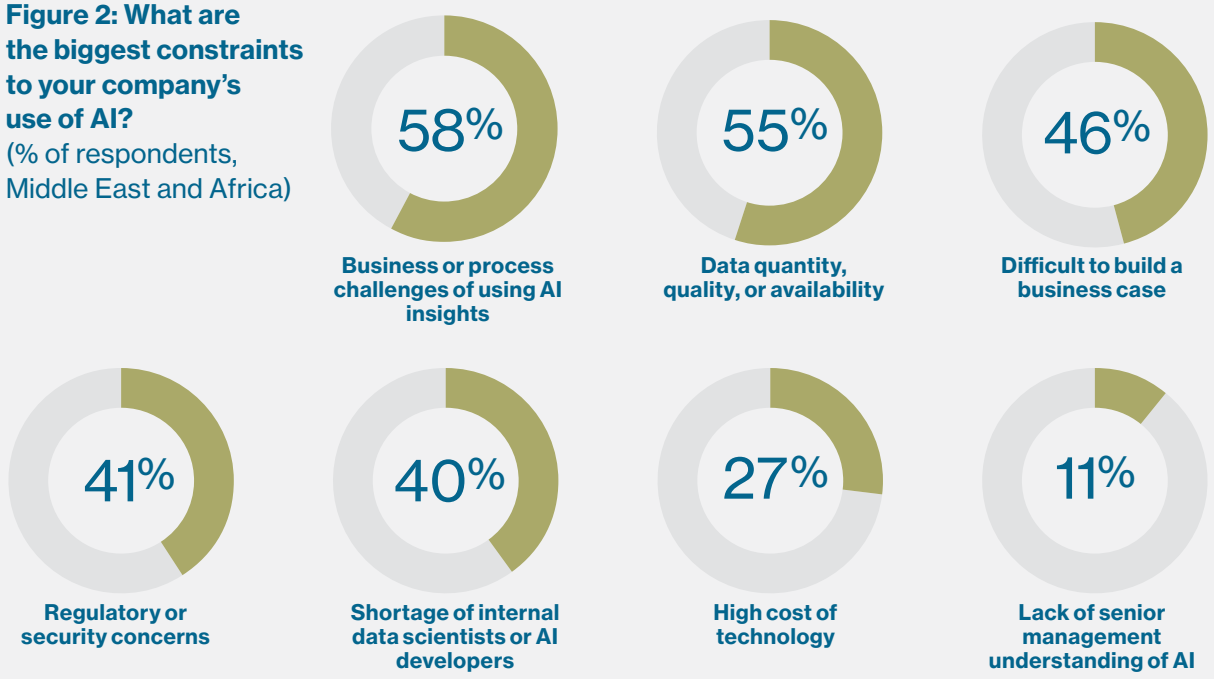
"Many people have no track record in areas like purchasing a house, but they are interacting regularly with mobile money products. You can leverage that data to understand behavior and do credit management."

Solomon Assefa, Vice President, Africa and Emerging Market Solutions, IBM Research

Data and talent are regional challenges

Survey respondents identify several challenges to their AI journey so far. Globally, changing business processes around AI was the greatest challenge, and felt even more

Figure 2: What are the biggest constraints to your company's use of AI?
(% of respondents, Middle East and Africa)



Source: MIT Technology Review Insights survey, 2020

keenly in the Middle East and Africa than in other regions (58% cited this as the top challenge compared to the global average of 51%). Data quantity, quality, or availability was also cited as a constraint by a larger number of respondents in this region: 55% compared to a global average of 48%. The main reasons for that were the difficulty of interfacing with open-source platforms, integrating unstructured data, and managing models for bias. Only 6% of respondents say there is not enough data.

In fact, there are ways to unlock more "dormant" datasets in the region and get more mileage from patchy or messy data, says Assefa, such as in public health. "Many African countries have conducted demographic health surveys, but the data is not consolidated in ways that can inform decisions like how to allocate primary care services or doctors," he says. AI tools like natural language processing are especially useful given that records might be kept in multiple languages in the Africa context, and can help policymakers understand more about disease dynamics and enable modelling. "You can use AI to explore interventions and help policymakers figure out, 'If this is the budget I have, what do I need to do to save the greatest number of lives?'"

While 40% of the survey sample report a shortage of internal AI skills, the region's institutions are working hard to scale up the available talent pool. Examples include the African Center of Excellence in Data Science in Rwanda and the AI and Data Science Research Group at Makerere University in Uganda, along with ecosystem-building conferences like Data Science Africa, an annual workshop, and Deep Learning Indaba, which has chapters across the continent. University courses on machine learning have also blossomed. In the Middle East, AI courses are offered at institutions including Saudi Arabia's King Saud University, and the nation has also promoted executive-level AI training through a recent collaboration between the AI Center for Advanced Studies and the Saudi Arabian Federation for Cybersecurity, Programming, and Drones.

Global education institutions are also playing a role. The UK University of Birmingham's Dubai campus offers a degree in AI covering modeling, machine learning, and computer vision; US-based Carnegie Mellon University established a branch campus in Doha, Qatar, as early as 2004 to explore research avenues and has since received over $40m in grants through the Qatar National Research Fund.[14]

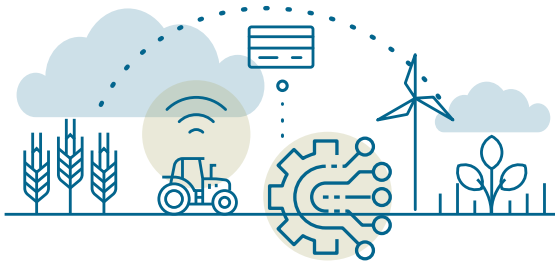
Global tech giants have also invested in local offices and programs to support the ecosystem. IBM opened an Africa office in 2013 in Nairobi, Kenya, later adding another in Johannesburg, South Africa.[15] Its presence has helped attract researchers from around the world to join local efforts. "The fact there was a research lab on the ground, tackling Africa's grand challenges, was attractive for talented people to come here, including from universities like Stanford, MIT, Columbia, and Oxford," says Assefa. This, combined with a growing number of AI courses and postdoctoral positions in African universities, helped build the skills base. In April 2019, Google opened its first African AI research center in Ghana and is running a digital skills program that will ultimately train 10 million Africans—it has already supported 100,000 developers and 60 startups through its Launchpad Accelerator Africa.[16] Google has also adapted its products to suit the region's infrastructure challenge, including low-RAM smartphones and unstable internet connections.

The outlook for data sharing

Data sharing is crucial to the successful development of AI, whose power hinges on the scale and richness of the data on which models are built. Respondents see clear benefits to data sharing between companies in their own or adjacent industries. Over half (64%) think greater speed and visibility across supply chains would be one of the top benefits, followed by new or enhanced customer services or experiences, selected by 45%.

Dubai is one of the more experimental jurisdictions in terms of data-sharing initiatives. The government's Smart Dubai strategy contains a data initiative aiming to create and manage a data trust to serve as a repository for companies' anonymized data, allowing members to receive aggregated insights on customer preferences, with payments made via cryptocurrency tokens; companies contributing to the trust including Majid Al Futtaim, the real estate giant, and Dubai Holding, a diversified conglomerate covering hospitality, tourism, real estate, and telecommunications.

AI in African agriculture



Africa's agriculture sector has long struggled with suboptimal yields and the continent is the most food-insecure in the world. This has led local innovators and global tech companies to explore ways that AI could help reduce food loss and waste. Examples include the use of machine learning with genomic data to develop intelligent animal breeding programs, which can lower the sector's ecological footprint and address changing consumer demands by identifying good genetic traits at early stages of the livestock production process.[10] In Yaoundé, Cameroon, Agrix Tech uses AI to detect plant diseases and suggest chemical and physical treatment and prevention measures.[11]

Big tech companies have been a significant enabler of AI in agriculture. Google has worked with farmers in rural Tanzania to create a machine-learning model to diagnose early stages of disease in the cassava plant, an important crop. The model, which works via farmers' phones without the need for internet access, helps them intervene earlier to save their plants.[12,13]

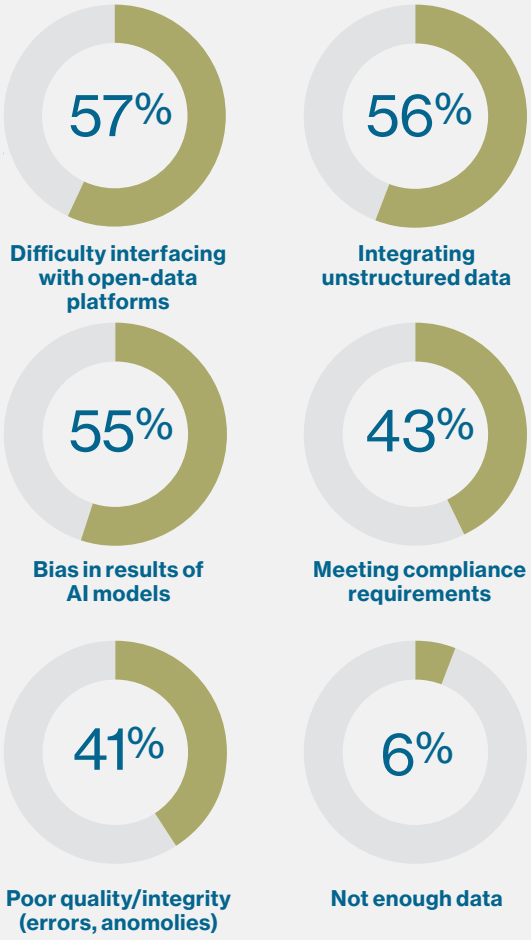
They are also helping expand the impact of businesses by adding AI to their offerings. Hello Tractor, for instance, is an Uber-type service for tractors whose business was well-placed to go further by adding AI and IoT functionality. "We started working with them and created algorithms that utilized data gathered from IoT devices on tractors," says Solomon Assefa at IBM. "If you can get data like the farm boundaries, you can connect that to weather data and forecast yield for specific seeds and fertilizer." AI insights could also dissuade farmers from suboptimal decisions, such as planting a day before rains are expected. "If you can forecast yield, you enable farmers to get loans from banks, tractor owners to get capital to expand their businesses, and you can engage with fertilizer and seed companies to activate the ecosystem," he says.

Data sharing is crucial to the development of a robust AI ecosystem. Respondents are cautious about the regulatory constraints, but could envision faster supply chains and new or enhanced customer experiences as a result.

However, there is a broader concern among consumers about data sharing, which may limit how far companies and governments go in facilitating it. One survey found that only 23% of Gulf-region respondents would be willing to share more data and only 19% would share more data if they got paid for it.[17]

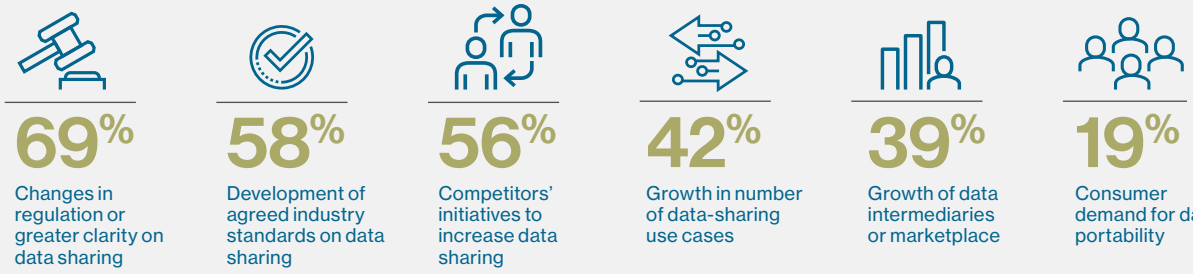
Of potential developments that might encourage companies to share data more openly, respondents said that more regulatory clarity is the most important, followed by the emergence of agreed industry standards. Overall, executives in the Middle East and Africa were more cautious about data sharing than those in other regions–despite being able to foresee benefits such as faster supply chains and more innovative product development, just over half said they were "very" or "somewhat" willing to share data, compared to three-quarters in North America.

Figure 3: What are the most difficult data challenges with regards to AI? (% of respondents, Middle East and Africa)



Source: MIT Technology Review Insights survey, 2020

Figure 4: Which developments would be most likely to lead your company to engage more actively in data sharing with third parties? (% of respondents, Middle East and Africa)



Source: MIT Technology Review Insights survey, 2020

Conclusion

1 **By the end of 2019, 82% of respondents in the region had launched AI programs.** Executives in the Middle East and Africa are strongly engaged in AI and already seeing benefits to operational efficiency and management decision-making. The appetite for AI will continue in the years ahead with the largest majority of respondents (44%) expecting AI to power 21%-30% of their business processes in three years' time.

2 **Customer service is the business department most actively using AI across the region.** Organizations in both regions are focusing heavily on customer relationships, evidenced through innovations like chatbot advisors in financial services, machine learning-based credit scoring, and ride-hailing conveniences, often supported by homegrown startups tailoring products to local conditions. While less than a third of respondents are currently using AI to grow revenue, sales and marketing will be a major AI growth area in the years ahead.

3 **Change management and data issues top the region's AI obstacles.** Changing business processes around AI was the greatest AI challenge globally, finds the survey, and this obstacle is felt even more keenly in the Middle East and Africa than in other regions (58% compared to the global average of 51%). Data quantity, quality, or availability is also cited as a top constraint; the main reasons being the difficulty of interfacing with open-source platforms, integrating unstructured data, and managing models for bias.

This report, "The global AI agenda: Middle East and Africa," is an executive briefing paper by MIT Technology Review Insights produced in partnership with Genesys. It is part of a series of regional papers published as part of The global AI agenda research program. Claire Beatty was the editor of this report, Nicola Crepaldi was the producer.

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