# 71. [Applications of Artificial Intelligence In EPC](https://www.bechtel.com/newsroom/blog/innovation/applications-of-artificial-intelligence-in-epc/)

## Applications of Artificial Intelligence, Deep Learning, Machine Learning, and the EPC Industry

Advances in big data collection and processing, distributed computing technologies, and statistical algorithms have mutually accelerated over the past few years. Companies of all sizes are taking advantage of their collective power to implement numerous forms of artificial intelligence, including machine learning and deep learning, to benefit their customers and business. More so than ever before, companies that are not traditional tech companies, like those in the EPC industry, are finding value in AI and data science. This added value is proving to be not just for Silicon Valley heavyweights. Bechtel is [leveraging applications of artificial intelligence](https://www.bechtel.com/newsroom/blog/innovation/the-impact-of-artificial-intelligence-on-the-construction-industry/) to evaluate project data to better understand schedule correlations, as well as improve its prediction capabilities.

As artificial intelligence (AI), data science, and big data become the buzzwords du jour, companies increasingly find themselves searching for data scientists, architects, and analysts without a plan. Understanding what AI is, what data science can do, and what it requires for success is a necessary first step.

* AI refers to technologies with the ability to perceive their surroundings, formulate strategies, and make decisions in pursuit of a goal.
  + The precise threshold for what counts as AI is subject to interpretation. While people tend to use the term AI to describe machines completing tasks once performed primarily by humans, the reference point has shifted as the domains of machines and humans increasingly overlap. In what is known as the ‘AI effect,’ humans discount the ‘real intelligence’ associated with a task once a machine has successfully performed it.
* With respect to determining ‘real intelligence’, AI can be theoretically divided: general or strong AI and specialized or weak AI.
  + General AI describes intelligence theoretically equivalent to the intelligence of human beings. Problems that require General AI are called AI-complete or AI-hard; the solver must learn, plan, make decisions in uncertainty, and even fundamentally re-program itself in order to arrive at a satisfactory result. Such problems cannot be solved with a specific algorithm or combination of specific algorithms. Presently, no AI-complete problems can be solved without a human in the loop and General AI does not yet exist.
  + All of our existing AI technologies constitute—at best—weak AI. That is, AI designed to focus on a specific problem. Weak AI is not self-aware and it does not have the ability to apply intelligence to any problem.
    - Siri and Alexa are examples of sophisticated-weak AI. What they do, they do well; but they operate within a defined range and struggle to deal with inputs outside of their limits. Despite not being generally intelligent, weak AI is still powerful; it can automatically regulate a city’s power and predict the stock market, as well as knock out an electric grid or spark an economic disaster (e.g., the May 2010 “flash crash” for which much of the blame fell on high-frequency trading algorithms).

## **Applications of Artificial Intelligence Augment Human Expertise**

One may object that every project is unique and thus AI, which relies on the presence of patterns and relationships in data does not apply. Every project is unique, and we can leverage AI to improve project delivery. We do not propose to remove humans and their necessary expertise from the process—general AI, after all, doesn’t exist. But AI-based solutions can range from automation to augmentation. It is with the latter, ‘augmented intelligence’, in which the most dramatic impacts can be seen. AI can process billions of data points and synthesize the most significant possibilities.

For example, AI-backed decision support of construction sequencing will aid in both long-term planning and immediate decision-making by helping make apparent the (potentially unintended) impacts of different scenarios. In each case, we want to leverage big data and artificial intelligence to support humans, so Bechtel’s experts are focused on the highest value tasks.

* The primary driver of AI is machine learning.
  + Machine learning enables technologies to learn on their own. More specifically, machine learning applications use algorithms to teach machines how to learn from data, as opposed to what to learn. These algorithms identify patterns in observed data, build models to capture those patterns, and use them to predict new outcomes.
  + Deep learning techniques, a part of the machine learning family, aims to learn meaningful representations of and relationships within the underlying data as opposed to simply accomplish a specific task. We may then ask questions of and make predictions from the deep learning representations. Roughly speaking, deep learning attempts to mirror the information processing and communication patterns of the human nervous system and brain. The results of deep learning moves us closer to general AI, but still have a ways to go to reach human intelligence, particularly with respect to uncertainty and previously unseen information.

In all, AI can be used to understand and predict risk, optimize planning, [detect anomalies](https://www.forbes.com/sites/davidteich/2019/01/09/management-ai-anomaly-detection-and-machine-learning/#3d77b4332237), and respond to unexpected events—to name only a few.

## **AI for EPC**

Success in this pursuit can disrupt our massive industry. [Construction-related spending](https://www.mckinsey.com/industries/capital-projects-and-infrastructure/our-insights/reinventing-construction-through-a-productivity-revolution) accounts for about 13 percent of the world’s gross domestic product (GDP). In 2013, global investments in energy, infrastructure, mining, and real-estate-related projects was about $6 trillion. By 2030, that could be almost $13 trillion.

And the biggest problem facing the EPC industry? Productivity.

Where nearly every other industry is progressing, productivity in construction has advanced only one percent [over the past 20 years](https://www.mckinsey.com/industries/capital-projects-and-infrastructure/our-insights/reinventing-construction-through-a-productivity-revolution). To put that into perspective, productivity in manufacturing has nearly doubled in that time. In a market that contributes to so much of the world’s GDP, even small improvements to labor productivity would have tremendous impact. With advancements in data, computing, and algorithmic learning, we have the opportunity for immense progress.

Bechtel is particularly well-positioned to lead the charge, and we’re doing so through our Big Data and Analytics Center of Excellence. With 120 years of data increasingly at its fingertips through digitization efforts, we can ask where hidden inefficiencies might lie and what might drive them. Presently, for example, we are developing a machine-learning tool to identify the most efficient construction packaging sequences for our most complex projects. Through artificial intelligence we are able to find connections and learn new solutions we would not be able to find if every possibility had to be tested in the wild. We can do so in the presence of dynamic factors and shifting constraints. Once faced with unexpected weather, material or labor shortages, our project teams will be able to ask: “What is the best approach from this point forward?” Machine learning will allow us to optimize in real time as events impact schedule and execution.

AI will continue to improve for the EPC industry as the technology advances and consistent baselining can be captured. In follow up pieces, we will dive into examples of how Bechtel is driving innovation by using AI and machine learning to tackle the industry’s most pressing challenges, and how our organization is transforming in response.

# 72. [AI at 2023 summit](https://www.turnerconstruction.com/insights/turner-spotlights-artificial-intelligence-at-2023-innovation-summit#:~:text=Turner%20promotes%20the%20ethical%20application,President%20and%20Chief%20Innovation%20Officer.)

Turner Construction Company recently held its eighth Innovation Summit, gathering 250 professionals from Turner and affiliate companies HOCHTIEF, ACS, Dragados, Flatiron, Real PM, and Clark Builders. For three days, participants delved deep into the theme “From Artificial Intelligence (AI) to Intelligence Augmentation (IA).” Participants engaged in sessions and hands-on workshops which illuminated the state-of-the-art in AI, its role in enhancing human skills, and a humanistic path forward in AI applications at Turner and beyond.

AI thought leaders presented a range of great practices and novel AI solutions in place to help employees mine and analyze Turner’s vast data warehouse to enhance risk management and improve access to information. In addition, an AI tool that adds efficiency and automation to the drafting of the approximately 30,000 trade contracts the company issues each year was demonstrated, and the Turner Engineering Group shared how they are exploring the integration of generative design into their processes.

Attendees collaborated to synthesize insights and imagine AI’s applicability in their work areas. “It is clear that AI and other technologies discussed at the conference can refine operations, heighten sustainability, reduce risks, and foster positive transformation within the built environment,” said [Kris Wahl](https://www.linkedin.com/in/kriswahl/), Innovation Manager. Wahl continued, “The most promising concepts are undergoing evaluation for further development.”

Turner promotes the ethical application of AI in construction, ensuring benefits for its workforce and the broader communities they serve. “This summit highlighted our people-first approach to innovations, especially AI,” said [Jim Barrett](https://www.linkedin.com/in/jamespbarrett/), Vice President and Chief Innovation Officer. Barrett continued, “More than just showcasing our advancements in AI, the event reaffirmed our commitment to prioritizing people in innovation. With the limitless capabilities of AI, we aspire to go beyond mere automation and unlock our people’s unparalleled potential.”

# 73. [Hyundai E&C ensures Safety and Quality Management of construction sites using AI video analysis](https://www.hdec.kr/en/newsroom/news_view.aspx?NewsSeq=704&NewsType=LATEST&NewsListType=news_clist)

xHyundai E&C is accelerating smart construction management by developing AI (artificial intelligence)-based construction site video analysis technology and registering patents

In general, AI for video analysis applied to construction sites is developed by asking AI-specialized companies in the areas of video data collection, training and development of AI, and as for the latter, they have used public data to date, as they struggle to understand the specificity of construction sites and access the real on-site imaging data.

Due to this reason, application was easy for industrial sites with stable working environments, but more difficult for construction sites where the working environment varies depending on the progress of the construction, more particularly in the safety sector with few relevant cases.

In order to address these challenges, Hyundai E&C internally built an “On-site CCTV Video Analysis System” with AI-trained data specialized in the construction sector through various video images collected at Hyundai E&C sites.

[Hyundai E&C wins one of the world’s top three design awards for four consecutive years](https://www.hdec.kr/en/newsroom/news_view.aspx?NewsSeq=965&NewsType=LATEST&NewsListType=news_list)

[2024.04.09 2min 20sec read 2709](https://www.hdec.kr/en/newsroom/news_view.aspx?NewsSeq=965&NewsType=LATEST&NewsListType=news_list)

[Hyundai E&C Signs PPA for Solar Renewables with Glennmont D&D Solar Holdings](https://www.hdec.kr/en/newsroom/news_view.aspx?NewsSeq=952&NewsType=LATEST&NewsListType=news_list)

[2024.03.12 3min 31sec read 3499](https://www.hdec.kr/en/newsroom/news_view.aspx?NewsSeq=952&NewsType=LATEST&NewsListType=news_list)

[Hyundai E&C to Embark on UK SMR Project forging Korea-US-UK Technology Alliance](https://www.hdec.kr/en/newsroom/news_view.aspx?NewsSeq=944&NewsType=LATEST&NewsListType=news_list)

[2024.03.06 4min 57sec read 3855](https://www.hdec.kr/en/newsroom/news_view.aspx?NewsSeq=944&NewsType=LATEST&NewsListType=news_list)

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[ On-site CCTV Video Analysis System - Safety Violation Detection and Alarm Alert ]

[ On-site CCTV Video Analysis System - Location of On-site Camera and AI Analysis Status ]

Hyundai E&C collected video images to develop a "on-site CCTV video analysis system" and selected data and scenarios that can reflect the reality of safety management at construction sites.

Data and scenarios for on-site safety management were selected in line with the construction safety-related laws and standards, and virtual data including 3D graphics were used for videos of fires at construction sites, which are difficult to obtain.

Based on this, training data, including more than 2 million working objects such as construction equipment, workers, flames, and smoke were built, and a 'on-site CCTV video analysis system' was developed by integrating them with technologies of AI companies.

The Hyundai E&C-developed system is a technology that enables AI to detect the location of workers, construction equipment, and fire risk factors in real time and prevent risks in advance.

AI analyzes images transmitted through CCTV in real time, identify and prevent at-risk distance of stricture accident of equipment, by detecting construction equipment, signalman, and guidance staff.

In addition, based on the posture estimation algorithm, it is possible to thoroughly manage safety in the workplace by detecting major joints and actions of the head, hands, and neck of the worker and recognize dangerous movements.

Hyundai E&C has recently applied its latest AI model by remotely connecting CCTV images and completed performance verification. In the future, it plans to supplement the effectiveness of various site-specific scenarios and apply them to domestic sites.

In addition, Hyundai E&C has devised and registered a patent for the first time in Korea for securing the quality and safety of ready-mixed concrete using a smartphone and has lead  quality management on sites using AI by developing a commercialization system in cooperation with IT companies.

The technology, developed by Hyundai E&C, is a system that can monitor concrete discharged from ready-mixed concrete vehicles in real time using a smartphone and check the defectiveness of the ready-mixed concrete.

First of all, ▲ a camera photographs the ready-mixed concrete discharged from the cement mixer truck, ▲determines whether the ready-mixed concrete material can be separated by comparatively analyzing AI-shot images with pre-learned images, and ▲automatically generates an alarm through the system in case of defect to stop concrete placement.

Hyundai E&C plans to upgrade this technology to an integrated solution that can easily manage quality of structures at construction sites, by integrating it with various technologies such as existing concrete crack diagnosis algorithm\*.

\* Concrete crack diagnosis algorithm: Hyundai E&C’s existing technology, whose algorithm inquires the area and location of the crack, the time of crack, and concrete placement information when a concrete crack occurs. When the inquiry is processed, the program will also provide a report including countermeasures based on the root cause analysis.

Meanwhile, Hyundai E&C has been accelerating efforts to conduct various researches and developments to lead AI technologies in the construction sector, ever since it established an organization dedicated to big data/AI within Hyundai Institute of Construction Technology in 2018.

In the future, it plans to develop core AI technologies that can be applied to construction sites through various research and development, expand their applications, and gain an upper hand in the AI-based construction sector.

A Hyundai E&C official said, "As smart construction applying advanced technologies develops day by day, its importance and utilization at construction sites will grow further,” adding that, “We will continue to secure and utilize quality data suitable for construction sites and lead AI technologies in the construction sector.”

# 74. [Shimizu develops AI systems for initial structural designs](https://japannews.yomiuri.co.jp/business/companies/20231017-143492/)

Shimizu Corp. has developed a system powered by artificial intelligence to assist in structural designs, including determining the framework of a building.

The company hopes this can possibly shorten the time required to create an initial design plan from about a week to a few hours.

The Tokyo-based firm expects the system to reduce the impact of the so-called 2024 problem that might arise when overtime regulations in the construction industry will be tightened.

Structural designs are the initial stage of work to construct a building. Information such as the height and area of an envisaged building is entered into the new system, and the AI software creates a 3D model by extracting similar structural specifications based on past designs.

The system can automatically show the size and quantity of columns and beams, so designers only need to select the data suited to clients’ design wishes and make minor adjustments to create plans.

Many complicated calculations have been burdensome for young and inexperienced designers. The AI tool will not only streamline the process, but also enable multiple proposals to be presented to clients without spending considerable amounts of time, while also making it easier to respond to changes in the plans.

Currently, the system can be used for office buildings that are up to 60 meters high. The company intends to expand the capability of the AI system in the future to handle designs for structures that require complex calculations, such as condominiums, hospitals and skyscrapers.

# 75. [Innovation and prospective](https://www.vinci.com/vinci.nsf/en/item/innovation-prospective.htm)

### Creating new opportunities for Group companies

Stimulating innovation is an integral part of VINCI’s strategy and accelerates the transformation of its business activities, products and services. In addition to the multi-business initiatives driving innovation at Group level, which include Leonard, lab recherche environnement and La Fabrique de la Cité, each business line houses a platform to infuse innovation in its sphere of activity, such as La Factory (Paris) at VINCI Energies, the tech startup Cyclope.ai at VINCI Autoroutes, the network of innovation centres of excellence at VINCI Concessions, and Eurovia’s international research centre in Bordeaux.

### To imagine VINCI tomorrow

To adapt to today's many challenges– energy transition, digital revolution, much shorter innovation cycles – VINCI has set up [Leonard](https://leonard.vinci.com/en), a Group-wide market intelligence and foresight structure.

Market intelligence  
Leonard, the Group’s innovation and foresight platform, has continued to support entrepreneurial innovation. The Intrapreneurs track welcomed nine new projects imagined by VINCI employees, while incubated projects from previous cohorts continued their development in the Group. Twelve of these have already evolved into new business activities or operating entities, such as Waste Marketplace, a digital solution for worksite waste management, and e>béton, a platform for the distribution of low-carbon concrete in the Exegy® range. An artificial intelligence track was inaugurated in 2020, generating six AI applications for the Group’s businesses, in addition to AI training courses for employees.

Events  
Leonard’s teams organised a number of events during France’s first lockdown due to the health crisis, including a series of daily virtual conferences. In September, the Building Beyond festival assembled some 100 speakers and more than 2,500 participants online and at Leonard:Paris. Internationally, Leonard expanded its activities in the DACH region (Germany, Austria and Switzerland), assisted by the German subsidiaries of Eurovia and VINCI Energies.

Prospective  
Leonard regularly brings together prospective groups whose task is to identify long-term challenges for VINCI, opportunities for change in the Group's business activities and organisation, and new sources of growth.

Incubator  
Leonard also supported five early stage startups in the Seed track, helping them to adjust their business plans to market realities. The 11 growth-stage ventures in the Catalyst track partnered with Group companies to expand their products and services. These programmes are turning Leonard into the foremost incubator, for both startups and investors, in VINCI’s sphere of businesses. Leonard also produces foresight studies, integrating the input of Group companies to help build projects with real-world applications. For example, Leonard’s work on autonomous, connected electric vehicles led to Eurovia’s participation in the testing of a selfdriving shuttle in rural areas. This coordinated approach has been validated by France’s national strategy for autonomous mobility, which recognises the need for cooperation between autonomous vehicles and road infrastructure. Leonard also joined forces with Shell and the OECD to develop three scenarios, to which about 30 experts have contributed, for achieving carbon neutrality for the city of Paris by 2050.

# 76. [Innovation strategy](https://www.bouygues.com/en/missions/)

# **MISSIONS**

Through its innovation strategy, the Bouygues group is preparing itself for changes in user behaviour, technological developments and the emergence of new, sustainable business models. Bouygues puts innovation to work for the benefit of its customers and its Climate strategy, while its intrapreneurship programme fosters a culture of innovation across its business segments.

Innovation and Elab, the Group’s innovation unit

Bouygues’ strategy in the field of innovation is focused on delivering services that provide real benefits to users. The aim is to make the daily lives of the Group’s customers, partners and employees simpler. It is also to improve its productivity and boost stakeholder satisfaction by creating sustainable solutions. Harnessing the potential of technology

The Bouygues group has pinpointed four technologies that it believes will shape its businesses:

* Artificial intelligence (AI) can provide effective decision-support to many of the Group’s business segments. For instance, by analysing physical data from a site, as well as regulations and environmental factors, AI can optimise the building potential of land and facilitate interaction between the stakeholders in a property development project (developers, architects, consultancy firms and local authorities).
* of high-risk areas on road networks through the analysis of vehicle behaviour.
* The Internet of Things, combined with Big Data, can harvest and analyse data on an enormous scale for the predictive identification of high-risk areas on road networks through the analysis of vehicle behaviour.
* With virtual and augmented reality, it is possible to interact in real time with digital elements that have been added to a live view. For example, brands can insert advertising into a television show without interrupting it. With BIM (Building Information Modelling), 3D can be used to represent a whole range of data used in the design and construction of a structure and simulate its behaviour.
* Finally, blockchain, by making flows more secure, will facilitate the creation of new services by simplifying transaction processes. For instance, it is currently being used to ensure more secure, transparent and faster signing of complex contracts.

Supporting the transformation

* Creating ground-breaking products and services for customers based on new sustainable business models. Since 2021 Bouygues Construction has been developing 20 “Build-to-Rent” programmes. These are fully-serviced, ready-to-rent homes built with urban families and households in mind, providing occupants with a better quality of life at a competitive cost. Also in 2021, Bouygues Immobilier launched the “Majorelle” project, a new range of affordable, modular housing units that can be adapted as families grow.
* Testing and providing solutions to facilitate the ecological transition. Bouygues Energies & Services and PowiDian are collaborating to explore growth opportunities and identify use cases in the emerging green hydrogen market.
* Digitising processes and optimising materials for the Construction businesses. Colas’ Grid2BIM project is on-line software that uses deep learning algorithms to convert underground network plans into very precise 3D-compatible models, thus reducing lead times and costs.

Supporting the transformation  In a context where small agile companies can disrupt entire ecosystems, Elab supports the Group’s subsidiaries with their transformation.

By applying nimble methods focused on uses, such as design thinking, business model canvas, C/K method and value quadrant, we help our customers carry out their business transformation:

* Creation and launch of new products and services or innovative business activities.
* Business transformation, by helping to adapt the core business to new market opportunities (new technologies, new customer demands, new competitors).

[ByTech](https://www.bouygues.com/en/bytech/) is an in-house community of IT, digital and innovation employees.

Monitoring of technological advances worldwide

BOUYGUES ASIA

Bouygues Asia was originally set up in Tokyo in 2002 as a subsidiary of Bouygues Telecom within the framework of the partnership with leading Japanese telecoms operator NTT Docomo. Today, Bouygues Asia represents the interests of the entire Group. This multicultural entity monitors the key players in Asia’s innovation ecosystem and offers assistance to the Group’s business segments and to customers outside the Group wishing to look for partnerships.

WINNOVATION

Winnovation is a Group subsidiary based in the US responsible for meeting companies or start-ups with which strategic partnerships can be formed. Winnovation also helps its customers with partnership negotiations. This unit also actively monitors US markets for developments in the domains of technology, marketing and strategy.

# 77. [Shareholder’s meeting & future prospects](https://www.grupoacs.com/shareholders-investors/general-shareholders-meeting/resolutions/2019/)

Hello, nice to meet you, my name is Chris and I work at Hochtief, a company of the ACS Group, world leader in infrastructure and services.  
  
Would you like to take a look at what we do around the world? Come with me and I'll show you.  
  
Here in Los Angeles, Turner, an ACS Group company, is building one of the largest stadiums in the world, a large construction with around 2,500 workers. It will be the Los Angeles RAMS and Los Angeles Chargers stadium and the venue for the opening ceremony of the 2028 Olympics.  
  
Construction works are being digitized more and more and the ACS Group is also at the forefront of technology.  
Here you can see our professionals in ESSEN discussing an information model for the construction of the new Northwest Metro in Sydney with our Australian colleagues from Fimik in Sydney. Digital models based on 3D and logistic data are improving the efficiency of construction processes making them safer and more effective.  
  
The ACS Group is working on Phase 2 of the Sydney Metro, where sustainable construction plays a leading role. And working physically in the construction zone is still very real, this implies huge construction machinery, large equipment, complex logistics and detailed planning. But, in addition, we work with BIG DATA, augmented reality, artificial intelligence and much more, generating great opportunities for the construction business.  
  
In the ACS Group we use information models for construction in all our large projects, these combine real project data with information on organization, cost planning and life cycles of infrastructure Thanks to the virtual reality all the elements of a planned construction They can be checked before the work begins to be built, that is pure efficiency.  
  
With augmented reality we go one step ahead. We can inspect a work in real time to see if all the processes have been carried out as planned, for example here, in The Spiral, one of the new skyscrapers that are being built in New York.  
  
To combine all the new digital trends we have created Nextplore, our global innovation company. Nextplore develops digital innovation for construction, with professionals located throughout the world. One of the issues we are currently working on is the geolocation, collection and use of geological data.  
  
Here on the A6 motorway in Heilbronn Germany, we have completed the initial test to collect photometry and laser scanning data using drones. In projects like this, precise calculations of earthworks are especially important. The real-time monitoring of the construction phases makes possible the exact measurement of the process and allows faster reaction times.  
  
Our Nextplore colleagues in Minneapolis are developing the software and algorithms for this type of supervision. Believe me managing this large volume of information is a total challenge. Nextplore is collaborating with several universities, through these collaborations we are investigating new and innovative solutions.  
  
Our Minneapolis colleagues are also processing geodata for other infrastructure projects, such as the large high-speed rail project in California.  
  
Dragados and Flatiron, subsidiaries of the ACS Group, participate in construction works using state-of-the-art methods for their supervision, which allow reliable planning and great savings.  
  
For us innovation is a shared process, so we have innovation teams in different centers around the world, one of these centers is located in Sydney. Here our subsidiaries Fimik and Dragados participate in the great construction project of the West Connex Highway. As you can see, most of the road will pass through tunnels below the city. The project aims to alleviate traffic, create jobs and bring the communities of this metropolis closer together.  
  
The ACS Group is participating in new cooperation programs with different research institutes. Among them is the Watson MIT artificial intelligence laboratory in Massachusetts. Our connection with this institution implies that we can directly apply pioneering innovations in the field of artificial intelligence in our industry.  
  
We are working closely with IBM to develop these solutions.  
  
We also collaborate with the UMATIX startup that focuses on extremely precise location technologies, which can be used both indoors and outdoors. The new robotic technology will allow to measure and accurately represent interior spaces in three dimensions without the help of GPS, while allowing precise navigation of the construction equipment.

# 78. [IntegratedSustainabilityReport 2022 – Committed to a Sustainable Future](https://informes-anuales.sacyr.com/2022/wp-content/uploads/sites/3/2023/04/SACYR_2022_informe_de_sostenibilidad_EN.pdf)

# 79. [Lendlease CEO on using AI in their businesses](https://www.afr.com/work-and-careers/leaders/how-these-six-ceos-are-using-ai-in-their-businesses-20230922-p5e6wg)

It’s no wonder everyone’s talking about artificial intelligence: the potential productivity benefits are enough to get anyone excited.

Recent research by Harvard Business School, for instance, found that Boston Consulting Group [consultants who used ChatGPT-4 finished 12.2 per cent more tasks](https://www.afr.com/work-and-careers/workplace/consultants-using-ai-do-better-especially-underperformers-study-20230922-p5e6vi) and achieved results that were 40 per cent higher quality, on average, than those who did not use the tool.

It is a massive improvement, especially in an era defined by stagnant productivity. And so, it is unsurprising that companies from all corners of the economy are setting up working groups and taskforces with the aim of deploying artificial intelligence across their businesses.

Current examples range from drafting bid documents and personalising marketing messages, to detecting fraud and making credit decisions. Even the Reserve Bank of Australia is turning to [AI in its fight against inflation](https://www.afr.com/chanticleer/how-the-rba-is-using-ai-to-fight-inflation-20230929-p5e8n4).

But, as BOSS learns from top business leaders, it is clear that corporate Australia is only at the beginning of its journey with the technology.

Here’s how six CEOs are using AI across their businesses today, and, perhaps more importantly, how they plan to use it in the near future.

**Tony Lombardo, Lendlease**

Property company [Lendlease](https://www.afr.com/property/commercial/lendlease-says-it-s-on-track-to-become-a-70b-investor-20230814-p5dw7p) is using artificial intelligence in two key areas: construction and bidding for contracts.

Chief executive Tony Lombardo says the group is using machine learning to help it improve the quality of bidding for projects. Machines can analyse previous successful and unsuccessful bids to help Lendlease improve the quality of its proposals.

AI can also lead to huge time savings. Lendlease bids on, say, 30 or 40 projects a year, and can use computing power to assemble key, consistent elements of a bid document, which can be 200 pages long.

“The AI actually can write all of that,” Lombardo says.

“We’ve been testing it to see how well it does, and it’s probably doing things at 70 to 80 per cent right.”

Staff are then freed up to “focus on the client and what we are trying to deliver,” Lombardo says.

“It lets us think more strategically on how to actually work on the EQ side of any bid and put more effort on the strategy,” he says.

Lendlease is also using AI to improve safety on construction sites. CCTV cameras patrolling sites feed information into a computer which can identify areas of work, such as pipes, that might be unsafe and need to be checked.

**Sue van der Merwe, Lottery Corporation**

[Sue van der Merwe](https://www.afr.com/work-and-careers/leaders/how-going-it-alone-was-the-best-thing-this-ceo-ever-did-20230130-p5cglc), chief executive of the $10.4 billion Lottery Corporation, says the operator of games such as Powerball, TattsLotto and Keno is “early in its journey” of deploying artificial intelligence learning models.

At least in the short term, she predicts the greatest benefits are likely to be in customer marketing and making internal processes more efficient.

On the marketing side, Lottery is starting to use AI to sift through large, disparate sets of data to help it determine when direct marketing messages to customers will be most effective, and on which channels.

Inputs into the machine learning include the day and time of the week, whether the customer tends to purchase lottery tickets online or in store, and the type and size of a jackpot.

If a customer is a regular Saturday lottery player, but occasionally plays Powerball, the AI will enable Lottery Corp to deliver a tailored message about an upcoming jackpot to the customer at a time to maximise the chance of a sale.

“It’s around letting you know what’s happening on any one of the games that week, based on what we know about you, and what would be well received by you, and the most effective marketing communication from our perspective,” van der Merwe says.

“AI is actually not necessarily about offering more products. It’s about offering the right products,” adds van der Merwe, who has been CEO at the group since May last year.

On the revenue front, AI should also make sales forecasting more accurate, while in the back office area, Lottery Corp expects to use AI to make processes such as bank reconciliations more efficient.

Lottery Corp is also using AI to detect changes in a customer’s behaviour that might suggest they are developing a gambling problem, although van der Merwe says the incidence of problem gambling in lottery games is low.

**Cynthia Scott, Zip Co**

Zip Co uses AI to detect fraud by flagging irregular customer behaviour.

The buy now, pay later company also uses it to determine a customer’s creditworthiness and make predictions about their product preferences by drawing on a massive dataset of past transactions.

“So, for example, we might [have] a customer who’s a male in his early 30s. [Let’s say] he’s employed, and he’s a homeowner, and he’s really sporty,” Zip Co group chief executive Cynthia Scott explains.

“We can use the millions of versions of that [type of person that] we’ve got [in our database], and the years of data that we’ve got on those [types of] individuals ... to predict how [that new customer is] going to engage with our products and what their risk behaviour is.”

The next frontier for the company, as it is for most Australian businesses engaging with AI, is [determining how it can use generative, rather than predictive, artificial intelligence](https://www.afr.com/work-and-careers/workplace/how-chatgpt-will-change-these-four-industries-20230328-p5cvzx), to make its staff more productive and achieve operational excellence.

Scott says one focus area is the real-time generation of scripts for call centre workers.

Customers who choose to speak to a human operator tend to have the most complex questions, so generating scripts for call centre workers would help them navigate the most challenging conversations.

“Right now, there’s a lot of people doing work to answer those complex queries, but there’s a real opportunity for AI [there],” Scott says.

“Our US team is starting to pilot with a partner to look at AI real-time call scripts.”

Scott also sees opportunities in using more advanced “propensity modelling” to deliver effective nudges in the company’s mobile app. AI could help the company better predict what a customer was going to do next on its app and serve up more relevant products and services to improve the customer experience.

And then there’s software engineering. Scott says Zip’s engineers are already using generative AI to help them write code, although all employees are warned not to input any company code or customer data when using ChatGPT.

“We’re not blocking [ChatGPT], but you will get a warning just saying, ‘Please ensure that you’re not inputting any customer data or any IP or any company code … into the AI engine’,” Scott says. “Formalising one of those safeguards and protocols across the organisation is really important.”

**Mick O’Brien, Equity Trustees**

Equity Trustees managing director Mick O’Brien says the financial services company had an AI-powered will-writing product in the market but retracted it when it became clear that it couldn’t handle the complexity of many customers’ requests.

O’Brien would like to reintroduce a more advanced version of it one day, though. And he also believes there’s plenty of scope to ramp up the company’s use of AI to analyse everything from wills and trust deeds to court orders and disclosure documents.

“Today, we’d have trust managers and lawyers scanning down and reviewing all this information,” O’Brien says. “But a lot of it could actually be reviewed [and] analysed [by AI].”

This analysis could also extend to ensuring the wording used to describe the company’s investments didn’t fall foul of greenwashing regulations, O’Brien says.

But, given the value of a trustee lies in their judgement and decision-making, O’Brien believes AI will be unable to assume responsibility for many of their tasks.

He offers a hypothetical scenario to make his point. Let’s say you have an underperforming investment scheme, he says, and that investors want to redeem their units.

You could use the most recent audited valuation of the scheme to help determine the value of the investors’ respective stakes. But that might not represent a fair valuation. And it could be unfair on the remaining investors if you let the outgoing parties redeem their shares at that valuation.

O’Brien believes it is in solving these types of challenges that trustees demonstrate their value to the customer, by exercising judgement beyond the capabilities of artificial intelligence. But he believes that AI could soon get to the point where it flags any abnormalities in a customer’s case so that human trustees know which parts of the case to investigate further.

“If we can get to that, then that would make us very efficient,” O’Brien says.

“It [would] basically [be] getting through a lot of data and identifying issues and flagging [them], and then allowing us to make decisions and judgements.”

O’Brien says it remains to be seen how far AI could go “in the next step of making some of those decisions for us”, though. But he tells *BOSS*that the nature of estate planning and funds management – and the fact that it is a heavily regulated area – suggests that this part of the business will always be left to a human trustee.

**Robin Khuda, AirTrunk**

Data centre firm AirTrunk is looking at AI to enhance its operations at the design stage, as well as in the construction and ongoing maintenance of its “hyperscale” data centres across the Asia-Pacific and Japan.

Founder and chief executive Robin Khuda says that during the design process, AI can be used to predict key requirements of a new centre, such as water and power usage.

“We are seeing a bunch of tools we’re looking to use. You can do a lot of that analysis [of water and power usage] in real time, rather than [do] the design and then get another team of people to do all that analysis separately,” Khuda says. Obtaining accurate estimates of power and water usage is critical because up to 90 per cent of data centre outages are the result of human error.

Even before then, AI will be used to help with site selection, because it will be able to analyse data from local utilities and planning departments, and various types of maps to determine quickly suitable locations for the centres.

AI can also be used to make construction more efficient and safer. It can better schedule the different types of work that needs to be done on a site, and ensure that not too many people are working in the same area at the same time, which heightens the risk of accident.

On an ongoing basis, AI will be able to help AirTrunk, which is [considering a stock market listing](https://www.afr.com/street-talk/airtrunk-mulls-10-billion-plus-ipo-shareholders-send-rfp-20230920-p5e65y) that is expected to value the company at more than $10 billion, to predict when equipment needs to be replaced, Khuda says.

**Drew O’Malley, Collins Foods**

Drew O’Malley, CEO of Collins Foods, expects the KFC franchise operator will use AI to better market to customers.

Fast food customers tend to gravitate to a certain brand for a period of time, and then get tired of it and migrate to a rival. AI can help Collins Foods to understand usage patterns and when a customer is more likely to start favouring a competitor. The company can then send an offer to the customer in an effort to retain them.

“There has been a lot of success around customised offers going to people based on how they like to access the brand. It is getting better and better because the more data we have, the more we learn about what works and what doesn’t,” O’Malley says.

# 80. [UAE National strategy for generative AI](https://ai.gov.ae/wp-content/uploads/2021/07/UAE-National-Strategy-for-Artificial-Intelligence-2031.pdf)

EXECUTIVE SUMMARY The UAE sets a clear vision through its AI Strategy, to become the world leader in AI by 2031. Implementing this vision on the ground requires rigorous dedication and clear steps that outline the path for success. Hence, it is essential to set the foundation, the AI Strategy, with clear strategic objectives that outline the initiatives that are essential in achieving the milestones. It is notably worth mentioning that the AI Strategy aligns with the UAE Centennial 2071, to make the UAE the best country in the world by 2071. The AI Strategy will contribute significantly in education, economy, government development, and community happiness through various AI technologies implementations in different sectors to include energy, tourism, and education, to list few. The UAE AI and Blockchain Council will overlook the implementation of the AI Strategy throughout all emirates but ultimately, the implementation will be a multi-stakeholders effort and cooperation from different local and federal entities in the UAE. There are eight strategic objectives outlined in the AI Strategy, namely: • Build a reputation as an AI destination. • Increase the UAE competitive assets in priority sectors through deployment of AI. • Develop a fertile ecosystem for AI. • Adopt AI across customer services to improve lives and government. • Attract and train talent for future jobs enabled by AI. • Bring world-leading research capability to work with target industries. • Provide the data and supporting infrastructure essential to become a test bed for AI. • Ensure strong governance and effective regulation. The UAE has a strong foundation consisting of cohesive and diversified multinational community that is a fast adapter to new and emerging technologies. Therefore, it acts as a magnet that attracts the best talents from the globe to conduct their experiments on AI solutions in the UAE and open the doors to practical implementations in different sectors.

WHERE THE UAE HAS OPPORTUNITIES TO LEAD The UAE’s vision to become a world leader in AI does not mean aiming for leadership across all technologies and sectors. The country will focus on domains where it can have world-leading assets and unique opportunities. Therefore, the mission for this first Ministerial term is to transform the UAE into a world leader in AI by investing in the people and industries that are key to the UAE’s success. The UAE will begin through its existing strengths: 1. Industry Assets & Emerging Sectors 2. Smart Government And also focus on opportunities where it can lead: 3. Data Sharing And Governance 4. New Generation Of Regional Talent By 2031, the very best version of the UAE would package these strengths and opportunities together. For example, early Government adoption of AI will come with training for domestic talent. Governance frameworks will be evaluated by testing them in the UAE’s industry pilots. The existence of a strong government and governmentowned commercial sector in the UAE provides novel opportunities for trialing governance, education and product innovation in combination. 1. Industry Assets & Emerging Sectors The UAE has set priority sectors – these will be the focus of initial activities. This does not mean that the UAE will stop working on AI solutions in other sectors where AI can deliver other benefits to society. It is also likely that these priorities will change over time, as the UAE economy matures and new opportunities arise. But in the first instance, the UAE will leverage physical and digital assets in two of its strongest existing sectors as part of adopting and trialing AI. Support will also be given to developments in emerging sectors where the UAE has the strong potential economic gains and where there are pockets of opportunity to lead globally. Therefore, the current priority sectors are: Resources & Energy: from existing technology in the extraction industry to renewable energy and innovation in utilities. Logistics & Transport: longstanding air and sea hubs in the UAE make it a valuable location for piloting new systems in the sector. Tourism & Hospitality: opportunity for globally becoming first in customersupport AI, creating integrated and personalized services for tourists in the UAE. Healthcare: a small sector with opportunity to be world leading in specific treatments, particularly in rare diseases. Cybersecurity: a strategic imperative, given the rise of AI, the UAE will also concentrate on building robust systems for protection. Economic Value of AI Further details on these choices are in Objective 2. A core reason for choosing these sectors came down to the potential of AI deployment causing disruption as well as pure economics, for instance the potential of AED 136 billion gain in services and trade sectors played a significant role in choosing Tourism as a priority sector. AI in this growing consumer-facing sector could likely have spillovers into other service sectors. AED 91 billion in resources and utilities contributed to making energy a priority, as did the AED 19 billion in logistics. Estimates for global economic gains from automation technologies - 0.3% to 2.2 % growth in compound annual productivity – are impressive 2. Using this kind of modeling of year on year productivity gains, PwC estimated that AI will contribute AED 353 billion to GDP by 2030 (13.6% of GDP). Gains from increased performance outweigh those that come from replacing labor with machines in some sectors, which play a major role in the young and resource-rich economies of the Middle East. For example, 85% of gains in oil and gas are likely to be in performance rather than labor substitution. This is similar in the redesign of the automotive industry or the large changes we are seeing to consumer marketing techniques. Spending on AI is also a significant economic factor. International Data Corporation estimates annual spending on AI in the Middle East and Africa to reach AED 419.54 million by 2021, increasing 32% a year. Using the UAE’s national statistics, the absolute opportunity to increase economic output based on current technology capabilities rather than focusing on annual productivity growth was calculated 3. Assuming automation happens to the full extent it can in each industry, there is a potential gain of AED 335 billion in increased economic output for the UAE. This is the equivalent to 26% increase. 2. Smart Government The UAE public sector is already a leader in smart public service delivery: The UAE is already taking steps to apply AI in innovative ways across government – dynamically adjusting transport timetables to respond to incidents, using AI sensors for smart traffic, deploying facial recognition to monitor driver fatigue and introducing chatbots to improve customer service. Objective 4 explains how the UAE will take steps to increase the amount of government experimentation with AI to improve the lives of its citizens. 3. Data Sharing and Governance It is part of the UAE’s ethos to turn ambitious visions into deliverable projects. This connection between big ideas and practical implementation will, become an asset in AI policy discussions, that can fall easily into abstract or implausible science fiction. Combining hands-on experience with new technologies and global policy development is a strong way to develop a plausible, positive future for AI. How will the UAE ensure AI is used for good? Public debates about AI often focus on whether or not it could take over important human decisions: from whether we go to war, to who receives medication. There continues to be a range of views about the prospects of AI, and many potential future scenarios for AI in the UAE societies. There is still time to change what this future will look like, making it one that more clearly reflects the UAE’s values. The actions we take today are still very much under human control and can still reflect those values. Responding to this opportunity, several of the initiatives in this strategy aim to develop a values-driven approach to AI: The UAE Government will play a direct role in designing and enabling AI systems that create the most value for society (objective 4). This will also give the UAE practical experience of how these systems operate and allow the country to identify, ahead of time, any potential unintentional consequences. These schemes and the national pilots in objective 2 will guide the approach to the governance of AI (objective 8). This approach to governance - embedded in worked examples - will help take the UAE beyond abstract statements to useable guidelines for values-driven AI. The schemes will advocate these guidelines on a global stage, working with other countries and international technological groups (also objective 8). Finally, research that keeps to these ethical principles will be rewarded (objective 6). 4. New Generation of Regional Talent A young and growing regional population is often described only in terms of unemployment. Youth unemployment in the Arab countries and Middle East was 30.6 % in 2016. It remains the highest of any region globally. But the Middle East and North Africa has an unusual segment of the professional workforce. There is a high proportion of professionals already involved in operations, IT and engineering. In fact there are giants in the field of AI who have come from some of the most fragile states in the Middle East. Iyad Rahwan and Oussama Khatib were both born in Aleppo, Syria. Iyad is now the director and principal investigator of the Scalable Cooperation group at MIT Media Lab. Oussama is a professor of computer science at Stanford University. The UAE offers access to world-leading universities and a safe hub for highly skilled professionals to re-skill the most in-demand AI roles. The country needs to leverage on its geographic position, and this existing cohort of talent around it. Out of the job functions reported on LinkedIn profiles, operations, information technology and engineering are ranked 1, 4 and 6 respectively 3. There is some evidence that there is a significant subset of these individuals already starting to combine technical skills and business operations. Data from jobseekers on the Middle East and South Asia jobs website, Bayt. com, shows that business analysts with technical skills often already have sophisticated, AI-relevant skills. 21% of the skills identified among this group were associated with business intelligence software like IBM Cognos, Microsoft Power BI or Qlik Sense. 20% were to do with data operations experience, for example with Hadoop or Apache Pig. 8% were Machine Learning & Statistical Modeling tools like Neural Networks 5. The UAE is also globally competitive when it comes to the proportion of university graduates who study STEM subjects (22% compared to 16% in the US). These graduates already have the base foundational skills relevant to AI (computer science, programming literacy, and statistical analysis) and so can be rapidly upskilled to become AI-ready. EIGHT STRATEGIC OBJECTIVES Although priorities are set out above, there will need to be a complete system of support to move from a nation that adopts AI to one that is building and exporting it. The UAE’s first steps will build a strong brand through AI activities that demonstrate the UAE as a testbed for AI technology. This will come through brokering agreements with international firms to base pilots in the UAE (under objective 2); it means coordinating access to domestic data systems applications (objective 3); and it will require government to take the lead in providing AIenhanced services (objective 4). There are also some early steps to be made in starting to build stronger foundations in talent, research, data and governance. Publicly accessible AI courses have already begun with large tech partners (objective 5); and international discussions on the positive use of AI provide an active platform for better governance of these technologies (objective 8). Over time, AI activities will include more significant programs – from funding for proof-of-concepts to a domestic AI Accelerator. The foundation will also start to grow a new generation of AI-ready talent, complemented by regular presence from leading global AI researchers in the UAE and through playing a leading role in international governance initiatives. Colleagues in the UAE Government, international bodies, educational institutions and global AI firms will play a significant role in achieving some of these objectives. The Office of the Minister of State for Artificial Intelligence (henceforth ‘AI Office’) will help broker new partnerships, particularly in education and governance. In particular, the AI Office aims to support other Ministries to make the most of world-leading AI technologies in their projects and policies, as well as train a generation of AI-ready talent in the UAE. The second half of this report provides more detail of the direction under each objective. This includes detail of initiatives that are already running, ones that to start over the next 3 years, as well as examples of successful policies and projects from other nations that could provide templates for UAE policymakers. OBJECTIVE 1: BUILD A REPUTATION AS AN AI DESTINATION To become a global AI leader, the UAE needs to compete with destinations around the world that are also trying to attract scarce AI talent and grow AI investment. Boston, London, Beijing, Shenzhen, Toronto and many other places are all vying to be the ‘next Silicon Valley’ for AI. Achieving this objective will require a brand that is built on what differentiates the UAE: its established reputation as a bold innovator. This reputation already brings companies to the country. SparkCognition, the world-leading AI firm, recently announced their first international office outside the US to be based in Dubai. This objective relies heavily on achieving the other seven. Those objectives are necessary but not sufficient to deliver the UAE as a destination for AI talent and investment. There will also need to be a brand campaign that explains and illustrates the UAE AI offering in a compelling and authentic form. This brand will provide a practical means to communicate this to the rest of the world. This has been announced as ‘UAI’. UAI Brand The UAE is developing a UAI brand and will use this to attract talent and business from across the globe to come to the UAE to test and develop AI. This includes a UAI mark recognizing high quality, ethical AI companies. It would reward safe, efficient, verified AI technology with a ‘UAI Seal of Approval’. The UAI will consist of four levels of approval to include Public Sector Level, Private Sector Level, Institutional Level, and Product Level. The certification system is based on the highest level of world-wide standards that will establish the core requirements in obtaining the UAE Seal of Approval. This robust, rigorous, and comprehensive certification methodology will ensure verifying the entities with the best AI technology in the region. The UAE is aiming to host key international conferences and forums on AI making it a hub for global experts and entrepreneurs. With this, the UAE will become the center of AI startups in the region. Singapore developed a successful brand campaign called ‘Smart Nation’. It demonstrated the connection between digital innovation and national priorities, signaling that the digital revolution is at the center of Singapore’s national strategy. A brand identity was backed up by regular 5, substantive indicators of progress in the field. OBJECTIVE 2: INCREASE THE UAE COMPETITIVE ASSETS IN PRIORITY SECTORS THROUGH DEPLOYMENT OF AI AI has the potential to generate up to AED 335 billion in the UAE economy boosting this by supporting industry pilots in sectors where this kind of intervention will create the most economic or social value. This objective details our initial priority sectors. This effort is complemented by support for government services in objective 4. In the medium to long term, these priority sectors could change. Existing Assets The largest economic gains from AI will come in significant and mature sectors, where the AI potential is also high – finance, resources, construction and retail trade. Government has a role to play in supporting industry to achieve these gains – helping industries to develop AI where a competitive advantage exists, incentivizing global AI firms to locate in the UAE and local firms to connect globally, and finally by supporting business more generally with advice to become successful in an AI enabled world. In three sectors, there are additional national assets or need for innovation that make them priorities: a. Resources & Energy: The UAE is the 5th largest exporter of oil in the world. The existing extraction industry already uses modelling software and algorithms to support its operations. As the UAE makes the transition to renewable energy supplies and more efficient water desalination, there is also an opportunity for AI systems to play a fundamental role in energy sector innovation. There is an opportunity to open up this sector to more companies, and provide support for proof-of-concept systems developed first in the UAE. The UAE is planning a proof-of-concept to utilize AI systems in order to focus both internally, to make energy saving decisions, and globally to understand supply and demand for oil. Energy supply and utilities is also an area of innovation. From smart grids to water recycling, there also needs to be support for small companies and utilities supplies to test and improve this infrastructure. b. Logistics & Transport: The UAE is a globally competitive transit hub. 60 million people pass through Dubai Airport each year; 26 million pass through Abu Dhabi Airport. Jebel Ali port is the largest marine terminal in the Middle East and provides market access to over 2 billion people. Airport and port management companies from the UAE continue to expand their management of overseas facilities. The UAE’s peninsular location between South Asia and East Africa provides an enduring advantage. There is an opportunity to make the most of these assets – facilitating test beds for new technologies in these locations by deploying AI solutions for air traffic management, baggage handling, and airplane boarding.. Demonstrator projects that make the most of these physical and digital assets in logistics and transport will be funded. c. Tourism & Hospitality: Tourism is a highly visible, successful export sector for the UAE. There is a particular opportunity to integrate services attracting tourists to the UAE and the packages that are offered once they are here, including business travelers and those on short stopovers. The greatest opportunity in Tourism & Hospitality comes from innovations that have potential for spillover into other customer service sectors. AI can be utilized to predict tourist’s needs and provide customized services. Emerging Sectors There are three other sectors, where the UAE has different kinds of advantage – these are not about existing scale but pockets of opportunity that are already visible. There have smaller, but valuable data assets; fast-growth and entrepreneurial activities or areas where government are taking a lead in the sector. The opportunity in this sector is to create partnerships that can boost tourist numbers in the UAE, where those tourists have AI-driven schedules or use automated assistants during their stay. a. Healthcare: Government does not own the healthcare industry in the UAE, but it plays a significant role in it. Dubai Health Authority’s new Dubai Genomics program hopes to bring population-scale whole-genome sequencing to the Emirate. The aim is to use the diverse genetic community in the UAE as a resource for new scientific studies, which make it easier to predict risks associated with genetic-related illnesses. This kind of study, and similar uses of patient data from UAE hospitals, could lead to novel opportunities for digital health innovation based in the UAE. The opportunities will most likely be low in number but some could be world-leading or have significant impact on the care of individuals with rare diseases. For example, testing diagnostics in a clinic that has access to the latest monitoring technology, detailed historical patient data and a diverse population could provide a rare asset for healthcare companies. There is also an opportunity to focus on diseases that are prevalent in the region, which receive relatively little attention from global pharmaceutical companies. The AI Office is most interested in providing access for companies and researchers to hospital and national databases, where their work could develop specialist capability in diagnostics that use AI, particularly for common diseases in the region. The AI Office has funded research into developing an AI algorithm for detecting Tuberculosis in patients via diagnosis of X-ray data and the pilot was launched at the United Nations World Data Forum 2018. b. Cybersecurity: Historically, the UAE has attracted the regional hubs for large technology companies like SAP or Microsoft, which often locate to free zones within the city. More recently, the UAE has grown or attracted smaller cybersecurity firms. There is significant potential benefit for government in developing better cybersecurity for their own services and for making the UAE a secure environment for business. There is also a strong entrepreneurial segment in cybersecurity, which the government wants to encourage. There will be more than 7.5 billion Internet users by 2030 (90% of the projected world population of 8.5 billion). Like street crime, which historically grew in relation to population growth, similar evolution of cyber crime is being witnessed with projected damage costs to hit USD 6 trillion annually by 2021. Hence, cyber security is a big investment that requires a priority considering the global shift towards maintaining safety. Over the next five years, the global spending on cyber security will cumulatively exceed USD 1 trillion7. Supporting pilots that demonstrate new cybersecurity approaches in the UAE first. There is also interest in community-building and skills-building programs for SMEs and local talent that focus specifically on AI as a risk or opportunity for cybersecurity. Proof-of-Concept Support in Priority Sectors Within these five priority sectors, the UAE government will fund or broker pilot projects. These proofs-ofconcepts could be designed by public sector, private sector or consortia. Funding will depend on how well proposed pilots map onto the reasoning for each priority sector as detailed above. For example, the AI Office is working with various private sector companies to develop pilots that use quantum computing to support health diagnostics and global energy supply management. Developing AI technology in the UAE will help the UAE diversify its economy, enhance productivity and find new sources of growth. It will also firmly establish UAE’s credentials as a world leader in AI and act as a catalyst to attract further talent and investment. Focusing efforts in industries with an obvious potential for AI development, commercialization and export exists will maximize the likelihood of success and the return on investment. OBJECTIVE 3: DEVELOP A FERTILE ECOSYSTEM FOR AI A combination of funding, knowledge, and strategic support will be needed to develop a domestic AI ecosystem. This starts with better access to local data infrastructure and funding for projects that make the most of this which will lead to opportunities for building new companies. Once these elements are in place, there needs to be incentives for world-leading products and services to be developed in the UAE. There are difficulties and uncertainties in developing algorithmic services. AI systems often require coordination across several locations, firms or industries. They also require trusted partners in order to automate products and services. Governments can play an important coordinating role, providing access to networks, data and finance that can help overcome these barriers. AI Network In order to encourage more research, collaboration and commercialization local expertise will be aggregated through the establishment of a network of researchers, industry experts and policy experts from across the UAE. Funding for AI research and companies could be provided according to priorities identified by the group, backed by evidence from a survey of regional AI activities. The Mohammed bin Rashid Innovation Fund has AED 2 billion to support local innovators. Collaboration between the fund and the UAE Artificial Intelligence and Blockchain Council (see objective 4) could support companies that need access to government data or partnerships with Government. The AI market is estimated to grow to USD 60 billion by 2021, with China alone aiming to create a USD 150 billion market by 2030 8. The UAE will need to accelerate domestic AI commercialization in order to capture its share of this growing market. There are currently an estimated 2,600 AIfocused startups globally, but the vast majority of them are in America and China, along with economies like the UK and Japan 9 . The UAE has an opportunity to become a competitive regional hub for AI entrepreneurs through providing a supportive ecosystem. A developed ecosystem of local startups will ensure that AI solutions are catering to the market needs of the UAE economy, rather than being reliant on adapting imported ideas and products. Applied AI Accelerator The AI Office will support the development of a domestic AI startup and product development ecosystem through incubator funds, mentoring, and publication of shared knowledge. Zeroth.AI, a Hong Kong based AI accelerator, provides USD 120,000 in seed capital to companies in the program for exchange for 10% equity stake. They also provide mentoring and support to get a long-term visa in Hong Kong. Another example, this time of a government supporting industry development, is in AI Singapore’s 100 Experiments project. The project funds researchers and academics with up to USD 250,000 to work on industry specific problems for which AI technologies may be quickly built, but without the need for time and resource-consuming research. AI Incentive Scheme for Overseas Companies Greater FDI by foreign firms will be a key enabler of industry development, bringing technology and skills to the UAE. The scope for greater FDI is real. 70% of global executives believe technological change will lead to an increase in global FDI10. While the UAE is seen as a promising source of FDI, it is not seen as a top destination for FDI investment. Planned relaxation of foreign investment laws and improving reputation for ease of doing business should facilitate greater FDI11. Incentives will be developed to encourage UAE firms to partner with global AI technology firms to foster greater links into global value chains and enable technology transfer from international firms. The incentives will also motivate international companies to set up regional offices in the UAE or relocate here. For example, a new cyber research center in Stuttgart and Tubingen, Germany (the Max Planck Society’s Institute for Intelligence Systems) attracted foreign investment from Amazon leading to an estimated 100 jobs over the next five years and providing EUR 420,000 per year to fund research students. Foreign investors were driven by locating near this known center of talent, which previously had not engaged with industry partners. Although the UAE does not have this kind of strong AI talent hub, it is building attractors that will grow the technical community here quickly Business Support for UAE AI Firms Once local systems and companies are in place, the next step is to form more ambitious UAE presence in global markets. Creating global markets often requires investments that are speculative (e.g. international trips, marketing campaigns) or require coordination (e.g. trade missions, joint ventures). This can often be difficult for individual businesses to undertake. Similarly, investments in new products require largescale investments, which can carry too much risk for any one investor. Governments can help business solve this problem by offering guidance, financial support, and by acting as a coordinator. Providing support and guidance will overcome knowledge barriers to developing AI solutions and strengthen connections into international markets, increasing exports and growth. OBJECTIVE 4: ADOPT AI ACROSS CUSTOMER SERVICES TO IMPROVE LIVES AND GOVERNMENT Government can play a strong role in making sure AI delivers the greatest public value, by making citizens safer, healthier and happier. The UAE also faces significant social and economic challenges, where the outcomes for the population are poor compared to other countries. For example, high rates of obesity and heart disease, high rates of traffic fatalities, poor air quality and poor education outcomes. Using AI to better respond to these challenges has huge potential benefits. There is a role for Government in supercharging this – providing the focus, resources and drive to solve these challenges. National AI Challenges A single program could be set up to support the best ideas from across government, universities and the private sector, which solve the UAE’s most pressing challenges using AI. In Australia, the government recently launched a National Missions Program, beginning with making the nation the healthiest in the world. This included a step-change increase in investment in national genomics and personalized medicine capability and its integration into medical research and healthcare systems. In similar fashion, a nationwide program to tackle the UAE’s distinctive challenges will be launched. The best ideas will receive funding, mentoring and access to data. Importantly, the program will have the potential to demonstrate the benefit of AI to the UAE population and inspire the nation to embrace AI to make lives better. UAE Artificial Intelligence and Blockchain Council AI can also be used to improve the experience and cost of government transactions and services. There will be fewer time-consuming administrative processes, fewer errors, and more convenient services. Building on a successful generation of digital government initiatives, the UAE has an opportunity for global leadership. But government entities need support from political leaders to move key services – such as tax filings, applications, regulatory compliance checks, payment of fines – to interoperable digital platforms, with high-quality, complete and accessible data. The UAE Artificial Intelligence and Blockchain Council includes representatives from all emirates on both federal and local levels. The Council’s main objective is to identify how and where AI can be incorporated in government and what supporting infrastructure it requires. OBJECTIVE 5: ATTRACT AND TRAIN TALENT FOR FUTURE JOBS ENABLED BY AI A recent study commissioned for the 2018 World Government Summit in Dubai argued that for six Middle East countries, 45% of the existing work activities in the labor market are automatable today based on current technologies. This average is slightly below the global average of 50%12. The same study shows that this risk is higher in sectors when employees perform routine tasks like in manufacturing and transportation. In the arts, education and healthcare, where human interaction or creativity is more important, the risk is much lower. For the UAE, around 43% of existing work activities have the potential to be automated across key sectors such as administration, government, manufacturing and construction. With around 70% of Emiratis employed in the public sector, retraining of government workers is particularly critical. It has been estimated that almost 300,000 jobs in the UAE in the Administrative and Support and Government sector may be impacted by automation, with around 125,000 of these jobs held by UAE nationals13. This will have a major impact on the public sector workforce and needs to be carefully managed, with a 2016 survey of Emirati workers finding the ideal future role for 54% was one in administration i.e. a role that may not exist in the future. These predictions could prove inaccurate. Working practices in the UAE are often different to US job descriptions, which are the ones used to estimate how work can be automated. At the same time, the growing youth population in the region and dominance of job-related visas in the UAE could have the greatest effects on the underlying dynamics of the workforce. Given this, there is a significant lowskilled population whose job can easily be changed by automation, but who currently have few skills to make the most of these changes. 40% of the UAE workforce has good digital skills14. This is less than the 56% of people with good digital skills in the UK, the top rated-nation in the AI-Readiness Index15. For most of the population, developing better digital skills and basic understanding of AI will help them make better decisions in an economy where automation technologies enter the workplace. Public AI Training Free courses are being run for UAE residents to raise awareness and understanding of AI technologies. The UAE AI Summer Camp took place in the summer of 2018 and it supports the efforts of future knowledge transfer and building a generation capable of adopting advanced technologies in developing solutions for various future challenges. Over 5000 UAE residents received specialized training on the fundamentals of AI with hands-on experience . Upskilling Students There is a similar opportunity in the student population. The UAE has a small student population, but a high percentage (22%) are in core STEM areas: ICT , engineering and natural sciences. Upskilling STEM graduates with specialist courses will provide the fastest short-term solution to increasing the number of AI experts. This upskilling will also provide a stronger pipeline of students able to undertake post-graduate training in AI to develop the pool of UAE talent able to build AI systems. The United Kingdom has recently stated an aggressive target of having at least 1,000 government supported PhD places at any one time in AI and related disciplines, by 2025. In order to compete technically on a global scale the UAE must also be ambitious in its targets, to that effect, at the February 2018 World Government Summit, the Minister of State for Artificial Intelligence announced that the UAE has the intention to produce world-class AI talent. This will be done through upskilling 1/3 of the UAE’s STEM graduates per year (2000 students). Given the public sector is a major employer and potential user of AI in the UAE, The AI Office has also started specific training for government employees. Government Training The AI Office is offering more advanced courses for Government employees starting Q4 2018, focused on skills needed to work with them being the AI Experts (ambassadors) in their entities. These require participants to complete a capstone project related to their current job. The aim is to ensure that 100% of senior leadership in government - Director-General, Ministerial and Senior-Ministerial levels - are trained and versed in AI, with more junior government employees being trained on a more ad hoc basis. This illustration summarizes how skills training could fit together across different segments of the labor marketv Professional Upskilling There is also an opportunity to take professionals with expert digital and analytic skills and provide them with the training needed to become specialists in AI. In the New Generation of Regional Talent section of this AI Strategy, the strong segment of professionals in the region with operational and analytical skills was highlighted. It is the AI Office’s aim to help upskill these individuals. Upskilling existing professional workers in the UAE could include specialisttraining, secondments and study tours overseas. Employment Transition Support Skills training for 60% of the workforce with low digital skills would benefit from more robust data on current skills in the labor force and current job openings. The AI Office supports the Minister of State for Higher Education and Advanced Skills in their efforts to improve this data collection, and champions efforts to develop a series of career advice tools and services to help current and future workers make more informed choices. OBJECTIVE 6: BRING WORLD-LEADING RESEARCH CAPABILITY TO WORK WITH TARGET INDUSTRIES This objective is concerned with building the wider knowledge production in the UAE, including university and commercial R&D. This will need to include increasing investment in research and encouraging world-class academics to work in the UAE. Investing in AI R&D capability is a necessary first step. The US, France, UK and China have embraced strategic national plans to boost AI’s share of its R&D investments. The UAE is ranked 35th in the world for overall R&D investments. There are researchers in UAE institutions developing or modifying algorithmic or automated technologies. To provide a targeted boost to R&D in AI, the focus will be on supporting and expanding the research of this small community. The UK’s national institute for data science and artificial intelligence was created as a partnership between centers of excellence at existing universities. Five founding universities – Cambridge, Edinburgh, Oxford, UCL and Warwick – and the UK Engineering and Physical Sciences Research Council created The Alan Turing Institute in 2017. It provides coordination and support for the research community, without the overheads of establishing a new university-scale institution. The AI Network in Objective 3 will help support similar coordination. Even in countries with a wellestablished research base, AI experts are in short supply and highly attractive to industry. For example, 65% of Google DeepMind research hires came from academia16. AI ideas are still emerging and new technologies are still finding their way to industry. Governments are investing heavily in AI, to supplement but by no means match significant investment by private companies. The US and China are world-leaders in developing domestic research capacity. This dominance is visible in AI research output, where the countries also produce the most number of original research papers on AI17. Countries with fewer researchers are still able to have research impact by building capacity in strategic areas. Countries like Canada and Spain have already developed hubs in AI-related research. The UAE is a young country that has not yet established a strong academic tradition to provide a pipeline of world class researchers. It will need to look for other ways to access research talent. With more than half the world’s population just a five hour flight away, the UAE is in a prime position to attract global research talent to visit the UAE to help build capacity and share their AI knowledge. Short-term opportunities for leading AI professors to work and experience the potential in the UAE may also support the UAE to attract leading professors in the medium to longer term, and develop UAE university capacity. Saudi Arabia’s Center for Complex Engineering Systems is a partnership between the Saudi Government and MIT, creating a flow of expert academics to Saudi Arabia. National Virtual AI Institute To ensure this increase in investment is well targeted, the AI Office will survey current local R&D capacity. This will help identify options for what is required and how best to boost R&D that can be directly applied to industry, providing a medium-longer term solution to addressing the UAE’s R&D gap. Following the survey, the UAE will launch a National Virtual AI Institute with stakeholder partners to aggregate the best local and global expertise in the region, and to encourage more R&D activity, collaboration and commercialisation. The AI Network in Objective 3 will provide the platform for this R&D network. Key Thinkers Program A program to attract key AI thinkers to visit the UAE will be initiated. These key AI thinkers will participate in workshops and lectures with local universities and businesses. Key Thinkers will also be provided with incentives to run research projects in partnership with these local bodies. In line with objective 4, improving lives, and objective 8, good governance of AI, The AI Office will also want to recognize and reward AI research with the greatest value to society. An award for programs with outstanding governance frameworks or the greatest social impact would be a helpful incentive. AI Library The research gap can be closed if the benefit of research can be shared with those who have an interest in AI. In order to boost further innovation, the AI Office will work on creating an open-access digital library of research and papers in both English and Arabic. This will be a first-of-a-kind initiative to boost the research sector in the region. The UAE will also endeavor to create accessible summaries of UAE government funded AI research and programs in order to help encourage the development of AI solutions. The AI Library will be a joint collaboration between academia, industry and government. OBJECTIVE 7: PROVIDE THE DATA AND SUPPORTING INFRASTRUCTURE ESSENTIAL TO BECOME A TEST BED FOR AI Governments around the world are increasingly recognizing the value of the vast data sets they collate. Machine learning models need access to training data sets, and open data can also be used to test and improve AI systems’ performance. The UAE has taken steps towards opening data to improve transparency, but still significantly lags behind other countries in the number of open data sets it releases. 537 datasets are currently available, whereas Turkey has shared 1,280 and Canada has over 10,000. Data Sharing The UAE has an opportunity to become a leader in available open data for training and developing AI systems. The greatest advantage that the UAE has is in its diversified culture, with more than 200 nationalities residing in the UAE. Given the unique mixture of cultures in the UAE, the data sets that the country holds is impeccable. This data in combination with machine learning can aid in accurately diagnosing diseases such as Tuberculosis (TB) using Artificial Intelligence. The UAE realizes that the oil of the future is data and will invest into creating a robust data infrastructure. The UAE’s ambition is to create a data-sharing program, providing shared open and standardized AI-ready data, collected through a consistent data standard. The X-Road platform in Estonia supports access and combination of government and private databases, setting the stage for the application of machine learning tools. The data solution saves citizens over 800 years of working time per annum. Secure Data Infrastructure A secure data infrastructure will be necessary to facilitate data sharing, and manage privacy concerns. Investing in a single AI data infrastructure makes it easier to do this efficiently, and makes it simpler to access data relevant to research or developing new products and services. Some countries have already experimented with virtual data libraries. Australia’s SURE (Secure User Research Environment) allows researchers to access data in hospitals, general practice and cancer registries. While designed to handle health data, it is now being used by other agencies with sensitive data, e.g. the Australian Taxation Office and the Australian Department of Social Services. SURE offers a data repository service, where a user can purchase secure, hosted space for multiple datasets and projects and set their own data governance framework, if approved by SURE. SURE also offers single project workspaces where SURE manages both the data governance and technical aspects of hosting. In these cases, a user must seek research ethics committee approval for the research before a workspace will be granted. Beyond national datasets, there is also a need for data protection and authentication as part of good corporate practice in the UAE. As the consultative group under objective 8 develops, they will begin to address these issues. Europe’s General Data Protection Regulation includes new rights for consumers; it provides an opportunity to re-consider how consumer data is handled, even for customers who are not European citizens. OBJECTIVE 8: ENSURE STRONG GOVERNANCE AND EFFECTIVE REGULATION The speed of developments in AI is a challenge for governance. With vast research efforts around the globe, it is difficult to ensure this technology is developed in a safe and ethical environment. As Governments and leading AI thinkers around the world grapple with this challenge, there is an opportunity for the UAE to learn from the best and collaborate with others to ensure effective governance and regulation of AI, both domestically and internationally. The UAE has the ambition to take a leading role in the development of responsible AI and advancing the regulation of AI. For example, the UAE has an important contribution to make to this global discussion by connecting abstract discussions to pilots run by, or in partnership with government. This will also mean working to make sure the UAE has the legal environment to support innovation in general and the adoption of AI in particular. Innovations in AI technology often require rapid changes in regulatory settings and can create risks to society. The adoption of interconnected data systems and the growing dependence of major industries on software also makes an economy more vulnerable to digital disruption. Cyberwarfare capability will continue to grow, meaning that cybersecurity will become increasingly important. In the absence of a coherent national strategy, cybersecurity would be developed on an ad hoc basis. This is inefficient and risks leaving gaps. This will be addressed through the governance review. National Governance Review The UAE Artificial Intelligence and Blockchain Council will add to its remit to review national approaches to issues such as data management, ethics and cybersecurity. They will also review the latest international best practices in legislation and global risks from AI. Furthermore, the Council will ultimately oversee the implementation of the AI Strategy in the UAE. Other countries have developed advisory structures that combine expertise in technical fields and regulation. The 2016 White House Artificial Intelligence Strategy formed a standing committee consisted of regulators and industry experts. California’s Little Hoover Commission is currently studying the impact of AI on regulatory settings through a committee of experts. France has created a national AI ethics committee, as well as ethics-by-design training for tech developers to build ethical considerations into their projects. Globally, the UAE has begun work on a number of initiatives to help develop responsible AI. During the World Government Summit in February 2018, over 100 leading experts at the inaugural Global Governance of Artificial Intelligence Roundtable were hosted. This collection of AI experts debated how governments could best navigate the challenges posed by the rapid rise of AI. Second Global Governance of Artificial Intelligence Roundtable For the 2019 World Government Summit, The AI Office is working with UNESCO, OECD, IEEE and the Council on Extended Intelligence in identifying the foremost experts and themes to explore. All of these working groups will then present their outcomes at a High Level Ministerial Panel composed of the world’s foremost Minister’s of Digital, Technology and ICT who are responsible for the development and use of AI in their countries. Intergovernmental Panel on Artificial Intelligence A natural evolution of the Roundtable is in the formulation of an intergovernmental body, dedicated to providing a mechanism for governments and private companies to better understand AI and its impact on societies in order to help give a solid framework for future regulation, in a more tangible and enforceable manner. In March 2018, President Macron, at the launch of the French Artificial Intelligence Strategy, announced a desire to establish an “IPCC for Artificial Intelligence” – referring to the Intergovernmental Panel on Climate Change. The UAE has expressed a desire to work with France and other governments in creating the foundations for such a body. The AI Office is actively working toward making this happen. CONCLUSION The UAE is unlike any other country in its diversified population, comprising of unique talents – we aim to give this human potential the best opportunities to nourish and flourish. Given this human potential, the UAE has always aimed at not just being better, but to become the best. The AI National Strategy is a cornerstone of the UAE Centennial 2071 and is a major variable in the overall equation. It will bring transformation to a new level by 2031 and set the foundations for future generations in the UAE to become the best. As one of the first movers in paving the path for AI nationally, a plethora of challenges is certain to arise, but we are true believers in that nothing is impossible in the UAE. We are a country that is known for tackling challenges head on, creating new opportunities, and deploying innovative solutions. As Minister of State for Artificial Intelligence, I aim to catalyze the responsible development of AI within our country, in order to help us reach the UAE Centennial 2071 – and to act as an inspiration for other nations to harness this technology for the betterment of humankind.