UNITED ARAB EMIRATES
MINISTRY OF CABINET AFFAIRS
PRIME MINISTER'S OFFICE

AI ADOPTION GUIDELINE in GOVERNMENT SERVICES

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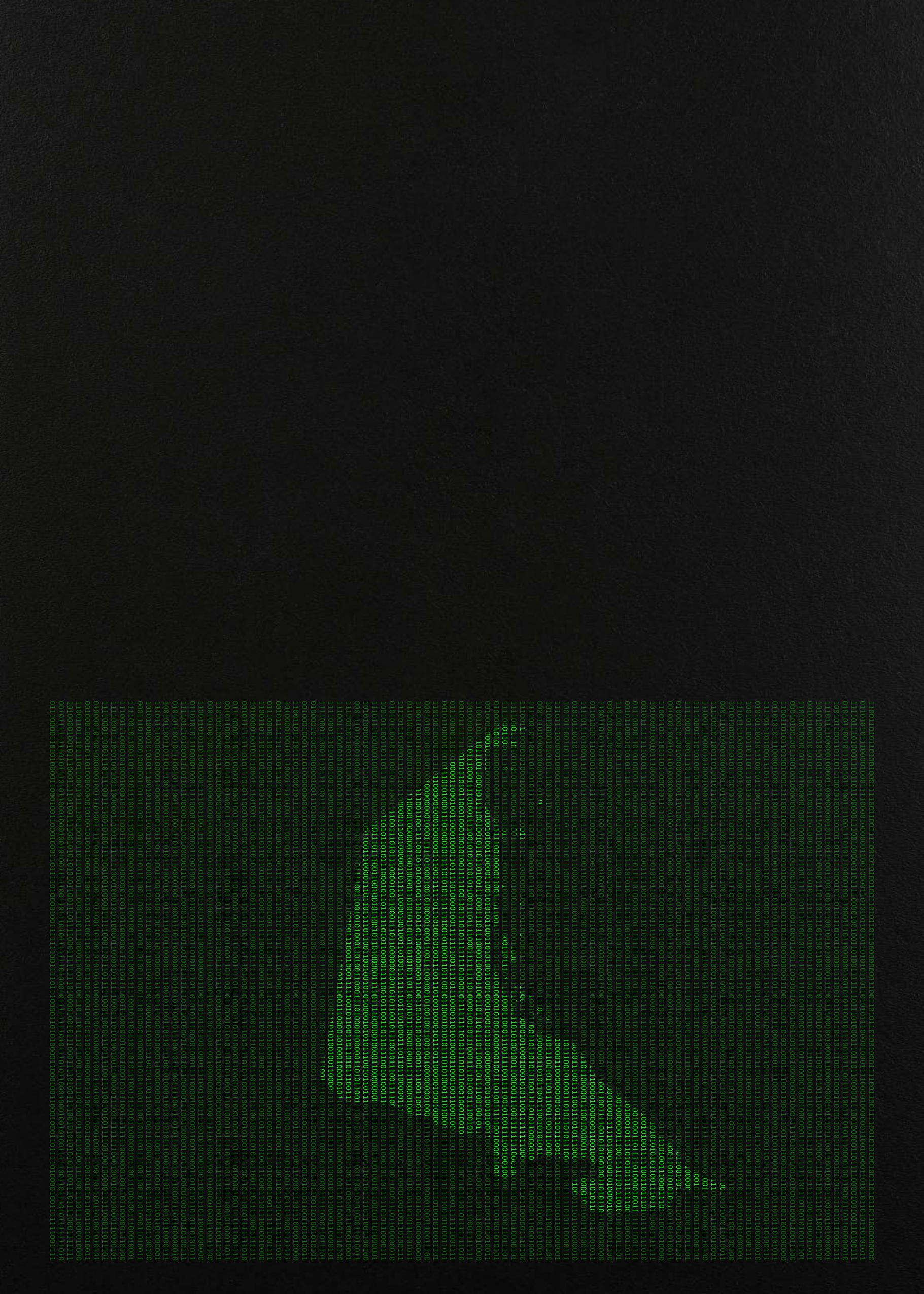

“THE **FUTURE** BELONGS TO THOSE WHO CAN **IMAGINE** IT **DESIGN** IT & **EXECUTE** IT.”

HH SHEIKH MOHAMMED BIN RASHID AL MAKTOUM
VICE PRESIDENT, PRIME MINISTER AND RULER OF DUBAI

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Context

Leading countries around the world are in a race to advance Artificial Intelligence (AI) maturity as the critical ingredient for national competitiveness in the coming era. This requires a national effort orchestrated by the government to drive AI adoption in a safe, ethical, and value targeted manner.

The UAE has already joined the league of leading countries in declaring its National Strategy for AI 2031, launching several initiatives for talent and partnership development, among others, to build national AI capabilities and accelerate AI transformation across government services.

As government plays a key role in the rotation to AI, it is the ambition of the UAE national leadership for government to set the example, and for the UAE to be positioned as the leading nation for AI adoption, especially across government services.

Key Objectives

Accordingly, the AI Adoption Guideline aims to actively contribute towards the realization of this ambition by:

Creating awareness

about AI, the value it can bring, and what resources are available to support adoption across government services

Harmonizing efforts

with the aid of a common tested framework that brings the national perspective and cascades it at government entity level, while still being adaptable to each entity's needs throughout their service delivery

Accelerating AI impact

through analyzing different AI journeys cutting across government services then synthesizing lessons learned and key considerations to support effective AI adoption, especially within the government services landscape

Provide a continuously updated repository of clear use cases

for AI in government services based on feasibility and value, whether it cascades across various entity levels or is specific to a single government service

Target Audience

The target audience of this document is the UAE Government and any agency engaged in delivering public sector services. Essentially, all national stakeholders play a vital role in taking a step forward towards AI adoption to catalyze the required momentum and drive national impact.

DEFINING AI

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Introductory Definition

In the simplest terms, Artificial Intelligence (AI) refers to systems or machines that mimic human intelligence to perform tasks and can iteratively improve themselves based on the data they collect. Although there are no AI systems that can perform the wide variety of tasks an ordinary human can do, some AI systems can match and even surpass human capabilities in specific tasks.

In line with the definition adopted by the UAE Minister of State for AI, Digital Economy and Remote Work Applications Office, AI describes a collection of technologies enabling a machine or system to comprehend, learn, act, and sense like a human. Successful applications of AI across government services range from basic automation of mundane human tasks (e.g. passport renewal processing), to mimicking human capabilities (e.g., AI conversational chatbots), to eventually transcending them (e.g., visual inspection of assets where AI can be much faster at detecting irregularities).

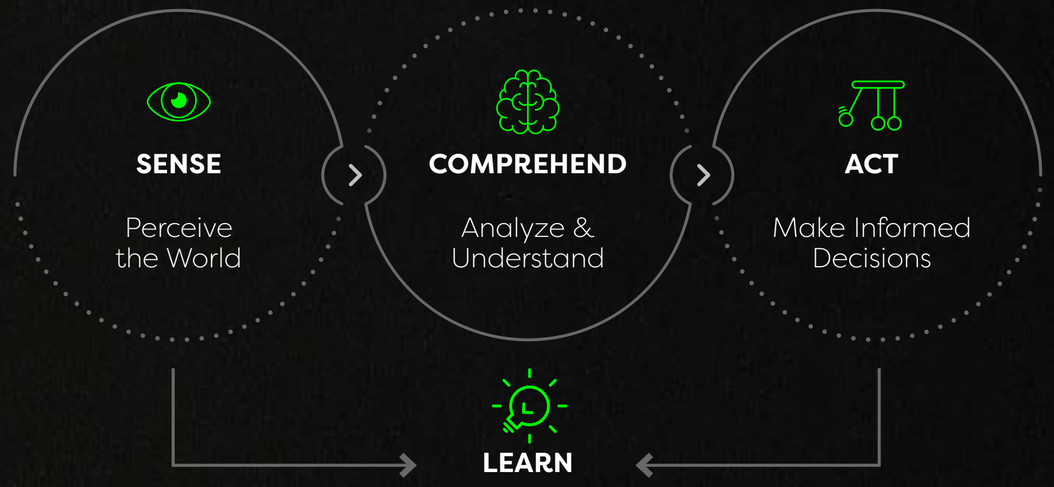


Figure 1 - Defining AI

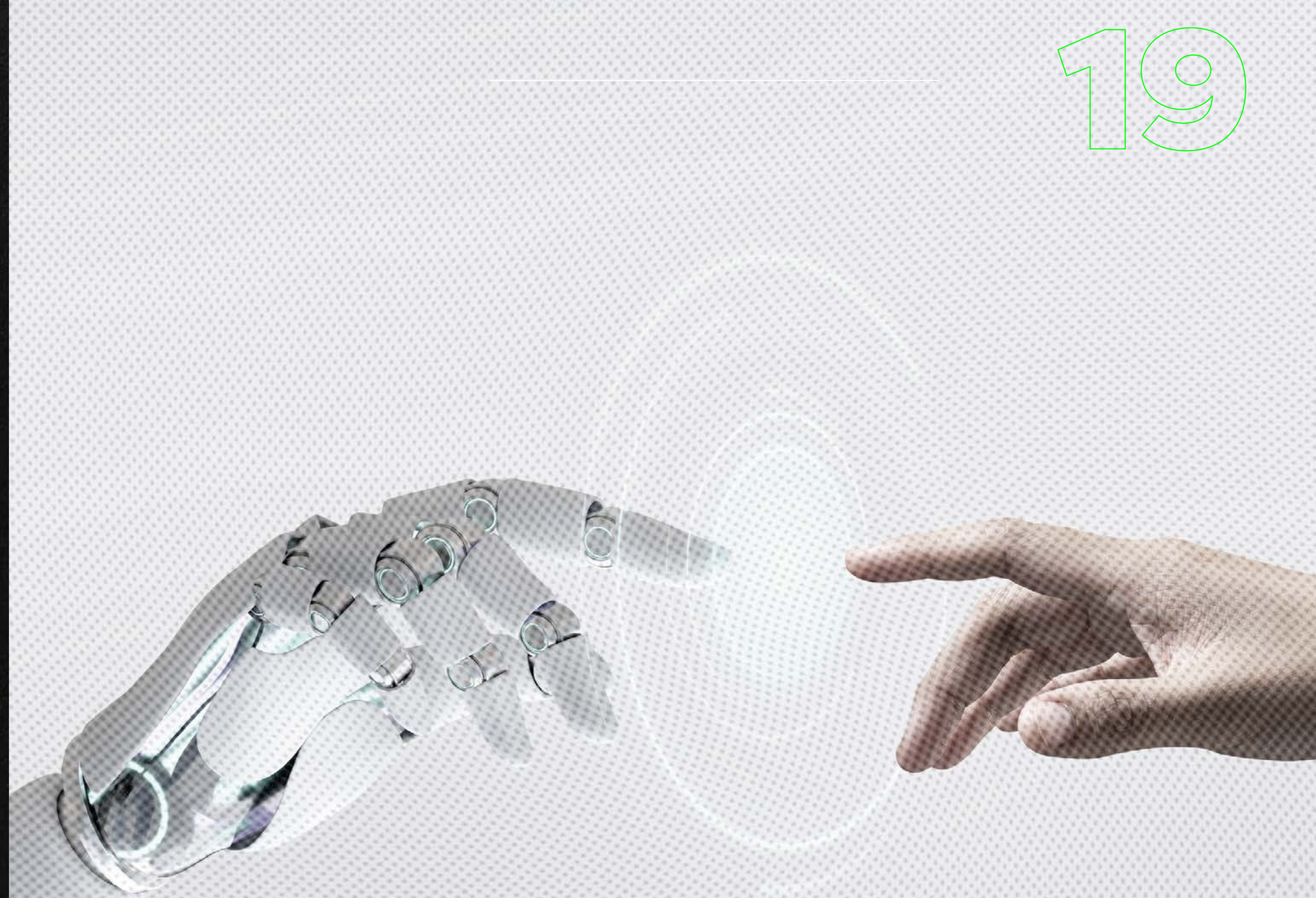
Most of what is experienced today is Narrow AI, which performs a single task or a set of closely related tasks. Applications of Narrow AI are powerful; they continue to influence how we work and live on a global scale. For example, AI is helping police forces identify suspects from vague CCTV images. More recently, there are growing efforts to progress towards General AI where perceptive machines emulate human intelligence, thinking strategically, abstractly, and creatively, with the ability to handle a range of complex tasks. While machines can perform some tasks better than humans (e.g., data processing), this fully realized vision of General AI does not yet exist. That is why human-machine collaboration is crucial and AI remains an extension of human capabilities.

In general, AI is about programming machines to form judgements with the aid of vast amounts of data. From a **Sense** perspective, machines can be trained to hear or translate audio to text, see or detect objects in an image or video, and detect changes in an environment thereby developing the ability to perceive the world.

Beyond Sensing, machines can be trained to **Comprehend** through knowledge representation. Efforts in this area are predominantly focused on Natural Language Processing or developing the ability for machines to understand language (nouns, verbs, propositions, etc.) and the meaning behind it then generate it.

Moreover, building on Sensing and Comprehending, machines can be trained to **Act** and make informed decisions. For example, after machines recognize biometrics at an immigration counter with high level of accuracy, the gate is instructed to open.

Similar to humans, machines also need to constantly **Learn** to improve its performance over time to Sense, Comprehend, and Act better. Data is the core element behind this.



AI Versus Data Analytics and Big Data

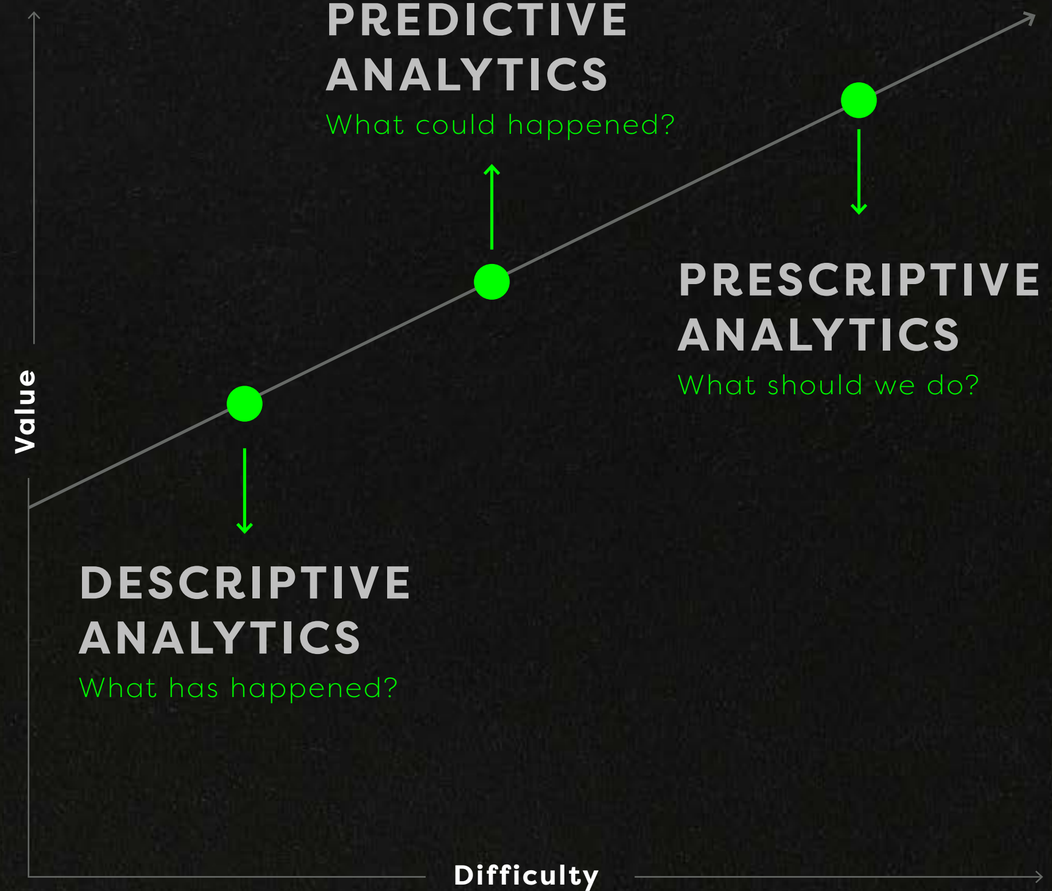
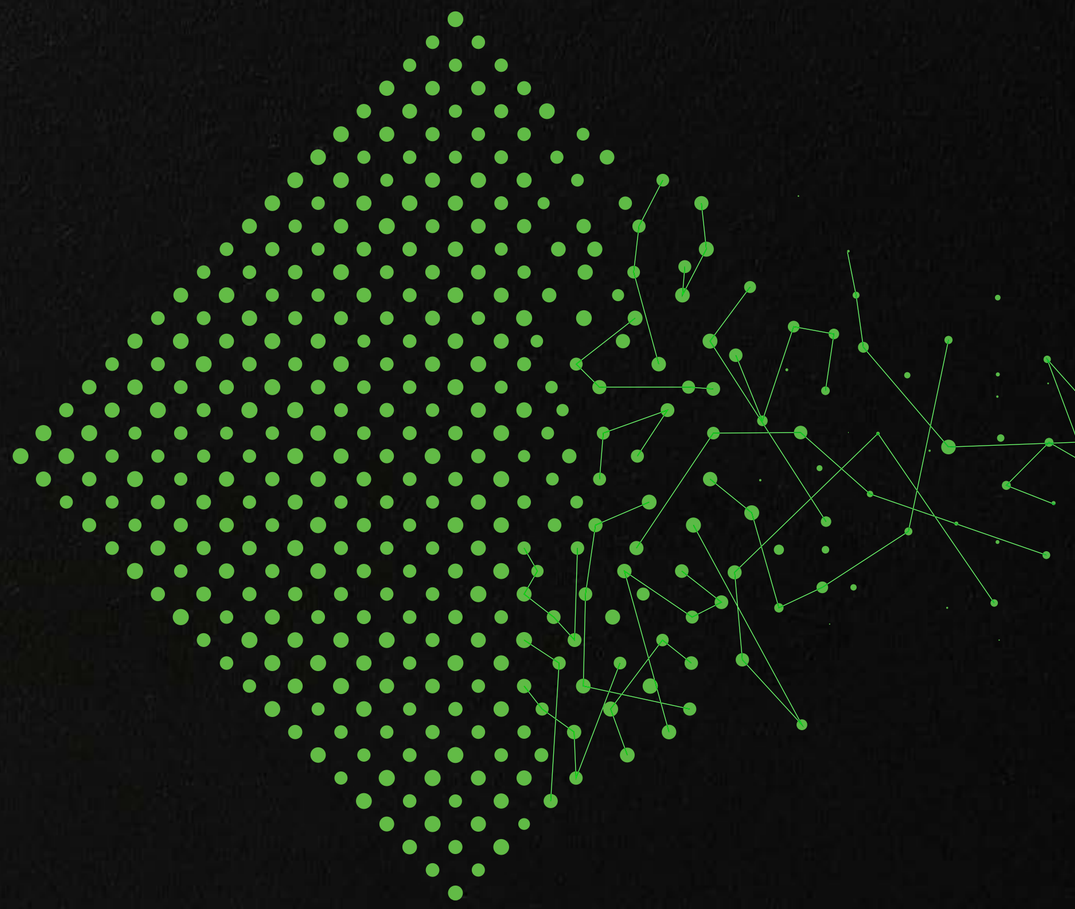


Figure 2 – Types of Data Analytics



AI and Data Analytics are related but not the same. While AI is the program to sense, comprehend, act, or learn, Data Analytics is the discipline focused on extracting insights from data through the use of AI or other analytical or statistical techniques. Data Analytics can be categorized as Descriptive, Predictive, or Prescriptive Analytics:

Descriptive Analytics:

This type of analytics does exactly what the name implies: they **describe** or summarize raw data and convert it into something that is interpretable. Descriptive analytics answers the **"What has happened?"** question, providing insights into the past and influencing future outcomes. This type of analytics is useful as it allows us to learn from past behaviors and understand how they might influence future outcomes.

Predictive Analytics:

This type of analytics is about understanding the future, it can **predict** what might happen, answering the **"What could happen?"** question. Predictive analytics provides entities with actionable insights based on gathered data and provides estimates about the likelihood that a future outcome might occur. However, it is important to remember that no statistical algorithm can predict the future with %100 certainty, this type of analytics is merely based on probabilities and as such, is used to forecast what might happen in the future.

Prescriptive Analytics:

This type of analytics allows users to **prescribe** several different possible actions, guiding them towards a solution to help answer the **"What should we do?"** question. Prescriptive analytics attempts to study and quantify the effect of future decisions to advise on possible outcomes before the decisions are made. It predicts not only what will happen, but also why it will happen, providing recommendations regarding actions that will take advantage of the predictions. In other words, prescriptive analytics predicts multiple outcomes and scenarios and allows entities to assess several possible outcomes based upon their actions. Prescriptive analytics is relatively complex to administer, and most entities are not yet using it. However, when implemented correctly, it can have a large impact on how entities make decisions.

Moreover, in relation to this, Big Data is the technology to capture, store, and analyze large volumes of data in a variety of forms and veracity to enable AI or Data Analytics. Accordingly, there is a high convergence of skillsets needed for each of AI, Data Analytics, and Big Data.

Underlying AI Domains

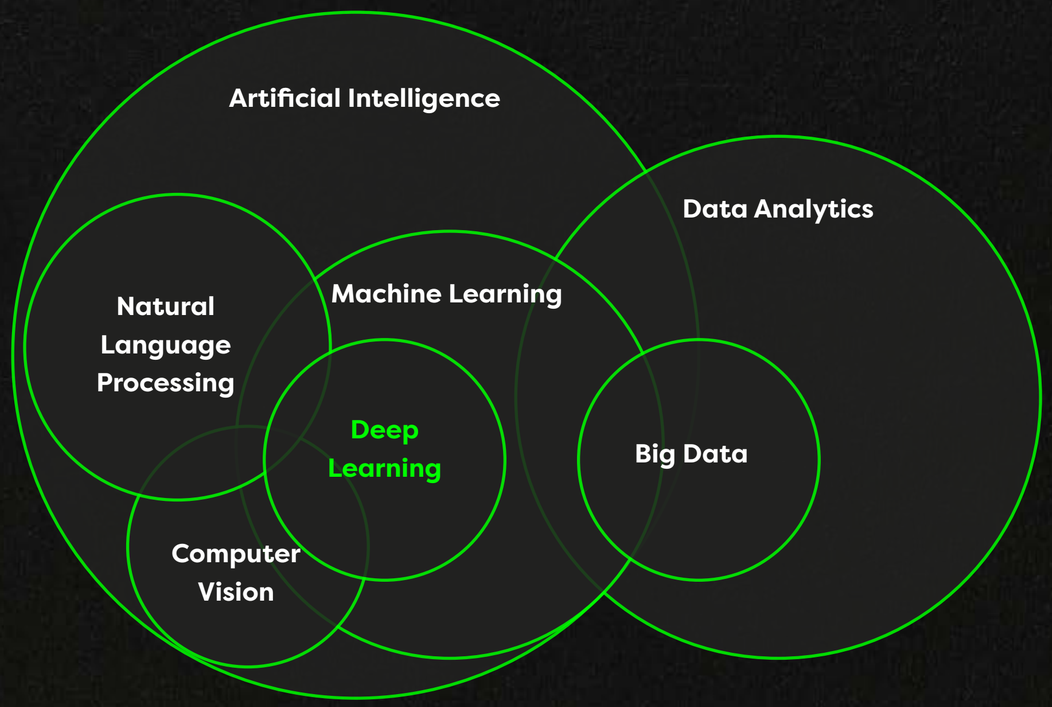


Figure 3 - AI and Underlying Domains Versus Data Analytics and Big Data

AI comprises a set of underlying domains including:

Machine Learning (ML):

Machine learning lies at the core of AI systems – algorithms whose performance improve as they are exposed to more data over time. The capability to learn from raw data powers most AI applications that are becoming ever more visible today.

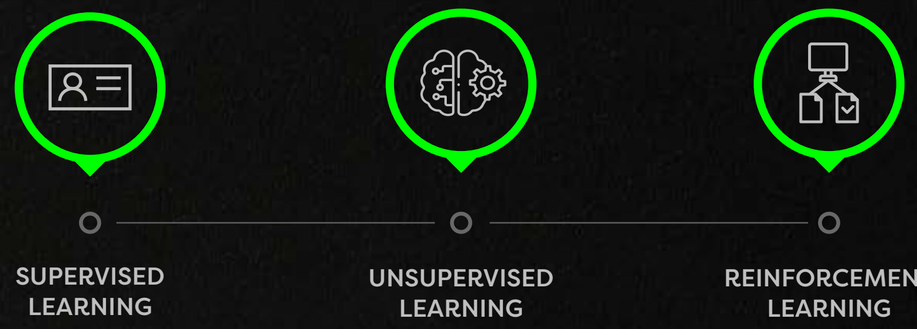


Figure 4 – Types of Machine Learning Algorithms

Some examples of machine learning include predictive systems that can forecast what is likely to happen, natural language processing that can comprehend speech and text in close to real time and computer vision that can understand visual inputs with extraordinary accuracy.

One of the real strengths of machine learning is that there are different types of learning algorithms which can be used, including supervised, unsupervised, and reinforcement learning.

Supervised Learning:

This type of machine learning is when the model is trained to map known inputs to outputs based on known examples. Therefore, it requires a good number of examples to learn from that show which inputs result in what outputs. These examples represent labeled datasets or data that has been organized and described to train the model. The model then deduces the most important features that characterizes each label in the dataset and learns to recognize those features in new data.

For example: showing the algorithm, a large number of labelled images of cats, it would learn eventually how to recognize a cat and spot one in any number of completely different pictures.

Unsupervised Learning:

This type of machine learning is when the model is trained to map inputs to unknown outputs by recognizing patterns in the data. The model relies on clustering, anomaly detection, or other techniques to make sense of the data. Conversely to supervise learning, the data in this case is not labeled. The model analyzes the patterns in the data and creates the rules to generate the outputs. The more data the better as always. Unsupervised learning is more difficult in practice and requires additional analysis to make sure the outputs are meaningful.

For example: showing the algorithm, a large number of unlabeled images of cats and dogs, it would sort images with similar characteristics into different groups without knowing that one contained "cats" and the other "dogs".

Reinforcement Learning:

This type of machine learning works by trial and error, using a feedback loop of "rewards" and "punishments". When the algorithm is fed a dataset, it treats the environment like a game, and is told whether it has won or lost each time it performs an action. As such, it builds up a picture of the "moves" that result in success, and those that do not, with the aim of maximizing success.

It is worth noting a fourth type of ML, semi-supervised learning which, as the name suggests, is a mix of supervised and unsupervised learning techniques when the data is partially labeled.

Deep Learning (DL):

It is a subset of machine learning in which multilayered neural networks learn from vast amounts of data. A neural network comprises an interconnected set of nodes which mimic the network of neurons in a biological brain. Each node receives an input, changes its internal state, and produces an output accordingly. That output then forms the input for other nodes, and so on. Deep learning is used, for example, in both image and speech recognition such as the ones used at government call centers. Deep learning systems can handle much larger datasets than alternative approaches.

Computer Vision (CV):

Computer Vision is a field of AI that enables computers to process, analyze and derive meaningful information from visual data such as digital images, videos, and other visual inputs in the same way humans do – and take actions or make recommendations based on that information. The concept of computer vision is based on teaching computers to process an image at a pixel level and understand it. If AI enables computers to think, computer vision enables them to see, observe and understand.

Natural Language Processing (NLP):

NLP is a field of AI concerned with the ability of a computer program to understand human language as it is spoken and written. It is the technology that is the basis of AI chatbots. Since NLP technology is based on understanding linguistics, its maturity varies by language. For instance, NLP is most mature in English and is still developing to reach higher levels of accuracy for Arabic.

THE IMPORTANCE OF AI IN GOVERNMENT SERVICES

The ultimate value of AI comes down to the application in a specific industry or functional domain. For example:

In **Healthcare:**

AI can be used across health-specific government services such as for preventing disease spread such as building a machine learning algorithm that cross-checks patients with similar symptoms from different locations, detects patterns, and warns when an outbreak might occur while using graph analytics. AI can also help in automating public health insurance claims and make this a more efficient seamless process for patients.

In **Public Safety:**

AI can be used across public safety specific government services to identify patterns in policing heatmaps to forecast where and when crimes are likely to occur. AI-based recommendations can be used to identify optimal police patrol presence. AI solutions enable geo-searches around locations of interest for better law enforcement.

In **Transportation:**

Congestions happen mostly due to incidents on roads, and it negatively impacts travel times, fuel consumption, and carbon emissions. AI can be used across transport specific government services to automate traffic optimization based on identified incidents which can be detected with the aid of Computer Vision then notify travelers through virtual agents on the road status.

Accordingly, the value of AI can be translated across key areas:

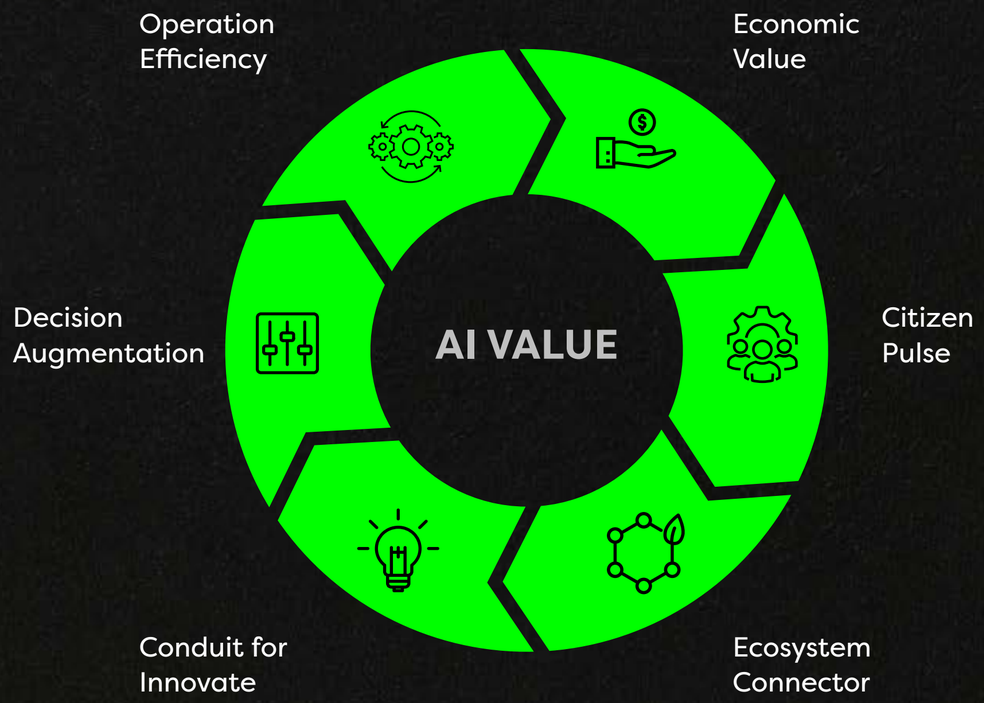


Figure 5 - Value of AI

Operational Efficiency:

AI applications in government services are mostly geared towards driving efficiencies, eliminating mundane tasks that can be automated, allowing public officials to dedicate their time towards more strategic, creative, and analytical activities. AI applications act as companions to public officials to bring in the relevant insights and recommendations, whether off or on the field, automate processes reducing them to single clicks based on decision rules, help them organize their work to focus on outcomes, and eventually deliver impact with higher operational efficiency.

Economic Value:

Building on operational efficiency, AI drives national productivity which translates to higher economic growth. Several studies analyze the additional GDP growth that countries can achieve with the adoption of AI. Therefore, as one of the key government's mandate to drive sustainable economic growth, government should lead the way to promote AI adoption across sectors, extending beyond government services, encouraging the private sector to follow suite. Moreover, the adoption of AI also represents an opportunity for the AI industry and R&D ecosystem to elevate their offerings. Growing the local AI industry and R&D would also contribute towards economic growth, generating opportunities for the private sector, as well as job creation.

Decision Augmentation:

AI is supporting government leaders in making top strategic decisions on national topics. For example, how would digital transformation impact employment? What is the impact of the data privacy regulation on the private sector? How do new visa schemes impact the economy? How effectively are we balancing real-estate demand and supply? All of the studies and impact analysis behind these questions that relate to government services stand to benefit from AI. It provides the ability to respond to arising situations and challenges in a more informed and adaptive manner.

Citizen Pulse:

Governments ultimately aspire to drive national prosperity and citizen happiness. Hence, having the ability to gauge citizen happiness and wellbeing is paramount. Natural Language Processing can be leveraged to capture citizen perspectives from social media or other public domains. This is a much more effective, proactive, and scaled approach to conducting regular surveys and enables timely interventions needed from government services while respecting data privacy and applying adequate controls to protect personal data.

Conduit for Innovation:

New possibilities can be unlocked with AI. The power of AI can be harnessed to deliver government services in innovative ways, whether they are more proactive, more efficient, more tailored to different citizen profiles, or others. Governments can also open opportunities for the private sector and R&D ecosystem to innovate around AI by offering them data, challenges to solve for, and many other types of incentives.

Ecosystem Connector:

Government as a platform is the new model for the public sector to deliver mission outcomes through the power of ecosystems. Government services transcend the boundaries of entities and require collaboration across the public sector and related partners. Beyond the development of digital platforms, equipping them with AI can optimize connections to power life journeys instead of individual services.

THE GLOBAL POSTURE OF AI TODAY

Rise of National AI Strategies

Recognizing its value, AI has become a top priority for many governments around the world. Over 50 countries have published their AI strategies.

GLOBAL AI AGENDAS

Figure 6 - National AI Strategies Timeline

Some of the ‘firsts’:

Canada was the first to launch its AI strategy in 2017

UAE was the first to appoint a Minister of State for AI

KSA was the first to grant citizenship to a robot

EU established the first international cooperation on AI efforts

South Korea defined the first strategy for R&D in the AI sector

UK was the first to set the AI governance architecture for ethical AI

Key Observed Country Positioning

Moreover, countries have taken different approaches for their national AI strategies:

1

Strtegic Focus

Address **National Challenges / Threats**

Capitalize on National **Strengths / Opportunities**

Become a Global **AI Leader**

2

AI Industry Development

AI **Consumer**

Balanced

+AI **Producer**

3

Role of the Government

Enable

Balanced

Drive

Figure 7 - Three different Approaches to AI

Strategic Focus:

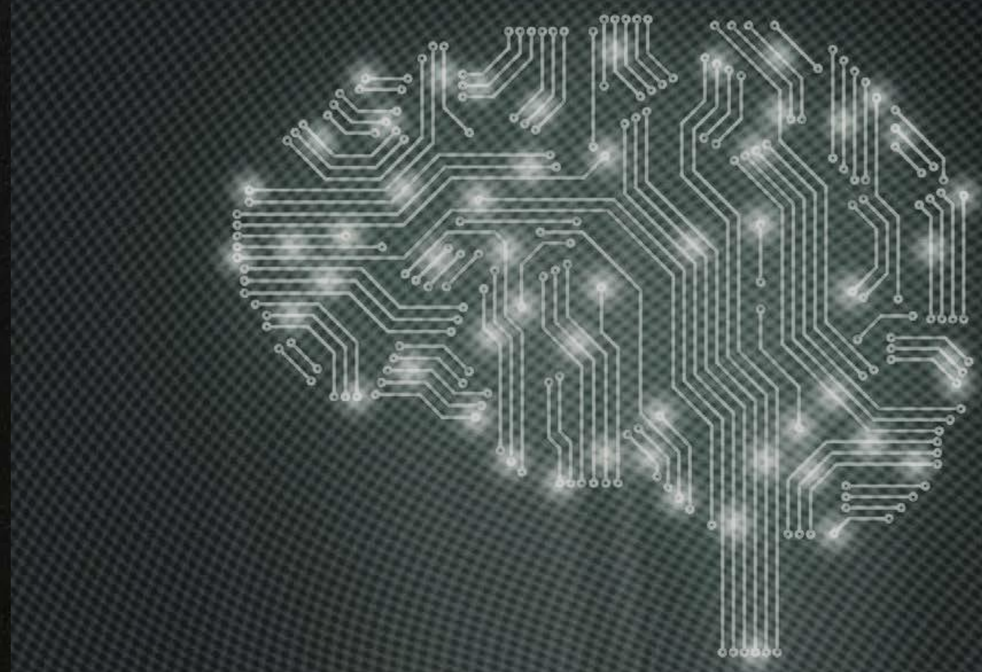
become a global AI leader versus address national challenges or capitalize on national strengths: While US and China are racing for global AI supremacy, Japan is focusing on health and robotics in government services delivery to address aging population and Singapore is focusing on leveraging AI to maintain its leading position as a global logistics hub.

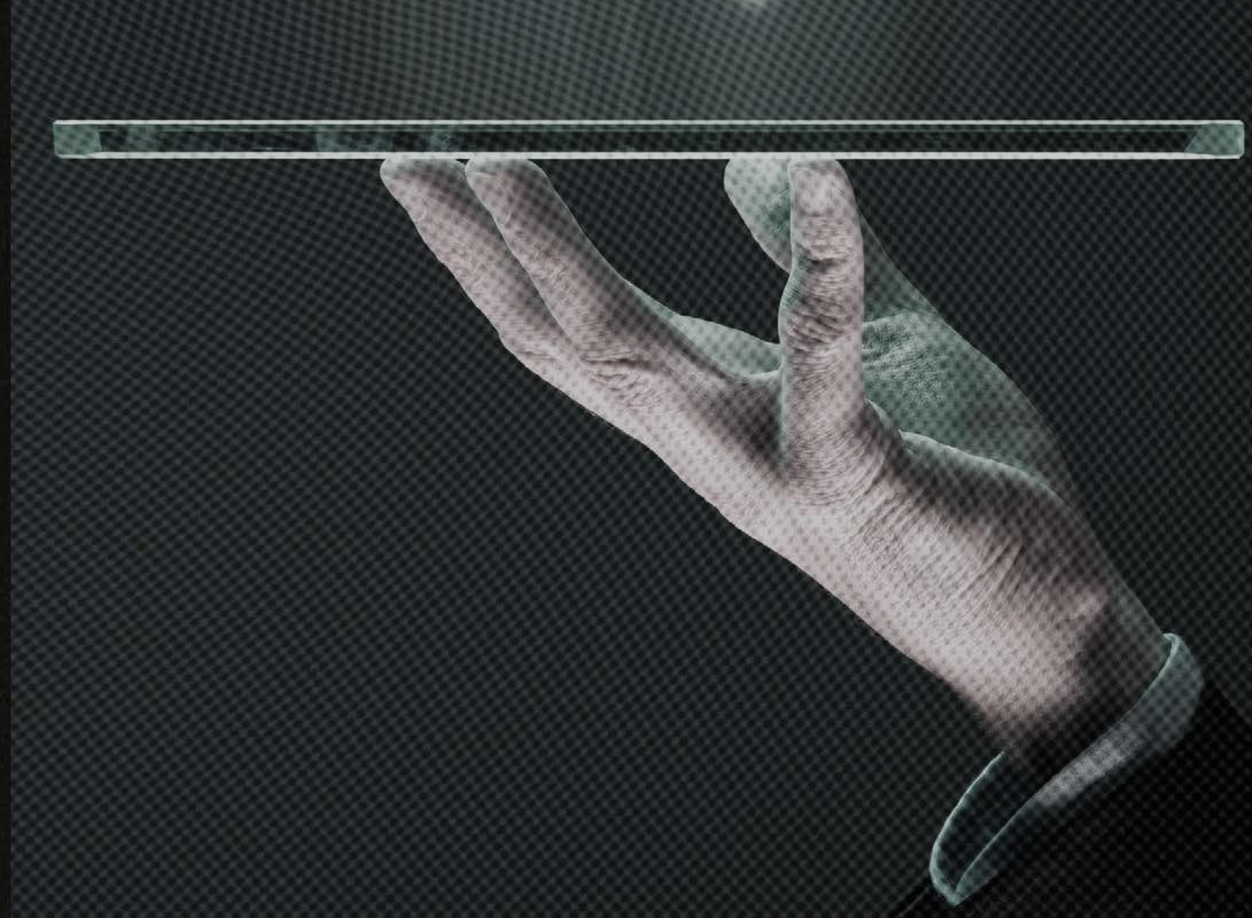
AI Industry Development:

while countries like India and Finland are focusing on AI adoption across government services to benefit from the latest technology progress, countries like US, China, and South Korea are focusing on the R&D ecosystem and growing the AI industry to elevate AI competitive advantage and exports.

Role of the Government:

as an AI enabler versus focused transformation: Countries like France and UK are focused on building infrastructure, talent, and other enablers to promote AI adoption whereas countries like China and South Korea are embracing a sector-focused approach to drive AI transformation across government services, driven by strategic public-private partnerships.





The UAE National Strategy for Artificial Intelligence 2031

The UAE has defined its AI vision “to become one of the world leaders in AI by 2031,” highlighting the role of all stakeholders across the nation to turn this vision into reality. The UAE has always been a first mover when it comes to the adoption of latest technologies across government services balancing between research and innovation and acting as a testbed, while also adopting proven applications and driving impact. The National Strategy for AI 2031 follows a similar approach while also developing key enablers including talent, infrastructure, governance, regulations, and others.

To bring focus to the national AI agenda, the UAE has defined priority sectors for AI transformation based on how AI is impacting different sectors and where the countries’ priorities and strengths reside.

However, this does not exclude other sectors. The AI transformation will eventually have to extend to all national sectors. Current priority sectors for AI transformation are: Resources and Energy, Logistics and Transport, Tourism and Hospitality, Healthcare, and Cybersecurity.

Furthermore, being a leader in smart government service delivery, the UAE is capitalizing on this strength to maintain a leadership position in AI adoption across the public sector. Each and every public official plays a fundamental role whether in elevating awareness about AI and finding ways to incorporate it in the strategic agenda, driving AI applications in terms of implementation and usage, or opening doors for others to apply AI by supporting with data or other required resources.

In summary, beyond advancing government services and operations with AI, the UAE Strategy for AI 2031 invites stakeholders across the public and private sectors to onboard on this journey, global experts and talent to contribute, researchers and thinkers to innovate, and the public community and youth to upskill themselves in this critical area for our future.

WHERE **UAE** STANDS ON GLOBAL **AI** INDICES

There are key leading institutions that have developed AI indices that can be beneficial for conducting a benchmarking analysis:

Tortoise Global AI Index:

A composite index that measures investment, innovation, and implementation of AI, along with a set of interrelated measures to assess the multidimensional concept of AI globally for 62 leading countries in AI space.

Oxford AI Readiness Index:

An AI readiness Index that aims to capture the capacity and readiness of the public sector to exploit the potential of AI and utilize it in their operations and delivery of government services. It provides a ranking for 160 countries around the world.

Clearly, the state of AI in government highly impacts the country's performance on these indices.

UAE Performance on Tortoise Global AI Index 2022

UAE performance on **Tortoise** index where **UAE ranks 34th**

Talent

#58 United Arab Emirates

Infrastructure

#10 United Arab Emirates

Environment

#27 United Arab Emirates

Research

#42 United Arab Emirates

Development

#23 United Arab Emirates

Government Strategy

#13 United Arab Emirates

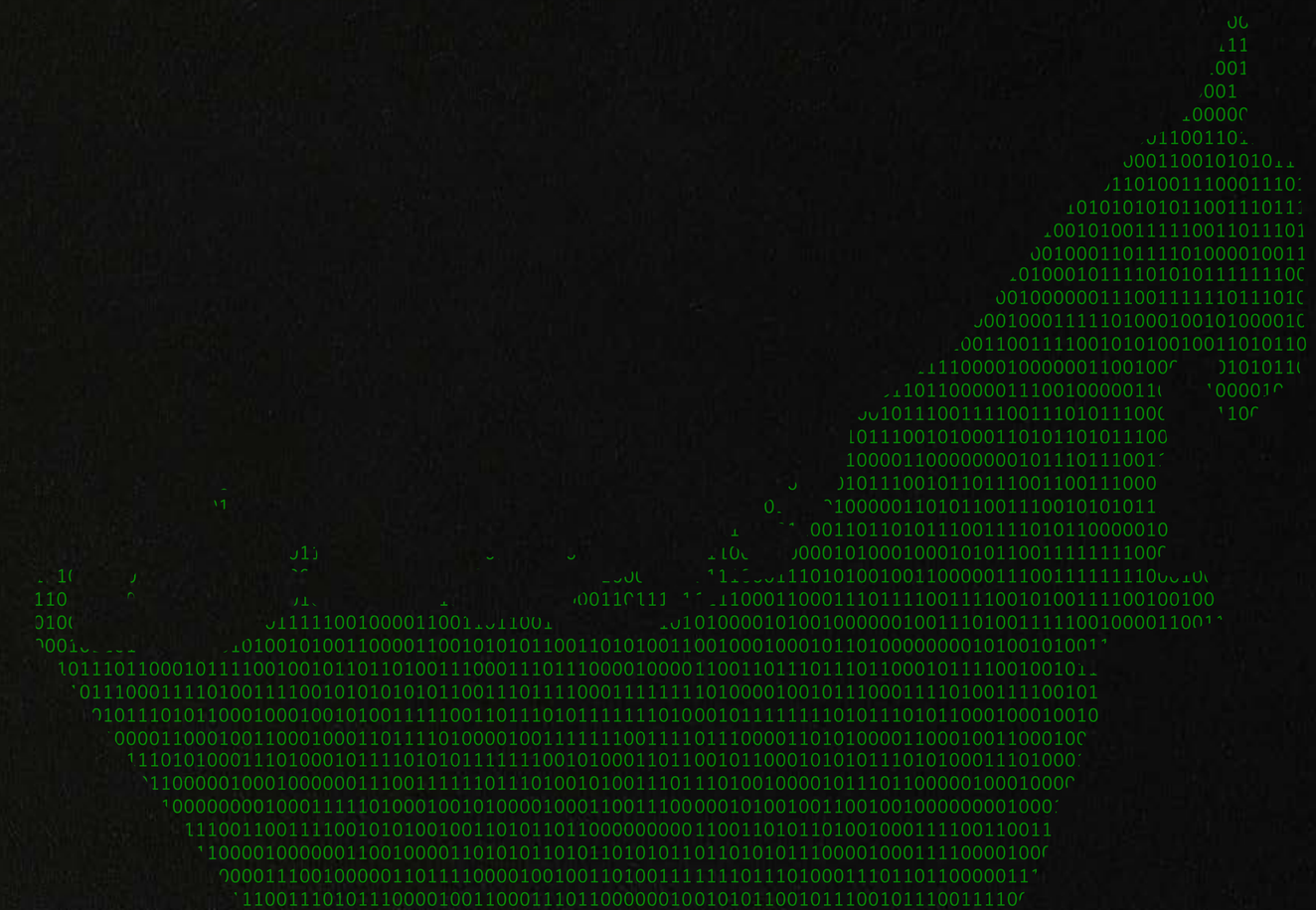
Commercialization

#27 United Arab Emirates

Figure 8 - UAE Ranking on Tortoise Index

The **Tortoise Global AI Index** has ranked UAE 34th in 2022 out of 62 countries where the breakdown of the ranking and scoring is presented below. Talent and Research are highlighted as key areas of improvement ranking 58th and 42nd respectively. Environment, Development, and Commercialization follow subsequently as areas of improvement.

UAE Government entities would create major difference in cascading down the national AI strategy at entity level, developing their infrastructure and platforms, upskilling their talent and overall AI capabilities so that these efforts can be geared towards AI development across government services and benefits realization. Government also has a key role to guide AI research focus towards national challenges and priorities and eventually create a fostering environment to bridge AI research towards real life applications and allow a vibrant AI industry to grow in this space.



UAE performance on Oxford AI Readiness Index 2021

UAE performance on **Government AI Readiness** index where **UAE ranks 19th** with an **overall score** of **71.60** out of 100

Government	Technology Sector	Data & Infrastructure
●●●●○	●●●○○	●●●●○
#18 United Arab Emirates	#22 United Arab Emirates	#20 United Arab Emirates

Figure 9 - UAE Ranking on Oxford AI Readiness Index

- On the **Oxford AI Readiness Index**, UAE ranked 19th in 2021 out of 160 countries. The MENA region is one of the most diverse in the world when it comes to the Government AI Readiness scores, the highest being 71.60 out of 100 (United Arab Emirates). The UAE ranks fairly and consistently in each of the pillars of the index.
- To be specific, UAE scores 79.41 out of 18) 100th rank) in the Government pillar, showing that the UAE has a strategic vision for how it develops and manages AI across government services, supported by appropriate regulations. Additionally, UAE needs to have a strong internal digital capacity, including the skills and practices that support its adaptability in the face of new technologies to score even higher in the Government pillar of the index.
- UAE scores 53.33 out of 22) 100nd rank) in the Technology Sector pillar and 82.05 out of 20) 100th rank) in the Data and Infrastructure pillar. For the Technology Sector pillar, the higher the rank the more the Government depends on a good supply of AI tools from the country's technology sector, which needs to be competitive and dynamic. The sector should have high innovation capacity, underpinned by a business environment that supports entrepreneurship and a good flow of R&D spending. The skills and education of the people working in this sector are also crucial (human capital).

As for the Data and Infrastructure pillar, AI tools need lots of high-quality data (data availability) which, to avoid bias and error, should also be representative of the individuals in a given country. The data potential cannot be realized without the infrastructure necessary to power AI tools and deliver them to citizens. Moreover, UAE has the third highest overall score in the government promotion of investment in emerging technologies indicator, which highlights the perception in the country that the government has made recognized efforts to arrange investments in AI.

Further accelerating AI adoption across government can take up the rank on ‘Government’ up from 18, while the government effectively contributes to building the enabling infrastructure and facilitating data provisioning, thereby also impacting the ‘Data & Infrastructure’ rank up from 20. While doing so, the government is expected to engage the AI industry and provide opportunities for growth in the UAE, also driving improvement on the ‘Technology Sector’ rank up from 22.

DRIVING YOUR AI JOURNEY

WITH FOCUS AND IMPACT

AI ADOPTION FRAME WORK IN GOVERNMENT SERVICES

National AI Framework in Government Services

The national AI strategy is guided by the framework below which covers the different components that need to come together to execute the strategy and realize target outcomes, in line with the measures of the different global indices examined.

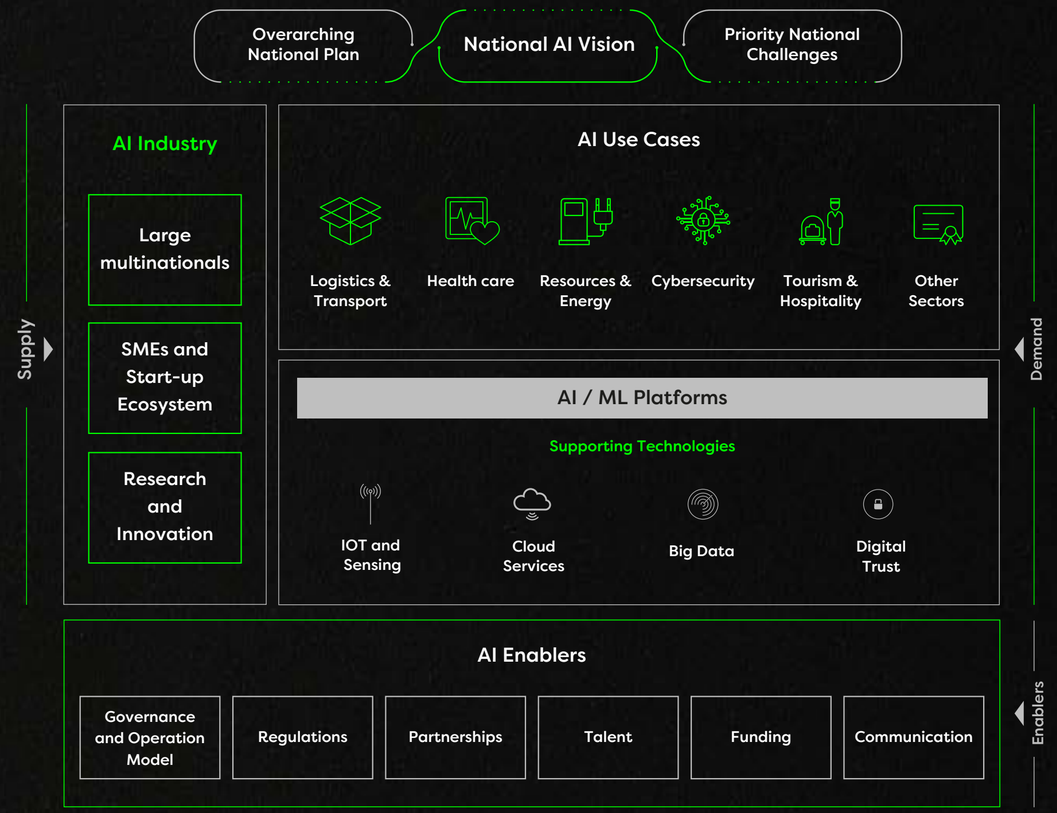


Figure 10 - National AI Framework

The framework is anchored by the National AI Vision that is defined based on national strategies and aspirations as well as priority challenges to be addressed. The National AI Vision is then translated to priority sectors where underlying AI use cases across government services would be defined, for example:

Healthcare - Resource Capacity Optimization:

This use case is an AI tool that will help improve health sector efficiency through the use of simulation models that draws on historical data to forecast future demand or patient beds and allocate resource models accordingly. Healthcare services are heavily burdened, and this trend is likely to intensify in the coming years, owing to a growing and aging population that sets greater demands on health services providers and healthcare practitioners. Being cognizant of this, the government can leverage AI to play a significant role in developing a resourcing plan based on simulation models and historical data improving working conditions, patient experience and outcomes.

Logistic & Transport - Smart CCTV for Public Transport:

This use case uses CCTV for public transport to track the operating status of transit and transportation networks, optimizes transit duration and capacity, and reduces citizens' waiting times to enhance citizen experience.

Resources & Energy - Supply Planning Optimization:

This use case optimizes supply in generation power plants by using AI to forecast energy load using real-time demand data, deriving the required supply from the generators and the required reserves to achieve this supply. This would result in decision making for energy forecasting, reduced production costs, and avoidance of lost revenue due to interruptions.

Other Sectors: Education - School Seats Optimization:

This use case is an AI model that will help improve education sector efficiency using simulation models to forecast future demand and predict the school seats needed by region based on population growth and dynamics.

Execution of these use cases across government services would drive the potential value of AI from an economic, social, environment, and security standpoint. Yet, execution of these cases requires the government to have the right technology foundations designed in a flexible, modular, and resilient manner to keep up with technology evolution and facilitate integration with open-source technologies while having adequate data privacy and protection controls.

The design of the technology foundation has to follow the AI supply chain from capturing and ingesting data from different sources, processing and annotating it, training the AI model, testing, and evaluating, followed by model deployment and continuous monitoring and maintenance.

Having defined the AI use cases across government services and related technologies, the AI demand becomes articulated and can be used to stimulate and guide the AI supply or industry represented by large multinationals, small-medium enterprises (SMEs) and start-ups, and the research and innovation ecosystem. Alignment of national AI demand and supply is critical for localizing AI technologies, driving job creation and economic growth, and realizing the targeted sector outcomes across government services.

Last but not least, driving AI adoption requires an enabling environment manifested by:

- National AI governance and top leadership sponsorship
- Regulations for safe AI adoption in line with cultural and ethical values
- Innovative partnership and procurement models to attract global capabilities and promote experimentation
- Talent development at all levels of specialization and expertise across business and technical professionals
- Access to funding avenues through the government, dedicated innovation and R&D funds, or attraction of private sector investment
- Effective change management and communication to engage all national stakeholders and bring everyone on the AI adoption journey

Cascading the National AI Framework at Government Entity Level

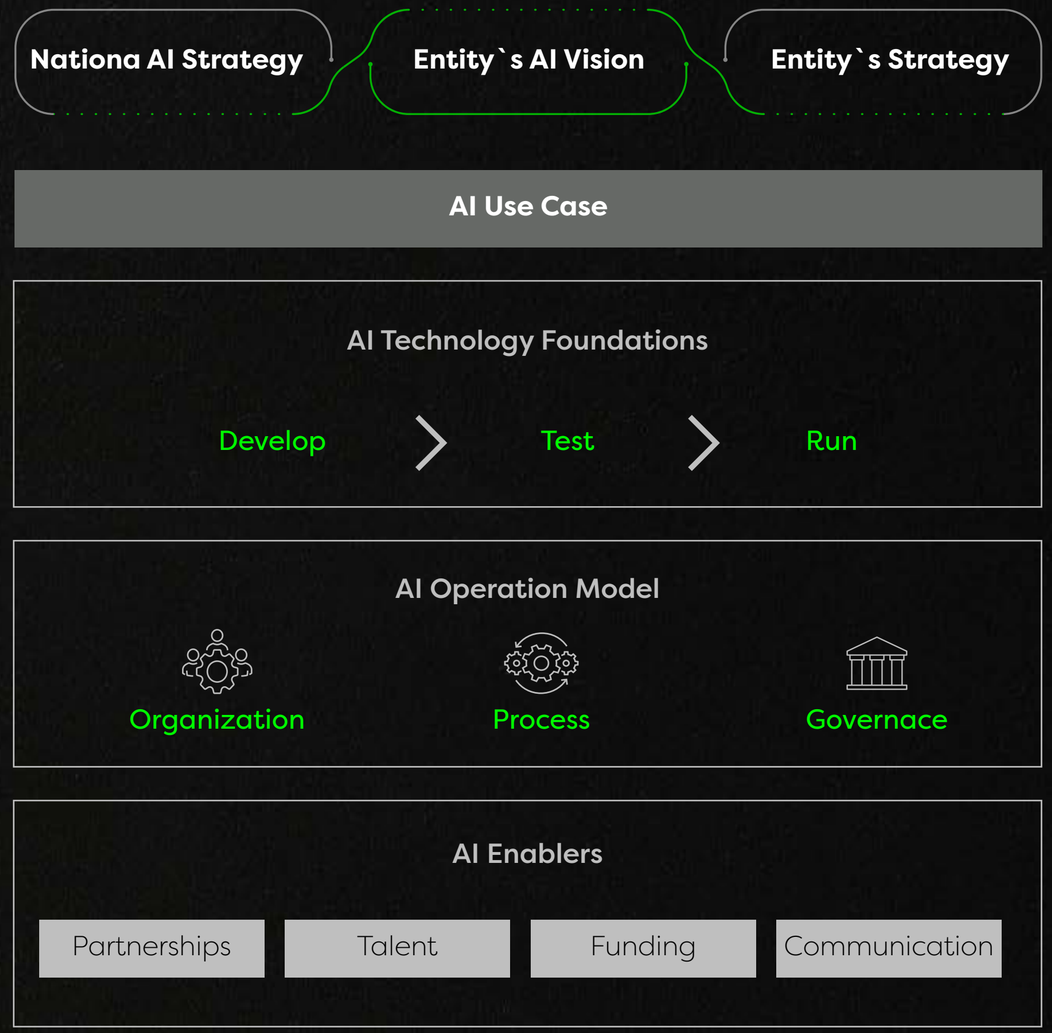
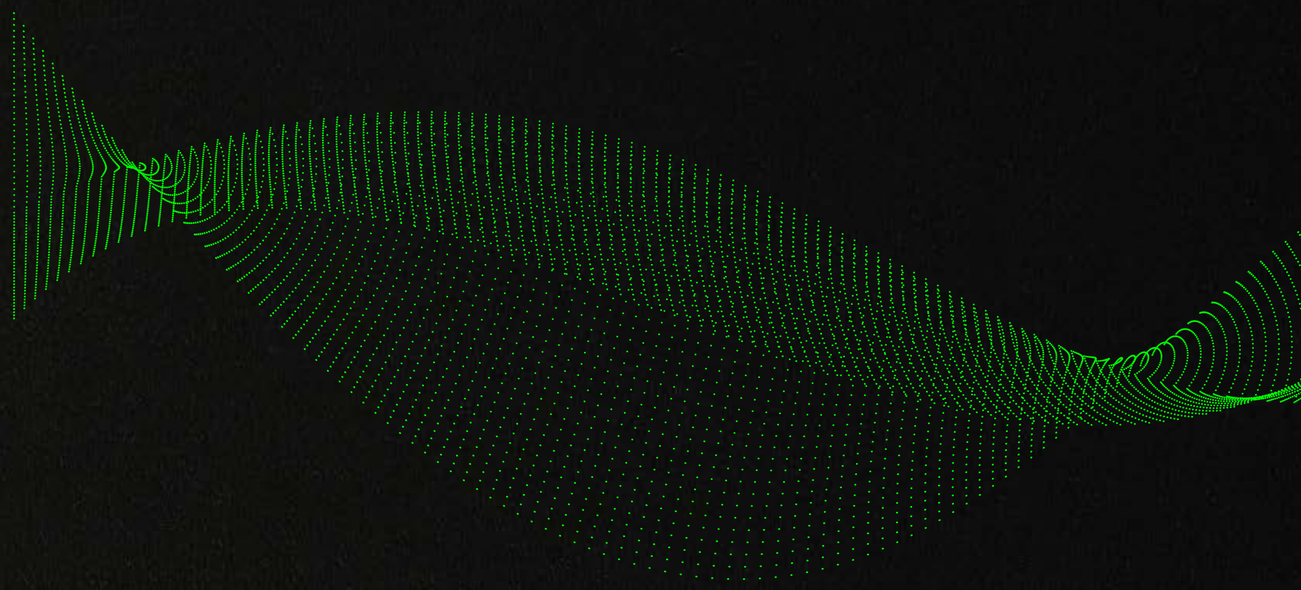


Figure 11 – Government Entity AI Framework

In summary, what this framework implies at an entity level is the following:

- Understand the national AI vision and how this is cascaded at the government entity level
- Define the portfolio of AI use cases across government services to serve that vision and realize target outcomes
- Build the required technology foundation while leveraging national platforms and capabilities to develop, test, and run AI
- Set up and activate the AI unit and related processes that would work with the rest of the entity to execute the AI use cases across government services
- Govern AI execution (with the aid of governance committees and working groups) and monitor value realization over time (through dedicated performance management indicators), while adopting related national guidelines and regulations to ensure ethical AI (augmenting with sector-specific considerations as needed)
- Establish the right partnerships to advance the government entity's AI agenda
- Capitalize on national AI talent development and change management programs
- Secure funding for the AI agenda driven by the business case
- Launch a change management program to engage everyone on the AI journey throughout design, execution, and adoption and regularly communicate progress and impact



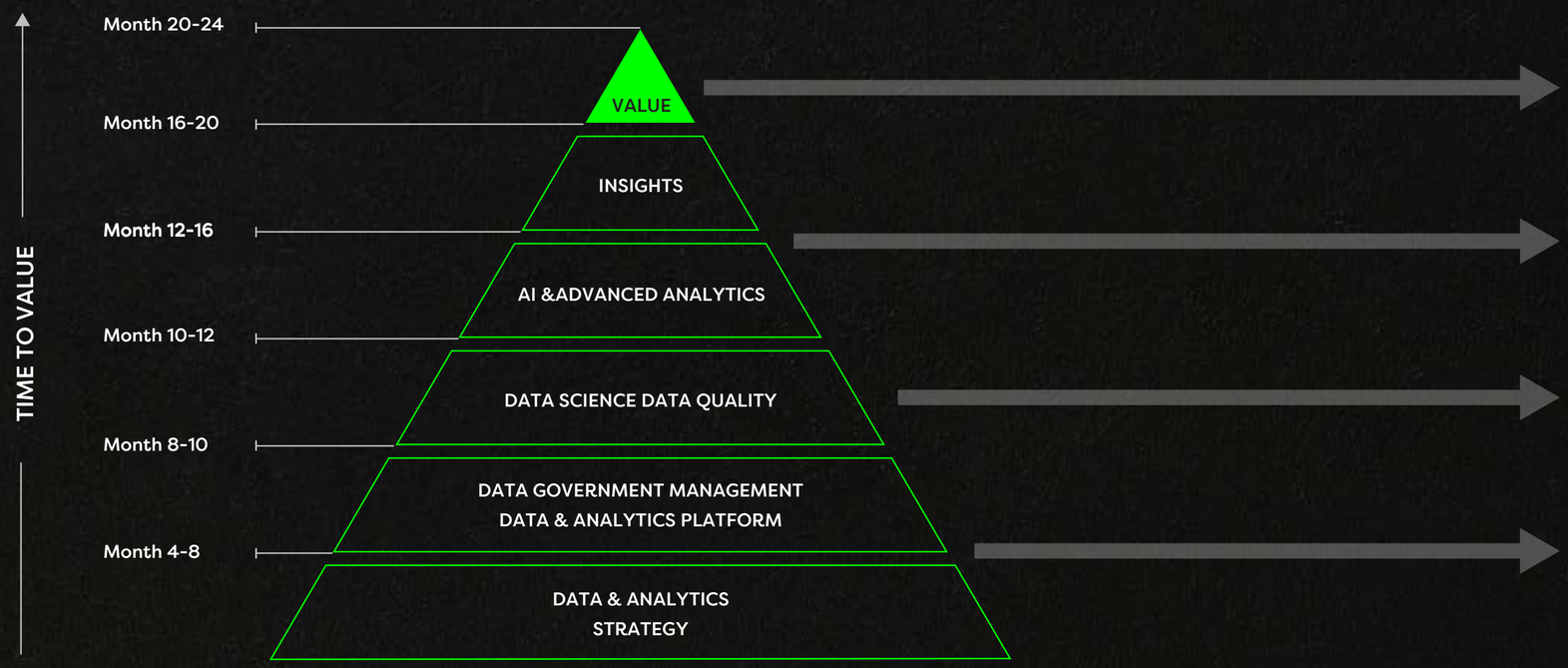
AI ADOPTION METHOD-OLOGY IN GOVERNMENT SERVICES

Overall Approach for AI Adoption in Government Services

Traditionally, government entities would choose to start their AI journey by first defining their data and AI strategy, then establishing data governance and building underlying platforms and infrastructure, then launching data analytics activities across government services while monitoring data quality, then advancing their analytics and AI capabilities to derive better insights and ultimately realize value. While this approach is effective, it delays value realization.

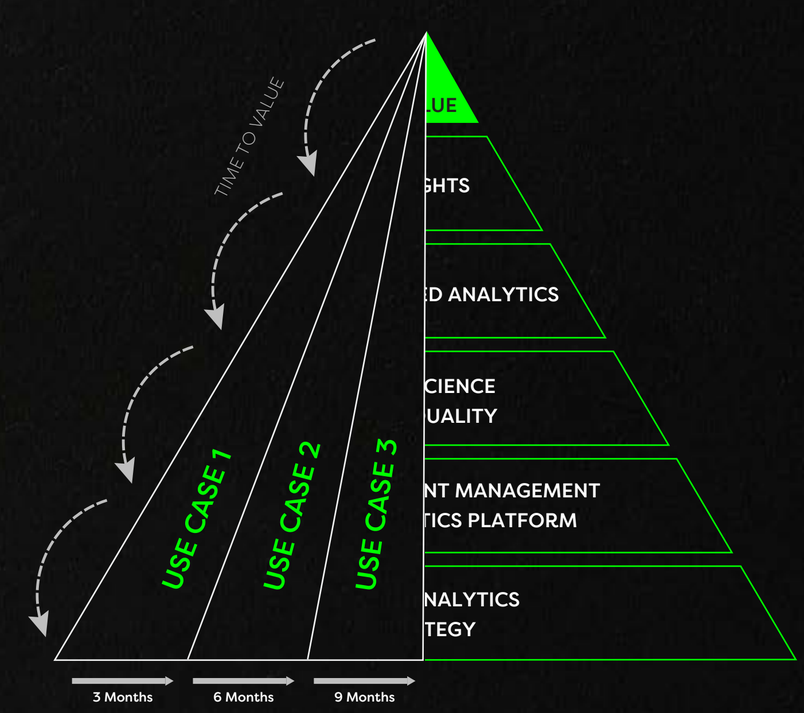
Alternatively, government entities stand to benefit from adopting an agile approach for their AI journey. This translates into defining the data and AI vision and portfolio of AI use cases across government services that help deliver on the entity's mandate. The assessment of the as-is environment and infrastructure would help carve out a roadmap of how these use cases could be implemented over time based on feasibility rather than waiting for the target environment and infrastructure to be fully done. Adopting a use case driven approach across government services allows for incremental value realization which sustains stakeholder buy-in, builds further confidence in the program, and allows for the value generated to be re-invested in the program scaling. In summary, this approach is still focused on building the foundations while launching use cases early into the program in an agile way based on feasibility and value.

Traditional Waterfall Approach



Transformation based on waterfall maturity layer approach even though effective delays value realization...

Tailored, Agile Approach



.... where as, adopting a use case driven approach allows for incremental value realization in agile fasion

Figure 12 - UAE Agile Approach to AI in Government Services

AI Use Case Development Stages

Your AI adoption journey across government services starts here, along key stages:

Discovery	Initiation	Execution	Operations

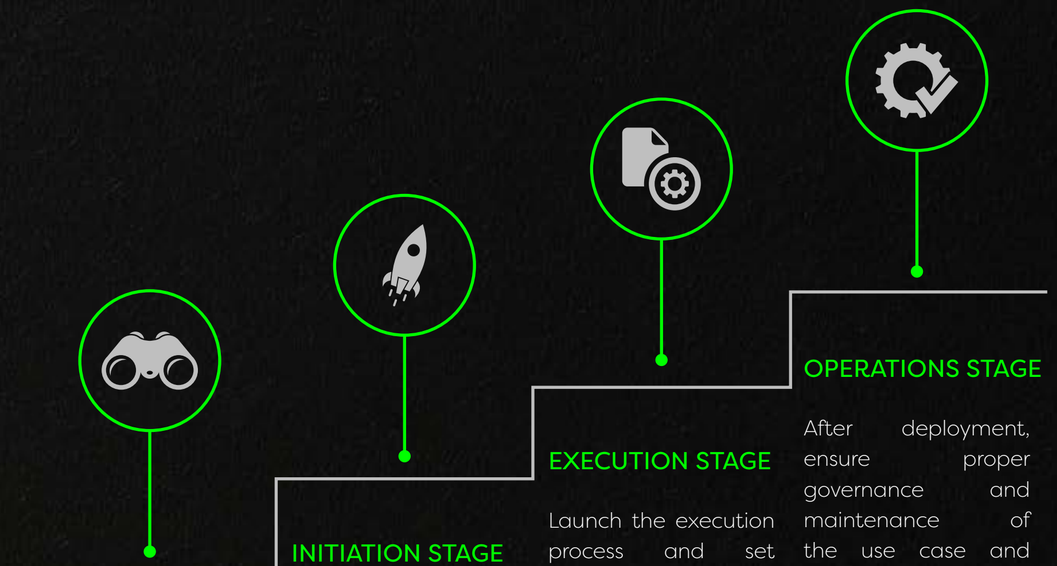
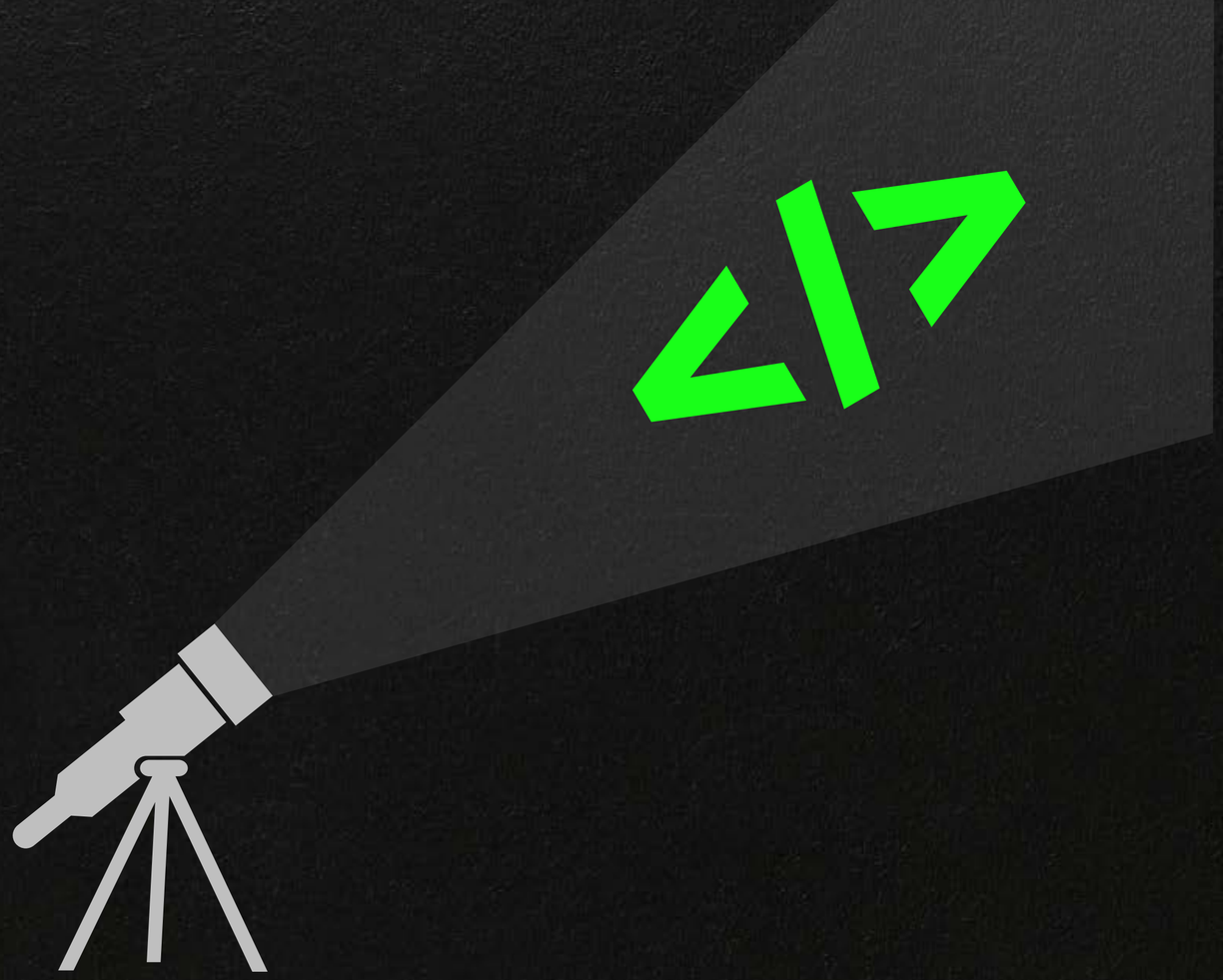


Figure 13 - AI Use Case Development Stages



Discovery

During this stage, you will identify a long list of use cases across government services that could come from multiple sources e.g., previous experience, partner input, key trends, and others. One key input to the Discovery stage could be holding an ideation workshop engaging different stakeholders to define AI focus areas and related use cases.

You should manage, evaluate, and prioritize the long list of use cases across government services based on key criteria. These could include:

Value

There are multiple levers to value. Value can be quantified in monetary terms, e.g. higher revenue / economic output or cost avoidance. It can also be quantified in non-monetary terms, e.g. lives saved, experience improved, pollution reduced, and others. In this case, value is outcome-driven in line with national objectives.

Feasibility

This entails several dimensions. First, it requires whether the data is available for the use case and can be sourced or it requires effort and time for collection. The data quality is also a key consideration here, whether it is representative, granular, accurate, or sufficient, beyond other key factors. Another dimension of feasibility is availability of relevant AI frameworks to leverage or the technical complexity of developing the AI model and whether this has been tested and proven before. This may also involve analysis of the computing resources required and the readiness of available infrastructure. Besides technical dimensions, the cost, time, and resources needed for the use case should be evaluated. Last but not least, in some cases there are regulatory measures or social acceptance that would need to be considered before embarking on an AI use case.

Your Discovery stage is completed when you have identified and profiled the list of priority use cases across government services to understand their target objective and audience, key stakeholders involved, how the use case works technically and functionally, and what data is needed.

Initiation

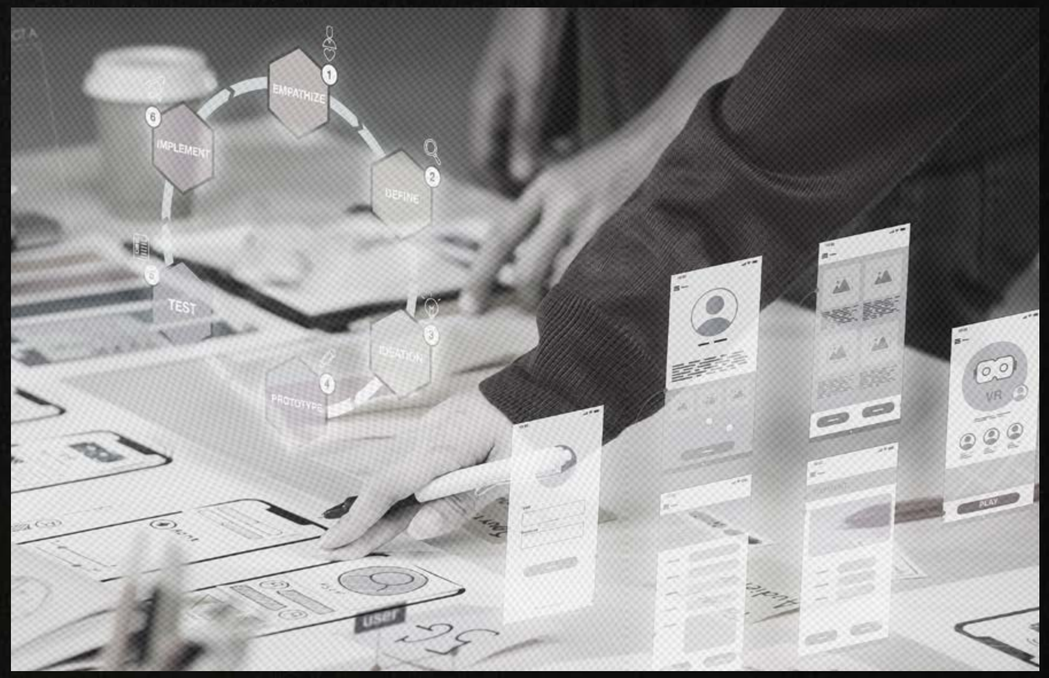
In the Initiation stage, your prioritized use case undergoes a detailed planning and business case exercise. The planning would define how the use case execution related to a government service will be phased out as a POC, MVP, and eventually final AI product and what decision gates are needed for each phase. The planning would also detail what datasets are needed and from which sources, what success looks like for each use case phase, whose buy-in needs to be secured from a use case persona and leadership perspective, and defining timeline and overall resourcing. In parallel, the business case is detailed to showcase the cost-benefit analysis and justify investment into the next phase.

Your Initiation stage ends when you have the plan and resourcing secured for a prioritized use case related to a government service.

Execution

When you are ready to launch the execution stage, you mobilize resources and start setting up the development environment, accessing the data, detailing the use case requirements, and developing the blueprint. You also set up agile project management working practices.

Once data is made accessible, you begin data exploration activities to check for quality, representation, granularity to form a judgement on data usability. Typically, data quality dimensions cover completeness, accuracy, validity, consistency, timeliness, and uniqueness and accordingly some data cleansing activities might be required. Representation of the data is key for eliminating bias in AI models and to drive trust in the results. Accordingly, either more data needs to be collected from different sources (potentially including synthetic data) or you are ready to proceed with structuring and annotating the data. Data annotation and labeling can be a time-consuming exercise depending on the volume and sector-specific expertise required but is a critical step to prepare for model development and training.



Then you select appropriate algorithms to start model development and feature engineering. Different models can be trained, compared, and fine-tuned based on the outputs of the analysis. Once your model is ready for testing, you evaluate against acceptance criteria to confirm readiness for model deployment.

Designing the UX and UI for the AI use case is also a key step throughout execution to ensure that it gets easily adopted by target users. As such, it is very important that you understand how the use case integrates into the day-to-day operations of the target persona in the delivery of a government service. Post model development and testing, enhancement of the visuals could be done to drive effective use case adoption.

Throughout execution, it is also very important to ensure model documentation for traceability and explainability, ranging from data collected, the code, testing results, deployment procedure, and others.

Your Execution stage ends when you evaluate the ROI and value of the use case related to a government service and refine your plan accordingly for adapting, scaling and/or operations.

Operations

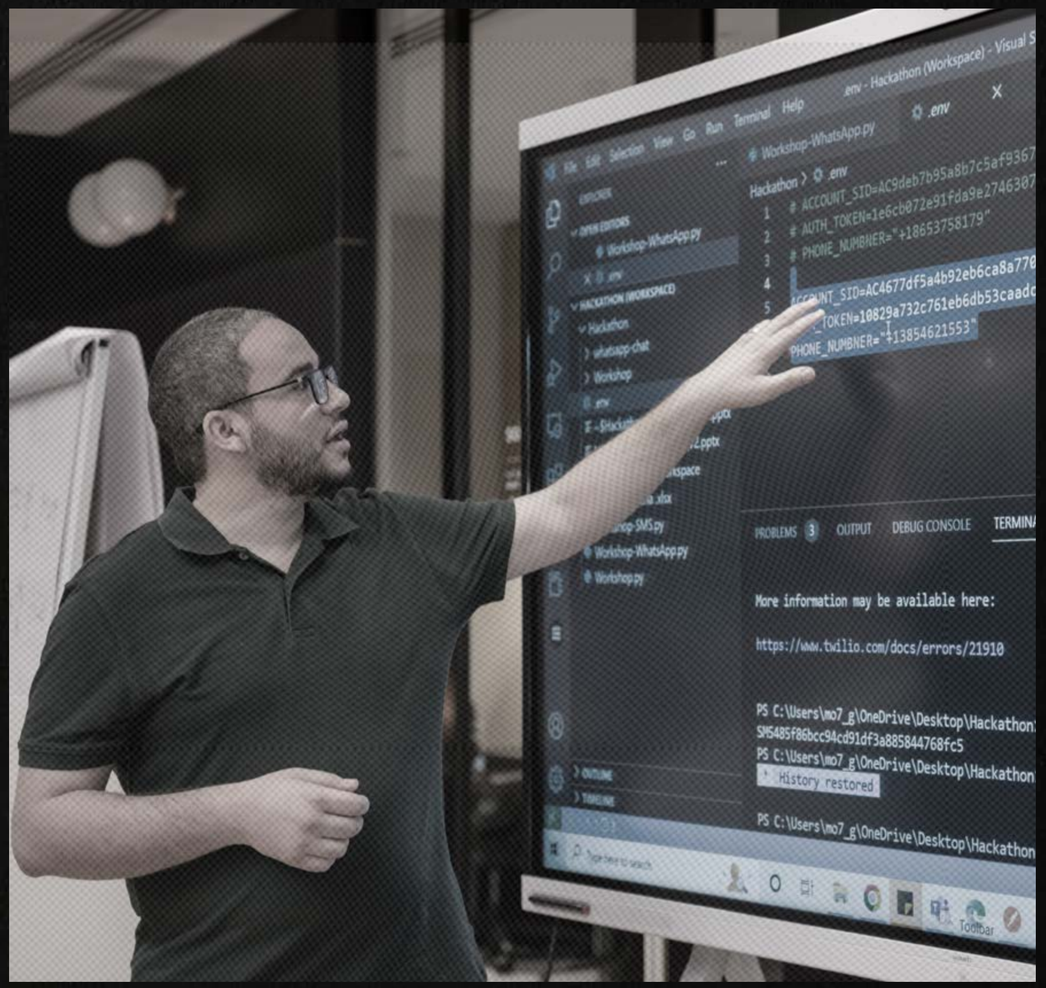
Once your AI use case for a particular government service has been deployed into the production environment, it needs to be governed and maintained to ensure that:

It is adopted by the business user and is delivering the target value

It is constantly meeting acceptance criteria, e.g. in terms of accuracy

It is being fed more data to enhance and optimize model results (with the aid of MLOps)

It follows ethical principles as determined by national AI policies and regulations

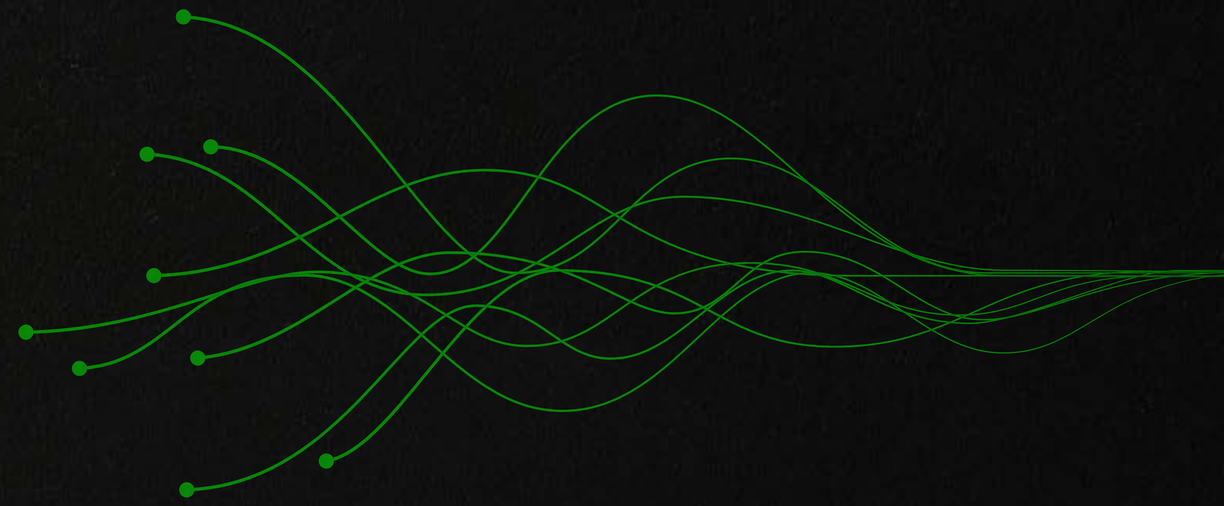


Note that it is expected for an AI use case to undergo continuous development (e.g., adding features, addressing new persona needs, etc.) to enhance its value. So, you must keep the momentum going towards excellence in government services delivery.

AI OPERATING MODEL

OVERVIEW OF REQUIRED COMPETENCIES

Within an entity, successful AI adoption requires, first and foremost, strong leadership. Top-down sponsorship of the AI agenda is fundamental to drive AI adoption and maturity. Strong leadership would highlight AI as a priority within the government entity, sponsor the AI agenda, secure funding, and govern AI value realization across government services.



Additionally, close sector alignment is required as the definition of AI focus areas and underlying use cases should be cascaded from the government entity's strategy. Hence, for successful AI adoption, a close sector alignment would support in shaping use cases across government services, identifying priorities, analyzing value and feasibility, defining requirements, overseeing execution, and ultimately adopting AI use cases to harness their value.

Ultimately, on top of having a strong leadership and close sector alignment, it is fundamental to have close technical alignment within the government entity. Technical competencies bring in the in-depth AI know-how. The latter is needed as a key partner of the sector in the AI transformation of government services throughout the use case discovery, initiation, execution, and operations stages.

DETAILING OF REQUIRED COMPETENCIES

AI Core Competencies

AI Product / Use Case Ownership

Define the use case and blueprint, drive its execution,understand the value, and act as the ultimate sponsor

AI Engineering

Deploy requirements and framewor ks and tools to be used as well as deploy AI models into production

AI Project Management

Plan, scope, objectives, schedule, deliverables,and funding of the project, among other things

Data Engineering

Program systems that collect,manage, and convert raw data into usable information for analysis

Industry Expertise

Provide industry expertise to help define how the use case would work and analyze its value

SolutionArchitecture

Define the AI use case architecture needs and advise on solution architecture and implementation

Data Science

Execute AI use cases that serve targeted challenges and develop Machine Learning algorithms

Development

Collect the solution requirements to design and develop the backend and frontend for the AI use case

AI Research

Conduct AI research and experiments to develop novel algorithms and other fundamental AI solutions.

UX/UI Design

Define use case personas, shape user journe ys, design the use case experience and look and feel

Figure 14 - AI Core Competencies

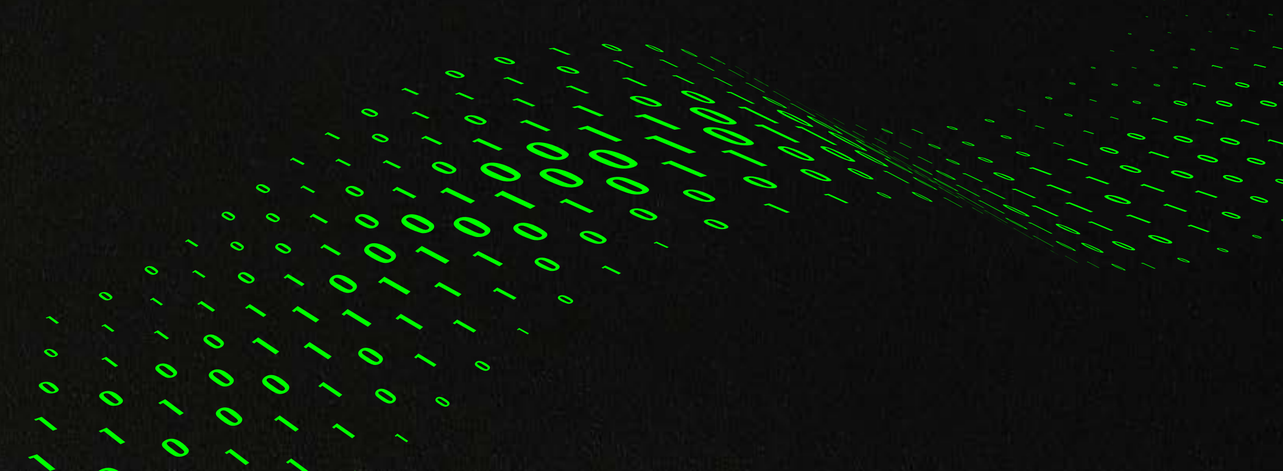
Accordingly, the development of an AI use case for a government service requires a pod team covering sector and technical competencies, sponsored by leadership. Typically, this pod comprises the following competencies:

AI Product / Use Case Ownership:

The ability to own the detailing of the use case and definition of the blueprint, drive it towards execution, understand the overall value the use case delivers, and act as the ultimate sponsor of the use case within the government entity.

AI Project Management:

The ability to define the project deliverables and perform related activities such as defining the project plan, scope, objectives, timeline, assessing and managing the project funding, defining the project delivery model, and overseeing and managing the project execution.



Industry Expertise:

The ability to provide industry expertise to help define how the use case would work, what data points are needed, what features are the most critical for the model, and help articulate the value.

Data Science:

The ability to execute AI use cases that serve targeted challenges and implement ML pipelines, including conducting data cleaning and preparation activities to prepare data for the model training stage and preparing and segregating datasets for ML model training and evaluation.

AI Research

(if experimenting with an innovative use case): The ability to conduct AI research and experiments to develop novel algorithms and other fundamental AI solutions.

AI Engineering:

The ability to deploy requirements and frameworks, tools, software, and hardware to be used based on the understanding of the model requirements, as well as deploy AI models into production.

Data Engineering:

The ability to use expertise in programming to build systems that collect, manage, and convert raw data into usable information for analysis.

Solution Architecture:

The ability to contribute to the definition of the AI use case architecture needs and advise on solution architecture and related implementation.

Development:

The ability to collect and analyze the solution requirements and set a development plan then design and develop the backend and frontend for the AI use case to support the solution rollout.

UX/UI Design:

The ability to define use case personas, shape user journeys, design the use case experience, look and feel.

Depending on the complexity and requirements of a use case for a government service, the size of the pod team and its underlying roles are determined.

Additionally, similar to any endeavor, soft competencies remain critical including:

AI Soft Competencies

Critical Thinking/Problem Solving

Break down the problem and propose a solution focusing on the targeted value while thinking of potential implications

Innovation

Produce new ways and ideas of how AI be used to support overarch ing objectives

Decision-Making

Make decisions at diff erent levels, whether decision to sponsor a use case, to define its key features, and others

Teamwork

Effectively collaborate and establish a teaming environment combining different competencies

Communication

Describe the value and message behind a use case using storytelling techniques, and convince leadership to adopt it

Change Management

Identify training and change management requirements,apply techn iques to keep engagement and buy-in

Figure 15 - AI Soft Competencies

Critical Thinking / Problem Solving:

The ability to break down the problem and propose a solution focusing on the targeted value while thinking of potential implications.

Decision-making:

The ability to make decisions at different levels, whether decision to sponsor a use case, decision to define its key features, decision on its future trajectory, and others.

Communication:

The ability to deliver the message and value behind a use case, while adopting storytelling techniques, and explaining and persuading leadership buy-in.

Innovation:

The ability to come up with new ways and ideas of how AI can be used to support overarching objectives.

Teamwork:

The ability to effectively collaborate and establish a teaming environment combining different competencies.

Change Management:

The ability to pinpoint training and change management requirements, then define and apply relevant techniques to maintain engagement and buy-in.

KEY CONSIDER-ATIONS

Key Challenges Expected Along AI Adoption Journey in Government Services

According to a far-reaching AI report published by Accenture, %84 of C-suite executives in a global survey conducted believe that leveraging AI will help them achieve their growth objectives. However, %76 of survey respondents have reported that they struggle to scale AI. Therefore, it is important to learn from different AI journeys and recognize key challenges in elevating AI maturity across government services so that the right mitigation measures are set.

Scarce talent:

Access to AI talent is still a key global challenge where most leading countries have designed programs to attract, build, and retain AI talent across all levels, including academic and vocational. Entities embarking on their AI journeys across government services are expected to face this challenge and can address it by proactively engaging their people in training programs while leveraging external partner capabilities (whether companies or academic and research institutions).

Data gaps:

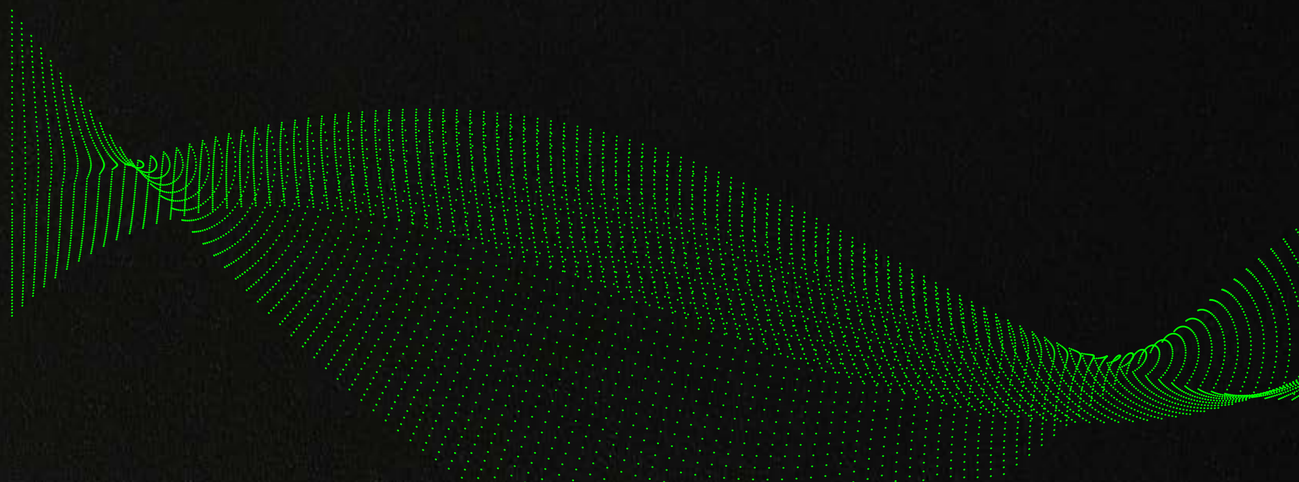
The most difficult part of AI development is sourcing high quality data. Entities need to have a proactive view of capturing data generated, enabling accessibility, and promoting its exploitation, in line with national data policies and regulations. Often, in parallel to strengthening data governance and quality controls, entities have to adapt to existing data gaps and find innovative ways in addressing them e.g., leveraging external data partners, using data proxies, developing synthetic data etc. Establishing a data sharing culture and controls is a critical component to enable the best possible value from data and power AI applications across government services. Once data accessibility has been resolved, the usability of the data into the AI model also requires intensive data annotation and labelling exercises that often require industry expertise e.g., annotating medical images. This is where AI collaborations on different topics (e.g., sustainability, public health, others) can have a symbiotic impact across entities trying to address these topics.

Functional / Industry and technical teams' alignment:

Entity structures should not be a barrier for building effective collaborations between functional / industry and technical teams. In some cases, technical teams have taken ownership of the AI agenda across government services that resulted in use cases that were never used or conversely the functional / industry teams designed an AI program that was never put into action due to absent AI skillets and technologies. For this reason, the establishment of the pod team for a use case combining both functional / industry and technical competencies is essential to set pod accountability for the use case success and ultimate government services improvement goal.

Cybersecurity risks:

The adoption of AI across government services is expected to increase the risk exposure from a cybersecurity standpoint. Cybersecurity foresight would instigate the needed measures to mitigate AI risks against hackers or system failures that might have a detrimental impact especially for advanced AI solutions that directly touch on the wellbeing of people, government and critical infrastructure operations, or business and economic interests. Therefore, cybersecurity operations would need to be upgraded to detect any tampering of AI solutions, whether in the data or the model itself, and address according to a define protocol.



AI Risk Management

Embracing AI is expected to yield key ethical risks that need to be anticipated upfront to avoid building ethical debt and to maintain confidence in AI use cases across government services.

Privacy:

AI may risk privacy from two perspectives, using personal data into the AI models for their development and AI models that lead to exposure of personally identifiable information. Use of personal data into AI models should follow the required controls and any entity should avoid AI models that are exposing personal data unless there is a matter of public interest and targeted government services outcomes or consent in line with national regulations.

Inclusion and Diversity:

Data being used to develop AI models across government services should be representative, otherwise AI decisions will turn out to be biased.

Lack of Transparency:

AI does not justify why it came up with a result. That is why AI developers and users need to work together in designing the AI model for government services, documenting what data was used, and what factors or features are being considered so that the result of the AI model can be explained.

Artificial Ignorance:

AI is as intelligent as the data and model that it is trained and tested on. It is important to recognize that because AI lacks empathy, common sense, and could be prone to human error which may lead to unfavorable outcomes.

The Singularity:

Conversely to artificial ignorance, the possibility of creating something that is more intelligent than humans is there.

Job Apocalypse:

The concern that AI adoption across government services will lead to job loss is there. However, the focus of AI is to empower people and allow them to focus on more creative or less dangerous tasks. The need to constantly get upskilled is always going to be there and new jobs in government services delivery are expected to emerge with new advancements.

Overall, the above risks raise ethical concerns, but to add to that, they could additionally have operational (guiding towards the wrong decision) and legal detriments (e.g. violating data privacy regulations). Therefore, as entities elevate their AI maturity across government services, their capabilities to govern AI and manage its risks need to evolve accordingly to sustain AI trust. To guide ethical AI practices, the UAE has published the AI Ethics Principles and Guidelines covering key principles including Fairness, Transparency, Accountability and Explainability.

AI MATURITY MODEL IN GOVERNMENT SERVICES

AI Maturity Model Objectives

AI adoption is a journey filled with experimentation, development, and innovation directed by government priorities. Government entities have a significant value to unlock by advancing their AI maturity.

Explorer	Experimenter	Practitioner	Professional	Transformer
Learn what AI can do and how to judge good AI opportunities from bad ones	Placing calculated bets to determine which AI opportunities are ready for production	Piloting AI solutions and aligning the organization to move ahead	Scaling AI and integrating it across the organization	Actively shaping the organization with AI in new and profound ways

Figure 16 – The Five Stages of AI Maturity

Therefore, a standardized AI maturity model catered for UAE government has been designed to assess where you stand today, define your AI maturity targets, provide key actions and recommendations on how to further develop your capabilities and take your maturity to the next level across government services, while monitoring your improvement over time . It looks at 5 key stages of maturity that are Explorer, Experimenter, Practitioner, Professional, and Transformer (described above). It also comprises 6 key dimensions that are important to be developed and coordinated: Vision and Strategy, Use Cases, Data, IT Infrastructure, People, and Governance (described in the next section).

DIMENSION 1

Vision & Strategy

Develop the AI vision and strategy aligned with the overarching strategy as well as a plan of action for achieving the target value and level of AI maturity

DIMENSION 2

Use Cases

Define the portfolio of value-driven AI use cases to deliver on the AI strategy, then pilot to prove the value and scale and govern accordingly

DIMENSION 3

Data

Enable access to high quality data from different sources and large volume required training the AI use cases

DIMENSION 4

IT Infrastructure

Provide the computing infrastructure and tools required to ingest and process data and deliver and manage AI models

DIMENSION 5

People

Establish the AI organization to drive the AI strategy under top leadership sponsorship and develop the needed skills at different levels of proficiency

DIMENSION6

Governance

Set the right model to govern the AI strategy involving different stakeholders and partners and ensure ethical and responsible AI practices

13 Subdimensions

1. AI Strategy
2. AI Budget

3. Use Case Methodology
4. Use Case Development

5. Data Discoverability & Accessibility
6. Data Quality

7. AI Platform
8. Computing Infrastructure

9. AI Organization
10. AI Talent Development

11. AI Governance Model
12. AI Responsibility and Compliance
13. AI Partnerships

Figure 17 - AI Maturity Dimensions

You can use the maturity assessment tool in the provided link and assign a team versed with AI that would measure where you stand today on the different dimensions and as an aggregate and build a plan to progress accordingly across government services. Your success would help create the momentum needed to communicate how UAE is evolving on its AI journey and what impact is being delivered.

AI Maturity Model Dimensions

To recap, the AI maturity model for UAE Government comprises the following dimensions:

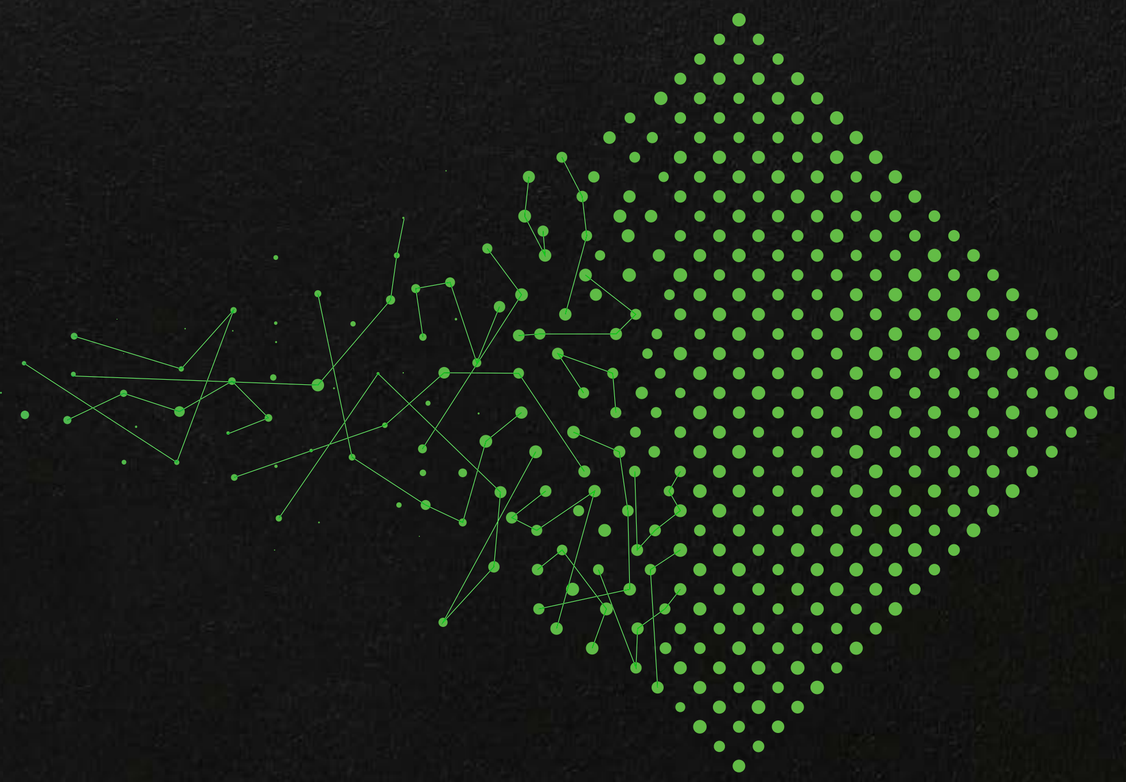
Vision and Strategy:

The Vision and Strategy dimension entails two key sub-dimensions (AI Strategy and AI Budget) to set the direction for harnessing the value of AI across government services. The AI Strategy sets the aspiration and high-level goals of AI adoption in line with the wider entity strategy. The AI Budget defines the investment required to realize the strategy and achieve the AI priorities of the government entity.

[1] Refer to the AI Maturity Model Scorecard and Dashboard to help you assess and measure their AI maturity.

Use Cases:

The Use Cases dimension entails two key sub-dimensions (Use Case Methodology, and Use Case Development) to translate the AI strategy into an actionable portfolio of AI applications across government services. The Use Case Methodology sub-dimension measures if the government entity has identified AI use cases with a systematic approach to gather and track AI topics and developed an approach within the government entity to profile and detail out AI use cases. The second sub-dimension Use Case Development measures if the government entity has developed MVPs for AI use cases that are trained and fine-tuned for high performance on live data, including UX/UI design, as well as if the entity has created an AI use cases implementation roadmap highlighting specific phases and key milestones across government services.



Data:

The Data dimension entails two key sub-dimensions (Data Accessibility & Visibility and Data Quality) that are critical considering no data no AI. The first sub-dimension Data Discoverability & Accessibility measures the extent to which the government entity has the data required for the implementation of AI use cases. Additionally, it measures the level of visibility on required datasets as well as the ability to streamline data pipelines to allow timely access for AI use cases across government services. The second sub-dimension Data Quality measures if the data quality monitoring of the main data repositories is automated with reliable measurement. It also assesses data quality against established rules that determines the usability of the data for AI development.

IT Infrastructure:

The IT Infrastructure dimension entails two key sub-dimensions (AI Platform and Computing Infrastructure) representing the environment for AI development and consumption across government services. The first sub-dimension AI Platform assesses if common analytical tools and libraries are implemented across the government entity to support the development of AI use cases along with the central repositories with versioning control to manage the code and algorithms throughout AI operations and improvement. Additionally, it measures if the government entity has established AI deployment architecture with development, testing and production environments. The second sub-dimension Computing Infrastructure measures access to scalable high performance computing infrastructure required to ingest and process large volumes of data and run complex algorithms.

People:

The People dimension entails two sub-dimensions (AI Organization and AI Talent Development) representing the skills needed to build and benefit from AI. The first sub-dimension AI Organization assesses if the government entity has clearly defined AI roles and responsibilities across the government entity. The second sub-dimension AI Talent Development measures if the government entity has established an AI talent strategy supporting the learning journey of all employees to increase AI literacy and adapt to changes in the workplace introduced by AI across government services.

Governance:

The Governance dimension entails three key sub-dimensions (AI Governance Model, AI Responsibility and Compliance, AI Partnerships) required to steer AI efforts in the set direction and oversee value across government services. The first sub-dimension AI Governance Model assesses if the government entity has established the AI governance concept (centralized, decentralized or hub) and associated bodies. The second sub-dimension AI Responsibility and Compliance measures if ethical AI principles are adopted by employees across the government entity and enforced through processes, policies, and technologies. Moreover, it measures if the government entity has established processes and implemented tools to ensure data privacy by design across the end-to-end AI use case development pipeline. The third sub-dimension AI Partnerships examines whether the government entity is benefiting from the experience of external stakeholders to advance on its AI journey.

AI Maturity Model Assessment

Below is the AI maturity model for the UAE Government that guides the scoring of each dimension based on the 5 maturity levels:

	Explorer	Experimenter	Practitioner	Professional	Transformer
Vision & Strategy	There is no AI strategy and AI has not been identified asa priority	AI has been included in the overarching plans with low priority	There is a dedicated AI strategy in place, however, its visibility remains moderate	A comprehensive AI strategy has been developed and properly communicated	AI is a top priority for the government entity, driven by top leadership, with a dedicated comprehensive strategy that is fully integrated into the overarching strategy and plans
Use Cases	Use Cases have not been identified to leverage AI	There are some AI use cases identified without a systematic method for profiling and executing	Use cases are identified across major functional areas and at least few prototypes are developed	A systematic approach to use case definition, profiling, and execution exists. Few MVPs are developed and tested	At least a few AI use cases across all functional areas are deployed in production environment with a detailed implementation roadmap underway, supported by top leadership
Data	There are no practices to govern data management (access, quality, etc.) and use data for AI	Few practices are defined to govern data management and ad-hoc availability of data for AI	Data availability for AI is advancing with institutionalized data management people, processes, and infrastructure	Data is generally available for AI and supported by proven data management frameworks	Leading data management practices in line with global standards, enabling acquisition of large volumes of high quality data from multiple sources to support AI

	Explorer	Experimenter	Practitioner	Professional	Transformer
IT Infrastructure	Very limited or no AI-specific technologies in place, and no plans for implementation	Limited AI technologies are available with plans for investment in the future	There are industrialized AI tools implemented across the organization, supported by data infrastructure	AI models are trained, tested, and deployed using a centralized platform connected to data repositories	A centralized AI platform with scalable computational power and an automated CI/CD pipeline is in place, facilitating data access from ingestion to consumption
People	There are no defined AI roles and responsibilities	Some AI roes have been identified yet not documented. Ad-hoc trainings are provided	Roles and Responsibilities are clearly defined. AI trainings are being offered to specific roles	A clearly defined AI organization is in place, with specific training paths for each position to enhance the capabilities	AI has been championed at the highest level – board or senior management – driven by an establish AI organization with a clear training plan across the entity
Governance	AI governance and partnerships are not defined	AI governance bodies are defined, yet not activated	AI governance bodies are defined, yet not activated	The governance model is steering the AI agenda and progress and several AI partnerships have been formalized and activated	The governance model is driving value from AI in a responsible way and an extensive network of partnerships has been developed

How to Proceed Forward

order to accelerate the AI journey across government services, we have identified key actions across the five AI maturity domains and maturity levels:

	Explorer	Experimenter	Practitioner	Professional	Transformer
Vision & Strategy	Ensure that business and technical leaders are aligned on the need for an AI strategy	Develop proof of concepts (POCs) to steer investments towards AI	Detail the AI strategy and communicate among all stakeholders to secure top leadership endorsement and budget allocation	Integrate the AI strategy with the overarching strategy and plans and coordinate AI efforts across stakeholders to maximize impact	Maintain AI momentum to continue innovating and transforming
Use Cases	Research and ideate potential use cases across different functions that can be implemented through AI	Develop a methodology for profiling and detailing use cases, prioritize key use cases to drive towards execution	Advance the use cases throughout implementation in a systematic approach and analyze ROI / value to refine or scale accordingly	Enhance developed MVPs considering feedback from focus groups with a focus on UX/UI and maintain and progress on the AI use cases roadmap addressing the needs of different functions in line with the strategy	Transform systematically successful MVPs into full scale products and capitalize on their potential while tracking ROI and value over time
Data	Start instituting data management practices while identifying priority data for AI	Use first AI experiments to standardized key data management practices and establish a data quality framework	Facilitate access to data for AI use cases while governing data quality through metrics, processes and technologies	Further break down data silos and enable development of data pipelines in an efficient manner while focusing on acquiring new data through technologies and partnerships	Utilize new AI techniques to maximize data›s contribution and continue to look for innovating ways in acquiring more data to mature AI use cases

	Explorer	Experimenter	Practitioner	Professional	Transformer
IT Infrastructure	Learn what technology is required to conduct the first AI experiments and set a plan to develop needed environment	Prove and refine existing IT environment and examine ways to automate the use of deployment architectures	Enhance the efficiency of the development tools and the management of computing resources	Evolve a centralized scalable platform connected to different data sources to track, deploy, and retrain AI models	Develop MLOps and innovate on new technologies to push the boundaries of AI
People	Identify AI specialists within the organization as well as basic AI capabilities needed to initialize the AI journey	Establish cross-functional, flexible, and networked teams to experiment with AI and develop learning activities for AI in line with different career paths	Set up AI accountabilities to deliver the AI agenda and enhance AI talent retention by updating rewards, recognition, and performance standards	Ensure that the AI organization is represented at the executive desk and develop sustainable AI learning journeys	Champion AI across the organization by offering a variety of benefits and support professional development by communicating self-driven career paths for AI
Governance	Design the AI governance model to drive the AI strategy considering potential AI challenges and opportunities	Activate governance bodies by engaging identified stakeholders and establish a framework to guide AI partnerships	Institutionalize the AI governance model to ensure AI value ina responsible way and formalize key partnerships	Expand the partnership network at a global level to leverage top expertise and adopt a responsible AI policy to drive trust and safe scaling	Contribute to the development of AI standards and best practices in collaboration with the broader AI ecosystem

CONCLUSION

This is the cusp of a crucial moment to take advantage of Artificial Intelligence. While AI is still away from the sentient machines from science fiction, the creation of algorithms that can learn, understand, and mimic some aspects of the human mind have led to huge advances.

AI is no longer a futuristic technology but is increasingly integrated into every realm of our lives and government services delivery, from offering advice to judging whether to grant bail conditions to criminal suspects to deciding whom to grant visas to predicting population health for early interventions. In truth, AI is touching lives far more than many of us realize.

Therefore, it is crucial for us to shape and progress on our AI journeys across government services while adopting a culture that sees AI not as a threat, but as a tool to augment human thinking and make better and faster decisions. This is where we should come together with our partners to shape the AI agenda focusing on human-machine collaboration.

In summary, we should embrace an agile approach for AI development, proving the value of identified use cases to evolve the AI maturity across government services from Explorer to Experimenter. At that stage, we become ready to scale these use cases and drive a pipeline of new ones based on the AI strategy, while consistently monitoring value and responsible practices, in collaboration with target end users, and building the supporting enablers such as data, IT infrastructure, people skills, and governance to become Practitioners and eventually Professionals. Once AI value becomes sustainable and pervasive across the government entity in delivering its mandate, we can truly call ourselves Transformers and reap the benefits of an AI driven government.

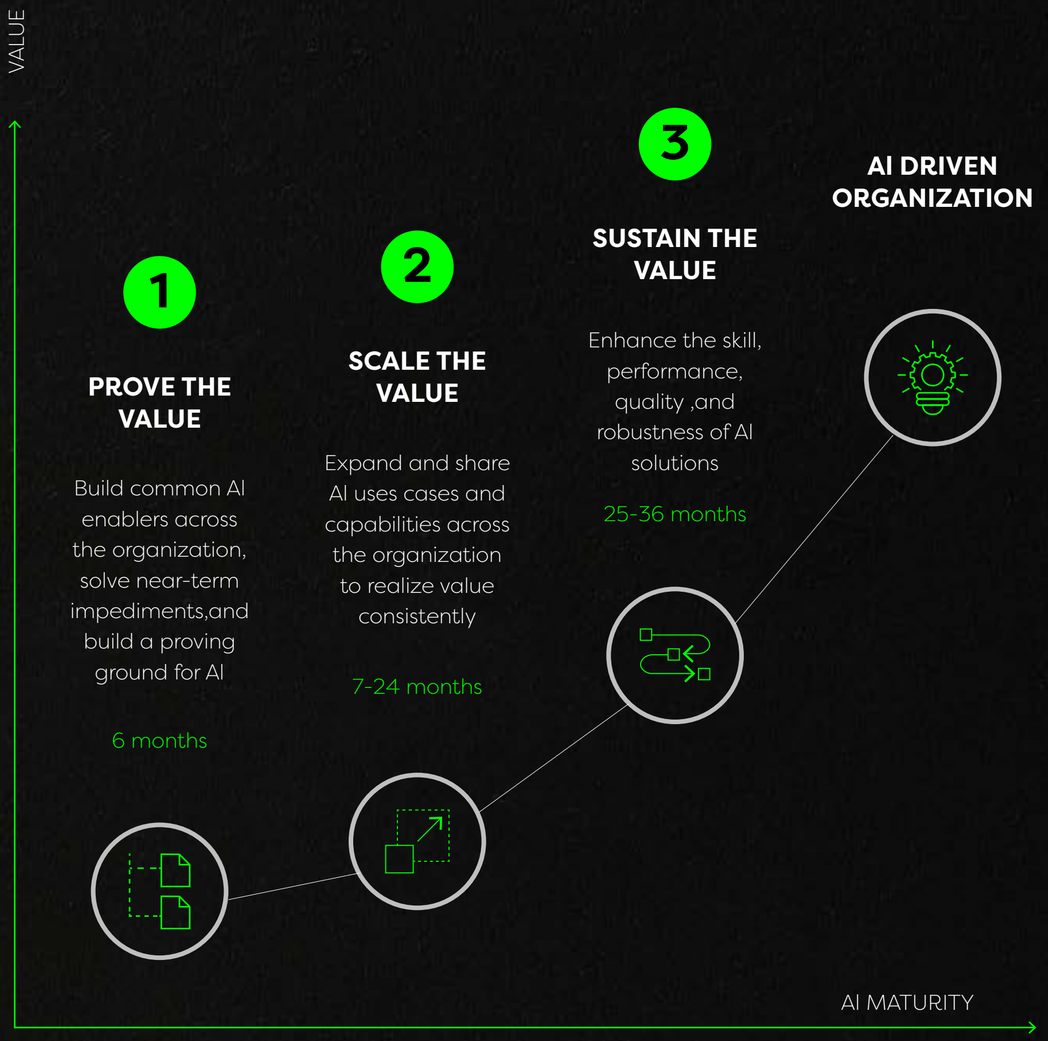
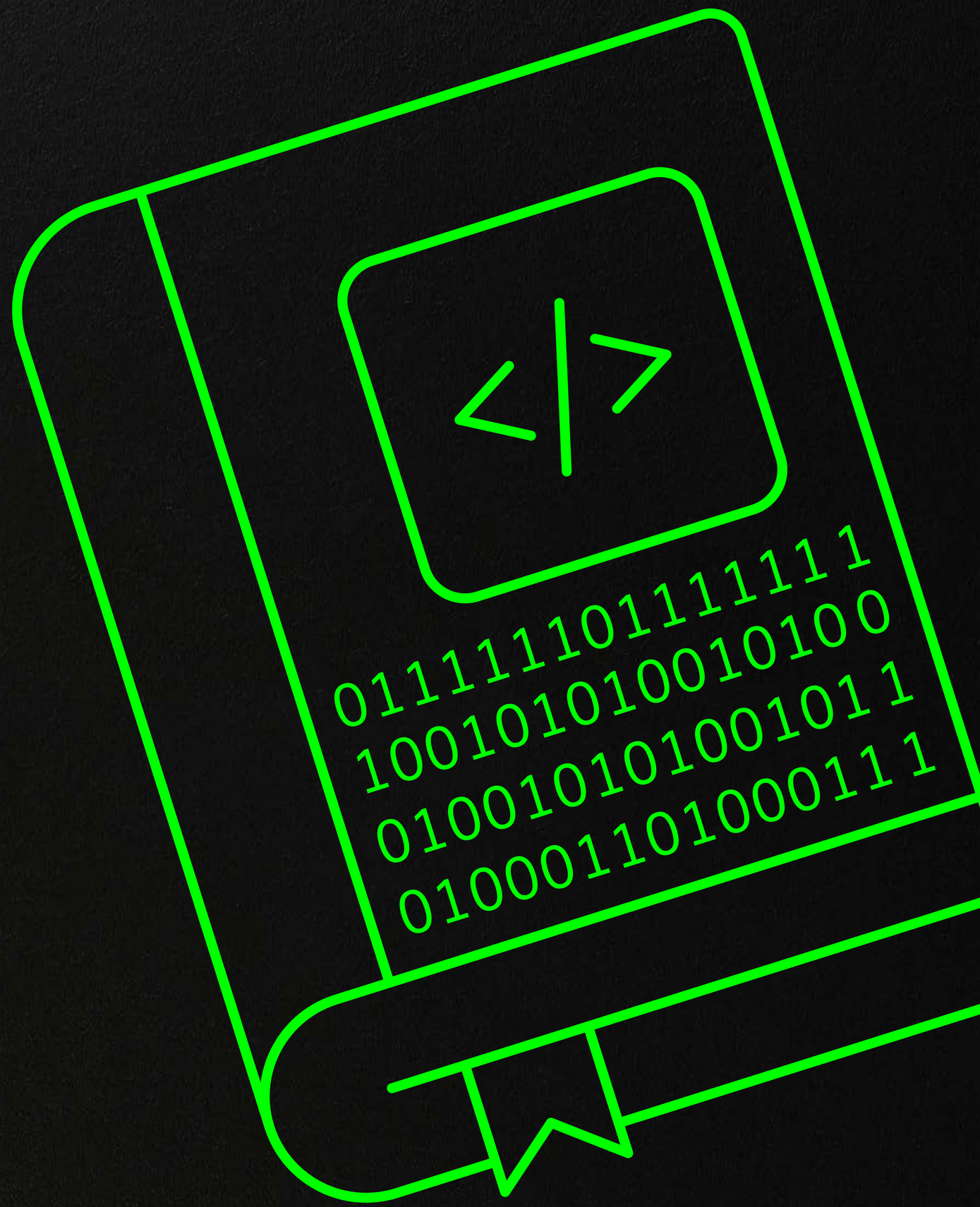


Figure 11 – The AI Journey

GLOSSARY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Below are key terms and their definitions used throughout the document:

Term	Definition
Artificial Intelligence (AI)	Artificial Intelligence (AI) defines a collection of technologies enabling a machine or system to comprehend, learn, act, and sense like a human
AI Use Case	An idea/opportunity on how AI or ML can be applied to solve a particular problem
Big Data	Big Data refers to the large, diverse sets of data that grow at ever-increasing rates. It encompasses the volume of data, the velocity or speed at which it is created and collected, and the variety or scope of the data points being covered (known as the «three v›s»)
Computer Vision (CV)	Computer Vision (CV) is a field of AI that enables computers and systems to derive meaningful information from digital images, videos, and other visual inputs – and take actions or make recommendations based on that information
Data Analytics	Data Analytics is the discipline focused on extracting insights from data through the use of AI or other analytical and statistical techniques
Deep Learning	Deep learning is a subset of machine learning where artificial neural networks, algorithms inspired by the human brain, learn from large amounts of data

Term	Definition
Descriptive Analytics	Descriptive analytics is a statistical method that is used to search and summarize historical data in order to identify patterns or meaning
Explainability	Explainable artificial intelligence (XAI) is a set of processes and methods that allows human users to comprehend and trust the results and output created by machine learning algorithms. Explainable AI is used to describe an AI model, its expected impact and potential biases. It helps characterize model accuracy, fairness, transparency and outcomes in AI-powered decision making
General AI	General AI refers to a machine that can perform any intellectual, physical, and even emotional task that a human being could
Machine Learning (ML)	Machine Learning (ML) is an application of AI that teaches machines how to perform specific tasks by learning from this data
Machine Learning Operations (MLOps)	Machine Learning Operations (MLOps) is a set of practices that aims to deploy and maintain machine learning models in production reliably and efficiently
Narrow AI	Narrow AI is artificial intelligence that is focused on one narrow task

Term	Definition
Natural Language Processing (NLP)	Natural Language Processing (NLP) is a collective term referring to automatic computation processing of human languages. This includes both algorithms that take human-produced text as input, and algorithms that produce natural looking text as outputs
Neural Network	A computer system modeled to simulate the human brain and nervous system
Proof of Concept (POC)	Proof of Concept (POC) is an exercise in which work is focused on determining whether an idea can be turned into a reality. A proof of concept is meant to determine the feasibility of the idea or to verify that the idea will function as envisioned
Persona	Characters, which are created to represent the different user types that might use your service, product, site, or brand in a similar way
Predictive Analytics	The term predictive analytics refers to the use of statistics and modeling techniques to make predictions about future outcomes and performance

Term	Definition
Prescriptive Analytics	Prescriptive analytics is a type of data analytics that focuses on analyzing different scenarios based on different decisions or actions taken to prescribe the most suitable course
Reinforcement Learning	Reinforcement learning is a field of machine learning concerned with how software agents ought to take actions in an environment so as to maximize some notion of cumulative reward
Robotics	Branch of technology that deals with the design, construction, operation, and application of robots
Supervised Learning	Supervised learning is the machine learning task of learning a function that maps an input to an output based on example input-output pairs. It infers a function from labeled training data consisting of a set of training examples.
Unsupervised Learning	Unsupervised learning is a type of machine learning algorithm used to draw inferences from datasets consisting of input data without labeled responses

10 سنوات

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