WHITEPAPER *2024*

Unleashing the Power of AI

How e& UAE is Shaping the Future of AI in Telecommunications and Beyond

Contents

Introduction

This whitepaper delves into the AI journey of e& UAE.

In an era defined by rapid technological evolution, e& UAE emerges as a pioneering force, strategically navigating the dynamic landscape of Artificial Intelligence (AI) and Generative AI (GenAI) within the United Arab Emirates (UAE). This whitepaper delves into e& UAE's comprehensive journey, unveiling its pivotal role in shaping the trajectory of AI adoption in the country.

From deploying advanced analytics and machine learning to fostering partnerships that enhance cloud and AI capabilities, the organisation is committed to continuous innovation. The document delves into the strategic advantage gained by e& UAE through the adoption of GenAI. It demonstrates the organisation's holistic approach beyond mere upgrades to position it as a strategic enabler, ensuring future readiness and sustainability. By weaving AI seamlessly into various operational domains, from sales and customer experience to telco networks and corporate functions, e& UAE exemplifies a forward-thinking stance in embracing transformative technologies and shaping the digital future of the UAE.

This whitepaper specifically focuses on e& UAE, the group's telecommunications arm in the country. It does not cover the AI initiatives, use cases, and innovations across other e& companies such as e& life and e& enterprise or other geographies outside the UAE.

> **This document is a testament to e& UAE's commitment to excellence, innovation, knowledge sharing, and responsible AI adoption.**

"I am thrilled to guide e& UAE on a transformative journey at the forefront of Artificial Intelligence (AI) and Generative AI (GenAI). This whitepaper encapsulates our commitment to pioneering innovation, strategic partnerships, and the responsible integration of cutting-edge technologies.

As we shape the future of technology in the UAE, our focus on AI-driven excellence positions us as catalysts for sustainable growth and unparalleled customer experiences. Join us on this dynamic journey as we unlock the full potential of AI, driving innovation that transcends boundaries and propels the UAE into a digital era of unparalleled possibilities."

Khalid Murshed
Chief Technology and Information Officer, e& UAE

"We are in one of the most pivotal moments in human history. AI has the potential to transform the world and create a real positive impact. Solving some of our biggest challenges, from sustainability to healthcare and ensuring we deploy it responsibly, is critical. I see AI as a force for progress, empowering societies and economies globally.

This whitepaper demonstrates the thoughtful approach, guiding principles, and unique use cases within e& UAE. Whether adopting AI to improve customer experiences, scale productivity, or reduce costs, the possibilities are endless. Within the e& ecosystem, both in the UAE and across our global footprint, the exponential adoption of AI is not merely a technological upgrade but a strategic enabler in an ever-evolving digital landscape."

Dena Almansoori
Group Chief AI and Data Officer, e&

AI-generated image

01 AI Evolution

The story of AI is one of remarkable progress punctuated by challenges and breakthroughs.

AI's story is one of remarkable progress punctuated by challenges and breakthroughs. It started with visionary ideas like Alan Turing's test for machine intelligence and the practical problem-solving expertise of early "expert systems." However, progress could have been smoother. Periods of limited funding and unrealistic expectations, dubbed "AI winters," hampered research in the 60s and 70s.

AI rose again in the 80s with the revolutionary backpropagation algorithm, which supercharged the training of complex neural networks. This paved the way for the rise of convolutional neural networks (CNNs), the driving force behind breakthroughs like Deep Blue's stunning victory over chess champion Garry Kasparov in 1997 and IBM Watson's domination of Jeopardy! in 2011. These milestones showcased the immense potential of AI, not just in games but in tackling real-world challenges like natural language processing (NLP).

The 2010s saw the dawn of deep learning, ushered in by the triumph of the AlexNet model in image recognition. Advancements like ResNet addressed the complexities of training deeper networks, paving the way for even more powerful models like BERT, which revolutionised NLP by understanding the context in both directions. GPT-3, with its massive parameter count, showcased the incredible feats of text generation. At the same time, tools like DALL-E pushed the boundaries of image creation by crafting diverse and realistic visuals from mere text descriptions.

Today, AI's evolution shows no signs of slowing down.

Recent developments like OpenAI's ChatGPT, with its improved conversational abilities, and Google's Gemini (formerly Bard), focused on comprehensive and informative information processing, highlight the ongoing diversification of AI applications. Tools like Microsoft Copilot are also transforming coding by assisting developers, while the quest for explainable AI (XAI) promises to make AI models more transparent and trustworthy.

The future of AI seems boundless. Advancements in diffusion models, foundation models, and natural language inference hold immense potential, while the burgeoning field of robotics stands poised to transform our world. This journey, from early ideas to cutting-edge applications, is a testament to the ingenuity and perseverance of researchers pushing the boundaries of what machines can achieve.

As we navigate the ethical considerations and challenges that come with this powerful technology, one thing is certain: AI's evolution is an ongoing story with some of the most captivating chapters yet to be written.

Summary of AI evolution milestones:

EARLY MILESTONES	1943	Neuron Model	First artificial neuron
	1950	Turing Test	Turing Test proposal for assessing machine intelligence
	1956	Dartmouth Workshops	Birth of AI as a field
	1957	Perceptron	Introduction of a simple neural network model
	1961	Unimate	First industrial robot
	1967	Dendral	Pioneering expert system demonstrating the potential of rule-based AI
	1970s	Expert Systems	AI focused on specific domains and tasks using knowledge rules
	1986	Backpropogation	Algorithm enabling efficient training of deep neural networks
	1989	Image recognition	Framework revolutionising image recognition and computer vision
	1990s	Statistical Machine Learning	Rise of probabilistic models and algorithms like Support Vector Machines
MAJOR BREAKTHROUGHS	1997	**Deep Blue vs. Garry Kasparov**	AI system defeats the world chess champion
	2000	**Kismet and ASIM**	Robots that recognise and simulate emotions, and able to walk
	2011	**IBM Watson on Jeopardy!**	Showcase of natural language processing capabilities
	2012	**AlexNet**	Deep learning model won the ImageNet competition for image classification
	2014	**Generative Adversarial Network (GAN)**	Framework for generating realistic synthetic data
	2015	**ResNet**	Neural network architecture addressing challenges in training very deep networks
	2016	**AlphaGo**	AI system defeating a world champion Go player through reinforcement learning
	2017	**Capsule Network**	Geoffrey Hinton's approach addressing hierarchical relationships in neural networks
	2018	**BERT by Google**	Model revolutionising natural language processing with bidirectional context understanding
RECENT ADVANCEMENTS	2019	**OpenAI GPT-2**	Language model showcasing advanced text generation capabilities
	2020	**AlphaFold**	AI system solving the protein folding problem in computational biology
		OpenAI GPT-3	Large language model with 175 billion parameters, showcasing large-scale transformer capabilities
	2021	**DALL-E**	Model generating diverse and high-quality images from textual descriptions
		ChatGPT	Conversational AI model based on the GPT architecture, improving language understanding
	2022	**Copilot**	AI pair programmer from Microsoft assisting developers in writing code
	2023	**Bard**	Large language model from Google AI focusing on comprehensive and informative information processing
	2024	**New Models**	Diffusion Models, Foundation Models, Natural Language Inference, Small language models, Robotics advancements, Explainable AI (XAI)

02 Decoding the AI Tapestry

AI is a vast term often likened to an umbrella term encompassing various subfields.

Unveiling classifications and applications

AI is continuously reshaping how we interact with and perceive the world. Its transformative influence spans industries, revolutionising healthcare, finance, communication, and beyond. With AI advancing at an unprecedented pace, comprehending its diverse classifications is paramount.

This section explores the intricacies of the AI ecosystem, examining key classifications ranging from foundational Machine Learning (ML) to the creative domains of Generative AI (GenAI) and the capabilities of Large Language Models (LLMs).

AI is a dynamic and expansive landscape, often likened to an umbrella term encompassing various specialised subfields. Each subfield possesses unique strengths within this intricate ecosystem, enabling various applications and collectively driving AI forward.

Key classifications:

Machine Learning (ML)

As the foundational technology, ML algorithms form the bedrock for intelligence development. These algorithms learn from data, enabling them to discern patterns, make predictions, and enhance their performance iteratively. This domain encompasses prominent techniques, including supervised, unsupervised, and reinforcement learning.

Deep Learning (DL)

Operating as a subfield inspired by the intricate structure and functionality of the human brain, DL leverages artificial neural networks with multiple layers to process complex data. This approach has led to groundbreaking advancements in image recognition, natural language processing, and speech recognition.

Generative AI (GenAI)

Reflecting its name, GenAI encompasses systems proficient in generating new content across various domains such as text, images, music, and code. This includes techniques like Generative Adversarial Networks (GANs) and Transformers, which power applications like creative writing tools and image/code generation.

Foundation Models

These extensive, pre-trained AI models are cultivated on vast text, voice, and image datasets. Notable examples include LaMDA from Google AI, Jurassic-1 Jumbo from AI21 Labs, and versatile models like the GPT (Generative Pre-trained Transformer) series, including GPT-3 from OpenAI. These models serve as foundational pillars for a wide range of applications. They allow fine-tuning for specific tasks, such as answering a question, translating, creating creative content, and more, showcasing the diverse and multimodal capabilities within the field of AI.

Large Language Models (LLMs)

LLMs are a specialised category of foundation models tailored for language processing. They demonstrate the ability to comprehend and generate human-like text. Applications include language translation and creative content generation.

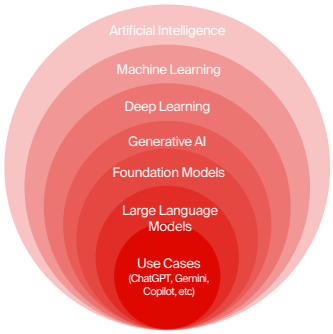
Use Cases

This encompasses the diverse methods through which humans interact with AI systems. Examples include chatbots, voice assistants, and virtual reality interfaces designed to facilitate seamless interactions with AI applications.

AI learning models classification:

Recognising that these categories often overlap is crucial in fostering a symbiotic relationship that contributes to advancing the AI field and ecosystem. As we navigate this space, understanding these classifications enhances our appreciation for the vast potential of AI technology and its profound impact on various facets of our lives.

In the rapidly evolving telecommunications sector, the strategic integration of AI and ML has emerged as a transformative imperative.



AI classifications and the intricate layers that define the diverse landscape of AI

AI learning approach classification:

Supervised Learning

Trains models with labelled data (inputs with corresponding outputs) to make predictions for new, unseen data. This is useful for tasks such as classification and regression.

Unsupervised Learning

Analyses unlabelled data to discover patterns and relationships within it. This is used for tasks like clustering and dimensionality reduction.

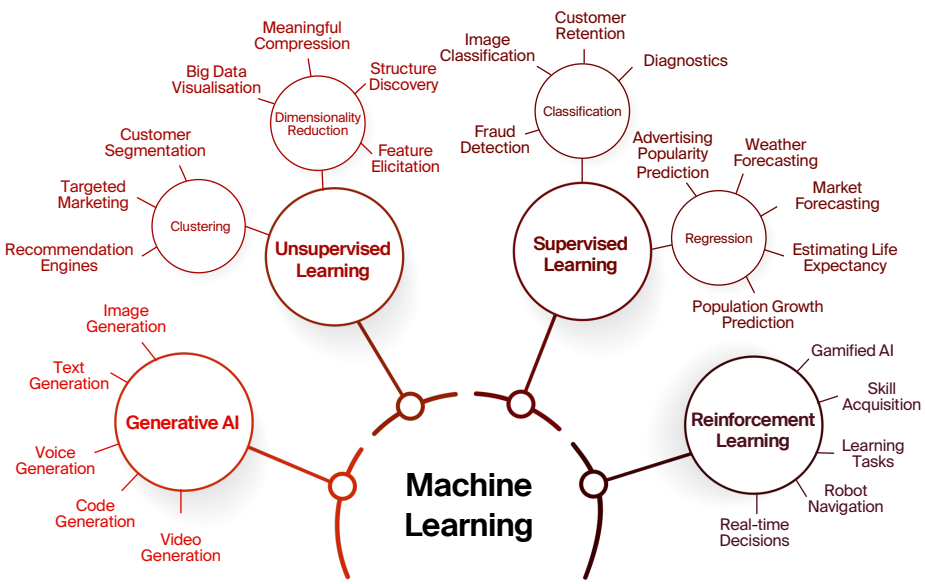
Reinforcement Learning

Trains a model through trial and error by providing rewards for desired actions, allowing a model to learn and optimise its behaviour over time. This approach is useful in tasks like robot control and gameplay.

Generative AI

Creates entirely new data, such as images, text, or music, by learning from existing data and patterns. Its practical applications include creative content generation, data augmentation, and language translation.

Classification of Machine Learning techniques and their applications:



In the rapidly evolving telecommunications landscape, the strategic integration of AI and ML has emerged as a transformative imperative. This section delves into the core functionalities of machine learning algorithms, each meticulously designed to address specific challenges and capitalise on emerging opportunities within the telecom sector.

Classification of Machine Learning techniques:

These algorithms are at the core of innovation, from predicting signal strength and optimising network coverage to fortifying security measures and proactively refining customer retention strategies. Telecom leaders like e& UAE have embraced this technological revolution, adopting AI and ML to enhance operational efficiency, deliver superior user experiences, and proactively meet evolving network demands.

The table below provides a comprehensive reference detailing the algorithms, descriptions, and diverse applications in the telecommunications sector.

ALGORITHM	DESCRIPTION	GENERAL USE CASES	TELCO USE CASES
Random Forest	Ensemble method using multiple decision trees	Predictive modeling, feature importance analysis	Signal strength prediction, network coverage optimisation
Logistic Regression	Classifies data into binary outcomes based on predictors	Customer churn prediction, spam detection	Churn prediction, network security (fraud detection)
Decision Trees	Constructs a tree-like model for decision-making	Credit scoring, risk assessment	Network fault detection, infrastructure planning
K-Means Clustering	Divides data into clusters based on similarity	Customer segmentation, anomaly detection	Geographical clustering, capacity planning
Neural Networks	Mimics the structure and functioning of the human brain	Image recognition, natural language processing	Predictive maintenance and network performance optimisation
Gradient Boosting Machines	Builds a series of weak models for a strong predictive model	Predictive modeling, ranking algorithms	Call drop rate prediction, network optimisation
XGBoost	Optimised and scalable version of gradient boosting	Structured data analysis, regression tasks	Network congestion prediction, data transfer rate optimisation
Recurrent Neural Networks	Designed for sequence data, processes information over time	Natural language processing, time series prediction	Network traffic pattern prediction, optimisation
Long Short-Term Memory	A type of RNN with memory cells for learning dependencies	Speech recognition, sentiment analysis	User mobility pattern prediction, handover optimisation
Support Vector Machines	Finds hyperplanes for data classification	Image classification, sentiment analysis	Network traffic classification, security threat detection
Isolation Forest	Anomaly detection algorithm based on isolation of outliers	Unusual network behaviour detection, anomaly detection	Network anomaly detection, security threat identification
Gaussian Mixture Model	Represents a mixture of multiple Gaussian distributions	Network traffic pattern analysis, fraud detection	User behaviour analysis, security threat detection
DBSCAN	Clustering algorithm based on data density	Identifying call density clusters, spatial data clustering	Infrastructure planning, network optimisation
naïve Bayes	Probabilistic algorithm based on Bayes' theorem	Spam filtering, network event classification	Spam filtering for messages and emails, event categorisation
AdaBoost	Boosting algorithm that combines weak classifiers	Improved network fault detection, face recognition in video calls	Enhanced anomaly detection, video call quality optimisation

Generative AI

GenAI, the latest innovation in AI, has opened up a world of possibilities. This section explores GenAI's diverse range of applications across various domains. From content creation to product optimisation, GenAI showcases transformative capabilities. Given its profound impact on shaping the future across different industries, it's worth examining specific examples of GenAI use cases.

Creative Content

Art and Design

Generating unique paintings, sculptures, and graphic designs in various styles. Platforms like DALL-E 2, Leap AI, Segmind and Midjourney allow users to create art with text prompts.

Music Composition

Producing original musical pieces in genres like classical, pop, or electronic. Tools like Amper Music, Songburst and Jukebox create music based on user preferences.

Creative Writing

Generating poems, scripts, stories, and other forms of creative text content. Platforms like LaMDA, Jasper, and Hemingway, can write different types of creative content.

Entertainment and Media

Video Game Design

Creating realistic and immersive game environments and characters. Generative models can populate gaming with unique details and infinite options.

Voice Acting and Dubbing

Synthesising realistic voices for characters in movies, games, and audiobooks. Tools like Resemble AI and Murf create expressive voices based on text prompts.

Personalised News and Social Media Feeds

Tailoring news articles and social media content to individual preferences, generating summaries or different writing styles. Platforms like Outwrite and Quill offer personalised content generation.

Product Development

Data Augmentation

Expanding existing datasets with synthetic data to improve the performance of machine learning models. This is crucial for tasks like medical diagnosis and self-driving cars.

Code Generation

Suggesting or auto-completing code for programmers through platforms like GitHub Copilot or Tabnine, improving efficiency and automation in software development.

Language Translation

Translating languages more fluently and creatively, going beyond literal translations to capture nuances and context. Tools like Google Translate and DeepL are constantly evolving with Generative AI techniques.

Other applications

Drug Discovery

Designing new molecules at an accelerated pace with desired properties for drug development. Tools like Generative TensorFlow and AlphaFold are used for this purpose.

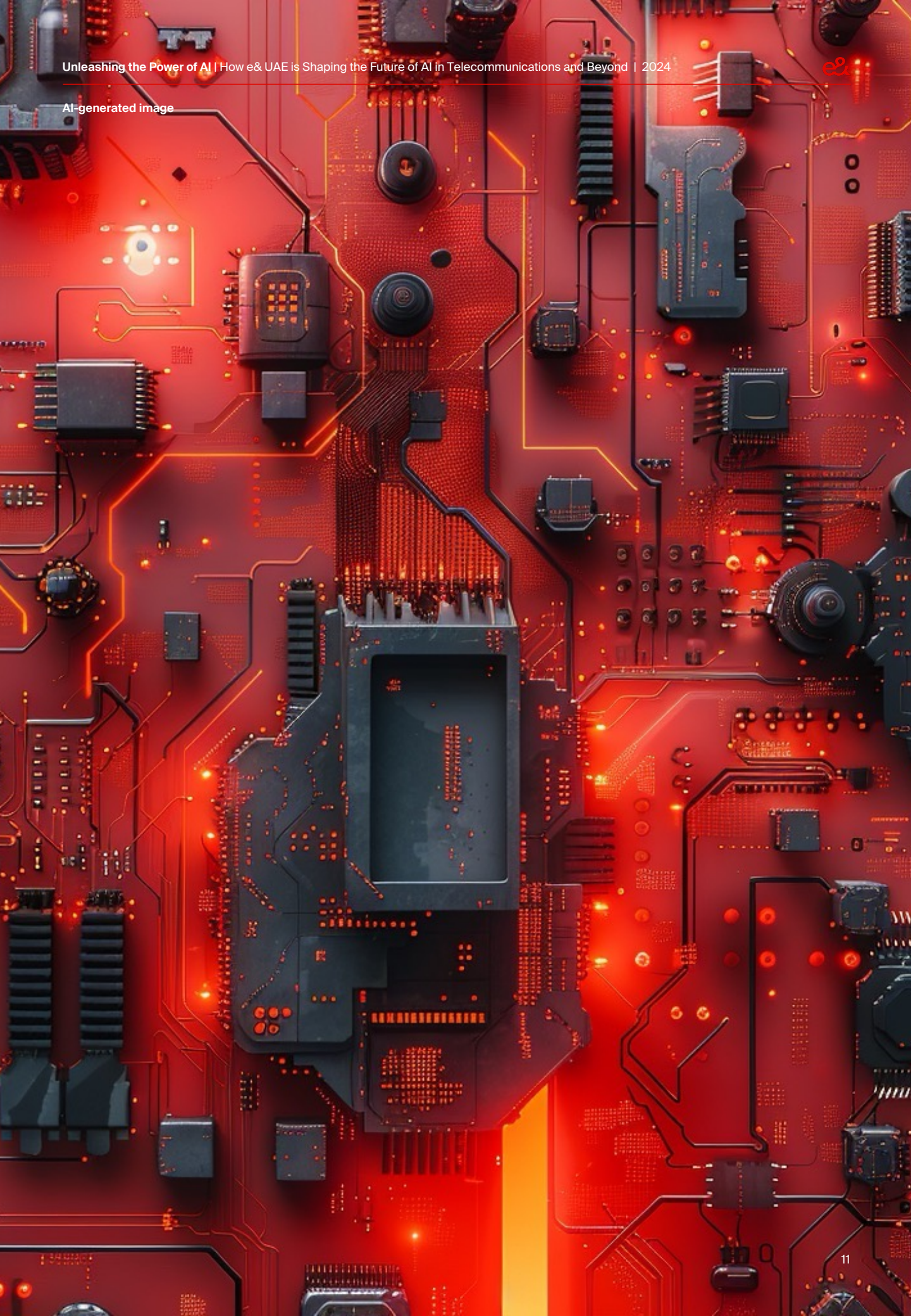
Material Science

Discovering new materials with specific properties for applications like battery technology or solar panels. Generative models can explore vast chemical spaces for potential breakthroughs.

Fashion Design

Generating new clothing designs and patterns based on trends and user preferences. AI applications, like WOMBO Dream, help create unique fashion designs.

These are just a few examples, and GenAI's possibilities are constantly evolving. As the technology develops, we can expect even more innovative and impactful applications to emerge in various fields.



AI-generated image

03 e& UAE: AI Adoption

e& UAE has proactively taken a stance toward AI and data-driven adoption.

In the digital era, e& UAE takes a proactive stance toward AI and data-driven adoption, positioning itself as a leading service provider committed to embracing new technologies for long-term growth and success.

This AI strategy encompasses several pivotal initiatives:

AI-Powered Business Optimisation

e& UAE effectively leveraged AI to streamline and automate business processes, align talent with future market needs, and cultivate advanced analytics capabilities. This strategic move resulted in a significant reduction in operational costs and improved agility and data-driven decision-making capabilities.

Diverse AI Applications

e& UAE showcases AI's versatility by deploying it across diverse domains beyond telecommunications. Innovations like facial recognition, voice biometrics, Optical Character Recognition (OCR), and chatbots transform customer experiences by enabling highly personalised and engaging interactions.

Sustainable AI Integration

Recognising the interplay between digitalisation and sustainability, e& UAE infused sustainable practices into its AI initiatives. This ensures responsible growth while contributing to the company's ambitious environmental goals.

Fostering Talent and Culture

Embracing cutting-edge technologies and innovative approaches, e& UAE fosters a culture of continuous learning and experimentation by cultivating new mindsets and exploring untapped potential.

Extensive AI Deployment

e& UAE implements more than 160 machine learning models in various functions, from customer segmentation and autonomous networking to fraud detection, which resulted in a significant decrease in fraudulent activities. These implementations optimise operations, protect customers, and drive substantial revenue growth through Customer Value Management (CVM).

Strategic Capital Allocation

e& UAE accelerates its growth through a strategic capital allocation approach incorporating targeted investments, alliances and partnerships. This strategy ensures access to leading technologies and expertise, expediting the company's AI journey.

To summarise, e& UAE's AI journey is characterised by strategic initiatives aimed at optimising business processes, streamlining customer experiences, ensuring sustainability, deploying extensive AI models, exploring diverse applications, fostering innovation, and strategically allocating capital.

> **By adopting a holistic approach to AI integration and digitalisation, e& UAE solidifies its leadership in the evolving telecommunications landscape. The company plans to leverage AI for even greater personalisation, network optimisation, and service innovation, cementing its position as a future-proof and customer-centric organisation.**

These efforts collectively position e& UAE as a dominant player in telecommunications, setting the stage for future innovations and breakthroughs. As we delve further into this whitepaper, we will explore specific case studies and examples that highlight the real-world impact of these initiatives, providing deeper insights into the transformative power of AI at e& UAE.

04 e& UAE: AI Journey

Marked by strategic milestones that underscore e& UAE's commitment to harnessing the power of AI.

Amidst rapid technological disruption and innovation, e& UAE has charted a bold course on its transformative AI journey. This path is paved with strategic milestones underscoring the company's commitment to unlocking the full power of AI. Over the years, e& UAE has steadily progressed toward intelligent operations. It began in 2016 with dedicated teams focusing on data analytics, followed by the establishment of the Robotic Process Automation (RPA) Team and the subsequent formation of the Machine Learning and Advanced Analytics Team. Each milestone represents a deliberate step toward infusing intelligence into operational frameworks.

Creating the AI Cognitive Team and collaborating with esteemed partners in the AI Centre of Excellence (AICoE) exemplifies e& UAE's dedication beyond adopting cutting-edge technologies to pioneering them. Initiatives such as the AI Graduate Programme rolled out in 2021, alliances with industry leaders like Microsoft and Oracle and the introduction of the Internal AI-First Programme underscore a holistic approach, emphasising talent development, strategic partnerships, and the seamless integration of AI into every facet of our operations. These milestones collectively reflect e& UAE's relentless pursuit of innovation, positioning the organisation at the forefront of AI in the UAE and beyond.

Below is a summary of e& UAE's AI milestones:

2016
Inception of the Advanced Analytics Team

OBJECTIVE
The creation of the Advanced Analytics Team marked e& UAE's strategic move to harness analytics for valuable data-driven business insights, setting the stage for subsequent advancements in leveraging analytics for operational enhancements and predictive modelling.

KEY ACTIVITIES
The team initiated the implementation of basic data analytics tools, laying the foundation for more informed data-driven decision-making processes.

2017
Establishment of the Robotic Process Automation (RPA) Team

OBJECTIVE
To enhance operational efficiency, increase productivity and accuracy, and reduce substantial costs, the Robotic Process Automation (RPA) Team was established, with the concurrent formation of the Robotics Centre of Excellence (COE).

KEY ACTIVITIES
RPA solutions were deployed across various departments, leading to a significant reduction in manual processing. The team also formulated a Governance Model for RPA implementation.

2018
Formation of the Machine Learning and Advanced Analytics Team

OBJECTIVE
e& UAE advanced its AI journey by forming the Machine Learning and Advanced Analytics Team, focusing on integrating more sophisticated AI techniques into its business processes, optimising strategic decision-making and customer services.

KEY ACTIVITIES
The team actively developed and implemented machine learning models for predictive analytics, resulting in improved forecasting capabilities and personalised customer experiences.

04. e& UAE: AI Journey

2019
Inception of the AI Cognitive Team

OBJECTIVE
In partnership with Emirates ICT Innovation Centre (EBTIC), Khalifa University (KU), and Microsoft, the AI Centre of Excellence was launched to drive AI research and development efforts and bolster innovation.

KEY ACTIVITIES
The Implementation of AI systems capable of simulating human thought processes, resulting in the deployment of chatbots and AI-driven customer service tools.

2020
Establishment of the AI Centre of Excellence (COE)

OBJECTIVE
Consolidation of AI research and development efforts to bolster innovation.

KEY ACTIVITIES
Joint projects with partner entities focused on AI innovation and application in telecommunications.

2021
Launch of AI Graduate Programme

OBJECTIVE
To nurture internal talent and ensure all new hire graduates have the capabilities to drive AI initiatives and develop skills aligned with the future of work, e& UAE introduced the AI Graduate Programme.

KEY ACTIVITIES
Offering intensive training and development programmes in AI and related fields for graduates. Empowering them with the technical and non-technical capabilities needed for AI-driven initiatives and becoming successful future leaders.

2022
Industry Collaboration

OBJECTIVE
Collaboration with several Cloud and AI organisations, like Microsoft, to enhance cloud and AI capabilities and substantially improve service quality and operational efficiency.

KEY ACTIVITIES
Joint efforts focused on integrating advanced cloud and AI technologies, driving advancements in cloud infrastructure and AI applications.

2023
Introduction of the Internal AI-First Programme

OBJECTIVE
To consistently embed AI across all internal operations, e& UAE launched the Internal AI-First Programme, which integrates AI into its core operations for sustained innovation and efficiency.

KEY ACTIVITIES
Prioritising AI solutions in all business processes and decision-making to foster a culture of innovation and efficiency.

2024
Deployment of GPU Farm

OBJECTIVE
To elevate cloud and AI capabilities, e& UAE entered a strategic collaboration with Oracle Corporation. The partnership significantly bolstered e& UAE's AI capabilities and processing efficiency by deploying advanced NVIDIA GPUs and developing and integrating sophisticated AI services to meet evolving market demands.

KEY ACTIVITIES
The collaboration involved deploying cutting-edge NVIDIA H100 GPU units within Oracle Cloud Infrastructure, enhancing AI processing capabilities. Utilising Oracle's robust cloud platform, AI services were seamlessly integrated into e& UAE's business applications, providing access to high-performance, flexible computing resources for the rapid and scalable development of AI services.

05 e& UAE: AI-driven Transformation

e& UAE embraces AI and data-driven transformation to thrive in the digital era.

AI takes centre stage as e& UAE moves beyond conventional boundaries, embarking on a transformative journey across diverse streams. e& UAE's evolution spans strategic initiatives that reimagine product offerings, redefine sales and marketing strategies, revolutionise customer experiences, optimise tech networks, and empower corporate functions.

This narrative reveals a forward-thinking approach in which AI is a catalyst to propel technology disruption and corporate innovation. This next section explores the complex aspects of this progressive journey, where e& UAE emerges as a trailblazer at the intersection of technology and telecommunications, setting new benchmarks for the company's and industry's future.

Product Transformation

e& UAE has seamlessly integrated AI-powered products into its comprehensive telecoms portfolio. This strategic move enhances the quality of offerings and contributes to scaled-up revenue from enterprise and government (Ent/Gov) sectors and small and medium businesses (SMBs).

Furthermore, the organisation has successfully diversified its revenue streams through monetising external use cases, demonstrating the versatility of AI in generating revenue beyond traditional telecommunications services.

Sales & Marketing Innovation

e& UAE has redefined its sales and marketing approach through an AI-centric lens. Establishing autonomous, fully digital stores has revolutionised the customer interaction process, ensuring a streamlined and efficient experience. Gamification techniques have been incorporated to enhance up-selling and cross-selling efforts, leveraging AI-driven sentiment analysis for a more targeted and personalised approach to customer engagement.

Customer Experience Revolution

When it comes to customer experience excellence, e& UAE has also achieved significant milestones. AI-powered virtual assistants inch closer to human parity, encompassing chat and voice interactions and supporting multiple languages. The commitment to providing a fully personalised experience across all customer journeys ensures that each interaction is hyper-personalised and tailored to the individual's preferences. Consistency in real-time experiences synchronised across all channels underscores the organisation's commitment to delivering exceptional and seamless customer experiences.

Telco Network Advancements

Implementing an end-to-end AI-driven autonomous network characterises e& UAE's telco network transformation. This innovation ensures optimal performance and efficiency throughout the network's lifecycle. The organisation has embraced Full MLOps (Machine Learning Operations), enabling the comprehensive management of AI models from end to end. Additionally, stringent measures have been put in place to ensure full compliance with data security regulations, safeguard customer information, and maintain the integrity of the network.

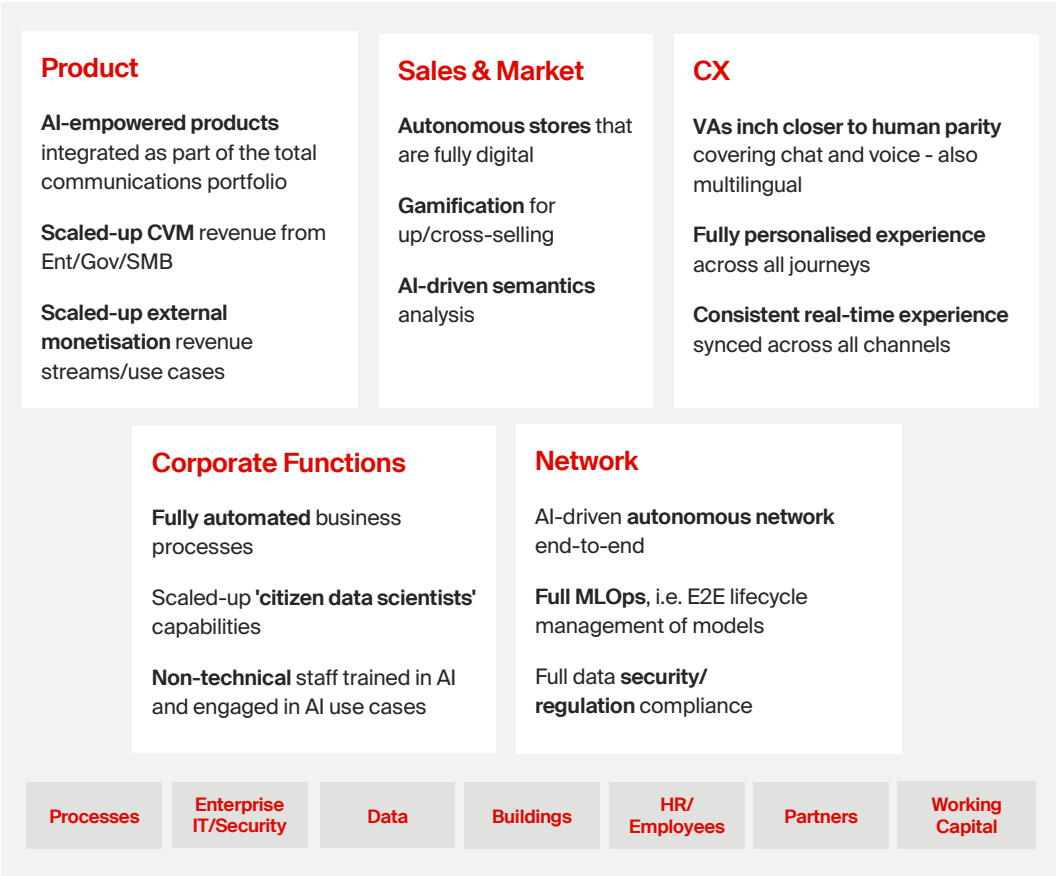
Corporate Function Evolution

In terms of corporate functions, e& UAE has achieved significant automation in business processes, optimising efficiency and productivity and reducing manual intervention. Scaling up 'citizen data scientist' capabilities empowers non-technical staff to engage with and actively contribute to AI use cases. The organisation's commitment to continuously upskilling and reskilling all employees on AI principles and applications further reinforces a culture of inclusivity and innovation.

In short, e& UAE's AI-driven transformation spans diverse streams, from enhancing product portfolios and sales strategies to revolutionising customer experience, telco network advancements, and corporate functions.

This multifaceted approach further solidifies the organisation's position at the forefront of AI adoption and reinforces its commitment to driving and infusing innovation across all areas of its operations.

Encapsulating the key milestones and strategic shifts that underscore the organisation's commitment to harnessing the power of artificial intelligence for a digital future.



e& UAE has strategically positioned itself as a frontrunner in AI adoption, aligning with best practices for successful GenAI integration. This strategic alignment reflects the organisation's foresight and commitment to harnessing the transformative power of AI across crucial dimensions such as technology infrastructure, data governance and management, skills and talent development, business alignment, ethical and regulatory considerations, and community and ecosystem engagement.

Let's examine in detail how e& UAE excels in each of these dimensions:

Technology Infrastructure

e& UAE has invested significantly in building a robust and scalable technology infrastructure. This includes advanced computing capabilities, data storage solutions, and networking frameworks that form the backbone for seamless GenAI integration. The organisation's foresight in technological investments positions it for agility and efficiency in deploying AI solutions.

Data Governance and Management

Recognising the importance of data in AI initiatives, e& UAE has implemented robust data governance and management practices. This involves ensuring data quality, privacy, and security throughout its lifecycle. The organisation's commitment to responsible data handling ensures trust and reliability in AI-driven solutions.

Skills and Talent

e& UAE prioritises cultivating AI skills and talent within its workforce. By investing in training programmes and workshops and fostering a culture of continuous learning, the organisation ensures that its teams have the expertise needed to navigate the complexities of AI adoption. This commitment to skills development contributes to the organisation's agility in leveraging AI technologies.

Business Alignment

Successful AI adoption requires strategic alignment with business goals. e& UAE continuously integrates AI initiatives with its overarching business objectives. The organisation's AI strategies are purpose-driven, addressing specific business challenges and enhancing operational efficiency, customer experiences, and overall innovation.

Ethical and Regulatory Considerations

e& UAE is acutely aware of the ethical and regulatory landscape surrounding AI. The organisation has implemented measures to ensure responsible AI practices, addressing ethical considerations and compliance with regulations. This proactive approach safeguards against potential pitfalls and ensures e& UAE is a responsible player in the AI ecosystem.

Community and Ecosystem

In recognition of the collaborative nature of AI ecosystems, e& UAE actively engages with the broader community and industry ecosystem. Through partnerships, collaborations, and participation in AI-focused initiatives, the organisation contributes to and benefits from the collective knowledge and advancements within the AI community.

> **In essence, e& UAE's strategic positioning across these six critical dimensions underscores its commitment to adopting AI in a technologically sound and ethically responsible manner and in alignment with its business objectives.**

This comprehensive approach sets the stage for the organisation to fully leverage the potential of GenAI, drive innovation and stay ahead of technological advancements.

AI-generated image

06 e& UAE: AI Use Cases

Driven by its commitment to technological excellence, e& UAE emerges as a trailblazer in AI.

e& UAE has achieved noteworthy milestones through diverse AI-driven projects, demonstrating a steadfast commitment to innovation. From implementing machine learning models to establishing a unified data management system, these initiatives underscore the organisation's evolution into an AI-driven powerhouse. Each milestone showcases e& UAE's dedication to harnessing the transformative potential of AI, going beyond enhancing customer experiences to optimising operational efficiency, maximising productivity, and fostering groundbreaking business innovation.

Below is a summary of e& UAE's AI use case journey:

2016 **AI takes centre stage with customer value segmentation**

Going beyond data analysis, this strategic move marked e& UAE's entrance into AI. By using ML, the company segmented customers based on needs and behaviours, enabling targeted marketing and personalised offers. This laid the foundation for future AI-powered customer experiences.

2017 **RPA transforms customer registration**

RPA was a game-changer in streamlining administrative tasks by eliminating long queues and cumbersome paperwork. Robotic automation took over routine aspects of customer registration, speeding up the process and allowing employees to focus on more complex and value-added interactions.

2018 **Building a strong data foundation**

The Customer 360

This was more than a data lake; it was a treasure trove of customer insights. e& UAE's Customer 360 combined traditional data with predictive models, AI-powered vision and language processing, and even economic factors. This empowered the team to anticipate customer needs and create hyper-personalised experiences.

2019 **AI revolutionises customer service**

Virtual Agent 181 and beyond

Steering away from having customers listen to music on hold or robotic prompts, Virtual Agent 181 ushered in a new era of customer service. Chatbots, voice analytics, and AI-driven recommendations transformed interactions, offering 24/7 support and making every customer feel valued and recognised.

2020 **AI reimagines the customer journey**

Facial Recognition, AI Factory, and more

e& UAE implemented facial recognition technology in stores for instant customer recognition, enabling personalised greetings and targeted offers. The AI digital factory churned out new solutions while predictive models optimised sales processes and pricing.

2021 **AI meets social media and deep learning**

Virtual agents expanded to WhatsApp, extending reach and convenience to customers. Social media channels became AI-powered, delivering relevant content and responding to customer queries swiftly. Predictive models eliminated bill shocks, and deep learning unlocked even deeper customer insights.

2022

Unified Data and Self-Service RPA

Empowering both customers and employees

Unified data management was launched to provide customers with a seamless experience, enabling access to all data needs in one place. Meanwhile, self-service RPA puts the power of automation in the hands of employees, boosting efficiency and productivity.

2023

Collaboration and innovation

Joining forces and prioritising AI

The AI-First Programme ensured all initiatives prioritised AI integration, while GenAI and Data Robot capabilities broadened their AI arsenal. From fraud prevention to debt analysis, AI allowed the company to tackle new challenges and solve problems.

2024

On-Prem GPU Farm Deployment

The deployment of an on-prem Oracle Cloud Infrastructure Dedicated Region (OCIDR) integrated with Nvidia GPU clusters represents a pivotal use case in e& UAE's AI journey. By bringing cloud capabilities directly to its premises, the organisation gains control over its computing resources, ensuring reduced latency and enhanced data privacy.

Leveraging the dedicated cloud region from Oracle, e& UAE tailors its environment to specific needs, optimising performance for AI workloads. Incorporating Nvidia GPU clusters further accelerates AI adoption by providing high-performance computing capabilities, facilitating efficient model training, and supporting computationally intensive tasks. This strategic initiative enhances current AI applications and positions e& UAE for future innovation, reflecting a commitment to secure, efficient, and cutting-edge AI integration.

This is just a glimpse into e& UAE's AI journey. Each milestone reflects the company's commitment to innovation, customers, and vision for a future optimised by intelligent technology.

e& UAE recent AI use cases:

Enterprise Disruptive Use Cases

ChatGPT Adoption

ChatGPT as an assistant for employees on MS Teams, and as content generator for CVM on GoChat mobile app

e& enterprise Assistant

GenAI ChatBot that streamlines HR interactions and starts to accumulate use cases for enterprises

AI Photo Validation

Uses computer vision to automate human effort to validate e& staff photos as part of rebranding

Customer Experience

Autonomous Stores

Stores that utilise AI, IoT and computer vision to offer a seamless, self-service shopping experience

AI Voice Authentication

Authenticate operations across channels by enabling customers to use their voice print

Bill Review

Automated bill validation by resolving discrepancies in advance

Technology Disruptive Use Cases

Op System Patching Automation

Empowered IT infrastructure team by automating server patching

Field Force

Deep Learning AI to automate Service Installation Auditing, Quality Assurance etc.

Revenue Generation

Smiles Personalisation

Profile-based personalisation which uses machine learning to recommend offers, food and products

CVM: B2C & B2B

Machine learning CVM use cases focusing on both core and non-core telco services

The story continues, and as AI evolves, so will e& UAE's journey, pushing the boundaries of what's possible and shaping the future of telecommunications and beyond.

07 GenAI Evolution

Empowering the telecommunications industry, GenAI fuels transformation, elevating innovation, productivity and efficiency to new heights.

In the telecommunications sector, GenAI emerges as a catalyst for transformation, elevating the industry to new heights. GenAI represents a sophisticated class of AI systems with a human-like capacity to comprehend, learn, and apply knowledge across diverse tasks. Beyond conventional AI systems, GenAI can generate novel content, be it text, images, music, or code, making it a versatile and powerful tool. With its adaptability and innovative problem-solving capabilities, GenAI is leading the way in technological innovation, offering a paradigm shift of unlimited possibilities for the telecommunications sector.

The diverse range of capabilities and applications achievable with GenAI and its transformative possibilities:

Enhanced Customer Experience

Personalisation

Enables hyper-personalised experiences by analysing customer data and predicting needs, leading to increased satisfaction and loyalty.

Support

Round-the-clock AI-driven customer service with natural language processing for seamless interactions, reducing wait times and improving resolution rates.

Operational Efficiency

Automation

Automate routine tasks, from network management to billing inquiries, freeing up employees to address more complex issues.

Predictive Maintenance

Use AI to predict and prevent network outages or equipment failures, ensuring uninterrupted service and reducing maintenance costs.

Innovative Services and Products

New Offerings

Leverage GenAI to develop cutting-edge services like smart home solutions, enhanced security features, and tailored data plans.

Competitive Edge

Stay ahead of the curve by using AI to quickly adapt to market changes and proactively meet customer demands.

Cost Reduction

Savings

Reduce operational costs through automation and improved efficiency, allowing for competitive pricing and better capital allocation.

Scalability

Scale solutions up or down based on demand without significant additional costs, thanks to the flexibility of AI systems.

GenAI is a critical strategic enabler, bolstering e& UAE's prominence within the telecommunications industry. This transformative force equips the organisation with a strategic advantage, empowering it to navigate the digital era with unparalleled prowess. By embracing GenAI, e& UAE ensures it is future-proofed, surpassing mere current relevance. The integration of GenAI into its framework and operations equips e& UAE to effectively tackle the challenges and embrace the opportunities that lie ahead.

> **This strategic foresight positions the organisation to meet the demands of the future with agility, excellence, and a competitive edge.**

The evolving landscape of GenAI holds transformative potential, reshaping approaches to work, creativity, and innovation. However, navigating AI's sometimes uncharted waters requires a strategic approach.

This roadmap is your comprehensive resource for effectively implementing GenAI in any project or product.

Step 1 **Clarify Your Purpose**	Embark on your GenAI journey with a clear vision. Identify the specific user needs or business challenges GenAI will address. Whether crafting personalised content experiences, generating groundbreaking ideas, or optimising workflows, a defined purpose and specific problem that needs to be solved ensures alignment with overarching goals.
Step 2 **Establish a Robust Data Foundation**	GenAI thrives on high-quality, relevant data. Evaluate existing data, identify gaps and explore augmentation techniques or external sources. Clean, unbiased data is paramount for accurate and valuable outcomes.
Step 3 **Select Your GenAI Toolbox**	With vast options, from pre-trained models to open-source libraries, choose a tool that fits the project's unique needs, considering budget, technical expertise, and desired functionalities.
Step 4 **Prototype and Iterate**	Begin with small-scale experimentation. Create quick prototypes to test GenAI implementation, gather user feedback, refine the approach, and iterate rapidly. Embrace this learning journey, understanding that perfection is not the immediate goal.
Step 5 **Seamless Integration/Avoid Siloing GenAI**	Strive for seamless integration into existing workflows and tools through API connections, custom interfaces, or automated pipelines. Make GenAI feel like an organic, natural extension of your current operations.
Step 6 **Continuous Monitoring and Adaptation**	GenAI models are dynamic systems. Regularly monitor performance metrics, analyse user feedback, and be prepared to adapt. Retrain data, fine-tune models or adjust parameters as necessary to maintain peak performance.
Step 7 **Ethical Considerations and Responsible AI**	Finally, prioritising ethical considerations, such as deploying AI responsibly, is paramount. Ensure all projects adhere to ethical principles, addressing potential biases or unintended consequences. By employing GenAI responsibly, you build trust and unlock its full potential for positive impact.

By following this roadmap, embracing experimentation and letting GenAI become your formidable partner in innovation, the future is yours to shape.

08 e& UAE: AI Enablement

With a strong vision for innovation, e& UAE consistently invests in and advances key elements that form the bedrock of our AI ecosystem.

These essential components, categorised as AI Enablers, encompass a triad of fundamental elements: AI Platforms, Data Enablers, and the supporting Data Infrastructure.

Three essential AI enablers:

AI Platforms

At the core of our strategy lies the development and refinement of Platforms

These platforms serve as digital playgrounds where intricate algorithms, machine learning models, and advanced analytics converge. Through continuous enhancement, we empower our teams to harness AI's full potential, facilitating swift development, testing, and deployment of intelligent solutions.

Data Enablers

Central to the success of our AI endeavours are our state-of-the-art AI Data Enablers

These encompass a suite of tools, methodologies, and processes designed to unlock the value embedded within our vast data reservoirs. From efficient data collection and cleansing to sophisticated preprocessing and feature engineering, our Data Enablers ensure that the raw material for AI applications is not just voluminous but also refined, accurate, and ready for insightful analysis.

Data Infrastructure

The backbone supporting our AI initiatives ensures our AI ecosystem thrives

This involves deploying and maintaining scalable, secure, and high-performance data architectures, including GPU cluster deployment on both on-premises and cloud environments. These infrastructural enhancements facilitate the seamless flow of information, ensuring that our AI models can access, process, and derive meaningful insights from data with unparalleled speed and efficiency.

AI enablement initiatives undertaken by e& UAE highlight the organisation's strategic efforts to harness AI for transformative impact.

AI Platforms

DataRobot

databricks

Power BI

On-prem LLM Orchestrator

Data Enablers

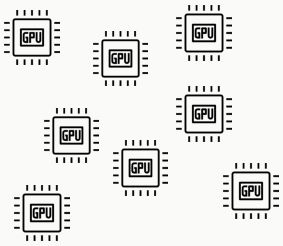
Data Marketplace | BI Solutions

Data Warehouse | Data Integration Tools

Big Data | Data Robot Implementation

Data Mesh Implementation | Logical Data Fabric

Data Infrastructure



AI platforms put in place

Data Layer enhanced in terms of capability, coverage across business lines and data points

Adding GPUs on e& UAE cloud

By continually refining and fortifying these AI Enablers, including deploying GPU clusters in both on-premises and cloud environments, e& UAE aims to outpace the ever-evolving digital arena and spearhead advancements in AI.

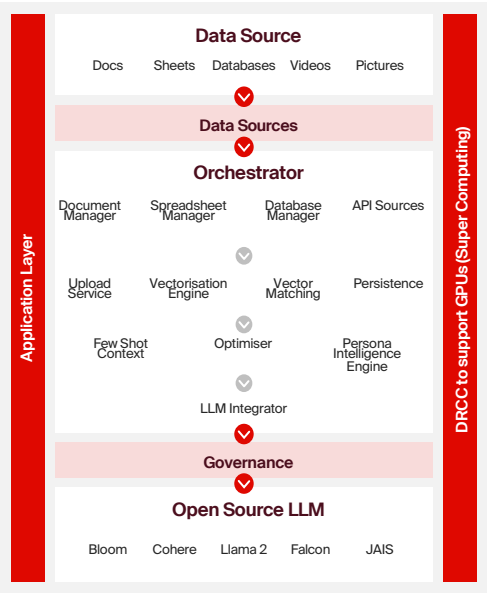
Through the synergy of cutting-edge platforms, refined data, and robust infrastructure, we are well-positioned to shape the future of AI, driving innovation and unlocking new realms of possibility.

On-Prem GenAI Platform

The deployment of the On-Prem GenAI End-to-End (E2E) Platform marks a significant stride in the capabilities and benefits harnessed by e& UAE.

This strategic initiative unlocks major capabilities, empowering even non-technical individuals as Citizen GenAI Experts. The platform seamlessly integrates with any open-source Large Language Model (LLM) and facilitates the fine-tuning of our data, all within the secure and controlled environment of on-premise infrastructure. Robust governance controls, ensuring security and responsible AI practices, form a foundational aspect of this platform.

The integration is extended further, reaching across data and application layers through APIs, establishing a harmonious connection that enhances overall operational efficiency. This provision enables next-level use cases and accelerates time to market, positioning e& UAE at the helm of AI innovation in the telecommunications domain.



Building the first GenAI Orchestrator

As part of our forward-looking initiatives in 2024, e& UAE aims to establish the first GenAI Orchestrator. This pivotal development is designed to streamline and enhance the management of various GenAI components, ensuring cohesive and efficient deployment of AI capabilities across our ecosystem.

Key components and features:

Orchestration Capabilities

The GenAI Orchestrator will serve as a central hub for coordinating and managing diverse GenAI modules and applications. It facilitates seamless integration, allowing different AI components to work cohesively and efficiently.

Responsible AI Framework Integration

A distinctive feature of the GenAI Orchestrator is its integration with a Responsible AI framework. This ensures that ethical considerations, fairness, and transparency are inherent in the deployment and functioning of our AI systems.

Scalability and Flexibility

One of the primary objectives is to ensure that the Orchestrator is scalable and adaptable to the evolving demands of our AI ecosystem. It will support the integration of new models, technologies, and functionalities, fostering innovation within our AI infrastructure.

Real-time Monitoring and Optimisation

The Orchestrator will provide real-time monitoring of GenAI applications, enabling proactive identification of potential issues or bottlenecks. This will allow for timely optimisation, ensuring optimal performance across different AI use cases.

GenAI Open-Source Lightweight LLM Models

In response to the growing demand for accessible and adaptable AI technologies, the evolution of GenAI involves creating and disseminating open-source lightweight LLM Models. This signifies a shift towards democratising AI, making advanced language models more widely available for developers, researchers, and businesses.

Open-source lightweight LLM Models provide a foundation for developers to explore and integrate AI capabilities into diverse applications. The emphasis is on accessibility, allowing a broader community to benefit from advanced language processing functionalities.

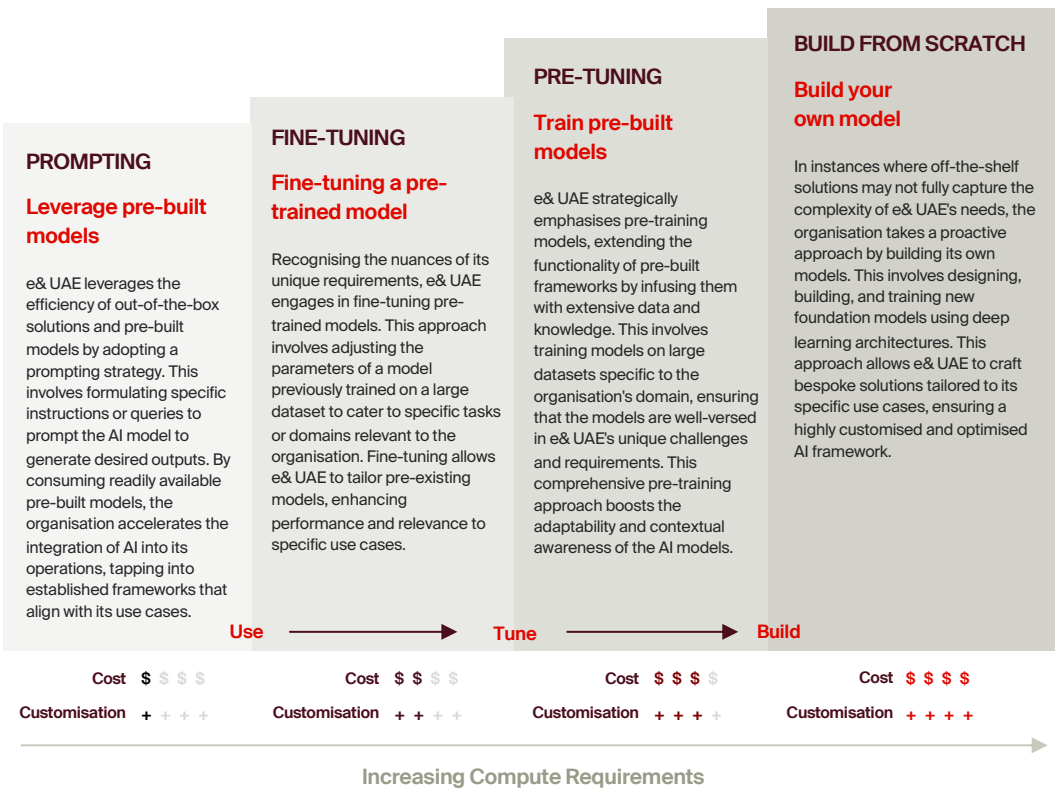
The open-source nature of the LLM also further fosters collaboration within the AI community.

Developers can contribute to improving and refining these models, ensuring continuous enhancements, and incorporating diverse perspectives. These lightweight models cater to various applications, from creative writing tools and chatbots to code generation. Their versatility encourages innovation across various domains, contributing to the broader scope of AI applications.

GenAI roadmap by e& UAE

e& UAE strategically leverages diverse GenAI models, demonstrating its versatility across various dimensions.

The organisation's roadmap encompasses the following methodologies:



In summary, e& UAE's adoption of GenAI models is characterised by a strategic mix of out-of-the-box consumption, fine-tuning for specific requirements, pre-training for contextual relevance, Open Source Models, Telco LLMs and, when needed, the proactive creation of proprietary models.

This comprehensive approach underscores the organisation's commitment to leveraging the full spectrum of GenAI methodologies, ensuring that each model adoption aligns seamlessly with its unique business objectives and challenges.

09 Conclusion

Leading by example, e& UAE is setting the benchmark for innovation and responsible AI adoption in the UAE and beyond.

The organisation's incredible journey is characterised by key milestones, starting with the creation of specialised teams in 2016, advancing through to the establishment of Robotic Process Automation (RPA), AI Cognitive and Machine Learning (ML) teams, and culminating in the integration of advanced AI technologies and partnerships.

As the AI and technology landscape evolves, e& UAE recognises the need to proactively shape its future. Setting the benchmark for innovation and responsible technology adoption is paramount, as well as continuing to stay at the forefront of emerging and disruptive technologies.

Advances in fields such as artificial general intelligence (AGI), which could revolutionise what is possible by creating systems that can learn and adapt like humans, have many implications. While AGI remains a long-term prospect, we are already laying the necessary foundations to ensure responsible progress in this field.

Continuing to forge strategic partnerships and alliances, both regionally and globally, is key to sharing cutting-edge research and addressing socioeconomic challenges and opportunities together.

> **While incredible groundwork has been laid, this is just the beginning – we intend to remain at the forefront of shaping AI's limitless potential.**

A broader vision

While this whitepaper has focused on outlining e& UAE's AI journey and achievements, it is important to recognise that these efforts firmly align with and contribute to the parent company, e& group's AI vision at large.

Whether through our core business verticals, e& UAE, e& international, e& life, e& enterprise, and e& capital, or throughout our global footprint, e& is driving excellence by pioneering next-generation technologies and championing inclusive digital capabilities across every work stream, business, and geography.

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Unleashing the Power of AI

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