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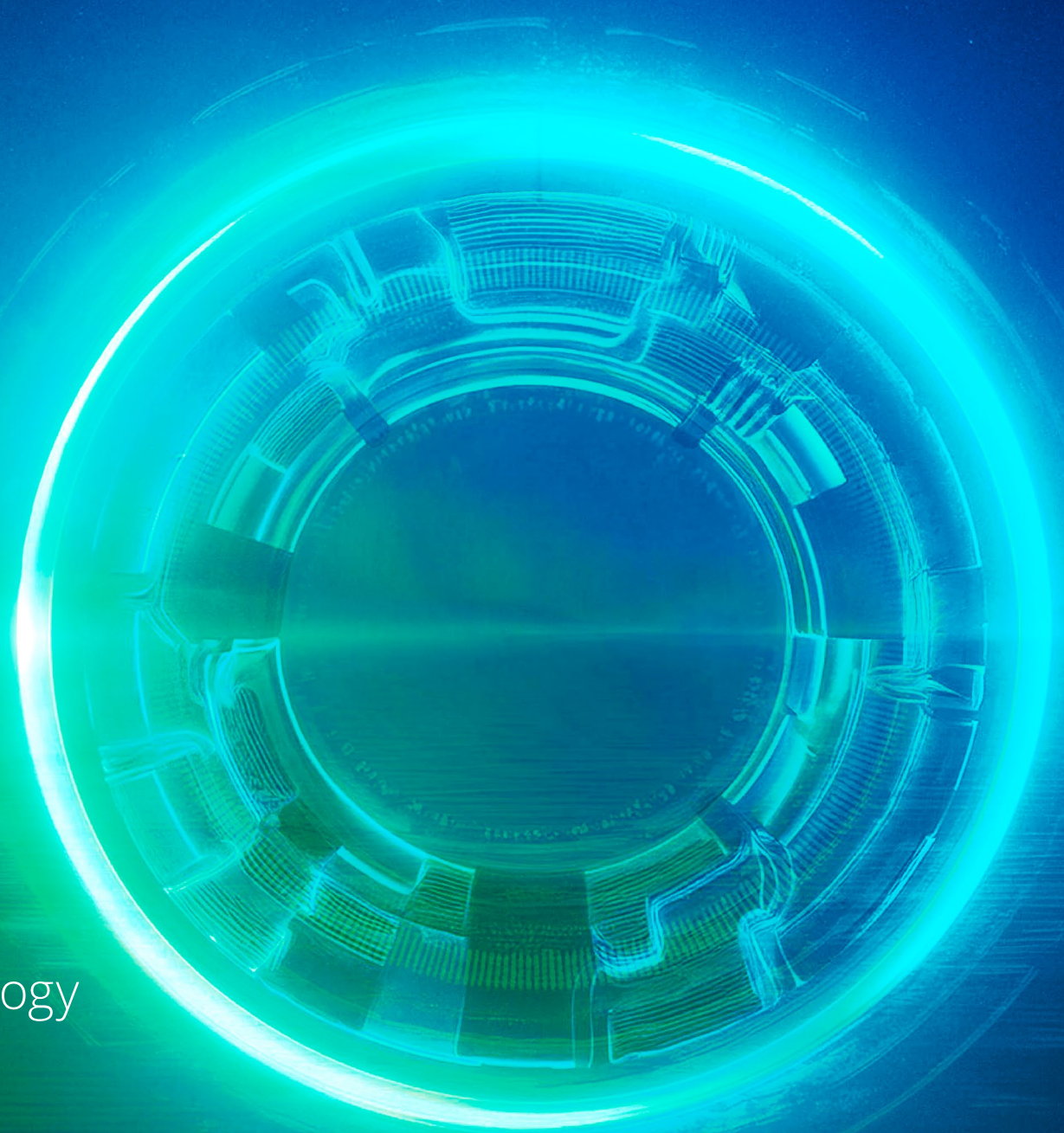


The Tech Tsunami

Reshaping the Technology Landscape

JANUARY 2025

Foreword

The once-futuristic scenarios of AI-powered medical diagnoses and virtual showrooms are quickly becoming a reality. According to a report by IDC[1], a worldwide **spending of over $500 Billion on Artificial Intelligence(AI) is forecasted by 2027,** which shows the importance of this technology and poses a question: **If there are similar advancements on the horizon in other areas of technology and could they potentially reshape entire industries?**

This rise in technology is more than just minor improvements. It is changing the way we work with faster and more powerful computing, network, and analytics, thereby paving the way for a bright future with new possibilities. Researchers have recently developed a **new AI tool to generate potential cancer drugs[2],** lecturers are **leveraging Augmented Reality (AR)** to create immersive learning experiences and developers are **leveraging software 2.0** (machine-written code) – showcasing the many transformations reshaping our world right now.

The critical question for leaders is no longer **"if"** these disruptions are coming, but **"when"** – and **"how"** can they strategically leverage them to future-proof their businesses?

If you are planning to start your transformation journey or are already part of it, we hope this report provides you a valuable perspective on the key use cases, understand the potential risks and questions to consider for these up-and-coming technology trends.

About the Report

The report will focus on the trending technologies with the greatest potential to disrupt and transform various industry sectors. The following technology trends will be the main focus of this report:

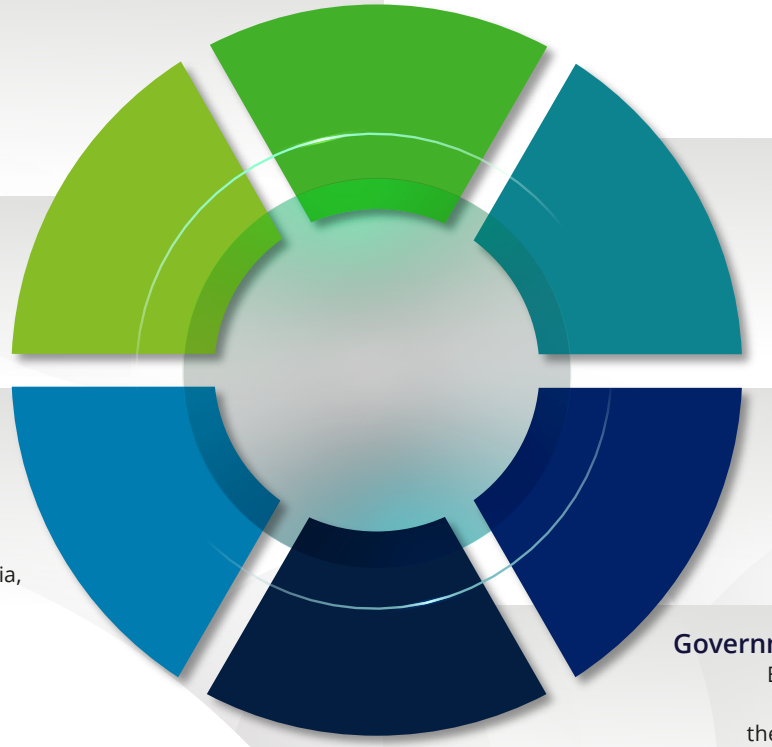
- Generative AI
- Cloud
- Digital Reality
- Web3

For each trend, we will explore the following key areas:

About the Technology & its Presence in the Current Market
A high-level overview of the technology, highlighting major players, regional presence, and use cases by major organizations globally

Key Events & Developments
A timeline view showcasing the major events occurring related to the technology trends

Potential Industry Uses Cases
Exploring the potential use cases of the technology across the following industry sectors: Consumer, Financial Services, Government and Public Services, Life Sciences and Health Care, Telecommunication and Media, and Energy and Resources



Questions to Consider
Critical questions that leaders and organizations need to consider before they decide to adopt the technology as part of their organization

Potential Risks to Adoption
Examine the potential downside and challenges that may arise due to the adoption of the technology trend

Government Initiatives in the Middle East
Exploring initiatives by government entities across the Middle East Region to promote the adoption and growth for each technology

Contents

Generative AI

About Generative AI

The race in the adoption of Generative AI was kicked off in November 2022 with the introduction of ChatGPT to the world and we are still at the beginning of this long and exciting transformation

What is GenAI?

Generative AI (GenAI) is a type of Artificial Intelligence designed to **create diverse forms of data,** including images, videos, audio, text, and 3D models. By **learning patterns from existing datasets,** GenAI uses this knowledge to **generate new and unique outputs.** It can produce highly **realistic and complex content,** such as writing stories, composing music, or generating images, based on the inputs from the users

Where does it fall on the AI Spectrum?

Key Modes of Output

Text
Written content which is easy to understand and is engaging, with the details and complexity aligned to the user's needs

Audio
Natural-Sounding speech that can adapt to the language, tone and complexity to fit any situation

Image
Leveraging textual or visual prompts to produce images with a wide spectrum of creativity and variability

Video
Leveraging user prompts to generate videos with scenes containing fictional objects and people

Code
Automatically summarize, document and provide recommendations for the code written by developers

3D Renders
Create 3D virtual renders for objects based on the textual or virtual inputs from users

Current & Upcoming Generative AI Solutions

Below showcases some of the most popular solutions from major players, alongside a look at upcoming projects that are pushing the boundaries of AI capabilities

Available Solutions

OpenAI

- **ChatGPT** helps generate **text** based on the inputs from the users
- **DALL-E** helps generate **images** based on the textual descriptions
- **Codex** translates natural language to **code** in the required programming language

Microsoft

- **Microsoft Copilot** can help generate **text** and **images** [limited capability] based on inputs from users
- **Microsoft** has **partnered** with **OpenAI** to develop **GitHub Copilot** which acts as an **AI coding assistant** for developers to help with tasks such as **code completion, chat assistance etc.**

Google

- **Gemini** can help generate **text** and **images** [limited capability] based on inputs from users
- **Gemini Code Assist** can help developers with **code generation, explanation, completion and error correction**

NVIDIA

- **NVIDIA GPU Cloud** platform comprises of multiple solutions such as **building & deploying custom GenAI models [NeMo],** generating **images, 3D Renders** or **videos [Picasso], text-to-speech [Riva]** and many more
- **NVIDIA** provides a **suite of industry-specific AI solutions**

Under Development

OpenAI

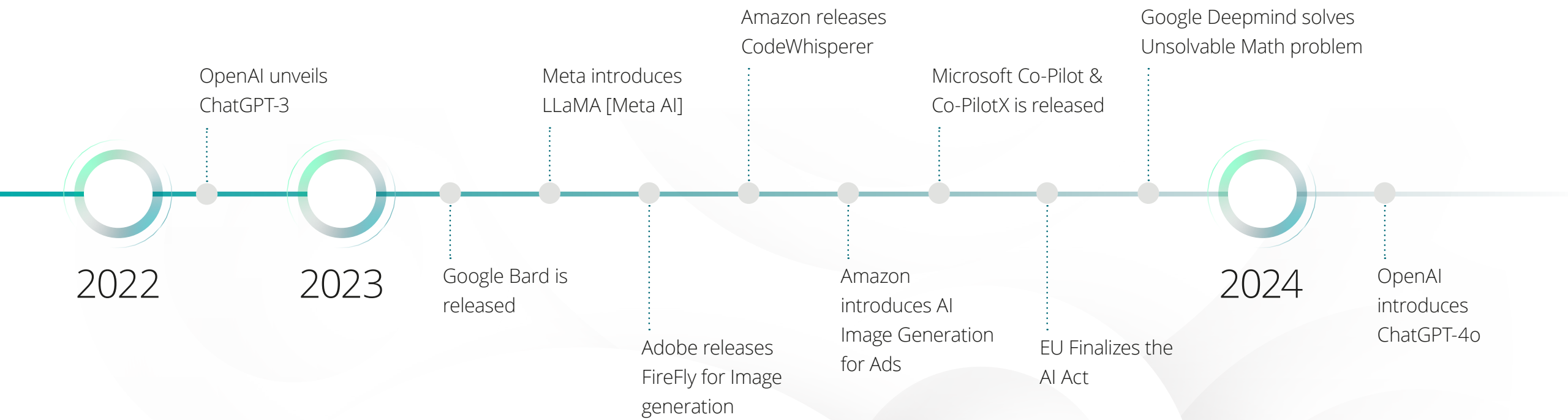
- **Voice Engine** can help generate **voice** using text inputs and a short audio sample but is not yet released due to potential safety concerns
- **Sora** is an upcoming AI model that can create **videos** from textual user prompts. It is currently being tested by domain experts

Google

- **Imagen 3** can generate high-quality **images** from text prompts and is available to selected creators as a private preview through ImageFX, a new experiment tool of labs.google
- **Veo** can generate high-quality **videos** from text prompts and is available to selected creators through VideoFX, a new experiment tool of labs.google

Key Events & Developments

Below showcases some of the key events that have taken place in the recent years with regards to Generative AI



Harnessing the Power of GenAI in the Middle East

Potential Industry Use Cases (1/3)

Below are some potential use cases of Generative AI across the major industries in the Middle East

Consumer

- Generate product recommendations and marketing campaigns that resonate with cultural preferences & trends
- Develop virtual apparel for customers to see a digital render of the products on their own bodies
- Analyze customer data & trends to increase efficiency in product prototyping & development
- Develop lifelike AI models with customizable features that match the local ethnicity instead of human models
- Help conduct faster market research by analyzing data obtained from various sources and provide insightful findings to support effective decision-making
- AI-enabled virtual agents can help improve customer experience by providing real-time support in the Arabic language and further enhancing it through audio conversations

Financial Services

- Analyze financial data for anomalies and identify patterns to mitigate potential cyber & deception attacks
- Analyze complex customer data to build a unique profile and develop personalized financial products and services
- Create customized marketing materials with the appropriate tone, language, cultural references and accurate information about the product to maintain regulatory compliance
- Generate financial reports in Arabic alongside other languages to address the needs of Arabic-speaking clients & regulators
- Help mitigate risks regarding investments by creating effective trade strategies using predictive analytics in real-time

Harnessing the Power of GenAI in the Middle East

Potential Industry Use Cases (2/3)

Below are some potential use cases of Generative AI across the major industries in the Middle East

Government & Public Services

- Generate targeted government communications to the citizens in different Arabic dialects to improve outreach and engagement
- Develop chatbots & virtual assistants to provide efficient and personalized public services
- Analyze data from social media platforms to understand public sentiment and tailor government policies and services accordingly
- Help the legal staff by quickly transcribing & summarizing legal hearings, documents, legislation, and official announcements
- Develop 3D models of the city to help city planners guide & refine existing city designs as well as assist in urban expansion planning. By simulating population growth, it helps planners understand the required infrastructure to accommodate future needs

Life Sciences & Healthcare

- Analyze patient data to develop personalized treatment plans, predict potential health risks and enhance patient care
- Generate summarized medical reports automatically, allowing doctors to focus more on patient care
- Help optimize lab procedures by analysing historical data and upcoming scientific principles and provide the necessary recommendations
- Live support agents can be supported by summarizing the customer's request, suggesting relevant resolutions, and providing real-time recommendations for the next steps
- Accelerate the discovery of new drugs by generating vast libraries of potential drug candidates and predicting their properties as well as their interactions with the target disease

Harnessing the Power of GenAI in the Middle East

Potential Industry Use Cases (3/3)

Below are some potential use cases of Generative AI across the major industries in the Middle East

Technology, Media & Telecommunications

- Help quickly translate and convert video and audio content into regional languages
- Identify and resolve root causes of network issues to improve the connection and speed
- Analyze and restore historical documents/scripts, recordings and artifacts to safeguard the Middle East's cultural heritage
- Help technicians retrieve technical specifications and summarize them into easy-to-understand language for the customers
- Develop virtual assistants to give personalized responses to customer inquiries as well as provide product recommendations and generate offers to increase customer satisfaction
- Help game developers to maintain and update their games with new assets and content inline with the requests from the community

Energy, Resources & Industrial

- Analyze data received through sensors from industrial equipments to identify & predict any failures which can help improve equipment uptime, reduce maintenance costs and enhance operational efficiency
- Help optimize and generate site plans by analysing various parameters such as accessibility to frequently used equipment, regulatory requirements etc.
- Summarize video data captured through drones for geological surveys
- Analyze electric grids to understand current infrastructure, energy demands and component connectivity to help design optimal grid configurations and expansion plans
- Help accelerate the discovery of newer materials by simulating virtual materials with varying compositions and structures compared to traditional methods

Harnessing the Power of GenAI in the Middle East

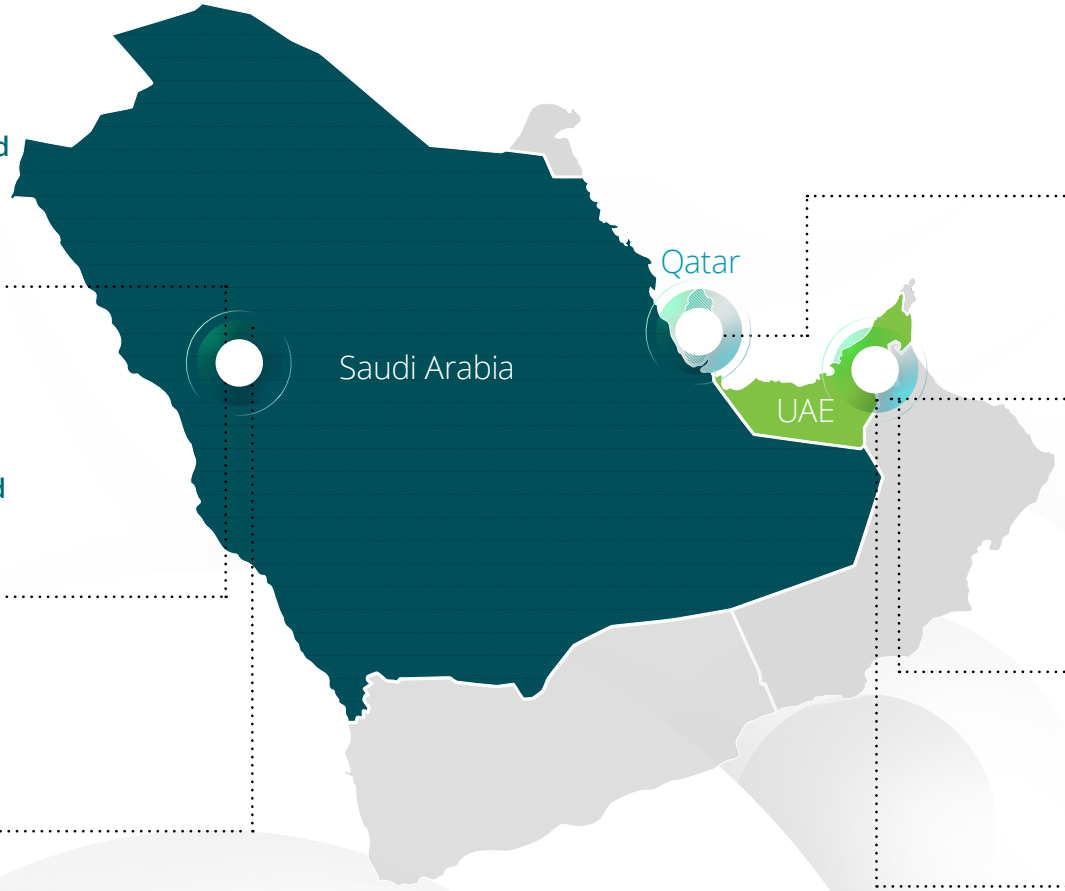
Government Initiatives

Below are some major initiatives launched by government bodies in the Middle East to support the development and growth of Generative AI in the region

Saudi Government launched the "Generative Artificial Intelligence (GenAI) for All" initiative which aims to **advance AI research, policy governance, and ethical considerations** within member states of the Digital Cooperation Organization[3]

Saudi Data and AI Authority has launched the Generative Artificial Intelligence guidelines for optimal adoption in **Government Entities,** which aims to **enhance awareness** around Generative Artificial Intelligence and **promote its responsible and effective** use in day-to-day dealings[9]

As part of **Saudi Arabia's National Strategy for Data and Artificial Intelligence (NSDAI),** the nation has set an ambitious target of **attracting $20B in investments** by 2030 for Data & AI initiatives[4]



Arabic GenAI project "Fanar" announced by MCIT, which will **focus on gathering extensive data in Arabic to develop AI solutions** in the native Arabic language[7]

Abu Dhabi's Advanced Technology Research Council (ATRC) launched a new AI company **AI71** which aims to **offer AI data control options to organizations & countries looking to self-host for greater privacy**[5]

Council for Artificial Intelligence and Blockchain has been formed, focusing on **developing of policies** to create an AI-friendly ecosystem, **advancing research,** and **promoting collaboration** between public & private sectors, including international institutions[8]

The Minister of State for Artificial Intelligence, Digital Economy and Remote Work Applications Office, UAE has **developed multiple publications that define guidelines & various use cases** related to AI[6]

Potential Risks to Adopting Generative AI

Generative AI has high potential to change the current technology landscape, but it has its own set of risks which need to considered

Data Biases
GenAI is trained on a large set of data and in case the data contains biases then the generated output could reflect these biases. This can lead to unfair representation and lead to social inequalities

Loss of Trust & Intellectual Property
GenAI can be leveraged to create deepfakes or manipulate content, which can cause damage to someone's reputation and spread misinformation. Additionally, training data may comprise of copyrighted data, leading to legal issues and diminishing recognition of the original creators

Data Protection & Sovereignty
GenAI requires a large amounts of data for training, which can raise data privacy and ownership concerns as sensitive information can be misused if strong data protection guardrails are not in place. Additionally, publicly available GenAI solutions can expose sensitive data if they have inherent security vulnerabilities

Overreliance
There is a possibility of users over depending on GenAI for decision-making without proper analysis which can lead to wrong outcomes

Impact on Workforce
Due to GenAI's capability of automating tasks performed by human users, there is a possibility of them being removed from their current organization

Potential High Cost
Developing custom GenAI solutions can be expensive depending on the organization's goals and use cases. The costs can also further increase due to overengineering of the required solution

Is GenAI Right for You?

Below are some questions organizations and leaders need to consider if they are planning to adopt Generative AI

What does the organization want to achieve with GenAI? Have we clearly defined our use case strategy?

Based on the use case, what technologies will need to be adopted or developed? Should we build from scratch or leverage existing market solutions?

Does the current workforce have the required skill set for implementation, or do we need to hire specialists or partner with 3rd party vendors?

Do we have a well-defined governance model to oversee the GenAI implementation and mitigate any potential risks?

What are the current and expected laws and regulations regarding the use of GenAI within the region the organization operates in?

Does the organization have quality data to develop GenAI models for tailored use-cases?

Cloud

About the Cloud

Cloud adoption has been growing in recent years and was accelerated due to the Covid-19 Pandemic, which caused disruption to workplaces globally and shifted cloud adoption from a business priority to a critical business imperative

What is Cloud?

Cloud refers to an **on-demand access** to a **shared pool of computing resources** such as servers, storage, applications and services that **can be rapidly provisioned and released with minimal effort** by users instead of buying, owning and maintaining physical data centers and servers

Types of Cloud Deployment Models

Public Cloud is owned and operated by 3rd party cloud providers who deliver computing resources over the internet. All hardware, software and other supporting infrastructure is owned and managed by the provider

Private Cloud is exclusively owned by a single business or organization and is physically located on the company's onsite datacenter. The services and infrastructure are maintained by the business

Hybrid Cloud combines public and private cloud, allowing data and applications to move seamlessly. This gives more flexibility to optimize existing infrastructure, and adhere to regional compliance needs

Multi-Cloud refers to a strategy where an organization uses a combination of multiple public or private cloud platforms to run their applications

Types of Cloud Delivery Models

Infrastructure as a Service [IaaS] involves deploying low level computing resources such as Servers/VMs, Storage & Network for users

Platform as a Service [PaaS] provides a managed environment to users for developing, testing, delivering and managing applications without worrying about the underlying infrastructure

Software as a Service [SaaS] refers to complete software solutions delivered to users over the Internet, with the provider managing the application and infrastructure

Serverless Computing refers to a model where the users develop applications, while the cloud provider manages provisioning and maintaining the underlying infrastructure

Major Cloud Service Providers in the Middle East

The Middle East is experiencing a surge of major cloud providers entering the market, bringing with them advanced cloud capabilities, fostering innovation and accelerating the region's digital transformation

Oracle Cloud Infrastructure

- **Oracle Cloud Infrastructure (OCI)** has launched **4 active cloud regions** in the Middle East with **2 in United Arab Emirates [Dubai, Abu Dhabi]** and **2 in Saudi Arabia [Jeddah, Riyadh]**
- **OCI** has **100+ services available** to users in **each of the active regions**
- **Oracle** has plans to **launch 1 more region** in **Saudi Arabia**

Google Cloud Platform

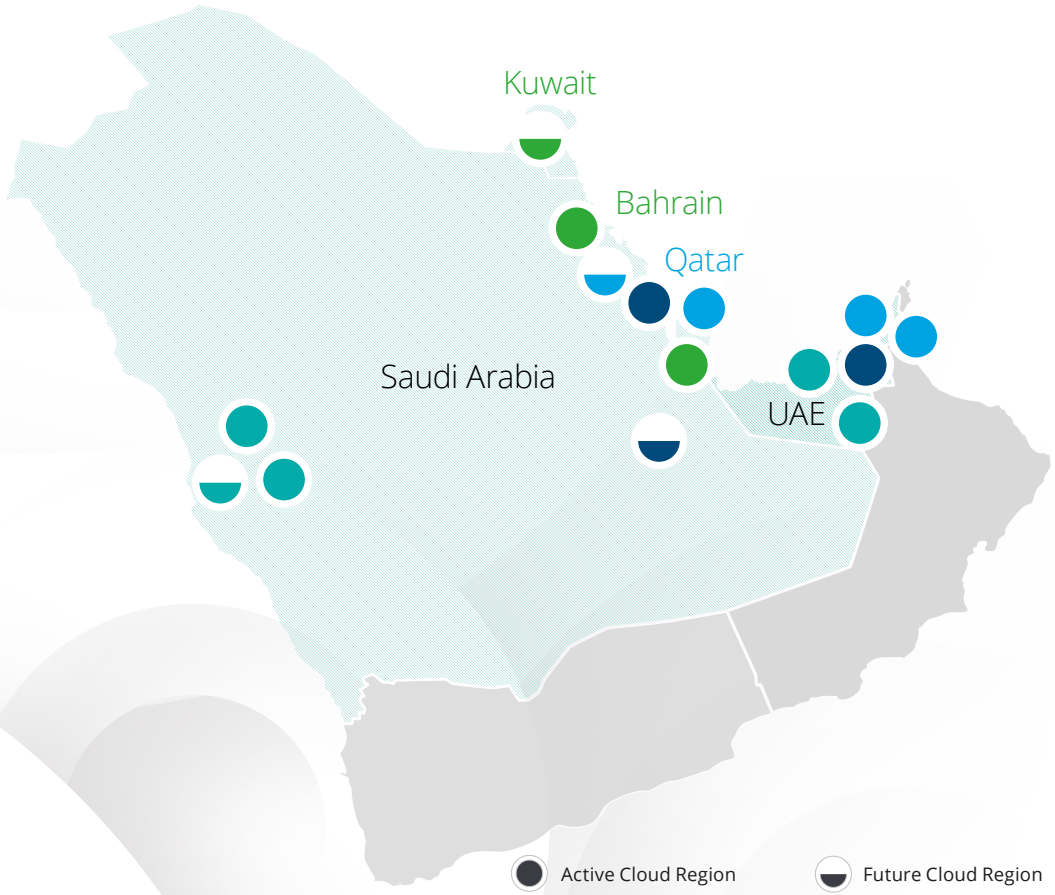
- **Google Cloud Platform (GCP)** has launched **2 active cloud regions** in the Middle East with **1 in Qatar [Doha]** and **1 in Saudi Arabia [Dammam]**
- **GCP** has **42 active services** in **Doha Region** and **41 active services** in **Dammam Region**
- **Google** has plans to **launch a region** in **Kuwait**

Amazon Web Services

- **Amazon Web Services (AWS)** has launched **2 active cloud regions** in the Middle East with **1 in Bahrain** and **1 in United Arab Emirates**
- **AWS** has **135 active services** in Bahrain Region and **115 active services** in **UAE Region**
- **Amazon** has plans to **launch a region** in **Saudi Arabia**

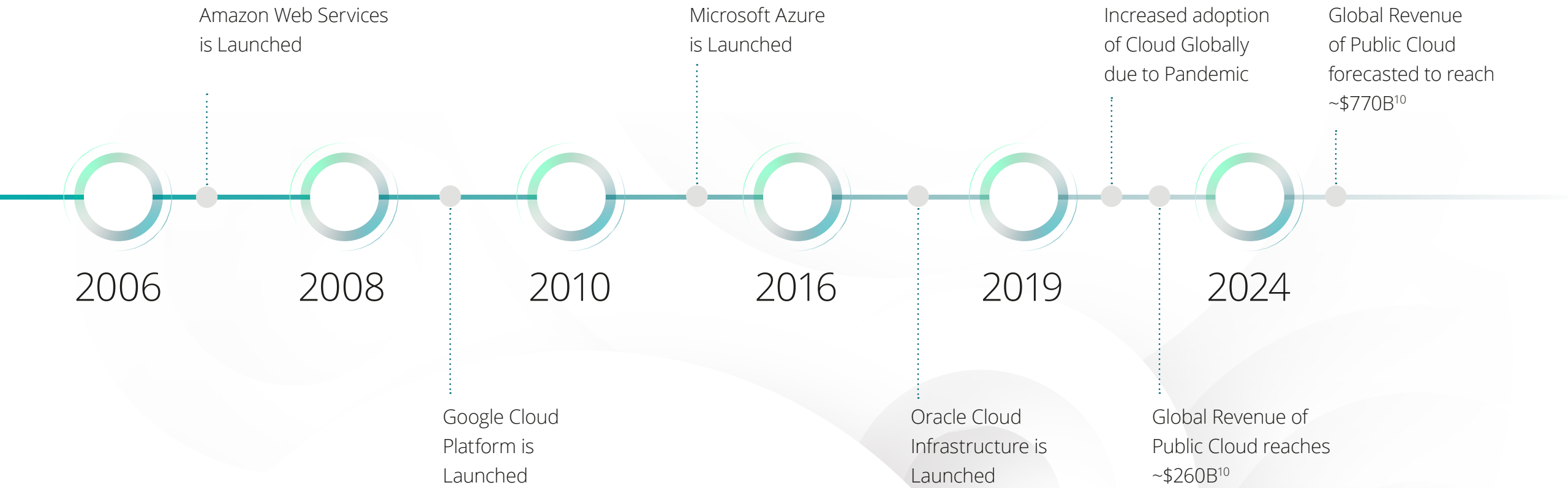
Microsoft Azure

- **Microsoft Azure** has launched **3 active cloud** regions in the Middle East with **1 in Qatar [Doha]** and **2 in United Arab Emirates [Dubai, Abu Dhabi]**
- **Azure** has **79 active services** in **Doha Region** and **55+ active services** in **UAE Region**
- **Microsoft** has plans to **launch a region** in **Saudi Arabia**



Key Events & Developments

Below showcases some of the key events that have taken place across the years with regards to Cloud



Cloud Powering Innovation Across the Middle East

Potential Industry Use Cases (1/3)

Below are some potential use cases of Cloud across the major industries in the Middle East

Consumer

- Leverage advanced cloud-based analytics to effectively manage inventory by conducting real-time stock checks as well as predictive inventory forecasting to resolve issues of stockouts and overstocking
- Leveraging advanced analytics services on the cloud to analyze customer data (feedbacks, reviews, purchase history etc.) can help organization understand customer needs and develop better marketing strategies and products to attract more customers
- Cloud automatically scales e-commerce platform infrastructure during demand surges, giving a seamless customer experience
- Online and offline retail channels integrated with cloud can allow customers to browse products online, check in-store availability, and even place orders for pickup or delivery

Financial Services

- Cloud Platforms can be used to deploy AI-chatbots to provide 24/7 support to customers for queries, improving customer experience and reducing operational costs
- Cloud-based analytics with Machine Learning can be used for identifying fraudulent transactions in real time
- Cloud Platforms can help generate automated reports to reduce efforts and minimize potential errors during audits
- Cloud can help banks develop and deploy an omnichannel banking solution to help customers access services through different channels such as mobile applications, online banking platforms etc.
- Cloud helps analyze customer data to understand their needs and develop and deploy new products to market faster

Cloud Powering Innovation Across the Middle East

Potential Industry Use Cases (2/3)

Below are some potential use cases of Cloud across the major industries in the Middle East

Government & Public Services

- Cloud Video Analytics can be used to analyze public surveillance footage to improve public safety
- Cloud-based messaging services can be used to send real-time alerts and updates to citizens through various channels
- Cloud platforms with appropriate security controls can enable data-sharing between government agencies and improve communication and faster responses in case of emergencies
- Cloud Analytics can help analyze vast amounts of data, gain insights on the needs of the citizens as well as understand the effectiveness of the existing services. This can be leveraged to identify any gaps and improve the services when necessary
- Smart cities can leverage cloud to analyze real-time data to optimize resource allocation and enable effective management

Life Sciences & Healthcare

- Cloud platforms can help analyze data from various sources (hospitals, public health agencies) to track disease outbreaks in real-time for effective public health intervention
- Cloud can allow secure sharing of data between researchers, pharmaceutical companies, and other global institutions to accelerate scientific breakthroughs and potential drug discoveries
- Cloud allows video conferencing and remote monitoring of patients, allowing doctors to care for patients in remote locations
- Cloud can help track and manage the inventory levels for pharmacies and hospitals, preventing stockouts
- Cloud based workforce management services helps optimize staff schedules and assign resources best suited for the situation

Cloud Powering Innovation Across the Middle East

Potential Industry Use Cases (3/3)

Below are some potential use cases of Cloud across the major industries in the Middle East

Technology, Media & Telecommunications

- Cloud provides solutions such as Software-Defined Network and Network Functions Virtualization to help telecom providers optimize their network performances, manage traffic, and deploy new services quickly
- Media companies can leverage cloud-based analytics to analyze user behaviour, preferences, and trends and create personalized experiences, targeted advertisements and content recommendations
- Cloud native storage solutions can be leveraged to store vast amounts of media content such as videos, images, and documents
- Cloud-based Content Delivery Networks can help deliver media content while ensuring high-speed and reliable access for users globally
- Cloud's Content Protection services can be leveraged to protect media content against potential piracy using different security measures such as encryptions and access control

Energy, Resources & Industrial

- Cloud analytics can help analyze the data generated by industrial equipments to detect anomalies and enable predictive maintenance, which can increase equipment uptime and reduce operational costs
- Connecting IoT sensors to the cloud can help track the worker's location and vital signs in high-risk environments, allowing faster response time in emergencies and optimizing resource allocation
- Cloud can manage the integration of renewable energy sources with the energy grid, optimizing the power distribution and reducing dependency on traditional fuels by utilizing cleaner energy alternatives
- Cloud can track pollutant discharges and greenhouse emissions generated by industrial processes and help organizations take necessary actions to reduce its impact on the environment
- Help design digital services for customers such as real-time energy usage monitoring, personalized recommendations for energy efficiency, and billing services

Cloud Powering Innovation Across the Middle East

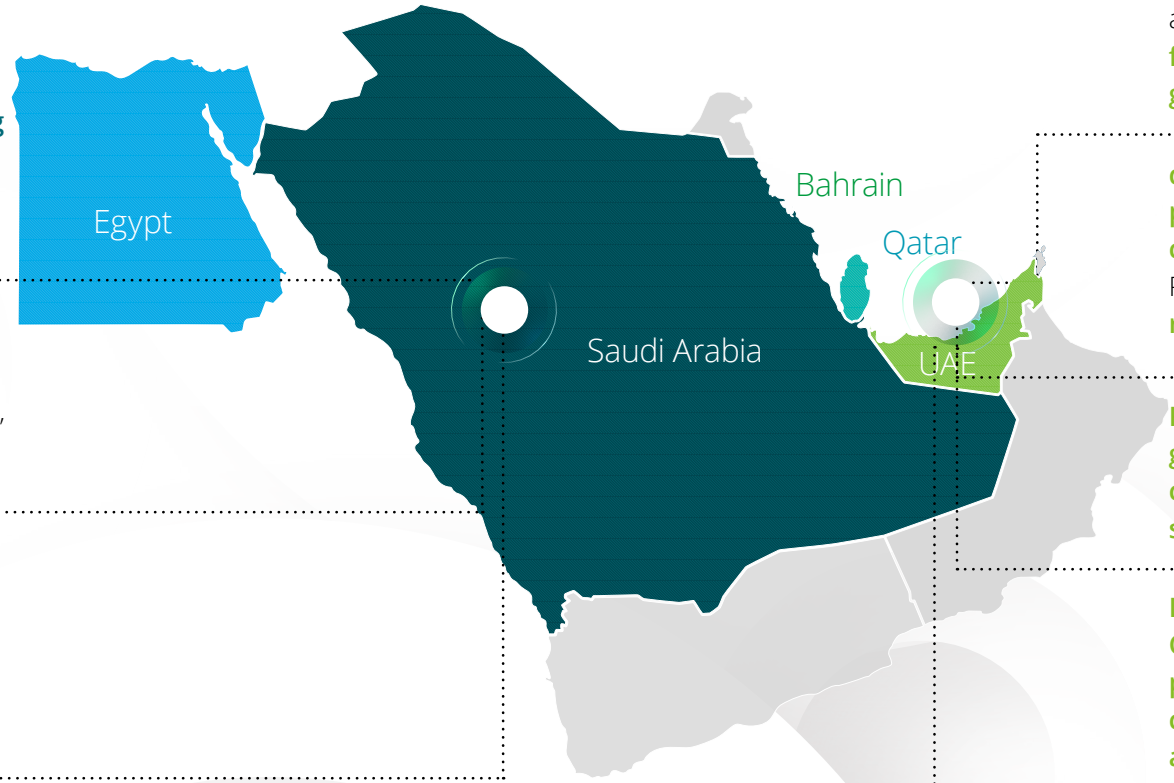
Government Initiatives (1/2)

Below are some major initiatives launched by government bodies in the Middle East to support the growth and adoption of Cloud in the region

Saudi MCIT published **KSA's Cloud First Policy** to **accelerate the adoption of Cloud Computing services** and **directs government entities to consider cloud options** when making new investment decisions[16]

Local KSA entities are **partnering with Cloud providers to increase cloud presence in the region** e.g. CNTXT partnering with Google Cloud[17], STC partnering with Alibaba Cloud[18]

Saudi MCIT has launched **a $18B plan** to **build a network of large-scale co-located datacenters** across the Kingdom **laying foundation to a globally recognized digital hub** to attract talent, investments and pipeline to several growth opportunities[15]



Dubai Digital Clouds Project launched which aims to **leverage advanced cloud technologies from multiple cloud providers to enhance the government services** at low operational costs[11]

du [EITC] will be **launching a complete cloud platform solution** which aims to **offer hyperscale cloud and AI services** to Government and Public Entities in the UAE **in alignment with the regulatory requirements**[12]

Federal Network[FEDnet] launched, offering government entities on-demand access to **configurable computing resources and AI solutions**[13]

Dubai Chamber of Commerce launches the **Cloud Computing Business Group** which will focus on **promoting the development of cloud computing companies** and will also provide a forum to **address policy matters** related to the various industries[14]

Cloud Powering Innovation Across the Middle East

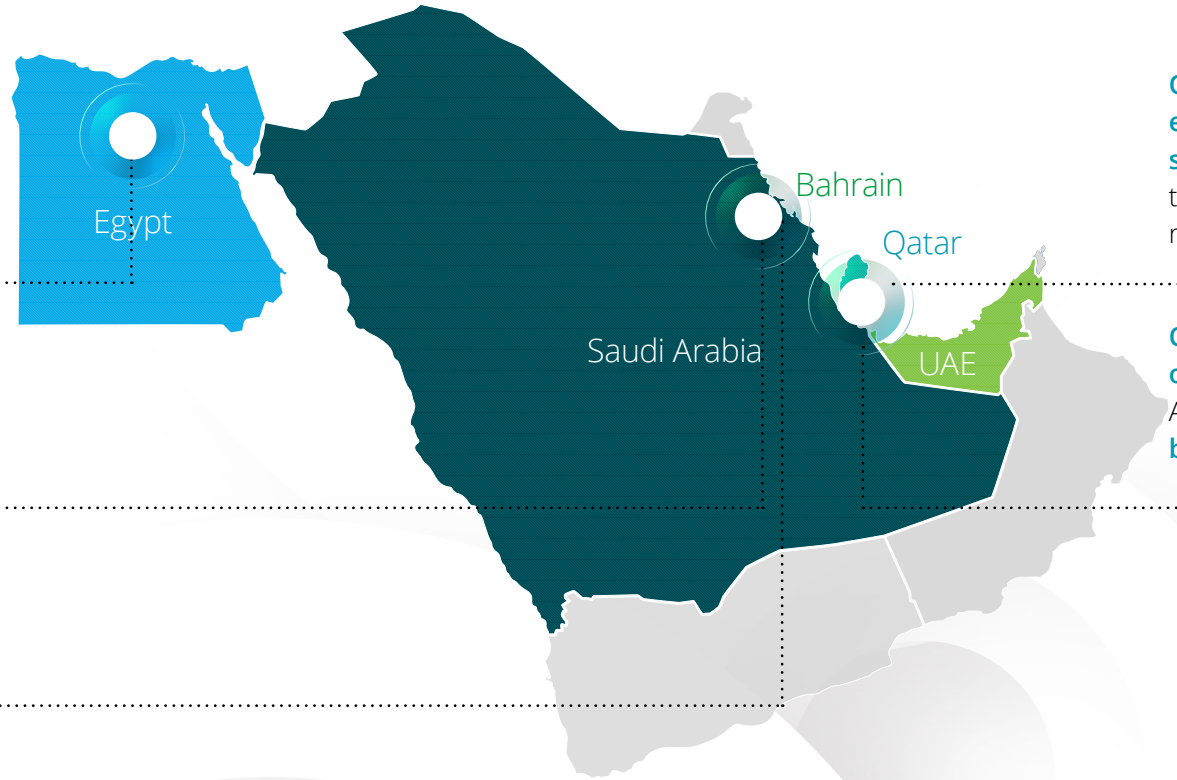
Government Initiatives (2/2)

Below are some major initiatives launched by government bodies in the Middle East to support the growth and adoption of Cloud in the region

Egypt launched its **first government data and cloud computing center** which will function as a **centralized national data and disaster recovery center** and use AI to provide accurate data to government agencies[19]

Bahrain has adopted the Cloud First Policy to **encourage government entities to consider cloud computing solutions** as part of their IT planning & procurement to enhance public's quality of life[20]

Bahrain implements regions first **multi-cloud & hybrid cloud system for the government sector** to **enhance the ability** of the authority **to host government systems and services**[21]



Qatar has developed a Cloud First Policy to **encourage government entities to adopt cloud services** from endorsed providers while adhering to applicable policies, regulatory & compliance requirements[23]

Qatar Cloud Platform has been created which **offers a suite of Cloud Services** from Microsoft Azure & Google Cloud, catering to the **needs of business and government entities in Qatar**[22]

Potential Risks to Adopting Cloud

Cloud adoption is unlocking a world of possibilities for organizations globally, but a clear understanding of its potential risks is crucial

Cost Savings not Materializing

Cost savings due to cloud adoption could be negligible or even escalate due to increased efforts taken to migrate workloads not ideal for cloud, hiring/upskilling required staff, additional toolset requirements, and inadequate monitoring of cloud services

Data Security & Privacy

Public cloud requires data to be stored onto a shared infrastructure managed by the Cloud Service provider, which introduces security & privacy vulnerabilities that attackers can exploit if proper controls and safeguards are not in place

Vendor Lock-In

Entering a contract with a cloud provider can pose many challenges such as financial penalties for early contract termination and limitations on migrating to other cloud providers due to poor interoperability between cloud platforms

Regulatory Compliance

Moving to public cloud can be challenging for organizations in the Middle East due to data residency regulations and the inability to negotiate on the standard terms and conditions of respective providers to accommodate specialized compliance requirements specific to the industry or organization

Integrating Cloud Platforms

Organizations adopting a Hybrid Cloud Model can face challenges in areas such as network connectivity, security, authentication, operations and management. Unresolved issues in these areas can lead to running parallel IT Operations, resulting in increased financial burdens, operational complexity, and strain on IT teams

Workforce Skillset

Organizations adopting cloud will be required to upskill their current IT team or hire cloud specialists, which can be a challenge in Middle Eastern regions due to limited talent pools of qualified candidates

Is Cloud Right for You?

Below are some questions organizations and leaders need to consider if they are planning to adopt Cloud

Does the organization have a well-defined Cloud Strategy in place?

Does the cloud provider meet the regulatory and compliance requirements of the region the organization operates in?

Does the cloud provider offer specialized/ industry specific solutions relevant to the organization's business needs?

Does the organization have the necessary staff and skillset to manage a cloud environment?

How will the Return on Investment (ROI) for cloud adoption be measured?

What are the complexities associated with migrating away from the chosen cloud provider? Are the contractual terms with the provider negotiable?

Digital Reality

About Digital Reality

The veil between the physical and digital world is slowly dissolving. Technology is helping transform the way we interact with the world and each other, and this may just be the beginning of a revolution that will define the way we interact in this digital age

Augmented Reality

Overlays digitally created content onto the real-world environment. This can be viewed through smartphone, tablet, or specialized lenses

Virtual Reality

Creates a digital environment that replaces the real-world environment. This can be viewed through specialized lenses

Mixed Reality

Blends the digital content into the real-world and creates an environment where both can coexist and interact with each other. This can be viewed through specialized lenses

360˚Reality

Video recording capturing the view in every direction at the same time. This can be viewed through smartphone, tablet, or specialized lenses

Organizations Leveraging Digital Reality Globally

Below are few examples of organizations utilizing Digital Reality around the world across various industry sectors

EMAAR

Emaar Properties is **leveraging Virtual Reality** to allow potential customers to **explore the various properties such as apartments and villas** prior to selecting them[24]

aramco

Saudi Aramco is leveraging **Virtual Reality to allow operators to train & explore various plants** as well as **provide training and knowledge transfer** in a controlled environment[25]

دبي الصحية DUBAI HEALTH

Dubai Health is embracing the use of **Virtual Reality** to help **improve patient care** across its hospitals and healthcare centres[26]

NASA

NASA is using **Virtual and Augmented Reality** to help engineers **design spacecraft and instruments** and also **conduct repairs** easily. It also enables astrophysicists to **explore star systems**[27]

IKEA

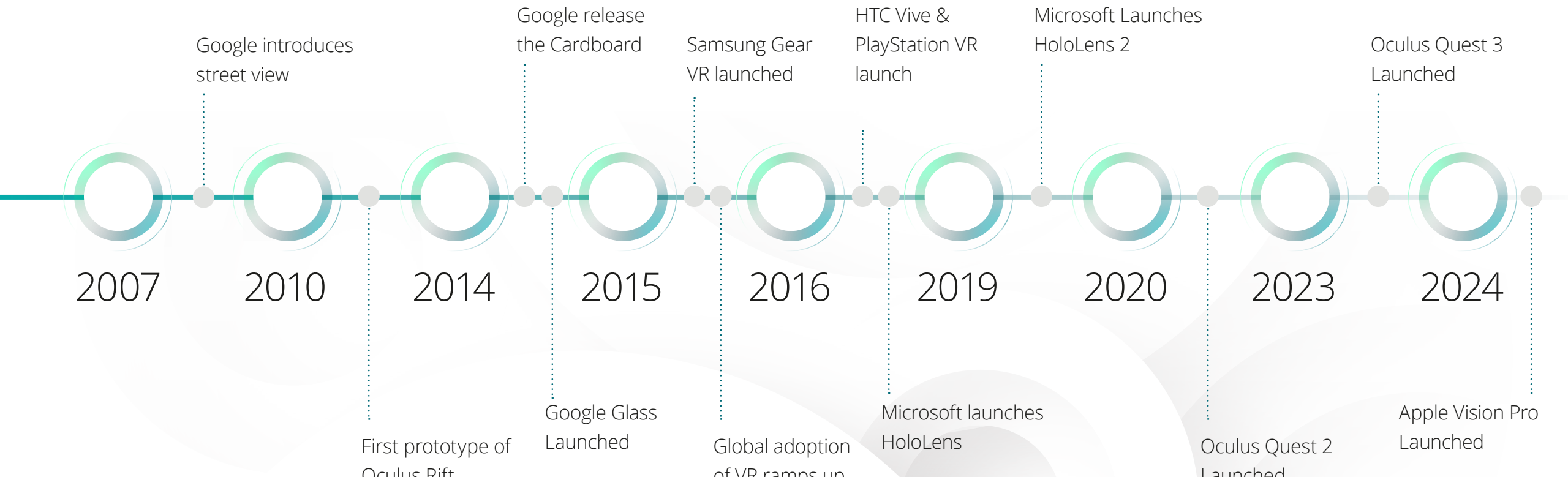
IKEA launched an **Augmented Reality** application called "IKEA Place", which lets its users **visualize the IKEA products within a space in real time** before they decide to buy them[28]

BMW

BMW is leveraging **Mixed Reality** to **visualise vehicle functions and new interior designs** for customers and also help development engineers **test different functions** and make changes as needed[29]

Key Events & Developments

Below showcases some of the key events that have taken place across the years with regards to Digital Reality



Bridging Worlds & Driving Middle East Innovation

Potential Industry Use Cases (1/3)

Below are some potential use cases of Digital Reality across the major industries in the Middle East

Consumer

- Allows customers to virtually try on clothes, makeup, glasses, etc. in real-time without purchasing them first, which can reduce the occurrence of products being returned and increase customer satisfaction
- Helps create an interactive showroom for customers to explore products in 3D, view detailed information as well as place them in the desired location to ensure it fits their needs
- Users can attend concerts, events, and museums as well as explore holiday destinations through VR
- Users can use AR to translate languages in real time when communicating with strangers
- Organizations can create interactive AR ads to help increase customer engagement
- Provide remote customer support by guiding them through troubleshooting or repairs in real-time
- Train employees on warehouse procedures using VR simulations for an interactive learning experience

Financial Services

- Create interactive tutorials for new customers, guiding them through setting up their accounts, understanding financial products, and viewing account balances and transaction history
- Create virtual branches for customers where they can perform transactions and consult financial advisors
- Investors can use AR to view real-time market data, stock prices, and financial news overlaid onto their surroundings
- Leverage VR to train employees on soft skills such as customer service interactions, negotiations, etc. as well as provide compliance training to ensure they are up-to-date on the latest regulations and practices
- Use AR and Machine Learning to verify documents and products during financial transactions
- Use Digital Reality to simulate various types of risk scenarios such as cybersecurity threats, market volatility, etc. to understand their impact and develop the necessary strategies

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Potential Industry Use Cases (2/3)

Below are some potential use cases of Digital Reality across the major industries in the Middle East

Government & Public Services

- City planners can use it to visualize infrastructure projects in real time, allowing stakeholders to interact and observe the proposed development and changes, and provide necessary feedback
- Assist workers in the maintenance and inspection of public infrastructure such as bridges, roads, and utilities by providing them with real time guidance
- Help firefighters, police, and other emergency teams practice techniques and critical decision-making by simulating realistic emergency scenarios
- Assist in wildlife tracking and conservation efforts by visualizing their movements and surrounding habitat
- Help create a virtual workspace for government agencies to collaborate on joint projects
- Enhance the educational curriculum by allowing teachers and students to simulate environments, conduct experiments, interact with 3D models, and provide virtual support to students when needed

Life Sciences & Healthcare

- Allow surgeons to practice complex procedures in virtual environments, improving the required skills and reducing the risk of complication during real-time operations
- Create safe and controlled environments for patients undergoing exposure therapy and guide patients through physical therapy exercises, providing necessary feedback
- Doctors can connect with patients remotely and assess their condition through live virtual consultations
- Lab technicians can repair and maintain equipment by connecting with experts remotely and receiving real-time guidance
- Accelerate drug discovery and development by visualizing and maintaining complex protein structures
- Medical students can visualize and interact with the human anatomy in 3D, thereby enhancing the learning experience

Bridging Worlds & Driving Middle East Innovation

Potential Industry Use Cases (3/3)

Below are some potential use cases of Digital Reality across the major industries in the Middle East

Technology, Media & Telecommunications

- Customers can interact with products such as smartphones, television, etc. in a virtual showroom to explore their respective features before purchasing
- Designers and engineers can create virtual prototypes of new devices, allowing faster user testing, iterations, and identifying potential flaws before building the physical prototype
- By leveraging virtual 3D models of cities, engineers can virtually place cell towers in different areas and simulate scenarios to analyze signal strength, identify gaps, and optimize for efficiency and coverage
- Telecom technicians can virtually inspect network infrastructure such as cell towers and leverage available manuals and schematics for conducting any repairs if needed
- Media companies can create new and engaging ways for the audience to consume media by creating content such as 360-degree videos and virtual reality shows

Energy, Resources & Industrial

- Review complex 3D models of refineries, power plants, and manufacturing facilities to identify and address design flaws, optimize layouts, and decrease delays in construction
- Technicians can troubleshoot and repair complex machinery by leveraging virtual schematics and repair manuals. They can also connect with remote experts to get real-time instructions when needed
- By leveraging the Digital Twins of the plants, engineers can virtually walk through the plants, inspect equipment, and also simulate operational scenarios to identify areas of improvement
- Employees can practice complex procedures and machinery and also train for real-world emergencies, such as oil rig fires, in a safe and controlled environment
- Digital reality integrated with IoT sensors can help technicians monitor equipment health and predict maintenance needs

Bridging Worlds & Driving Middle East Innovation

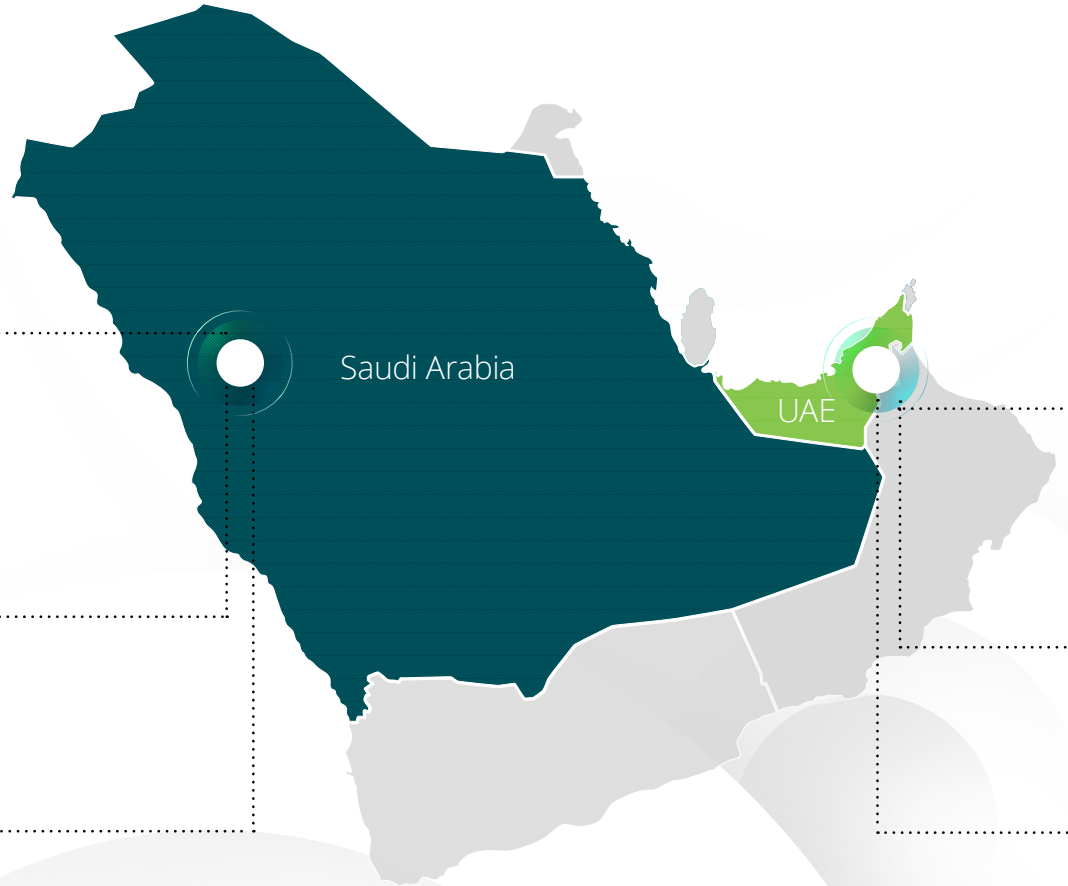
Government Initiatives

Below are some major initiatives launched by government bodies in the Middle East to support the growth and adoption of Digital Reality in the region

NEOM TONOMUS has **invested $1 Billion** in 2022 **in AI-driven products and hyperconnected, predictive, and proactive solutions such as Mixed Reality and Digital Twins**[33]

Tuwaiq Academy in collaboration with Meta, Saudi Federation for Cyber Security and Programming, and Simplon.co launched the **first metaverse academy** to educate youngsters interested in the metaverse[35]

Royal Commission of AIUIa launched a **metaverse project** to **grant tourists virtual access** to Hegra's Tomb of Lihyan, **showcasing its rich heritage**[34]



Dubai Government has **launched the Dubai Metaverse Strategy,** focusing on **advancing Metaverse** within the country **through advanced R&D collaborations and educating** developers, creators, and users of the community. It is also aiming to **create 40,000 virtual jobs by 2030**[30]

Sharjah Department of Town Planning & Survey launched the **"Virtual Transaction Center"** to help **optimize its functions and improve the quality of life** of its customers[32]

Dubai Electricity & Water Authority launched **DEWAverse** to provide **its services to the customer and employees**[31]

Potential Risks to Adopting Digital Reality

The immersive power of Digital Reality is reshaping social interactions and industries around the world, but we cannot ignore some of its potential risks

High Investment Cost

The high cost of acquiring or developing the specialized hardware and software required for each type of Digital Reality creates a barrier to its adoption for majority of the consumers and businesses

Technical Challenges

Integrating Digital Reality into the existing workflows and business systems can be complex and would require businesses to invest in revamping their current infrastructure. Additionally, there are high chances of compatibility issues due to a lack of standardization in the hardware and software from different vendors

Security & Privacy

Digital Reality devices collect vast sets of personal data including eye movements and the collection of this data raises concerns regarding privacy and user consent. These devices are also susceptible to security vulnerabilities, allowing attackers to gain control of the device, steal data, or launch cyberattacks against devices in the network

Health Concerns

Prolonged use of Digital Reality devices can potentially cause issues such as motion sickness, eye strain and physical discomfort

Regulatory Compliance

Adopting Digital Reality can be challenging as it needs to be compliant with various regulations such as industry standards, health and safety regulations, and data security & privacy laws specific to the region, especially for applications that collect personal data of its users

Workforce Skillset

Due to the specialized skillset required to develop Digital Reality applications, businesses will need to either train their existing employees, which can be time-consuming and expensive, or hire specialists, who are limited in the current market

Is Digital Reality Right for You?

Below are some questions organizations and leaders need to consider if they are planning to adopt Digital Reality

How can Digital Reality transform the way organizations interact with their customers, employees and suppliers?

Does the current IT infrastructure support Digital Reality? If not, what are the hardware and software requirements and their respective costs?

Can the Digital Reality solutions seamlessly integrate with the organization's current business processes, systems and platforms?

Does the organization have the expertise to develop and deploy Digital Reality solutions, or does it need to hire specialists or consider a partnership?

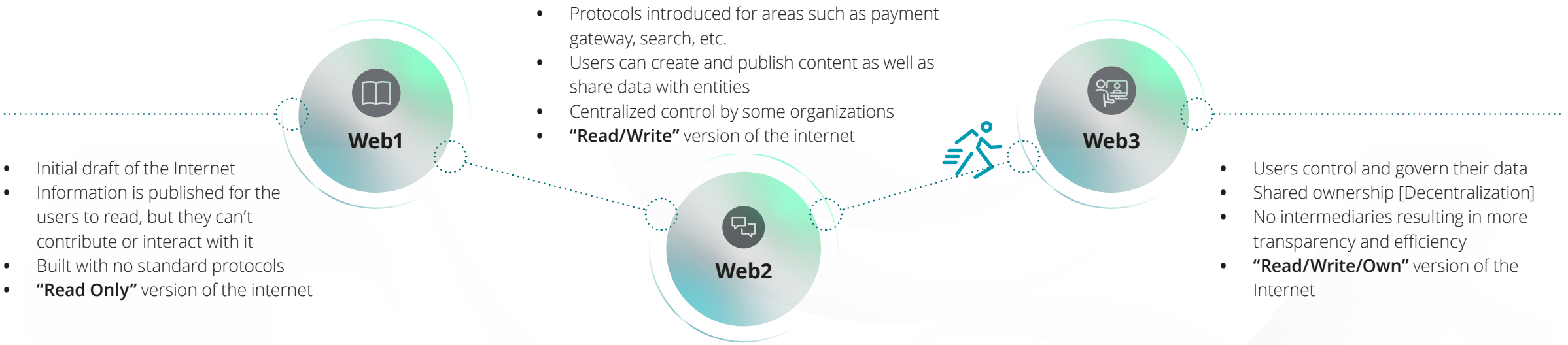
What are the regional regulations (including data privacy and security practices) and industry standards that need to be considered?

What metrics and KPIs will be used to measure the success and impact of the adoption of Digital Reality?

Web3

About Web3

Web3 is chipping away at the walls of the traditional internet, empowering users with ownership and control, paving the way to a new era of decentralized collaboration



- Initial draft of the Internet
- Information is published for the users to read, but they can't contribute or interact with it
- Built with no standard protocols
- **"Read Only"** version of the internet

- Protocols introduced for areas such as payment gateway, search, etc.
- Users can create and publish content as well as share data with entities
- Centralized control by some organizations
- **"Read/Write"** version of the internet

- Users control and govern their data
- Shared ownership [Decentralization]
- No intermediaries resulting in more transparency and efficiency
- **"Read/Write/Own"** version of the Internet

Foundational Technologies Supporting Web3

Blockchain
A decentralized and distributed digital ledger that securely records transactions and data in a transparent and tamper-proof way

Cryptography
A core suite of algorithms and techniques that enables secure communication, data integrity verification, and access control

Smart Contracts
Self-executing programs stored on blockchain that automatically execute pre-defined terms when specific conditions are met

Decentralized Storage
A secure distributed network of computers that stores data, which is encrypted and fragmented across various nodes

WebAssembly (WASM)
A binary code format for creating applications that can run within browsers, regardless of the original programming language

Organizations Leveraging Web3 Globally

Below are few examples of organizations utilizing Web3 around the world across various industry sectors

Nike launched a **Web3 platform called .SWOOSH to co-create virtual products** such as shoes, jerseys, etc. with the community and wear them in digital games and immersive experiences[36]

Tag Heuer's new smartwatch **lets the user display their NFTs** and showcase its authenticity by connecting their respective crypto wallets[37]

Zynga has **launched its first blockchain-based game** called " Sugartown" which is **based on the Ethereum Network** and will be available to the players only through web browsers[38]

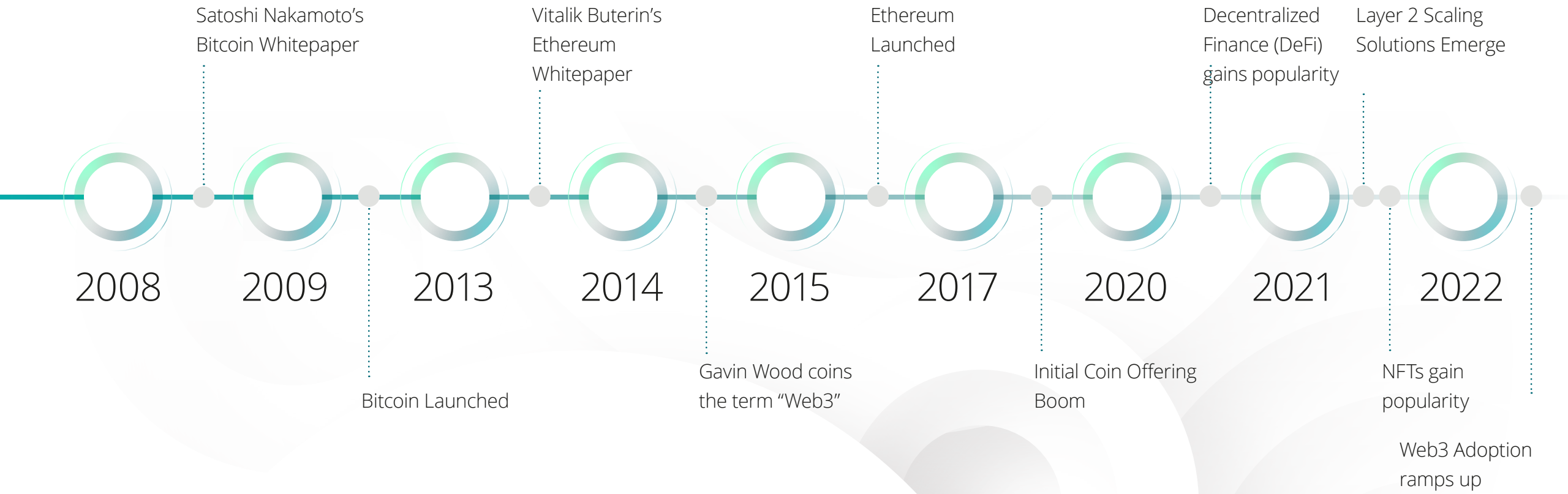
Adidas in collaboration with major NFT brands launched its **"Into the Metaverse" NFT collection** containing 30,000 NFTs **on the Ethereum network**[39]

Warner Music Group has partnered with Polygon Labs to build a **Web3 Music Accelerator Program** and has recently selected two projects to build the ecosystem on Polygon Network[40]

Visa has launched the **Web3 Loyalty Engagement Solution** which **helps customers gain loyalty points** through programs such as **gamified giveaways and treasure hunts**[41]

Key Events & Developments

Below showcases some of the key events that have taken place across the years with regards to Web3



Web's Evolution Fuels Innovation in the Middle East

Potential Industry Use Cases (1/3)

Below are some potential use cases of Web3 across the major industries in the Middle East

Consumer

- By recording every movement of goods on a blockchain which can include details such as origin, manufacturing date etc., retailers can provide a transparent record from the manufacturer to the shelf. This can help build customer trust and help retailers manage their supply chain efficiently
- Retailers such as luxury brands can use blockchain to create digital certificates of authenticity for their products which the customer can access and verify
- Decentralized Finance (DeFi) platforms can help improve financial inclusivity by allowing unbanked customers to get microloans or other financing options for their purchases
- Retailers can create Decentralized Autonomous Organizations (DAOs) where token owners can participate in decision-making processes such as voting on product designs etc.
- Create loyalty programs based on NFTs, which can offer rewards, discounts, or access to exclusive events

Financial Services

- Financial Institutions can expedite the KYC checks of new customers by accessing and verifying the user's identities stored on a blockchain
- Using blockchains to create an immutable audit trail and consolidate financial transactions can help simplify the auditing process
- Leverage blockchain's immutable ledger to detect and prevent fraud by analyzing transaction records for discrepancies and patterns
- Smart contracts can help automate various financial transactions such as insurance claims, loan settlements, etc. based on predefined conditions, improving efficiency and reducing errors
- Decentralized Finance (DeFi) enables peer-to-peer lending and borrowing, allowing users to lend their assets or borrow funds without intermediary entities

Web's Evolution Fuels Innovation in the Middle East

Potential Industry Use Cases (2/3)

Below are some potential use cases of Web3 across the major industries in the Middle East

Government & Public Services

- Blockchain-based digital identity systems can be deployed to verify and manage the citizen's identities, reducing the risks of identity thefts and allowing identified individuals to access certain services
- Leverage decentralized storage systems such as IPFS to securely store and share data, such as evidence for criminal cases, licenses, etc., among different government agencies
- Record government transactions such as budgets and expenditures on a public blockchain to provide citizens real-time access to this information, building trust and transparency
- Use Smart contracts to automate various governmental processes and operations
- Introduce a token-based economy to incentivize desired behaviour among citizens such as recycling etc.
- Using Decentralized Autonomous Organizations (DAOs), government agencies can enable community-driven decision-making for certain public services such as public transport, waste management etc.

Life Sciences & Healthcare

- Electronic Medical Records can be stored on blockchain, allowing secure sharing of health information so healthcare professionals can view and update patient records in real-time when needed
- Logging all the movements within the pharmaceutical supply chain on a blockchain can help identify and prevent counterfeit drugs from entering the market
- Create token-based systems to help fund research for rare diseases and accelerate the drug discovery and development process
- Smart contracts can automate healthcare processes such as insurance claims, appointment schedules, etc.
- Healthcare professionals can upload their qualifications to the blockchain which can be validated by institutions and help expedite administrative tasks and prevent potential fraud
- Patients can earn by sharing their anonymized health data with researchers and pharmaceutical companies

Web's Evolution Fuels Innovation in the Middle East

Potential Industry Use Cases (3/3)

Below are some potential use cases of Web3 across the major industries in the Middle East

Technology, Media & Telecommunications

- Decentralized Content Platforms (DCPs) can help artists, writers, and musicians publish their work to the audience, giving them control over their content and also allowing them to monetize it if needed
- Blockchain-based micropayments for consuming content such as articles, short videos, etc. can help creators monetize their content and provide wider access to premium content
- Blockchain-based advertising networks can record all ad interactions and provide advertisers with accurate metrics and help reduce ad frauds
- Decentralized Wireless (DeWi) Networks can help expand internet access to remote areas by utilizing user-owned devices and blockchain-based incentives
- Smart contracts can manage Service Level Agreements (SLAs) between telecom providers and consumers by automating tasks such as real-time monitoring, notification of breaches and dispute resolution

Energy, Resources & Industrial

- Decentralized Energy Market Platforms can be created to allow peer-to-peer trading of surplus energy generated between the producers and consumers
- Blockchain can be leveraged to record the maintenance history of the infrastructure for regulatory reviews and reference for 3rd party contractors
- Smart contracts can help automate tasks within smart grids such as optimizing electricity distribution by analyzing the data gathered through smart meters and other IoT devices
- Decentralized Autonomous Organizations (DAOs) can enable community funding and management of renewable energy projects
- Blockchain-based platforms can be leveraged for tracking and trading Renewable Energy Certificates (RECs)

Web's Evolution Fuels Innovation in the Middle East

Government Initiatives

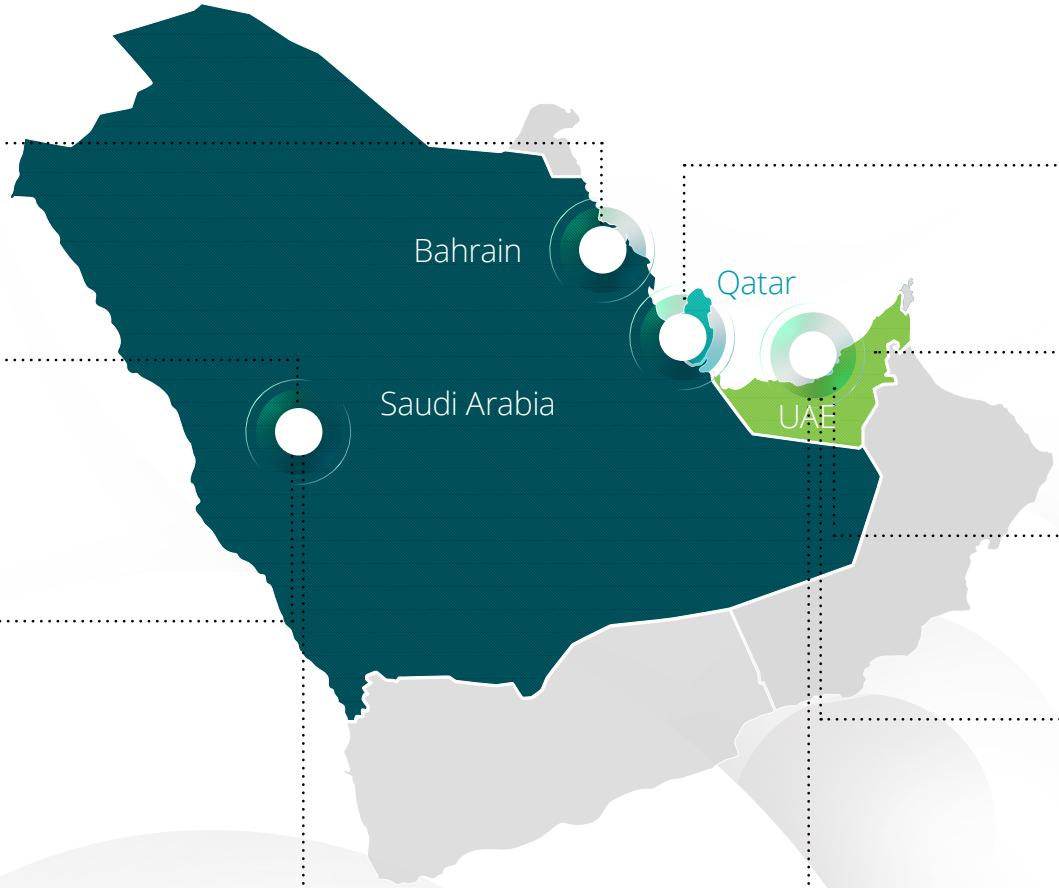
Below are some major initiatives launched by government bodies in the Middle East to support the growth and adoption of Web3 in the region

stc Bahrain has launched **the Web3 Launchpad Program** which **aims to advance the progress of Web3 adoption** in the region[42]

NEOM Investment Fund and Animoca Brands partnered in a **$50 Million deal** to drive the **country's Web3 Initiatives** in line with the Saudi 2030 Vision plan[43]

King Abdulaziz City for Science and Technology and Animoca Brands are partnering together to **advance the Web3 and gaming ecosystem** in the Kingdom which also includes **building a physical Web3 Hub** in Riyadh[44]

National Technology Development Program of Saudi Arabia and Outlier Ventures partnered to launch the **Base Camp Web3 Accelerator Program** which will **focus on supporting Web3 startups** as well as **developing the Web3 ecosystem**[45]



Qatar Financial Center has **partnered with Settlemint**[49] and **The Hashgraph Association**[50] to help grow **adoption of Blockchain and Web3** in the financial sector

Dubai Government has **launched the Dubai Metaverse Strategy,** focusing on **developing Web3 technology** and its applications to create government models and develop vital sectors[30]

Abu Dhabi launched Hub71+ Digital Assets, a dedicated specialist ecosystem **focused on promoting Web3 and digital assets** within the country[48]

Virtual Assets Regulatory Authority (VARA) is established, which is responsible for **regulating and overseeing the provision, use, and exchange of virtual assets** in and from the emirate of Dubai[47]

Abu Dhabi Global Market designed the **DLT Foundations Framework,** which **provides a robust legal structure** tailored for Block Foundations, DAOs and Web3 Entities[46]

Potential Risks to Adopting Web3

Embracing Web3 can open doors to exciting possibilities, but it comes with its own risks which need to be considered before adopting it

Scalability Challenge

As the adoption of Web3 is increasing, the core technology i.e. blockchain is facing challenges to accommodate the high number of users and transactions. This is leading to network congestion, slow processing time and increased transaction costs which can discourage user adoption

Regulatory Challenges

Government agencies in the region are still developing regulations for blockchain technologies and cryptocurrencies, which can cause compliance and legal challenges for businesses

Security Vulnerabilities

Due to the decentralized nature of blockchain, it can expose businesses to newer forms of cybersecurity risks. These risks can be more difficult to address due to the immutable nature of blockchain transactions

Interoperability Issues

Currently, different blockchain networks use their own set of standards and protocols. This prevents the seamless movement of data, and assets across these different networks

Steep Learning Curve

Concepts like blockchain technology, Decentralized Finance (DeFi), DOAs, etc. can be complex for new users to understand. Additionally, a lack of user-friendly interfaces can further discourage exploration and adoption

Workforce Skillset

Organizations planning to adopt Web3 as part of their technology landscape will require employees with the relevant skillsets. This can involve training the existing employees, hiring specialists or partnering with experienced organizations

Is Web3 Right for You?

Below are some questions organizations and leaders need to consider if they are planning to adopt Web3

How does Web3 align with the organization's strategic objectives and goals? Are their areas that Web3 can address better than the current technologies?

What are the regional regulations governing blockchains, cryptocurrencies, and dApps, and the security protocols that need to be considered?

If planning to leverage tokens and cryptocurrencies as part of the Web3 solution, how will it impact the organization's financial processes?

Does the organization have the expertise to leverage blockchains and Web3 Applications, or does it need to hire specialists or consider a partnership?

Does the organization have the required technology infrastructure and how will Web3 technologies integrate with existing systems and processes?

How will the organization handle the growth and ensure that the Web3 solutions can scale with the increasing demand?

Looking Ahead

The future isn't approaching, it's here – and it's driven by technology.

GenAI, Cloud, Digital Reality, and Web3 are just the first ripples of a transformative wave.

Embrace the power of technology, navigate the currents of change, and become a shaper, not a spectator, in the future we're creating together.

Let’s Talk

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