

4th Industrial Revolution

Workshop

Business Opportunities

13th January 2025

This presentation may contain certain forward-looking statements. All statements other than statements relating to historical facts are, or may be deemed to be, forward-looking statements. Forward-looking statements include, but are not limited to, statements related to future events or to the company's future financial or operating performance such as the company's expectations and projections regarding its growth, initiatives and strategies, capital expenditures and investments, customer and partner relationships, major projects and product development. These statements may generally, but not always, be identified by the use of words such as "target," "goal," "aim," "believe," "expect," "commit," "anticipate," "intend," "estimate," "should," "will," "shall," "may," "likely," "plan," "strategy," "initiative," "project," "outlook" or similar expressions, including variations and the negatives thereof.

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Workshop Agenda

No.	Title of the Investment Opportunity	Presenters
	Opening remarks	Fares Alotaibi
1	AR & VR	Saud Alshammari
2	AI & GenAI	Lama Alabdulkareem
3	Industrial Internet of Things Devices	Mohammed Albeaik
4	Blockchain	Sattam Almuzaini
5	Robotics & UAV	Soliman Walaie Alaa Benmahfoudh Khaled AbuSaleem
	Closing remarks	Fares Alotaibi

iktva Program Overview (1/2)

The In-Kingdom Total Value Add (iktva) program is designed to drive increased investment, economic diversification, job creation, and workforce development within the Kingdom

Saudi Aramco aims to achieve 70% localization of all spending



iktva in Procurement

2000+ Service contracts	290+ Corporate purchase agreements
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Business Opportunities

12 Sectors	210 Business Opportunities	\$28 bn Annual Market Size
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Anchor Projects

6 Anchor projects

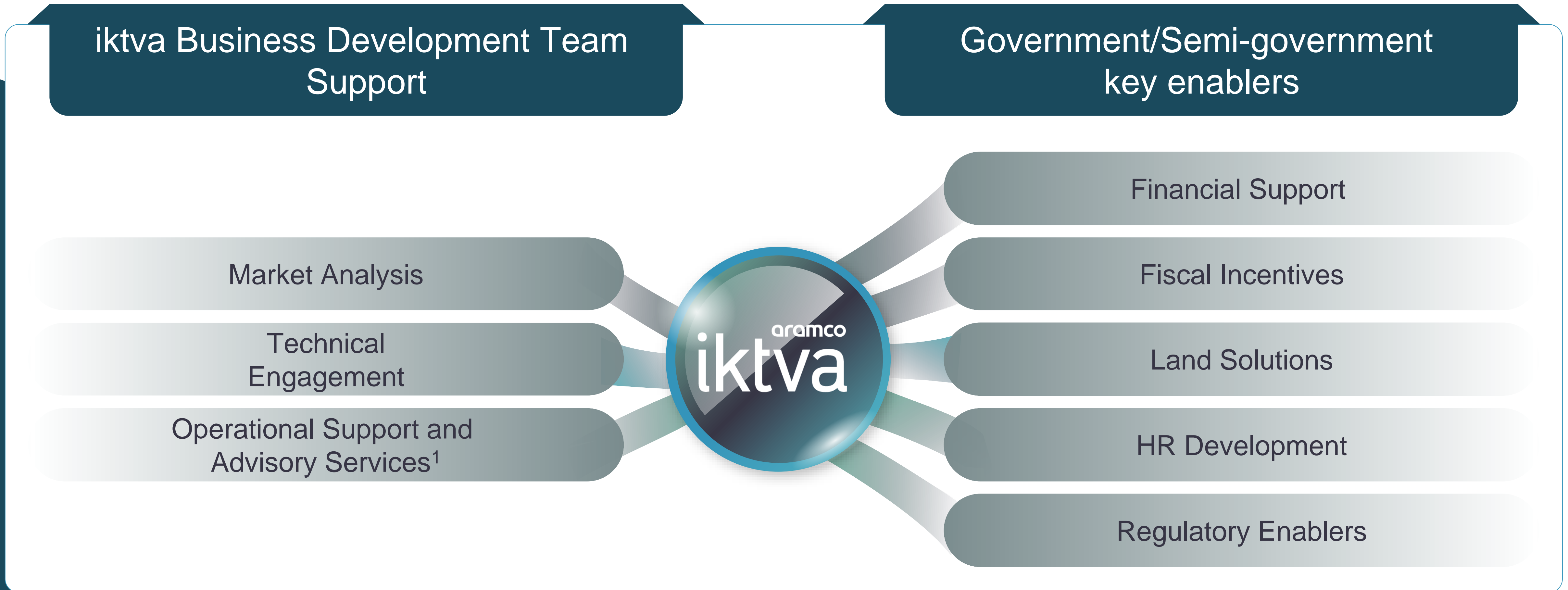
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Local Workforce Development

16 National training centers	90+ Programs
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4IR Workshop

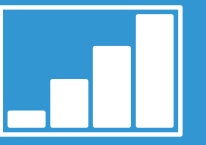









4IR Workshop

1. Includes broad range of support services provided by the team: user requirements, advisory on available financial and fiscal incentives, guidance on localization process in line with local regulations and standards, action plan development etc.

Why invest in KSA?

Non-exhaustive


 Strong GDP growth and healthy economy	 Big market and game-changing opportunities	 Government incentives and enablers	 Ease of doing business	 Strategic global location	 Favorable demographics
<p>Top 20 economies globally</p>	<p>5 Special Economic Zones drive innovation</p>	<p>\$1.3T+ invested in private sector by 2030</p>	<p> one of world's most rewarding tax systems</p>	<p>12-15% of global trade passes via Red Sea</p>	<p>17% population growth from 2013-2023</p>
<p>GDP growth among highest projected in 2025 in top economies</p>	<p>6 giga projects driving urbanization and industry</p>	<p>5.7% contribution of FDI to GDP by 2030</p>	<p>Top 5 in the MENA region for ease of doing business</p>	<p> KSA container ports are among the most efficient globally</p>	<p>67% of population below the age of 35</p>

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Note: FDI = Foreign Direct Investment
 Source: IMF; MISA; Vision 2030 Key Performance Indicators; Shareek Program; World Bank

4IR Market Overview

KSA 4IR



\$4029MM
18% CAGR¹

2024 KSA market size for opportunities
in today's workshop

Five opportunities to be discussed today

- 1 AR & VR
- 2 AI & GenAI
- 3 Industrial Internet of Things Devices
- 4 Blockchain
- 5 Robotics & UAV

How do we define what is an opportunity?



Growing market

High growth high spend markets



**Limited local players
& import driven**

*Markets with few local contributors and
high import resilience*



**Technological
& labor feasibility**

*Markets with accessible or
standardized technology and available
skilled labor*

AR & VR

Saud Alshammari

Opportunity profile – AR & VR

1

KSA needing AR/VR to meet growing demand across multiple industries

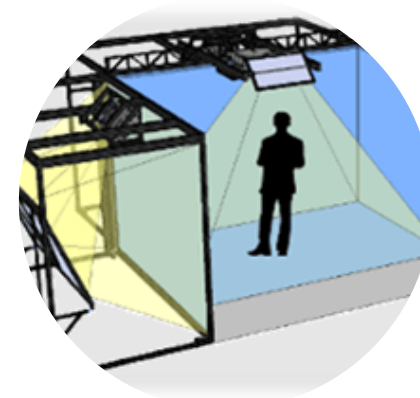
Types



Wearables



Hand-held



Projected

Potential Use Cases

- Real-time expert support for field workers
- Optimize complex repair processes using virtual assistance
- Virtual employee trainings
- Virtual project management utilizing digital twins

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Note: \$MM = USD Millions
Source: Statista; Expert interviews; Team analysis

2

AR/VR market is expected to show strong growth in the next 5 years

108

Estimated 2024 KSA market size. \$MM

9%

Forecasted 5-year CAGR

3

Attractive investment opportunities in the value chain

KSA value chain opportunities



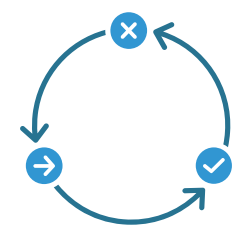
R&D



Ecosystem Mfg.



OEM Mfg.



Deployment & Mgmt.

KSA enablers

- Critical machinery exempt from import duty
- Financing available (Kafalah, Tanafusiya)
- 1M+ AI-trained Saudi nationals
- Tax exempt exports
- Accelerated setup and licensing

AR & VR categories

Non-exhaustive

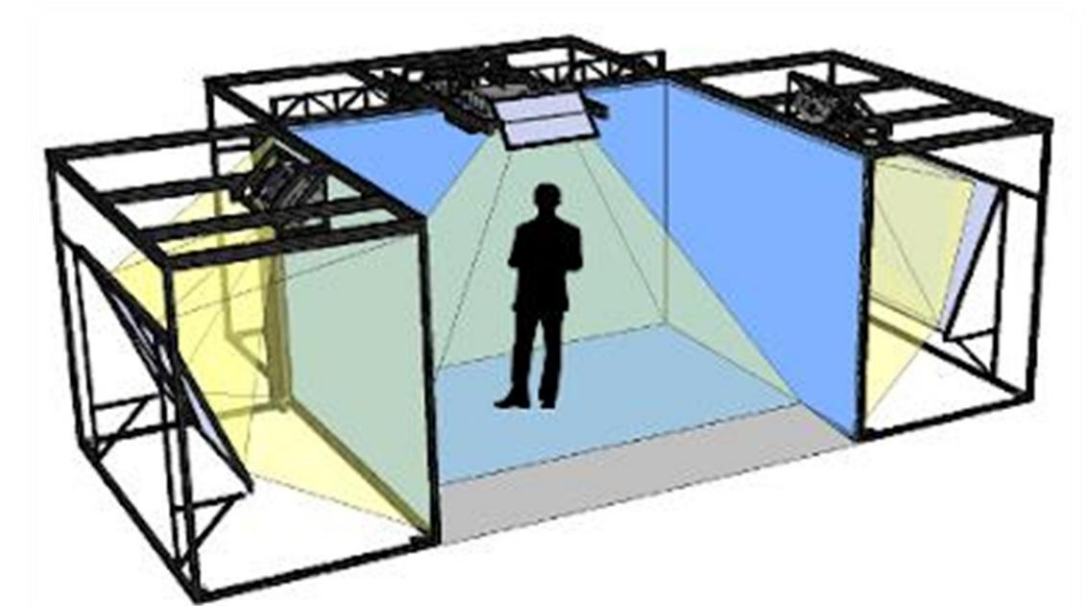
Wearables



Hand-held



Projected



Applications







- Remote maintenance support
- Operational monitoring
- Safety enhancement

- Field navigation
- Training and education
- Digital documentation

- Event simulations
- Team visualizations
- Product/process prototyping














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Use cases

Business case	Description	Key users	Key technology	Key benefits
<p>Remote assistance</p>	<ul style="list-style-type: none"> • Solution connecting field workers to supervisors or AI-enabled bots for task-specific assistance • Provides real-time video for assisting parties and allows hands-free interaction via voice or video through smart glasses 			
<p>Maintenance digital work through</p>	<ul style="list-style-type: none"> • AR-powered solution that helps operators perform complex repairs with virtual guidance and real-time data 			

Engineer
 All Employees
 Maintenance Technician
 Operator
 AR/VR
 Improves Operations Performance and Productivity
 Safety Officer
 Security officer
 Better Error Avoidance
 Modeling
 Mobility
 AI
 Better Knowledge Transfer

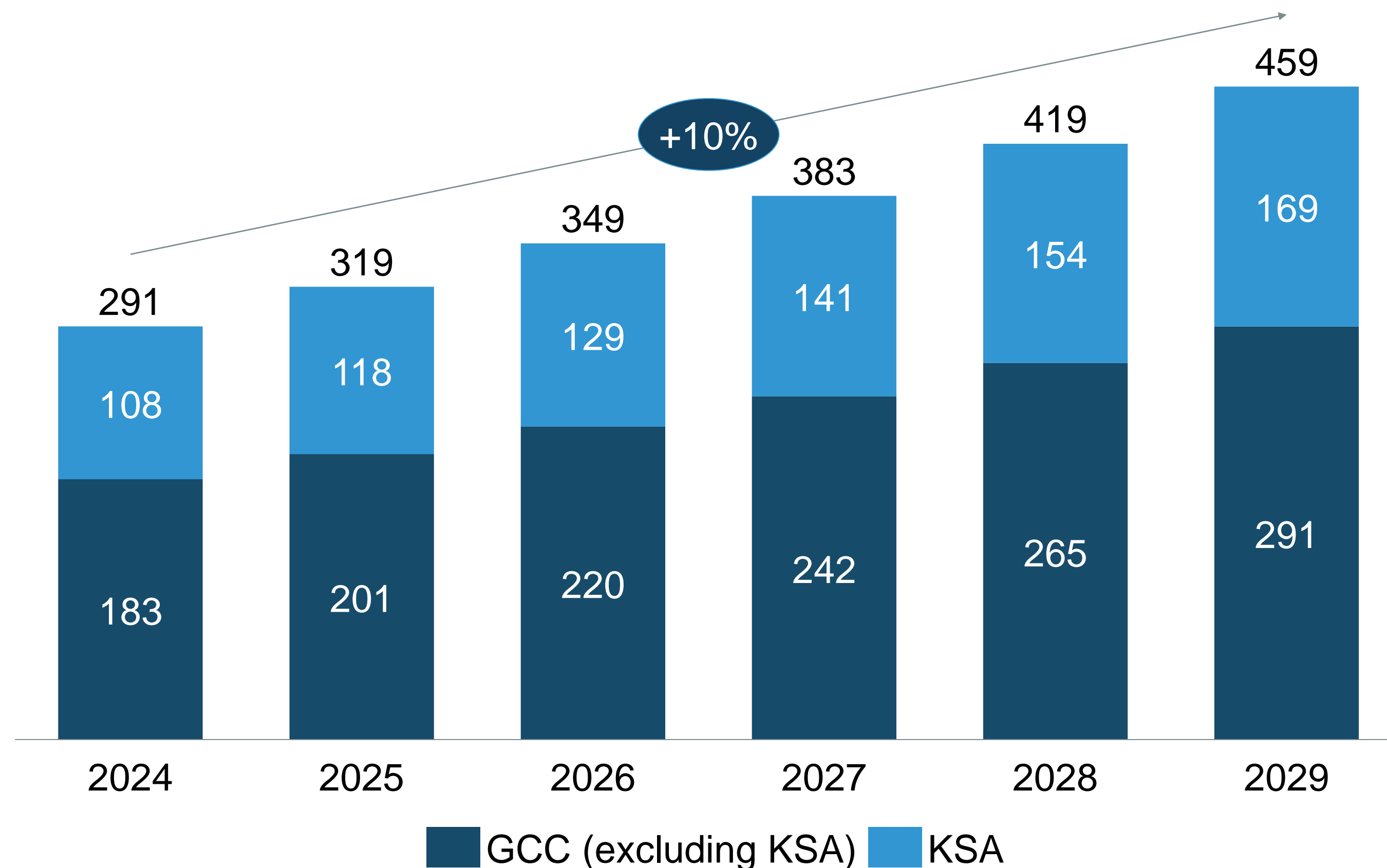
Use cases

Business case	Description	Key users	Key technology	Key benefits
Virtual trainings	<ul style="list-style-type: none"> • VR-driven solution offering interactive training in a virtual environment with 3D visualization and real-time user interaction 		 	
Virtual project management	<ul style="list-style-type: none"> • Digital twin of construction projects that integrates with existing systems to capture all asset data and updates real time to accommodate changes in real plant 	  	  	  


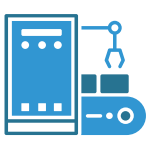

 Engineer
  All Employees
  Maintenance Technician
  Operator
  Modeling
  AR/VR
  Improve Training Effectiveness
 Better Error Avoidance
  Accelerate Project Execution
  Analytics
  Intelligent Sensing
  Improve Design Accuracy

Robotics and UAV localized categories

Forecasted GCC AR & VR market 2024-2029 (\$MM)



Potential customers in KSA

-  Oil & gas
-  Industrial manufacturing
-  Healthcare

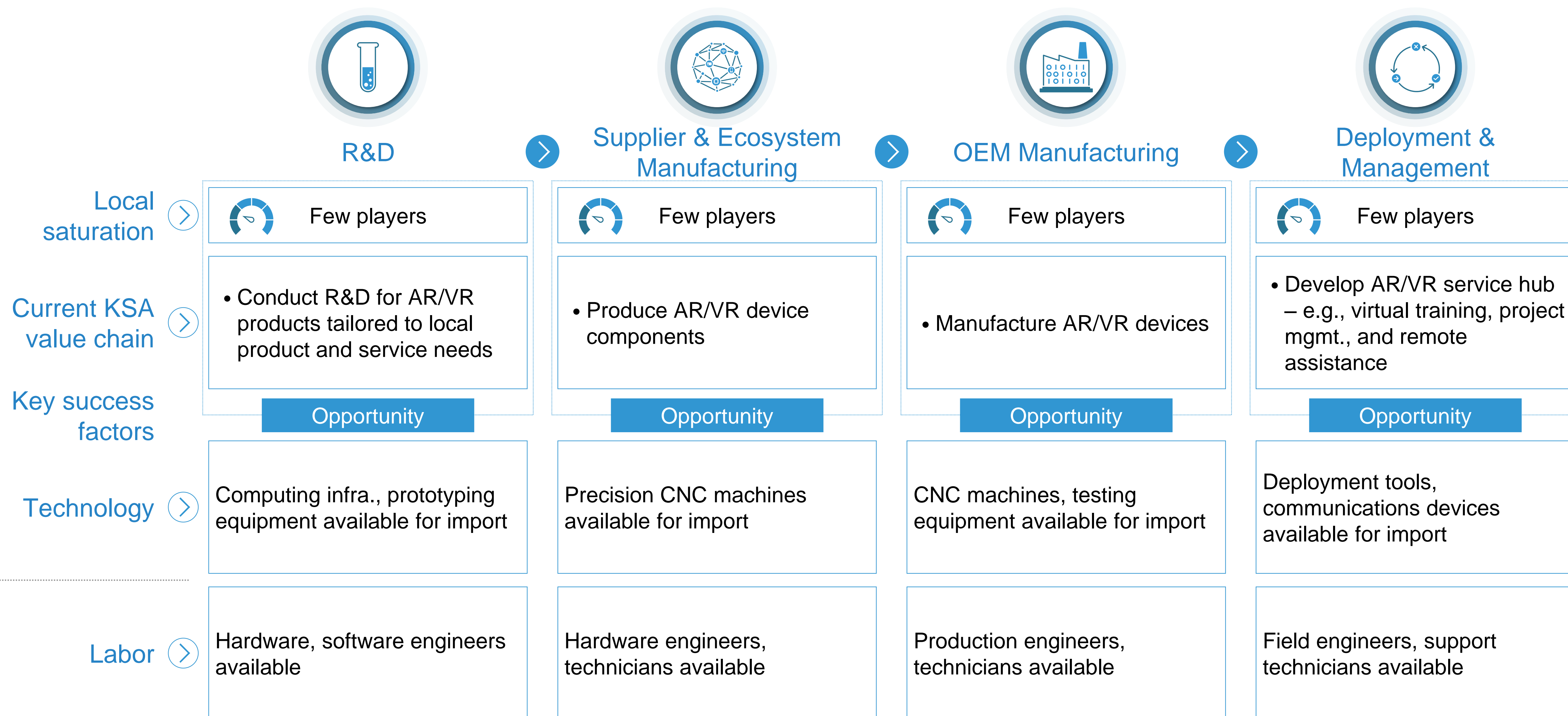
Key KSA demand drivers

- **Technological advancements:** Use of AR & VR in streamlining industrial operations and growth as a consumer product leading to an increased demand for the product
- **Economic & demographic factors:** KSA aims to foster growth and increase the economic contribution of 4IR to 12% of GDP by 2030

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Note: \$MM = USD Millions
Source: Statista; Zawya; Expert interviews; Team analysis

Value chain and key localization opportunities




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Note: CNC = Computer Numerical Control
Source: Expert inputs; Team analysis

Investment opportunity and enablers


Key enablers in KSA to drive success

 **Financial incentives:** Financing up to 75% of setup costs available through SIDF


 **Tax exempt exports:** Export revenue is not subject to tax

 **Trained workforce:** 1M+ Saudis trained in AI, data science, or Blockchain

Where is the opportunity

 **R&D**
 Conduct R&D for AR/VR products tailored to local product and service needs

 **Supplier & Ecosystem Manufacturing**
 Produce AR/VR device components

 **OEM Manufacturing**
 Manufacture AR/VR devices

 **Deployment & Management**
 Develop AR/VR service hub – e.g., virtual training, project mgmt., and remote assistance

AI & Gen AI

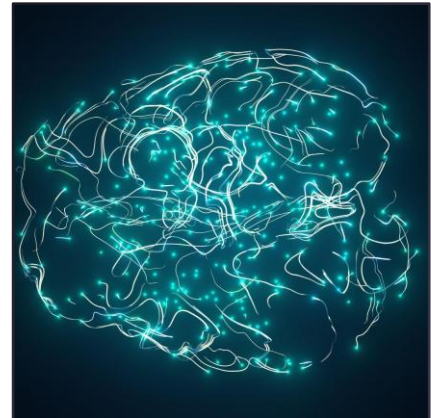
Lama Alabdulkareem

Opportunity profile – AI & Gen AI

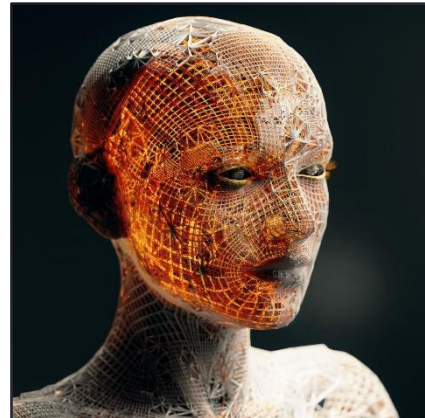


AI expected to accelerate growth across multiple industries in KSA

Types



Artificial Intelligence



Generative AI

Potential Use Cases

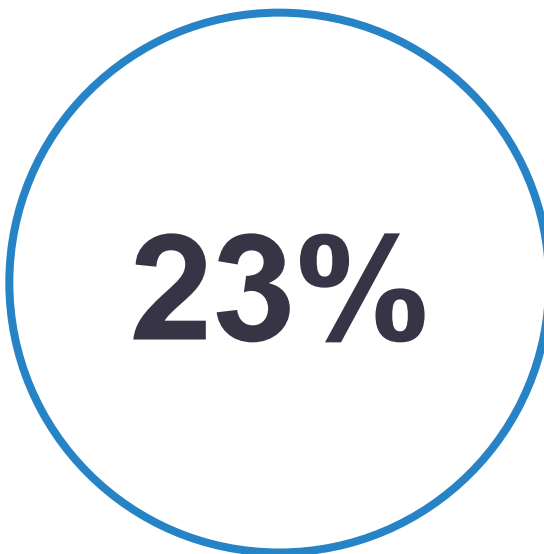
- Simplify media archiving with AI
- Optimize supply chain operations, improve visibility, and drive data-driven decisions
- Automate contract drafting
- Optimize loan decisions using AI



AI market is a rapidly growing market, KSA to lead GCC demand



Estimated 2024 KSA market size. \$MM



Forecasted 5-year CAGR

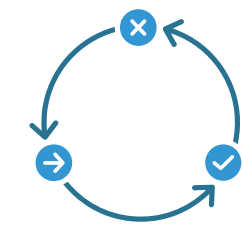


Attractive investment opportunities in the value chain

KSA value chain opportunities



R&D



Solution Development and Deployment

KSA enablers

- Financing available (Kafalah)
- Data science training from national universities
- 1M+ AI-trained Saudi nationals
- Tax exempt exports
- Accelerated setup and licensing





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Note: \$MM = USD Millions
 Source: Expert interviews; Statista; Team analysis





AI & Gen AI applications

Non-exhaustive

Artificial Intelligence

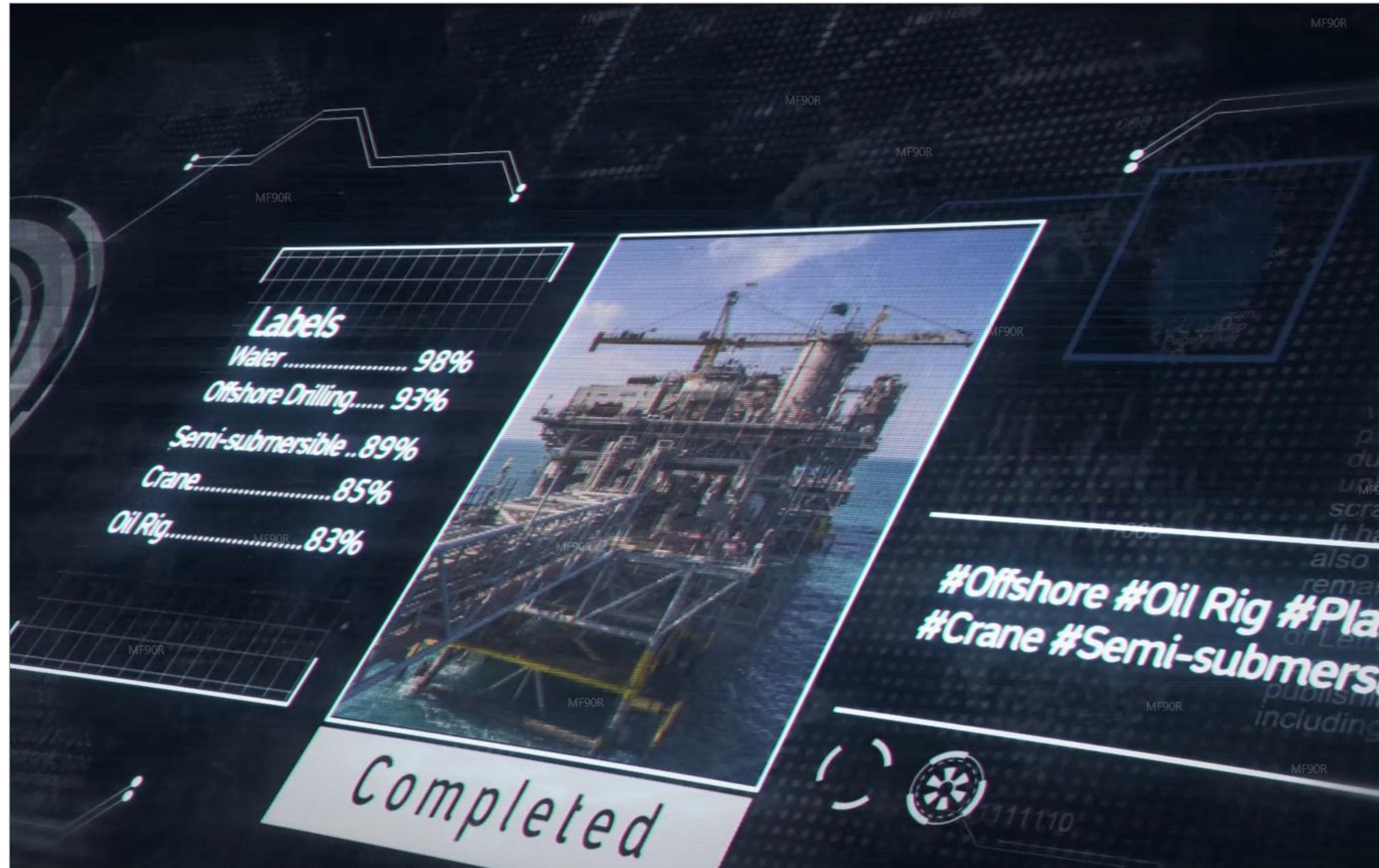
- 
Prediction Analytics: Leverage historical data for outcome predictions
- 
Optimization: Optimize decision-making under constraints
- 
Computer Vision: Extract insights from digital images and videos
- 
Natural Language Processing: Enable machines to process human language effectively

Generative Artificial Intelligence

- 
Chatbot Models: Conversational tools used for customer support, training simulations, and operational efficiency
- 
Content Creation: Generate marketing content, technical documentation, and personalized learning materials
- 
Document Processing: Automate complex workflows like legal contract drafting and compliance reporting
- 
AI-Driven Design Tools: Generate designs for architecture and industrial layouts

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Use Case | AramcoLens: AI-Driven Media Archive Solution



Overview

Consolidate existing media and digitize analogue materials, ensuring accessibility and long-term preservation & employ computer vision and generative AI to identify objects and generate captions, enabling improved search and user experience

Added Value

- Improved accessibility and preservation
- Enhanced search functionality
- Streamlined workflows for archivists
- Elevated user experience

Use Case | Supply Chain Intelligence (Control Tower)



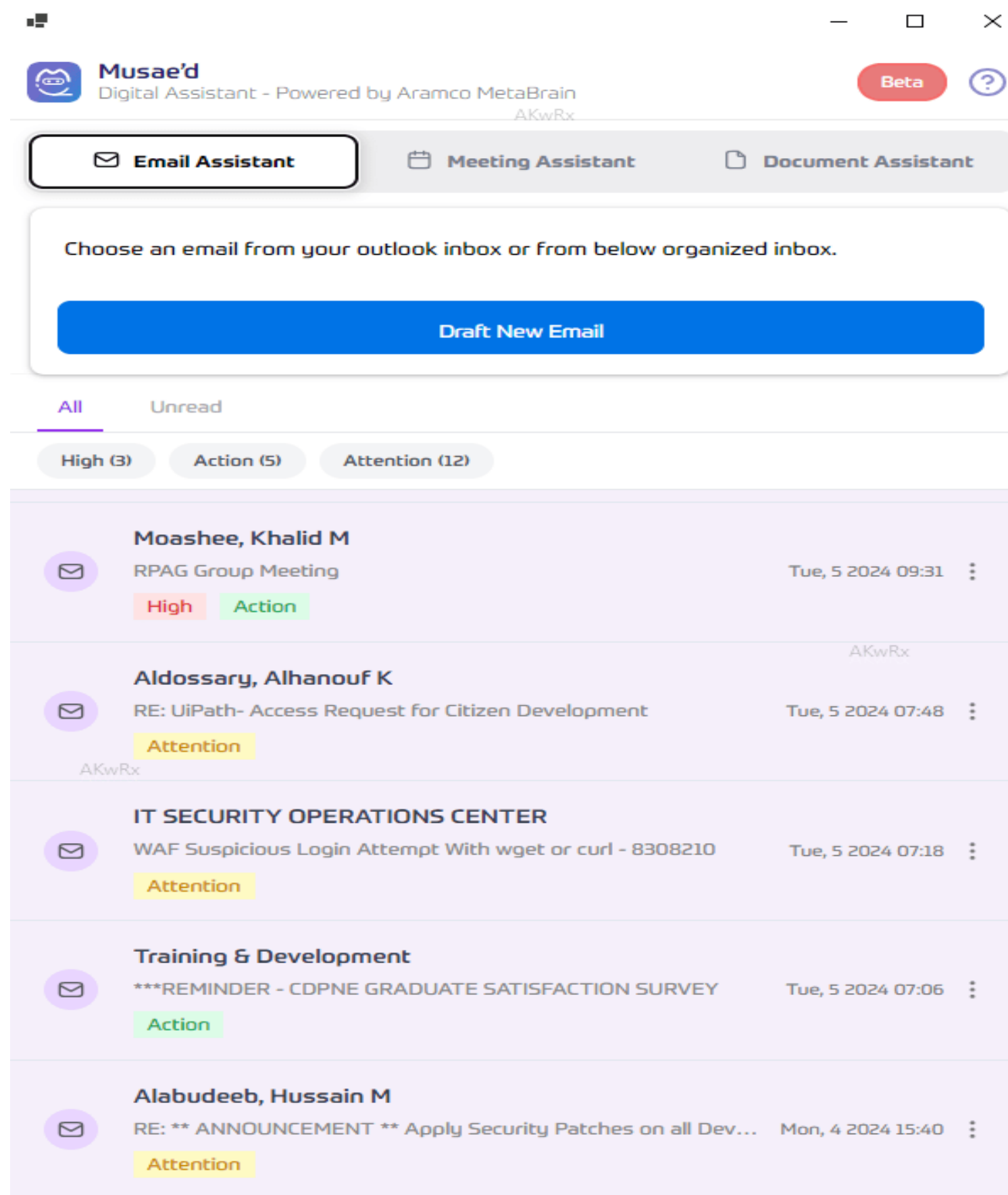
Overview

Using AI to analyze and visualize data in the Supply Chain Control Tower; processing 5 billion records, fed into 43 analytical solutions, 30 real-time and proactive alerts, and 27 performance management KPIs

Added Value

- Utilizing machine learning and AI in different use cases such as inventory growth prediction and supplier on-time delivery
- Analyzing huge datasets to determine issues of highest importance

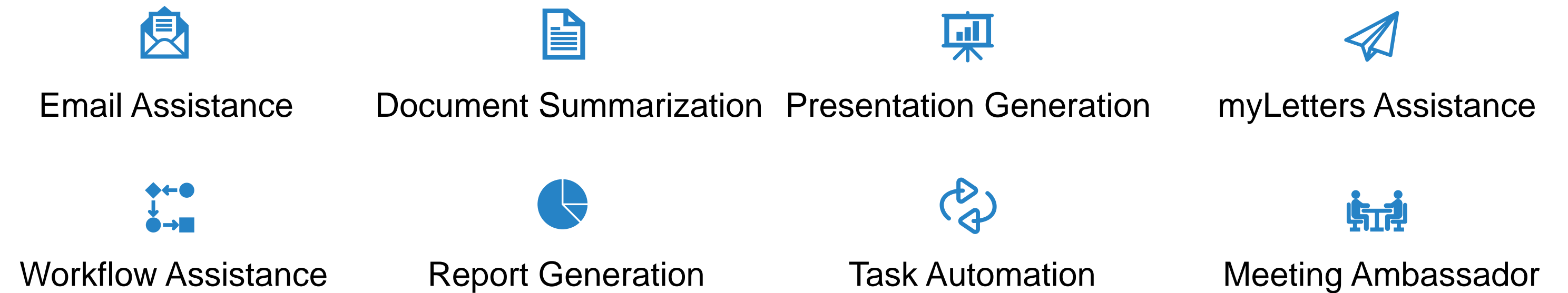
Use Case | Musae'd



Overview

Musae'd is a corporate AI-powered desktop solution that leverages Robotic Process Automation (RPA), Artificial Intelligence (AI), and Aramco GenAI "AramcoMetaBrain" to boost the productivity of Aramco employees by supporting them with their daily activities

Solution Features



Added Value

- Boosts employee productivity
- Automates daily tasks and activities
- Enhances employee assistance and support

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Use Case | Crude Shipping Optimization



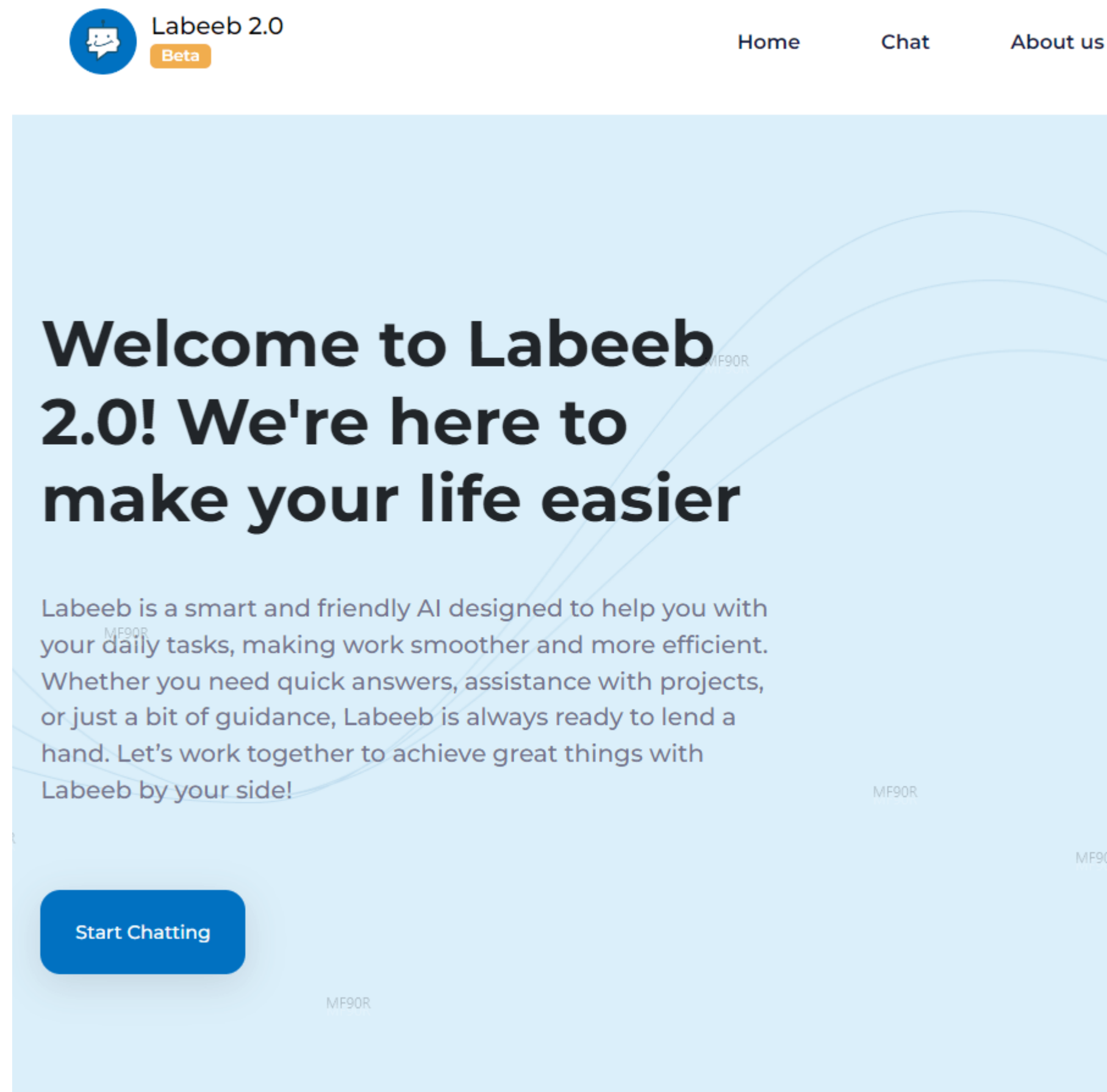
Overview

The objective is to acquire an AI powered Digital Planner, which extracts trends from historical data and uses both historical trends along with operational requirements to optimize both the crude oil exports monthly lifting schedules as well as the four-day ship to berth assignment

Added Value

- Optimizes crude oil exports scheduling
- Enhances ship-to-berth assignment efficiency
- Utilizes historical trends for informed decision-making

Use Case | LABEEB



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Overview

Labeeb is a GenAI-powered conversational assistant that created to increase productivity in day-to-day activities - it is trained on a vast range of knowledge from the web, enabling it to perform a variety of tasks and provide valuable assistance to users

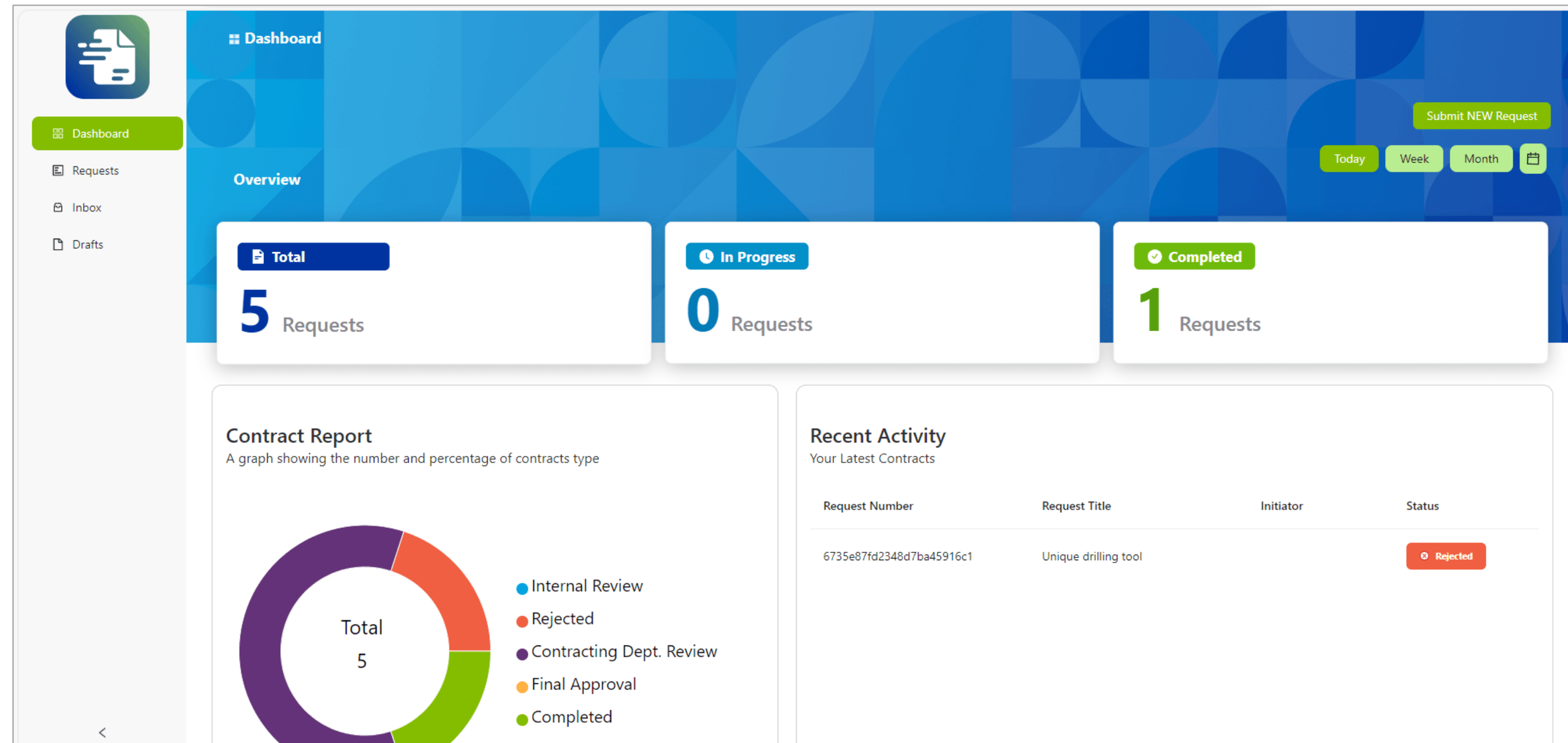
Applications

- **YLAB Survey Analysis:** uses Labeeb for employee feedback analysis
- **CHATIR:** Gen-AI application for Investor Relations
- **Bayan:** Conversational AI for Data Governance
- **Operator Copilot:** Operator Copilot integrates GenAI with PI systems
- **Maarefa:** Gen-AI application for knowledge sharing

Added Value

- Increases productivity
- Automates day-to-day tasks
- Provides intelligent answers and content generation
- Enhances document management and analysis

Use Case | ContractAI



Overview

An LLM-based contract documentation expert system assisting contract advisors in creating contract drafts in record time - this tool supports advisors in generating various types of Scope of Work (SOW) documents resulting in substantial productivity increase across the board

Added Value

- Maximize productivity of contract advisors
- Significantly reduce review time
- Significantly reduce human errors

Use Case | Loan Sourcing Expert System

The screenshot shows a web application interface for loan sourcing. At the top, there are filters for 'Loan Amount' (1,000), 'Interest Rate' (5%), and 'Annual Interest Amount' (50 USDm). Below these is a 'Global Matrix' table with columns for various countries: Azerbaijan, Belgium, Bermuda, Brazil, Cayman Islands, China, Curacao, Cyprus, Denmark, Egypt, Finland, Germany, Greece, Guernsey, India, Indonesia, Ireland, Italy, Japan, KSA_DS, KSA_LS, and Kuwait. The table is currently redacted with a large 'Data Redacted' watermark.

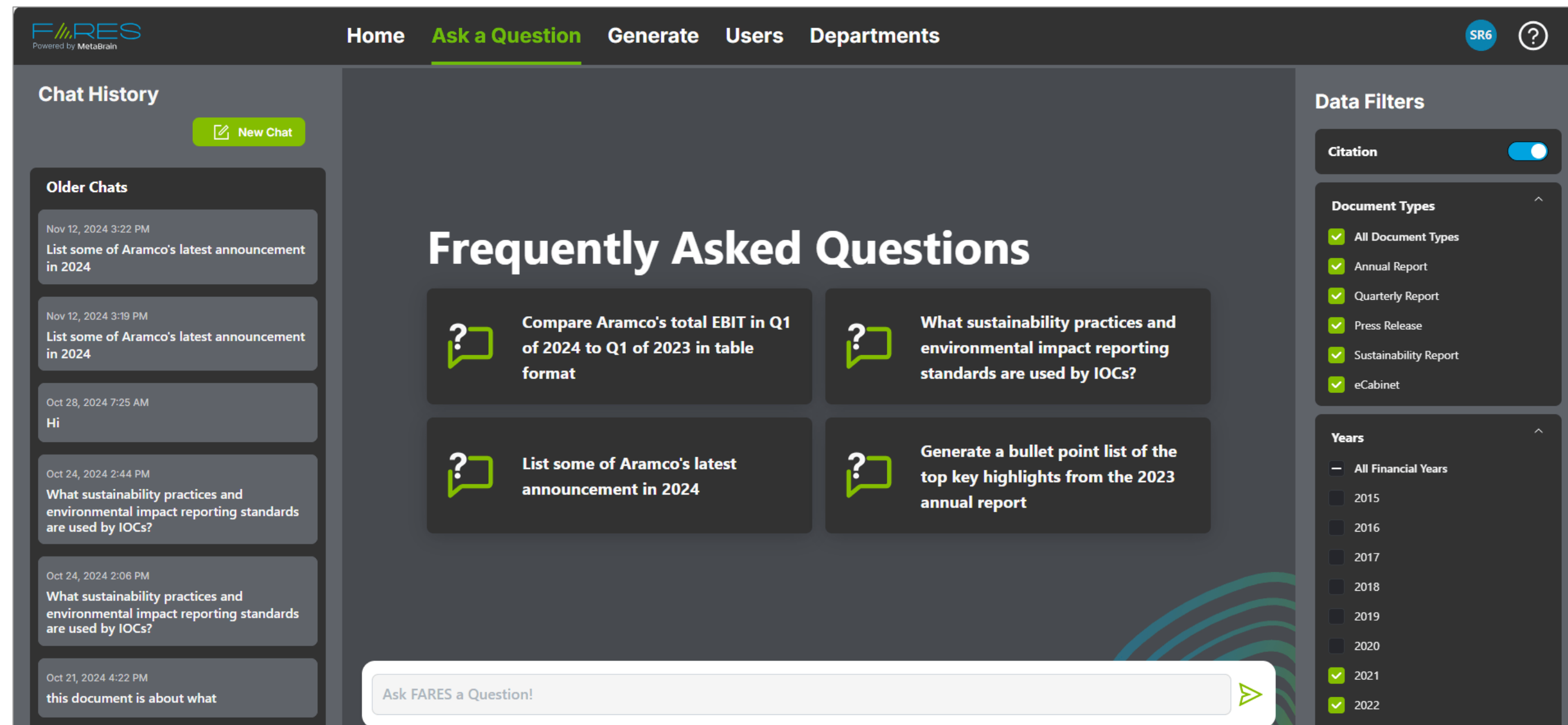
Overview

An AI model trained on vast amounts of unstructured data is leveraged to aid treasury professionals in optimizing loan sourcing by automatically analyzing and considering all relevant input factors for each loan case

Added Value

- Maximize productivity of financial analysts
- Significantly reduce review time
- Reduce value loss caused by non-optimal loan sourcing decisions

Use Case | Finance AI Report Enablement Solution (FARES)



Overview

An LLM-based financial expert capable of generating annual financial reports, answering benchmarking questions quickly and effectively, and enquiring about peer companies, public press releases, and internal financial data- the system is integrated with trusted public data sources, to ensure maximum accuracy in addressing financial inquiries

Added Value

- Maximize productivity of financial analysts
- Significantly reduce manhours spent
- Significantly reduce human error and increase accuracy

Use Case | GenAI-Powered Data Synthesis for Safety Scenarios



Overview

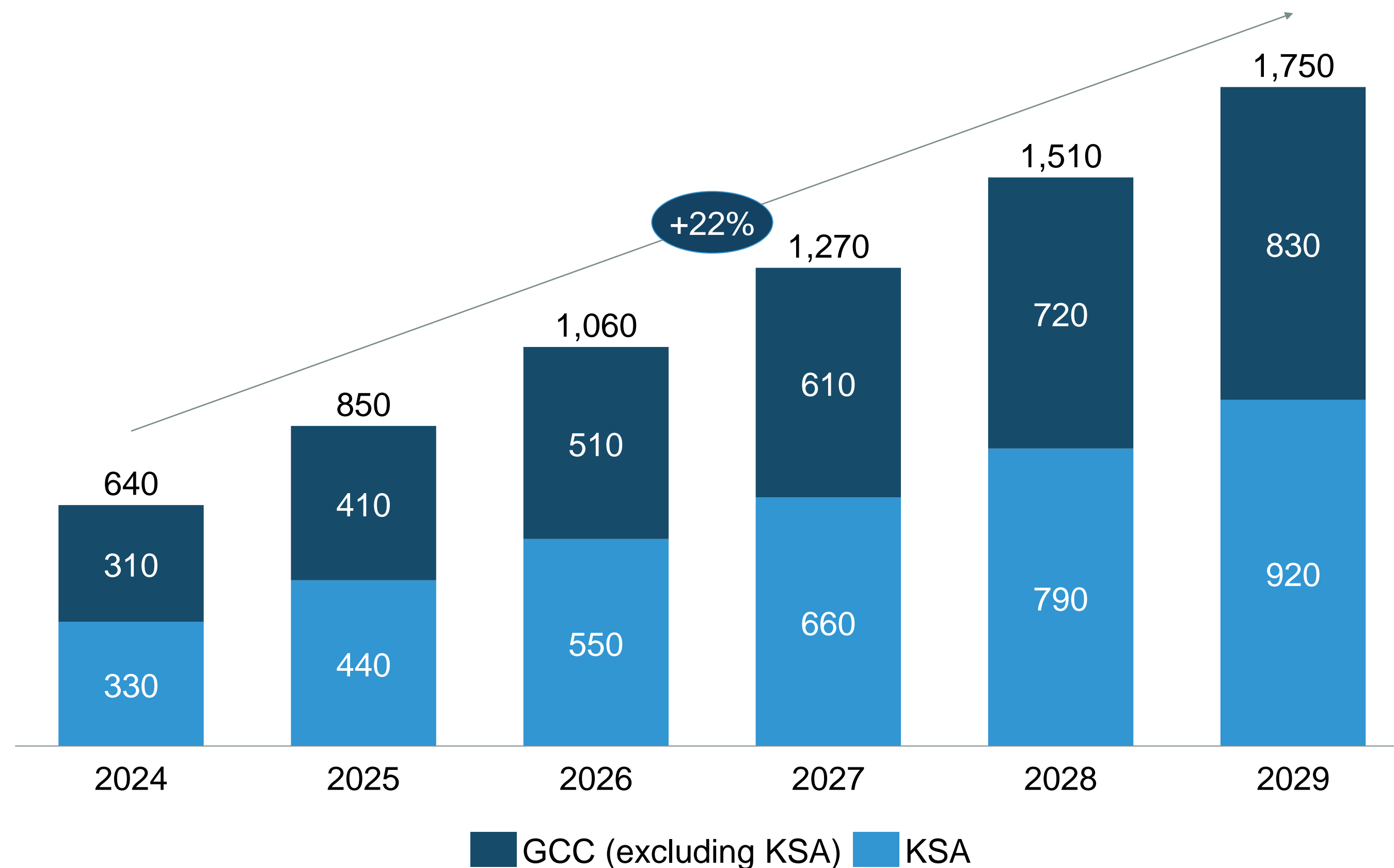
A GenAI-based data synthesis and generation tool capable of generating image and video datasets for various safety scenarios - the lack of readily available safety violation training datasets is a real challenge for organizations and enterprises - this tool helps in generating required datasets for AI applications to improve safety posture of the organizations

Added Value




- Eliminate lack of data availability
- Augment existing datasets to build better, more complex AI models
- Increase accuracy and generalizability of AI models

AI & Gen AI demand, customers, and drivers

Forecasted GCC AI & Gen AI market 2024-2029 (\$MM)



Potential customers in KSA

-  Government and public sector
-  Oil & gas players
-  Healthcare

Key KSA demand drivers

- **Consumer industry trends:** Demand for Smart City solutions in the Kingdom's Giga projects with a focus on next-generation AI technologies
- **Economic & demographic factors:** KSA aims to foster growth and increase the economic contribution of the 4IR and AI sectors to 12% of its GDP by 2030

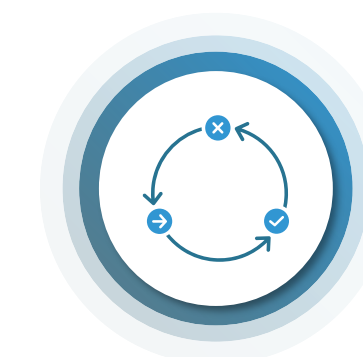
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Note: \$MM = USD Millions
Source: Statista; Expert interviews; Team analysis

Value chain and key localization opportunities



R&D



Solution Development & Deployment

Local saturation



Few players



Few players

Current KSA value chain



- Provide R&D for AI and GenAI services tailored to local service needs – e.g., structural defect identification, predictive maintenance tools

- Develop AI and GenAI service hub for high-value industrial applications – including product identification, tool development, deployment, and training

Key success factors

Opportunity

Opportunity

Technology



HPC infrastructure equipment available for import

Deployment tools, cloud and edge devices available for import

Labor



Data scientists, software engineers available


Software developers available, AI trainers required

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Note: HPC = High-Performance Computing
Source: Expert inputs; Team analysis

Investment opportunity and enablers


Key enablers in KSA to drive success

 **Financial incentives:** Financing up to 75% of setup costs available through SIDF

 **Tax exempt exports:** Export revenue is not subject to tax

 **Trained workforce:** 1M+ Saudis trained in AI, data science, or Blockchain

Where is the opportunity

R&D
 Provide R&D for AI and GenAI services tailored to local service needs – e.g., structural defect identification, predictive maintenance tools

Solution Development & Deployment
 Develop AI and GenAI service hub for high-value industrial applications – including product identification, tool development, deployment, and training

Industrial Internet of Things Devices

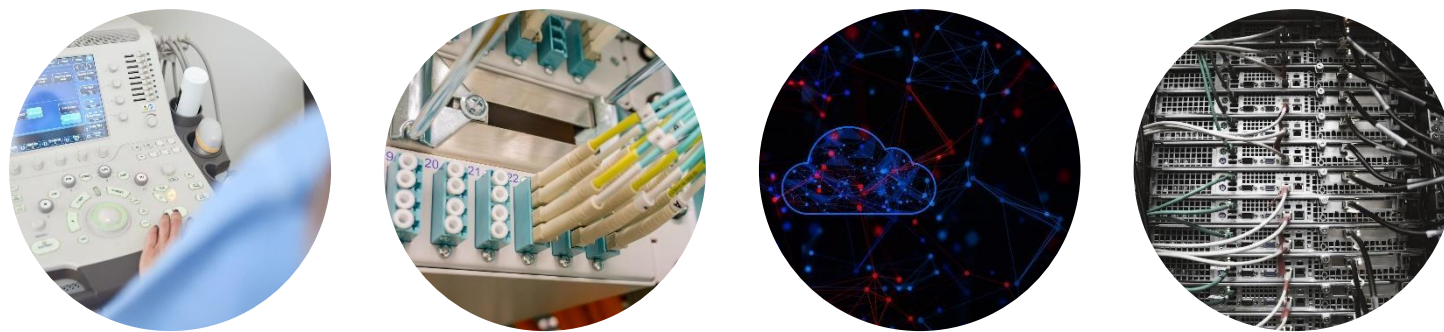
Mohammed Albeaik

Opportunity profile – Industrial Internet of Things (IIoT)

1

KSA requires IIoT to meet current industrial expansion

Components



IIOT Sensors IIoT Connectivity Solution Integrators Others¹

Potential Use Cases

- Asset condition monitoring
- Leak Detection, Emission Reduction & Decarbonization Technologies
- Wastewater Management
- Industrial Buildings
- Process Safety

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2

IIoT market is nascent with rapid forecasted growth

1620

Estimated 2024 KSA market size. \$MM

14%

Forecasted 5-year CAGR

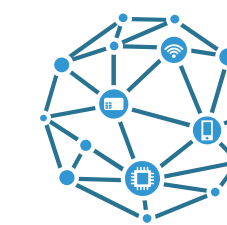
3

Attractive investment opportunities in value chain

KSA value chain opportunities



R&D



Ecosystem Mfg.



OEM Mfg.

KSA enablers

- R&D project financing available
- Corporate tax incentives available
- Qualified system integration talent from NIT

1. Others = Edge Devices, Routers, Repeaters, Gateway; Note: \$MM = USD Millions; NIT = National Information Technology Academy
 Source: Expert inputs; Statista; Team analysis

Industrial Internet of Things devices and selected use case overview

Non-exhaustive

Components



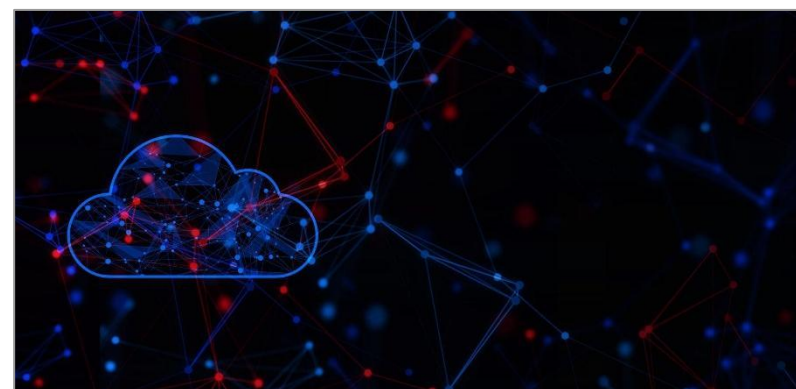
IloT sensors

- Non-intrusive
- Power harvesting
- Nano sensors



IloT Connectivity

- LPWAN, LoRaWAN, 4G/5G, & Satellite



Cloud and IloT platform



Edge Devices, Routers, Repeaters, Gateway

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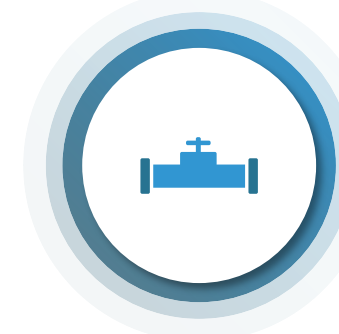
Potential use cases



Asset Condition Monitoring



Leak Detection, Emission Reduction & Decarbonization Technologies



Wastewater Management



Industrial Buildings



Process Safety

Use Case | Asset Condition Monitoring



Applications

- Monitor asset condition and predict performance
- Enable AI and ML through big data gathering

Benefits

- Support scalability and maintainability
- Aid circular economy

Use Case | Leak Detection, Emission Reduction & Decarbonization Technologies



Applications

- Provide carbon emissions measurement and forecasting
- Detect and identify the source of gas leaks
- Detect and identify the source of liquid leaks

Benefits

- Support Net Zero mission
- Aid circular economy

Use Case | Wastewater Management



Applications

- Provide a unified solution to monitor and control wastewater
- Leverage AI and Edge computing technologies to contribute to reusable irrigation water supply

Benefits

- Effective use of wastewater
- Support forestation and Saudi Green Initiative

Use Case | Industrial Buildings



Applications

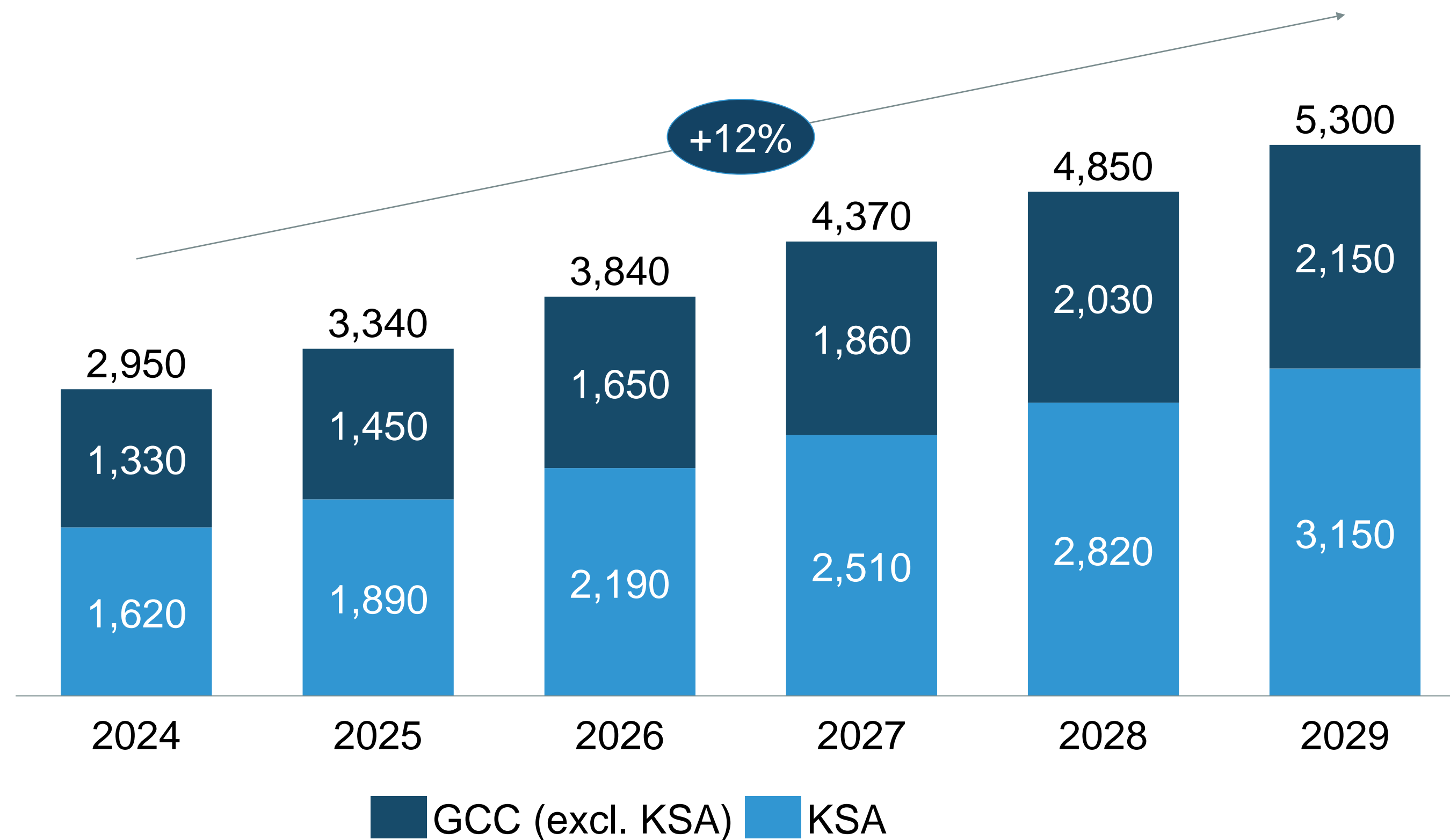
- Monitor temperature, humidity, and emissions inside industrial buildings
- Measure power consumption

Benefits




- Enable live monitoring with alerting system
- Support decarbonization goals
- Aid energy optimization

Industrial Internet of Things demand, customers, and drivers

Forecasted KSA and other GCC IIoT market 2024-2029 (\$MM)



Typical IIoT customers in KSA

-  Oil & Gas
-  Manufacturing
-  Energy and utilities

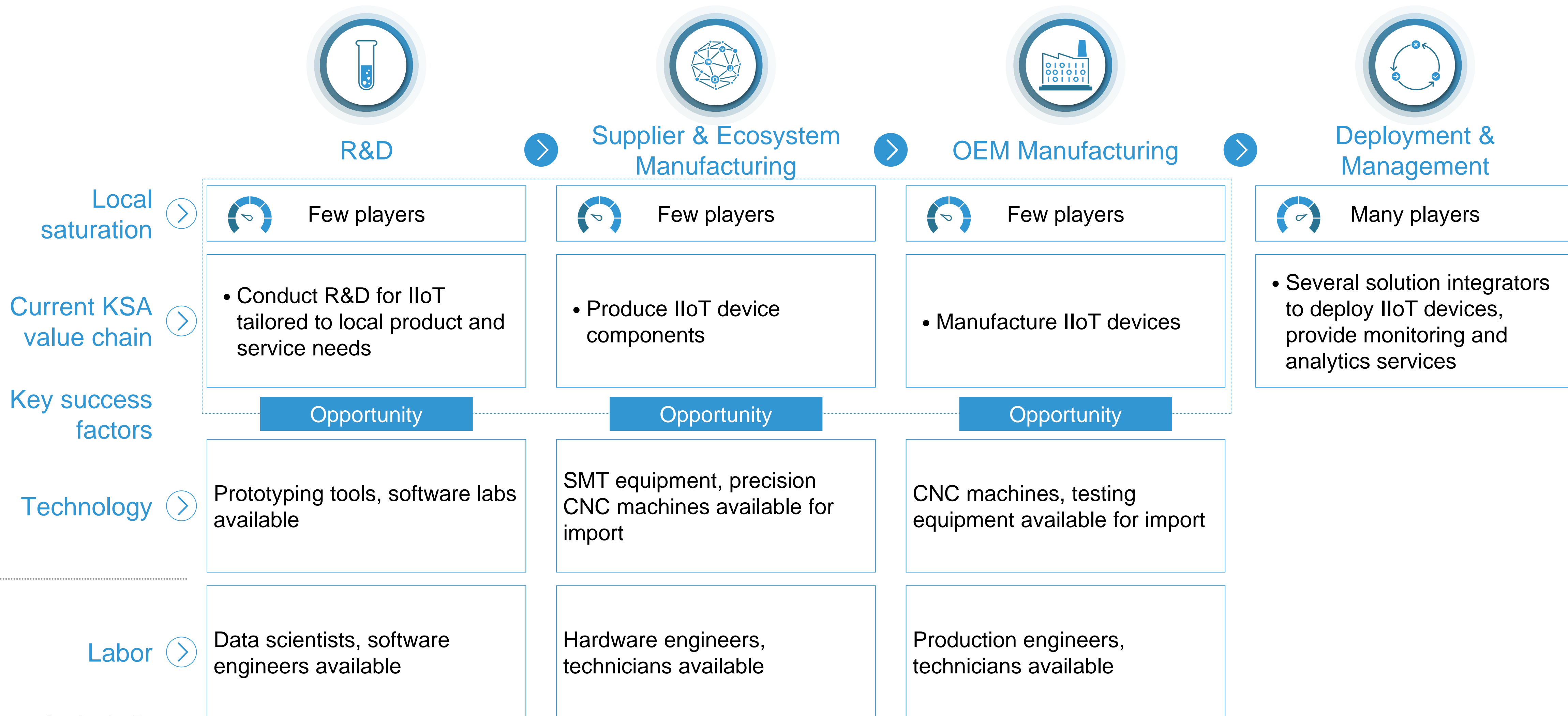
Key KSA demand drivers

- **Industrial expansion:** Increase in IIoT adoption driven by rising role of manufacturing – 4,000 fully automated factories expected by 2035
- **Regulatory Frameworks:** Policies that encourage public and private sectors to prioritize cloud adoption

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Note: \$MM = USD Millions
Source: Arab News; Expert inputs; Statista; Team analysis

Value chain and key localization opportunities



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Note: SMT = Surface-mount technology
Source: Expert inputs; Team analysis

Blockchain

Sattam Almuzaini

Opportunity profile - Blockchain

1

KSA is actively integrating blockchain across sectors to enhance efficiency

Potential Use Cases



Transparent and reliable invoicing solutions



Automated sensor readings



Automated system entries

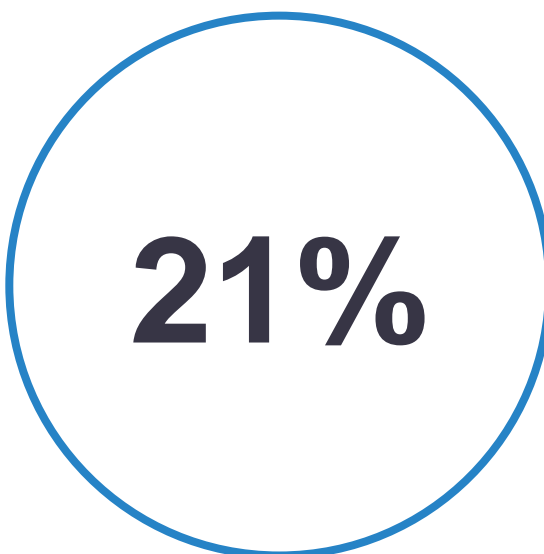
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2

Blockchain market is sizeable with strong forecasted growth



Estimated 2024 KSA market size. \$MM



Forecasted 5-year CAGR

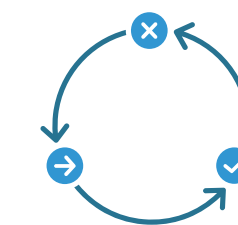
3

Attractive investment opportunities in the value chain

KSA value chain opportunities



R&D

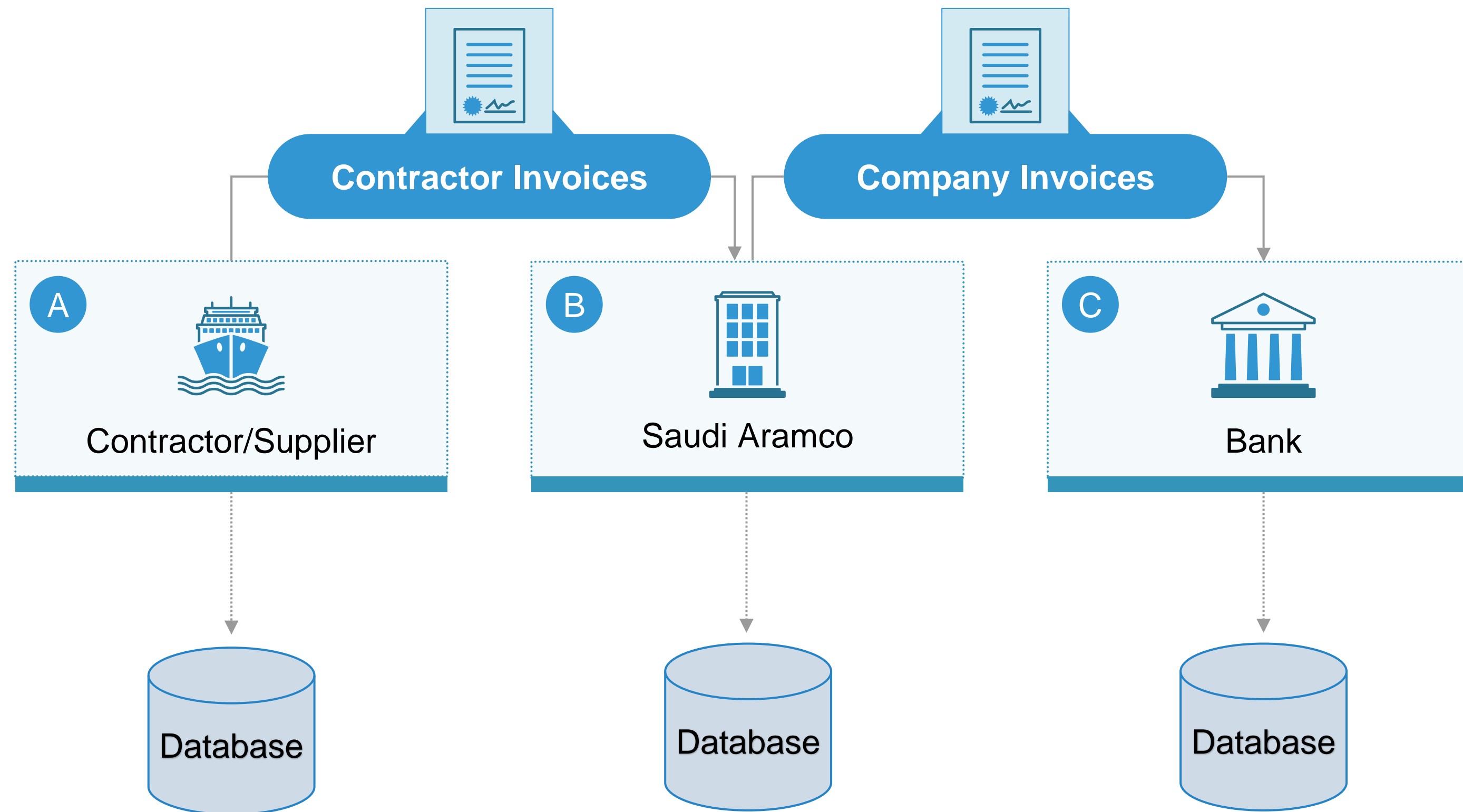


Solution Development and Deployment

KSA enablers

- Financing available (Kafalah)
- Blockchain training from national universities
- 1M+ AI-trained Saudi nationals
- Tax exempt exports
- Accelerated setup and licensing

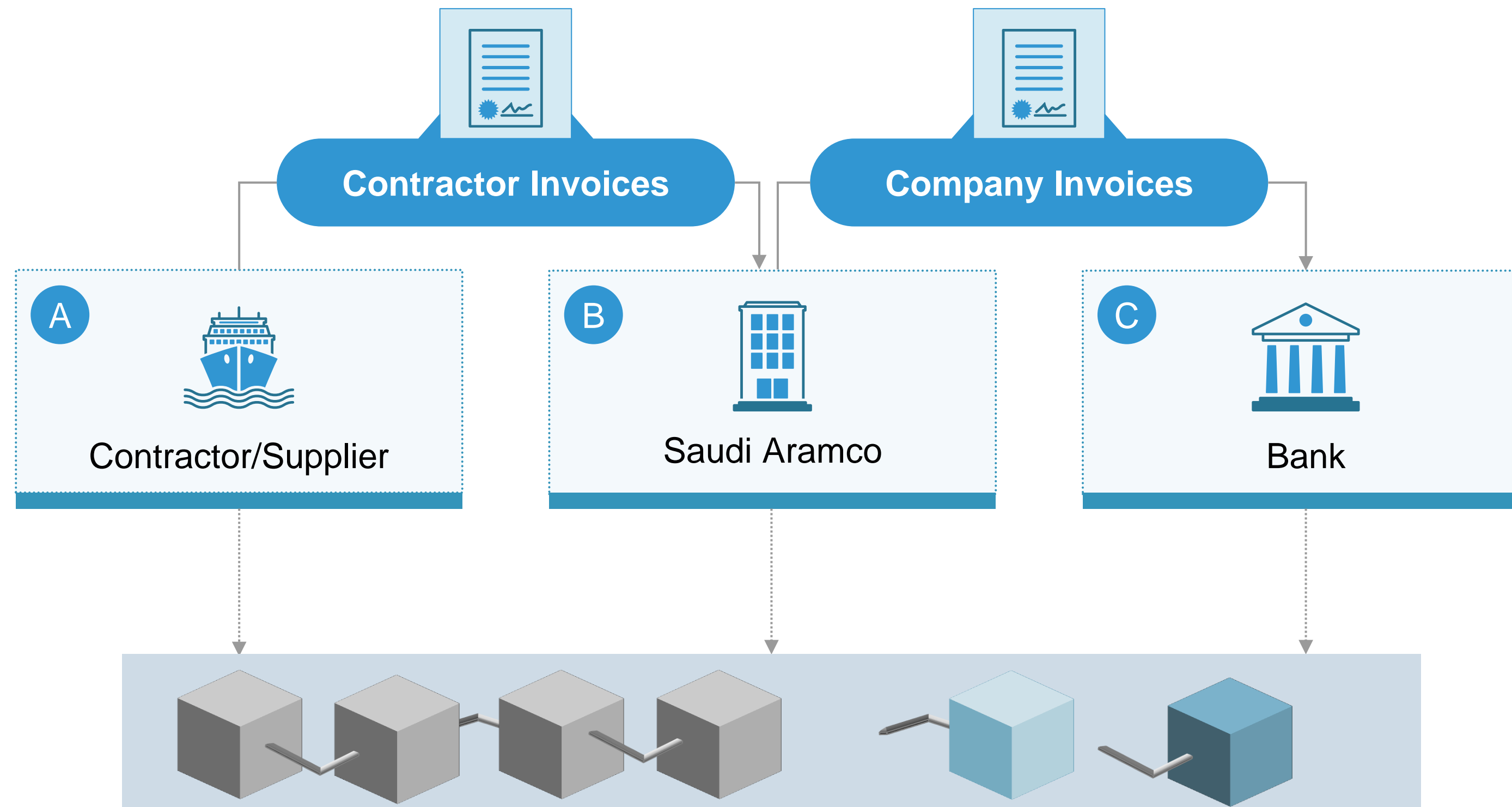
Blockchain overview and applications



Challenges

- Duplicate Records
- Lengthy Processing Time
- Lack of Transparency
- Potential Disputes

Blockchain overview and applications



Benefits

- Unified Transaction Log
- Optimized Processing Time
- Shared & Agreed Records
- Dispute Avoidance

Applications

- Real time supply chain management
- Automated smart contracts

- Increased security as ledgers cannot be tampered
- Transparent record of transactions

- Peer to peer energy trading
- Verifying authenticity of purchased products

Innovating for the Future

Use Case | Trusted Invoice Blockchain



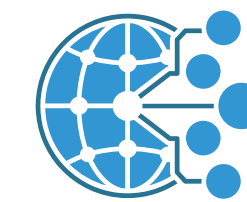
Description

- Invoicing Solution
- Aramco & its many vendors onboarded on the blockchain
- Invoices processed with all entities involved in one platform.
- Invoices recorded on blockchain with 100% visibility



Solution Benefits

- Massive optimization in processing time
- Mitigated Disputes



Industry

- Any B2B business with frequent disputes

Use Case | Hydrocarbon Custody Transfer



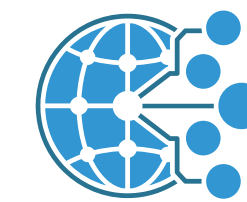
Description

- Automated sensor readings
- Automated system entries
- Aramco & its partners have access to same data in a streamlined process



Solution Benefits

- Processing time optimized by 90%
- Cash flow transparency & payment accuracy
- Mitigated Disputes



Industry

- Supply chain & Logistics
(Traceability & Authenticity)

Use Case | TrueCerts Blockchain



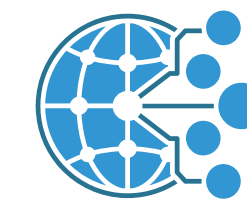
Description

- Increasing number of fraudulent certificates/documents
- Unauthenticated signatures when signed manually
- Lengthy verification times
- Data accuracy issues put people's lives at risk



Solution Benefits

- Blockchain-based credential management
- Automates document verification and ensures authenticity



Industry

- Trusted certificates
- Error-free verification
- Real-time authentication

Use Case | Material Digital Passport



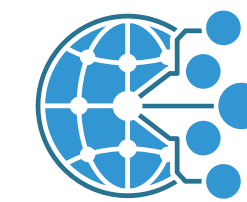
Description

- A large quantity of Materials for Aramco projects are procured through contractors
- There is a requirement for Inspection Department to ensure the quality of materials
- Inspection Department enforces Material Test Certificates from authorized Certificate Issuers
- Ensuring the authenticity of the certificates produced by contractors is a challenge for the Business



Solution Benefits

- Blockchain-based solution enabling Aramco to receive authentic test certificates directly from Issuers' Management
- Onboard business, governance, and external stakeholders into one single system

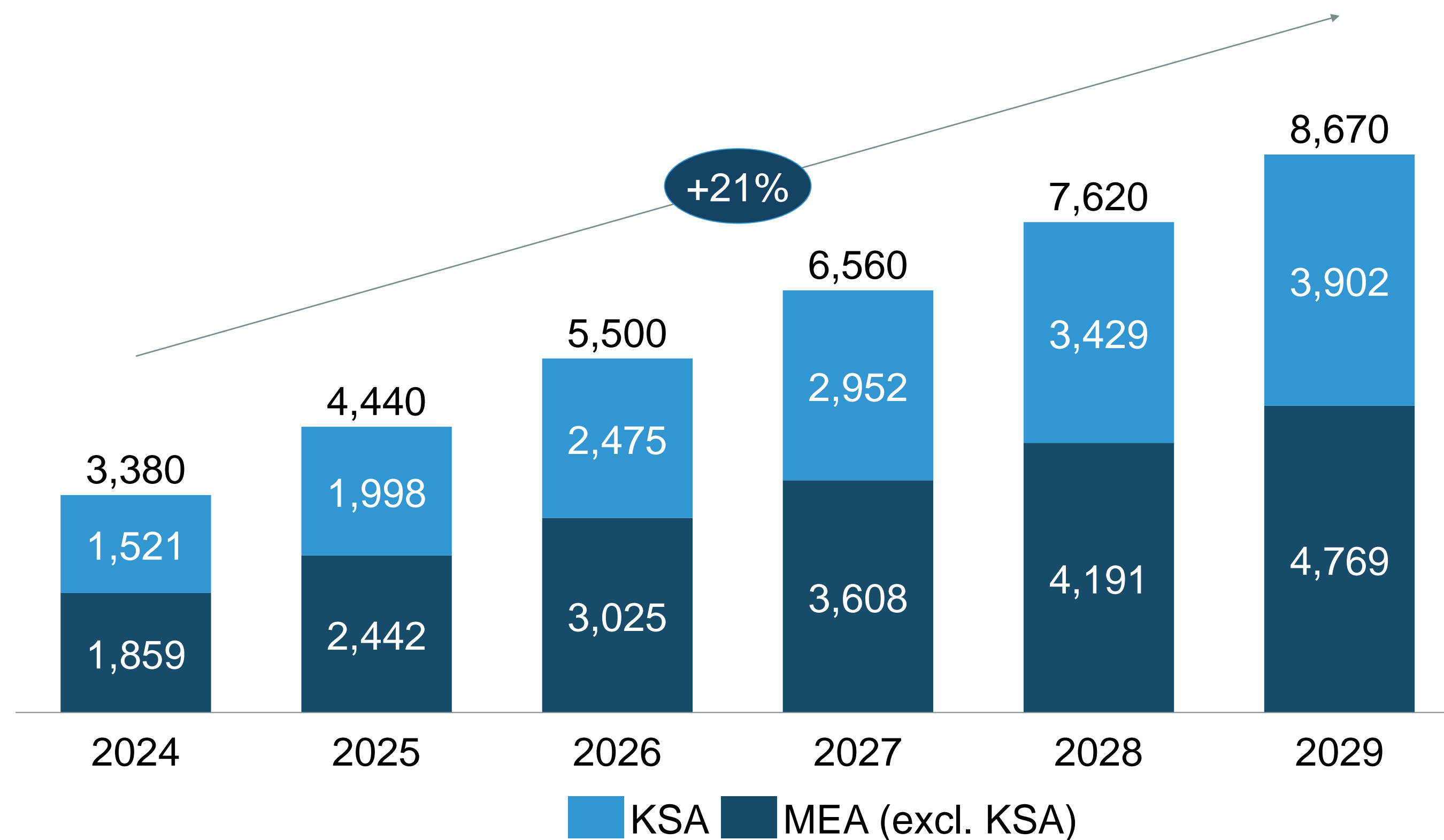


Industry




- Trusted certificates
- Immutability of Material Test
- Certificates Tracking Delivery Status

Blockchain demand, customers, and drivers

Forecasted Middle East and Africa Blockchain market 2024-2029 (\$MM)



Potential customers in KSA

-  Oil & gas players
-  Government and public sector
-  Financial sector

Key KSA demand drivers

- **Consumer industry trends:** Growing interest in decentralized finance (DeFi) and smart contracts with new initiatives such as Project Aber by SAMA in KSA
- **Economic & demographic factors:** KSA aims to foster growth and increase the economic contribution of 4IR to 12% of GDP by 2030

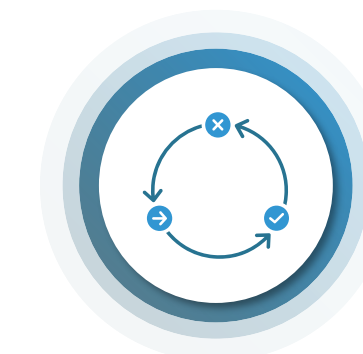
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Notes: \$MM = USD Millions; SAMA = Saudi Central Bank; \$MM = USD Millions
Source: Business Market Insights; Expert interviews; Team analysis

Value chain and key localization opportunities



R&D



Solution Development & Deployment

Local saturation



Few players



Few players

Current KSA value chain



- Conduct R&D for Blockchain services - e.g., supply chain node mapping, smart contract execution

- Establish Blockchain service hub for training, deployment, and support for Blockchain services – e.g., certificate management, material digital passport

Key success factors

Opportunity

Opportunity

Technology



HPC infrastructure equipment available for import

Deployment tools, cloud and edge devices available for import

Labor




Data scientists, software engineers available

Software developers, Blockchain trainers available


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Investment opportunity and enablers


Key enablers in KSA to drive success

 **Financial incentives:** Financing up to 75% of setup costs available through SIDF

 **Tax exempt exports:** Export revenue is not subject to tax

 **Trained workforce:** 1M+ Saudis trained in AI, data science, or Blockchain

Where is the opportunity

 **R&D**
 Conduct R&D for Blockchain services - e.g., supply chain node mapping, smart contract execution

 **Solution Development & Deployment**
 Establish Blockchain service hub for training, deployment, and support for Blockchain services – e.g., certificate management, material digital passport

Robotics and Unmanned Aerial Vehicles (UAV)

*Soliman Walaie, Alaa Benmahfoudh, Khaled
AbuSaleem*

Opportunity profile – Robotics and UAV

1

KSA needing robotics and UAV to meet current industrial expansion

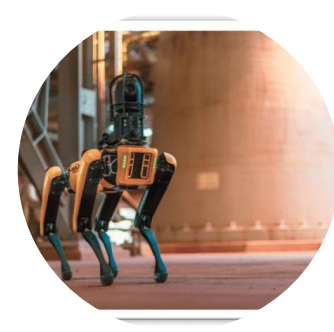
Types



Inspection



Maintenance



Repair

Potential Use Cases

- Inspection of pipelines for corrosion, leaks, and structural integrity
- Assisting geological surveys and pre-drilling site assessment
- Inspection and asset monitoring to minimize downtime
- Surveillance of critical infrastructure

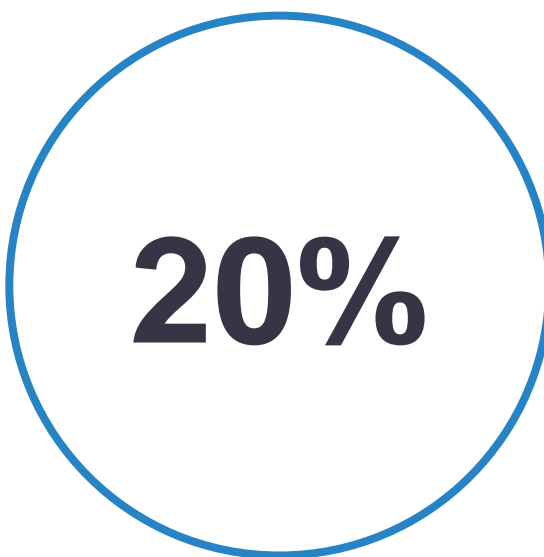
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2

Robotics and UAV market is sizeable with strong forecasted growth



Estimated 2024 KSA market size. \$MM



Forecasted 5-year CAGR

3

Attractive investment opportunities in the value chain

KSA value chain opportunities



R&D



Ecosystem Solution Devt.



OEM Solution Devt.

KSA enablers

- Critical machinery exempt from import duty
- Financing available (Kafalah, Tanafusiya)
- 1M+ AI-trained Saudi nationals
- Tax exempt exports
- Accelerated setup and licensing

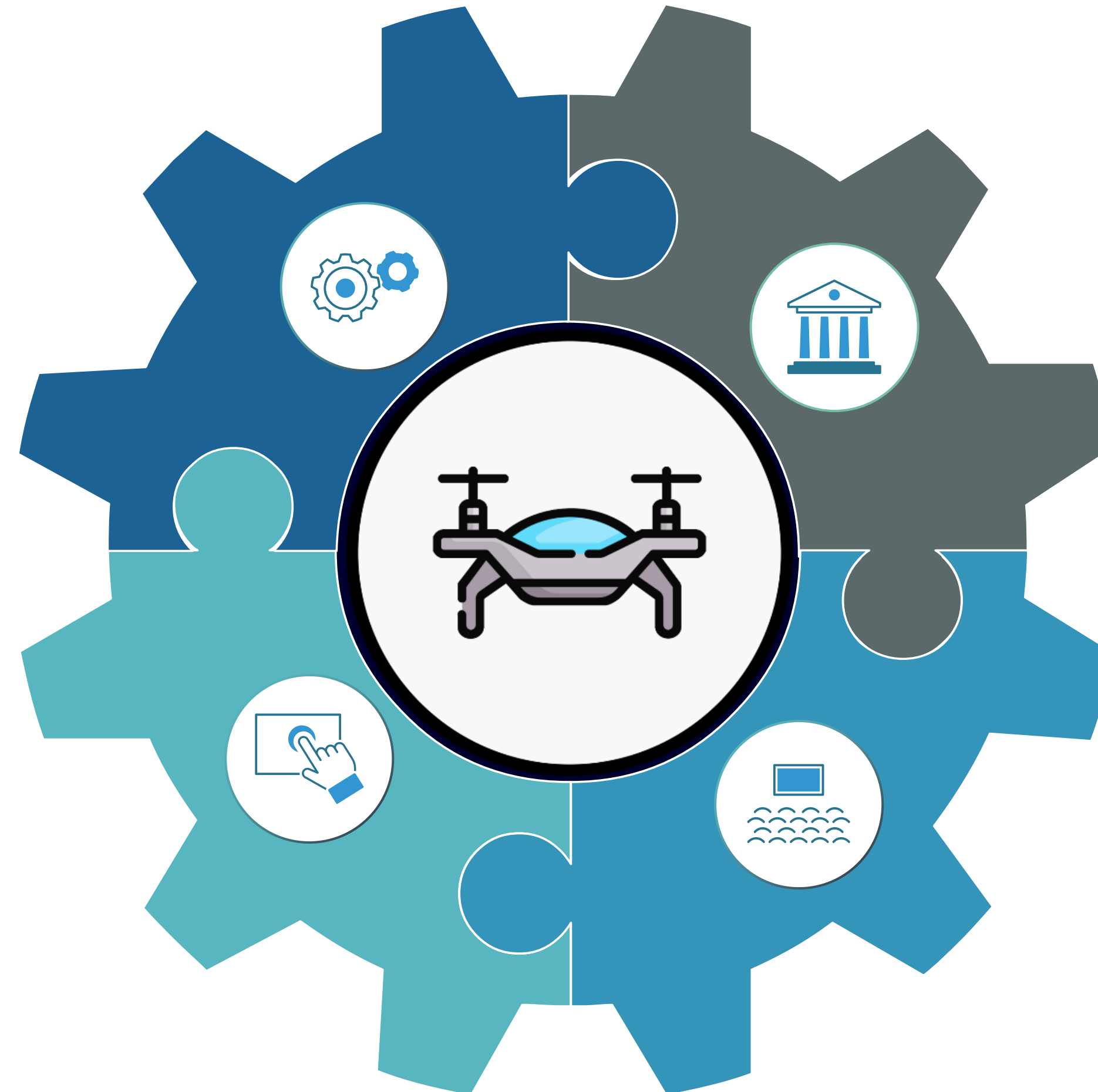
Saudi Aramco Robotics Strategy

Technologies

- NDT Inspection Drones
- VTOL Fixed-Wing Drones
- Gas Emission Survey Drone
- Autonomous Drone-in-a-Box
- Delivery Drone

Digitalization

- BI-51 and DT BI-19
- Onboard AI/ML
- Corporate “Drone-as-a-Service” model



Governance

- UAV & Robotics Standards Committee
- SAEP-80, SACS-039, 34-SAMSS-950
- Blanket Approval (76 sites)
- Corporate Fleet Management Platform

HR & Talents

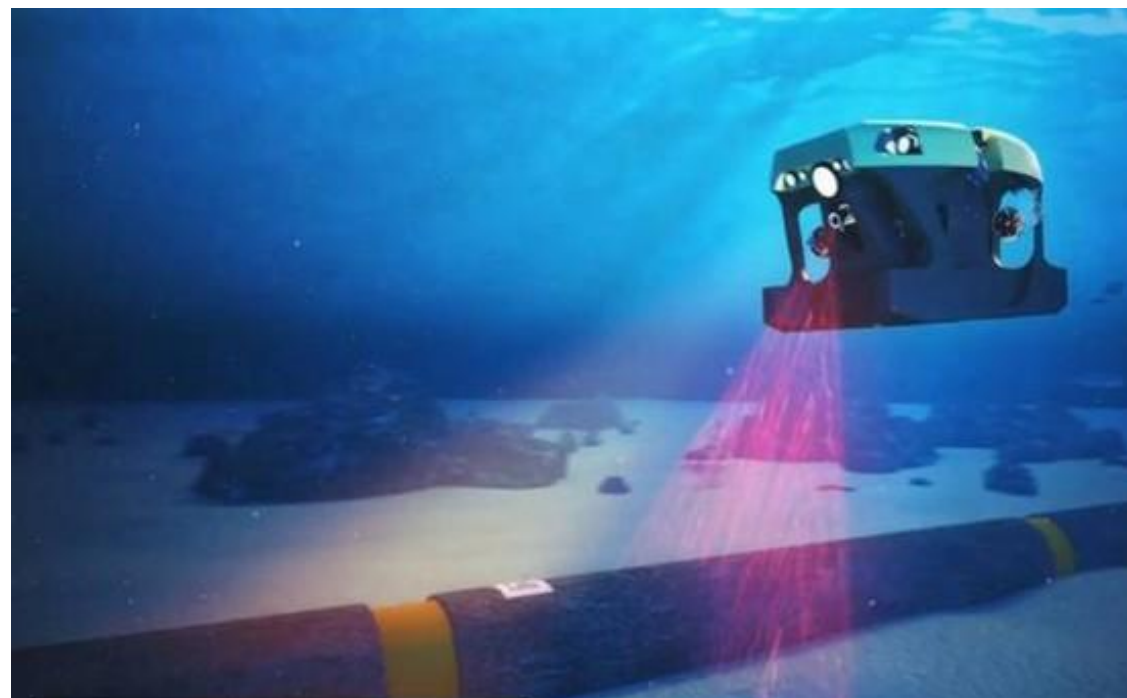
- CMAP
- Training & Certifications
- Patents (4)
- International engagement

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Robotics and UAV localized categories

Non-exhaustive

Inspection



Applications

- Pipeline, tank, flare, and vessel corrosion assessment
- Internal inspections
- Non-destructive testing

Maintenance



- Thermal imaging and photogrammetry-based maintenance
- Non-intrusive operations during active production

Repair



- Weld repair in hazardous zones (e.g., underwater)
- Remote cladding, sealing, and coating
- Treatment spraying

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Note: Aramco material number 6000016532
 Source: Team analysis

Use Case | Inspection, Maintenance, and Repair (IMR)

Challenge

- Maintenance and repair of inaccessible equipment/asset such as underwater assets, storage tanks, boilers, and vessels among the main assets that need to be maintained over time to help ensure a longer service life and a safe environment
- Activities include repair, coating, blasting, sludge cleaning, welding

Status Quo

Conventional Method:

- Manual effort consumes additional time and cost
- Confined space entry
- Health and safety risk and environmental impact

Solution

- Leverage robotic technologies to robotize the welding, coating, blasting, cleaning maintenance activities utilizing autonomous blasting and coating robots working concurrently

Benefits

- Enhance quality of work and asset integrity
- Enhance safety of maintenance operators and fabricators
- Reduce time required for IMR
- Cut costs

Technologies



Users



Use Case | Remote Autonomous Inspection & Surveillance

Challenge

- Offshore and onshore remote unmanned sites imposes risk and cost on operators at remote scattered locations
- Some of the tasks does not require physical existence such as reading gauge

Status Quo

Conventional Method:

- Operation conducts frequent visits to offshore unmanned facilities and remote areas via helicopters, boats, and cars
- Conventional methods require extended patrolling (up to several days)

Solution

- Utilize robotic technologies to automate remote operation for unmanned and offshore facilities

Benefits

- Enhance operational efficiency
- Improve workplace safety
- Eliminate costly patrolling and site visits

Technologies



Users



Use Case | AI for Robotic Technologies

Challenge

- Multiple drone and robotic technologies that conduct routine activities such as security and inspection
- These technologies are yet to be equipped with AI capabilities to carry out the required processing of images and capture inspection or security items which will unleash the technologies' full potential

Status Quo

Conventional Method:

- Experts and SMEs review drones and robotic images and streaming to capture findings related to their functions

Solution

- AI-Powered robots are capable of performing complex tasks such as autonomous navigation, real-time data analysis, and decision making
- These advancements enable robots to efficiently inspect assets and survey sites, identify potential issues, and enhance security and inspection measures

Benefits

- Optimize resource utilization
- Enhance efficiency of inspection and security
- Enable continuous operational up-time
- Cut costs

Technologies

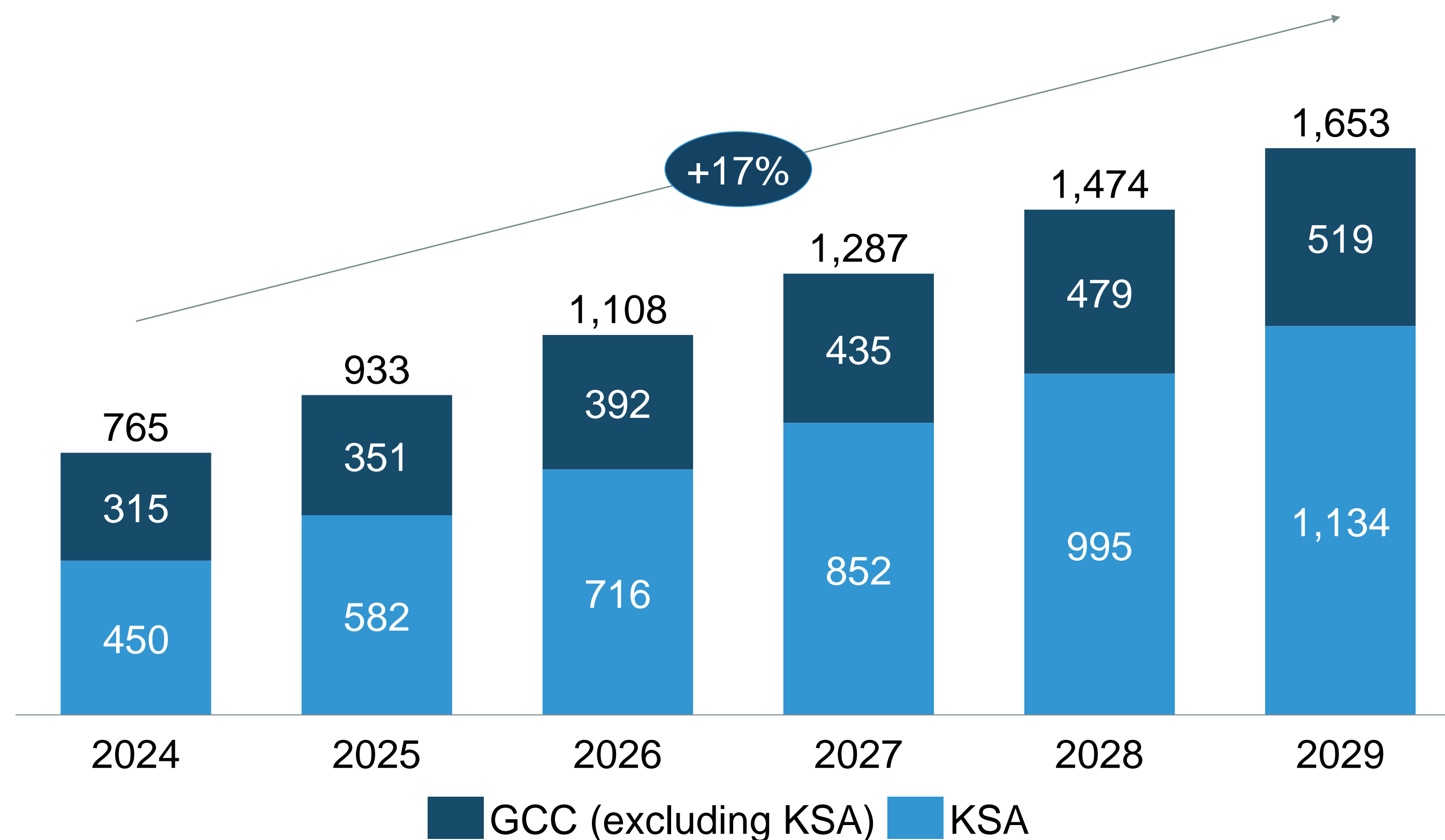


Users



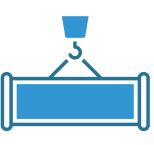


Robotics and UAV demand, customers, and drivers

Forecasted GCC robotics and UAV market 2024-2029 (\$MM)



Typical IIoT customers in KSA

-  Oil & Gas
-  Utilities and power generation
-  Construction and real estate

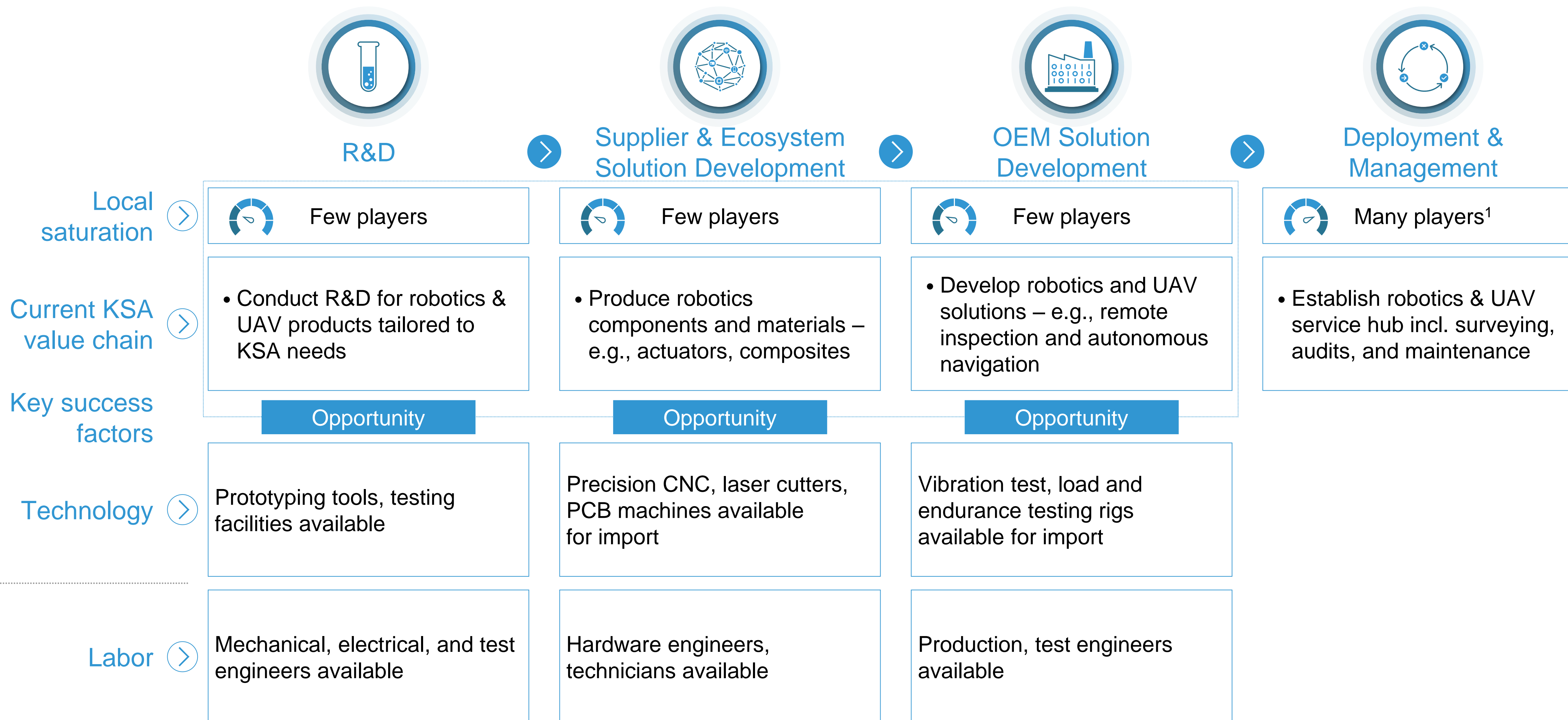
Key KSA demand drivers

- **Infrastructure and Mega Projects:** Large-scale projects like NEOM incorporate advanced robotics and UAVs for construction, maintenance, and operational efficiency
- **Pipeline and remote site inspections:** UAV demand bolstered by need to optimize pipeline and remote facility inspections and reduce logistics burden

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Note: \$MM = USD Millions; UAV = Unmanned Aerial Vehicle
Source: Statista; Expert interviews; Team analysis

Value chain and key localization opportunities



4IR Workshop


Innovating for the Future

1. Several players expanding operations; Note: CNC = Computer Numerical Control; PCB = Printed Circuit Board; IMR = Inspection, Maintenance, and Repair; UAV = Unmanned Aerial Vehicle


Source: Statista; Expert inputs; Team analysis

Investment opportunity and enablers


Key enablers in KSA to drive success

 **Financial incentives:** Financing up to 75% of setup costs available through SIDF

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Where is the opportunity

-  **R&D**
Conduct R&D for robotics & UAV products tailored to KSA needs
-  **Supplier & Ecosystem Solution Development**
Produce robotics components and materials – e.g., actuators, composite materials
-  **OEM Solution Development**
Develop tailored robotics and UAV solutions for large industry players

**Thank
You**