

Inspection Technology

Workshop

Business Opportunities

14th January 2025

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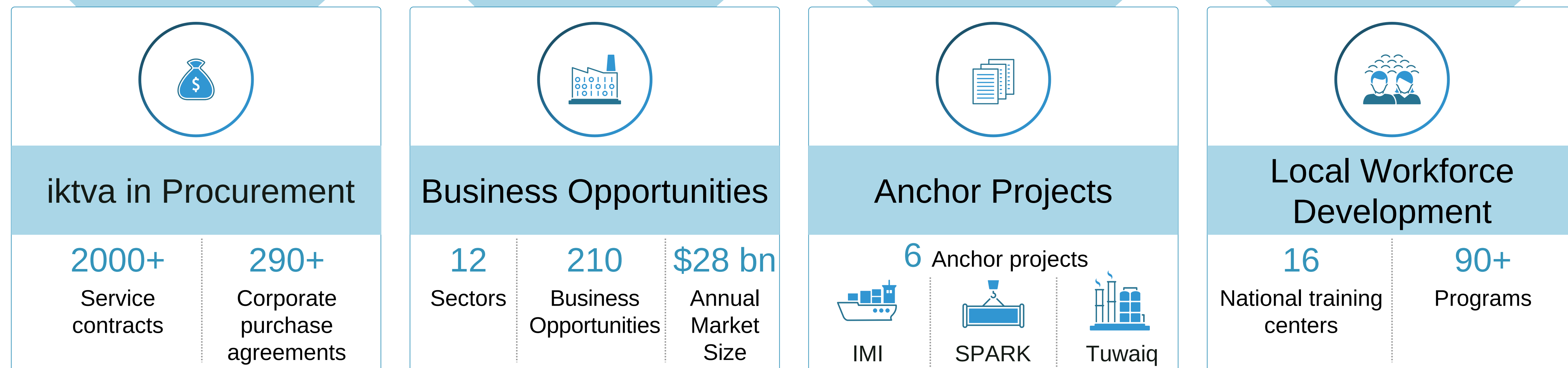
Workshop Agenda

No.	Title of the Investment Opportunity	Presenters
	Opening remarks	Hisham Bin Dayel
1	AI to Inspect Concrete Structures	Zakaria Helal
2	Structural Health Monitoring	Jwana Almarghlani
3	Online Robotic Tank Inspection	Mohammad Almajed
	Closing remarks	Hisham Bin Dayel

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 Business Development Team Support

Government/Semi-government key enablers

Market Analysis

Technical Engagement

Operational Support and Advisory Services¹



Financial Support

Fiscal Incentives

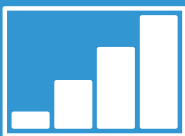
Land Solutions

HR Development

Regulatory Enablers

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
Top 20 economies globally	5 Special Economic Zones drive innovation	\$1.3T+ invested in private sector by 2030	 one of world's most rewarding tax systems	12-15% of global trade passes via Red Sea	17% population growth from 2013-2023
GDP growth among highest projected in 2025 in top economies	6 giga projects driving urbanization and industry	5.7% contribution of FDI to GDP by 2030	Top 5 in the MENA region for ease of doing business	 KSA container ports are among the most efficient globally	67% of population below the age of 35

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

Inspection Technology Market Overview

KSA Inspection Technology



2024 KSA market size for opportunities
in today's workshop

Three opportunities to be discussed today

- 1 AI to Inspect Concrete Structures
- 3 Structural Health Monitoring
- 3 Online Robotic Tank Inspection

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*

AI to Inspect Concrete Structures

Zakaria Helal

Opportunity profile – AI to Inspect Concrete Structures

1

KSA requires concrete inspections to realize industrial expansion

Key supporting elements



Image Capture
Mechanisms



Computer Vision
Processing
Platforms

2

AI solutions will replace traditional Concrete Structure Inspection market

183

Estimated 2024 KSA market size. \$MM

10%

Forecasted 5-year CAGR

3

Attractive investment opportunities for the AI Inspection value chain

KSA value chain opportunities



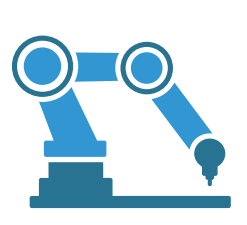
R&D



Ecosystem
Mfg.



OEM Mfg.



Solution
Delivery

KSA enablers

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

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Note: \$MM = USD Milloins; Market equal to forecasted KSA concrete inspection market
Source: PS Intelligence; Mordor Intelligence; Press releases; Team analysis

AI to Inspect Concrete Structures supporting elements

Image capture mechanisms



- High resolution cameras or multispectral imaging systems
- Can be handheld or through use of robotic devices / UAVs

Computer vision processing platforms



- Platforms that process images to detect cracks
- Provide predictive maintenance requirements

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Note: UAV = Unmanned Aerial Vehicle
Source: PS Intelligence; Mordor Intelligence; Press releases; Team analysis

Use Case | Large-scale industrial and residential concrete inspection



Overview

Utilize handheld capture, robotic devices, and UAVs to capture data on concrete structures in industrial and large residential facilities – utilize AI-driven software to identify and define severity for defects to be analyzed by engineers

Added Value

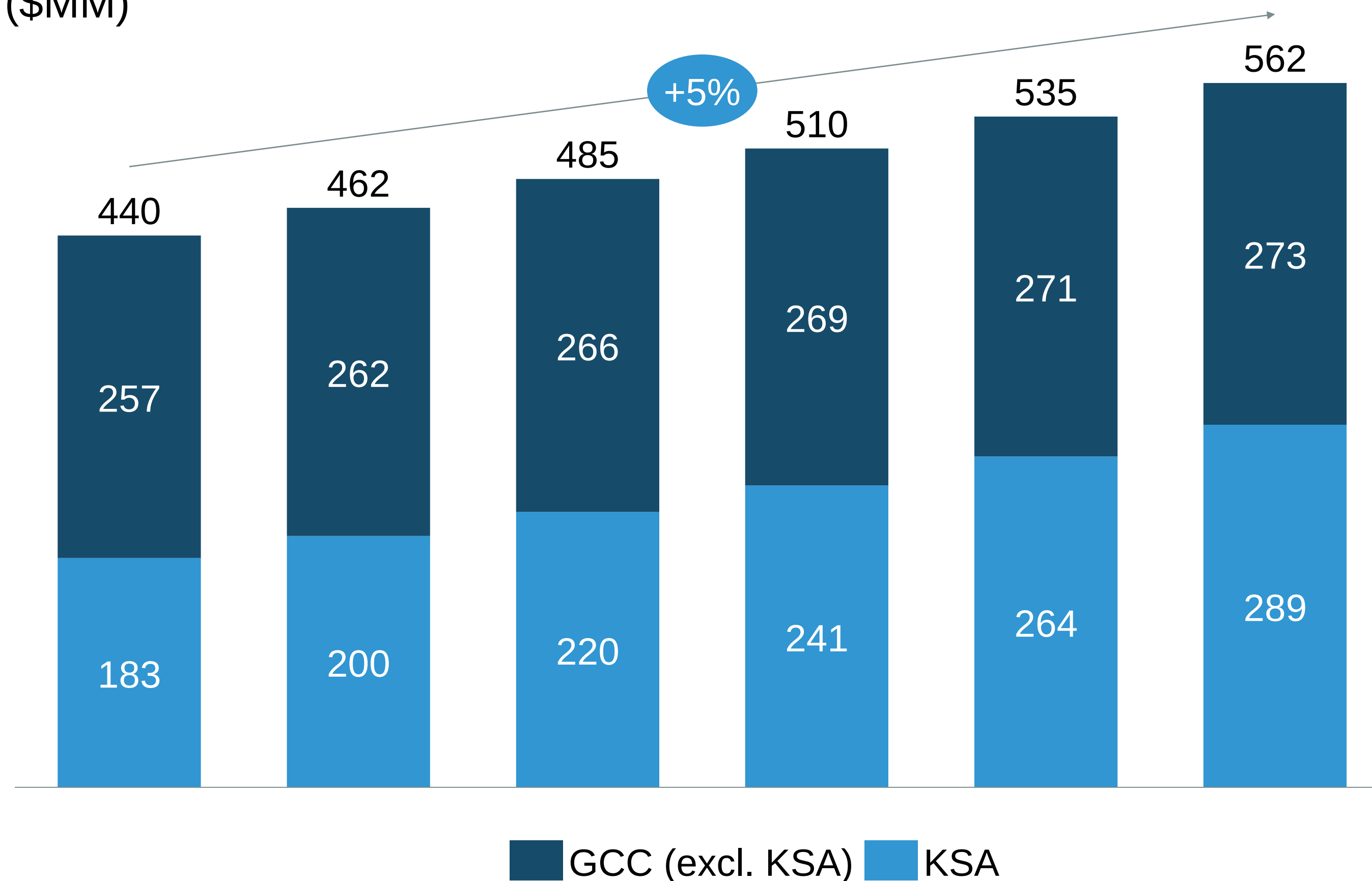
- Reduce time and cost for longer inspections
- Increase and improve pre-emptive maintenance

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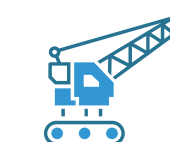
Note: UAV = Unmanned Aerial Vehicle
Source: PS Intelligence; Mordor Intelligence; Press releases; Team analysis

AI inspection concrete structures demand, customers, and drivers

Forecasted GCC AI to inspect concrete structures market '24-'29 (\$MM)



Potential customers in KSA



Construction



Oil & gas



Power & utilities

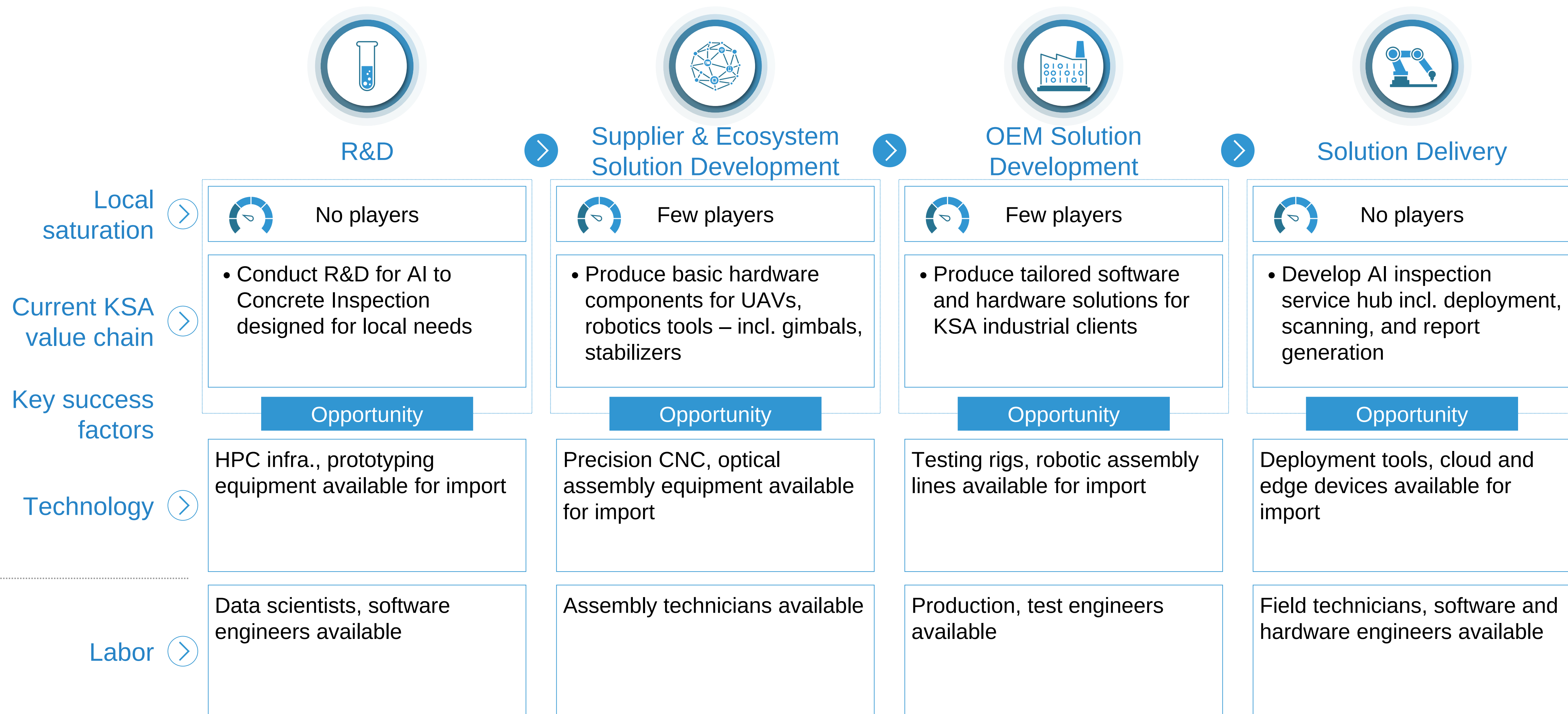
Key KSA demand drivers

- **Concrete market growth:** Need for concrete inspections driven by growing use of concrete for construction to accommodate megaprojects and industrial growth
- **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; Market equal to forecasted KSA concrete inspection market
Source: Zawya; PS Intelligence; Mordor Intelligence; Press releases; Team analysis

Value chain and key localization opportunities



Structural Health Monitoring

Jwana Almarghlani

Opportunity profile – Structural Health Monitoring (SHM)

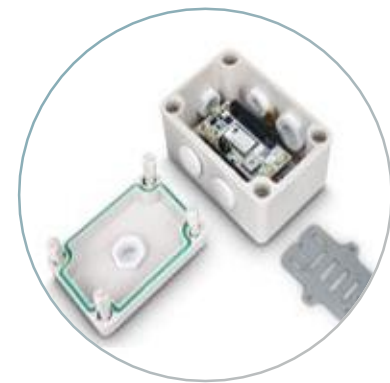
1

KSA requires SHM to maintain growing infrastructure base

Key categories of devices



Acoustic
Emission
Sensors (AE)



Sensor Nodes



Control Unit



Accelerometer



Smart Gateway
Unit

2

SHM is a growing market, KSA has largest regional share

120

Estimated 2024 KSA
market size. \$MM

18%

Forecasted 5-year
CAGR

3

Attractive investment opportunities for the SHM value chain

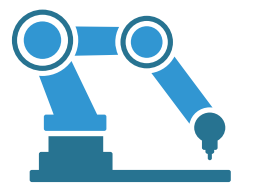
KSA value chain opportunities



R&D



OEM Mfg.



Solution
Delivery

KSA enablers

- Critical machinery exempt from import duty
- Financing available (Kafalah, Tanafusiya)
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- Accelerated setup and licensing

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Note: \$MM = USD Millions

Source: Grandview Research; Databridge; Press releases; Team analysis

Structural Health Monitoring key device categories

Acoustic Emissions Sensor (AE)



- Detect high frequency stress waves emitted by defects
- Provide warnings

Sensor Nodes



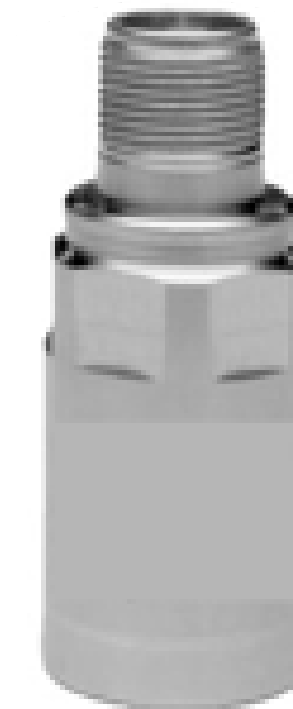
- Localized data collection points
- Transmits sensor data for processing

Control Units



- Central processing hub
- Analyzes sensor inputs to warn or act on set rules

Accelerometer



- Measure vibration and dynamic forces
- Identify potential structural stress

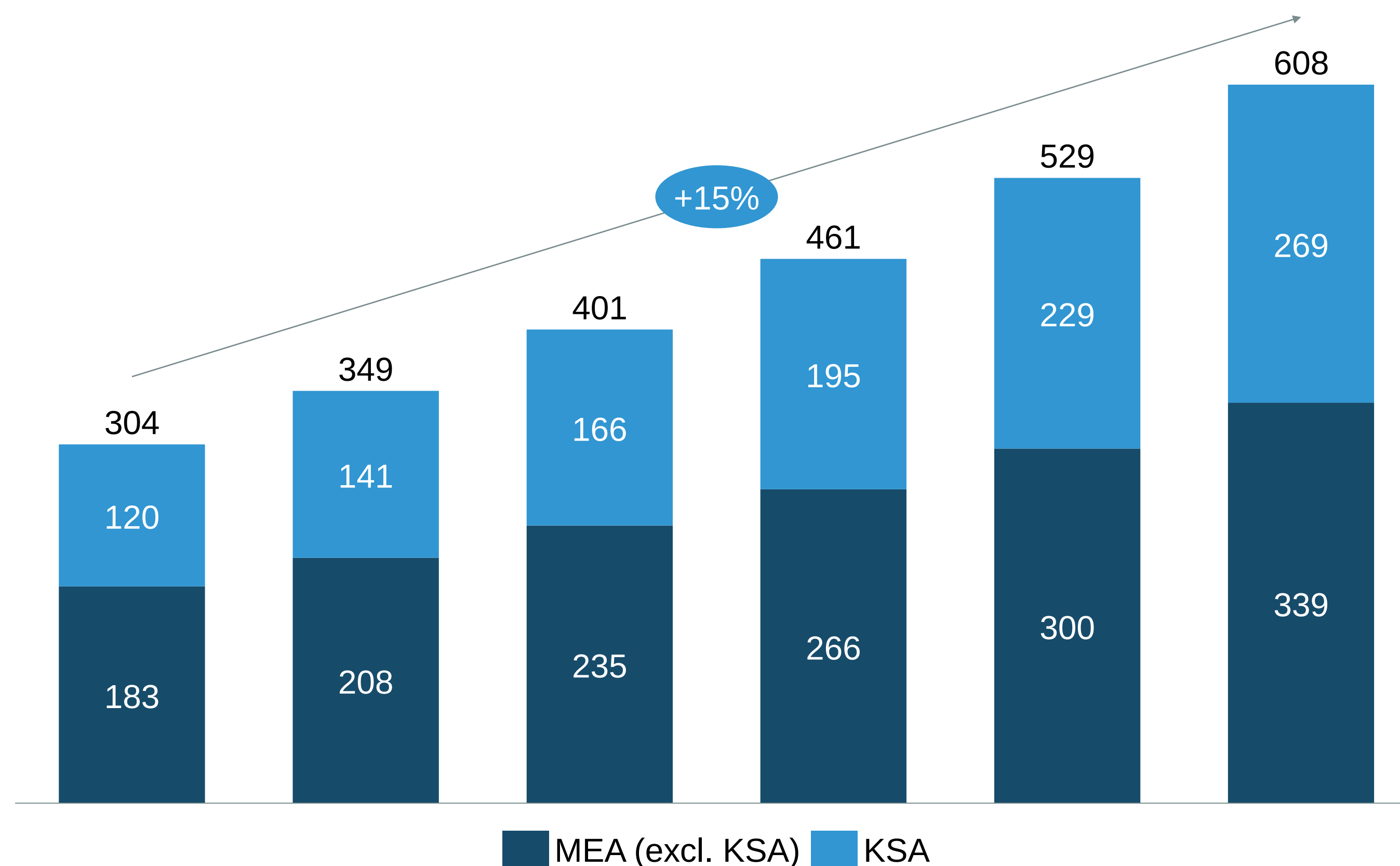
Smart Gateway Unit



- Facilitate communication between sensor networks and cloud

Structural Health Monitoring demand, customers, and drivers

Forecasted MEA Structural Health Monitoring market '24-'29 (\$MM)



Potential customers in KSA



Real estate



Oil & gas



Power & utilities

Key KSA demand drivers

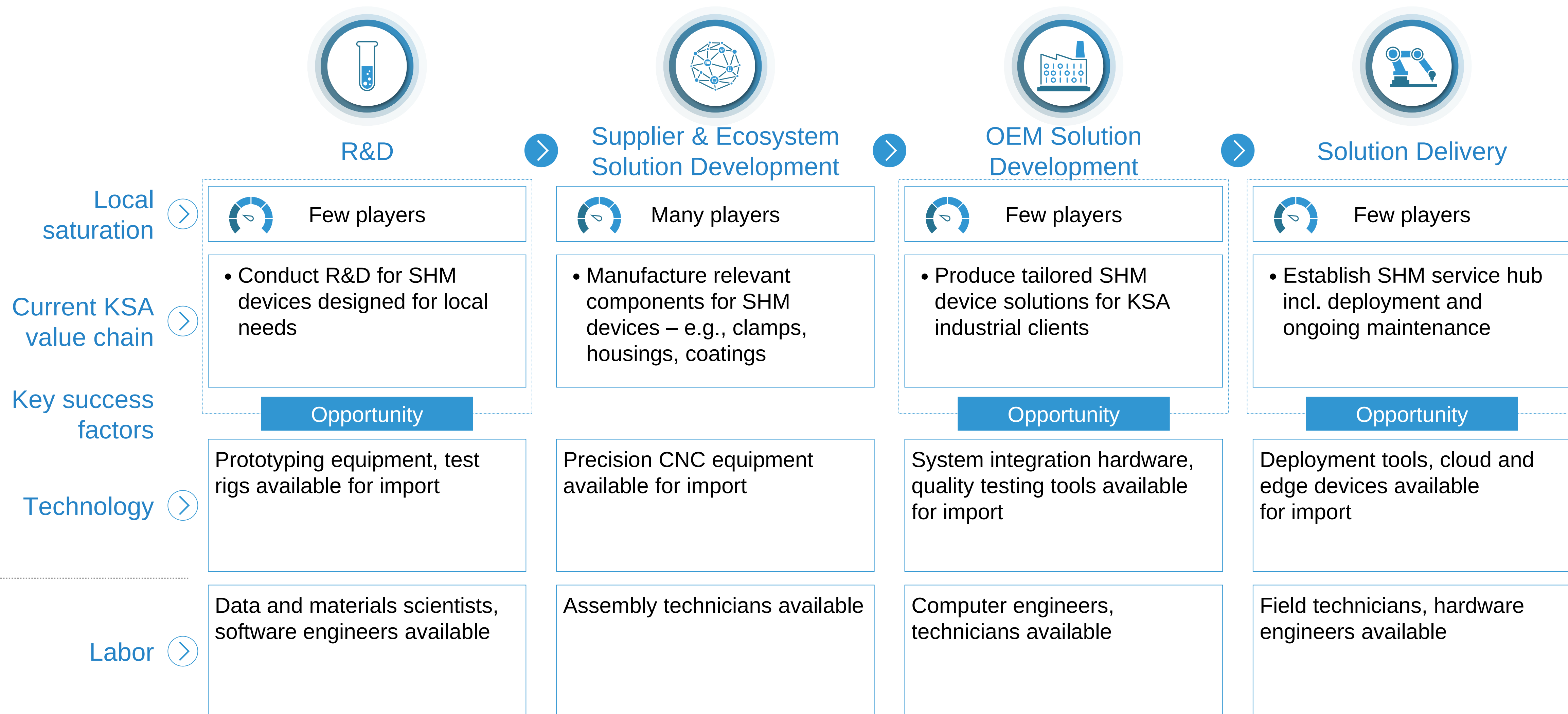
- **Infrastructure development:** Need for SHM bolstered by infrastructure under development for megaprojects and other large developments under Vision 2030
- **Rising digital adoption:** Increase in demand for SHM through increasing push towards industrial digital adoption in KSA

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Note: \$MM = USD Millions

Source: Grandview Research; Databridge; SIDF; Press releases; Team analysis

Value chain and key localization opportunities



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Investment opportunity and enablers

Key enablers in KSA to drive success

 **Financial enablers:** SIDF working capital and CAPEX loans for specialized equipment procurement and facility setup

 **Trained workforce:** ITQAN Institute provides workforce skilled in inspections principles

 **Skilled visa processing:** MHRSD facilitates hiring expatriates with AI development expertise through streamlined visa processes

Where is the opportunity

 **R&D**
Conduct R&D for SHM devices designed for local needs

 **OEM Manufacturing**
Produce tailored SHM device solutions for KSA industrial clients

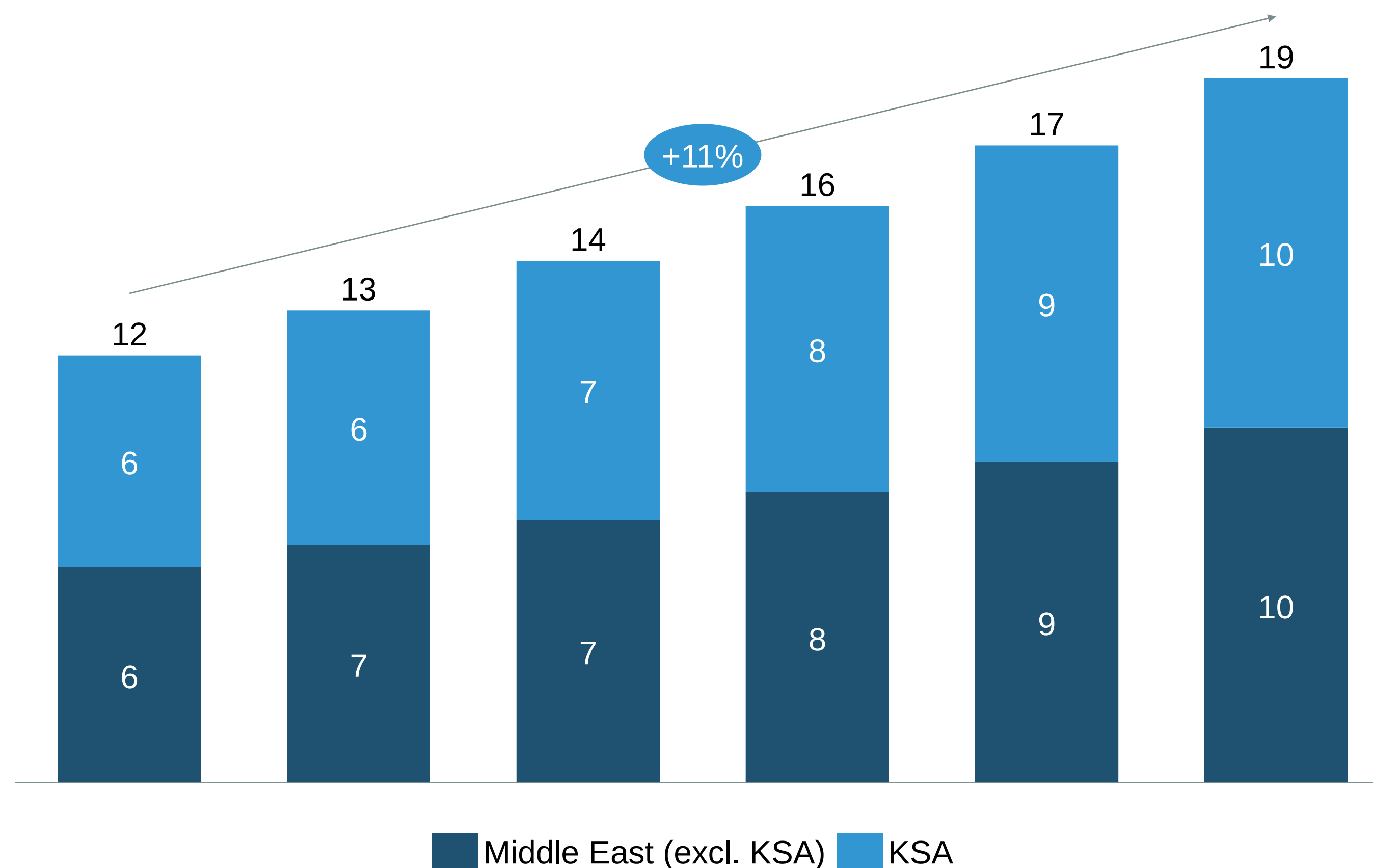
 **Lifecycle management**
Establish SHM service hub incl. deployment and ongoing maintenance

Online Robotic Tank Inspection

Mohammad A. Almajed

Online Robotic Tank Inspection demand, customers, and drivers

Forecasted Middle East Tank Inspection market '24-'29 (\$MM)



Potential customers in KSA



Real estate



Power & utilities

Key KSA demand drivers

- **Downstream infra. expansion:** Need for ORTI bolstered by downstream infrastructure expansion yielding additional use of hydrocarbon tanks with growing petrochemical sector
- **Industrial city-driven storage growth:** Increase in ORTI due to additional storage infrastructure build-up of tanks at Oxagon in NEOM, SPARK

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Note: \$MM = USD Millions

Source: Business Research Insights; Tank Terminals; NGHC; Zawya; Press releases; Team analysis

Online Robotic Tank Inspection key required elements

Robotic Crawlers



- Enter tank and carry all relevant sensing eqt.
- Collect and store data for analysis

Onboard Electronics



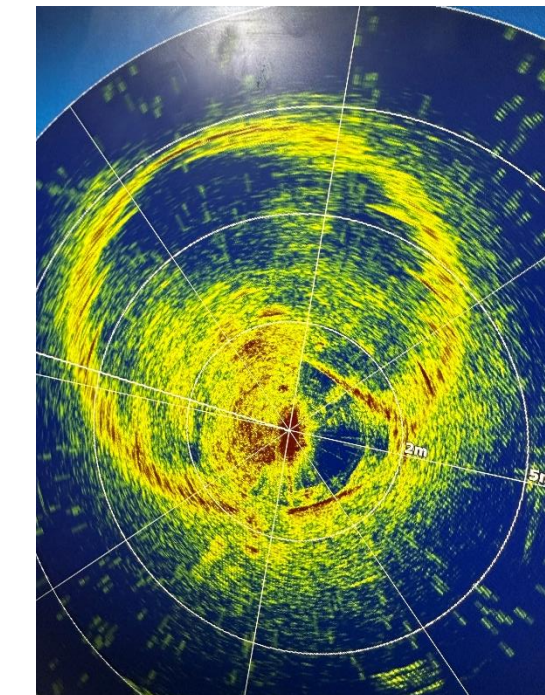
- For motor & inspection system power connection

Rubber track wheels



- Stability and smooth movement for the robot during inspections

Sonar system



- Acts as a navigation system inside the tank

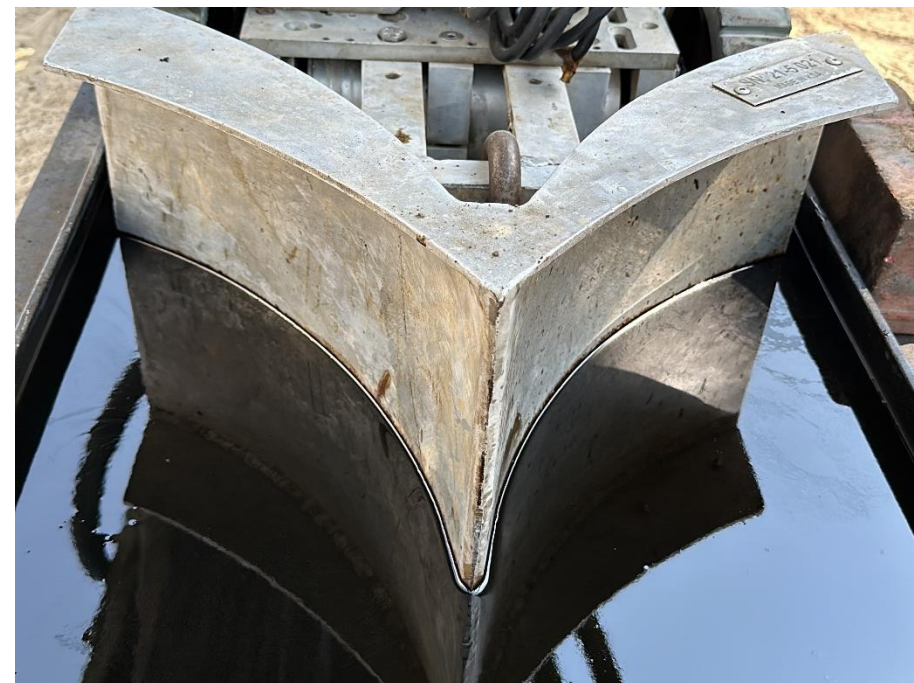
Electrical motors



- Drives the movement and operation of the robotic system inside the tank

Online Robotic Tank Inspection key required elements

Rubber scraper



- Removes debris and ensures clear paths for accurate inspection

High-Resolution (HR) cameras



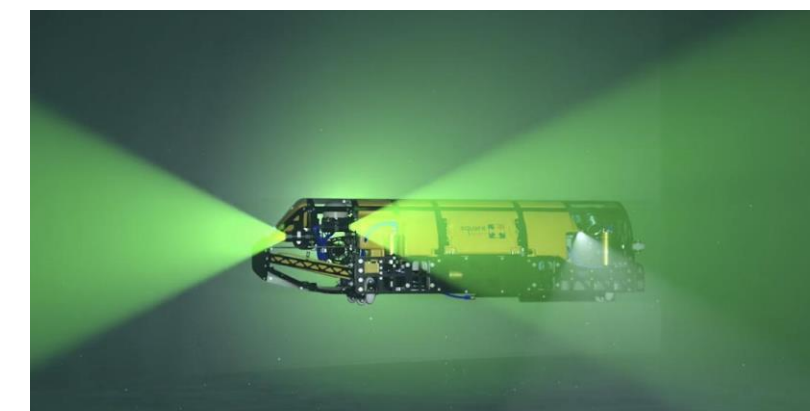
- For visual inspection while moving inside the tank

NDT sensing devices



- i.e. ultrasonic (UT) & Magnetic Flux Leakage (MFL) sensors

Pressure switch



- Ensures safe operation by monitoring the pressure

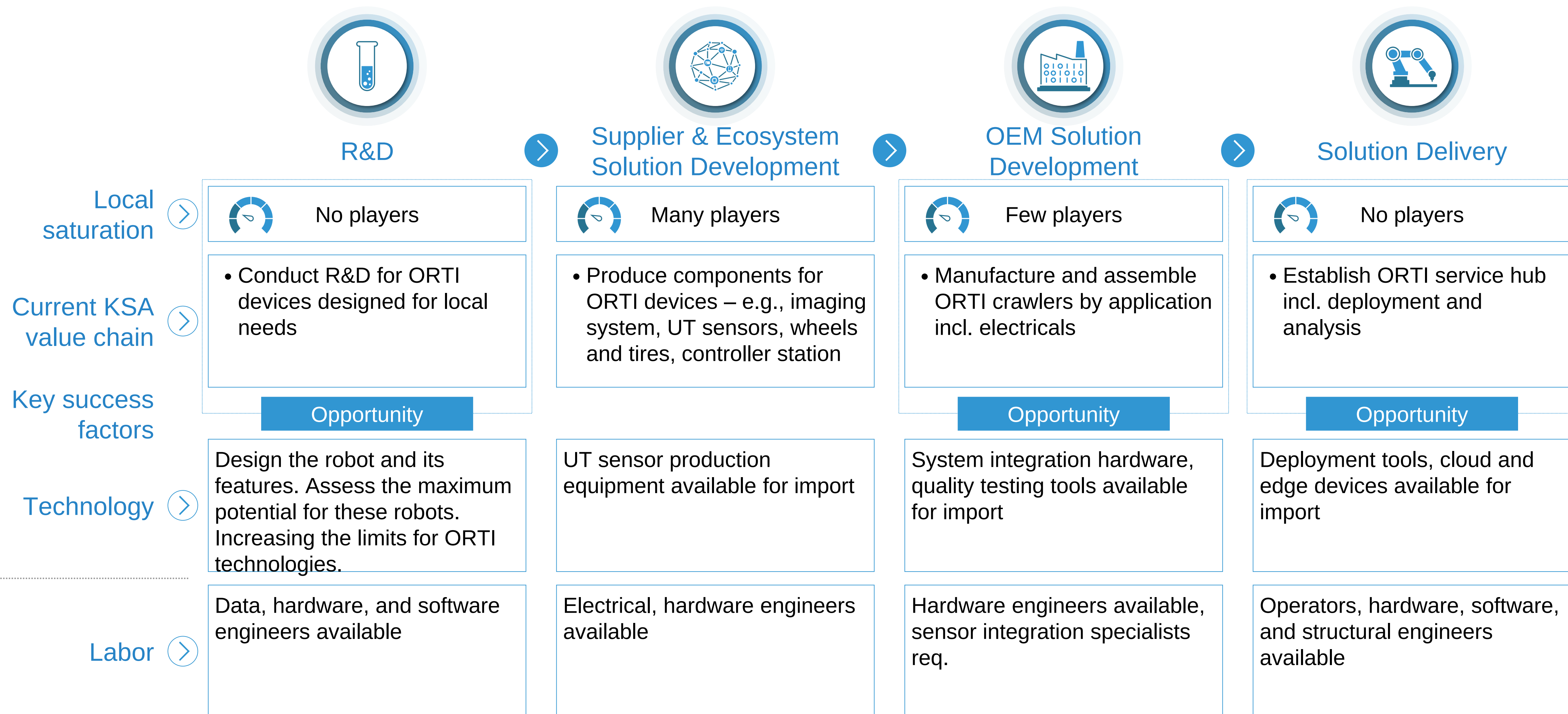
Umbilical cable



- Supplies power, control, communication, and data transfer between the robot and the control unit

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Value chain and key localization opportunities



Investment opportunity and enablers

Key enablers in KSA to drive success



Financial enablers: SIDF working capital and CAPEX loans for specialized equipment procurement and facility setup



Corporate tax incentives: Tax exemptions on earning from exports, beneficial to KSA-manufactured ORTI devices



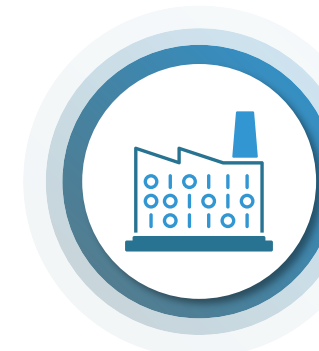
Streamlined setup: MISA provides accelerated licensing and business set-up support

Where is the opportunity



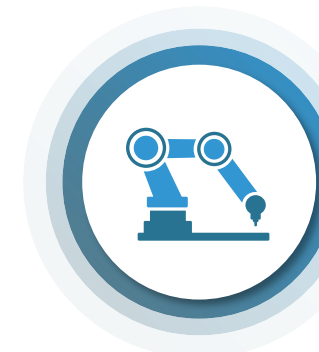
R&D

Conduct R&D for ORTI devices designed for local needs



OEM Solution Development

Manufacture and assemble ORTI crawlers by application incl. electricals



Solution Delivery

Establish ORTI service hub incl. deployment and analysis

Please direct Business Opportunities inquiries below:



We invite you to engage with us and send us your Expression of Interest by scanning the QR code or visiting:

Website: <https://iktva.sa/english/opportunities/opportunity-submission-form>

Email: local-content@Aramco.com

**Thank
You**