



*Opportunities for Swiss Investors in
AI, Robotics and Advance
Manufacturing*

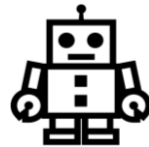
Robotics and India

Density of Robots in India as compared to developed nations

AI can add USD 957 Bn (or 15% of current gross value added) to the Indian economy by 2035

USA

189 Robots

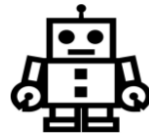


Every 10K Workers



China

68 Robots

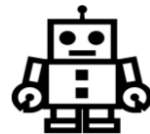


Every 10K Workers



India

3 Robots

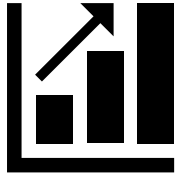


Every 10K Workers



- Robots in healthcare used for operations requiring greater precision
- India has one of the lowest doctor to patient ratio and bringing healthcare to large set of population can only be done through technology
- Robots in automotive limited to assembling and screw tightening
- Robots in banking are being used to sort, distribute and count notes
- In Electronics industry, function of robots is limited to sorting, picking and placing objects

Robotics and India



The Indian market for industrial robots is expected to double over the next three to four years, driven by country's automotive, electronics and white goods sectors



Indian Industrial Robotics market was evaluated at 4,564 units in 2018, up by 33% from 3,412 in 2017 and is expected to grow at a CAGR of 13.3% from 2019-2024



Owing to the massive potential of robotics in warehousing, the Indian market for warehouse automation is projected to grow at a CAGR of 10-12% and is expected to reach USD 3.5 Bn by 2020

Case Study



- ✓ **ABB** set up a **Robotics Application Centre** for Body-In-White (BIW) Systems (Body Shop Systems) in Bangalore in March 2018
- ✓ **ABB** India has also put state of Telangana on its investment map and has **earmarked a USD 100 million capex** every year for the coming years

Top Robotics Start-ups in India



ASIMOV Robotics

Provides engineering products solutions and consultancy in the areas like robotic simulation and control, machine-vision, training, virtual reality, and navigation applications.



Gridbots

A technology firm in the field of Robotics - Artificial Intelligence and Machine Vision. Develops systems used in the industry for defect detection, dimension measurement, sorting applications and grading application.



DiFACTO Robotics & Automation

Offers turnkey industrial automation systems and solutions.: Robot Simulation and Off-Line Programming, Onsite Robot Programming, Robot Calibration, Design and Consultancy, Line Shifting and Used Robot Commissioning.



Systemantics

Flagship product ASYSTR 600 is a 6-Axis industrial robot capable of handling applications such as CNC Machine tending, handling operations, inspection, and dispensing.



Grey Orange

Designs, manufactures and deploys advanced robotics systems for automation at distribution and fulfillment centers. A pioneer in warehouse automation.



Sastra Robotics

Sastra Robotics builds and delivers Robotic solutions for human-like automated functional testing of real physical devices. Caters to automotive, aviation and electronics industry.

State of AI in the Indian Healthcare Industry

Indian Healthcare sector is expected to grow to USD 280 Bn by 2021 at a CAGR of 16% from ~USD 100 Bn in 2017 The use of AI in Indian Healthcare Industry can be categorized into the following broad categories:

Descriptive (Insight into Past)

Descriptive AI is the most widely used in healthcare technology. It quantifies events that have already occurred and uses this data to gain further insights, such as detecting trends and minor changes that may otherwise escape detection by medical professionals

Descriptive analytics are useful because they allow us to learn from past behaviors and understand how they might influence future outcomes.

For instance, such technology can be used to identify patterns in fracture detections and skin lesions

Predictive (Understanding the Future)

Predictive AI uses descriptive data to attempt to make predictions about the future. Used by medical professionals to provide insights and suggest actions in a predictive manner. Some illustrative cases which would improve efficiencies are:

- ✓ By training modules on larger data sets, which can then detect and identify positive cases early, and have proven to be more effective at disease identification
- ✓ By analysing heart rates like ECG and predicting heart attacks

Prescriptive (Advise on possible outcomes)

Prescriptive AI furthers the purpose of predictive AI, and not only detects trends that may not be predicted by humans, but also suggests possible treatments based on nuances in the diagnosis.

This decision-making ability makes prescriptive AI the most interesting and the most controversial use case.

At their best, prescriptive analytics predicts not only what will happen, but also why it will happen, providing recommendations regarding actions that will take advantage of the predictions

Gaps in Indian Healthcare AI

Cancer Screening

India sees an incidence of more than 1 million new cases of cancer every year, a number that is likely to increase given the increasing age of Indian population and lifestyle changes.

For that number, India has barely 2,000 pathologists experienced in oncology, and less than 500 pathologists who could be considered an expert oncopathologist.

Early detection and management can be crucial in an optimum cancer treatment regimen across the country. Machine learning solutions aimed at assisting a general pathologist in making quality diagnosis can very well plug this gap in providing essential healthcare.

Imaging Biobank for Cancer

Human cancers exhibit strong phenotypic differences that may be visualised noninvasively by expert radiologists (using imaging modalities).

AI based Radiomics is an emerging field that refers to the comprehensive quantification of tumor phenotypes by applying a large number of quantitative imaging features. It has resulted in improvement to existing biomarker signature panels by adding imaging features.

This provides an opportunity to use AI to improve decision-support in cancer treatment at low cost especially in country like India.

AI Opportunity Landscape in Indian Agriculture

AI in agriculture was valued at USD 430 million in 2016 and is expected to grow at the rate of 22.5% CAGR to be valued at USD 2.6 billion by 2025

Current Scenario

Agrarian Distress

Agriculture accounts for 49% of India's workforce, 16% of the country's GDP. This sector suffers from poor resource utilization, has weak supply chain and low productivity

Water Overuse

The practice of growing water intensive crops, and inefficient water management put irreversible pressure on limited water resources

Opportunities

01 AI Based Crop Selection Solutions

- AI-based solutions are ideal for crop selection as they can take complex parameters like soil type, monsoon dates, water use / availability etc. into account along with historical data while choosing the crops

02 Crop Monitoring

- Using technologies like IoT, drones, satellite imaging, etc. authentic data can be collected from the fields, monitored and analyzed by AI-based applications to identify the right solutions

AI Opportunity in Education

Indian education industry was valued at USD 92 Bn in 2018 and the country has become the second largest market for online education after US and is expected to reach USD 2 Bn by 2021 with over 9.5 million users from USD 250 million in 2017



Potential AI Applications in Supplementing Pedagogy



- ✓ Adaptive learning tools for customized learning
- ✓ Intelligent and interactive tutoring systems
- ✓ Predictive tools to inform pre-emptive action for students predicted to drop out of school
- ✓ Automated rationalization of teachers
- ✓ Customized professional development courses

Key Facts

For 218 million students India has only two million teachers; a ratio of 140:1

More than two million students are already paying online for education, and this is expected to reach 10 million by 2021

Large teacher vacancies due to uneven distribution. For instance, elementary schools in Uttar Pradesh reported 174,000 teacher vacancies, but a simultaneous surplus of 66,000 teachers across the state

AI in Service Sector (Banking, Tourism, Hospitality)

Banking

- ✓ India's digital lending stood at US\$ 75 billion in FY18
- ✓ Estimated to reach US\$ 1 trillion by FY2023

Tourism and Hospitality

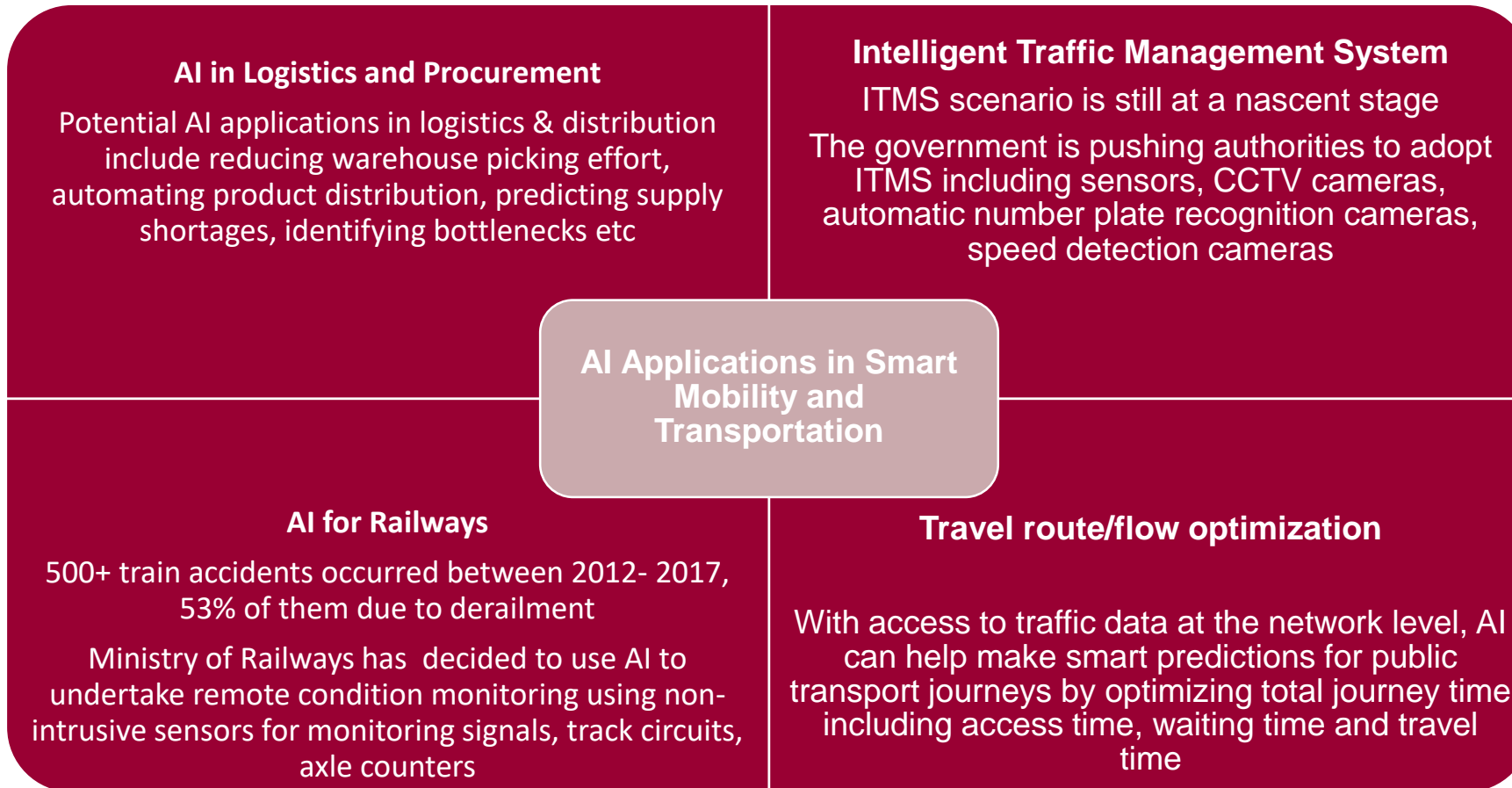
- ✓ The sector is predicted to grow at an annual rate of 6.9% to USD 460 billion by 2028 which is ~10% of GDP
- ✓ USD 25.2 billion foreign exchange earnings during 2017-18 (growth of 17% year-on-year)

AI Opportunities

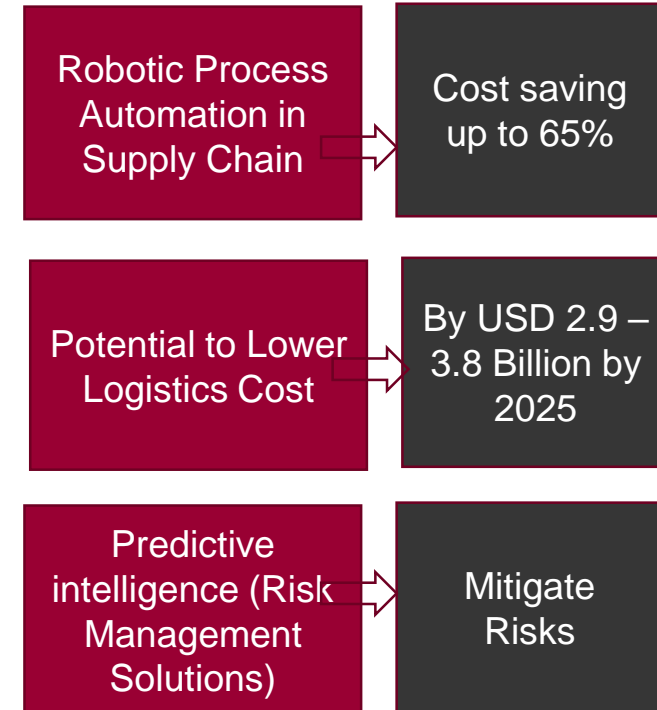
<p>Credit Assessment</p>	<p>Portfolio Management</p>
<p>Banking Customer Services</p>	<p>Fraud and Risk Management</p>

<p>Context Specific Personalized Services</p>	<p>Operations Management</p>
<p>Lodging Services</p>	<p>Virtual Assistant: Chatbots</p>
<p>Tailor-made Suggestions for Travellers</p>	<p>Hotel Staff Assistance</p>

AI in Traffic, Transport and Logistics

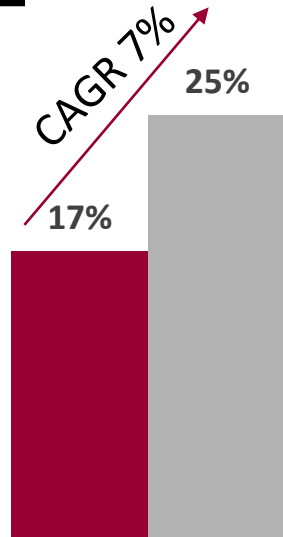


Potential Benefits



Advance Manufacturing and India

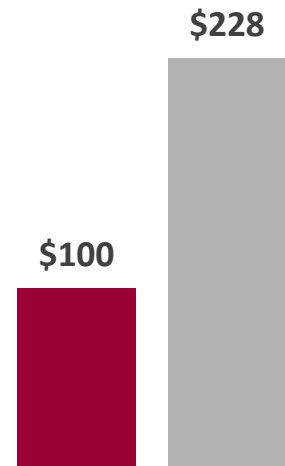
Growth Opportunity



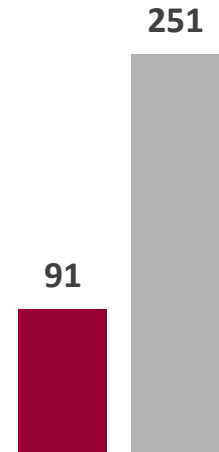
Manufacturing to GDP (%)
■ FY2017 ■ FY2022



Market Growth (Advance Manufacturing) - Electronics & Automobiles



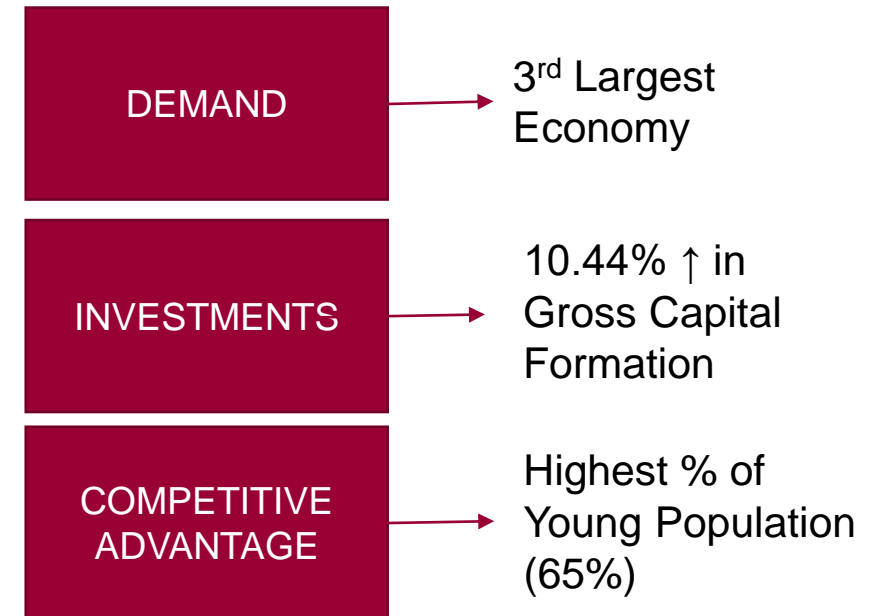
Electronics Market Size (USD billions)
■ FY2017 ■ FY2022



Automobiles Market Size (USD billions)
■ FY2017 ■ FY2026

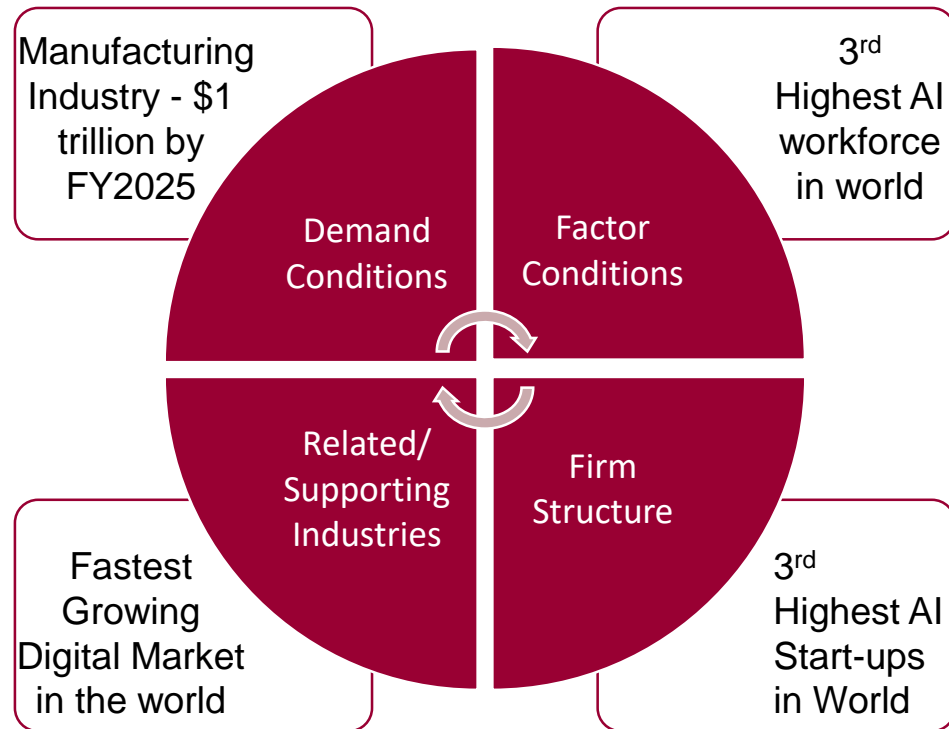


Market Determinants

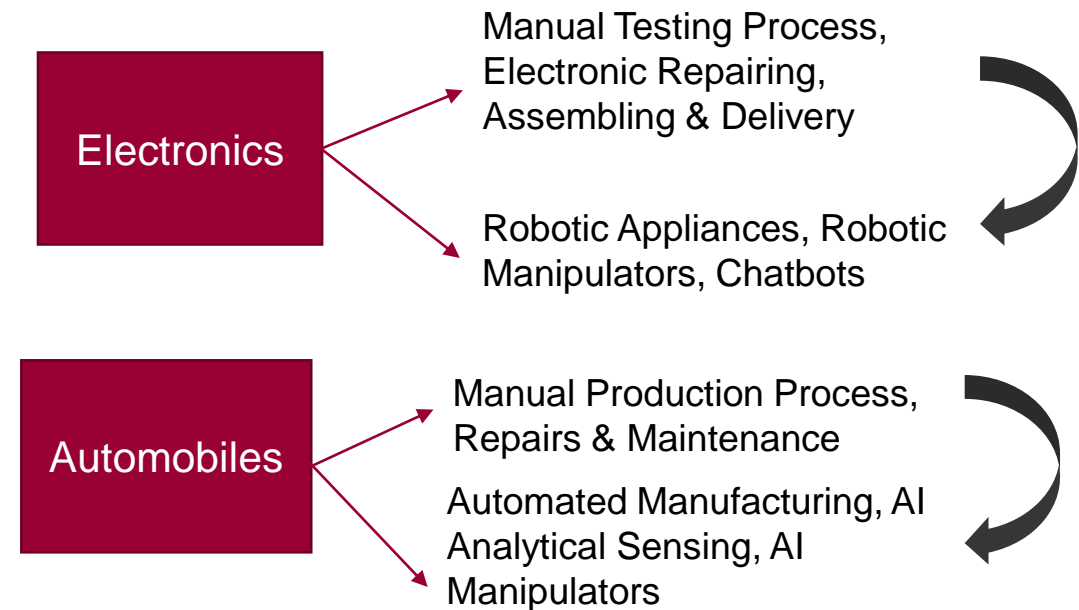


Advance Manufacturing and India

Overview of AI in Advance Manufacturing



AI Applications in Advance Manufacturing



Advance Manufacturing and India

Support/ Related Industries & Firm Structure



Government Policies

Government Institution

National Artificial Intelligence Task Force for promotion of AI in India

University-Industry

Indian Institute of Technology Research Centres- Focuses on AI Research

Fund Allocation

Initial \$400 million for AI push in India

Target Set

AI contribution to economy- USD 1 trillion by FY2035



AI Readiness in Asia Pacific

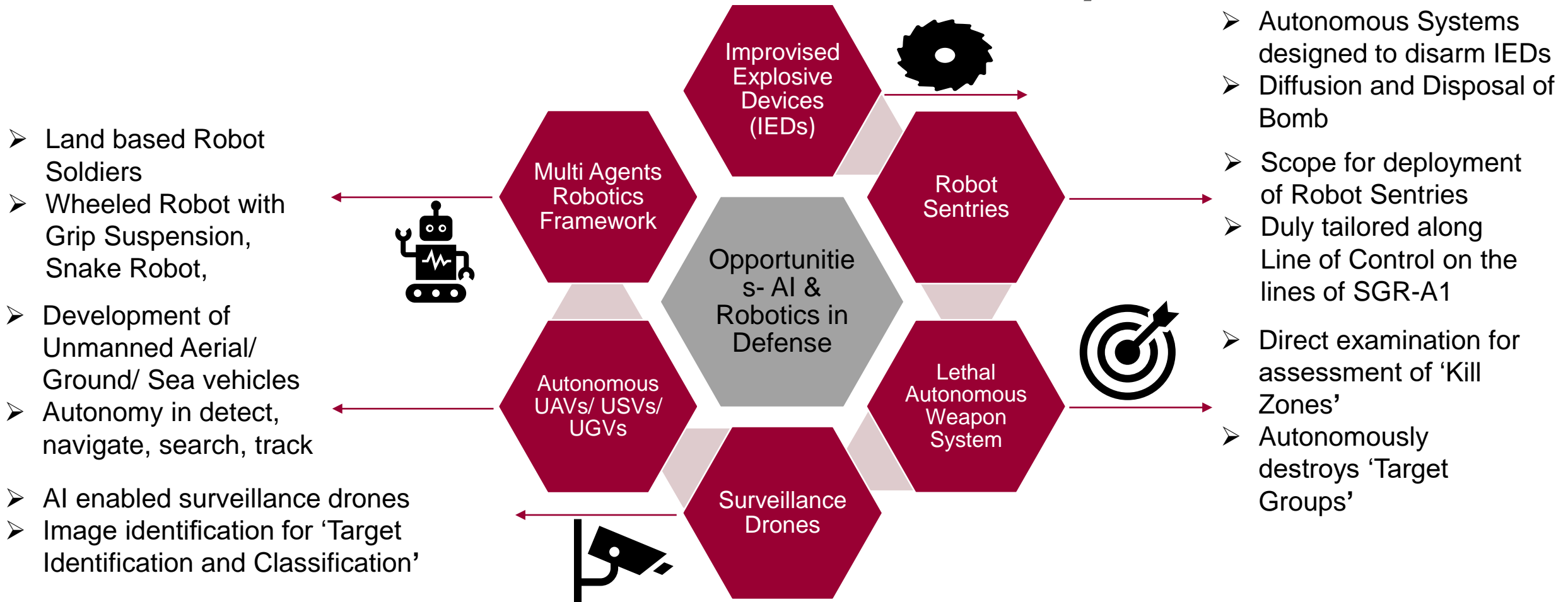
Rank	Country	Score
1	Singapore	63/100
2	Hong Kong	56.5/100
3.	India	50.2/100
4.	Malaysia	49/100
5.	Thailand	46.7/100



AI Start-ups in Manufacturing

Company	Segment
ASIMOVs	Electronics-Assembling
Gridbots	Electronics-High Speed
Helpforsure	Electronics
Netradyne	Automobiles-

AI & Robotics in Defense Industry in India



AI in Indian Railways (IR)

Key Facts

IR is the **4th largest** railway network in the world by size with **70,000 km** of tracks

In FY18 IR carried **8.26 Bn** passengers and transported **1.16 Bn** tonnes of freight

IR generated revenue of about **CHF 30 Bn** in FY18



Potential AI Application Areas



Predictive Analytics



- Predictive maintenance of linear infrastructure
- Prediction of train delays
- Predictive maintenance for rolling stock

Safety & Security



- Cybersecurity
- Physical safety of infrastructure and rolling stock
- Passenger safety

Passenger Experience



- Serve better food, handle queries and prevent mishaps
- More efficient ticket verification procedures
- Real-time washroom status availability

THANK YOU
