



# Industry 4.0 Roadmap

Updated as of 21 September 2023

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DONE	ONGOING	TARGET
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## OVERALL STRATEGIES

### Facilities and Services

- Establishment of Advanced Mechatronics, Robotics, and Industrial Automation Laboratory (AMERIAL)
- Establishment of a Smart Factory demonstrating Industry 4.0 architecture
- Establishment of a Smart Factory Web

### Human Resources

- Creation of Industry 4.0 Technical Working Group
- Conduct of industry-led webinar series for Industry 4.0 awareness and adoption
- Assessment and certification of Smart Industry Readiness Index (SIRI) and Smart Manufacturing Maturity Index (SMMI) of industrial companies
- Development of modules on Supervisory Control and Data Acquisition (SCADA) to accelerate connectivity and automation
- Capacitate local professionals to be Industry 4.0 Certified SIRI Assessors
- Implementation of flexible and modular skills certification programs

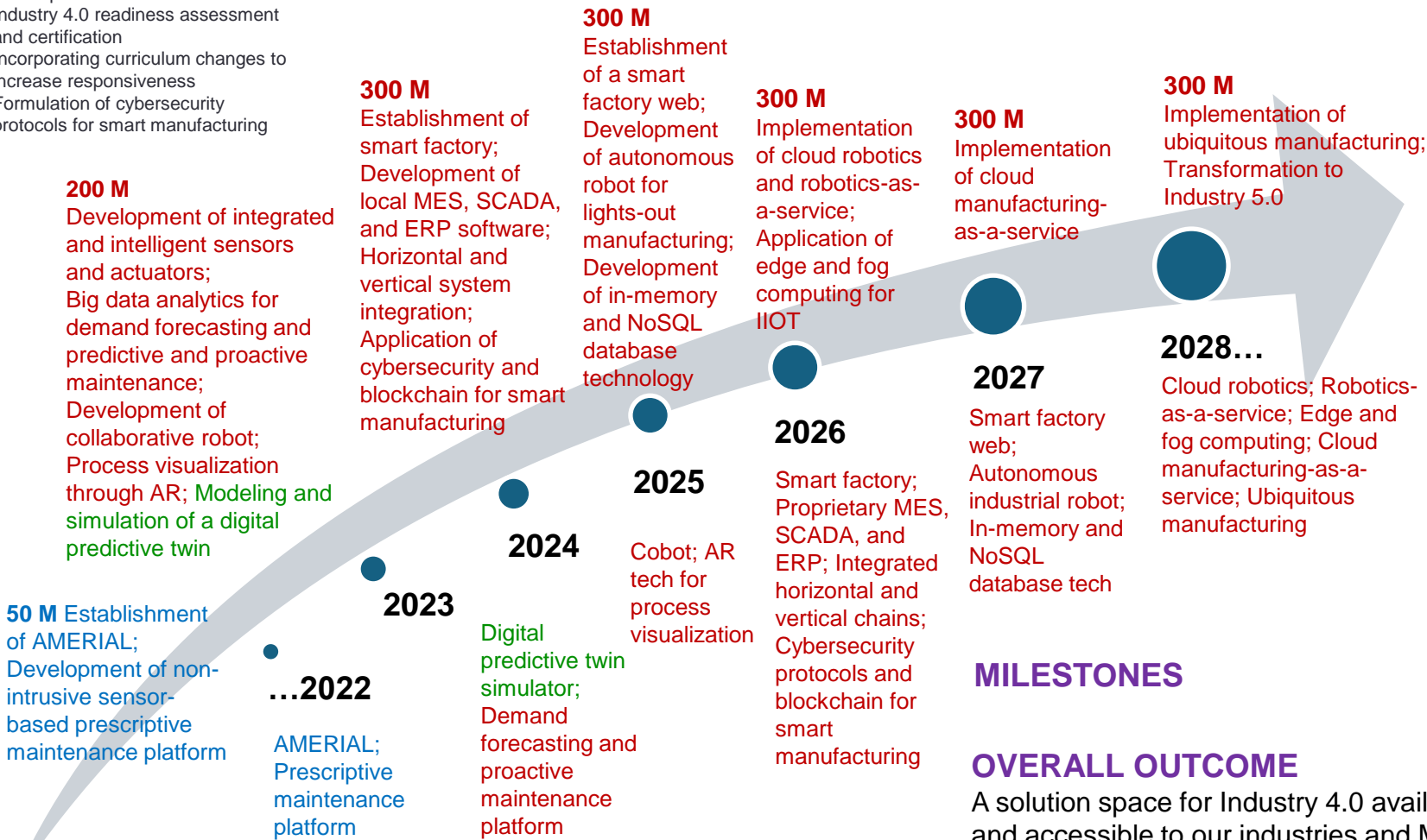
### R&D Technologies

- Development of non-intrusive sensor-based prescriptive maintenance platform
- Development of integrated and intelligent sensors and actuators
- Utilization of big data and analytics for demand forecasting and predictive and proactive maintenance
- Process visualization through augmented reality technology for worker maintenance and training
- Development of local manufacturing execution systems (MES), SCADA, and enterprise resource planning (ERP) software
- Digitization and integration of horizontal and vertical system for on demand manufacturing
- Development of collaborative robot for materials handling
- Development of autonomous robot for lights-out manufacturing
- Implementation of cloud robotics and robotics-as-a-service
- Modeling and simulation of a digital predictive twin of an entire shop floor for cyber physical production system
- Development of in-memory and NoSQL database technology
- Application of cybersecurity technology for manufacturing equipment
- Application of blockchain in smart manufacturing
- Application of edge and fog computing for IIOT
- Implementation of cloud manufacturing-as-a-service
- Implementation of ubiquitous / wireless manufacturing
- Transformation to Industry 5.0

### S&T Policies

- Incentive systems for companies undergoing Industry 4.0 transformation
- Development of local standards for Industry 4.0 readiness assessment and certification
- Incorporating curriculum changes to increase responsiveness
- Formulation of cybersecurity protocols for smart manufacturing

## R&D SOLUTIONS



## VISION

Create and foster a flourishing innovation ecosystem for Industry 4.0 in the country

## MILESTONES

## OVERALL OUTCOME

A solution space for Industry 4.0 available and accessible to our industries and MSMEs

# List of Industry 4.0 Projects (for the whole duration of the roadmap)

R&D Technologies	Project Title	Budget Allocation ('000)							Status
		2022	2023	2024	2025	2026	2027	2028	
Industry 4.0	Non-Intrusive Sensor-based Prescriptive Maintenance Platform for Wire Manufacturing Factory								Completed in 2021 (PCIEERD-GIA)
	New: Digital Manufacturing Assembly Trainer (DMAT) and the Digital Twin Simulator (DTS)			6,570,129.80					Ongoing (PCIEERD-GIA)

