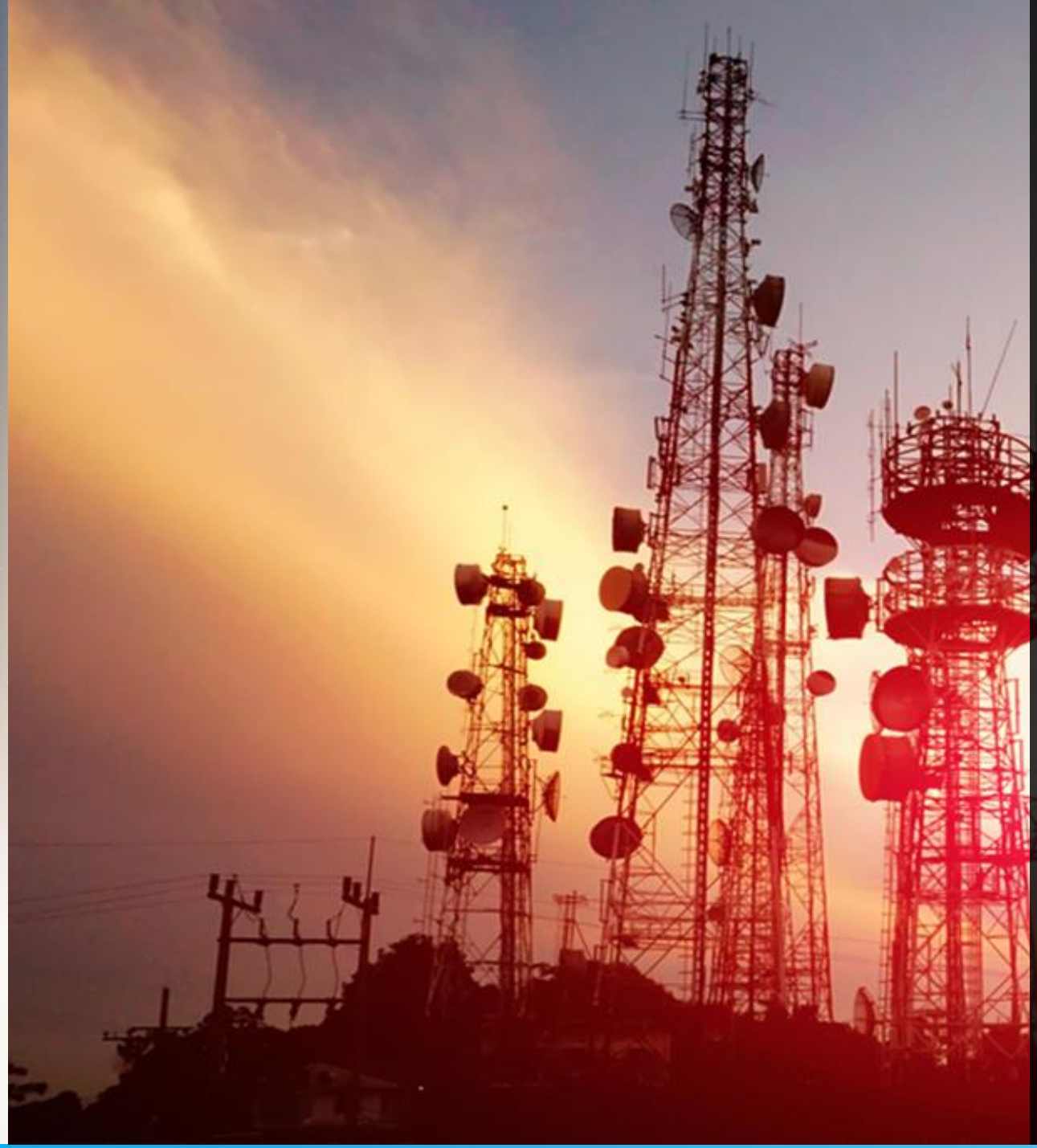
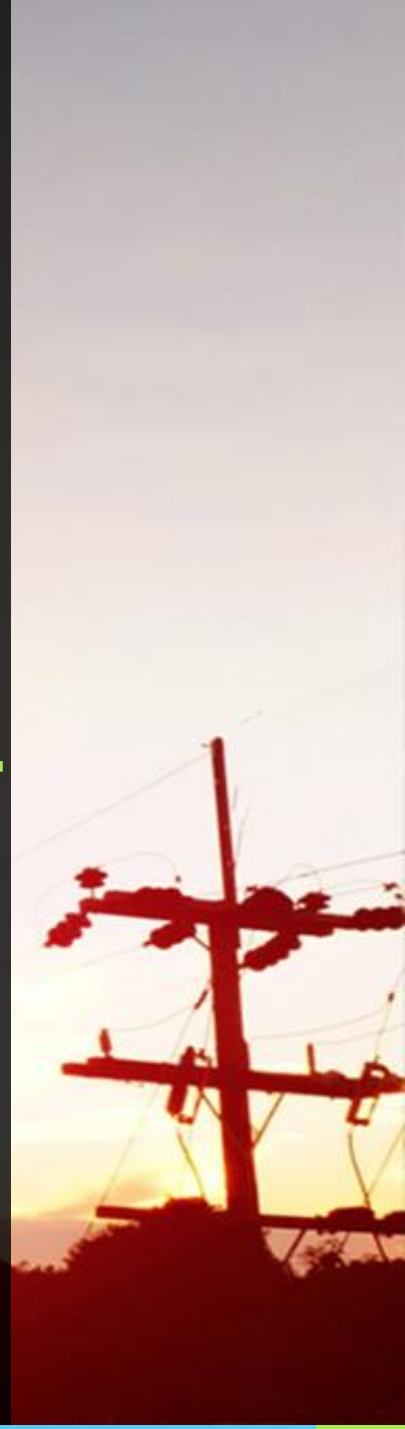


টেলিটক

৪র্থ শিল্প বিপ্লবে ৫জি প্রযুক্তি ও বাংলাদেশের প্রস্তুতি

সাহাব উদ্দিন

ব্যবস্থাপনা পরিচালক, টেলিটক বাংলাদেশ লিমিটেড।



আলোচ্য সুচি

- ৪র্থ শিল্প বিপ্লব ও ৫জি প্রযুক্তির প্রয়োগ
- ৫জি প্রযুক্তি ও টেলিটকের পরিকল্পনা

৪র্থ শিল্প বিপ্লব ও ৫জি প্রযুক্তি'র প্রয়োগ

Phases of Industrial Revolutions

Industry 1.0

Mechanical production equipment, steam and water power

Industry 2.0

Electricity, mass production, assembly line

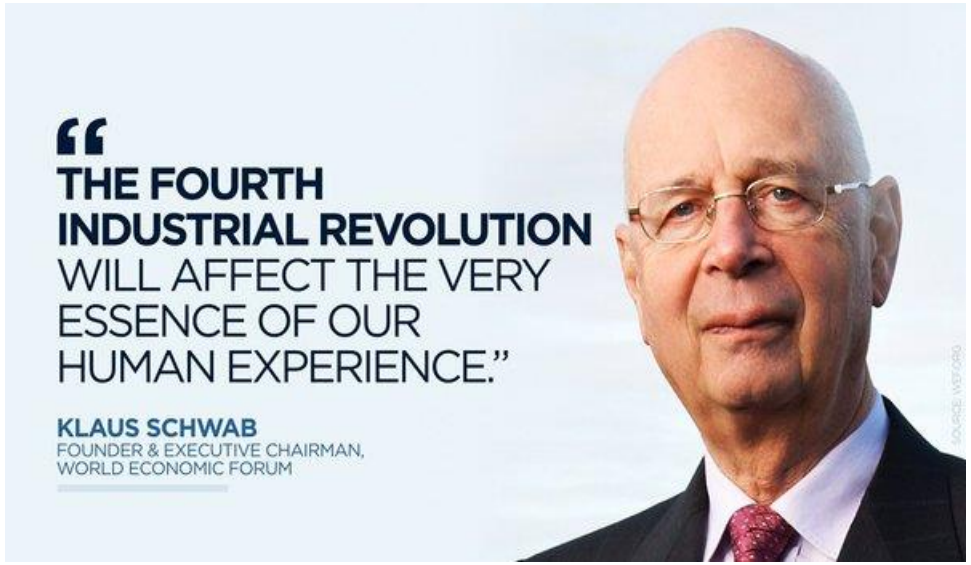
Industry 3.0

Computers and automated production

Industry 4.0

Cyber-physical systems

Fourth Industrial Revolution



- The phrase ***Fourth Industrial Revolution*** was first introduced by a team of scientists developing a high-tech strategy for the German government.
- Klaus Schwab, executive chairman of the World Economic Forum (WEF), introduced the phrase to a wider audience in a 2015 article published by *Foreign Affairs*.
- "Mastering the Fourth Industrial Revolution" was the 2016 theme of the World Economic Forum Annual Meeting, in Davos-Klosters, Switzerland.

Fourth Industrial Revolution

INDUSTRY 4.0

Industrial Revolution 4.0

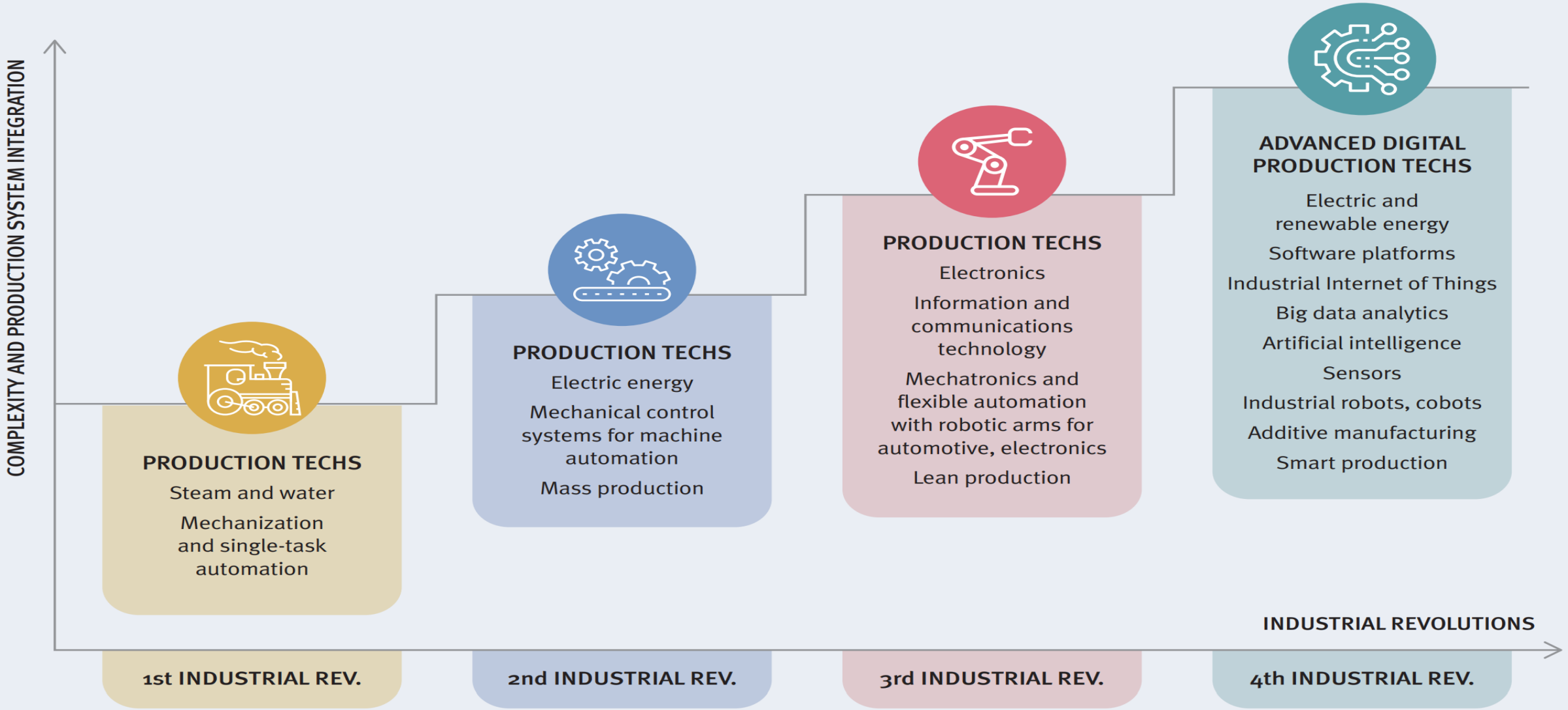
Industrial Internet of Things (IIOT)

Smart Factory

Industrial Internet

4IR

Production technologies: From the 1th IR to 4th IR



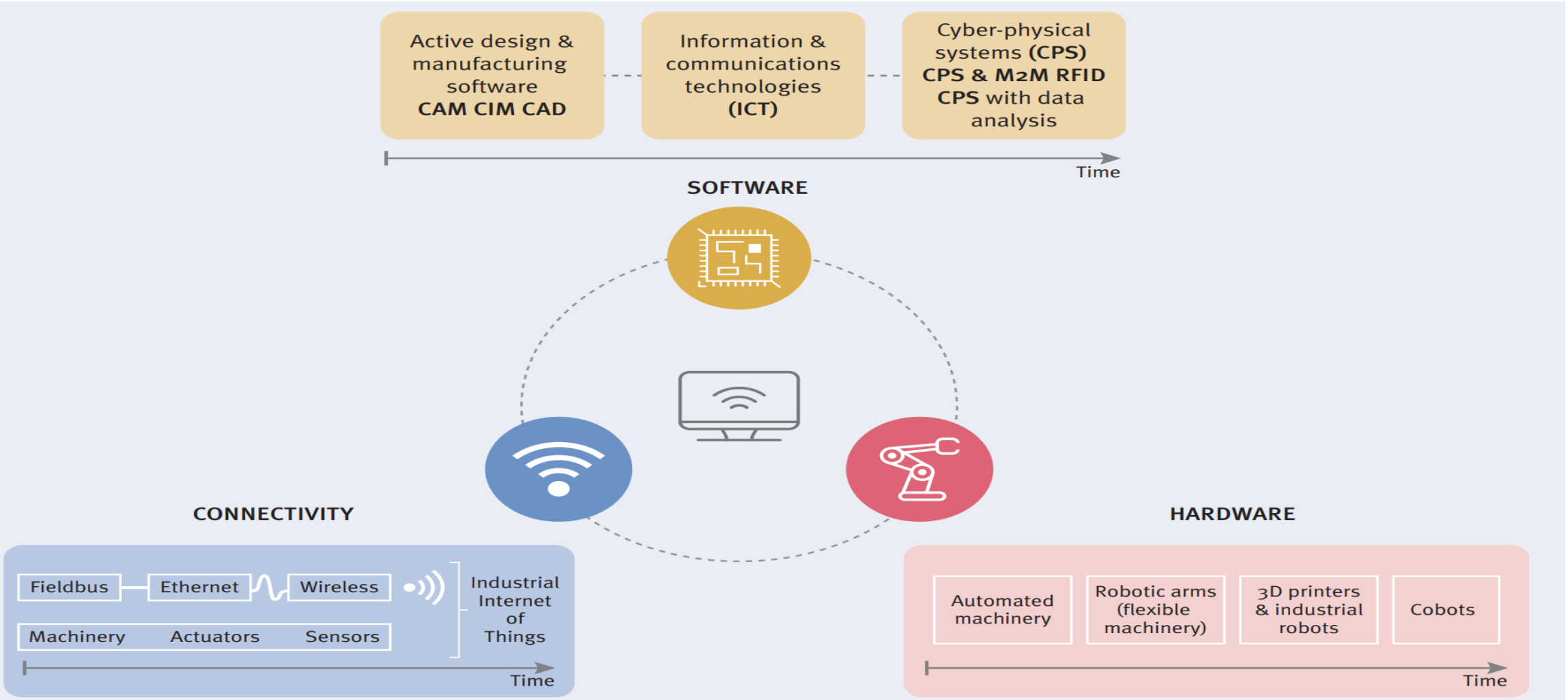
Source: Andreoni and Anzolin 2019.

Automatic vs Autonomous

Automatic *is capable of operating without external control or intervention while* ***Autonomous*** *is self-governing intelligent, sentient, self-aware, thinking, feeling, governing independently.*

SMART FACTORY
SMART INVENTORY

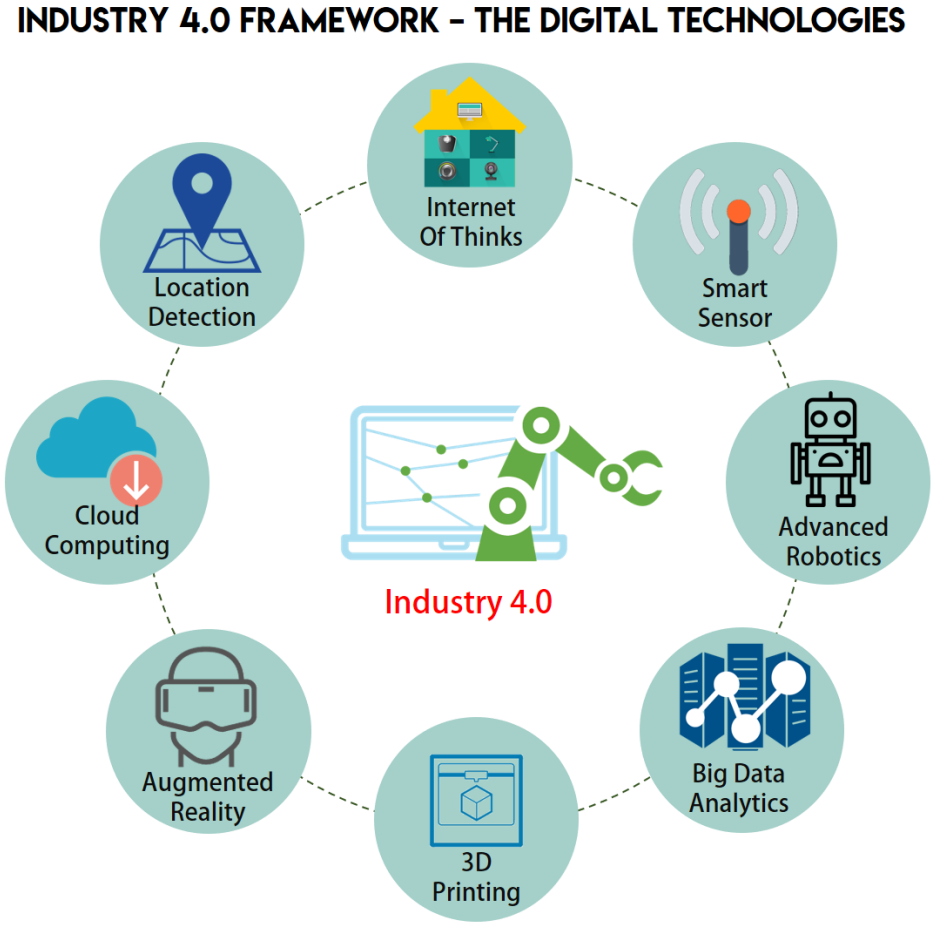
Building blocks of Smart Factory (IR 4.0)



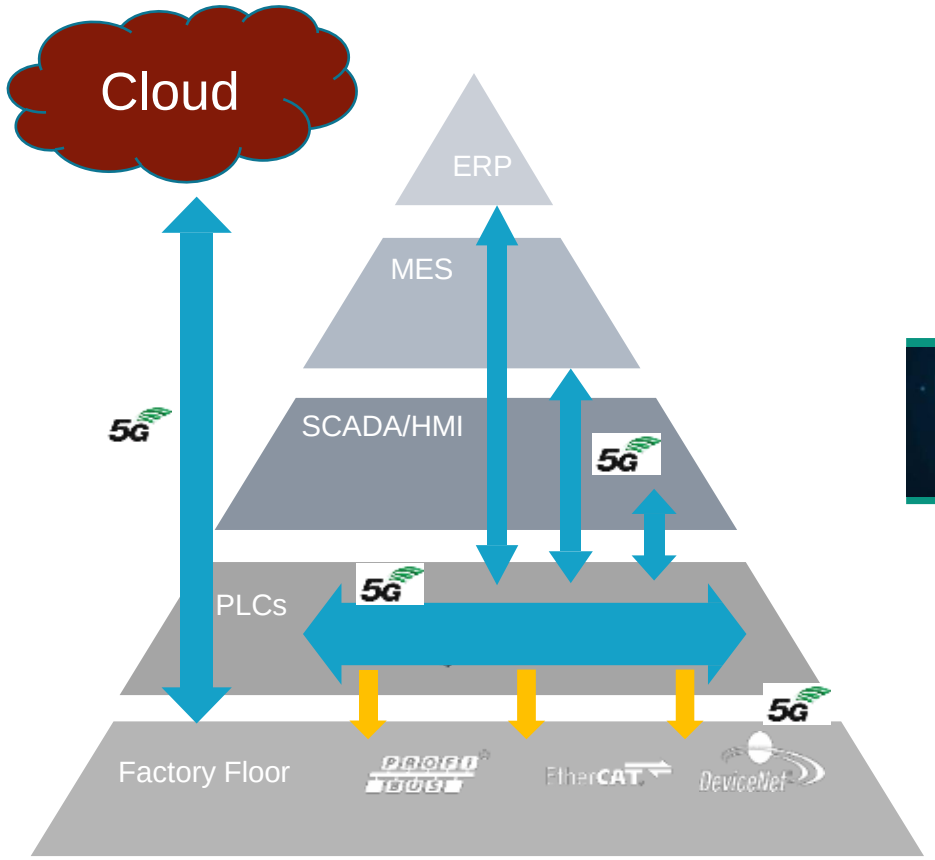
Note: CAM is computer-aided manufacturing, CAD is computer-aided design, CIM is computer-integrated manufacturing, M2M is machine to machine, and RFID is radio-frequency identification. CIM links CAD, CAM, industrial robotics, and machine manufacturing through unattended processing workstations.
Source: Andreoni and Anzolin 2019.

INDUSTRY 4.0 : The Digital Technology Transformation

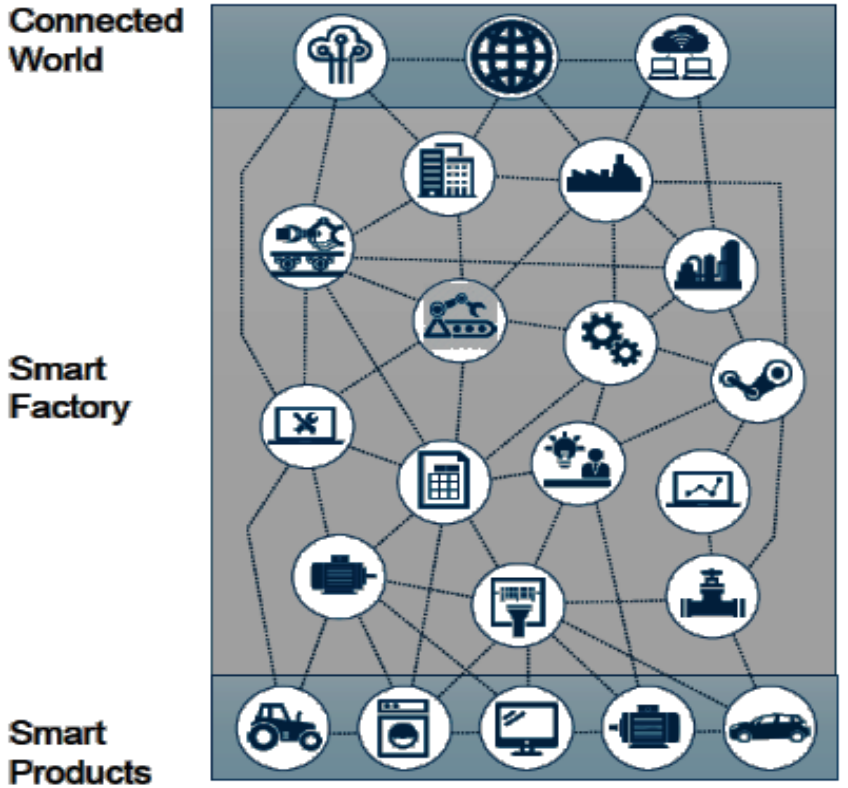
- Blended of all frontier technologies but **5G will be pioneering in communication space** of Smart Factory.
- 5G services provide **connectivity** options applicable across the broad range of **Industry 4.0 use cases**, making these the superior choice for manufacturing and supply chain companies.



Transforming to Smart Factory and 5G



New mesh data interaction architecture



Source: Platform I4.0

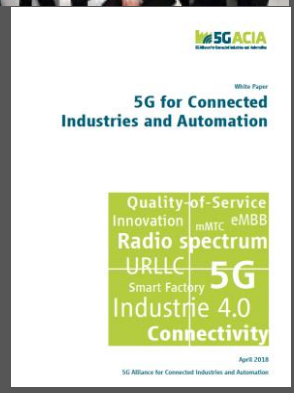
Traditional pyramid-mode data interaction will be changed, data volume is exponentially rising in such flat/ mesh interaction mode

5G Industrial Internet for IR 4.0

5G ACIA
5G Alliance for Connected Industries and Automation

Milestone

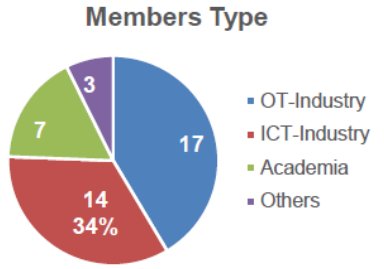
- 01.2022: 5G IoT for Manufacturing Forum (GSM & 5GACIA)
- 04.2021: VDMA WCM and 5G-ACIA Issue Statement on Cooperation on Industrial 5G
- 03.2019： 5G Non-Public Networks for Industrial Scenarios (White Paper)
- 11.2018： 5G Alliance for Connected Industries and Automation: Designing 5G for Industrial Use （White paper）
- 10.2017 Alliance Establishment

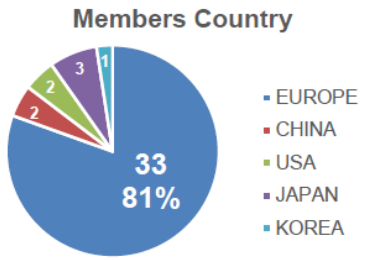


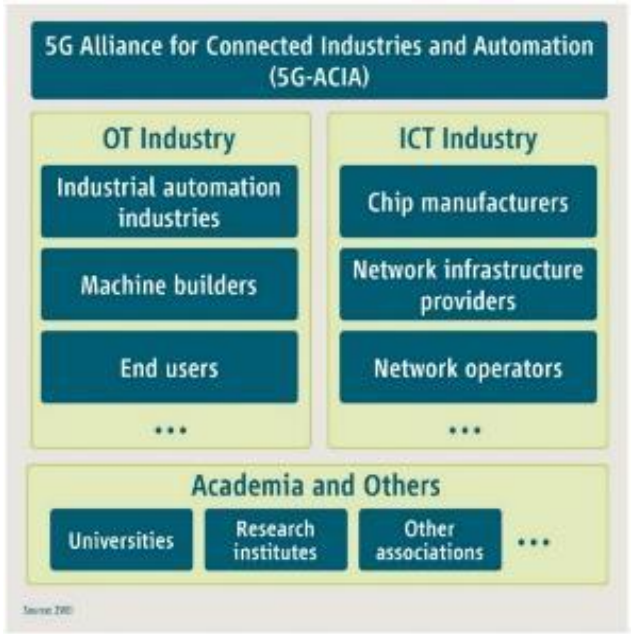
Cases, Requirements, and Standards | Spectrum and operation | Architecture and Technology | Communication and publicity | Commercial use and test

5G-ACIA,5G Alliance for Connected Industry and Automation

https://www.5g-acia.org/







Global Positioning for the adoption of IR 4.0

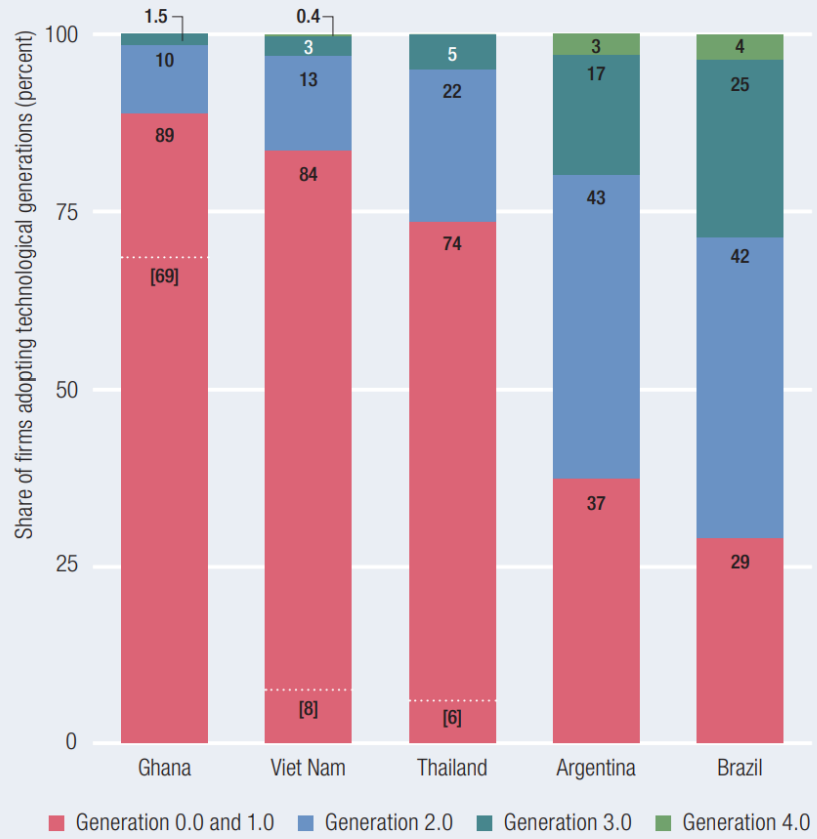
Bangladesh

Group		Short description	Criteria
Frontrunners (10 economies)		Top 10 leaders in the field of ADP technologies	Economies with 100 or more global patent family applications in ADP technologies (average value for all economies with some patent activity in this field)
Followers in production (23 economies)	As innovators	Economies actively involved in patenting in the field of ADP technologies	Economies with at least 20 regular patent family applications, or 10 global patent family applications in ADP technologies (average values for all economies with some patent activity, once frontrunners are excluded)
	As exporters	Economies actively involved in exporting ADP-related goods	Economies relatively specialized in exporting ADP-related goods that sell large volumes in world markets (above the average market share once frontrunners are excluded)
Followers in use (17 economies)	As importers	Economies actively involved in importing ADP-related goods	Economies relatively specialized in importing ADP-related goods that purchase large volumes in world markets (above the average market share once frontrunners are excluded)
Latecomers in production (16 economies)	As innovators	Economies with some patenting activity in ADP technologies	Economies with at least one regular patent family application in ADP technologies
	As exporters	Economies with some exporting activity of ADP-related goods	Economies that either show relative specialization in exporting ADP-related goods or sell large volumes in world markets (above the average market share once frontrunners are excluded)
Latecomers in use (13 economies)	As importers	Economies with some importing activity of ADP-related goods	Economies that either show relative specialization in importing ADP-related goods or sell large volumes in world markets (above the average market share once frontrunners are excluded)
Laggards (88 economies)		Economies showing no or very low engagement with ADP technologies	All other economies not included in the previous groups

Economies actively engaging with ADP technologies

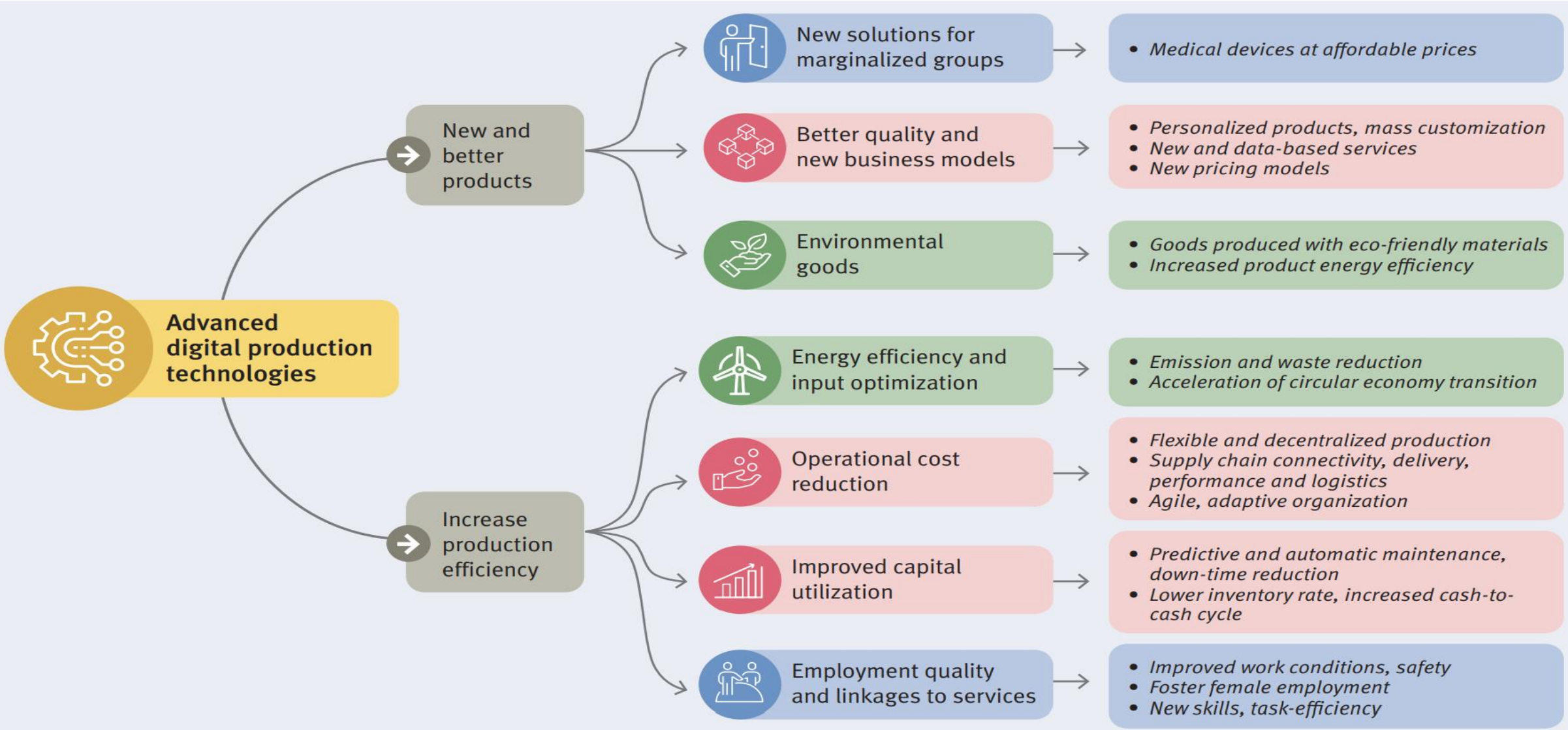
Note: The characterization is for 167 economies that, according to the United Nations Statistical Division, had more than 500,000 inhabitants in 2017. See Table A1 in the Annex for the economies in each category.
Source: UNIDO elaboration.

Adoption of ADP technologies is still limited among developing countries



Note: Numbers in brackets are generation 0.0 firms. For Argentina and Brazil no information on generation 0.0 is available due to the structure of their survey questionnaires.
Source: UNIDO elaboration based on data collected by the UNIDO firm-level survey "Adoption of digital production technologies by industrial firms" (for Ghana, Thailand and Viet Nam) and Albrieu et al. (2019) and Kupfer et al. (2019) (for Argentina and Brazil).

Expected Dividend from IR 4.0 Smart Factory



Source: UNIDO elaboration based on Andreoni and Anzolin (2019).

Challenges of implementing 4IR

ECONOMIC	SOCIAL	Organizational	Political
• High economic costs • Business model adaptation • Unclear economic benefits/excessive investment	• Privacy concerns • Surveillance and distrust • General reluctance to change by stakeholders • Threat of redundancy of the corporate IT department • Loss of many jobs to automatic processes and IT-controlled processes, especially for blue collar workers	• Cyber Security • Reliability and stability needed for critical machine-to-machine communication (M2M), including very short and stable latency times • Need to maintain the integrity of production processes • Organizational transformation on IT infrastructure • **Lack of adequate skill-sets to expedite the transition towards a fourth industrial revolution**	• Lack of regulation, standards and forms of certifications • Unclear legal issues and data security

How to ensure leverage of 4IR

To transform young population into human capital and to promote technology-driven jobs.

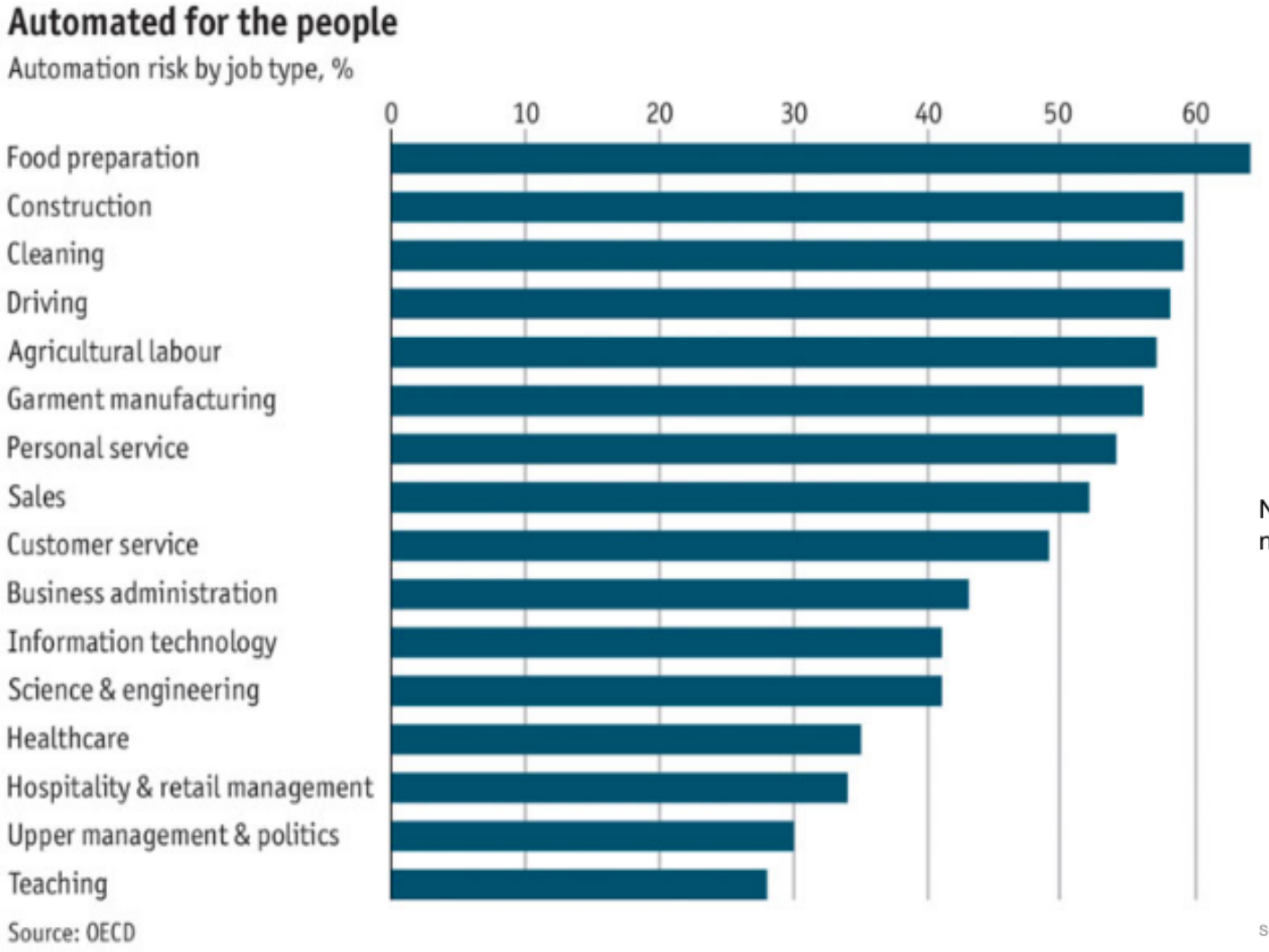
Impart/employ imagination, creativity and innovation, in educational institutions, industries/factories, companies

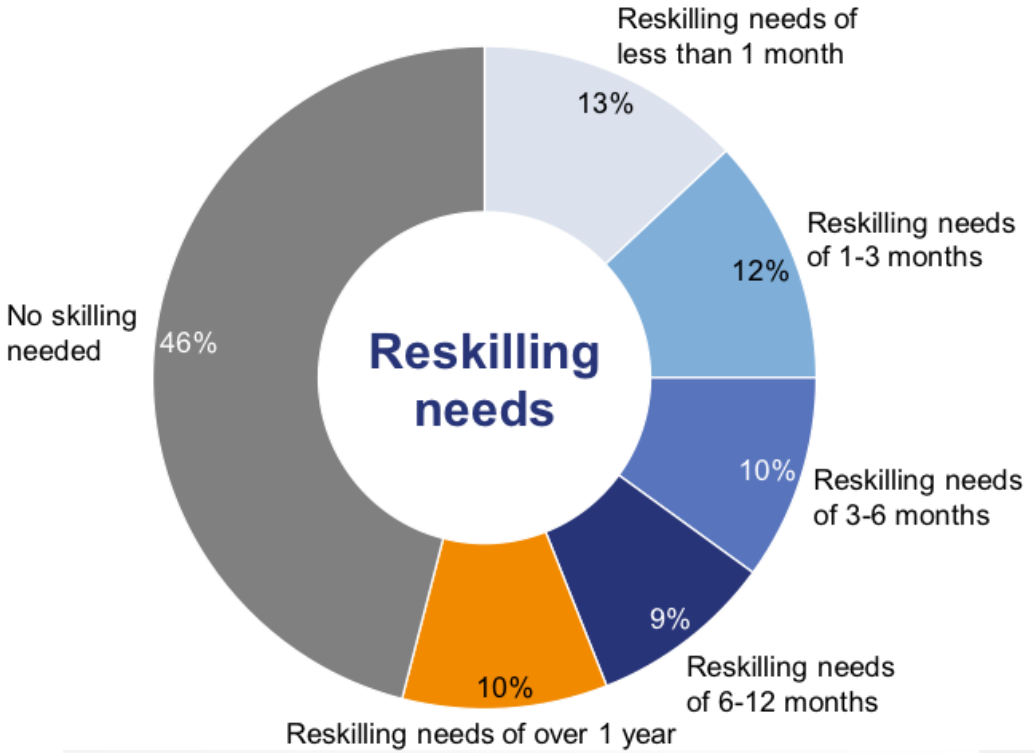
Entrepreneurs to adopt newer technologies

Create awareness about the global skills in demand, to train the labor force to excel in IT and skills necessary

Policy-makers, the public, private sectors, trade unions, and civil society organizations need to work together

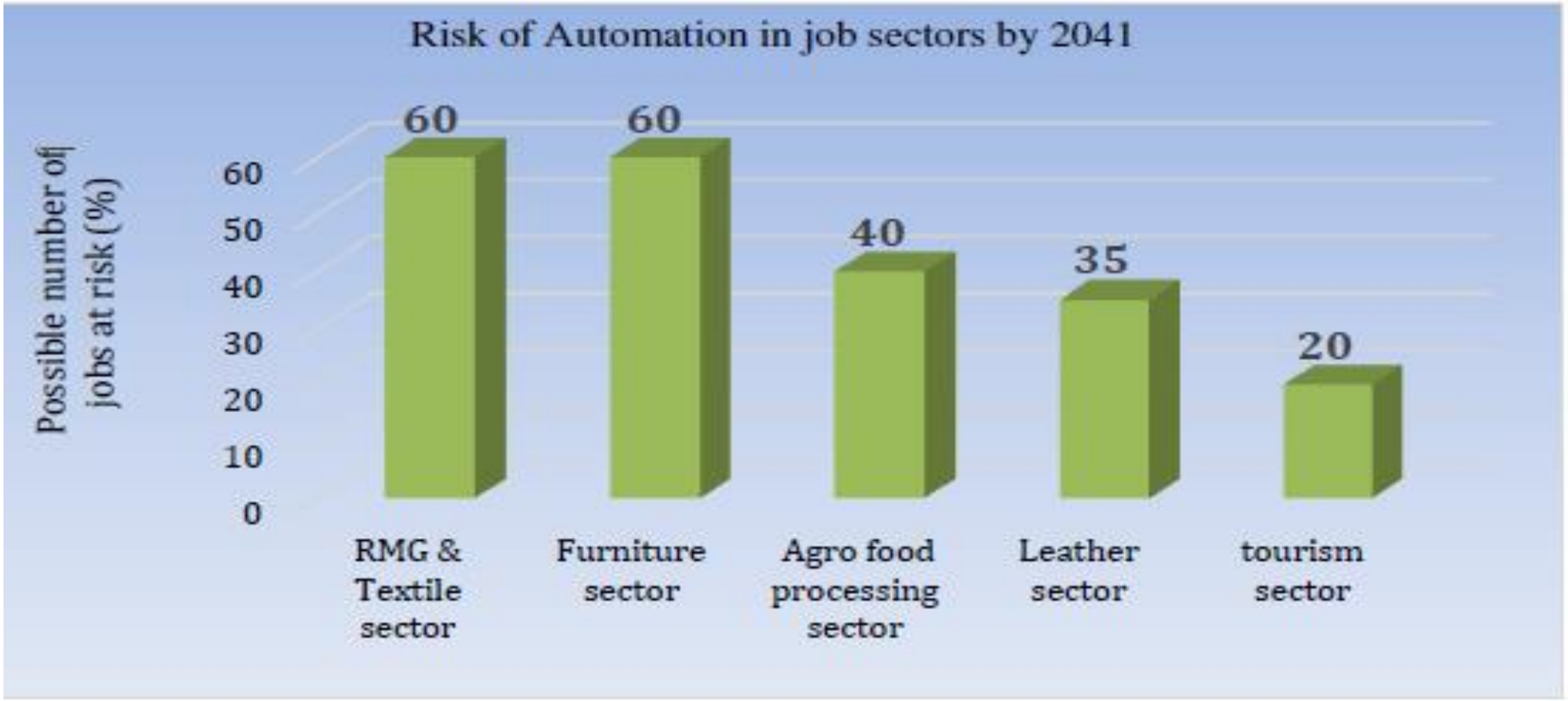
Probability of a Job becoming automatable & Reskilling Opportunities





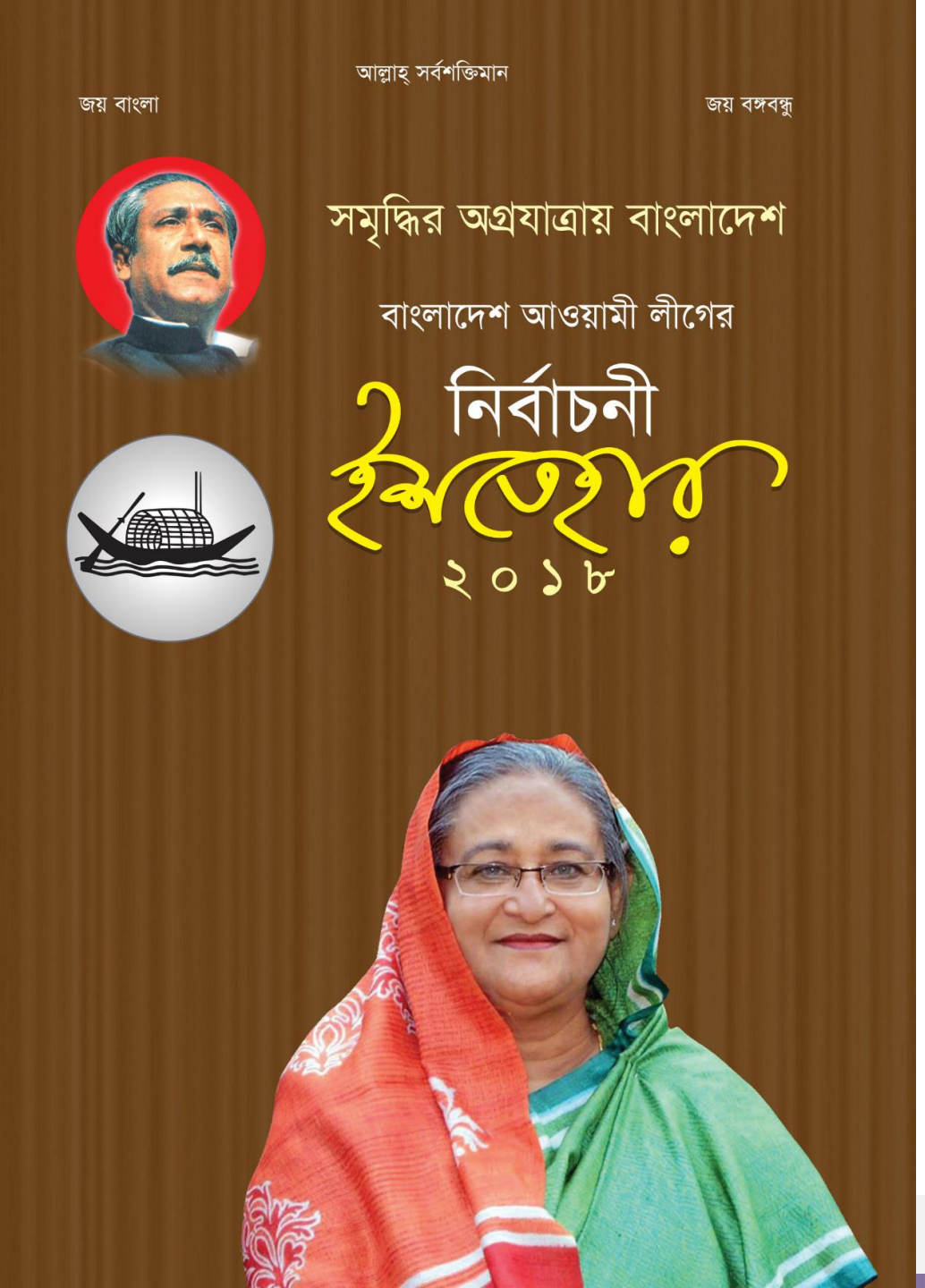
SOURCE: Future of Jobs Survey 2018, World Economic Forum

Risk of Automation Under 4IR



Ref: Risk of Automation in job sectors by 2041 in Bangladesh by a2i, august 2019.


৫জি প্রযুক্তি
ও টেলিটকের
পরিকল্পনা



টেলিটক

- ২০২১-২৩ সালের মধ্যে ফাইভ-জি চালু করা হবে।
- কৃত্রিম বুদ্ধিমত্তা, রোবোটিক্স, বিগ ডাটা, ব্লকচেইন, আইওটি-সহ ভবিষ্যৎ প্রযুক্তির বিকাশ ঘটানো হবে।

৫জি প্রযুক্তি সেবাসমূহ

মোবাইল ব্রডব্যান্ড গতি

৪জি হতে ২০গুন বেশী

সংযোগ লেটেন্সি (বিলম্বতা)

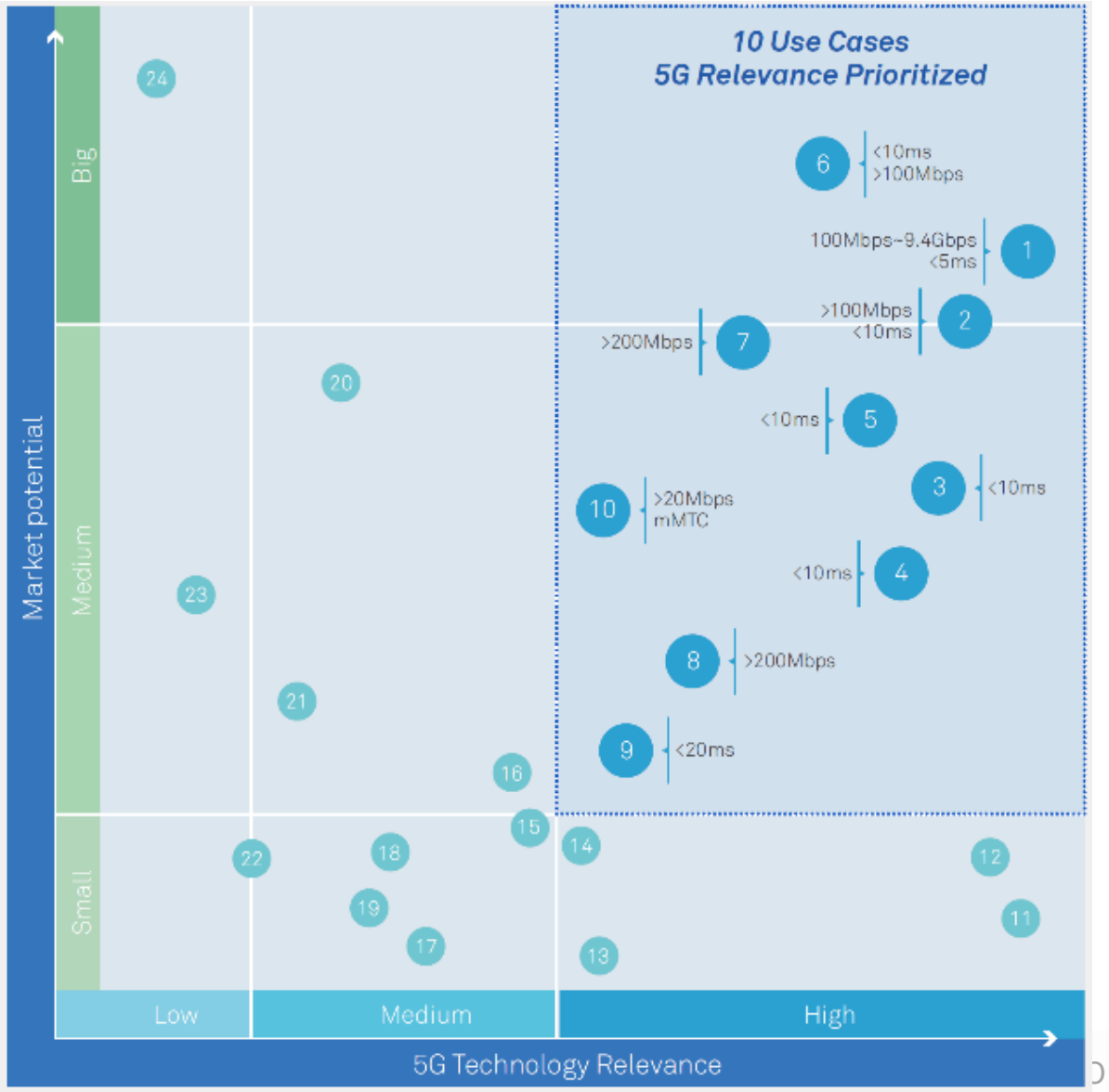
৪জি হতে ১০ গুণ কম

ডিভাইস সংখ্যা ও প্রকারভেদ

আইওটি, মেশিন টু মেশিন, এফডব্লিউএ, এবং স্মার্ট ফোন

5G Unlocks a World of Opportunities: Top 10 5G Use Cases

1. **Cloud Virtual & Augmented Reality** – Real-time Computer Rendering Gaming/Modeling
2. **Connected Automotive** – ToD, Platooning, Autonomous Driving
3. **Smart Manufacturing** – Cloud Based Wireless Robot Control
4. **Connected Energy** – Feeder Automation
5. **Wireless eHealth** – Remote Diagnosis With Force-Feedback
6. **Wireless Home Entertainment** – UHD 8K Video & Cloud Gaming
7. **Connected Drones** – Professional Inspection & Security
8. **Social Networks** – UHD/Panoramic Live Broadcasting
9. **Personal AI Assistant** – AI Assisted Smart Helmet
10. **Smart City** – AI-enabled Video Surveillance

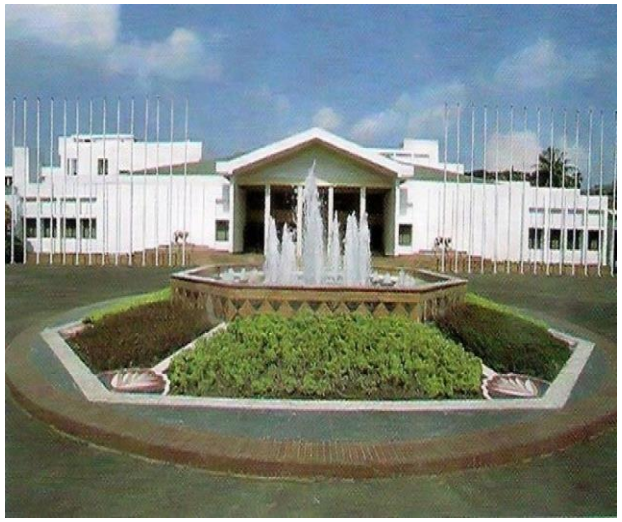


টেলিটকের ৫জি সম্পর্কিত তথ্যাদি

- ৬০ মেগাহার্টজ স্প্যাকট্রাম ব্যান্ডউইডথ (৩৭৪০ থেকে ৩৮০০ মেগাহার্টজ)
- প্রারম্ভিক পর্যায়ে ৫জি এনএসএ (অপশন ৩.এক্স) এবং পরবর্তীতে ৫জি এসএ বাস্তবায়ন
- ৬৪টি৬৪আর এমআইএমও ও ২৫৬ কিউএএম/৬৪কিউএএম
- ৫জি বিটিএসে জিবিপিএস অপটিক্যাল ট্রান্সমিশন সংযোগ

৫জি নেটওয়ার্ক (পরীক্ষামূলক) কভারেজ স্থানসমূহ- ঢাকা শহরে

সংসদ ভবন এলাকা



প্রধানমন্ত্রীর কার্যালয়

বাংলাদেশ সচিবালয়

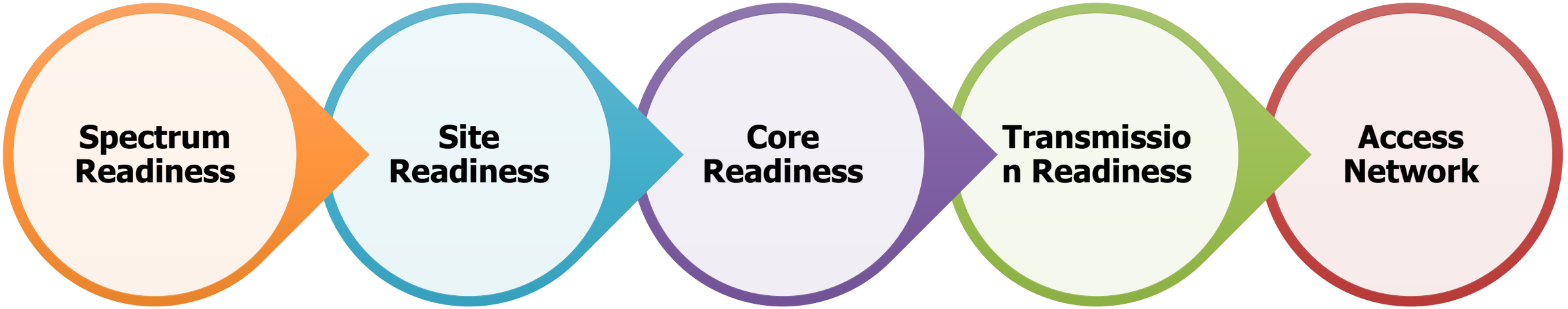
বঙ্গবন্ধুর স্মৃতি জাদুঘর

৫জি নেটওয়ার্ক (পরীক্ষামূলক) কভারেজ স্থানসমূহ- ঢাকা শহরের বাইরে

জাতীয় স্মৃতিসৌধ
সাভার, ঢাকা

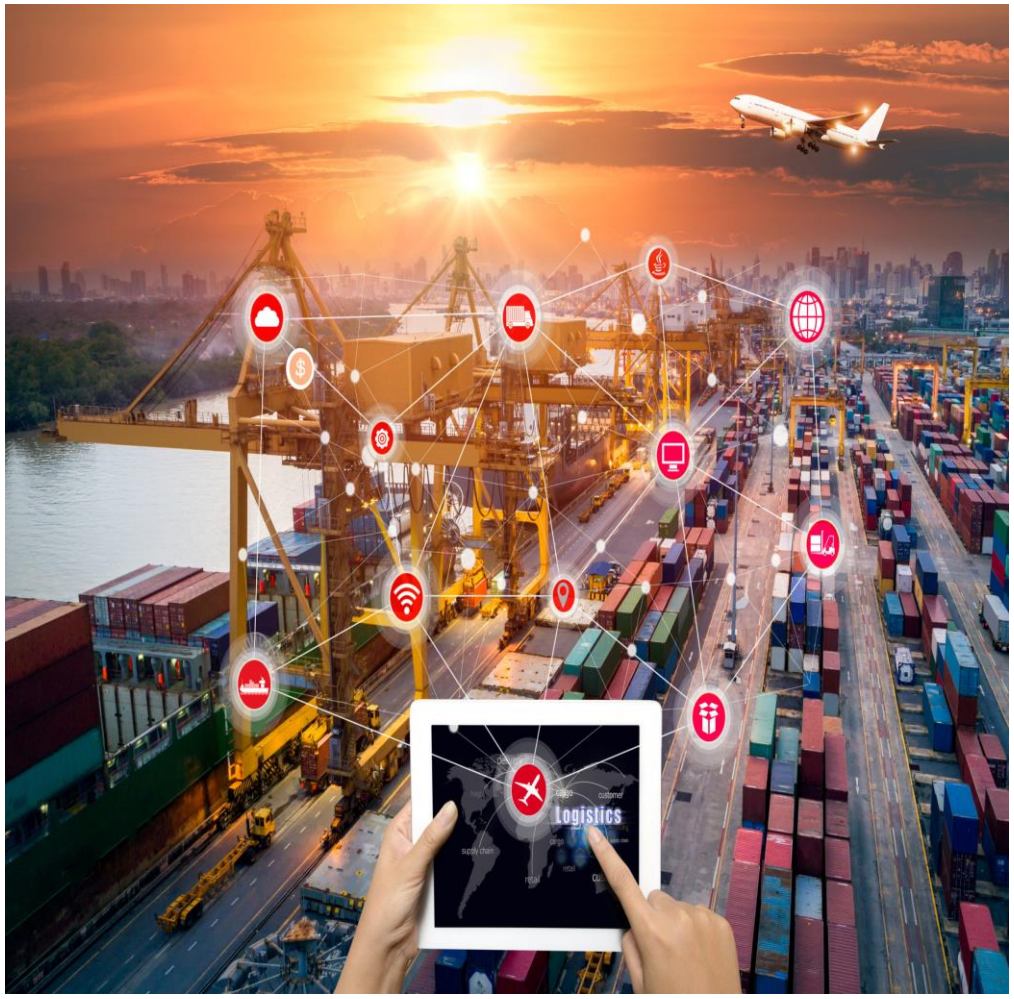
জাতীর জনক বঙ্গবন্ধুর সমাধিসৌধ
টুঙ্গিপাড়া, গোপালগঞ্জ

Key Considerations in 5G Readiness



Private/Enterprise 5G for SMART PORTS

- **Remote-controlled ship-to-shore cranes** load and unload container ships, moving containers between the ship and the dock with precision and manoeuvrability.
- **Automated rubber tired gantry cranes** stack containers at terminals, crucial for when high-capacity stacking and good manoeuvrability are needed.
- **Automated guided vehicles**(AGVs) navigate through the port using smart 3D sensors, handling all port materials, reducing energy costs and risk of accidents.
- **Condition monitoring** detects faults before they occur, reducing unplanned downtime and maximizing asset productivity.
- **Drones** deliver documents from ship to shore, reducing costs and environmental impact of crewed boats while also conducting security surveillance of ports



Future 5G Rollout Plan of Teletalk

Target	Dec-21	Dec-22	Dec-23	Dec-24	Dec-25	Dec-26	Dec-27	Dec-28
Action	**5G Field Trial (NSA)**	**Commercial Trial (NSA)**	**Commercial Service (NSA)**	**Commercial Service (NSA)** **Commercial Service (SA)**	**Commercial Service (NSA)** **Commercial Service (SA)**	**Commercial Service (NSA)** **Commercial Service (SA)**	**Commercial Service (NSA)** **Commercial Service (SA)**	**Commercial Service (NSA)** **Commercial Service (SA)**
Place	*Dhaka Metropolitan*	*Dhaka Metropolitan*	*Dhaka (with Narayangonj and Gazipur Towns), Chittagong, Sylhet*	*All Divisional Cities and Major District Towns*	*All District Towns, Highways, Railways and Growth Centers*	*Upto Upazilla HQ*	*Strengthening Coverage up to Rural Areas*	*Strengthening Coverage up to Rural Areas*
Coverage focuses	*in existing towers*	*Government and business offices*	*All Existing Sites, similar to 4G network coverage*	*All Existing Sites, similar to 4G network coverage*	*All Existing Sites, similar to 4G network coverage*	*All Existing Sites, similar to 4G network coverage*	*All Existing Sites, similar to 4G network coverage*	*All Existing Sites, similar to 4G network coverage*
Site Quantity	**6**	**200**	**2200**	**2500**	**2500**	**2500**	**2000**	**2000**
Expected Output	*Assessment of 5G Integration with existing 4G Network* *Acquired hand-on-experiences* *Trained Engineers*	*Limited 5G Services in important areas in Dhaka City.* ***- Population Coverage by 1%***	*All Divisional Cities will covered with 5G* ***- Population Coverage by 10%***	*All Divisional Cities, Industrial Zones, and Major District Towns covered with 5G Services* ***- Population Coverage by 25%***	*All Divisional Cities, Industrial Zones, and Major District Towns covered with 5G Services* ***- Population Coverage by 45%***	*All Divisional Cities, Industrial Zones, and Major District Towns covered with 5G Services* ***- Population Coverage by 60%***	*All Divisional Cities, Industrial Zones, and Major District Towns covered with 5G Services* ***- Population Coverage by 70%***	*All Divisional Cities, Industrial Zones, and Major District Towns covered with 5G Services* ***- Population Coverage by 78%***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