"Indian ICT Sector"

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Project SESEI
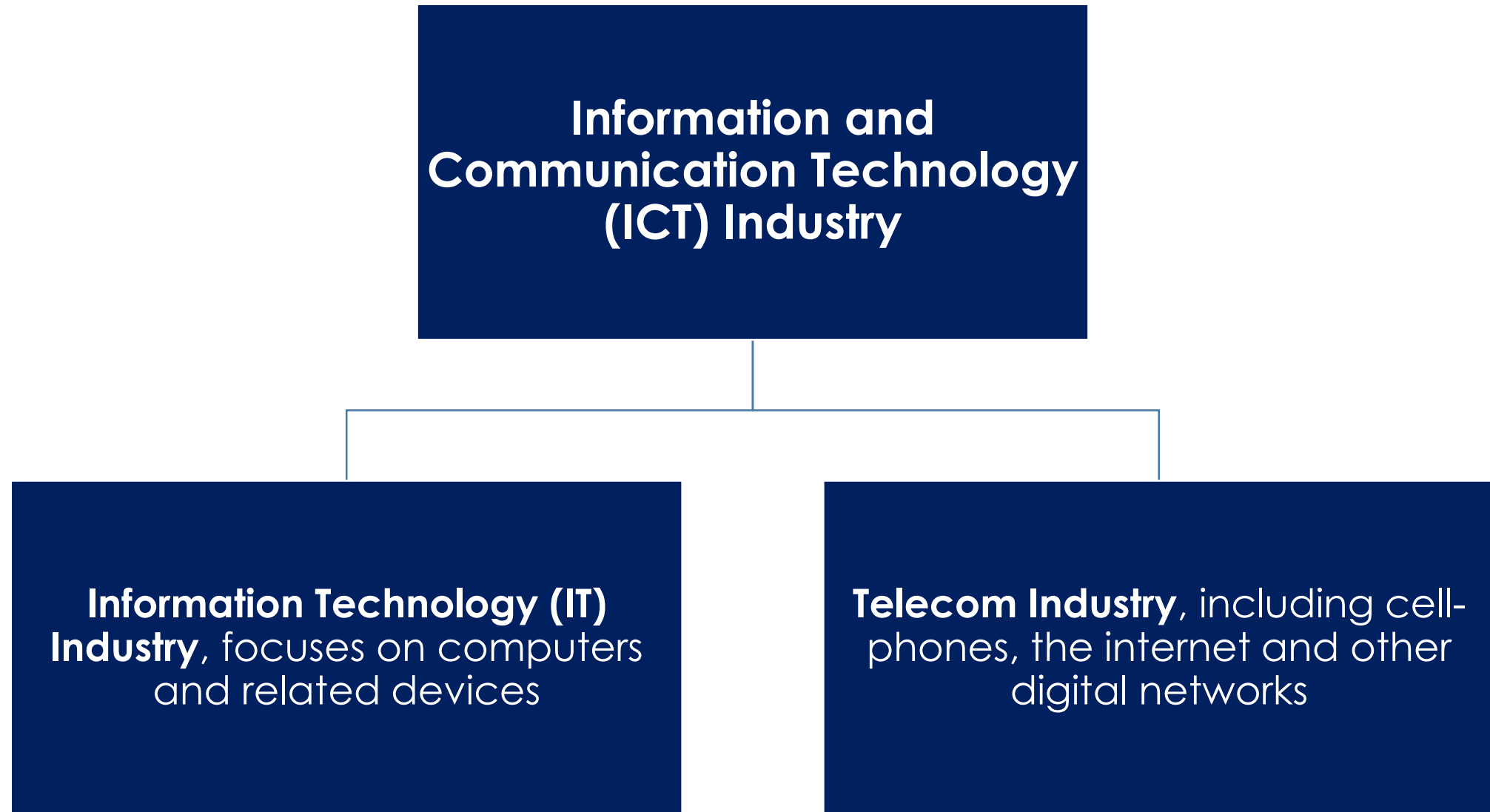
Outline

- Introduction of **Information and Communication Technology (ICT)**
- **Information Technology industry** (Market status, Major players & Growth drivers)
- **Telecom Industry** (Market status, Major players & Growth drivers)
- Government Policy & New initiatives
- Standardization bodies
- R&D and Innovation
- Conclusion

Indian ICT Sector

Information and Communication Technology (ICT) Industry

Information Technology (IT) Industry, focuses on computers and related devices

Telecom Industry, including cell-phones, the internet and other digital networks

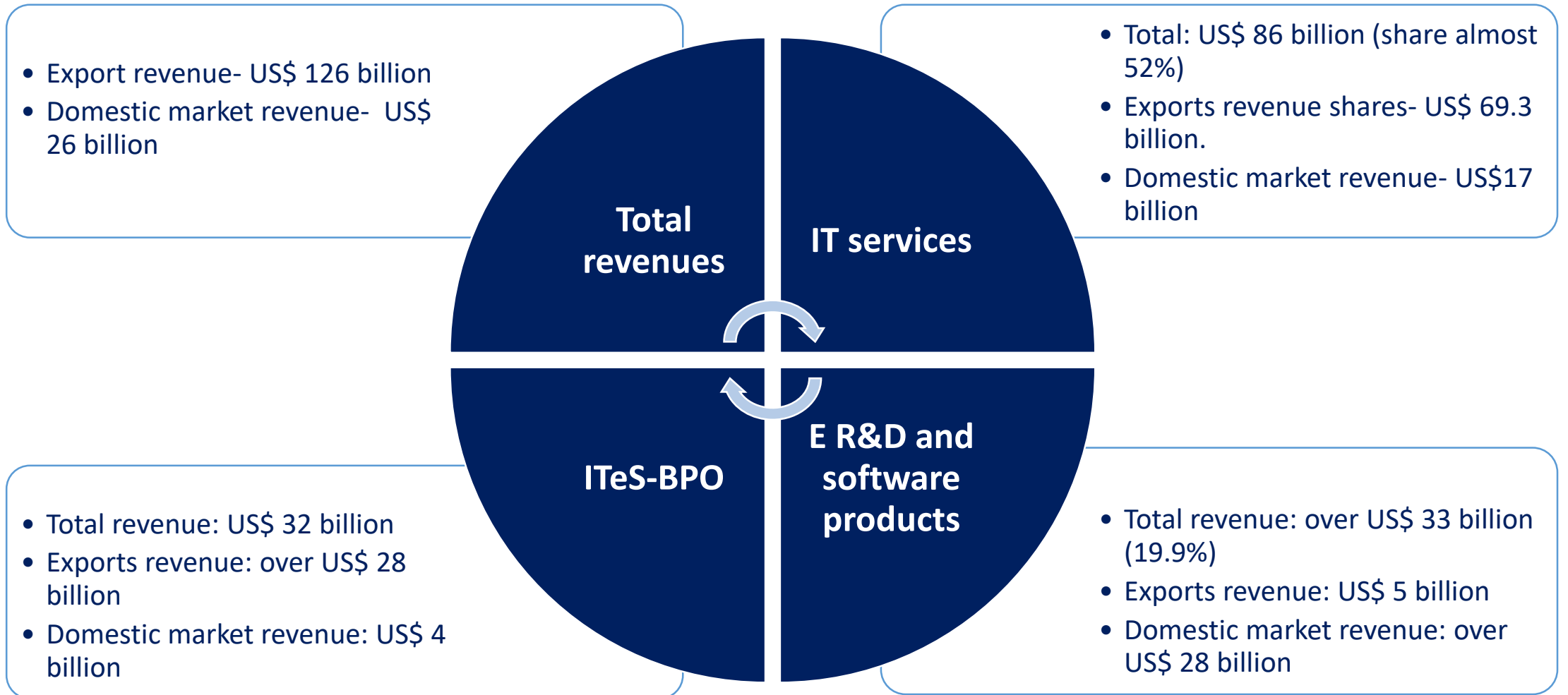# Information Technology (IT) Industry

Introduction

- **Classification:**

  - **Software**

    - Software products (Infrastructure software & Enterprise application software)

    - Engineering and R&D services

  - **IT services**

    - Project Oriented Services (IT consulting, system integration, Custom Application Development & Management (CADM), network consulting & Integration, software testing)

    - IT outsourcing (application management, infrastructure (IS) outsourcing and network infrastructure management

    - Training and support (IT education and training, hardware support and installation and software testing)

  - **information technology enabled services-business process outsourcing (ITeS-BPO)** (Customer interaction services, financing and accounting, HR services and KPO services)

- IT and ITeS sectors go hand-in-hand in every aspect and has emerged as a 'sunrise industry'.

- IT sector contributes around 7.9% to the country's GDP

- Accounts for approximately 55% market share of the US$ 185-190 billion global services sourcing business in 2017-18

- Sector ranks 3rd in India in attracting Foreign Direct Investment (FDI) share and has received US$ 29.825 billion of FDI inflows between April, 2000 and December, 2017.

Market Status (FY18)

- Export revenue- US$ 126 billion
- Domestic market revenue- US$ 26 billion

Total revenues

IT services

- Total: US$ 86 billion (share almost 52%)
- Exports revenue shares- US$ 69.3 billion.
- Domestic market revenue- US$17 billion

ITeS-BPO

E R&D and software products

- Total revenue: US$ 32 billion
- Exports revenue: over US$ 28 billion
- Domestic market revenue: US$ 4 billion

- Total revenue: over US$ 33 billion (19.9%)
- Exports revenue: US$ 5 billion
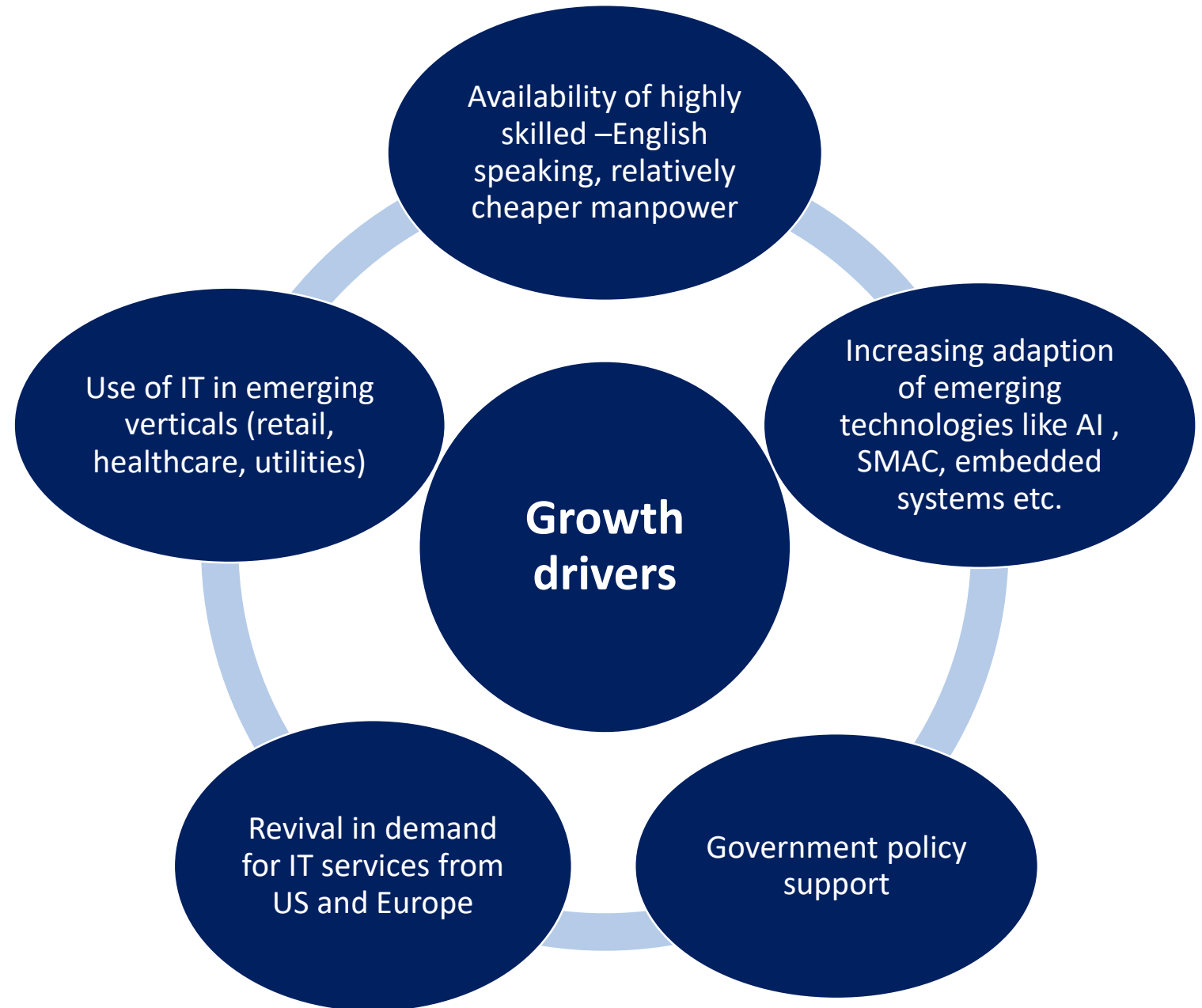- Domestic market revenue: over US$ 28 billion

Major players

Top 5 companies in 2018 based on their revenues:

1. **TCS:** TCS is one of the global leader and generates roughly 70% of the revenue for Tata Sons, and is one of the global leaders in the sector.
2. **Infosys** generated total revenue of INR 60,878 crores (~7.6 billion Euros) in 2018.
3. **Tech Mahindra** had a total revenue of 23,562 crores (~3 billion euros) in 2018.
4. **Wipro** has a total revenue of INR 44,902 crores (~5.6 billion euros) in 2018.
5. **HCL Technologies** generated a revenue of more than INR 21,000 crores (~2.5 billion euros)

Tata Consultancy Services (TCS)

Infosys

Tech Mahindra

Top 5 IT Companies

1
2
3
4
5

HCL Technologies

Wipro
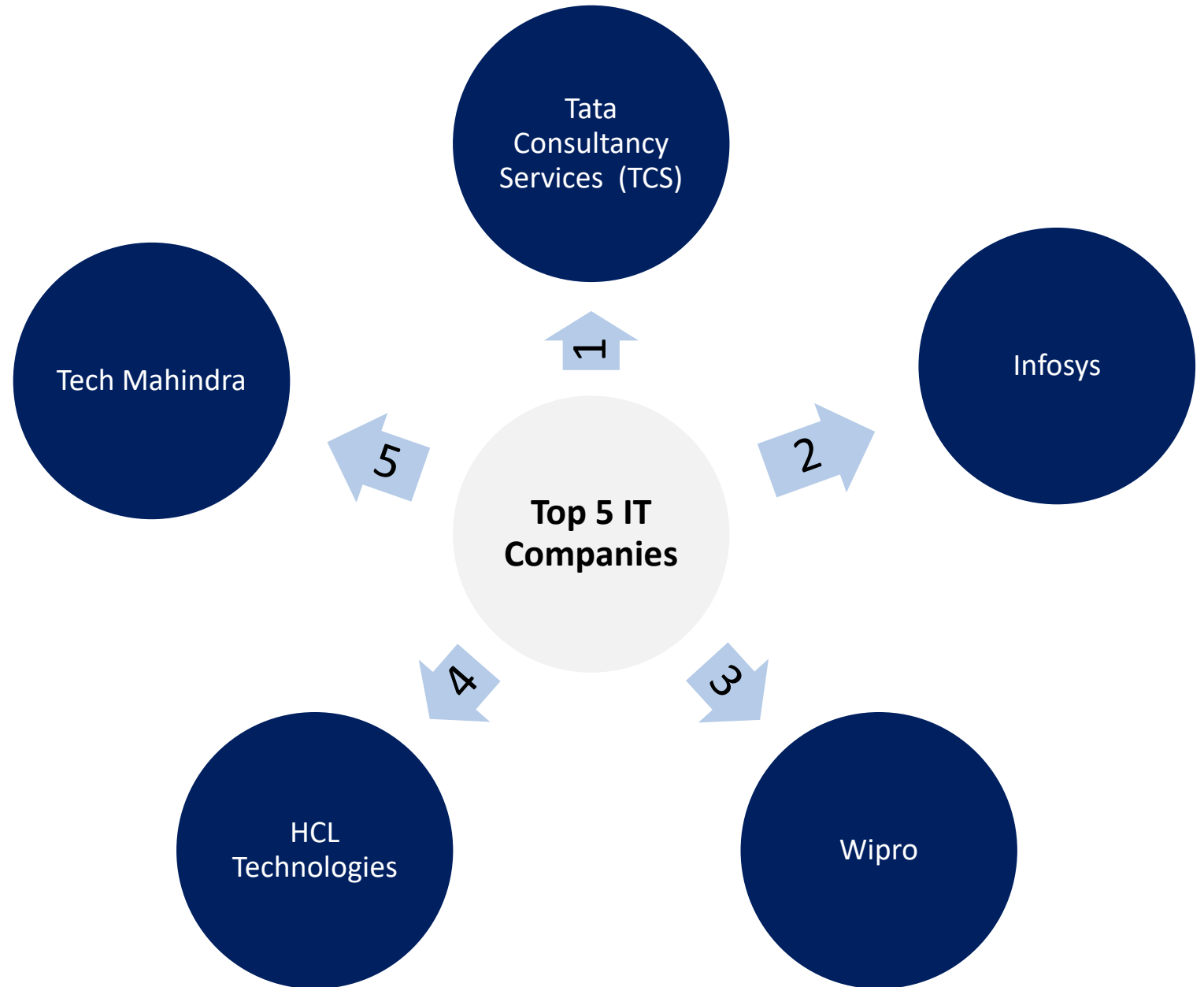
Growth drivers

- Availability of highly qualified talent pool at lower rates helps in cutting the cost for about 60-70 % to source countries.
- Disruptive technologies like AI, Social Media, Mobility, Analytics and Cloud (SMAC), embedded systems etc. are the emerging trends to create new paradigms.
- GoI envisions a digitally equipped India and supporting R&D programmes at every possible level
- Companies proving IT services are stepping ahead for turnaround due to revival in demand from Europe and US.

Availability of highly skilled –English speaking, relatively cheaper manpower

Increasing adaption of emerging technologies like AI , SMAC, embedded systems etc.

Use of IT in emerging verticals (retail, healthcare, utilities)

Growth drivers

Revival in demand for IT services from US and Europe

Government policy support

Telecom Industry

Introduction

- **Classification:**
  - ✓ **Wireless** (Includes mobile phone – GSM and CDMA)
  - ✓ **Wireline** (Includes fixed line telephone and Broadband)
  - ✓ **Other telecommunication services** (internet services, broadband services, VSAT, Mobile Added Value Services etc.)
- World's second largest telecommunications market with a subscriber base of over 1 billion.
- India's mobile economy is growing rapidly and currently constitutes more than 98% of all telephone subscriptions.
- Contributes 6.5% to India's GDP.
- Employs over 4 million people- directly and indirectly and expected to generate over 10 million employment opportunities in next five years on the back of rapid 4G technology deployments, rising data consumption, use of digital wallets and smartphone adoption.
- According to DIPP, the industry has attracted FDI worth more than US$ 30 billion during the period April 2000 to March 2018.

Market Status

- **As of November 2018, total telephone subscribers are stood at around 1194 million**

  - ✓ **Wireless subscribers -1171.76 million** (Urban- over 645 million, Rural – over 526 million)

  - ✓ **Wireline subscribers – 21.96 million** (Urban- over18 billion, Rural- over 3 million)

- **Broadband subscribers- 511.9 million** (over 490 million are wireless subscribers and 18 million are wired subscribers.

- Telecom density (At the end of November 2018):

  - ✓ **Overall:** 91.21%

  - ✓ **Urban:** 159.81 %

  - ✓ **Rural:** 59.27 %

  - ✓ **Wireless:** 89.54% (urban- 155.28%, rural- 58.92%)

  - ✓ **Wireline**: 1.68% (Urban- 4.53%, rural- 0.35%)

- As of March 2018, India's internet population sits at 493.96 million and expected to reach 600 million by 2020.

- According to Swedish telecom gear maker Ericsson, monthly data usage per Smartphone in India is expected to increase from 3.9 GB in 2017 to 18 GB by 2023

Major Players

- According to TRAI, as on Nov. 2018, private access service providers held 89.99% market share of the wireless subscribers whereas **Government owned BSNL and MTNL** had a market share of only 10.01%.
- Telecom giants Vodafone India and Idea Cellular have become a single merged entity and now known as **Vodafone Idea Ltd.**
- **Rank of telecom companies based on their wireless subscribers as on Nov. 2018**
  1. Vodafone-Idea : over 420 million
  2. Bharti Airtel: over 340 million
  3. Reliance Jio: over 270 million
  4. BSNL & MTNL: ~114 million & 3.5 million respectively
  5. TATA Teleservices: ~20 million*
- Shareholders of Bharti Airtel has approved the proposed merger with Tata Teleservices and approval from National Company Law Tribunal (NCLT) is expected to be finished by March 2019.

* Tata Teleservices has merged with Bharti Airtel

Vodafone-Idea
(35.94%)

TATA
Teleservices
(1.71%)

Bharti Airtel
(29.17%)

Telecom companies

1

2

3

4

5

BSNL &
MTNL
(10.01%)

Reliance Jio
(23.17%)
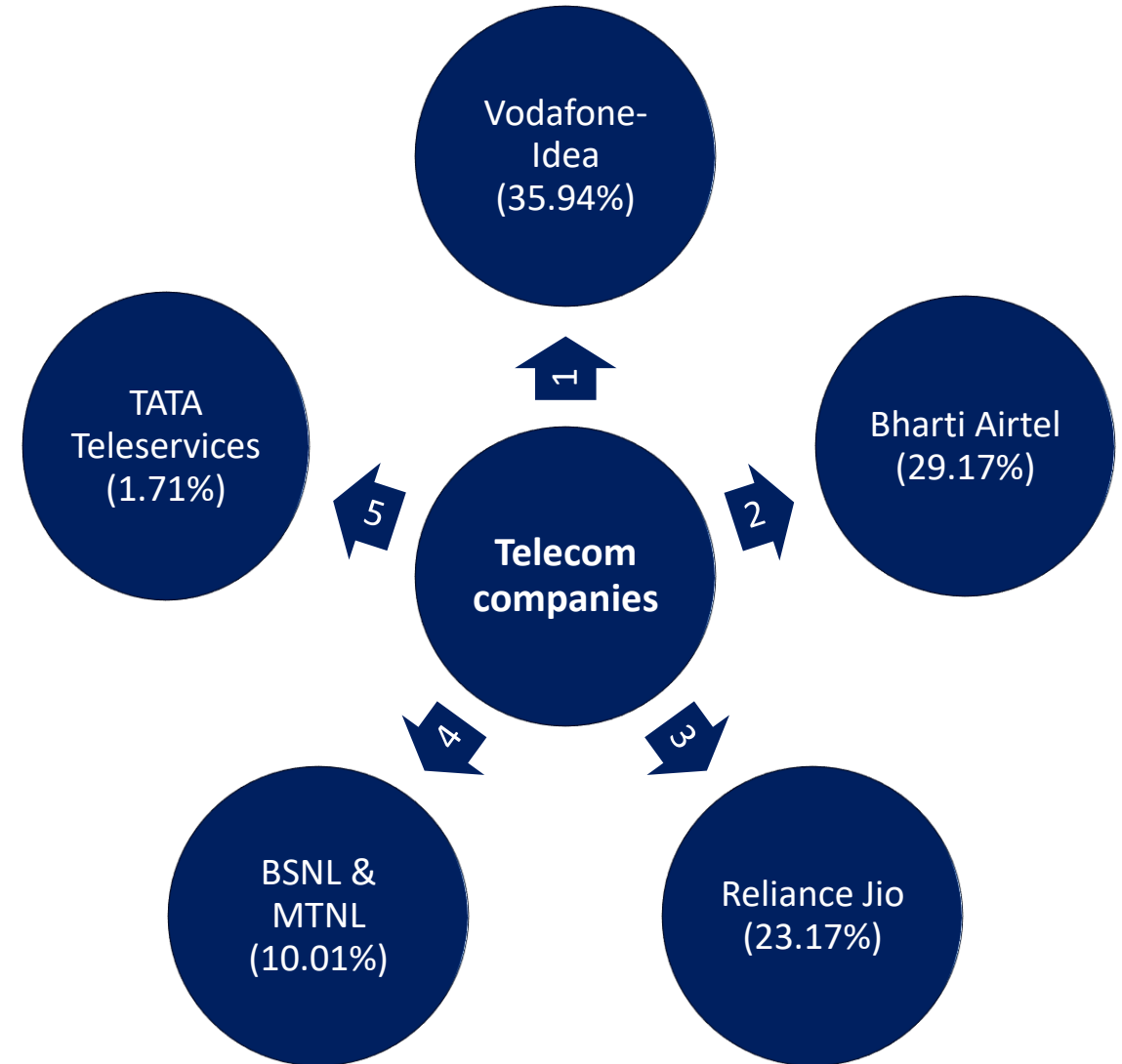
Growth drivers

- **Growing young population & changing lifestyle:** Mobile internet is predominantly used by youngsters, with 46% of urban users and 57% of rural users being under the age of 25.

- **Increasing rural market**: Next wave of growth in mobile internet users is going to come from rural areas, where mobile data penetration is very low compare to urban areas.

- **Favorable policy support**: GoI is taking major steps such as Digital India Programme, National Digital Telecommunication Policy 2018, National e-Governance Plan etc. to promote R&D, Innovation and to attract investment in Telecom sector in India.

Growing young population & changing lifestyle

Growth drivers

Favorable policy support

Increasing rural market
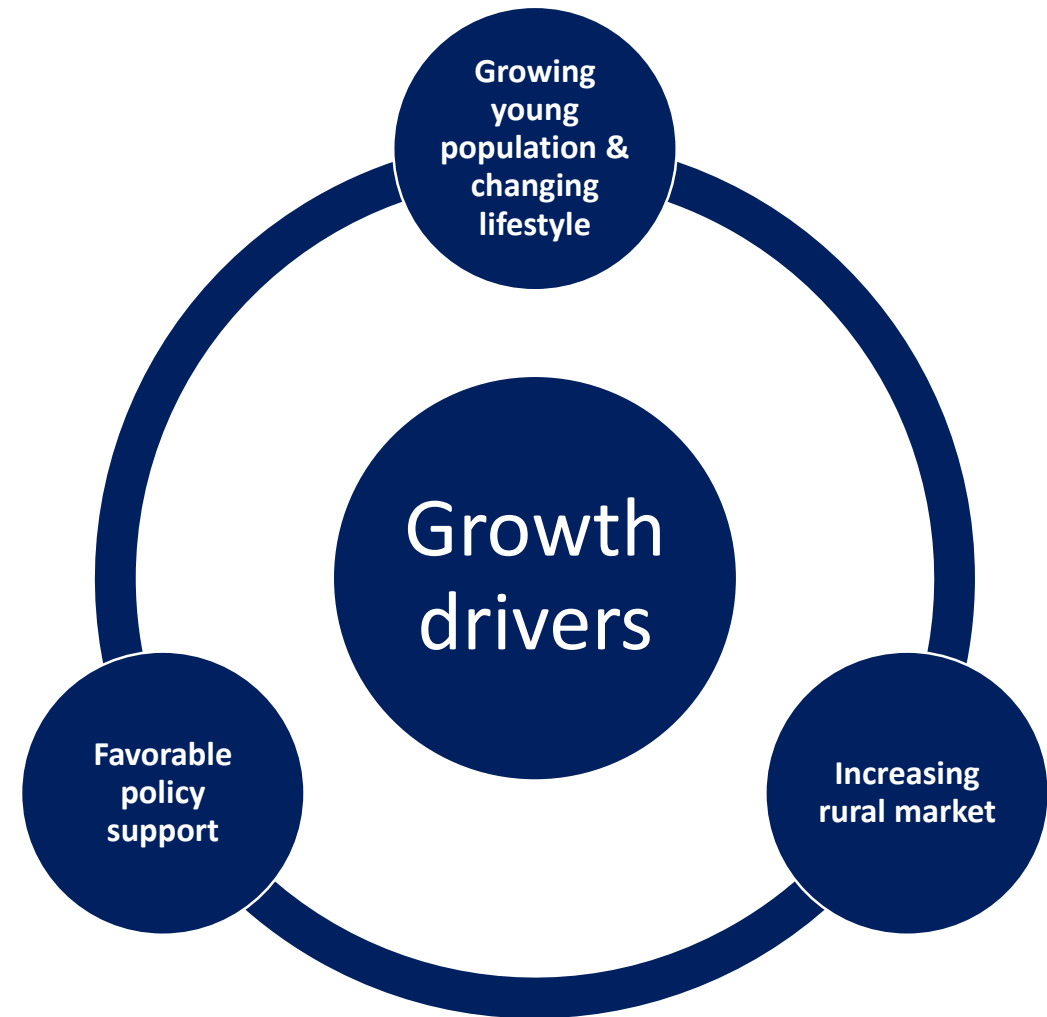
Government policies & New initiatives in ICT sector

National Digital Communications Policy 2018

- Union Cabinet approved the National Digital Communications Policy-2018 (NDCP-2018) in September 2018

- NDCP envisions supporting India's transition to a digitally empowered society and a knowledge economy.

- **The key objectives of policy are:**
  - ✓ Provisioning of Broadband for All
  - ✓ Creating 4 Million additional jobs in the Digital Communications sector
  - ✓ Enhancing the contribution of the Digital Communications sector to 8% of India's GDP from ~ 6% in 2017
  - ✓ Propelling India to the Top 50 Nations in the ICT Development Index of ITU from 134 in 2017
  - ✓ Enhancing India's contribution to Global Value Chains
  - ✓ Ensuring Digital Sovereignty

- **Mission**:
  - ✓ **Connect India**: Creating Robust Digital Communications Infrastructure
  - ✓ **Propel India**: Enabling Next Generation Technologies and Services through Investments, Innovation and IPR generation
  - ✓ **Secure India**: Ensuring Sovereignty, Safety and Security of Digital Communications

Download National Digital Communications policy 2018>>

Internet of Things (IoT) policy 2016

- Department of Electronics and Information Technology (DeitY) has drafted India's first 'IoT Policy' in October 2016

- **Key Objectives:**

  ✓ To create an IoT industry of USD 15 billion by 2020

  ✓ To undertake capacity development (Human & Technology) for IoT specific skill sets for domestic and international markets

  ✓ To undertake Research & development for all the assisting technologies

  ✓ To develop IoT products specific to Indian needs in all possible domains such as agriculture, health, water quality, natural disasters, transportation, security, automobile, supply chain management, smart cities, automated metering and monitoring of utilities, waste management, Oil & Gas) etc.

  ✓ To facilitate global and national participation of industry and research bodies with relevant global Service Setting Organizations (SSOs) for promoting standards around IoT technologies developed in the country

- IoT Policy will support the initiatives taken by GoI to develop connected and smart IoT based system for our country's Economy, Society, Environment and global needs.

Download Internet of Things (IoT) policy >>

National Telecom M2M Roadmap 2015

- Department of Telecom (DoT) released the 'National Telecom M2M Roadmap' for growth of M2M in 2015.

- **Focus Areas:**

  ✓ Efforts towards assimilation of various Machine to Machine (M2M) standards

  ✓ Outline of policy and regulatory approaches for M2M

  ✓ Plans to boost M2M manufacturing as a part of 'Make In India' initiative

  ✓ Building M2M communication infrastructure

  ✓ Road ahead for M2M initiatives and plans

  ✓ Approach towards M2M adoption in different sectors of economy.

- DoT has released draft guidelines for M2M Service Providers Registration in 2016.

- In September 2017, Telecom Regulatory Authority of India (TRAI) has **recommended** that all telecom licence holders should be allowed to provide M2M service using any spectrum.

- In 2018, DoT issued **13-digit numbers to telecom operators** for the trial of M2M communications and **M2M guidelines** in relation to SIM cards used for M2M communication services.

Download National Telecom M2M Roadmap 2015>>

Digital India

- GoI launched Digital India on 1 July 2015 to transform India digitally empowered society and knowledge economy.

- **Three core components**

  1. Development of secure and stable Digital Infrastructure
  2. Delivering government services digitally
  3. Universal Digital Literacy

- **Nine Pillars**

  1. Broadband Highways
  2. Universal Access to Phones
  3. Public Internet Access Programme
  4. e-Governance - Reforming government through Technology
  5. e-Kranti - Electronic delivery of services
  6. Information for All
  7. Electronics Manufacturing - Target NET ZERO Imports
  8. IT for Jobs
  9. Early Harvest Programmes

Read more about Digital India programme>>

National Cyber Security Policy 2013

- Launched by GoI to protect information, such as personal information, financial/banking information, sovereign data etc.

- **Key objectives:**
  - ✓ To create a secure cyber ecosystem in the country
  - ✓ To create an assurance framework for design of security policies
  - ✓ To strengthen regulatory framework for ensuring a secure cyberspace ecosystem
  - ✓ To enhance and create National and Sectoral level 24X7 mechanism for obtaining strategic information regarding threats to ICT infrastructure, creating scenarios for response, resolution and crisis management through effective predictive, preventive, protective response and recovery actions.
  - ✓ To enhance protection and resilience of Nation's Critical Information Infrastructure (CII) by operating 24X7 a National Critical Information Infrastructure Protection Centre (NCIIPC)
  - ✓ To develop suitable indigenous technologies
  - ✓ To improve visibility of the integrity of ICT products and services
  - ✓ To enhance global cooperation

Download National Cyber Security Policy 2013>>

National Policy on Information Technology 2012

- Government launched the **National Policy on Information Technology 2012**, which aims to make at least one individual in every household e-literate among other objectives.

- **Key objectives:**
  - ✓ To transform India into a global hub for the expansion of language technologies.
  - ✓ Target of IT Exports: 200 Billion USD by 2020 (currently US$ 126 billion (FY 18))
  - ✓ To develop a pool of 10 million skilled manpower in the Indian ICT sector.
  - ✓ To achieve significant market share in global technologies and services.
  - ✓ To offer fiscal benefits to foreign investors and Small Medium Enterprises (SMEs).
  - ✓ To promote adoption of ICTs in strategic and economic sectors to enhance the productivity and competitiveness of ICT
  - ✓ Enhance transparency, accountability, efficiency, reliability and decentralization in Government
  - ✓ Strengthening the Regulatory Framework
  - ✓ Adopt open standards and promote open source and open technologies etc.

Download National Policy on Information Technology 2012>>

Some other policy & new initiatives

- **Bharatnet**, the world's largest rural broadband project is being implemented by GoI to deploy high-speed optical fibre cable (OFC) network to all the 2.5 lakhs gram panchayats across India.

- **High Level Forum for 5G India 2020** constituted by Ministry of Communications (MoC) has released a report titled "**Making India 5G Ready**".

- NITI Ayog has unveiled its **discussion paper on national strategy on AI** which aims to guide research and development in new and emerging technologies.

- MeiTY launched **Phased Manufacturing programme (PMP)** for promoting the growth of domestic manufacturing of Cellular mobile handsets.

- **Mandatory Testing and Certification of Telecom Equipments (MTCTE)** is being implemented by TEC in India and will come into effect from April 2019.

- MeiY set up **Software Technology Parks of India** with the objective of encouraging, promoting and boosting the Software Exports from India.

- Government approved **India BPO Promotion Scheme (IBPS)** under Digital India Programme, to incentivize BPO/ITES Operations across the country.

- 100% FDI & Delicensing
  - IT industry: 100% through automatic route
  - Telecom industry: 49% through automatic route and 51% through the FIPB (Foreign Investment Promotion Board) approval route

Standardization bodies
(Bureau of Indian Standards (BIS), Telecommunications Standards Development Society of India (TSDSI) & Telecommunication Engineering Centre (TEC))

Bureau of Indian Standards (BIS)

- **BIS has Electronics and Information Technology Division Council (LITDC):**
  - ✓ Covers standardization in the field of electronics and telecommunications including information technology.
  - ✓ 30 technical committees and has developed more than 1600 standards till date.
    - o **LITD 13: Information And Communication Technologies** prepares standards relating to : a) computer communication networks and interfaces to these computer communication networks including microprocessor systems, interfaces, protocols and associated interconnecting media for information and communication technology equipment etc. b) Telecom equipment and associated systems & devices. It is national mirror committee of ISO TC- 25 SC- 25 (P); ISO TC- 35 SC- 35 (P); ISO TC- 6 SC- 6 (O)
    - o **LITD 27: Internet of Things and related technologies**: National Mirror Committee for **ISO/IEC JTC 1/SC 41**
    - o **LITD 28: Smart Infrastructure: LITD 28** prepares standards in the field of Smart Cities (Electro-technical and ICT aspects) and related domains including Smart manufacturing & Active assisted living. It is the mirror committee of IEC TC-SyC SC.
      - o LITD 28 has released a **Pre-Standardization Study Report on Technical Requirements Analysis of Unified, Secure & Resilient ICT Framework for Smart Infrastructure**.
    - o **LITD 29: Blockchain & Distributed Ledger Technologies** is responsible for standardization work in the field of blockchain technologies and distributed ledger technologies. It is the National Mirror Committee of **ISO/TC 307**.
    - o **LITD 30: Artificial Intelligence (AI):** the National Mirror Committee for **ISO/IEC JTC1/SC42**.
  - **List of standards published by LITDC is available here**

Telecommunications Standards Development Society, India (TSDSI)

- Government recognized body
- TSDSI Study Group on IoT/M2M has published **9 technical reports** covering Indian Use cases.
  - List of technical report is available **here**
- Technical activities are conducted in two Study Groups as below:
  1. **Study Group - Networks (SGN):**
     - ✓ Wireless communication systems
     - ✓ Backhaul using wireless & wireline
     - ✓ Spectrum studies.
     - ✓ Interference studies
  2. **Study Group - Services and Solutions (SGSS)**
     - ✓ Definition of requirements for telecom industry and related services and applications
     - ✓ Development of end-to-end service capabilities and architecture, based on the requirements
     - ✓ Security and Privacy aspects in the end to end telecom networks.
     - ✓ Energy performance for telecommunication networks
     - ✓ Recommendations of test requirements and evaluation methodologies for any service level conformance testing activities
- TSDSI coordinate, contribute and work with global SDOs such as 3GPP, oneM2M & ITU etc.
- TSDSI transposes 3GPP Specifications and oneM2M Specifications

More information is available here>>

Telecommunication Engineering Centre (TEC)

- TEC is the engineering wing of DoT which is responsible for drawing up of standards; generic, interface & service requirements and specifications for telecom products, service and networks.

- M2M WGs at TEC have released **13 Technical Reports** (Release 1 and Release 2).
  - Technical reports are available **here**

- **National Working Groups (NWGs)** corresponding to respective ITU-T Study Groups:
  - ✓ NWG-5- Environment and climate change
  - ✓ NWG-9, Television and sound transmission and integrated broadband cable networks.
  - ✓ NWG-11,Signaling requirements, protocols and test specifications
  - ✓ NWG-12, Performance, QoS and QoE
  - ✓ NWG-13, Future networks including mobile and NGN
  - ✓ NWG-15, Optical transport networks and access network infrastructures
  - ✓ NWG-16, Multimedia coding, systems and applications
  - ✓ NWG-17, Security
  - ✓ NWG- 20, for submitting contribution in ITU-T Study Group-20 ((IoT and its applications in Smart Cities)):- NWG 20 is having members from all stakeholders.

More information is available here

R&D and Innovation

R&D and Innovation

	Centre for Development of Advanced Computing (C-DAC)	• Premier R&D organization of MeitY for carrying out R&D in IT, Electronics and associated areas. • Setting up of C-DAC itself was to build Supercomputers in context of denial of import of Supercomputers
	Centre for Development of Telematics (C-DOT)	• Autonomous Telecom R&D centre of DoT, GoI • Developing latest technologies products while working on futuristic technologies like M2M/IoT, 5G, AI etc. • C-DOT has developed CCSP(C-DOT Common Service Platform)
	Centre of Excellence in Wireless and Information Technology (CEWiT)	• An autonomous research Society of **IIT Madras** • Plays a key role in building a dynamic wireless R&D ecosystem in India

R&D and Innovation

Telecom Centres of Excellence (TCoE)

- Created as a PPP initiative by DoT to strengthen the R&D in ICT sector
- TCOE initiative became reality with the signing of tri-partite MoUs between DoT, GoI, Institutes, and the sponsors from the Industry
- The eight largest Telco's have joined the initiative as Principal Sponsors.

Centre of Excellence for internet of Things (CoE-IoT)

- CoE-IoT was announced as a part of Digital India Initiative.
- NASSCOM is establishing CoE-IoT along with Meity/Deity, ERNET and State Governments to build IoT ecosystem in India

Conclusion

- Indian ICT industry has become catalysts of higher Gross Domestic Product (GDP) growth.

- The next phase of growth in the industry is hinged on convergence of ICT.

- As Government of India has set its vision to propel India to the Top 50 Nations in the ICT Development Index of ITU by 2022, new and emerging technologies such as Internet of Things (IoT), Machine to Machine communication (M2M), 5G, Artificial Intelligence (AI), Blockchain, Big data etc. by far the greatest opportunities.

- India has started work on identifying and formalizing standards for implementing above mentioned new and emerging technologies. Standardization work must be tabled at global standardization platforms for their harmonization.

- With the emergence of IoT, M2M communications and increased digitization of societies, cyber-security and a secured network infrastructure are critical needs for any country and India has to become self-reliant in this important area.

For additional information on Information and Communication Technology (ICT) Standards & Policy initiative covering M2M/IoT and its role in Smart Cities and Cyber Security please click here and download the study report which was released during 3rd Indo European Conference of standards and Emerging Technology, held in April 2018 in New Delhi.

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