



DIGITAL ECONOMY & CYBER SECURITY

(DIGITAL ↔ DIGITAL ECONOMY ↔ DIGITAL SECURITY = A 3D APPROACH)

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Indian Economic Growth

Migration towards Digital Age

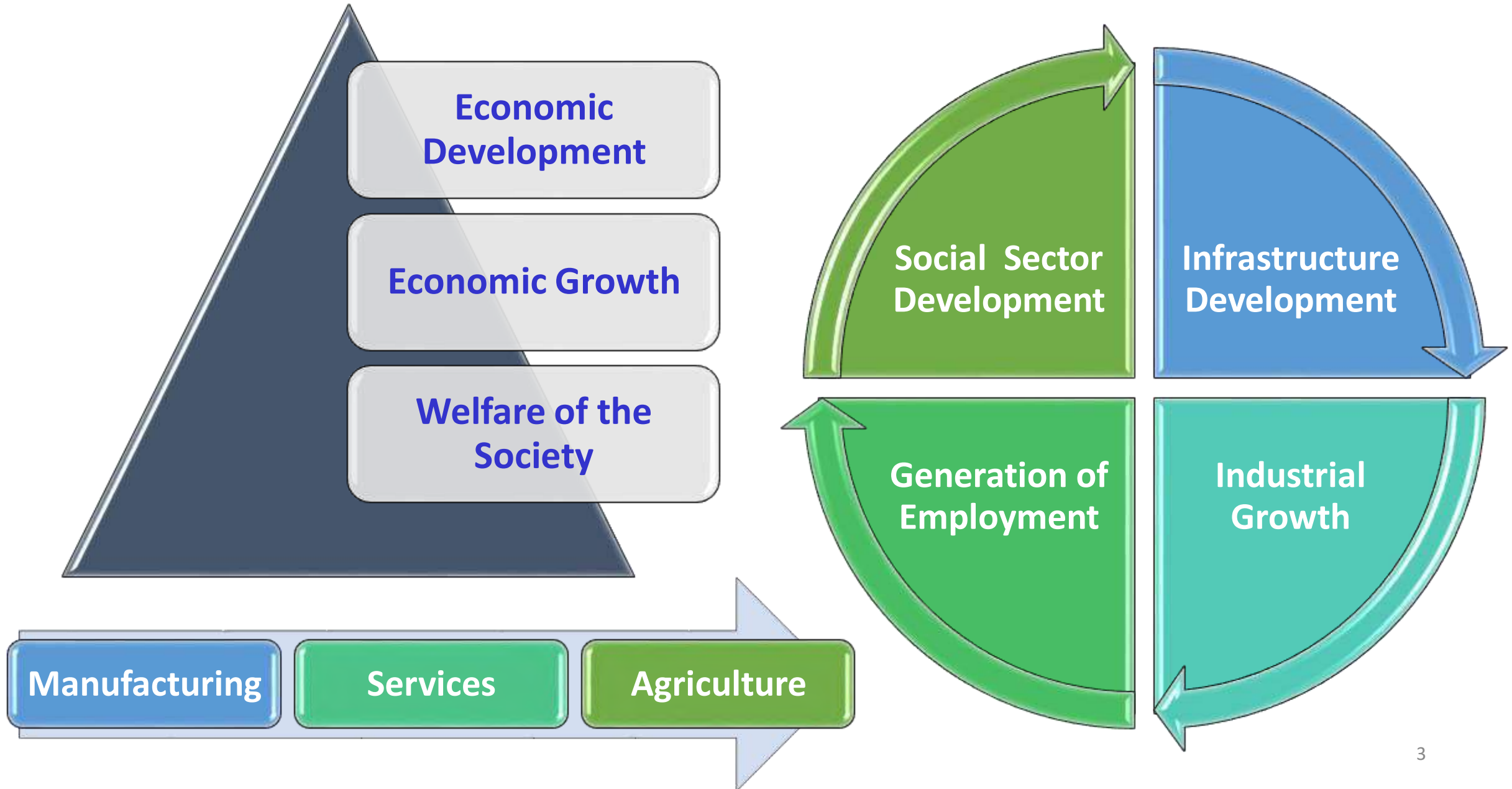
Digital Enabling Infrastructure Technologies

Digital Economy : Banking, Fintech, E-Comm and Infrastructure

Digital Security – Cyber Security

Way Ahead and Conclusion

BHARAT – THE LEADING & EMERGING ECONOMY



Partnered in Indian Economic Growth Story – Industry & Infrastructure

(Followed 60 years of 12 Five Year Economic Plans of India and following the Present Economic Plans)



Core Manufacturing

- Steel & Alloys
- Petrochemical
- Cement
- Capital Goods
- Light & Heavy Engineering
- Electrical Machines
- Electronics



Agriculture & Other Traditional

- Textiles
- Sugar
- Paper
- Fertilizer
- Food Processing
- Chemical
- Pharma

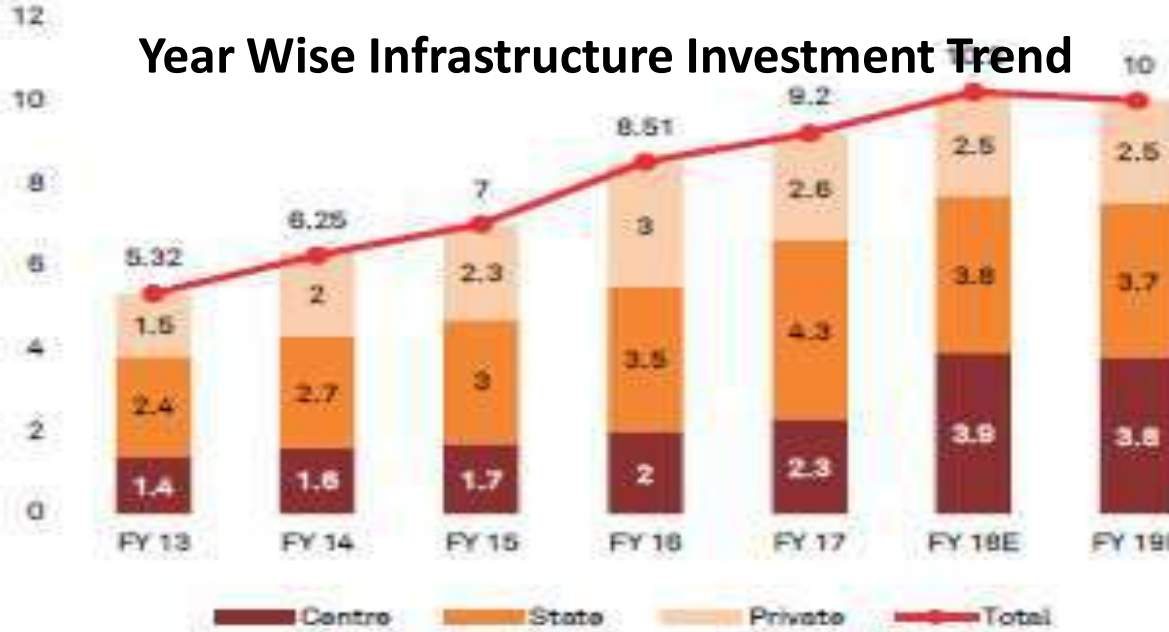


Infrastructure & Services

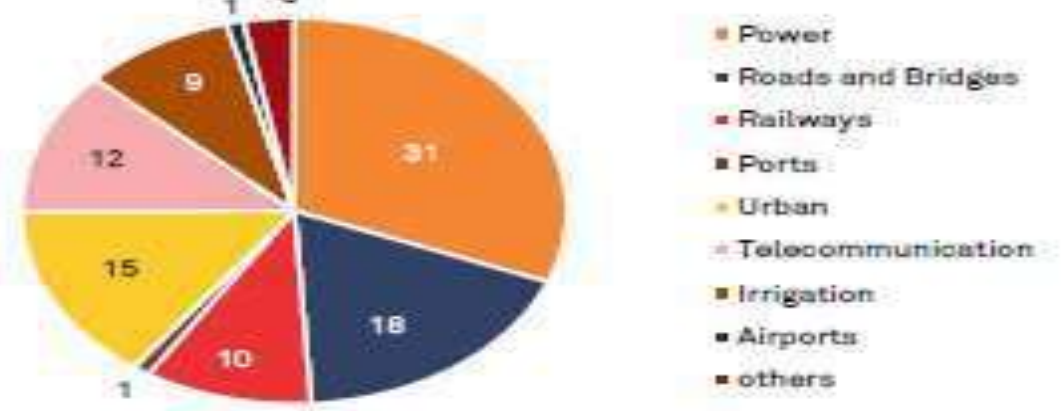
- Power Sector
- Road Sector
- Port Sector
- Telecom Sector
- Shipping & Airports
- Hospitals
- Tourism & Hospitality

INFRASTRUCTURE INVESTMENT PATTERN & SEGMENTS IN INDIA

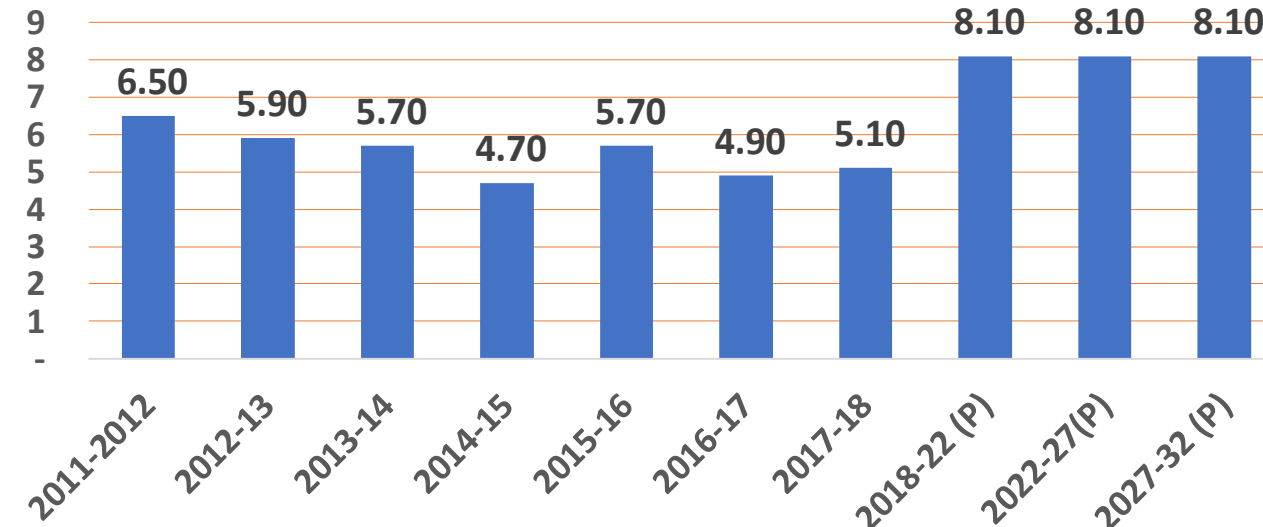
Year Wise Infrastructure Investment Trend



Sector wise share (%) in infrastructure investments during fiscals 2013-2019



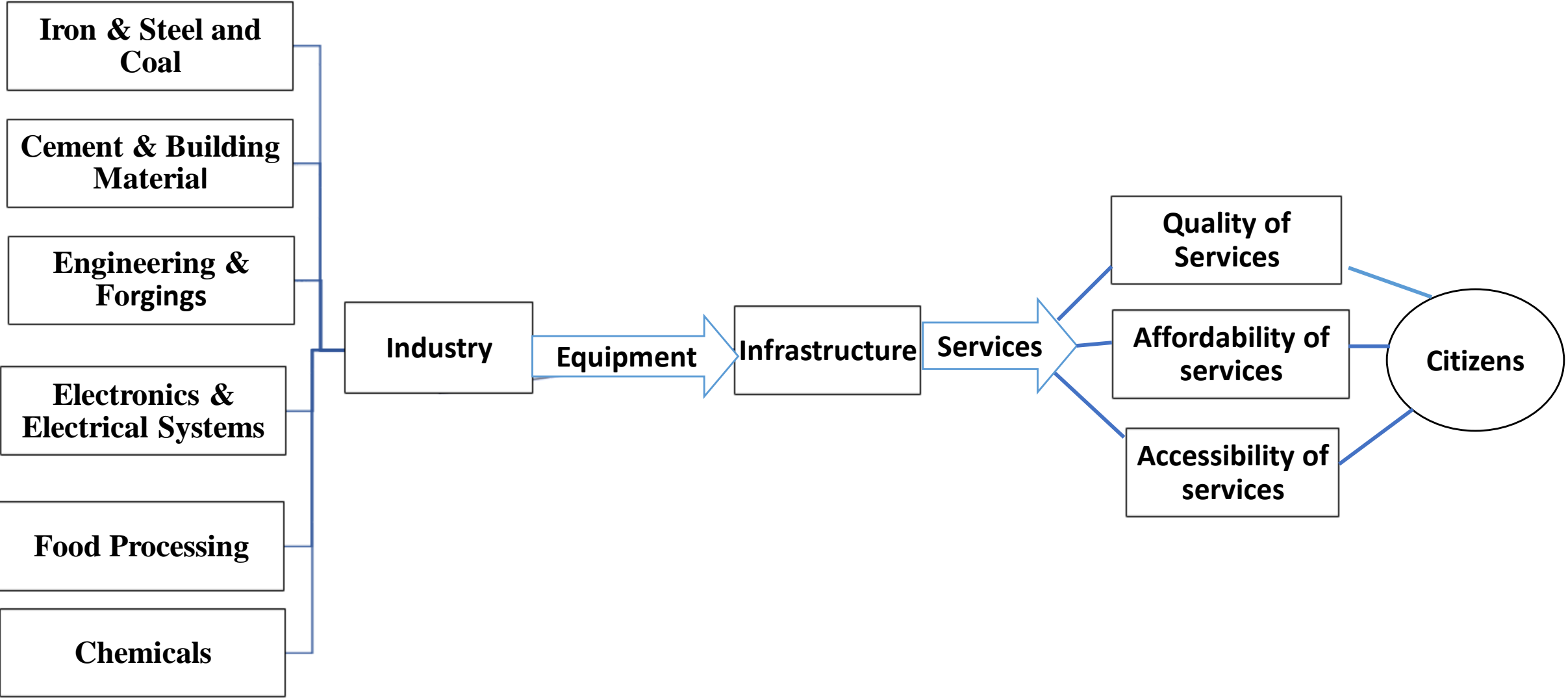
Infra Spending as % to GDP



Source: Appraisal documents for five-year plans, CRIS estimates (Investments mentioned are at current prices)

- Power, Roads & bridges, Telecommunications, railways, irrigation and urban accounted for ~85% of the infrastructure investment in India during FY 2013-2019.
- The **Centre NIP Rs 111 Crores** and states are the major funding sources for infrastructure sectors, with almost 50% participation from the Private Sector.

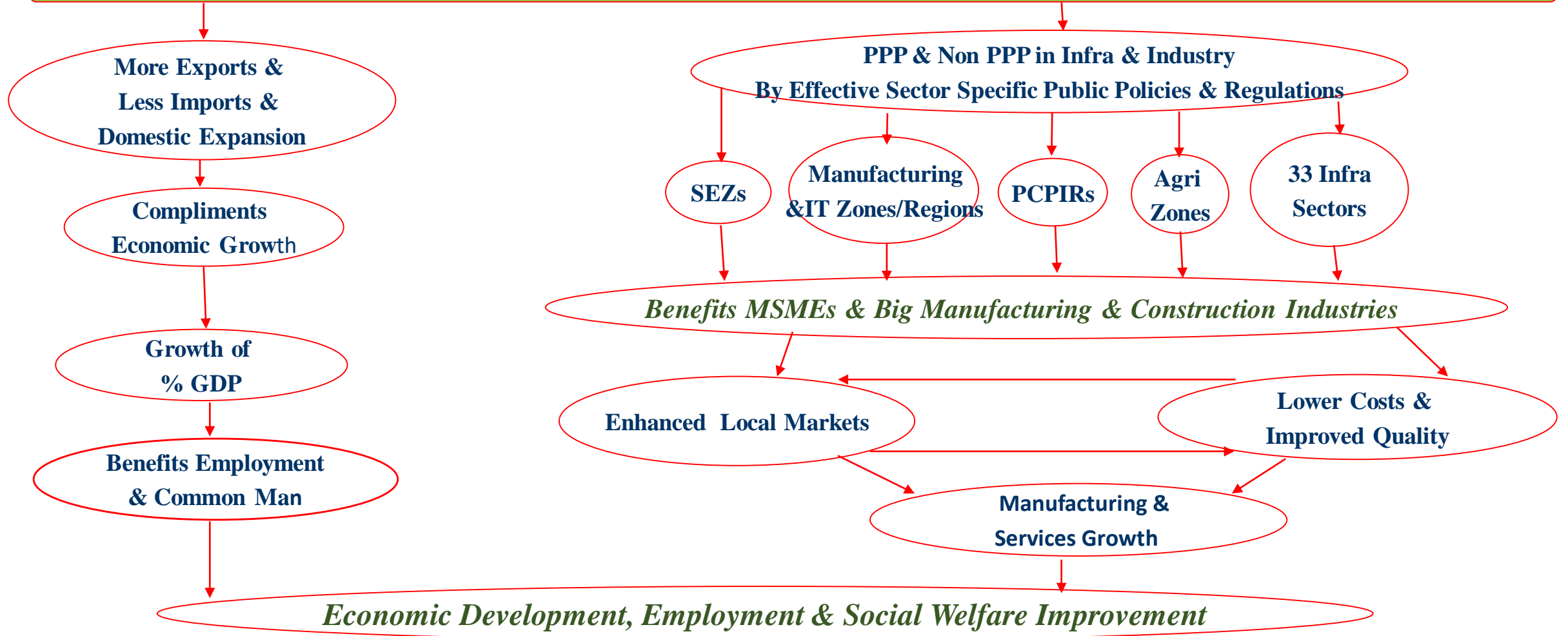
Integration of Infrastructure & Core Industry Ecosystem for Economic Growth



DEVELOPMENT FINANCE A CATALYST FOR CAPITAL FORMATION & EMPLOYMENT CREATION

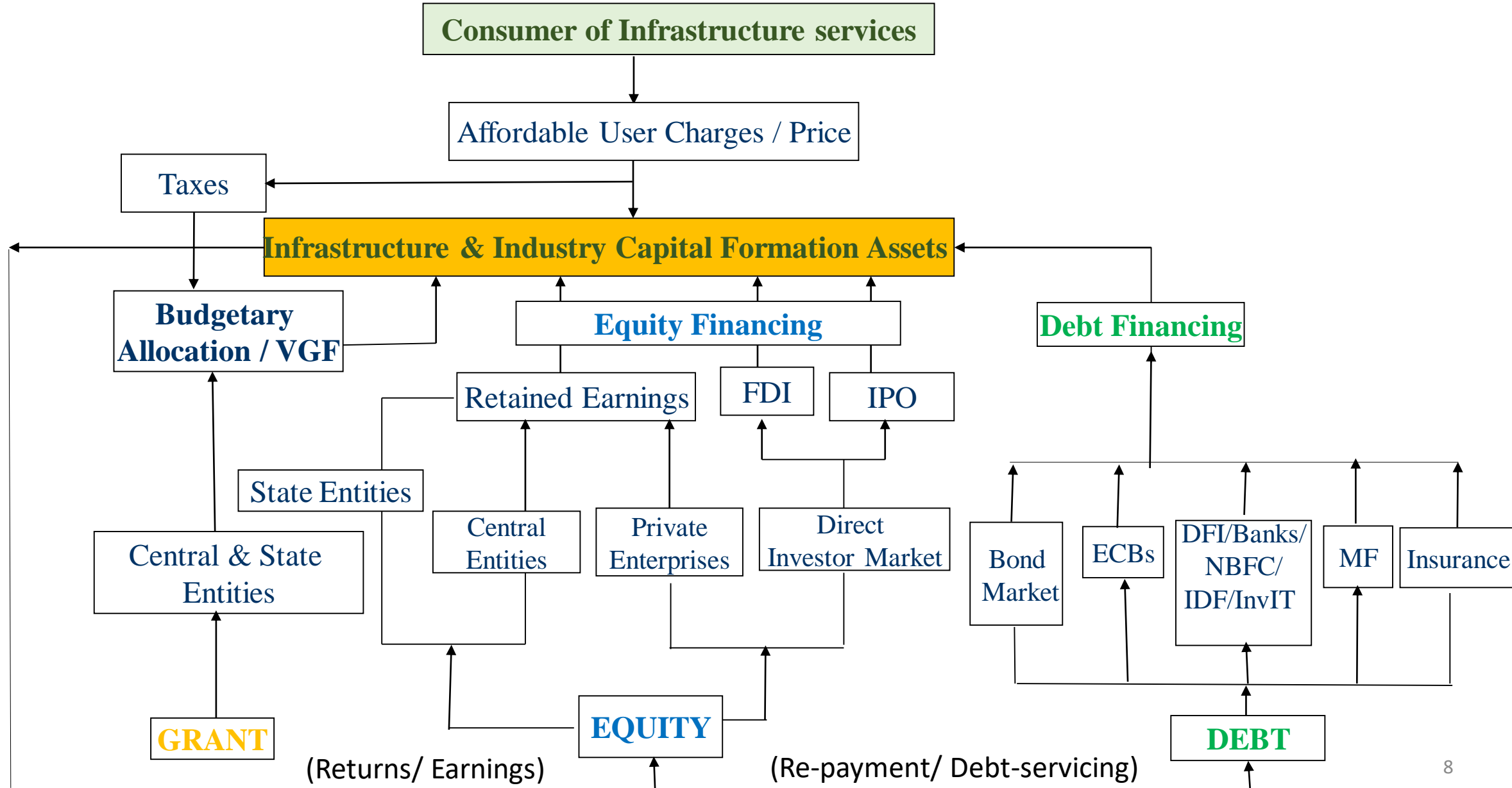
INDIAN INFRASTRUCTURE & INDUSTRY ECOSYSTEM

INTEGRATED INDIAN INFRA & INDUSTRY ECO-SYSTEM FOR DEVELOPMENT & GROWTH

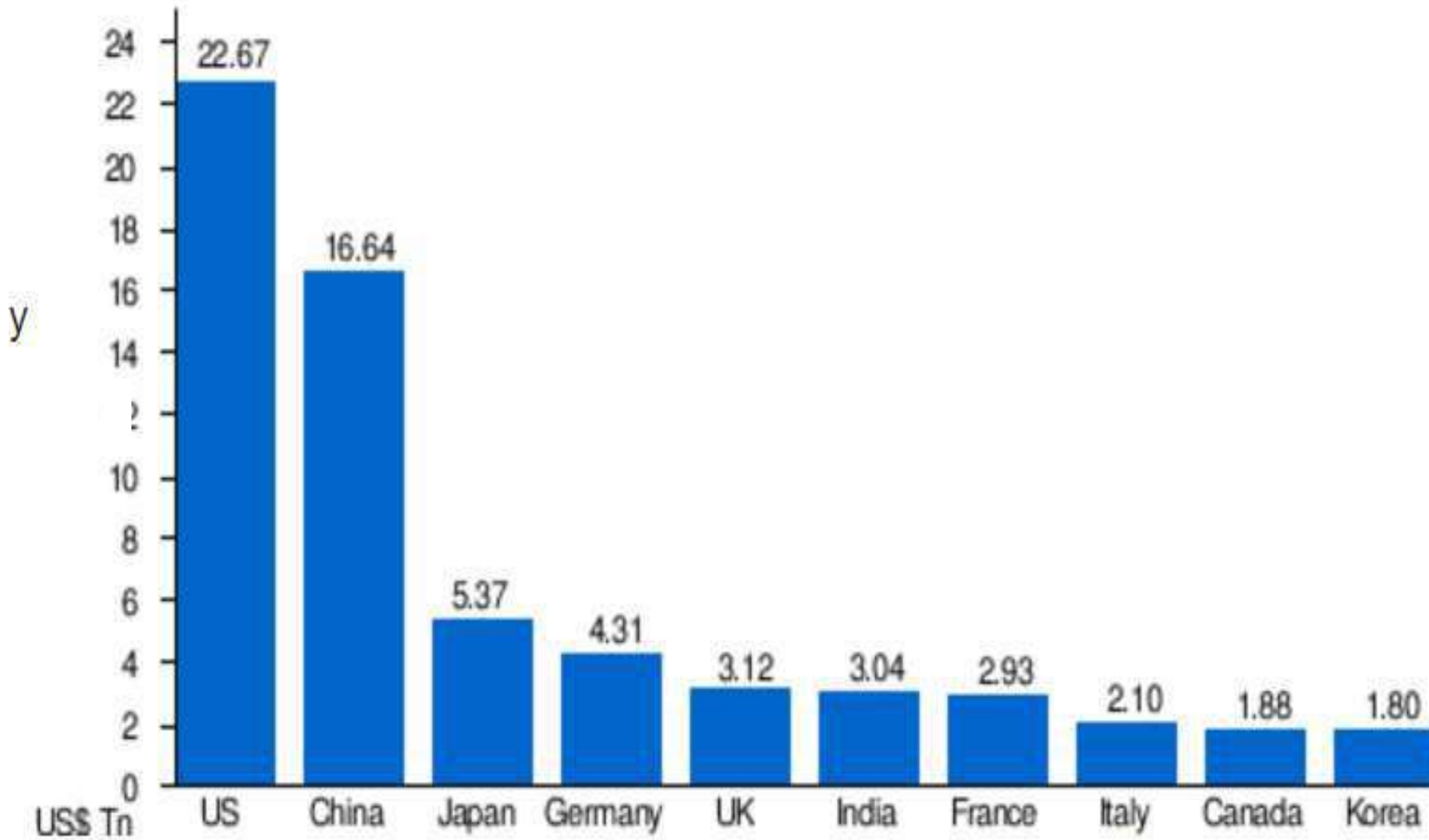


IMPACT : Capital Formation, Employment Creation, Cheaper & Quality Products & Services , Boosting Consumption, Lowers CAD

INFRASTRUCTURE & INDUSTRY FINANCING NETWORK = CAPITAL FORMATION



Indian Economic Growth Trends



Largest economies by nominal GDP in 2021^[1]

5th Largest Country after US, China, Japan, Germany

India FY 23 GDP with \$3.4 Tn to become 3rd largest by 2030

IMF: Countries GDP Projections of 2023

World Output Projection 2023

Real GDP, annual percent change



For India, data and forecasts are presented on a fiscal year basis. India's growth projections are 5.4% in 2023 and 6.3% in 2024 based on the calendar year.

Source: World Economic Outlook IMF

April 2023

Bloomberg: Recession of Countries 2023

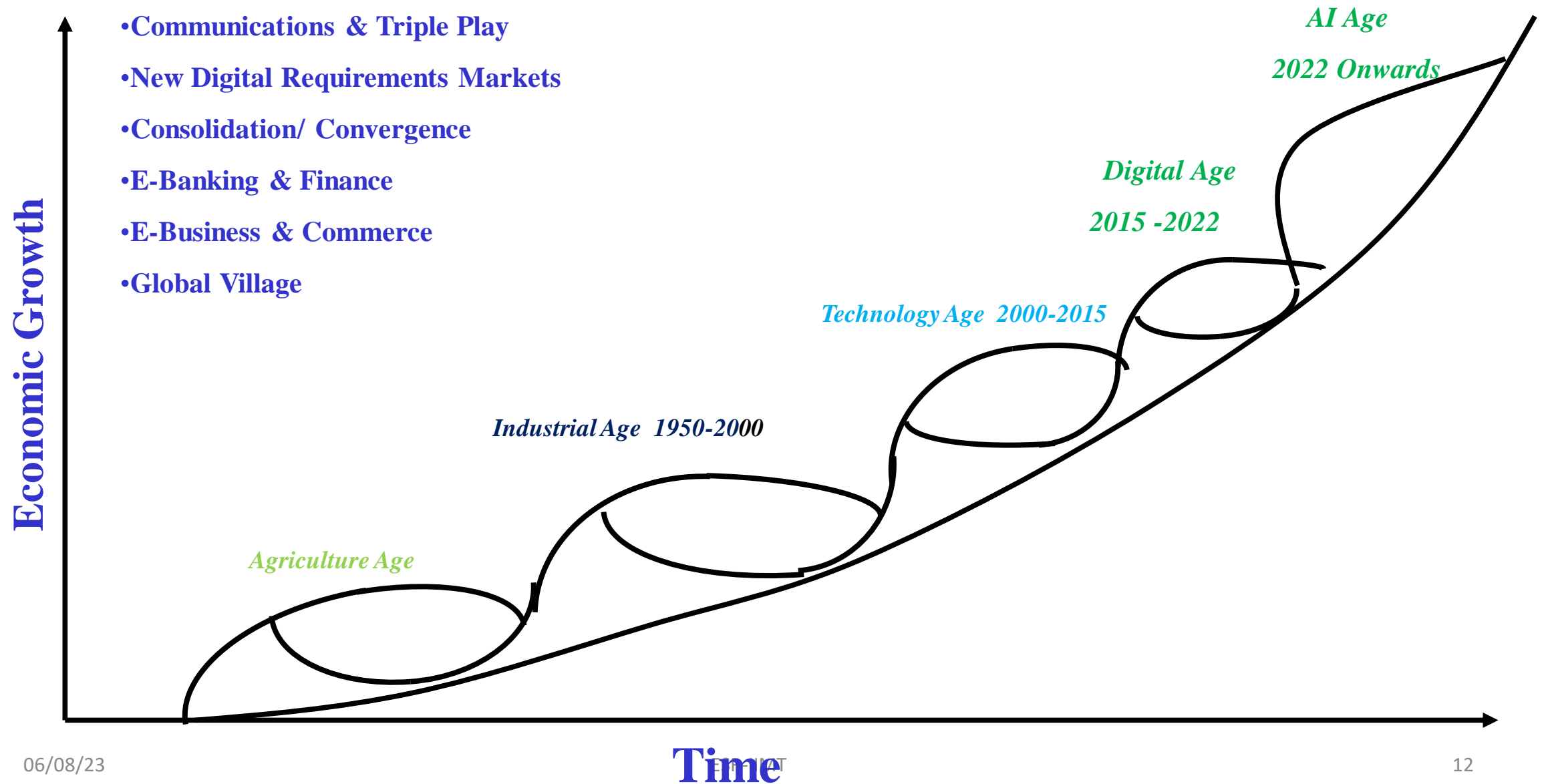
Recession Probabilities Worldwide 2023



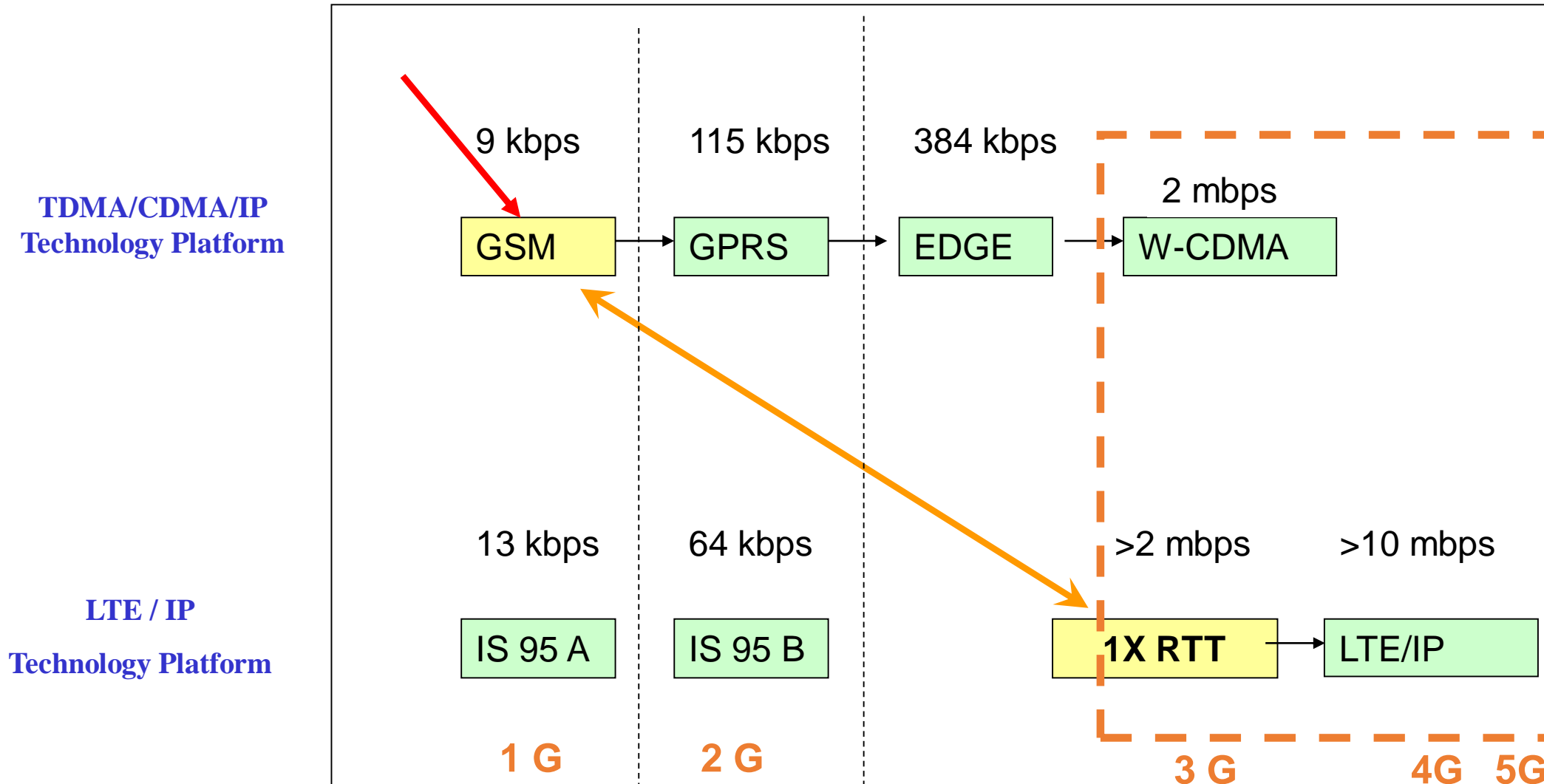
Source: Bloomberg | April 2

India's Recession Probability:
Bloomberg

INDIA MARCHING TOWARDS DIGITAL AGE & NEW ECONOMY



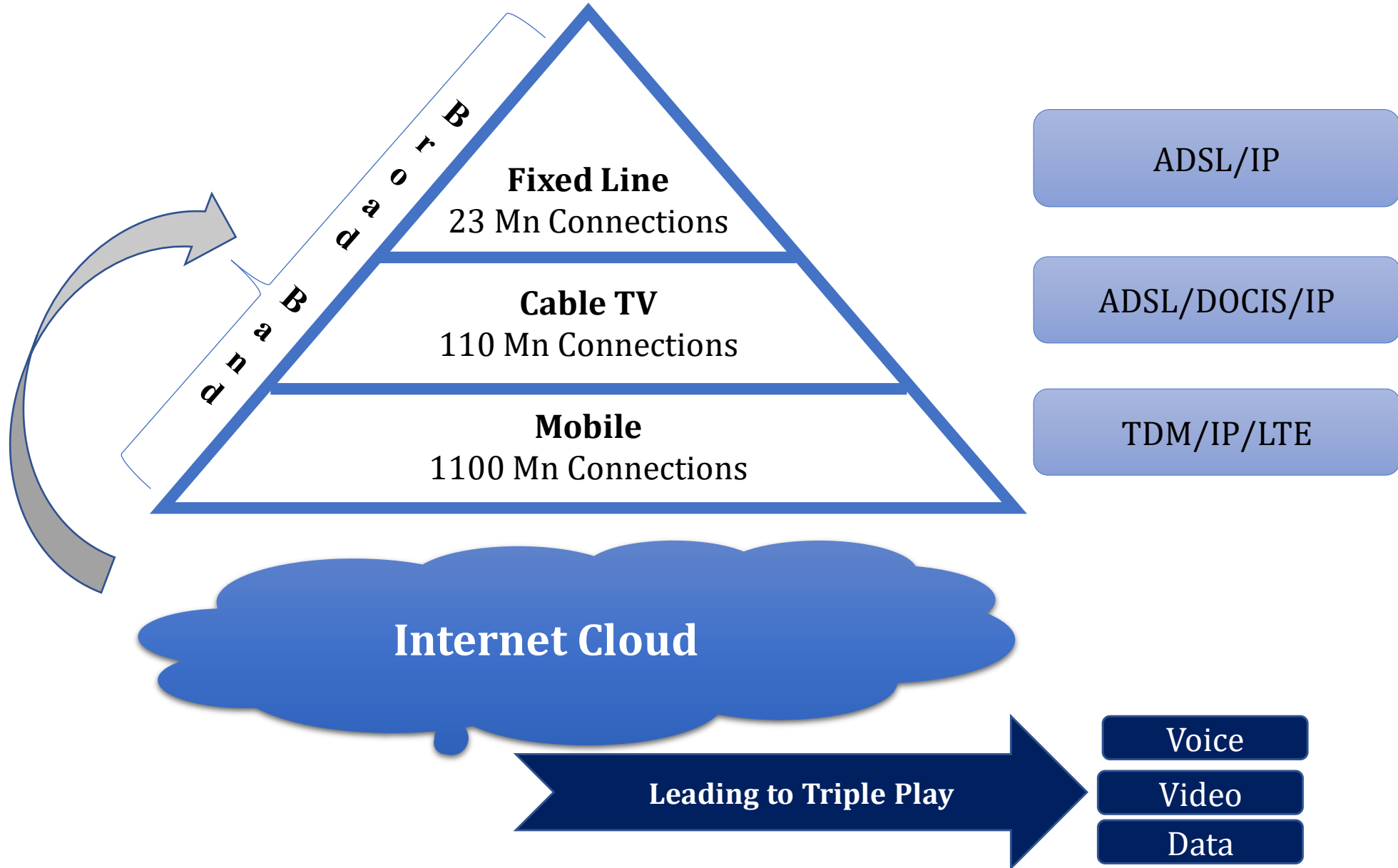
TECHNOLOGY - MIGRATION PATHS 2G To 5G



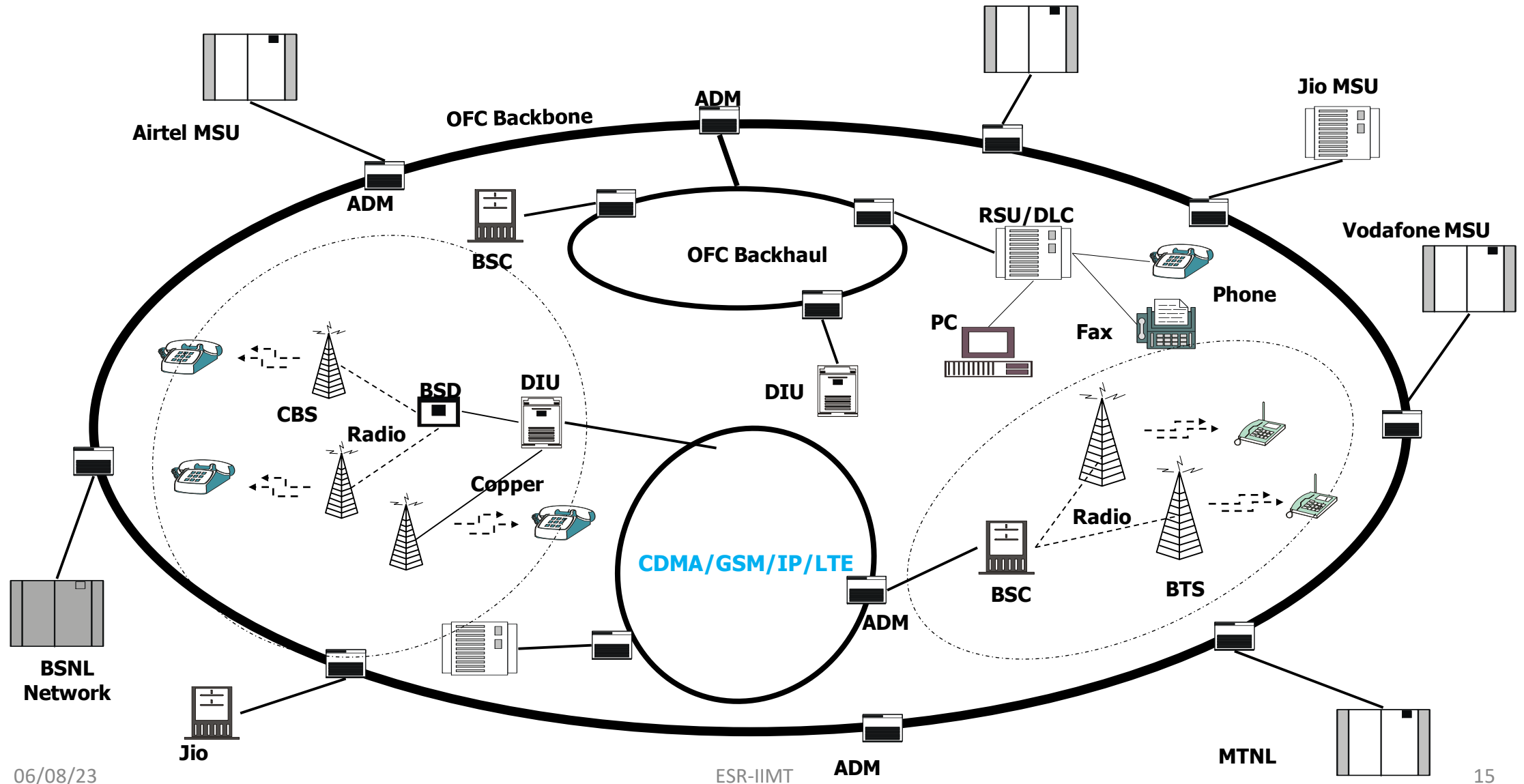
2G TO 3G & 4G 5G/LTE

DIGITAL CONNECTIVITY

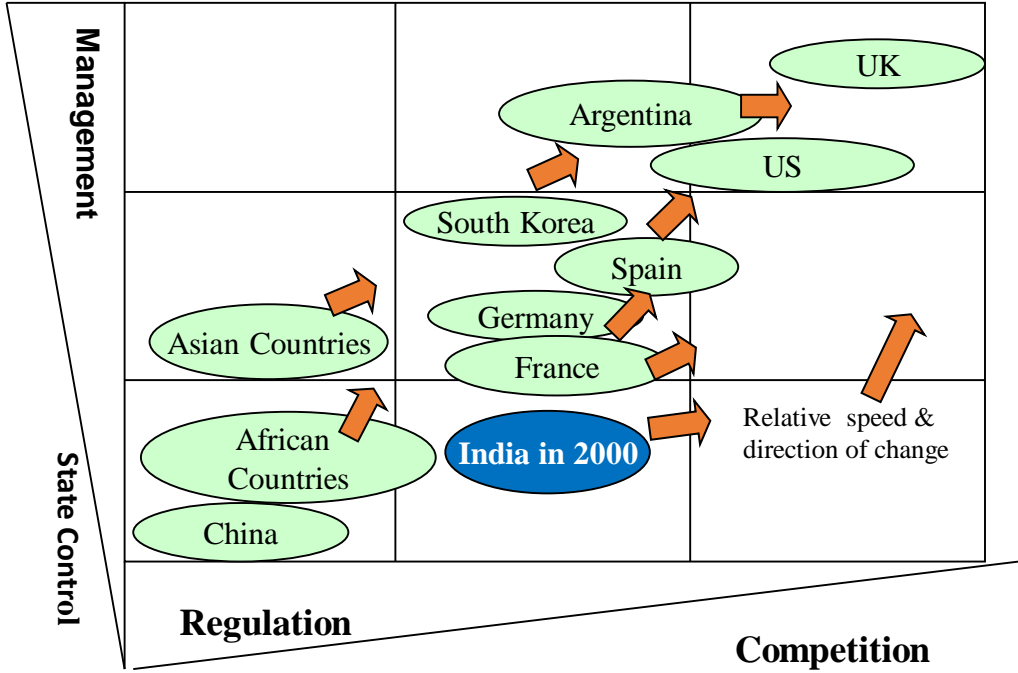
TECHNOLOGY



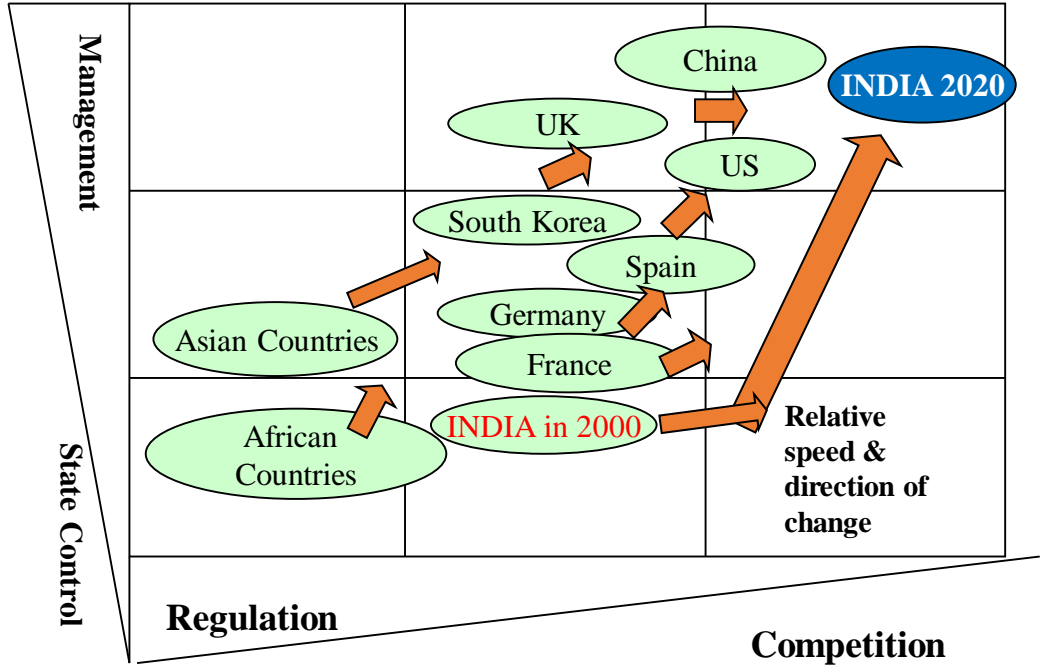
INDIAN DIGITAL INTEGRATED NETWORK ARCHITECTURE



1994 - 2017 REFORMS UNLOCKING THE TELECOM VALUE



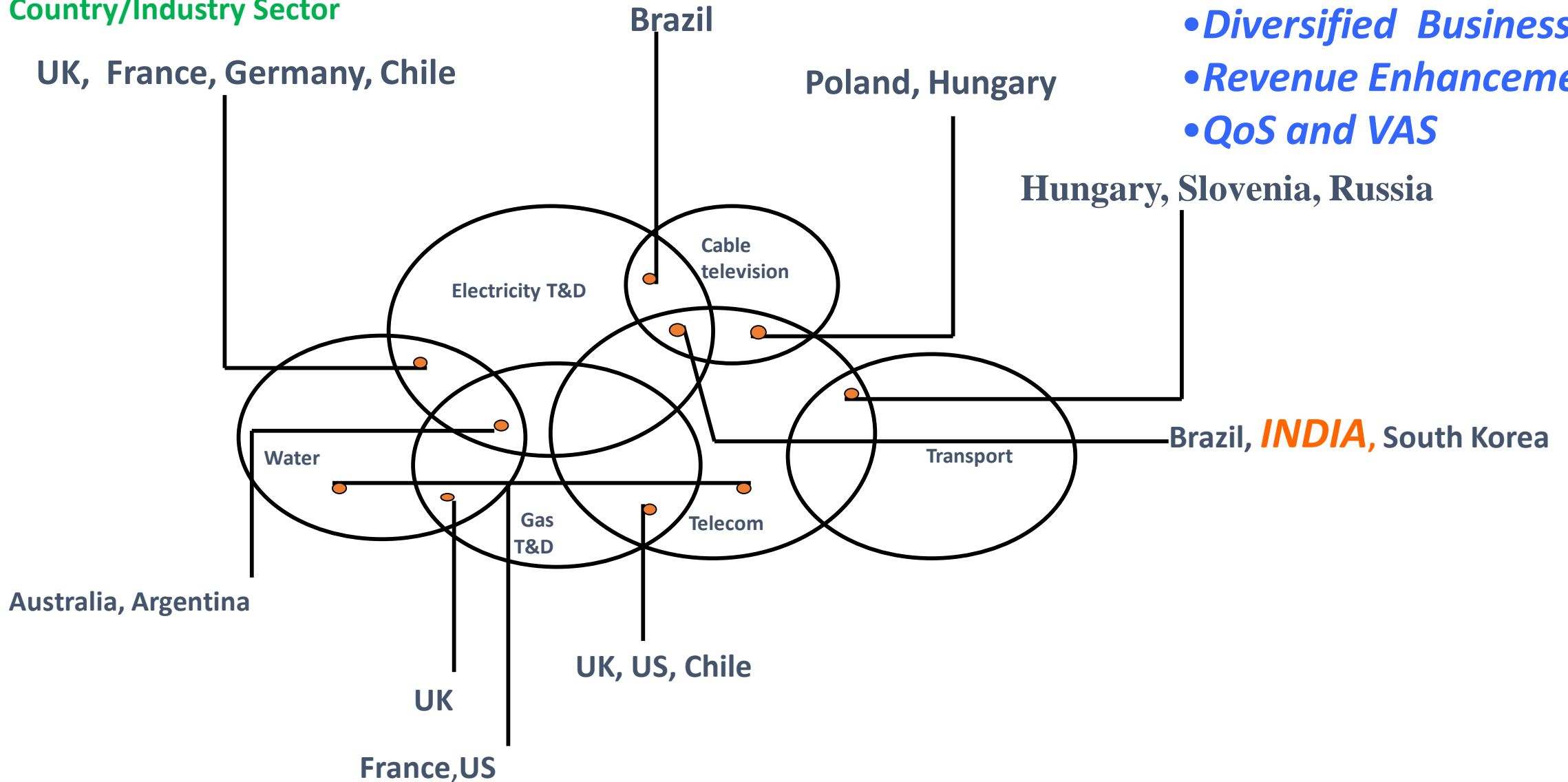
1994 – 2000 REFORMS



2000-2020 REFORMS
India Leading the Way in the Telecom & IT Sectors Reforms in the Globe

M&A LEADING TO HOMOGENEOUS & HETEROGENEOUS CONVERGENCE

Country/Industry Sector



- *Service Bundling*
- *Diversified Business*
- *Revenue Enhancement*
- *QoS and VAS*

DIGITAL EVOLUTION INDEX 2017

HARVARD BUSINESS REVIEW

The Analysis considered factors such as demand and supply conditions, Institution environment, innovation and change

India has been placed in Break-Out Zone

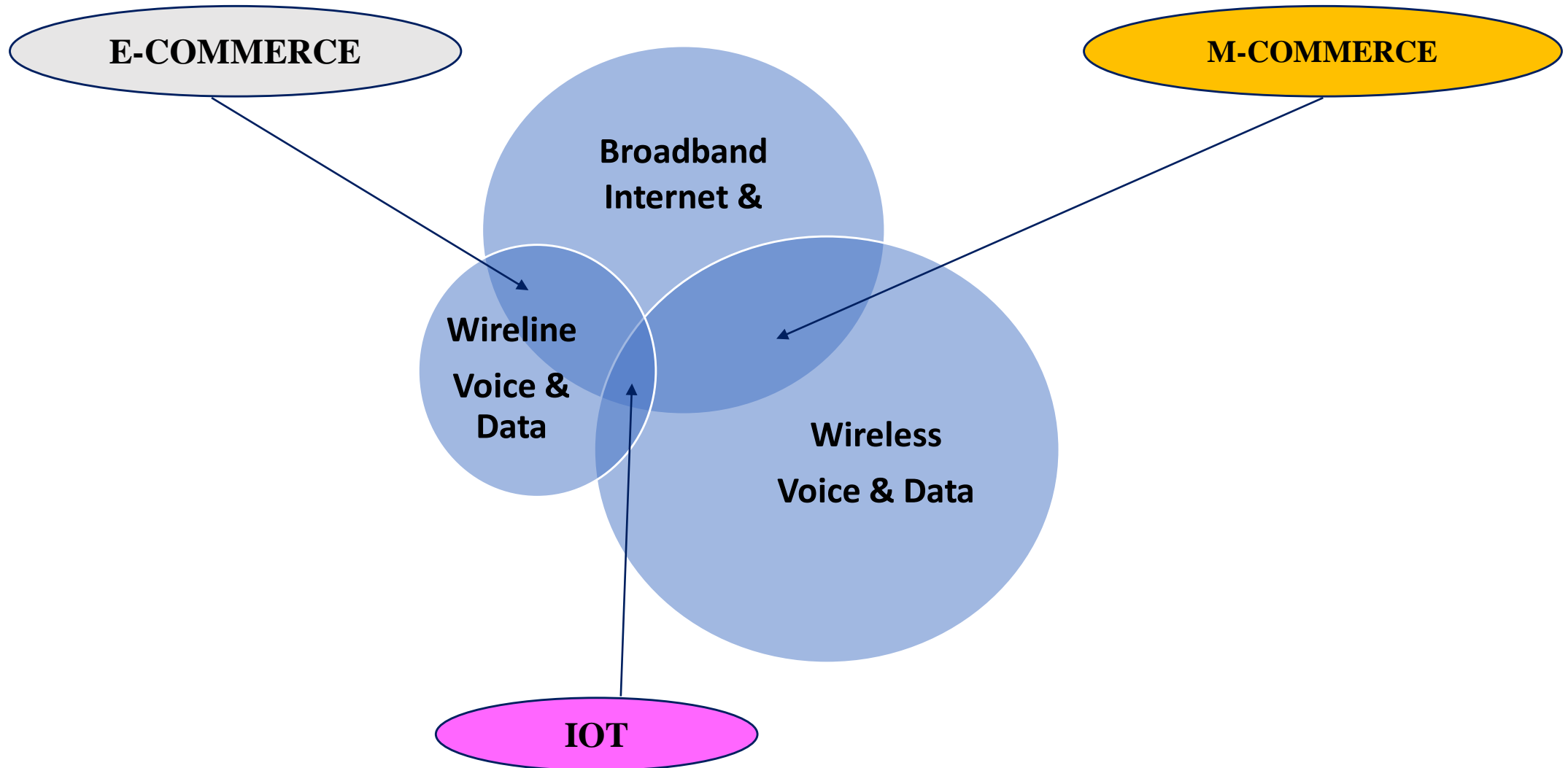
Break-Out Zone signifies countries with low state of digitization but are rapidly evolving

Other countries in this zone are – China, Indonesia, Philippines, Morocco, Vietnam etc



The world recognises that India is at the cusp of digital revolution – the various demographic factors along with the macro-economic factors are favourable for growth in this direction.

DIGITAL SERVICES CONVERGENCE LEADING TO NEW DIGITAL BUSINESSES



The Digital Communications and IT complimenting Business opportunities in E & M-Commerce, Media, Logistics, Banking, Manufacturing and AI in a big way in the next 5 years in India

LEADERS ON DIGITAL INDIA



Shri Narendra Modi
Hon'ble Prime Minister of India

“Digital India is an enterprise for India’s transformation on a scale that is perhaps unmatched in human history.”



Sundar Pichai
CEO, Google

*“We’ve learned that that when we solve for a place like India, we solve for everyone around the world.
#Digital Unlocked”*



Satya Nadella
CEO, Microsoft

“Everything that’s happening in marketing is digitised. Everything that’s happening in finance is digitised. So Pretty much every function in every industry, has a huge element that’s driven by information technology. Its no longer discreet.”



Nandan Nilekani
*Co-founder of Infosys &
First Chairman of UIDAI*

“The new trifecta of a bank account, digital identity and smartphone for everyone will drive economic change.”

DIGITAL INDIA – LANDSCAPE

Enablers 1191.8 million telecom subscribers (Teledensity 90.3%)

615.4 million Broadband Subscriber

1.2 billion digital identities registered (Aadhaar)

373 million beneficiaries of Jan Dhan Accounts

Worlds highest data user per smartphone (9.5GB)

Source: TRAI

Govt. Initiative

Digital India

Digitation of Social Welfare Distribution

100% FDI with approval in Telecom, Digital Payments

Evolving Regulation for E-Commerce & Fintech

Economy & Demographic

World's fastest growing economy

Fast technological absorption

60% active working population & 50% below 30 yrs.

Growing population of middle class families

06/08/23

ESR-IIMT

India no. 1 globally

1.2b

people enrolled in the world's largest unique digital identity program

India no. 2 globally, behind China



12.3b

app downloads in 2018



1.17b

wireless phone subscribers



560m

internet subscribers



354m

smartphone devices



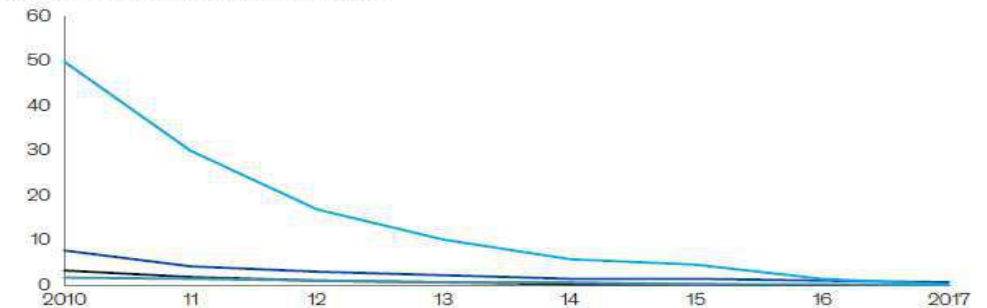
294m

users engaged in social media

United States Brazil China India

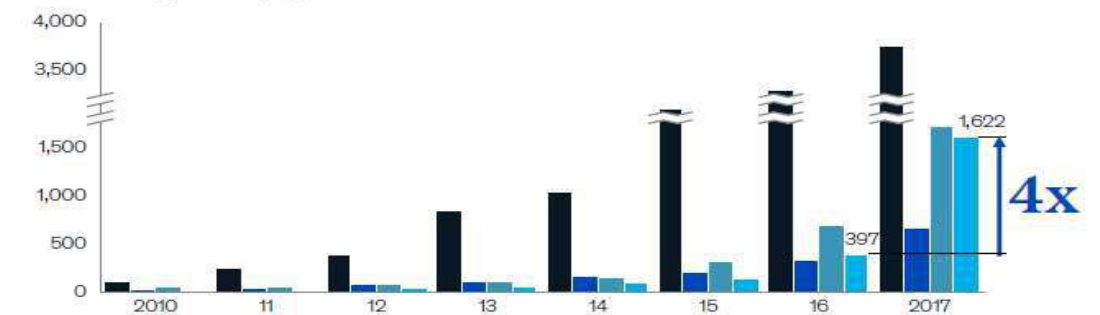
Data price

Per GB of data (% of monthly GDP per capita)



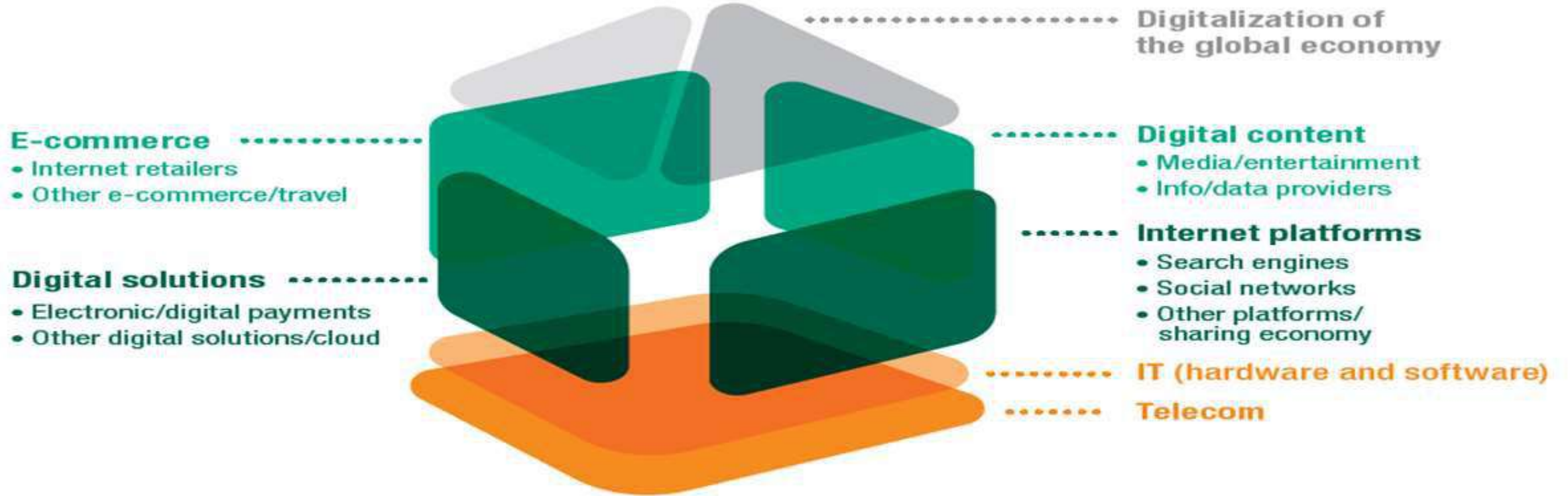
Data consumption

Per connection, per month (MB)



Source: Technology to transform a connected nation - McKinsey Global Institute

The architecture of the digital economy

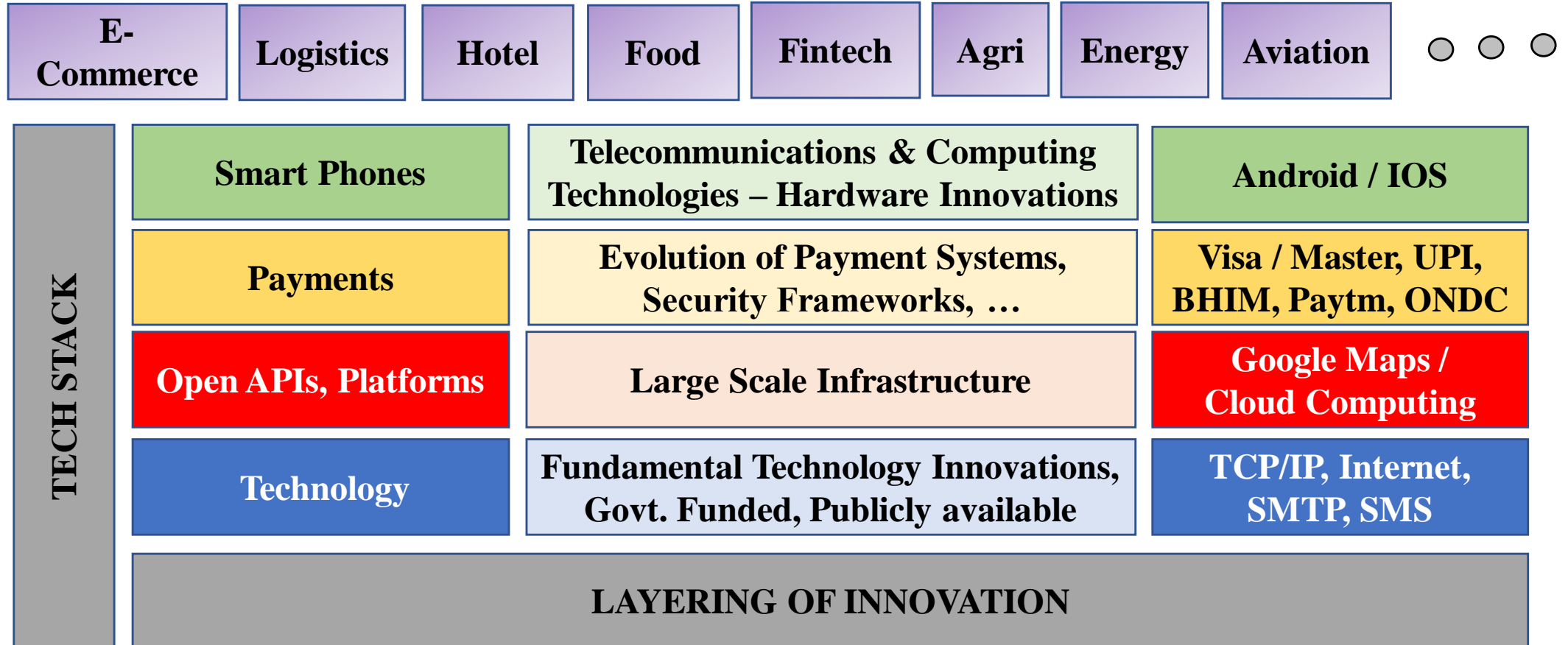


Digital MNEs, performing activities based on or strictly linked to the internet

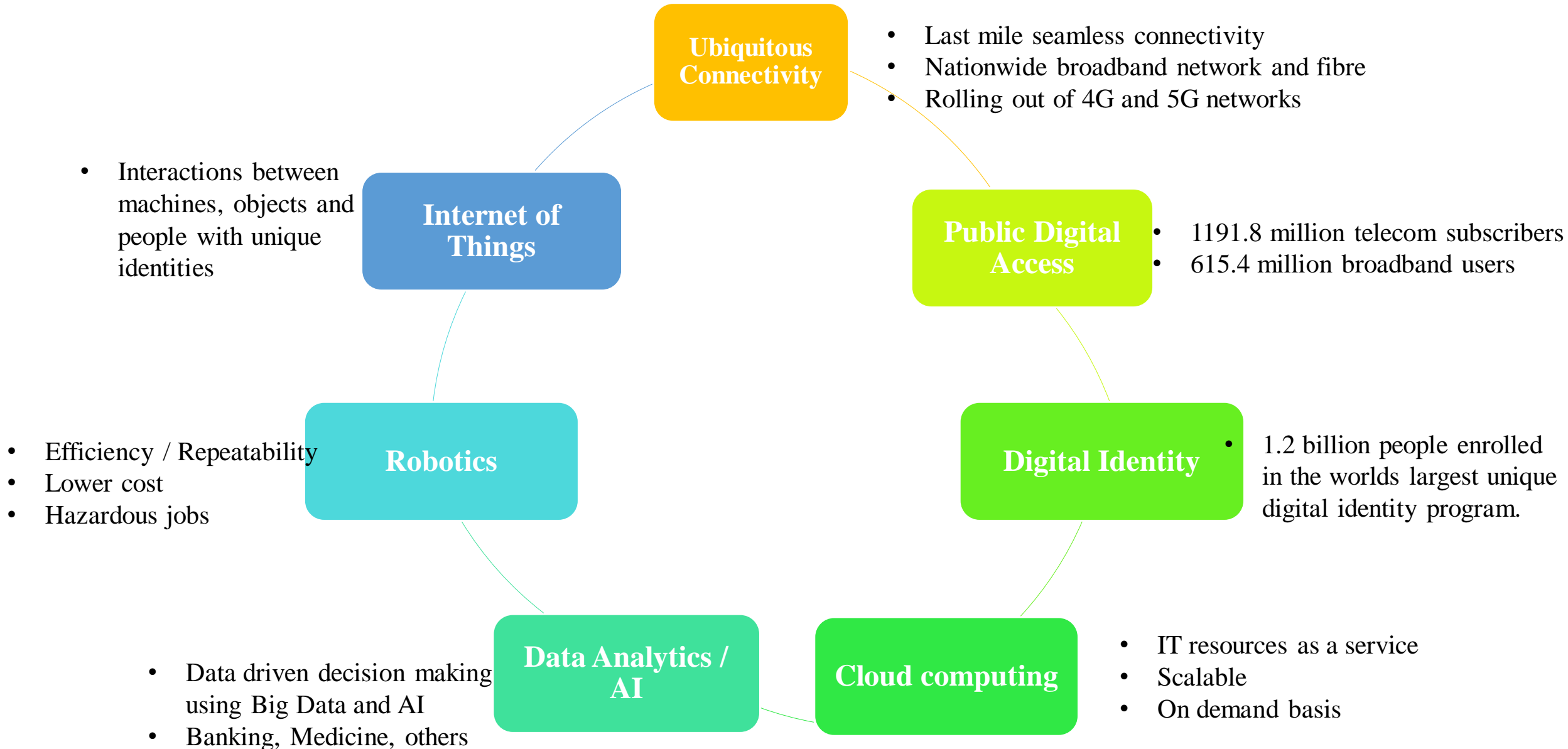
Purely digital
 Mixed

ICT MNEs, providing the enabling infrastructure supporting the internet

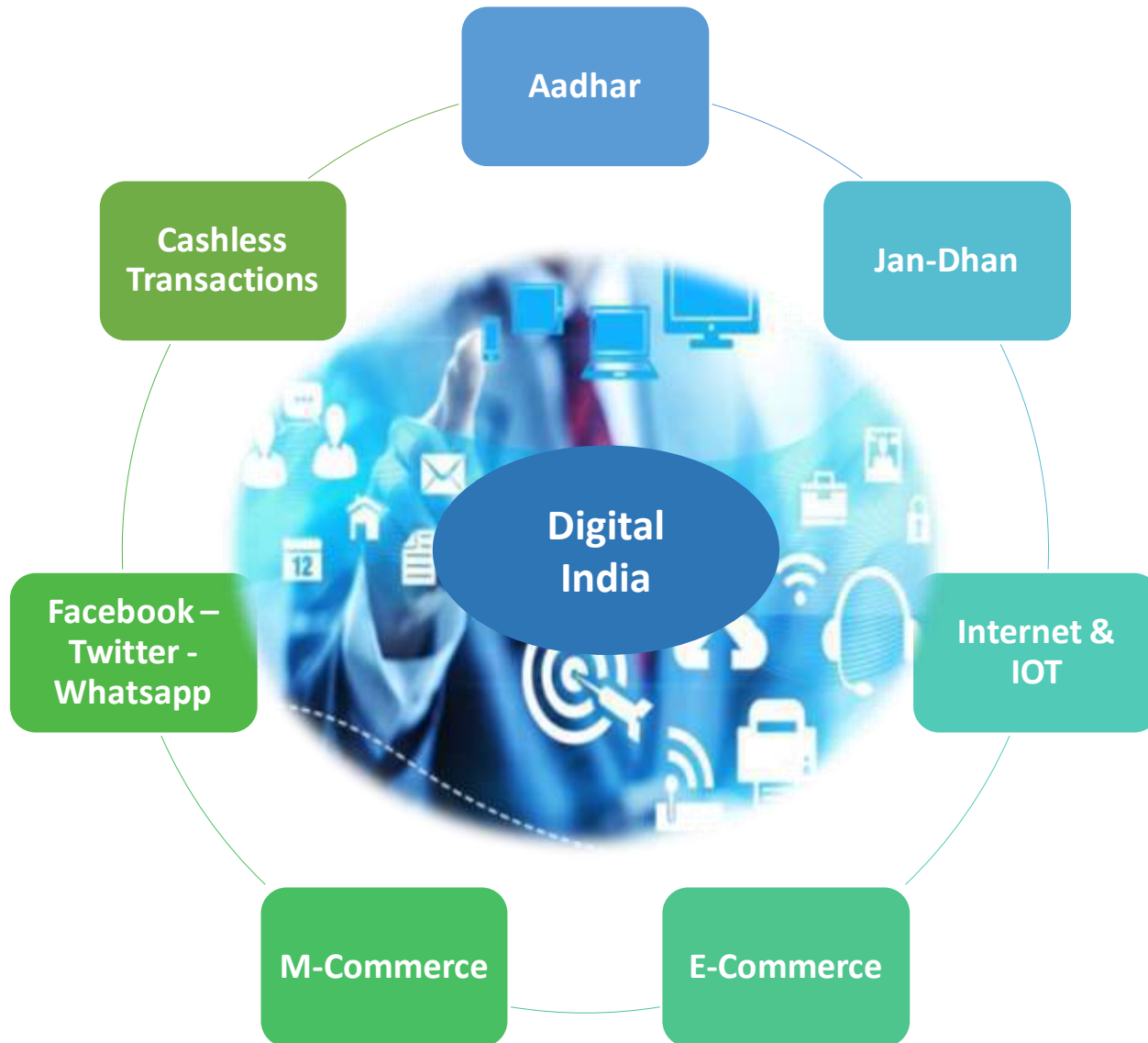
DIGITAL ECONOMY EVOLVING BUSINESS MODELS



DIGITAL INFRASTRUCTURE ECO-SYSTEM



THE OMNIPRESENT DIGITAL INDIA



The beginning of the Digital Revolution in India was in 2010 with the launch of Aadhar – the biometric identification program of the Government of India.

At present there are about 1100 million mobile subscribers and 600 million users have internet access – this is expected to double by 2026.

Government is also encouraging cashless payments and incentivizing digital payments. Soon, Cash won't be king!

Digital Evolution brings with it Automation, Data Analytics, Artificial Intelligence, Internet of Things – impacting millions of jobs world over

DIGITAL INDIA - GOVERNMENT INITIATIVES

- 1.2 bn. digital identity, largest in the world
- Enabler for big digital transformation and social empowerment

AADHAAR



- Online docs verification tool
- 31.46 mn. users with 3.5 bn docs
- Enabling paperless verification

DigiLocker



- Build on Unified payment interface
- 119 member banks
- Big enable for digital payment across service providers

BHIM-UPI



- Unified payment interface platform
- Seamless & secure digital payment
- Multiple Bank account through one App

UPI



- Biometric enabled digital life certificate for pensioners
- 26.3 mn. users submitted life certificate

Jeevan Praman



- Unified national market for agriculture products
- 585 Markets, 16 States, 2UTs and 1.64 crore farmers

E-NAM



- Promotion of start-ups
- Tax exemption and other benefits
- 24,227 no. of DPIIT recognised Start-up

Start-up India

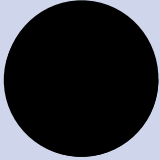
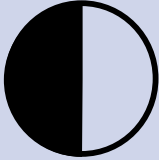


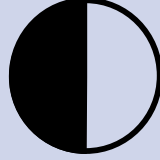
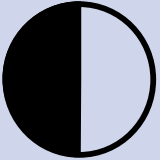
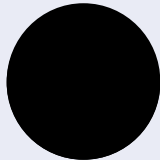
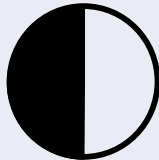
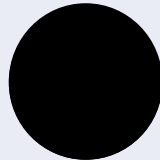
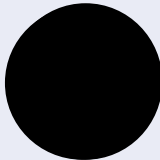
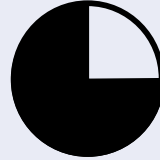
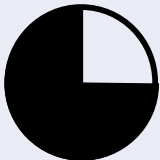
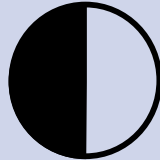
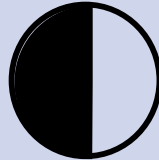
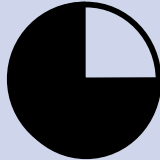
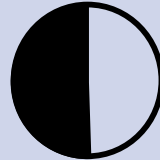
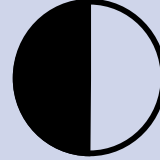
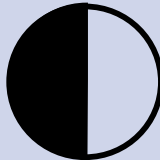
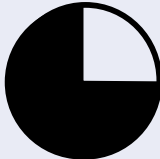
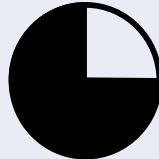
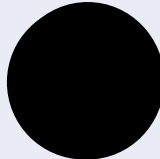
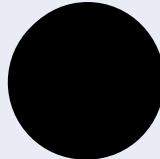
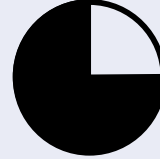
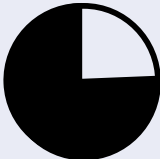


- Largest IT network in the world for tax compliance
- Integrated IT interface with 100% paperless compliance

GST Network

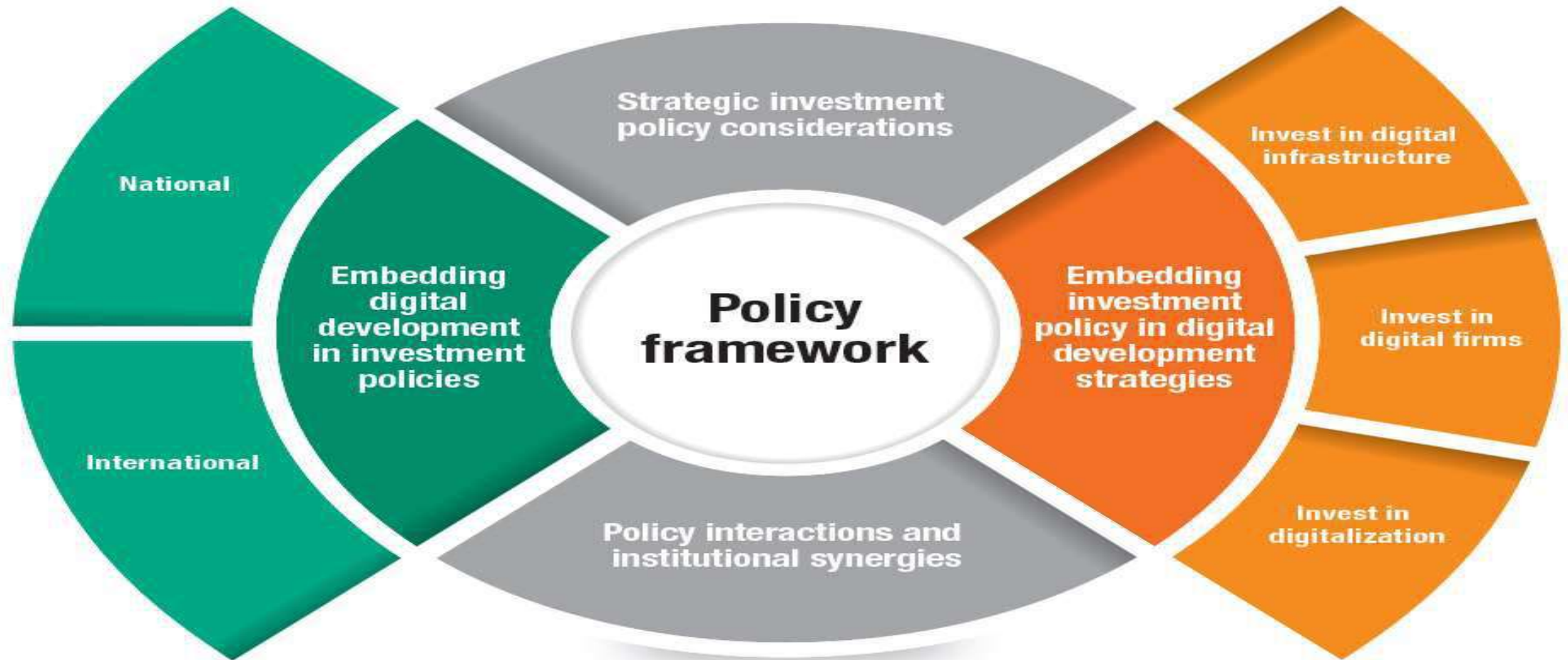


DIGITAL IMPACT ON BUSINESS MODELS

Parameters	Retail	Power	Telecom	Airlines	Logistics	Agriculture
Competition						
Private participation						
Policy & Regulation						
Market outreach						

Good Policy + Good Regulation = Good Governance & Progress

Policy framework for investment in the digital economy



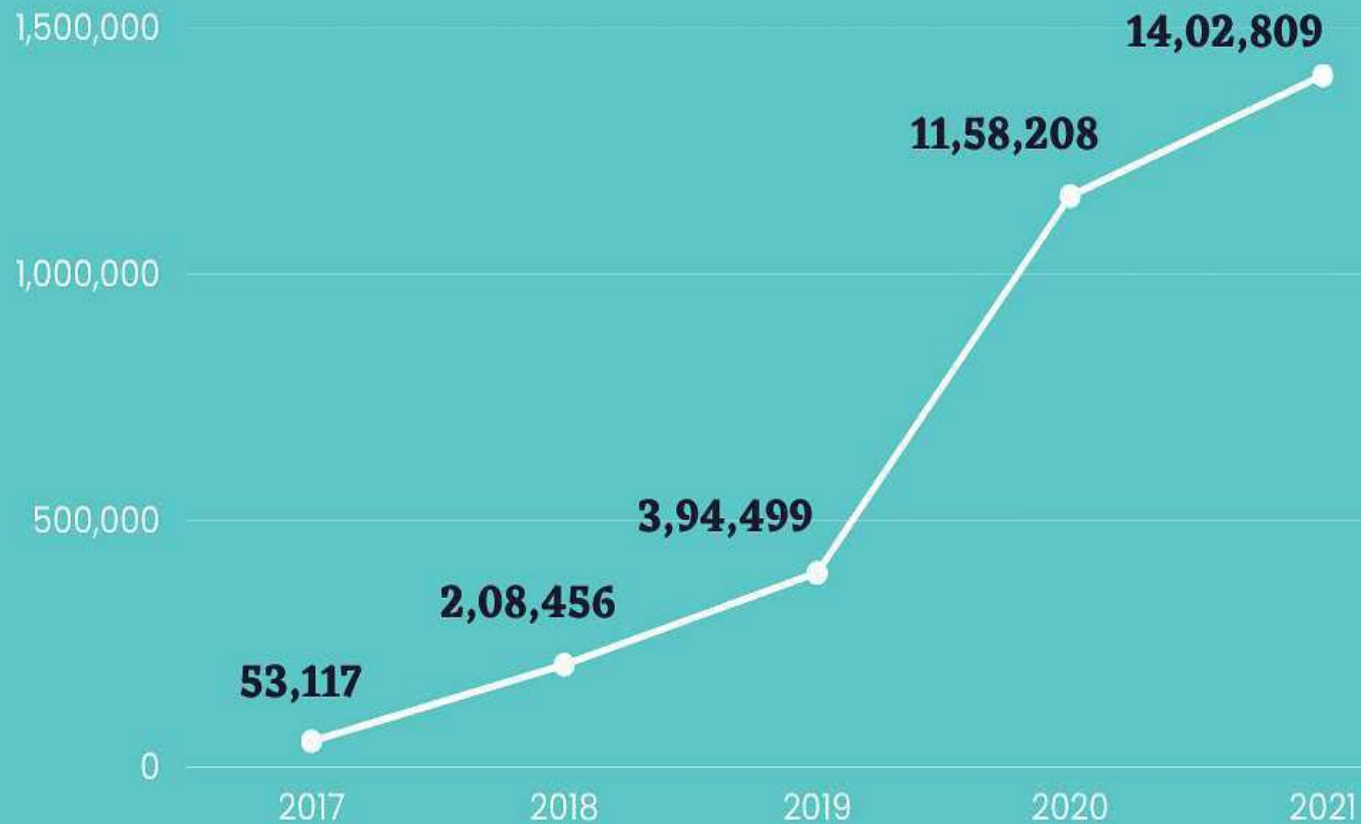
WHAT KINDS OF THREATS ARE THERE

- Phishing Attacks
- Social Engineering Scams
- Common Malware and Ransomware
- Business Email Compromise
- Fake websites that steal data or infect devices
- And much more

Cybercrimes – When Numbers Speak

Cybersecurity incidents in India

CERT-IN data indicates a surge in cyberattacks since 2017



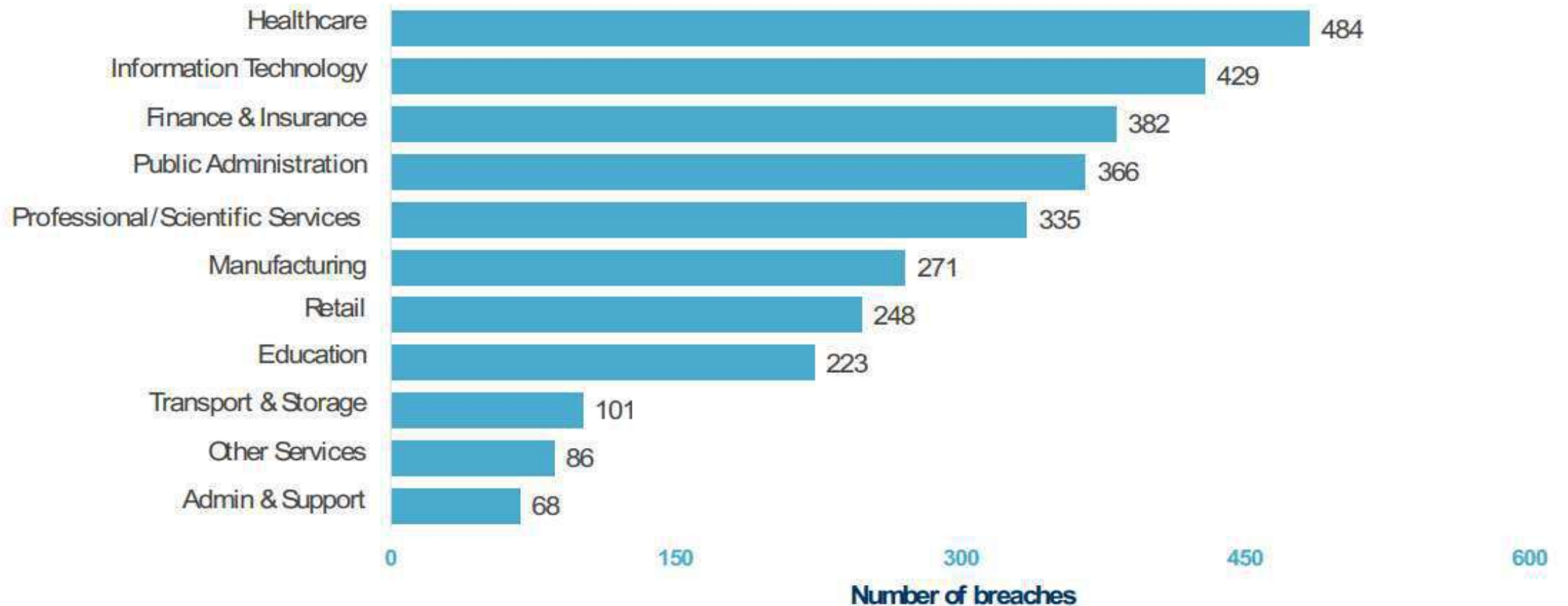
Source: CERT-IN website

ThePrint

- Cyber crime continued to create havoc in 2022.
- More cyber attacks against the healthcare industry in India were recorded from January to November 2022.
- Cyber-attacks against Indian government agencies doubled in 2022, making it the most targeted country in this sector.
- Globally in 2023, it is expected that cybercrime would cost the world \$8 trillion. The cost of cybercrime is expected to rise by 15% over the next five years, reaching \$10.5 trillion by 2025.

Global Breach Statistics

CYBER INSECURITY IS FELT ACROSS INDUSTRIES NUMBER OF DATA BREACHES BY ECONOMIC SECTOR IN 2020



Source: Risk Based Security

Figure 1: All Cyber Defense Index country rankings, 2022-2023

The leaders	The 5 countries making the greatest progress and commitment toward creating a cyber defense environment.	1	Australia	7.83
		2	Netherlands	7.61
		3	South Korea	7.41
		4	United States	7.13
		5	Canada	6.94
The challengers	The 10 countries making progress or commitment toward creating a cyber defense environment.	6	Poland	6.91
		7	United Kingdom	6.79
		8	France	6.78
		9	Japan	6.71
		10	Switzerland	6.45
		11	Italy	6.37
		12	China	6.27
		13	Germany	6.24
		14	Spain	6.13
		15	Saudi Arabia	5.55
Strivers	The 5 countries making slow and uneven progress or commitment toward creating a cyber defense environment.	16	Mexico	5.31
		17	India	4.87
		18	Brazil	4.75
		19	Turkey	4.26
		20	Indonesia	3.46

Source: MIT Technology Review Insights, 2022

- India is improving overall on the Global Cybersecurity Index (GCI) 2020 released by the International Telecommunication Union.
- India placed fourth in the Asia Pacific region, highlighting its commitment to cybersecurity.
- The scope and creativity of digital attacks in 2023 will only increase.
- The Data Protection Bill 2022 is tabled in LS to repeal and tighten the IT Act 2000 with stringent penalties

Recent Cyber Attacks on India

Sectors Attacked

- **Pharma - Sun Pharma**
- **Hospitals - AIIMS**
- **Aviation - Delhi Airport and Other Airports**
- **Power – Tata Power**
- **Banking**
- **Manufacturing**
- **Construction**

Quantum of Attacks

- **FY 2020 – 1.15 Mn**
- **FY 2021 – 1.4 Mn**
- **FY 2022 – 1.39 Mn**
- **In FY 2023 in 3 months 0.674 Mn which is 3700/day**
- **In FY 22 the Avg cost of Attack for a Indian company is Rs 17.6 Cr**

Cyber Frauds

- **FY 2021 – Rs 542 Crores**
- **FY 2021 – Rs 1357 Crores**
- **FY 2022 – Rs 2537 Crores**

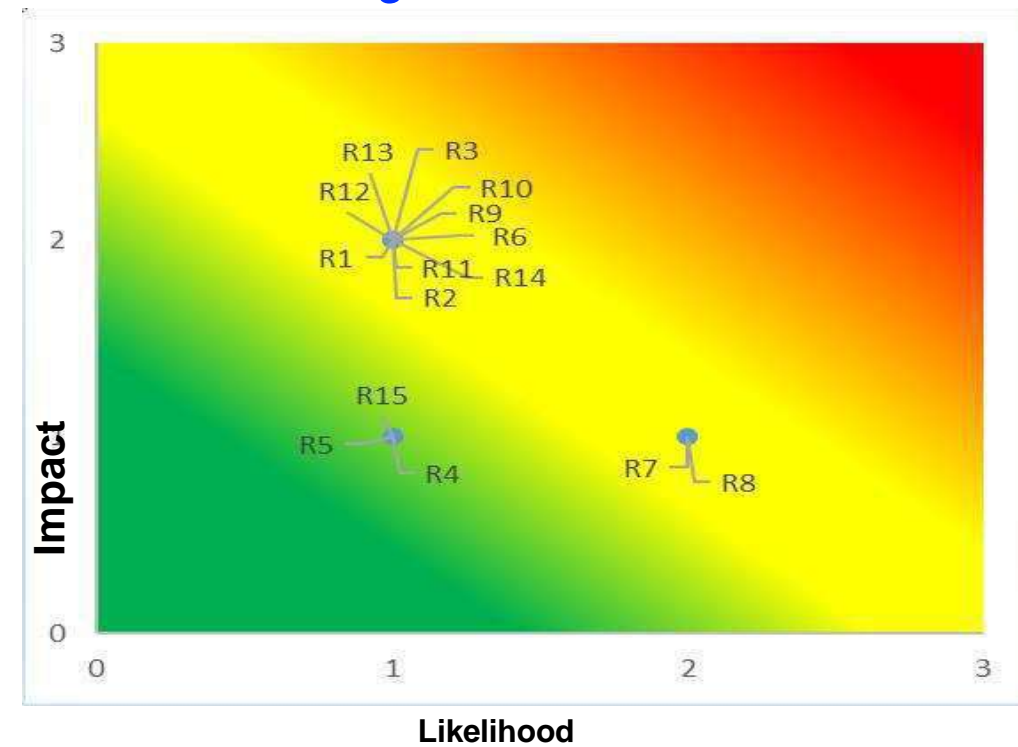
The frauds are in UPI, Credit Cards, Internet Banking and E-Wallet's

With more usage of 5G and IoT the Cyber Risks will be high in Fintech, Utilities, Health, Aviation and Manufacturing Sectors through the Apps and Devices

Aviation Sector Cyber Security Risks

Risk	Description	Level	Trend*	Comments
R1	Malicious Code (Malware, virus) infection	Medium	-	Industry best practices in place
R2	Account take over / credential abuse attacks / Password Theft	Medium	-	Industry best practices in place
R3	Ransomware / Crypto jacking	Medium	D	Improved management controls
R4	Phishing / spear- phishing attacks	Low	-	Industry best practices in place
R5	Attack on brand and reputation in social media and on the web	Low	D	Improved alerting and response capabilities
R6	Advance persistent attack (APT) / targeted attack	Medium	-	Industry best practices in place
R7	Denial of service attack LAST	Medium	D	New DDOS protection technology deployed
R8	Insider threat/ data exfiltration by employees	Medium	D	Improved management controls
R9	Cloud security threats	Medium	-	Industry best practices in place
R10	Unauthorized application usage (Shadow IT)	Medium	-	Industry best practices in place

Risk	Description	Level	Trend*	Comments
R11	Regulatory Environment	Medium	D	Data Privacy readiness program by EY
R12	3rd party cyber security exposure	Medium	-	Wider 3 rd party security program planned
R13	Social engineering / cyber security awareness gap	Medium	-	Industry best practices in place
R14	Configuration Mistakes / web-application attack	Medium	-	Industry best practices in place
R15	Mobile Device vulnerabilities	Low	-	Industry best practices in place

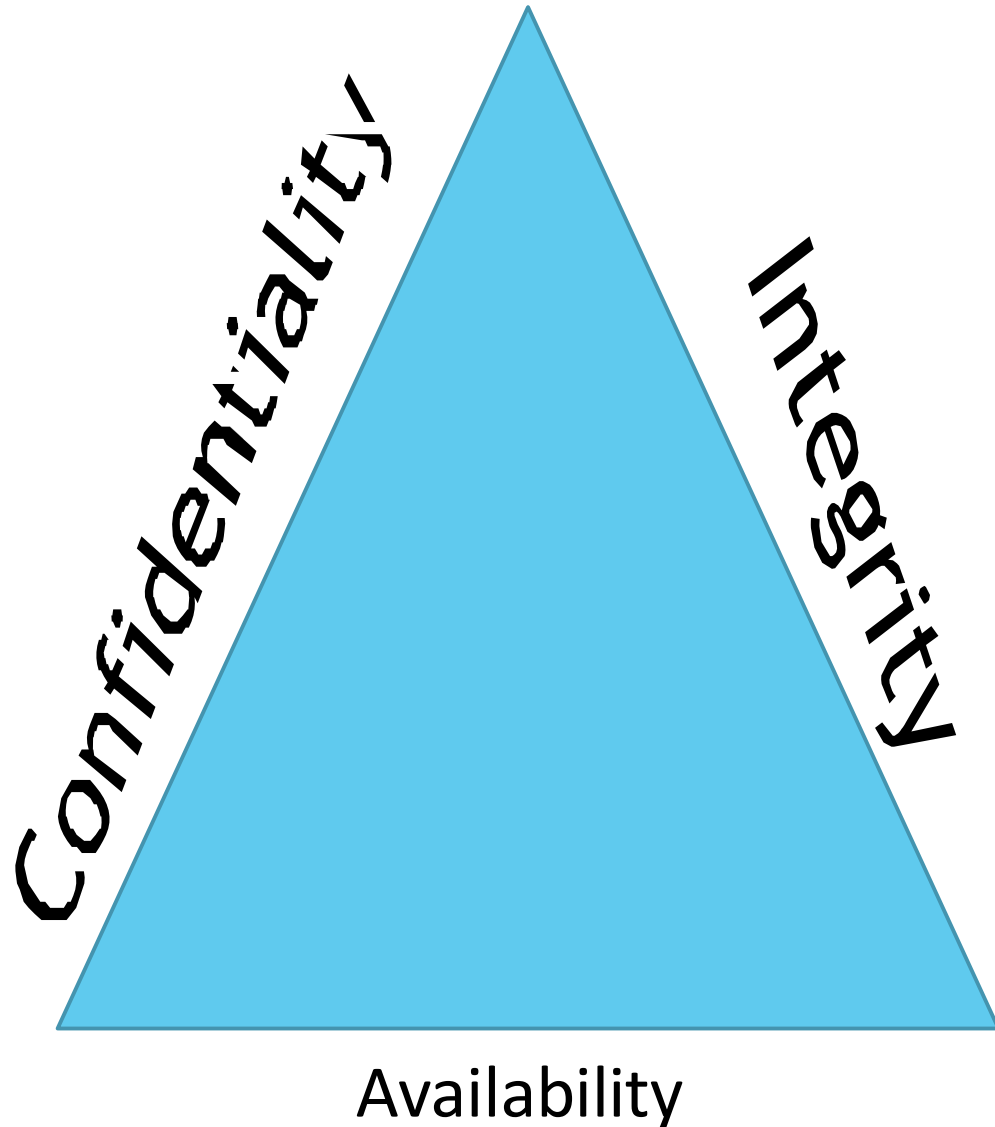


Legends: **D** Risk reduced **C** Risk increased **-** No Change

- No cyber security incident or data breach of any material nature was noted in 2023 YTD.
- Increased hacktivism activity on Indian airports from multiple international groups since April 2023; *All attacks successfully thwarted.*
- Engagement with National Critical Information Infrastructure Protection Center (NCIIPC) to assess DIAL as “Protected System” by Ministry of Electronics & Information Technology (MeitY) is currently in progress.



So Invest in Secure Cyber Systems



- Confidentiality – restrict access to authorized individuals
- Integrity – data has not been altered in an unauthorized manner
- Availability – information can be accessed and modified by authorized individuals in an appropriate timeframe

CHALLENGES & WAY FORWARD IN DIGITIZATION



Increase in Cyber Crime with deeper impacts

Obsolescence of Technology and existing Investments

Data is the new Oil – Ownership, Privacy & Security of Data

Sustained Investments

Though Challenges in Digitization are large, Opportunities are even larger!

Way Forward For Digital India

Its time to move ahead in the digital space...

its time to push the digital revolution...

its time to metamorphosis digitally and enable economy growth in all sectors...

*this wont be the end of current style of functioning but a beginning of a new brighter & stronger digital world which would reinforce **India's** position on the World map*

**What the caterpillar calls
the end, the rest of the
world calls a butterfly.**

Lao Tsu





**Thank You
For Your Kind Listening & Interaction
Best Wishes**

Dr. E. Sankara Rao

Former Chairman Board of Governors - MDI Gurgaon & Mushidabad and ILD Jaipur

Former MD & CEO IFCI Limited & Chairman Stock Holding Corporation of India, Min of Finance, New Delhi

Director – Delhi International Airport Ltd, GMR Airports Infra Ltd, GMR Power Ltd, Visakha Pharma City Ltd, Coastal Corp Ltd, Vizag Profiles Ltd

Denial of Service Attack

Denial-of-Service (DoS) Attack

In the most common example of Denial-of-Service (DoS) attacks, an attacker uses a network of hijacked computers.

This network is used to flood the target site with phony server requests, leaving no bandwidth for legitimate traffic.

