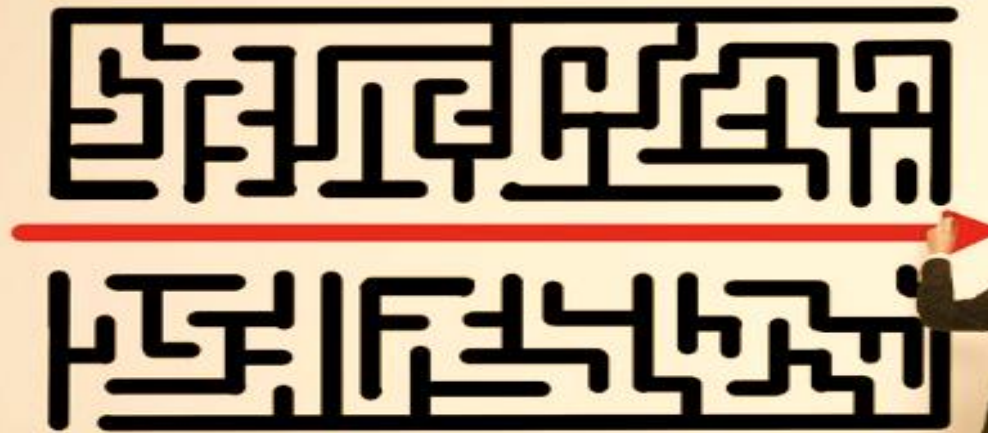


Internal Audit – What does the Future hold



complex
simple

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September 28th 2019

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Section 3 – Internal Audit – What does the Future hold

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Audit Landscape: Basics and Visualisation

Contents:

- Points to be added

Internal Audit – System overview

Assure

Core processes

Truly greatest risks

Decision governance

Behaviours

3 LoD

Digital technologies

Advise

3 LoD enhancements

Assurance by design

Control effectiveness

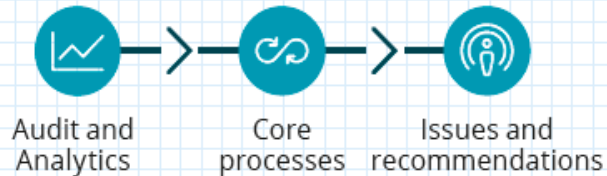
During change

Anticipate

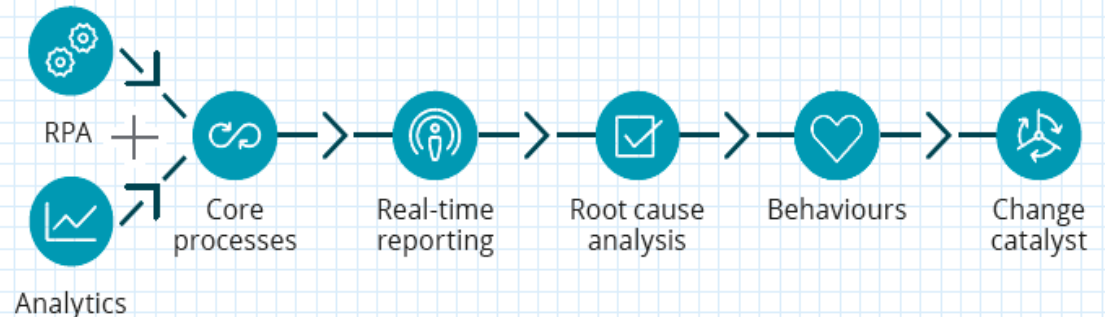
Risk sensing

Risk learning

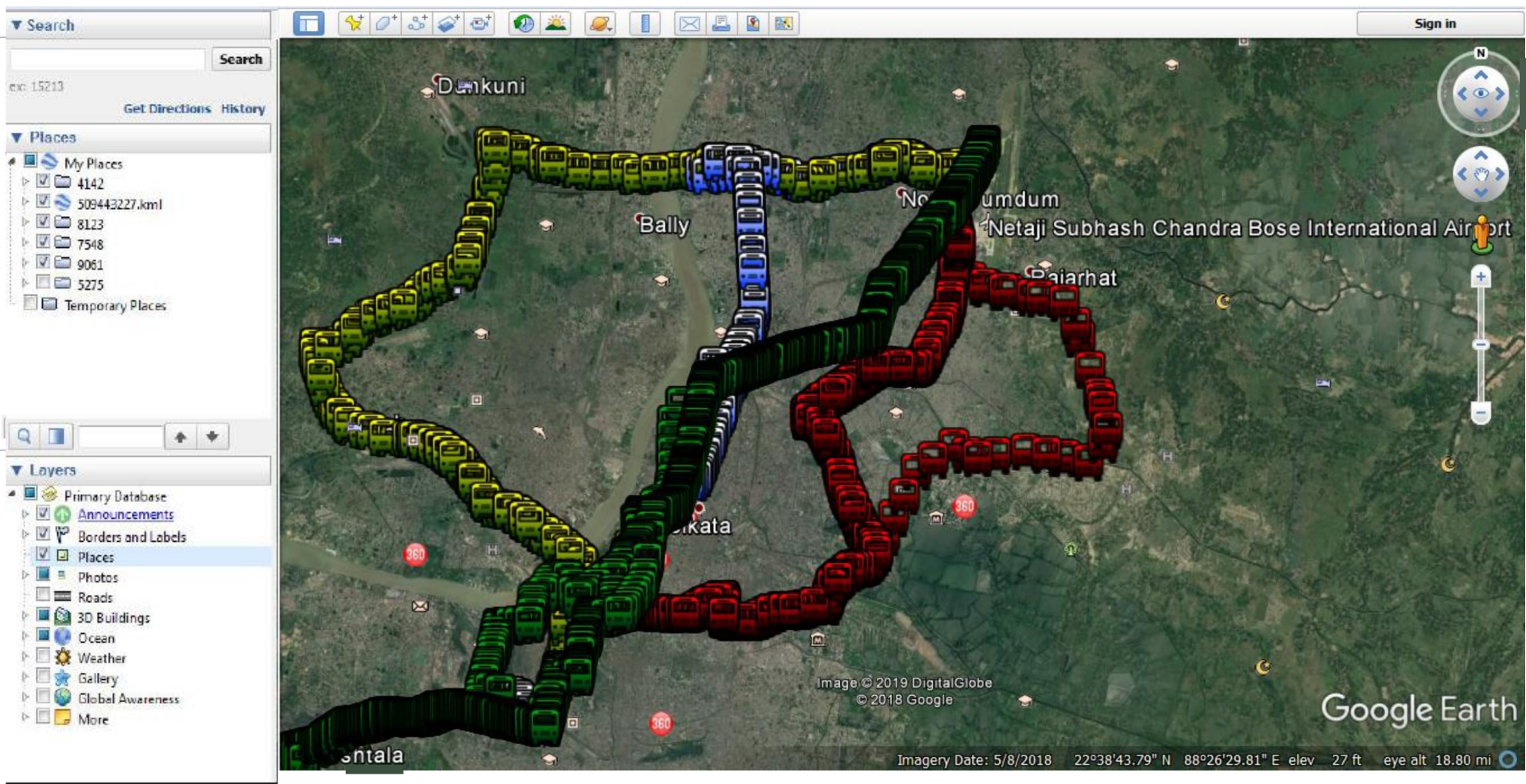
Traditional approach



Automated core assurance approach



USAGE OF DATA ANALYTICS TOOLS: TT ROUTE BEHAVIOR



USAGE OF DATA ANALYTICS TOOLS: UNAUTHORIZED LONG HALTS

The image is a screenshot of the Google Earth interface. The search bar at the top left contains the text "ex: Museums in New York, NY". Below the search bar, there are buttons for "Get Directions" and "History". The left sidebar shows a "Places" list with many bus icons and a "Layers" panel with various map layers like "Primary Database", "Announcements", "Borders and Labels", "Places", "Photos", "Roads", "3D Buildings", "Ocean", "Weather", "Gallery", "Global Awareness", and "More". The main map area shows an aerial view of a city street with a massive, dense cluster of blue bus icons, representing unauthorized long halts. The icons are arranged in a long, winding line that fills a significant portion of the street. The Google Earth logo is visible in the bottom right corner, and the Imagery Date is shown as 2/23/2018. The coordinates and elevation are also displayed at the bottom: 22°29'14.50" N 88°12'05.29" E elev 27 ft eye alt 191 ft.

Search

ex: Museums in New York, NY

Get Directions History

Places

Layers

Primary Database

Announcements

Borders and Labels

Places

Photos

Roads

3D Buildings

Ocean

Weather

Gallery

Global Awareness

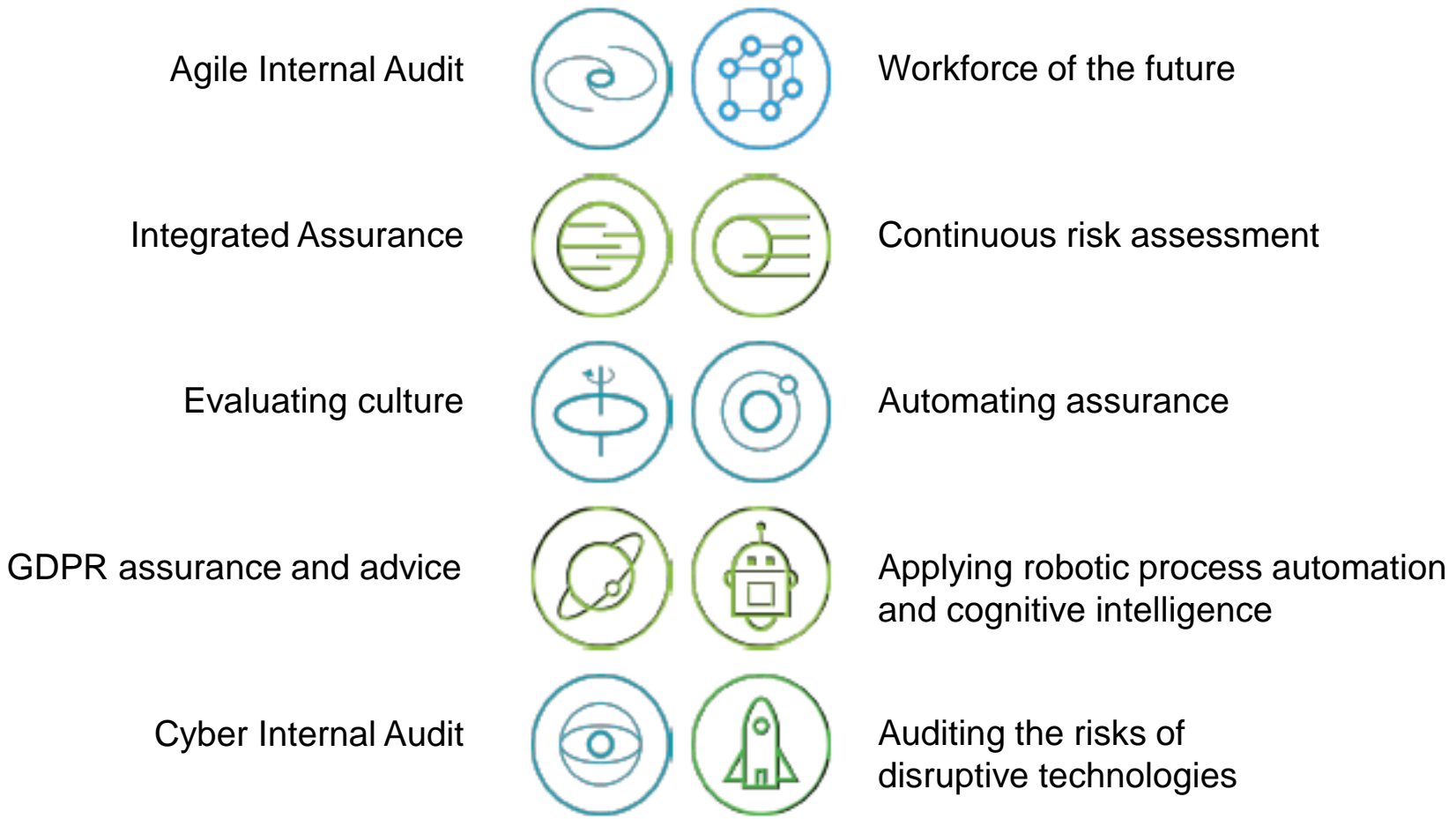
More

Image © 2019 DigitalGlobe
© 2018 Google

Google Earth

Imagery Date: 2/23/2018 22°29'14.50" N 88°12'05.29" E elev 27 ft eye alt 191 ft

What the Future of Internal Audit holds..



Take Courage

Megatrends, Business Models and Global Risk

Contents:

- Points to be added

Fourth Industrial Revolution - Megatrends

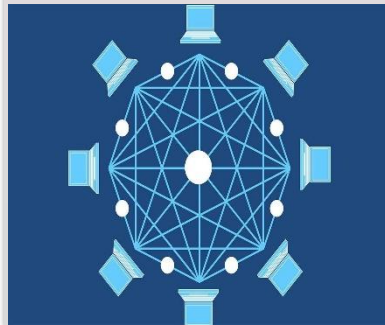
Physical A

- Autonomous vehicles
- 3D printing
- Advanced robotics
- New materials



Digital B

- Internet of Things (IoT)
- Block chain & its applications (like Bitcoin)
- Platforms & its applications (like the Shared Economy)



Biological C

- Synthetic biology (biofuels, agriculture)
- Genetic engineering and editing (genome to CRISPR-Cas9)
- Neurotechnology
- Implants and embedded devices








Societal D

- Shared economy
- Global to regional
- Urbanization
- Global risk
- Environment consciousness



Physical Transformations – Across all Industrial Revolutions

Year	Cases	Key Drivers	
1845	(Era of negligible corporate identity). Aluminium was costlier than Gold (Napoleon dinner experience)	The advancement in electrolysis.	
1931	Henry Ford (engineering improvements for cars) versus the horse breeders (increasing speed of horse/adding more horses)	Engineering advancement transformed the scene	
1954	In 1995, cost of the industrial robots were \$1,30,000, however now the BCG expected that the cost will be \$24,000 by 2025. Performance 100X+	Engineering advancement & Automation	
Recent	Graphene - From lab to micro application. 200 times stronger than steel	Convergence	
Recent	Composites – Endless possibilities High strength, reduced weight, self repair, fusion of abundance	Nano technology + Convergence	

Digital Drivers of Today – 3rd Industrial Revolution

- Infinite computing
- Information Enablement
- Platform
- Crowd sourcing

Name	Vision	Founded in	Dec 22nd, 2017
Intel	Delight our customers, employees and shareholders by relentlessly delivering platform and technology advancements that becomes essential to the way we work and live.	1968 (48 years)	218 billion USD
Google	To organise the world's information and make it universally accessible and useful	1998 (18 years)	741 billion USD
Facebook	Give people power to share and make the world more open and connected.	2004 (12 years)	515 Billion USD
AirBnb	Belong anywhere	2008 (8 years)	Privately owned 24 billion USD +

Observation – When power /decision making moved from organization to People – greater is the market capitalization in lesser time – Simply Emergence of Disruption & Innovation and thus Business Transformation

Societal Shared Economy



Mega current
(Past Innovating)




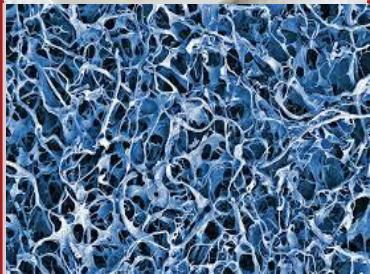


Sub currents



Spiraling Micro Current
(Future)

Biological

People	Cheaper, easier and safer way to read, write or edit DNA, reprogramming the code of life (increasing resilience & eliminating life threatening diseases; genes to store data; genome engineering)	
Healthcare	Development of advanced vaccine and antibiotic increased & immunity	
Food & Agriculture	Changing what we eat (plant-based meat substitutes), and how we produce our food (microbes based fertilizers; precision agriculture)	
Energy, materials and chemicals	Replacing petroleum products with new bio-materials, with smaller carbon footprint and better physical properties (eg silk which is 340 times stronger than steel)	

Healthier, easier & societal

Flywheel

AI + Technology Feedback + Onboarding System + UI + UX

Technology Feedback + Experience

Word of mouth

USER

SUPPLIER



1 cr 10000 100

10 1000 100000

Amazon's Business and its Competitors



Top 5 Risks

2009

Likelihood

- Asset price collapse
- Slowing Chinese economy (<6%)
- Chronic disease
- Global governance gaps
- Retrenchment from globalization



2019

Likelihood

- Extreme weather events
- Failure of climate change mitigation or adaptation
- Natural disasters
- Data fraud or theft
- Cyber attacks

■ Economic ■ Environmental ■ Geopolitical ■ Societal ■ Technological

Report Highlights

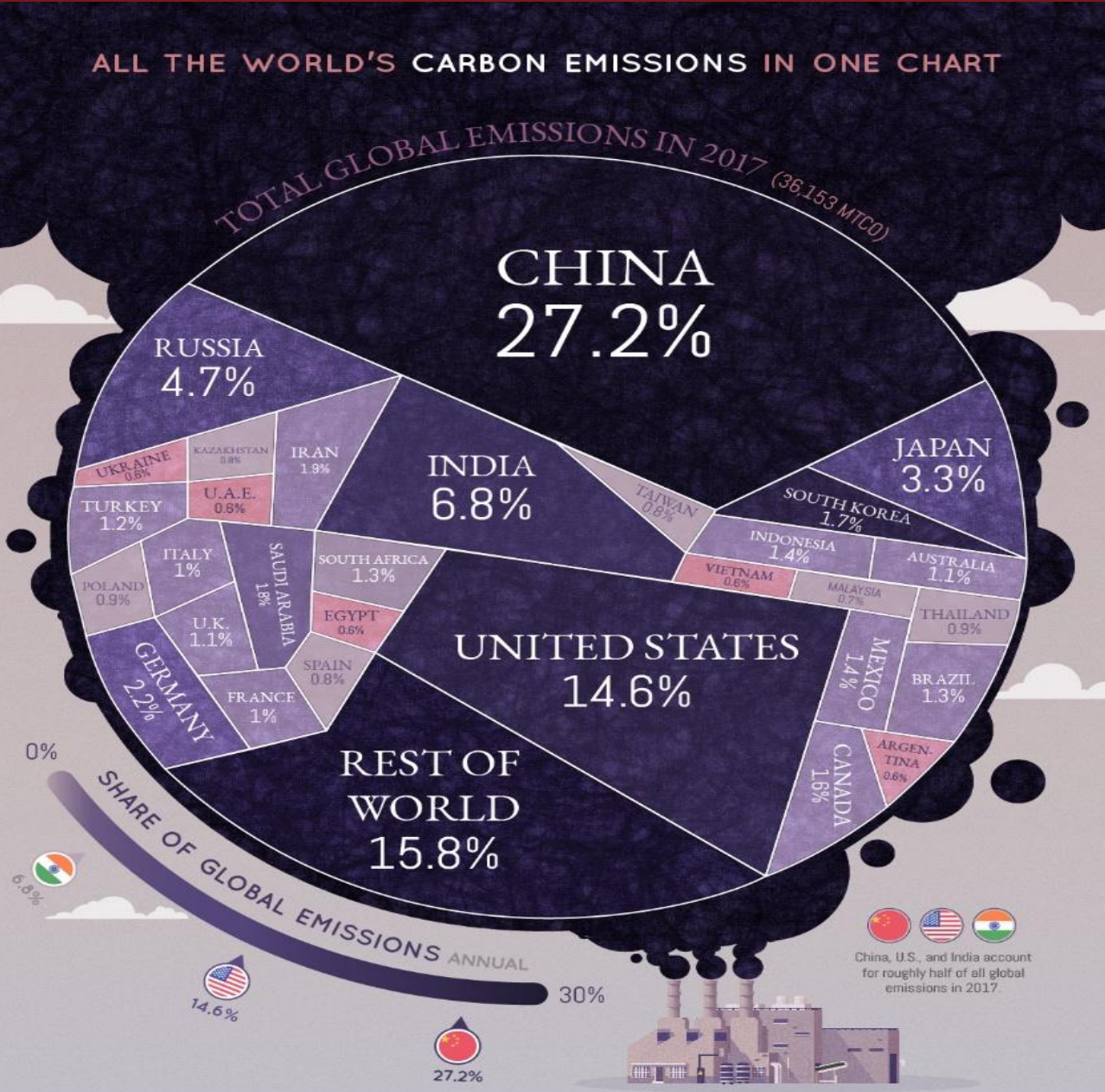
Top 5 Global Risks in Terms of Likelihood

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
1st	Asset price collapse	Asset price collapse	Storms and cyclones	Severe income disparity	Severe income disparity	Income disparity	Interstate conflict with regional consequences	Large-scale involuntary migration	Extreme weather events	Extreme weather events	Extreme weather events
2nd	Slowing Chinese economy (<6%)	Slowing Chinese economy (<6%)	Flooding	Chronic fiscal imbalances	Chronic fiscal imbalances	Extreme weather events	Extreme weather events	Extreme weather events	Large-scale involuntary migration	Natural disasters	Failure of climate-change mitigation and adaptation
3rd	Chronic disease	Chronic disease	Corruption	Rising greenhouse gas emissions	Rising greenhouse gas emissions	Unemployment and underemployment	Failure of national governance	Failure of climate-change mitigation and adaptation	Major natural disasters	Cyber-attacks	Natural disasters
4th	Global governance gaps	Fiscal crises	Biodiversity loss	Cyber-attacks	Water supply crises	Climate change	State collapse or crisis	Interstate conflict with regional consequences	Large-scale terrorist attacks	Data fraud or theft	Data fraud or theft
5th	Retrenchment from globalization	Global governance gaps	Climate change	Water supply crises	Mismanagement of population	Cyber-attacks	High structural unemployment or underemployment	Major natural catastrophes	Massive incident of data fraud/theft	Failure of climate-change mitigation and adaptation	Cyber-attacks

Top 5 Global Risks in Terms of Impact

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
1st	Asset price collapse	Asset price collapse	Fiscal crises	Major systemic financial failure	Major systemic financial failure	Fiscal crises	Water crises	Failure of climate-change mitigation and adaptation	Weapons of mass destruction	Weapons of mass destruction	Weapons of mass destruction
2nd	Retrenchment from globalization (developed)	Retrenchment from globalization (developed)	Climate change	Water supply crises	Water supply crises	Climate change	Rapid and massive spread of infectious diseases	Weapons of mass destruction	Extreme weather events	Extreme weather events	Failure of climate-change mitigation and adaptation
3rd	Oil and gas price spike	Oil price spikes	Geopolitical conflict	Food shortage crises	Chronic fiscal imbalances	Water crises	Weapons of mass destruction	Water crises	Water crises	Natural disasters	Extreme weather events
4th	Chronic disease	Chronic disease	Asset price collapse	Chronic fiscal imbalances	Diffusion of weapons of mass destruction	Unemployment and underemployment	Interstate conflict with regional consequences	Large-scale involuntary migration	Major natural disasters	Failure of climate-change mitigation and adaptation	Water crises
5th	Fiscal crises	Fiscal crises	Extreme energy price volatility	Extreme volatility in energy and agriculture prices	Failure of climate-change mitigation and adaptation	Critical information infrastructure breakdown	Failure of climate-change mitigation and adaptation	Severe energy price shock	Failure of climate-change mitigation and adaptation	Water crises	Natural disasters

Societal :Interactive GHG Emissions Website



The World's Top 10 emitters countries contribute to 73% of the global emissions.

As of 2017,
 Global emissions: 36,153 Million tonnes CO2 equivalent
 India emissions: 2,467 Million tonnes CO2 equivalent

Internal Audit – What does the Future hold

Contents:

- Points to be added

Deep Shifts for BSE 30

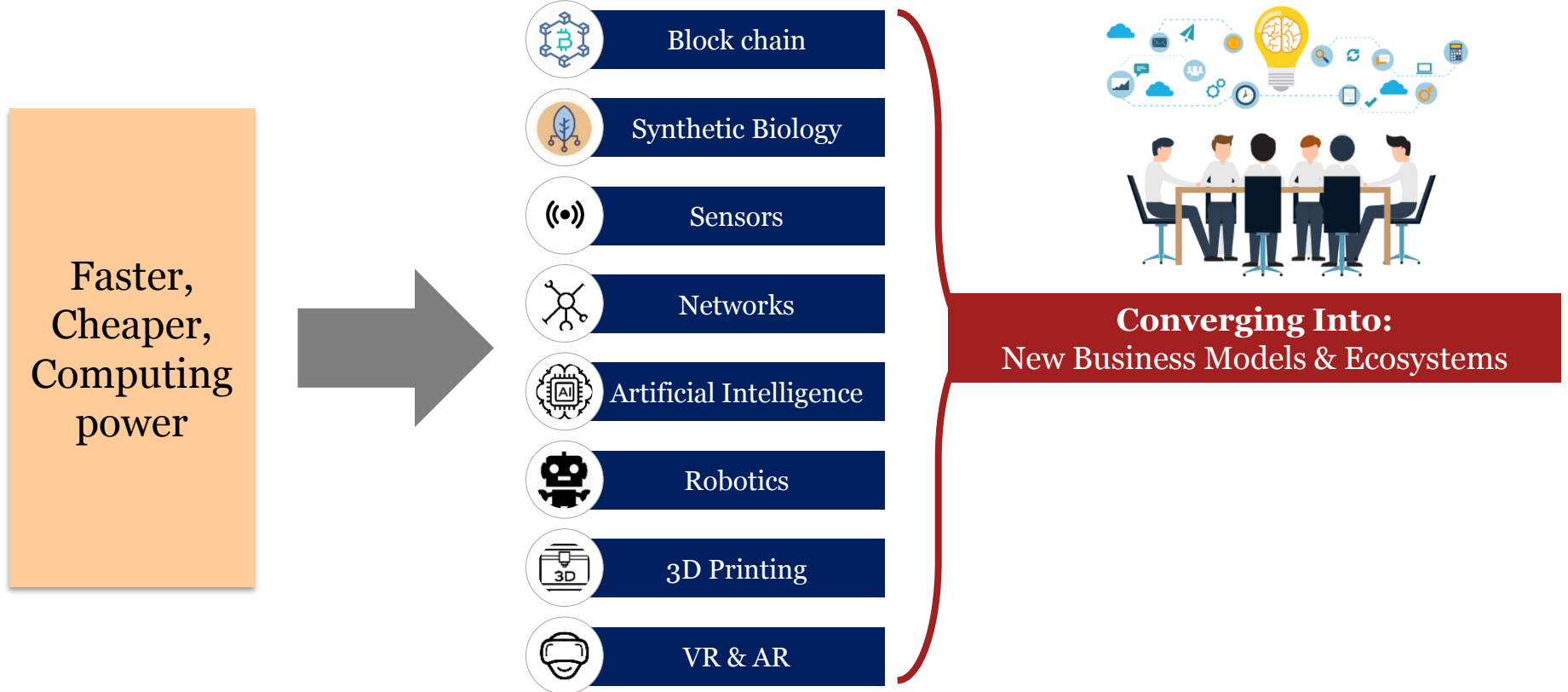
(Rs. in crore)

Sr No	Name of the Company	Market Cap (30-Sep-18)	Market Cap (17-Sep-19)	Deep Shift
1	Asian Paints Ltd	109,118	146,858	3D Printing and Manufacturing
2	Axis Bank Ltd	125,800	167,748	Bitcoin and Block Chain
3	Bajaj Auto Ltd	80,049	80,255	Driverless Cars/The Sharing Economy
4	Bajaj Finance Ltd	125,678	195,159	Bitcoin and Block Chain
5	Bharti Airtel Ltd	157,697	174,410	Ubiquitous Computing/ Satellite orbit technologies
6	HCL Technologies Ltd	147,586	143,273	Artificial Intelligence and Decision Making
7	HDFC Bank Ltd	489,122	604,136	Bitcoin and Block Chain
8	Hero MotoCorp Ltd	73,293	51,331	Driverless Cars/The Sharing Economy
9	Hindustan Unilever Ltd	293,585	396,366	3D Printing and Consumer Products
10	Housing Development Finance Corp	302,203	344,672	Bitcoin and Block Chain
11	ICICI Bank Ltd	172,559	258,708	Bitcoin and Block Chain
12	IndusInd Bank Ltd	107,666	92,337	Bitcoin and Block Chain
13	Infosys Ltd	245,614	356,940	Artificial Intelligence and Decision Making
14	ITC Ltd	315,664	291,338	3D Printing and Consumer Products
15	Kotak Mahindra Bank Ltd	205,467	276,751	Bitcoin and Block Chain
16	Larsen & Toubro Ltd	181,666	184,389	3D Printing and Manufacturing
17	Mahindra & Mahindra Ltd	94,103	64,913	Driverless Cars/Internet of Things/The Sharing Economy
18	Maruti Suzuki India Ltd	272,331	185,195	Driverless Cars/Internet of Things/The Sharing Economy
19	NTPC Ltd	137,163	119,576	Smart Cities/Connected Homes
20	Oil & Natural Gas Corp Ltd	225,287	166,447	Government and Blockchain/ Energy abundance
21	Power Grid Corp of India Ltd	102,591	104,841	Smart Cities/Connected Homes
22	Reliance Industries Ltd	567,014	758,920	Blockchain/Artificial Intelligence and Decision Making/Neurotechnologies
23	State Bank of India	220,348	244,445	Bitcoin and Block Chain
24	Sun Pharmaceutical Industries Ltd	120,446	100,926	Designer Beings/Wearable Internet
25	Tata Consultancy Services Ltd	556,492	796,012	Artificial Intelligence and Decision Making
26	Tata Motors Ltd	102,702	35,211	Driverless Cars/Internet of Things/The Sharing Economy
27	Tata Steel Ltd	67,495	39,740	Robotics and Services/ Nanomaterials
28	Tech Mahindra Ltd	71,866	68,104	Artificial Intelligence and Decision Making
29	Vedanta Ltd	86,146	54,104	Blockchain/Artificial Intelligence and Decision
30	Yes Bank Ltd	70,390	16,615	Bitcoin and Block Chain
	Total BSE 30 – Market valuation	58,14,029	65,19,450	
	Others	88,58,890	74,50,906	
	Total Market Valuation	1,46,72,919	1,39,70,356	

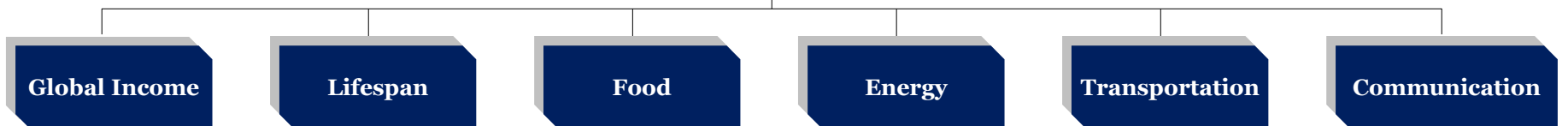
Traditional Industries are ripe for Disruption

Convergence & Evidence for Abundance

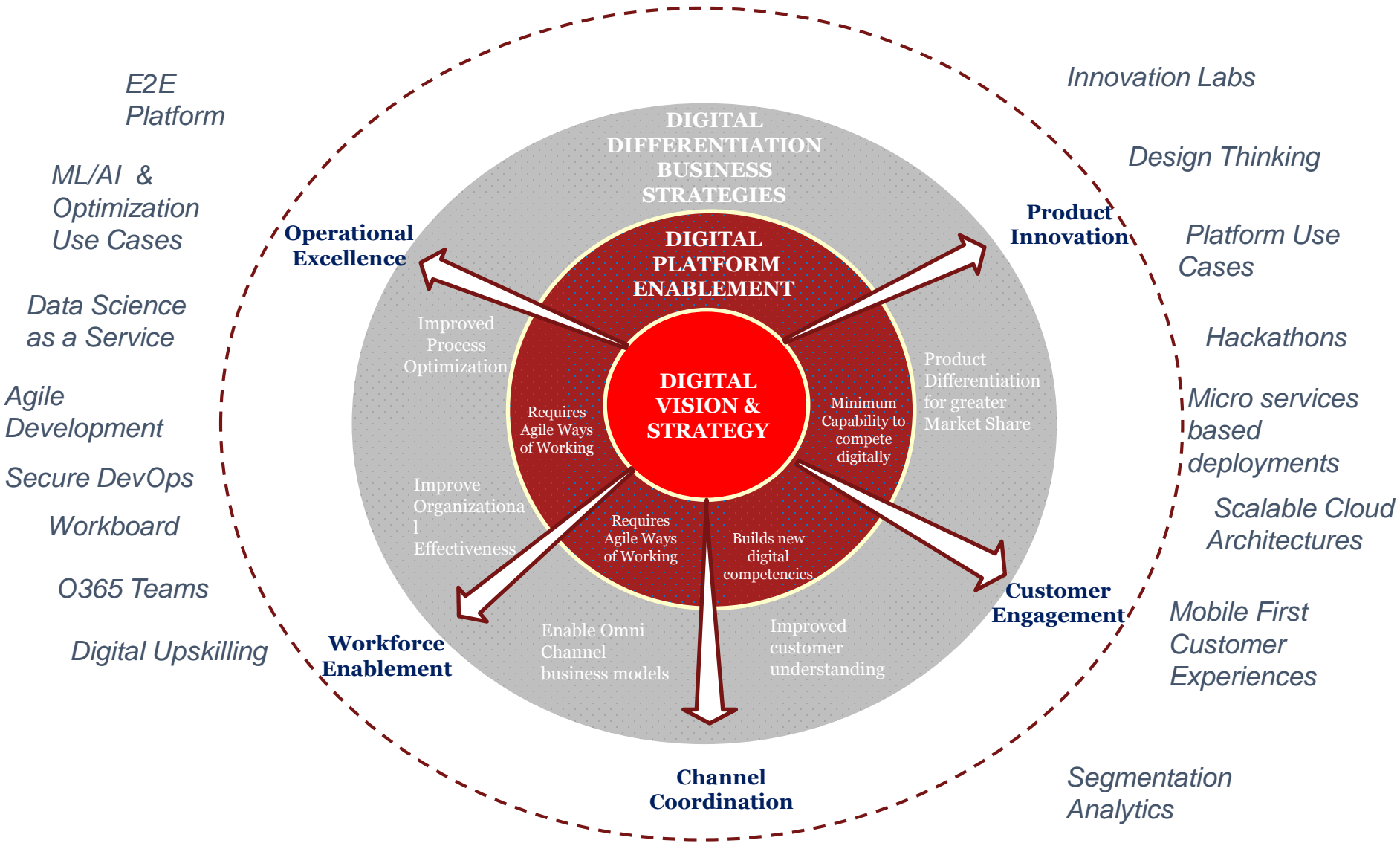
Convergence



Evidence for Abundance



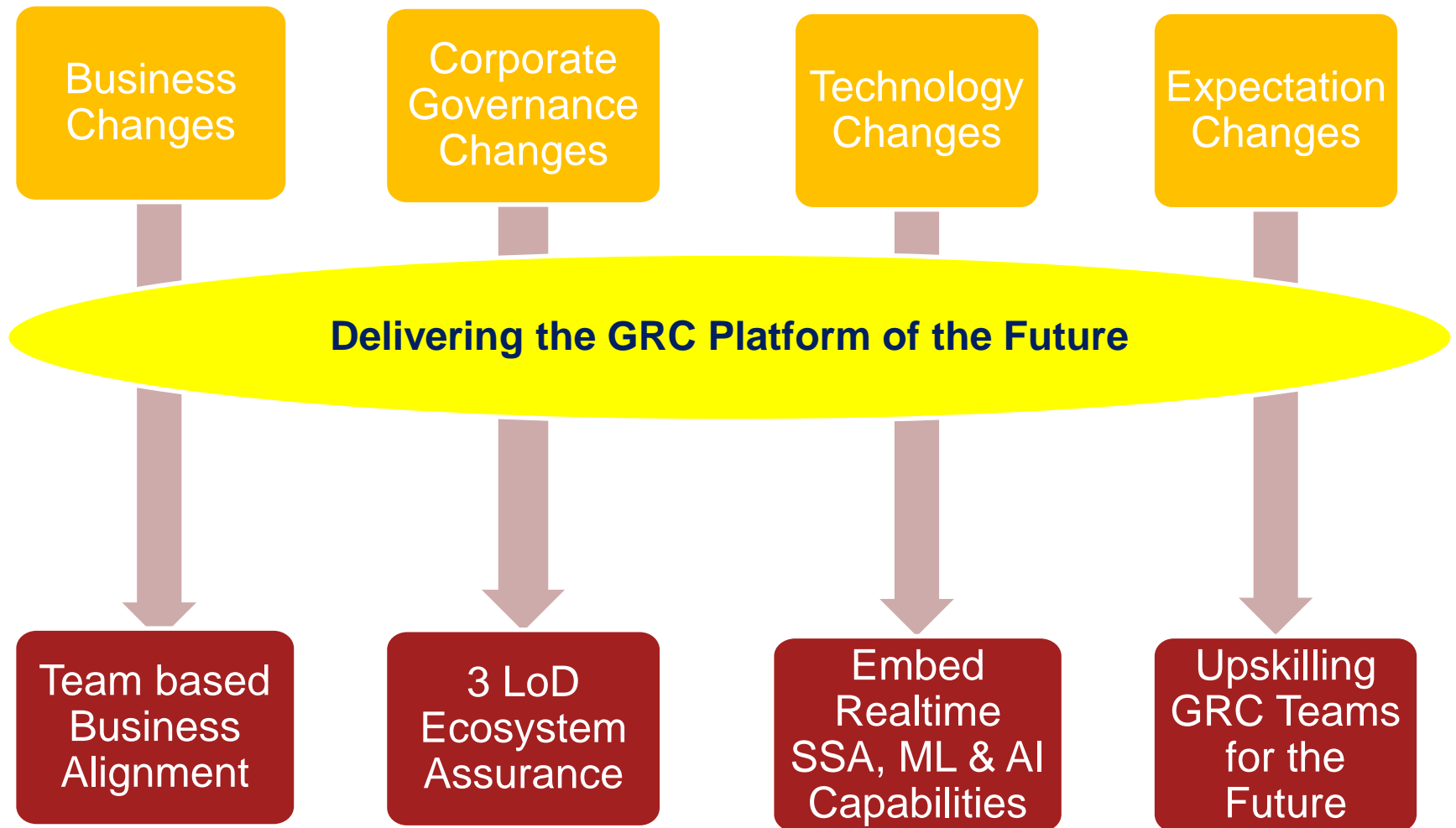
Digital Transformation Strategy



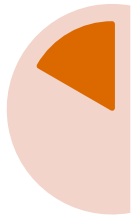
Digital Transformations introduce several new ways of working:

- 1) **Team based organizations – Organizational effectiveness?**
- 2) **Design Thinking – GRC Involvement in design ?**
- 3) **Domain Driven Design – Process optimization and**
- 4) **UI/UX Requirements – Customer experience assurance ?**
- 5) **Agile Development - Providing assurance on agile assurance ?**
- 6) **Secure DevOps – Automated Change management controls testing ?**
- 7) **ML & AI Deployments – Providing assurance on dynamic algorithms ?**

3.0 The GRC Roadmap Ahead

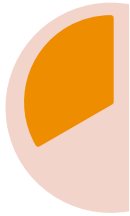


Roadmap for DevSecOps Pipeline



DevSecOps 1.0

- Jenkins
- Jira
- Gitlab
- Sonar cube
- WSO2
- Ansible
- Kubernetes
- Fortify
- Web Inspect
- Nessus/tenable.io



DevSecOps 2.0

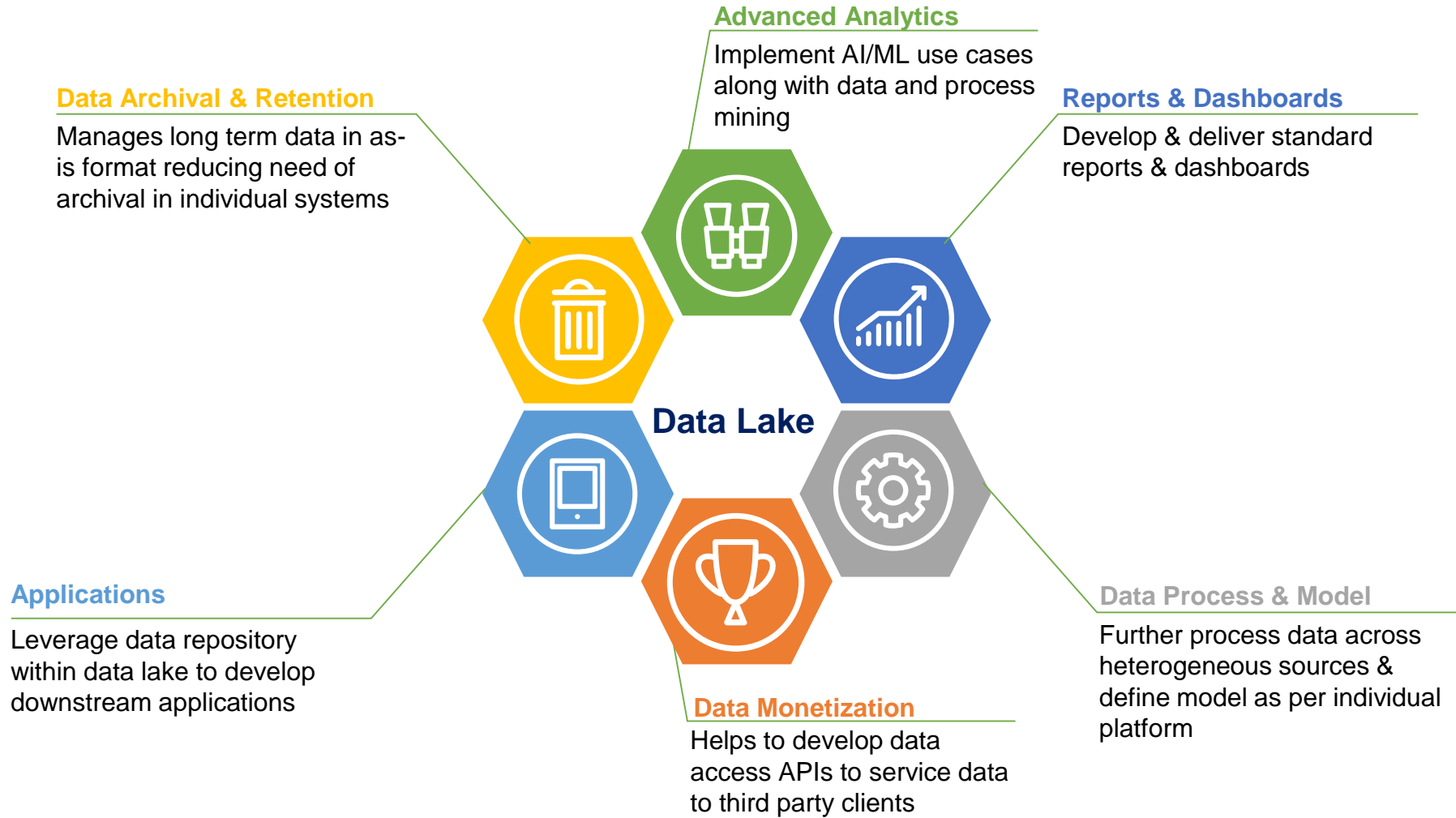
- Jenkins Cluster
- Gitlab
- Jira Enterprise
- WSO2 - HA
- Sub-platform pipeline
- AKS
- Automation of MS Pipelines
- VAPT tools
- Dockers and Kubernetes
- Security



DevSecOps 3.0

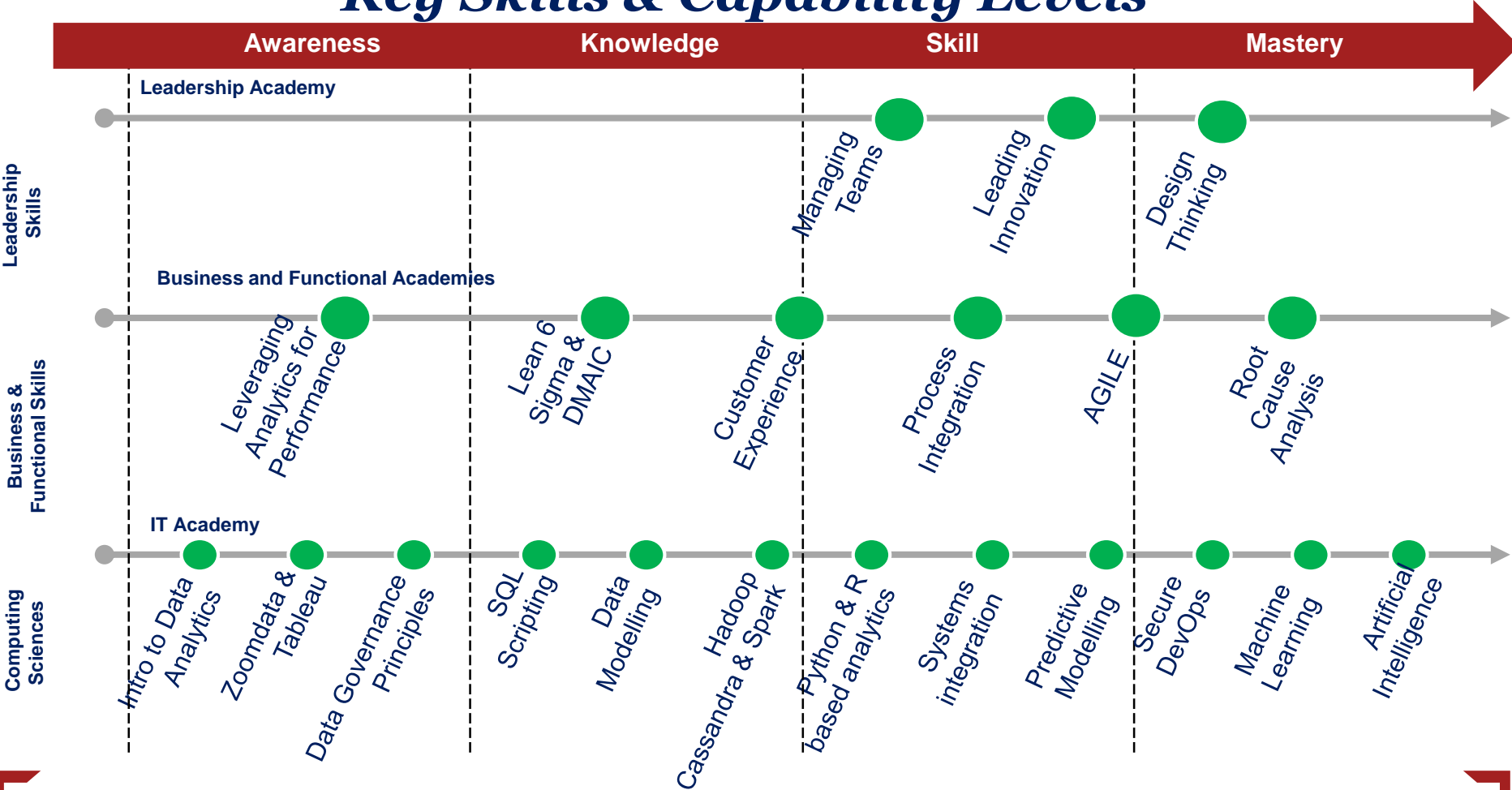
- Jenkins Cluster
- Gitlab Cluster
- Jira Enterprise
- WSO2 - HA
- AKS
- Automation of MS Pipelines
- VAPT tools
- Threat Modelling
- Dockers and Kubernetes
- Security

3.0 Leveraging Data Lake



Future Skilling the GRC Community

Key Skills & Capability Levels



Continuous multidimensional training to prepare Platform teams to leverage new technologies, identify creative solutions and drive self service autonomy

User Interfaces – Changing Dimensions



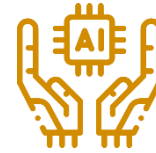
Chat Bots

- Messaging apps are offering businesses a new, intuitive way to interact in the workplace and with customers
- The smartest chat bots answer questions, complete tasks and hand over to humans when needed



Voice User Interfaces

- Most AI assistants and more and more applications have voice command options
- Google says 20 % of mobile queries are voice searches



AI Interfaces

- AI-powered virtual assistants handle tasks and services for humans
- These tasks and services are based on user input and on the assistant's ability to access information and “learn” from a variety of data sources
- Integration of customer-facing AI assistants (Cortana, Siri, Alexa, Google Assistant) and enterprise software

User Interfaces – Changing Dimensions (Cont'd)



Internet of Things

- Any object with a unique identifier and an on/ off switch to the Internet can be part of the IoT
- Use sensors to create “frictionless” and personalized experiences for customers, e.g. Shops with no cash registers



Wearables

- Wearables include smart watches, smart glasses, and many sensor-embedded accessories and clothing (Apple Watch, Google Glass, Fit Bit)
- **Personalised support.** Improve the efficiency of a product by giving context-aware support to the customer (e.g. drug instructions).



Augmented Reality

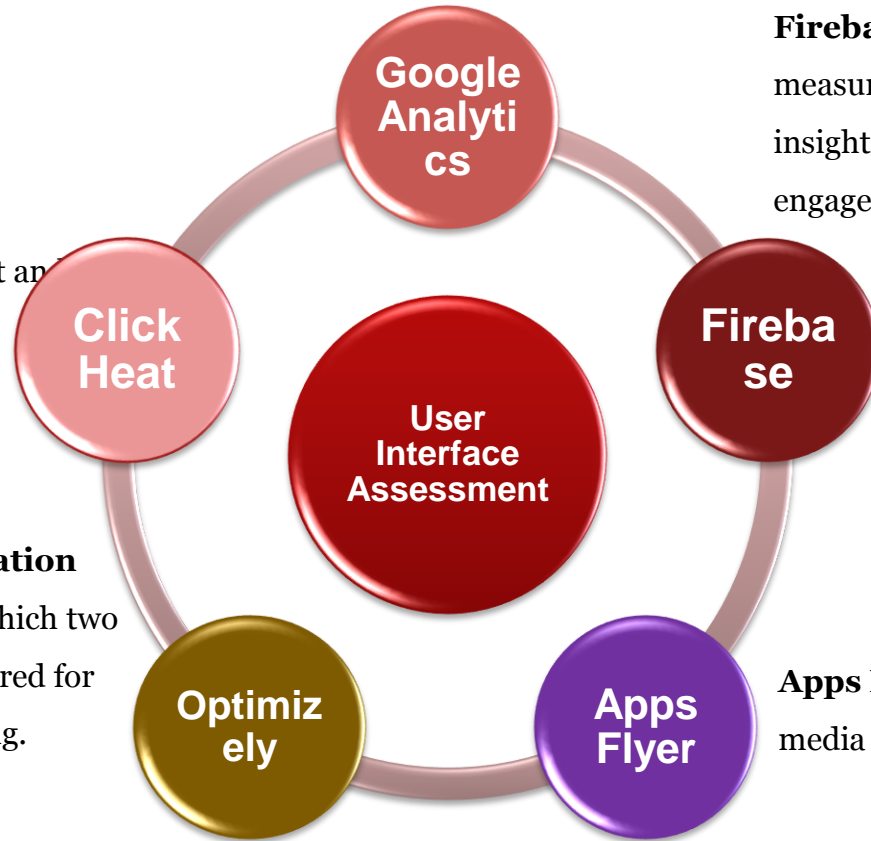
- **Touchpoints.** Invent new triggers and new interactions between the real and the virtual world (e.g. object scanning, virtual previews, 3D instruction guides)
- **Merge Online and Offline.** Design experiences that connect the online with the offline world (e.g. From social media to retail, from Business to mobile app)

Measuring and Monitoring UI

Google Analytics helps in understanding the behavior of component groups of users including ratings, numbers of downloads and verbatim feedback.

Click Heat is a visual heat map of clicks on a HTML page, showing hot and cold click zones.

A **customer experience optimization** software, provides testing tools, in which two versions of a web page can be compared for performance, and multivariate testing.



Firestore Analytics is an app measurement solution that provides insight into app usage, user engagement, crash reporting

Apps Flyer can help to know the media source of installation of the app

Assessment of UX (including UI)

The most difficult part of a UX audit is possibly the first step, the gathering of relevant materials. If goals were properly defined before embarking on the audit, you would know what kind of information you need; now you just need to think which metrics will provide you with that information. Some sources of metrics and materials helpful in an audit:



A Heuristic Product Evaluation

- Conduct a cognitive walkthrough of the product to see things from a customer perspective
- Heuristics evaluation will provide you with Qualitative data



Website and Mobile Analytics

- Analytics tools will provide the necessary quantitative information you need
- Analyse traffic source, user flow within website, Abandonment hotspots, Conversion rates



Stakeholder Interviews or User Surveys

- Interviewing internal product stakeholders such as product owners and developers on product plan, development challenges, expectation from UX audit
- Ask Marketing or sales department on user surveys, user comments and feedbacks
- Online data – user blogs, user reviews and rating etc.

What is Heuristic Product Evaluation ?

How to Conduct it ?

- Heuristic evaluation is a usability engineering method for finding usability problems in a user interface design
- In a heuristic evaluation, a set of evaluators assess a designed interface for compliance against an agreed set of principles
- These principles are summarized in **Nielsen heuristics** and **Ben Shneiderman's "eight golden rules"**. Note that there is considerable overlap between these two methods



10 Usability Heuristics

- 👁️ Visibility of system status
- 🔄 Match between system and the real world
- 👤 User control and freedom
- 🔄 Consistency and standards
- ⚠️ Error prevention
- 📷 Recognition rather than recall
- ★ Flexibility and efficiency of use
- ❤️ Aesthetic and minimalist design
- 👛 Helps users recognise, diagnose, and recover from errors
- 📄 Help and documentation

Changing Landscape of Audit – 3 Lines of Defense

LoD	GRC Domain	Current State	Key Challenges
1	Risk Management	<ul style="list-style-type: none">• ERM Implemented• Limited deployments in business	<ul style="list-style-type: none">• Further integration of external risk intelligence sources
1	Controls Management	<ul style="list-style-type: none">• Financial Controls implemented.• Operational controls deployment underway	<ul style="list-style-type: none">• Real time Analytics capabilities required• No ML & AI capabilities
1	Compliance Management	<ul style="list-style-type: none">• E-compliance management deployed in central function	<ul style="list-style-type: none">• Additional functional improvements• Group wide scalability functionality required
1	Incident Management	<ul style="list-style-type: none">• Multiple IM systems not integrated• Manual Whistleblower Mechanism in place	<ul style="list-style-type: none">• Group IM strategy to be defined and deployed

Changing Landscape of Audit – 3 Lines of Defense

LoD	GRC Domain	Current State	Key Challenges
2	Self Assurance	<ul style="list-style-type: none"> • Deployed in Business 	<ul style="list-style-type: none"> • Business Site Audit capabilities required • Crowd sourcing functionalities required
3	Audit Management	<ul style="list-style-type: none"> • Risk and controls integration needs improvement • Missing features to improve audit efficiency and UX • Audit reporting functionalities are limited 	<ul style="list-style-type: none"> • Tighter Risk & Controls integration required • Improve VAR capabilities linked to risk impact measurements • Real time analytics enablement • Integration of voice and video sources • Improvements to reporting functionality and insights aggregation across multiple audits

What is GDPR?

The **General Data Protection Regulation (GDPR)** replaces the **1995 General Data Protection Directives** and applies directly to each of the **28 EU Member States**. The GDPR aims to reinforce data protection rights of individuals, facilitate the free flow of personal data in the digital single market and reduce administrative burden.

Impact: Any company doing **business with European citizen** or **processing data from EU**. Regardless of where the company is based

Applies to **processing of personal data** by data controllers and processors

Process:

Collection, storage, organisation, structuring, adaption or alteration, retrieval, use, transmission, dissemination, restriction, destruction, erasure of personal data or set of personal data

The GDPR becomes enforceable from

25th May 2018

The definition of **personal data** is more **explicit** and includes identifiers such as:

Genetic, Mental, Cultural, Economic, Social Identity

Data Subject:

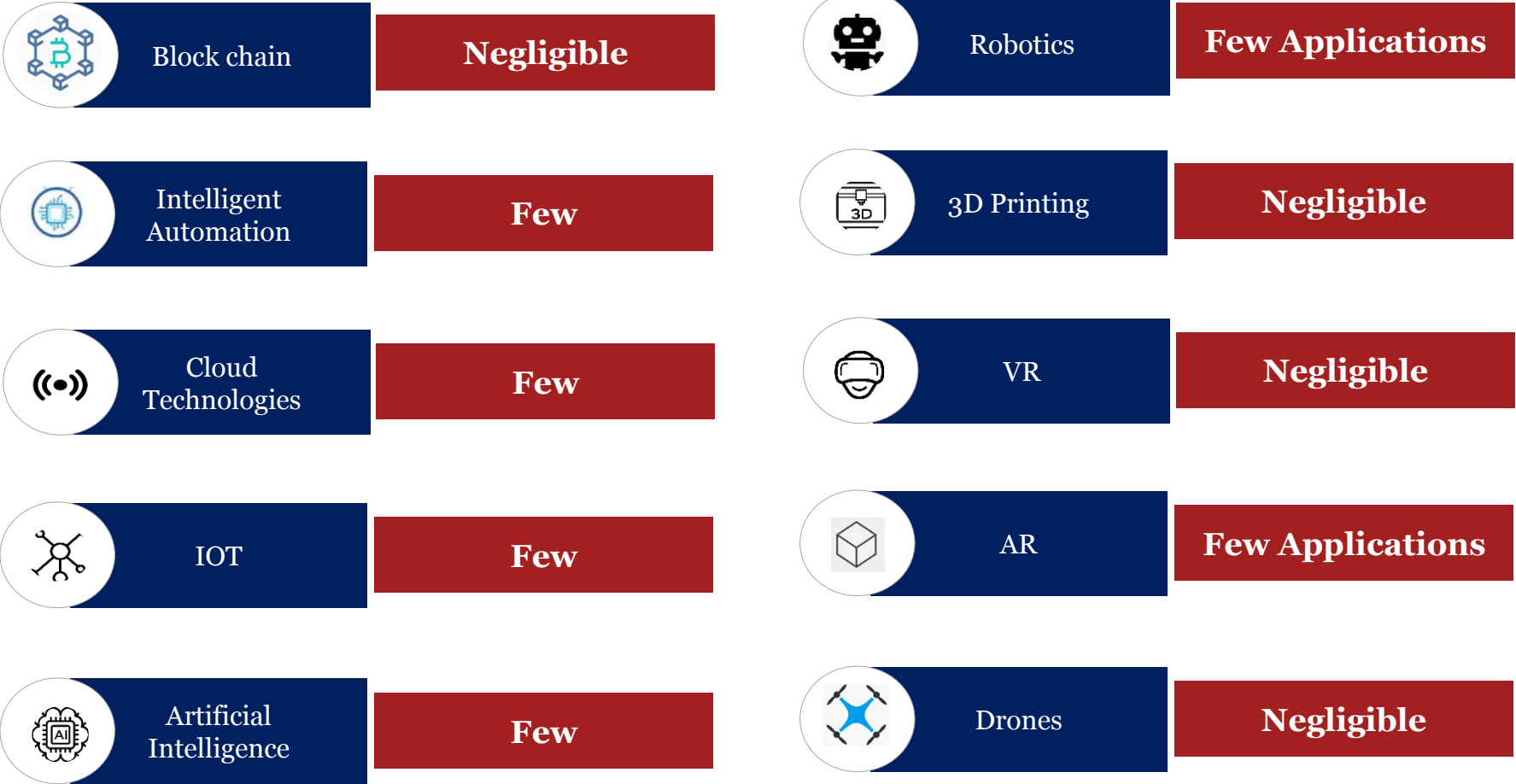
Natural Person whose personal data is processed

Tough Penalties

Fines up to **4% of annual Global Revenue** or **20 Million Euros (INR 159.015 Cr)**

Whichever is higher

Current State of emerging technologies – Future infinity



Source: Elevating internal audit's role by PWC

Six habits of risk functions - Fuel smarter risk taking

Six habits of dynamic internal audit functions

1. Go all-in on the organisation's digital plan

2. Upskill and inject new talent to move at the speed of the organisation

3. Find the right fit for emerging technologies

4. Enable the organisation to act on risks in real time

5. Actively engage decision makers of key digital initiative

6. Collaborate and align to provide a consolidated view of risks

Preparing to audit for emerging technologies

Digital strategies for recruitments

Strategies for building digital skill

More powerful insights from data & technology

**Identify opportunities impacting a billion people
- Making a world a better place to live in.**

A close-up photograph of a red ballpoint pen writing the words "Thank you!" in cursive on a white piece of paper. The pen is positioned on the right side of the frame, and the ink is a vibrant red. The background is a soft, out-of-focus gradient of red and white.

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