# Emerging Technologies & Transition

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FORM



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Sabyasachee Panda Panelist

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Murthy Divakaruni Panelist

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Dr Phiroz Darukhanavala Panelist

Industry Advisor, Energy & Power, Technology Innovation, Ex-CTO, BP



Section	Торіс	Speaker/s
Introduction	Social & Industry Impact from Emerging Technologies	Dr Tilak Agerwala
Keynote	State of Technology Transitions (Progress & Prospects of emerging technologies)	Sabyasachee Panda
Technology Induced Conflicts	Technology Advances causing a Clash of Trends	Dr Phiroz Darukhanavala
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2

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# Has Technology advanced the human condition & the health of our planet ?

#### **Technology Impact**

### (+) Impact

**Healthcare**, improving access to healthcare services and enhancing patient care

<u>Education</u>, e-learning platforms, online courses, and educational apps provide access to quality education worldwide

<u>Agricultural</u> technologies play a crucial role in addressing the problems of hunger, food security, environmental sustainability, & economic development

<u>Assistive technologies</u> have improved the quality of life for people with disabilities

Technology has facilitated the **<u>financial inclusion</u>** of underserved populations.

### (-) Impact

**Embedding biases** in automated decision-making processes & information-processing algo

Exacerbating <u>economic and social inequalities</u> within and between countries

New weapons and avenues have threatened **global security and stability** 

Some manufacturing processes and fossil fuel extraction have contributed to **<u>environmental pollution</u>** 

The widespread use of surveillance tech has raised concerns about **privacy and civil liberties**.



#### AI Critical to Future Technology Development and Adoption

#### Myth: AI represents an existential threat to humanity

No evidence for AGI or Superintelligence [Emotional Intelligence, Common Sense Knowledge, Sentience].

#### AI (ANI/GenAI) will play a critical role.

- Increase productivity by automating/speeding up tasks.
- Drive innovation and discovery
- Significantly impact the future of collaboration in various domains (GenAI)
- Solve complex problems that cannot be solved by humans or machines alone

#### ANI/GenAl Issues must be overcome:

- Hallucination\*
- The spread of disinformation and polarization is significant
  - Many of us have been subject to the loss of privacy and "surveillance capitalism"
- Words like "ransomware" have become part of our vocabulary
- Ethical issues (Bias/Fairness, Transparency, Privacy, Accountability, Safety)
- Copyright Issues
- Legal & Regulatory Issues

The tendency for certain AI models to generate nonsense or errors that do not correspond to fact or real-world or common-sense logic.

But

5



#### **Trusted and Ethical Solutions**

#### Should AI developers apply "ethics" in deploying AI solutions?

- All AI today is narrow AI, applies to limited domains, and is based on Statistical Learning. AI has no agency and makes no ethical decision.
- Al Ethics has to do with the mindset of the people who must make responsible choices to ensure human well-being at every stage from the design to deployment.
- Al developers must practice Ethical Design, all of us must familiarize ourselves with the available Al tools and their capabilities, limitations, and risks.

#### <u>ELSE</u>

AI will perpetuate and exacerbate social and economic inequalities, as well as create new forms of exclusion and discrimination



#### Dr Tilak Agerwala Papelist

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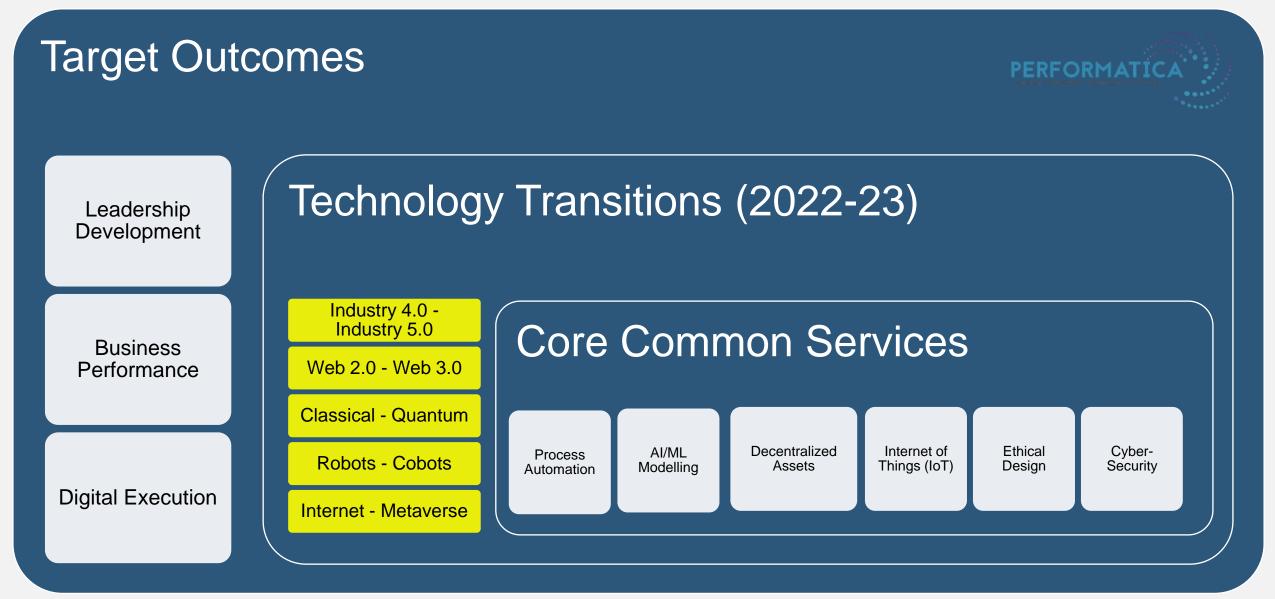
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#### Technology Transitions that we covered last year



### Progress of these Technology Transitions

## (1/2)

Shifts	Meaning of this Transition	Challenges & Adoption	Next Trends
Industry 4.0 To Industry 5.0	Industry 4.0, focuses on the automation and digitization of processes, Industry 5.0 focuses on collaboration between humans and machines to achieve more flexible and personalized mfg	<ul> <li>Cybersecurity</li> <li>IT-OT Integrations</li> <li>Legacy IT Systems</li> <li>Limited Industry 4/5 Skills</li> </ul>	<ul> <li>Personalized Manufacturing</li> <li>Digital Twins of Processes</li> <li>Sustainable Manufacturing</li> </ul>
Web 2.0 To Web 3.0	Web 2.0 focuses on content consumption, whereas Web 3.0 focuses on content creation (Semantic Web)	<ul> <li>IP Rights</li> <li>Scale (as Web3 is decentralized)</li> <li>Cyberattacks on smart contracts - hacking, smart contract flaws, data leaks, identity theft, etc.</li> </ul>	<ul> <li>Integrations and standardization in Web 3.0</li> <li>Utility NFTs/tokenization of physical assets (real estate)</li> <li>DeFi (decentralized finance) into payments, P2P lending</li> <li>Virtual Identities</li> </ul>
Classical To Quantum	Classical computing relies on binary digits (bits) that are either in the state of 0, or 1, while quantum computing relies on quantum bits or qubits. These can be both in the state of 0 and in the state of 1, simultaneously	<ul> <li>Short lifespan of qubits</li> <li>Fabrication precision challenges</li> <li>Limited quantum computing resources (includes software)</li> <li>Skills Gap</li> </ul>	<ul> <li>Quantum based cryptography</li> <li>Standalone quantum chips to a "modular" quantum computing framework</li> <li>Quantum-friendly fibre-optic and microwave connections</li> <li>Emerging "hybrid" quantum computing that combines quantum computations with classical algorithms</li> </ul>

### Progress of these Technology Transitions



Shifts	Meaning of this Transition	Challenges & Adoption	Next Trends
Robots To Cobots	While a robot performs a task without human control, a cobot performs tasks in collaboration with human workers.	<ul> <li>Suitable for handling small payloads (&lt;20kg)</li> <li>Safety coordination/hands off during the production</li> <li>Limited Speed during production cycles (~250 mm per second)</li> <li>Not in a 24x7 mode as human loops are embedded in the process</li> </ul>	<ul> <li>Increasing Adoption in Small and Medium Enterprises (SMEs)</li> <li>Advancements in End-of-Arm Tooling (EOAT)</li> <li>Integration of Artificial Intelligence (AI) and Machine Learning (ML)</li> <li>Cloud Connectivity for Remote Monitoring and Control</li> </ul>
Internet To Metaverse	The metaverse is a hypothetical iteration of the Internet as a single, universal and immersive virtual world. Creates shared experiences and virtual economies, marking the next evolution of digital interaction	<ul> <li>Technical complexity - 3D environments to designing AI-powered interaction systems</li> <li>Privacy in virtual worlds</li> <li>Integrations and standardization limitation</li> <li>Metaverse development necessitates a balance between centralization and decentralization</li> </ul>	<ul> <li>Virtual economy</li> <li>Urban planning and architecture – Smart Cities</li> <li>Al and gamification</li> </ul>

### **Key Industry Players**



Key Quantum Players

#### () Startups drive the transition to web 3.0



Key Web 3.0 Players

#### **Key Industry Players**





Online Game Makers	Design Software Vendors	Social Networking	Gaming, AR & VR Hardware	Live Entertainment
Roblox	🚭 Unity	• Facebook	Facebook	Live Nation
💹 Epic Games	🕎 Epic Games	MR Tencent	😑 Lenovo	Theme Parks
Microsoft	Adobe		🥢 нр	Sports Teams
📰 Activision Blizzard	\Lambda Autodesk		候 Logitech	
T2 Take-Two	🔥 Ansys		acr Acer	
## Tencent			www Valve	
🥑 NetEase			ৰ্শ্ব Razer	
💺 Nexon				
ware Valve				



Key Metaverse Players

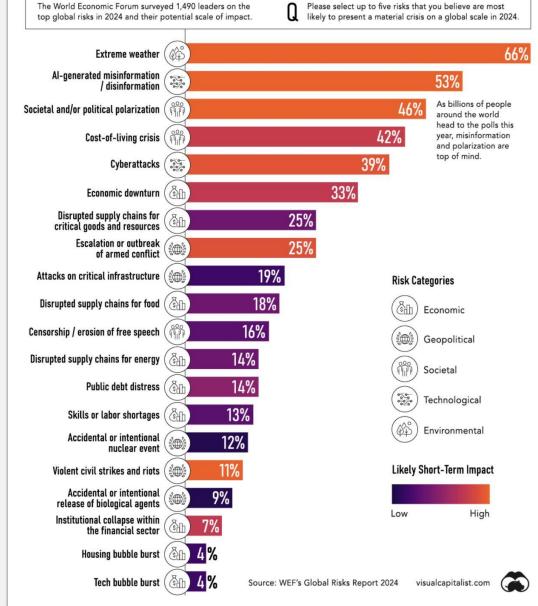
Key Cobot Players

### **Top Global Risks - 2024**

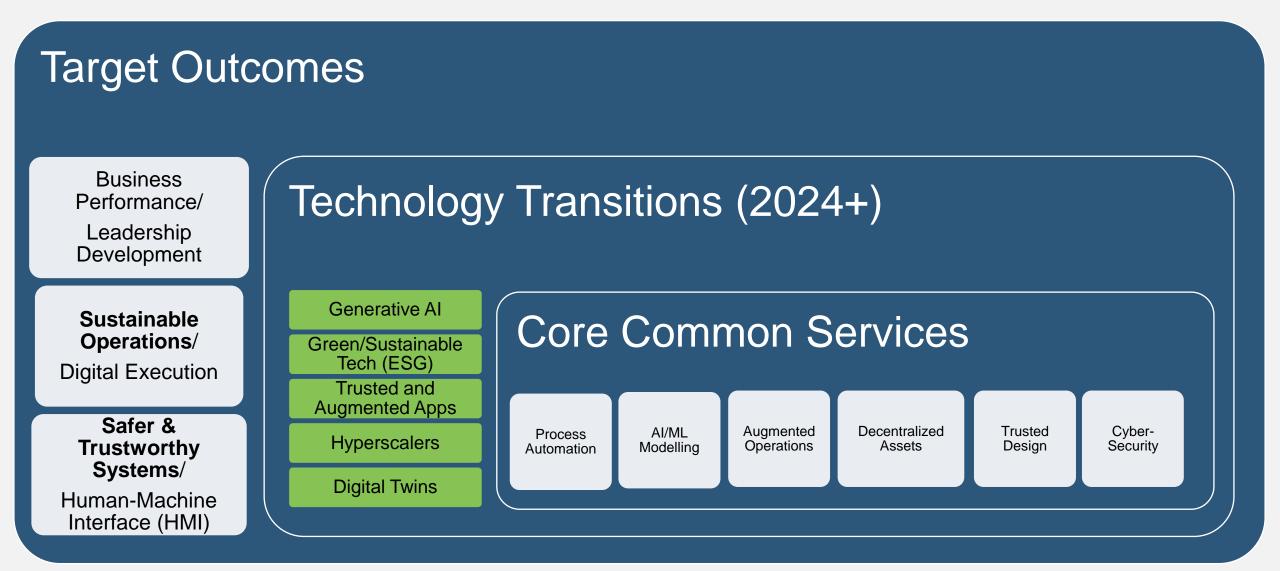
#### Tech Impact

- a) Extreme Weather
- b) AI Generated Untrusted Content
- c) Cyberattacks
- d) Attacks on Critical Infrastructure
- e) Skills/Labor Shortages

# THE TOP **GLOBAL RISKS** IN 2024



### **Refreshed Set of Technology Transitions**



### **Technology Transitions (2024-25)**



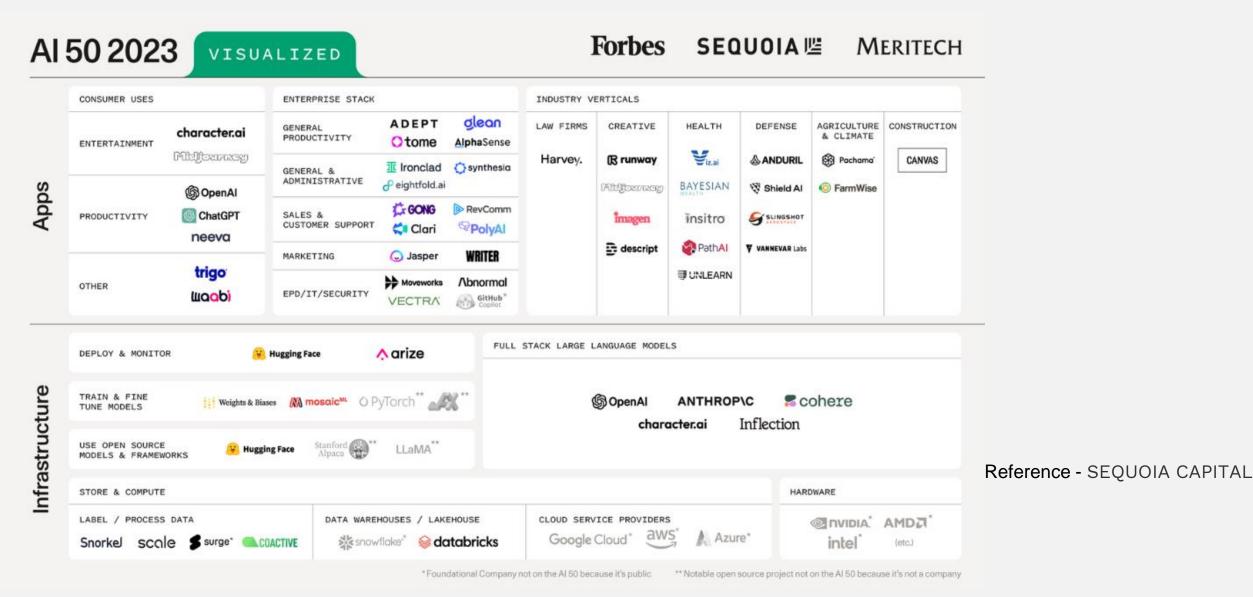
New Technology	Expected Adoption	Current Trends
Generative AI	Gartner predicts that "by 2026, more than 80% of enterprises will have used Generative AI APIs and models and/or deployed GenAI enabled applications in production environments, compared to less than 5% in 2023". Gen AI will help bring new products to market faster, increase business efficiency and productivity, hyper-personalization, and the most advanced technology available today, within everyone's reach.	<ul> <li><u>TimeGPT</u></li> <li><u>Private AI</u></li> <li><u>Gen AI for Embedded Systems</u></li> </ul>
Green/ Sustainable Tech	According to the latest CEO survey by PWC,39% of CEOs are concerned about the future of their businesses. They believe that switching to green technologies is necessary to address these concerns. <b>75% of consumers are more likely to buy</b> <b>from companies fighting climate change</b> .	<ul> <li><u>Google's DeepMind AI</u> reduces energy consumption in data centers by 40%</li> <li><u>GreenWave Reality</u> enables users to track and reduce energy usage</li> <li><u>IBM Food Trust</u> promotes sustainable and ethical sourcing with blockchainbased traceability</li> </ul>
Trusted and Augmented Apps	The global Artificial Intelligence Trust, Risk and Security Management (AI TRISM) market size was USD 1.72 Billion in 2022 and is expected to register a steady revenue CAGR of 16.2% during the forecast period, according to latest analysis by Emergen Research	<ul> <li><u>Trusted AI offerings from Top Mgmt</u> <u>Consulting Firms (KPMG, Deloitte)</u></li> <li>User driven AI based workflow systems <u>(KNIME)</u></li> </ul>

### **Technology Transitions (2024-25)**



New Technology	Expected Adoption	Current Trends
Hyperscalers	Hyperscaler data center buildouts and upgrades will nearly triple cloud compute and storage capacity in the next six years, according to Synergy Research Group projections.	<ul> <li>Gen AI workloads, which require higher-capacity server technology, has intensified competition among the largest hyperscalers to capture market share.</li> <li><u>AWS, Microsoft and Google Cloud have all pledged to upgrade infrastructure to meet customers' AI compute needs</u></li> </ul>
Digital Twins (DTs)	Gartner estimates that by 2027, 40%+ of large companies worldwide will be using Digital Twin in their projects to increase revenue.	<ul> <li>Empowering DTs with <u>Artificial intelligence</u> (AI)</li> <li>Integrating with <u>Virtual reality (VR) &amp;</u> <u>Augmented reality (AR)</u></li> <li><u>DT models for Sustainability Analytics</u></li> </ul>

#### Key Industry Players – Gen Al



### **Key Industry Players – Digital Twins**

3

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virtual sensors in complex conditions

Maturing partnerships between hyperscalers and OT/simulation specialists

Mounting promotion of interoperability across different systems

Reference

🚜 IOT ANALYTICS

### Summary/Learnings

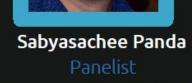
- New technologies bring efficiency, cost savings, better customer experiences, and a competitive edge.
- Risks include data breaches, system failures, and impacts on morale or satisfaction.
- Evaluation involves considering implementation costs, ROI, and associated risks.
- Confidence in technologies requires transparency, accountability, collaboration, and ethical frameworks.
- A careful approach ensures these technologies benefit society at large rather than limit to few enterprises.





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#### **Technology Advances causing a Clash of Trends**

Remote Working is well established but now clashing with Company Governance/Operations

#### Emergence of Al tools creating fear of job loss – Trend towards Unions growing

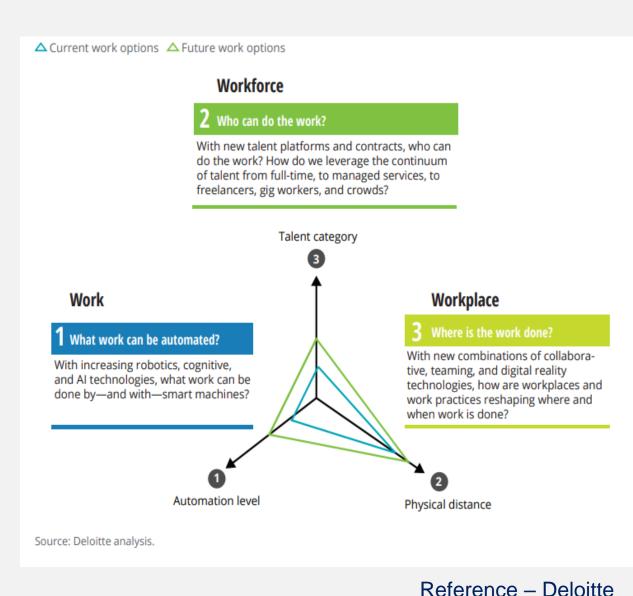
#### <u>Conversion to</u> <u>Renewables</u> is Hitting Roadblocks

In the real world, <u>Automation</u> is proving more challenging than anticipated



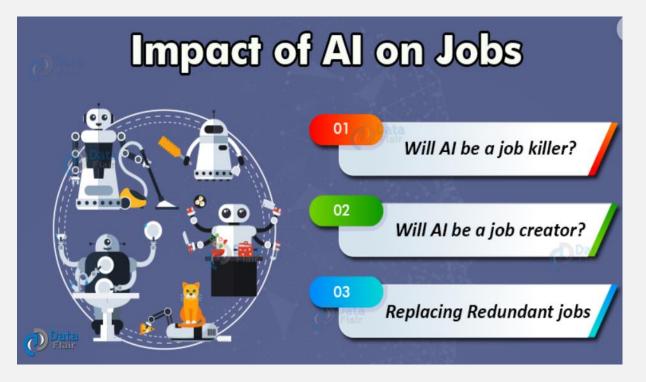
#### "Remote Working" Vs "Return to Workplace"

- Covid Remote working became the norm. Conferencing technologies advanced fast
- Post-Covid Companies need in-person meetings for innovation and project work
- Return to Workplace policies meeting with huge resistance from workforce used to working from home



#### "Emergence of AI Tools" Vs "Loss of Jobs"

- New AI technology posing serious threat to white collar jobs
- Everything from engineering design, customer service, media to healthcare jobs is on the table
- Current workforce resisting strikes, unionization increasing
- Al adoption challenged with Unions fighting to preserve jobs

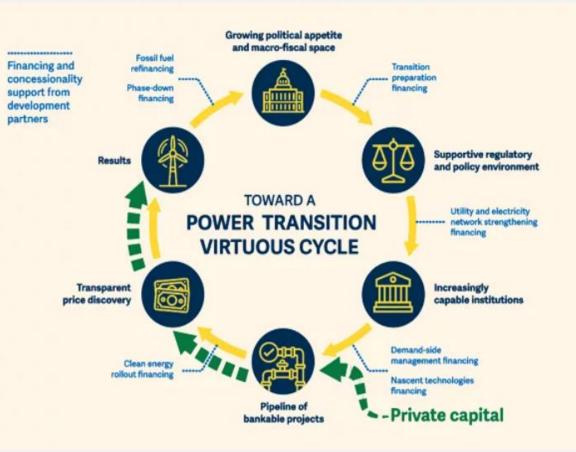


Reference – DataFlair



### "Energy Transition" Vs "Growth & Profitability"

- Big push from governments and the climate change lobby to move to renewable energy sources
- Solar, Wind and EV technologies advancing rapidly
- But serious challenges have emerged
  - War in Ukraine and energy supply uncertainty has increased reliance on fossil fuels
  - Solar facing huge resistance from landowners and local townships
  - Wind technology has serious reliability issues, costs of wind projects have skyrocketed, many wind projects cancelled
  - EV sales have been slower than expected other than Tesla, customers not buying EVs at scale battery cost and performance issues remain



Reference – The World Bank



#### "Automation Expectations" Vs "Ground Realities"

- Robotics technologies advancing rapidly
- Factory automation progressing new technologies lowering cost of implementation
- Digital twins have seen strong adoption
- But autonomous driving is hard to implement

   regulators have banned self-driving
   vehicles big setback
- Cybersecurity threats are growing, giving pause to companies implementing highly connected automation solutions

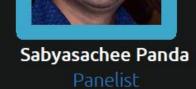
Small & Medium Enterprises (SMEs) can take advantage of these clashes by developing innovative apps or services to enable compromises and reduce friction



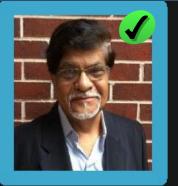


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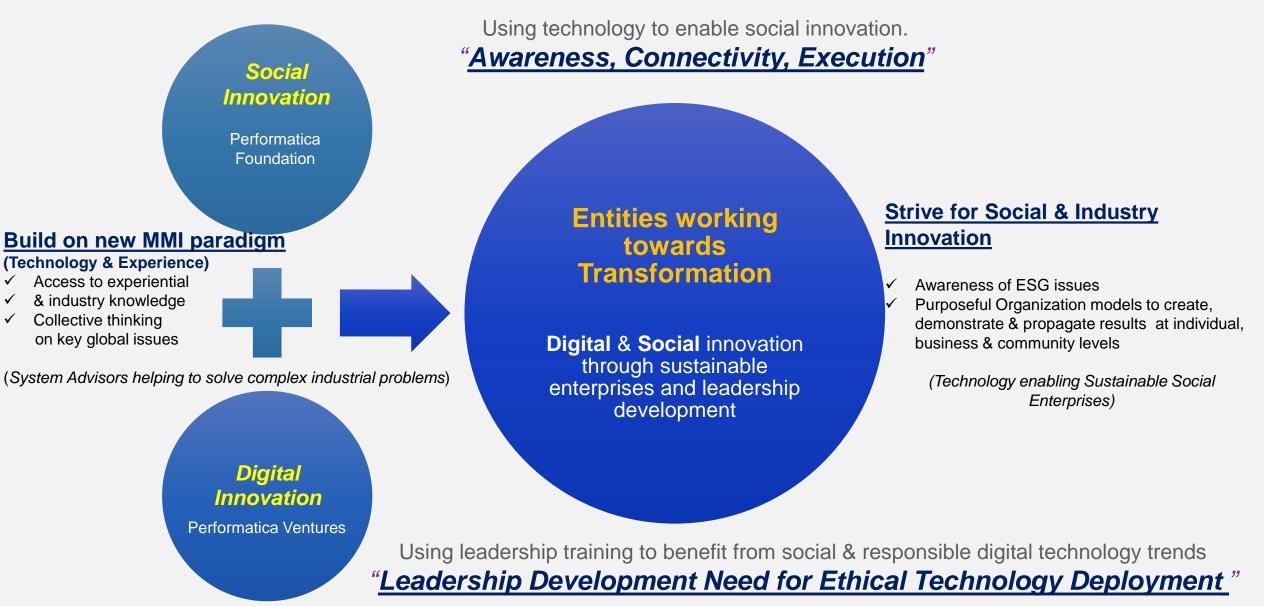
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#### **Organizations In the Future: Digital & Social Innovation**



### **Social Technology Trends**

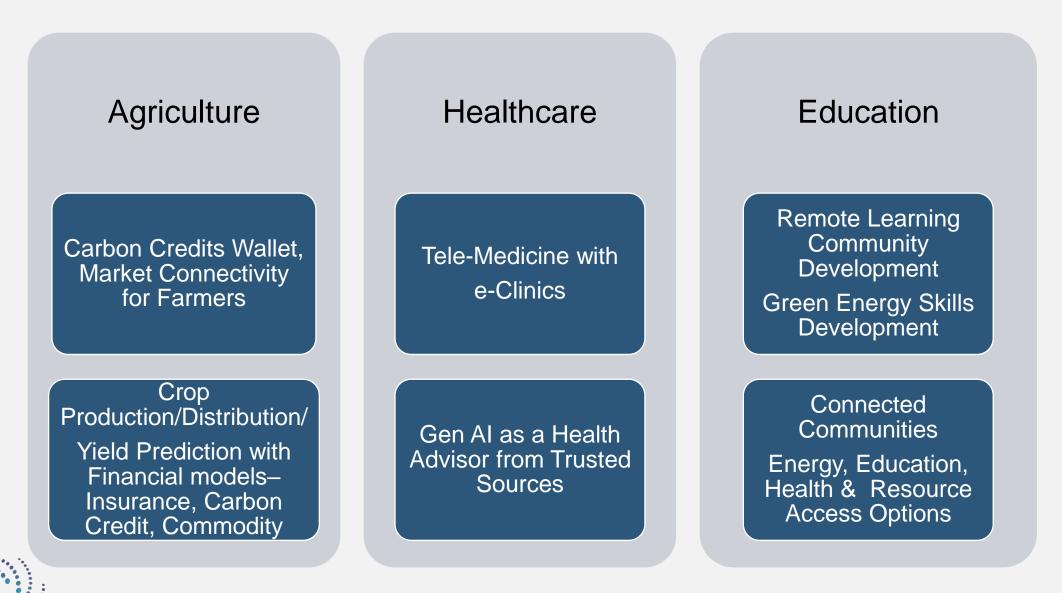
- Smart/Green Cities
- Community Empowerment
- **Inclusive Fintech** (Lending)
- Accessible Healthcare
- **Employment/Job Profile** Innovations
- Smart Legal •
- Climate for Food
- Equitable EdTech

#### Reference – StartUs Insights

#### Impact of Top 9 Social Technology Trends & Innovations in 2023

Green Cities 20 %	Inclusive Fintech 15 %	Digital Justice 8 %	Responsible Data 7%
Community Empowerment	Accessible Healthcare	Climate-positive	Food
	Employment Innovations 9 %	Equitable EdTech	1
This tree map illustrates the top 9 innovation & their impact on the Social Tech Confidential. All rights reserved.		StartUs Insights. All	

#### **Technology Impact on Social Segments**



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### **Panel Discussion:**

# Emerging Technologies & Transition





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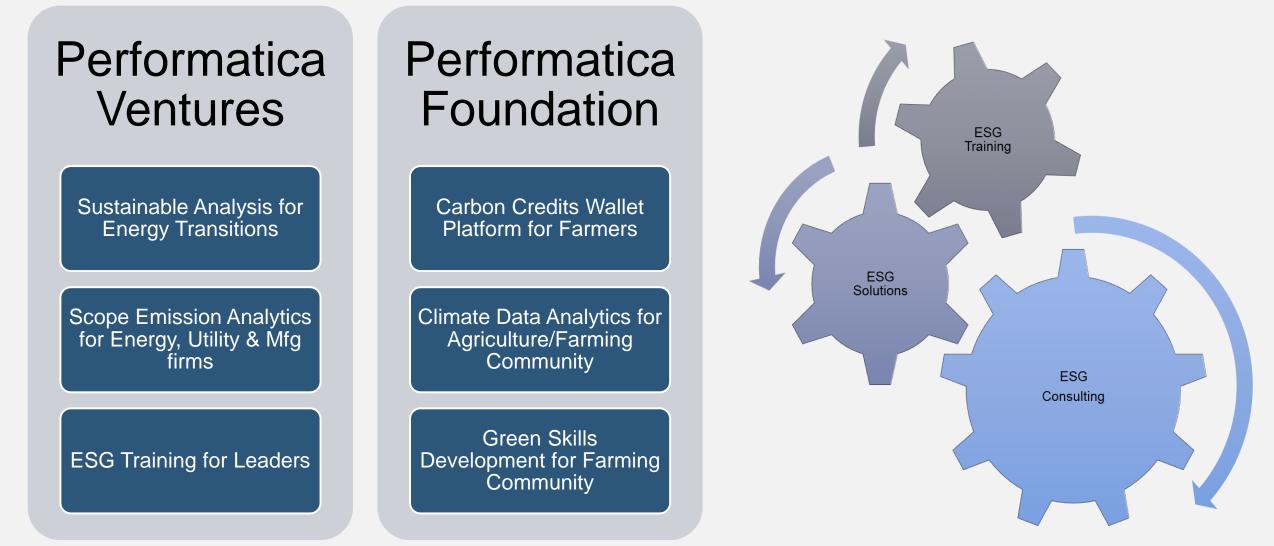
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31

#### Performatica: Adopting a Trusted & Sustainable Enterprise Model







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