



Final Group Project Presentation

Innovating Global Supply Chain Economy: Opportunities & Challenges

*Innovation & Entrepreneurship for Digital Economy
IEDE Spring 2024*



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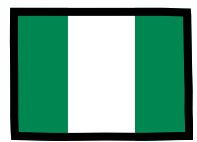
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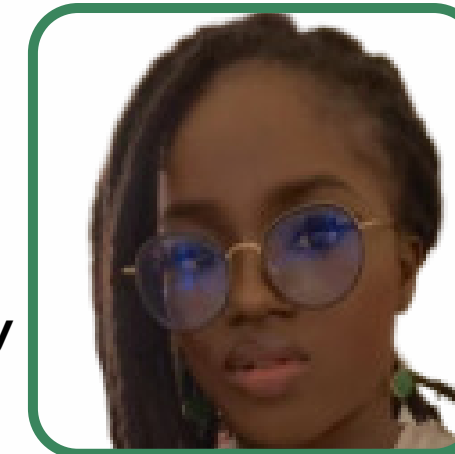
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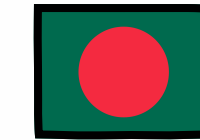
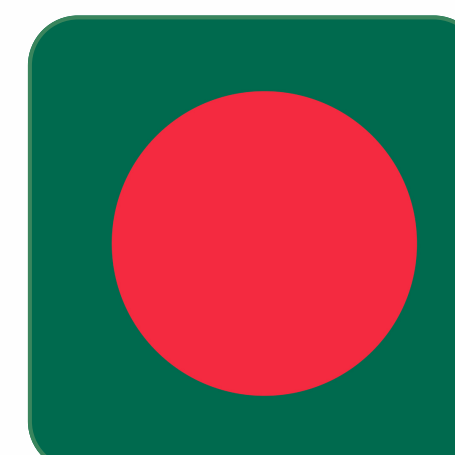
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RESEARCH

BACKGROUND



Importance

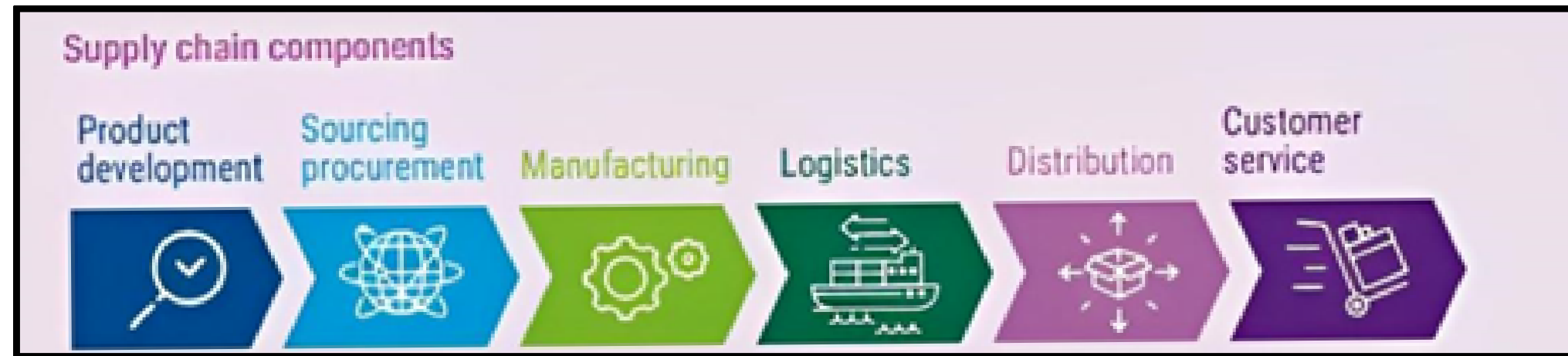


To be aligned with the Sustainable Development Goals set by the United Nations (UN): Goals 9, 10, and 11.

Identified research gaps revolve around the equitable adoption of advanced technologies such as IoT, AI, Big Data, Blockchain, Robotics, and 5G in the Supply Chain field in Emerging economies.

General Objective: Identify the main challenges of innovating the global supply chain economy, as well as the opportunities of integrating Artificial Intelligence and new key technologies in the supply chain field.

OVERVIEW OF THE CURRENT GLOBAL SUPPLY CHAIN STATUS



THE SUPPLY CHAIN

Economy

Challenges

**Covid-19
Pandemic
Disruptions
(2020-Present)**

**Supply
Side
Disruptions**

**Demand Side
Disruptions**

**Geopolitical
Tensions and
Climate Change**



THE ROLE OF SUPPLY CHAIN ECONOMY IN INNOVATION



THE ROLE OF SUPPLY CHAIN ECONOMY IN EMPLOYMENT



THE ROLE OF SUPPLY CHAIN ECONOMY IN WAGE GROWTH



THE ROLE OF SUPPLY CHAIN ECONOMY IN STEM INTENSITY



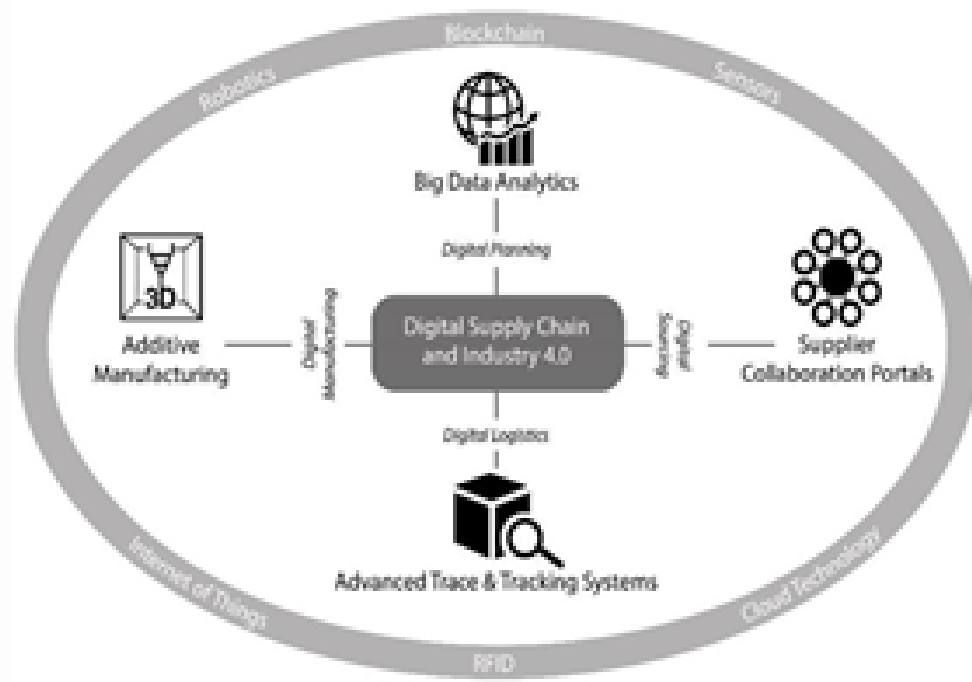
SUPPLY CHAIN INNOVATION FOCUS AREAS

Innovation and Trends

- ✓ Geopolitics and Deglobalization of SCM
- ✓ Digital Supply Chain
- ✓ Big Data Analysis and AI
- ✓ Supply Chain Investment
- ✓ Visibility, traceability, location intelligence and Last mile delivery
- ✓ Disruption and Risk management
- ✓ Agility and Resilience
- ✓ Cybersecurity
- ✓ Green and circular Supply Chain

SUPPLY CHAIN INNOVATION FOCUS AREAS

Digital Supply Chain



Innovation and Trends

Agility and Resilience

Efficiency-focused initiatives ■ Resilience-focused initiatives ■ Agility-focused initiatives

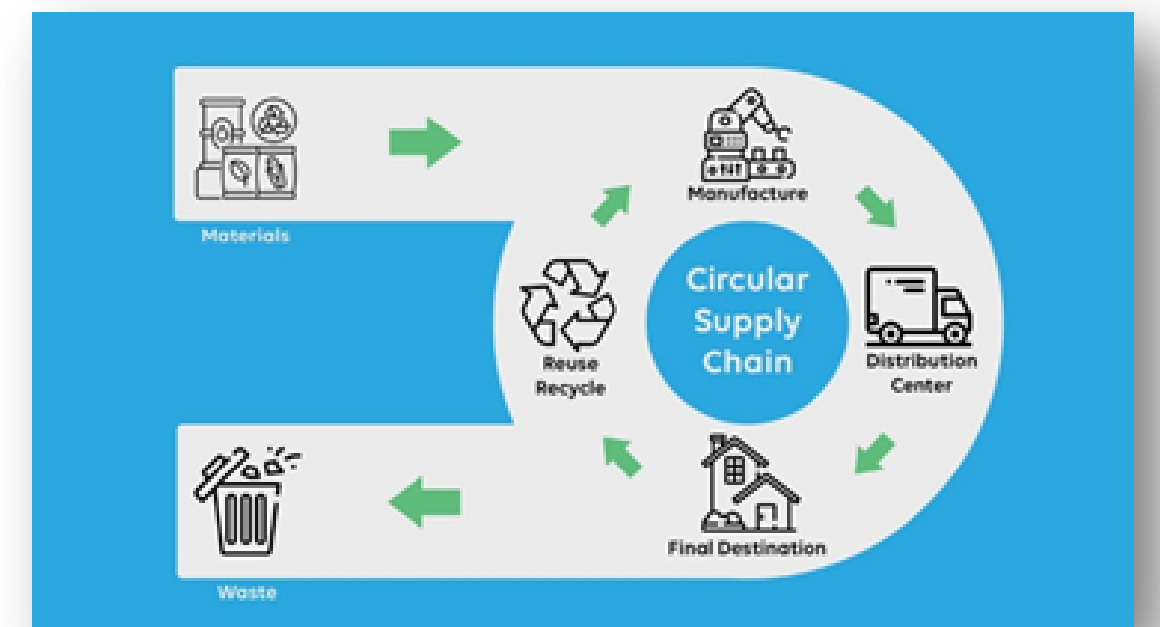


Visibility, traceability & Last-Mile Delivery



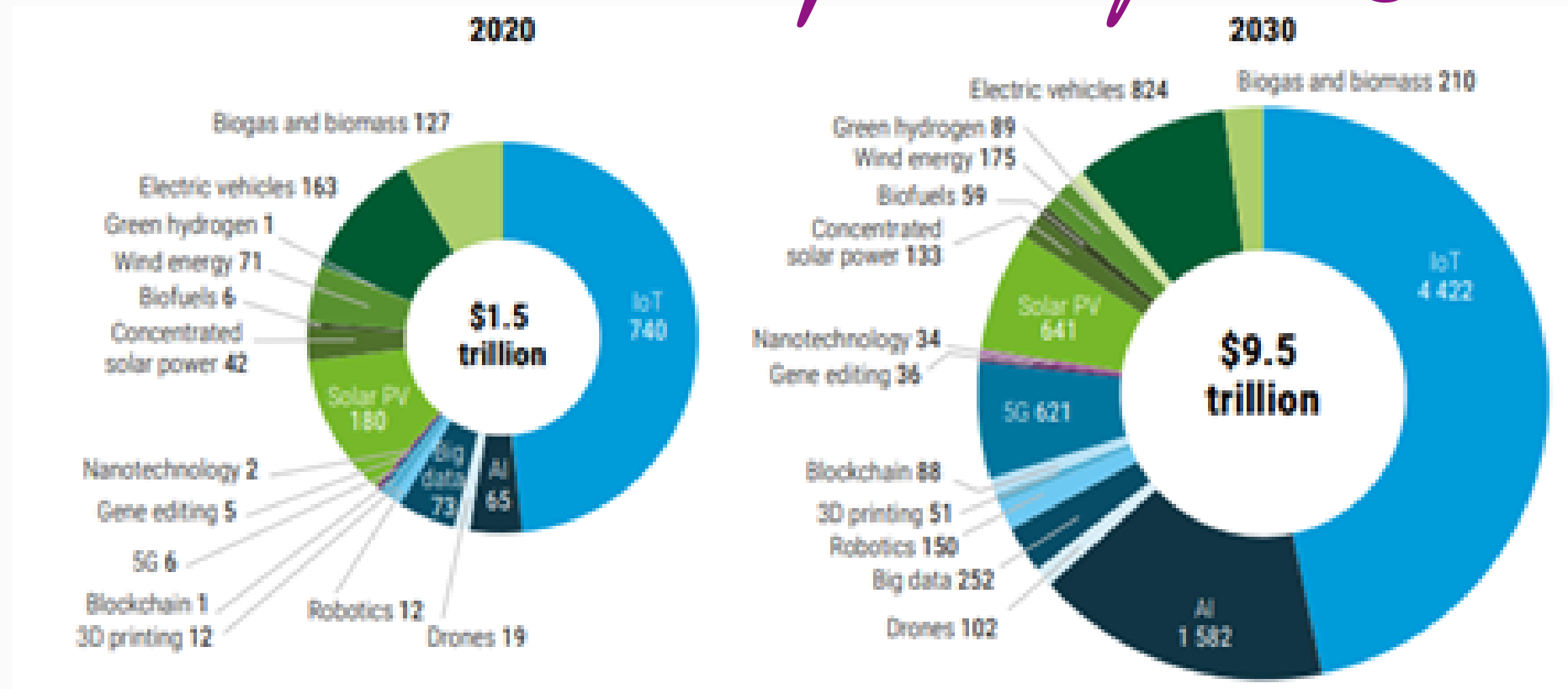
Supply Chain Investment

Innovation Areas



Green and Circular Supply Chain

Frontier Technologies



Industry 4.0 frontier technologies	Green frontier technologies
Artificial intelligence	Solar PV
Internet of things	Concentrated solar power
Big data	Biofuels
Blockchain	Biogas and biomass
5G	Wind energy
3D printing	Green hydrogen
Robotics	Electric vehicles
Drone technology	

KEY TECHNOLOGIES FOR GLOBAL SUPPLY CHAIN ADOPTION

- Internet of Things (IoT)
- Artificial Intelligence (AI)
- Big Data & Analytics
- Blockchain Technology
- Robotics and Automation
- Cybersecurity
- 5G Connectivity
- Digital Twins





Internet of things (IoT)

- Predictive maintenance
- Asset tracking and management
- Fleet Management
- Warehouse management
- Supply Chain Visibility
- Cold chain management

Blockchain

- Supplier management and compliance
- Provenance tracking and anti-counterfeiting
- Supply chain transparency and traceability
- Smart contracts for automated transactions
- Inventory management and reconciliation



Digital Twins

Asset monitoring and management

Supply chain maximization

Predictive maintenance

Warehouse and distribution centers streamlining

Transportation and Logistics management



Robotics and Automation

- Warehouse automation
- Autonomous vehicles and drones
- Robotics process automation (RPA)
- Inventory management and tracking
- Automated guided vehicles (AGVs)
- Collaborative robots (cobots)



Big Data Analytics

- Demand forecasting and inventory optimization
- Supplier management and procurement maximization
- Route optimization and transportation management
- Warehouse streamlining and operations management
- Quality Control and product traceability
- Predictive maintenance and asset management

5G Connectivity

Real-time tracking and monitoring

Autonomous vehicles and drones

Smart warehouses and inventory management

Augmented Reality (AR) and Virtual reality (VR)

Predictive analytics and demand forecasting



Use cases

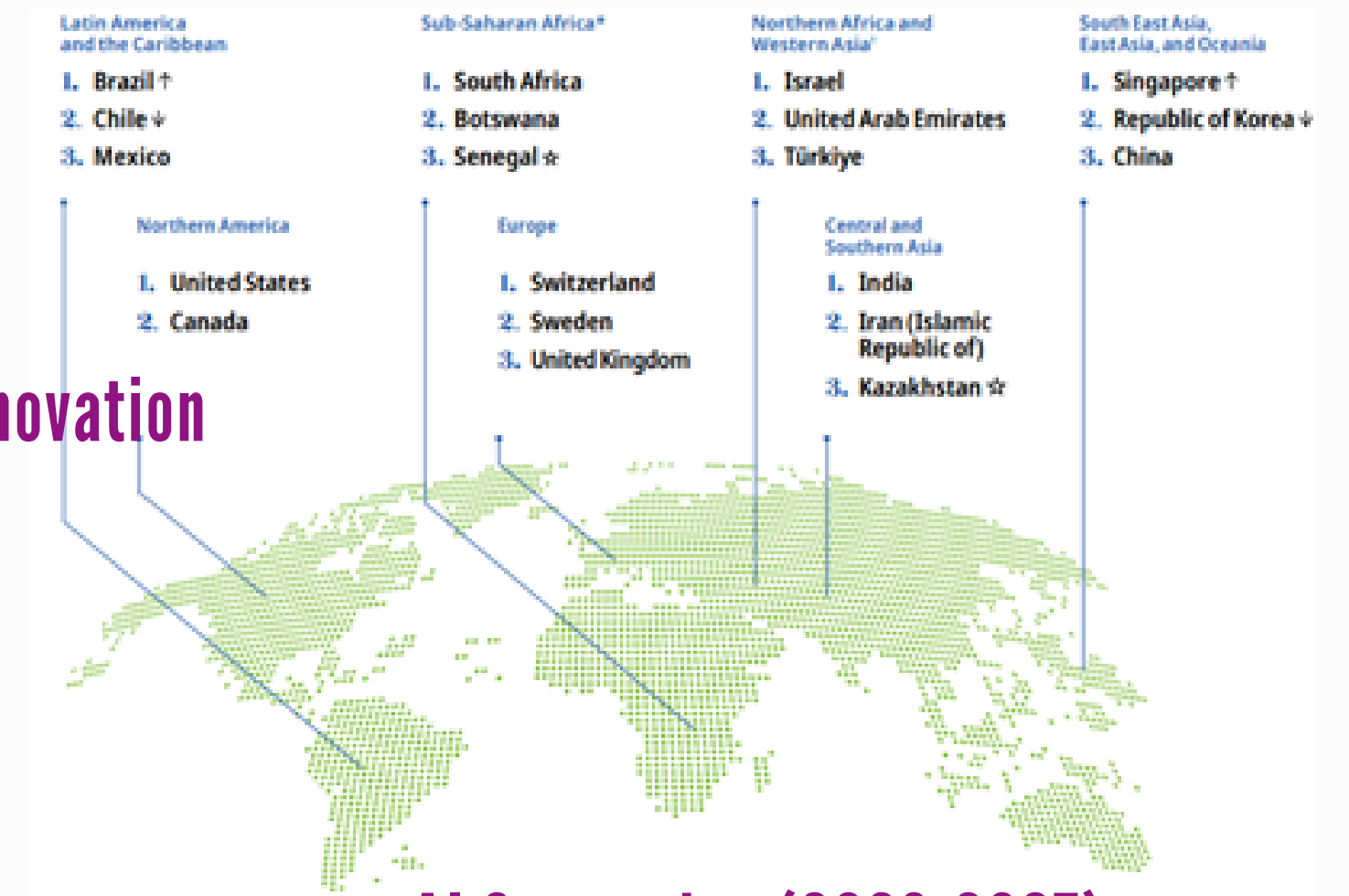
KEY TECHNOLOGIES FOR GLOBAL SUPPLY CHAIN ADOPTION

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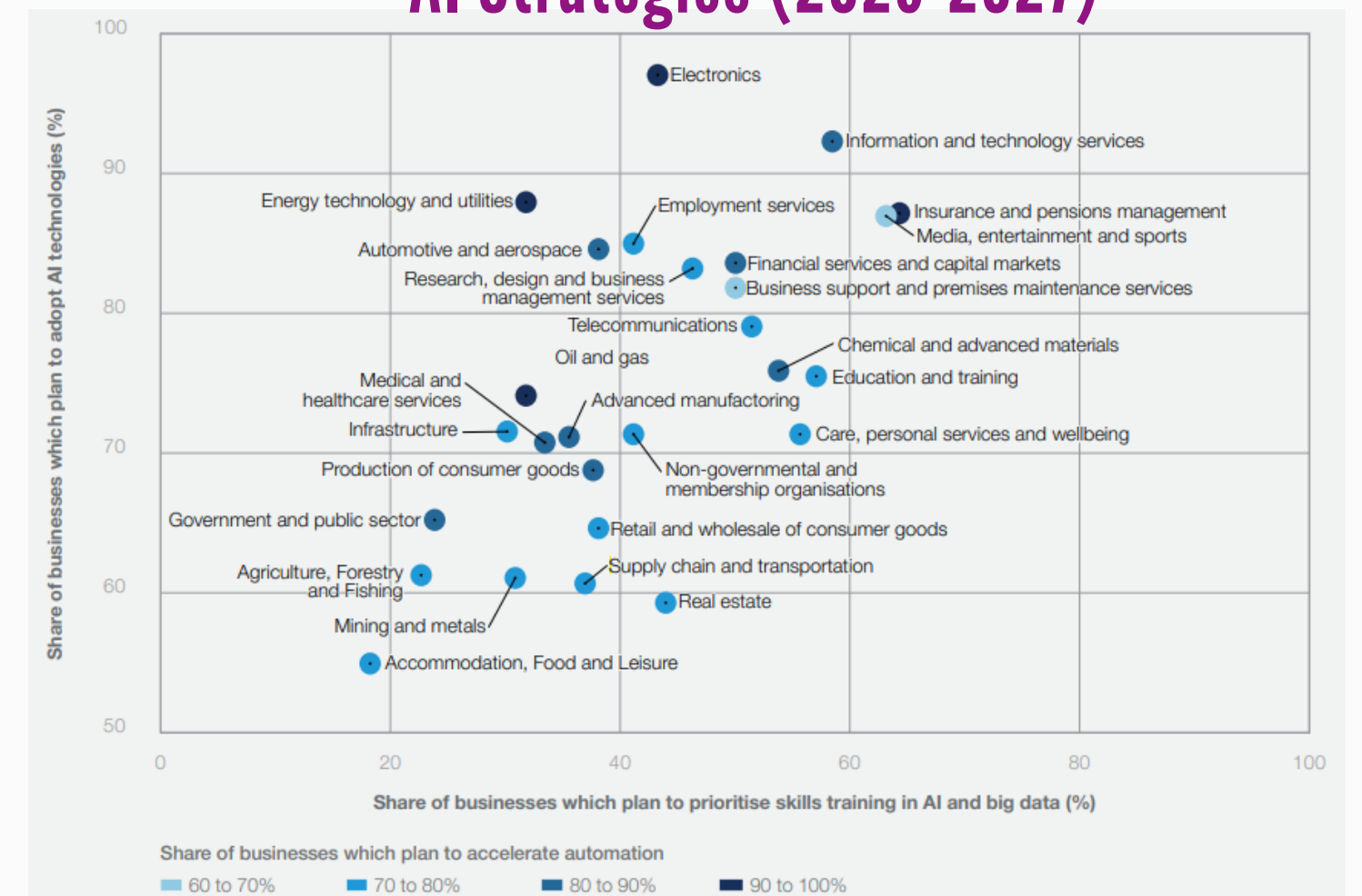
	Rank in 2022	Rank in 2021	Movement in rank	ICT ranking	Skills ranking	R&D ranking	Industry ranking	Finance ranking
Top 10								
United States of America	1	1	—	11	18	2	16	2
Sweden	2	4	▲	6	2	16	11	18
Singapore	3	5	▲	7	8	17	4	17
Switzerland	4	2	▼	21	13	12	5	5
Netherlands	5	6	▲	4	9	15	10	31
Republic of Korea	6	7	▲	15	26	3	9	7
Germany	7	9	▲	24	17	5	12	40
Finland	8	17	▲	22	5	21	20	30
China, Hong Kong SAR	9	15	▲	9	23	29	2	1
Belgium	10	11	▲	13	4	23	19	48
Selected transition and developing economies								
Russian Federation	31	27	▼	43	32	13	54	69
China	35	25	▼	117	92	1	8	4
Brazil	40	41	▲	50	55	18	51	57
India	46	43	▼	95	109	4	22	75
South Africa	56	54	▼	71	77	36	67	25

Frontier Technologies Readiness Index 2023 (UNCTAD)

Global Innovation Leaders

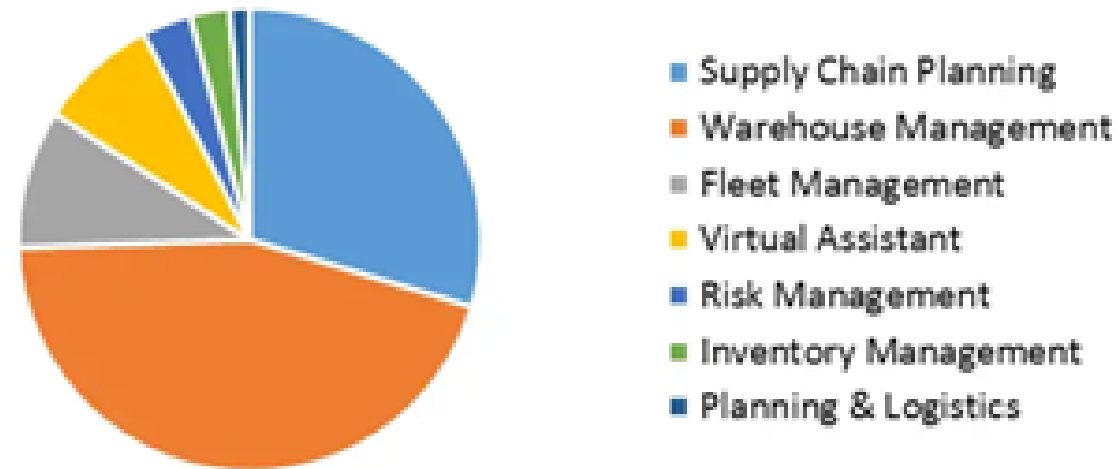


AI Strategies (2023-2027)

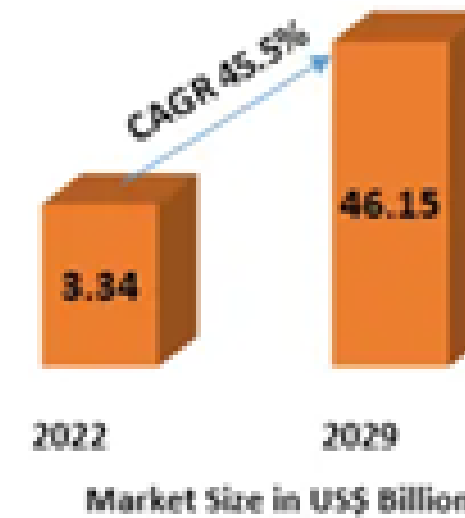


ARTIFICIAL INTELLIGENCE IN GLOBAL SUPPLY CHAIN

Artificial Intelligence in Supply Chain Market, by Application 2022 (%)



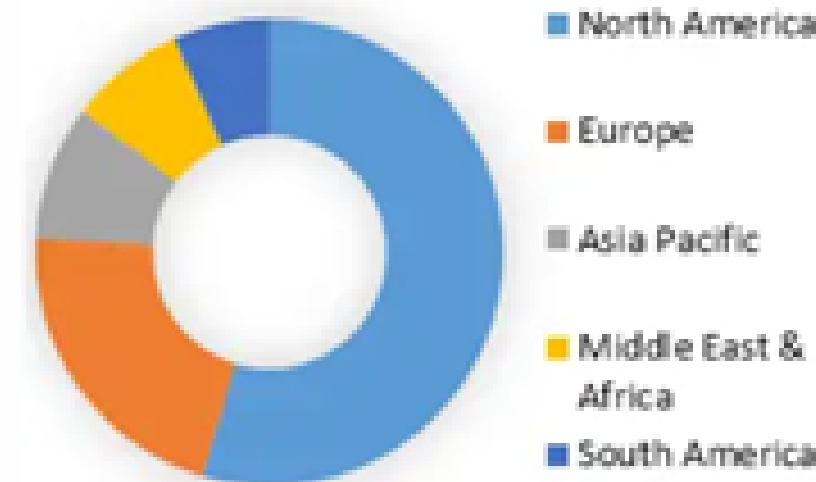
Artificial Intelligence in Supply Chain Market



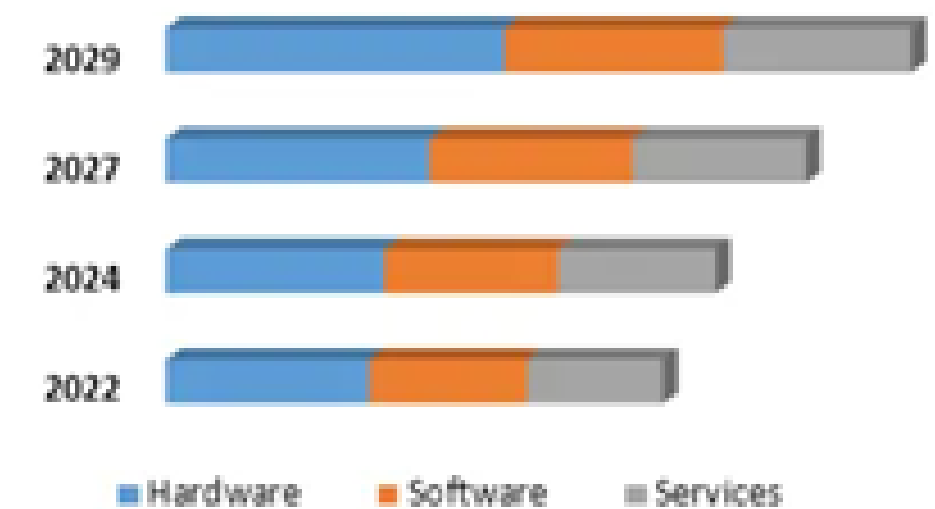
- Key Players**
- Intel Corporation
 - Amazon.com, Inc.
 - Google LLC
 - Microsoft Corporation
 - Nvidia Corporation
 - Oracle Corporation
 - IBM Corporation
 - Samsung (South Korea)
 - Lamasoft Inc.
 - SAP
 - General Electric
 - Deutsche Post AG DHL
 - Xilinx
 - Micron Technology, Inc.
 - FedEx
 - ClearMetalInc
 - C.H. Robinson
 - E2open
 - Relex Solution

	AWS Supply Chain	Sustainability parameters can be factored into ML-based risk alerts and rebalance recommendations.
	FourKites	Cloud-based platform provides visibility across multiple transportation modes. Also offers yard management and security features.
	IBM Cognitive Supply Chain	Cognitive supply chain functionality leveraging AI, ML, and analytics was implemented and proven at IBM before offered to customers.
	Dynamics 365 Supply Chain Management	Integrates with SharePoint, PowerBI, other apps for compatibility, data consistency in Microsoft-centric shops.
	Project44	APIs provide supply chain transparency across ocean, intermodal, air, truck, and rail including Ocean Terminal Visibility.

Regional Analysis in 2022 (%)

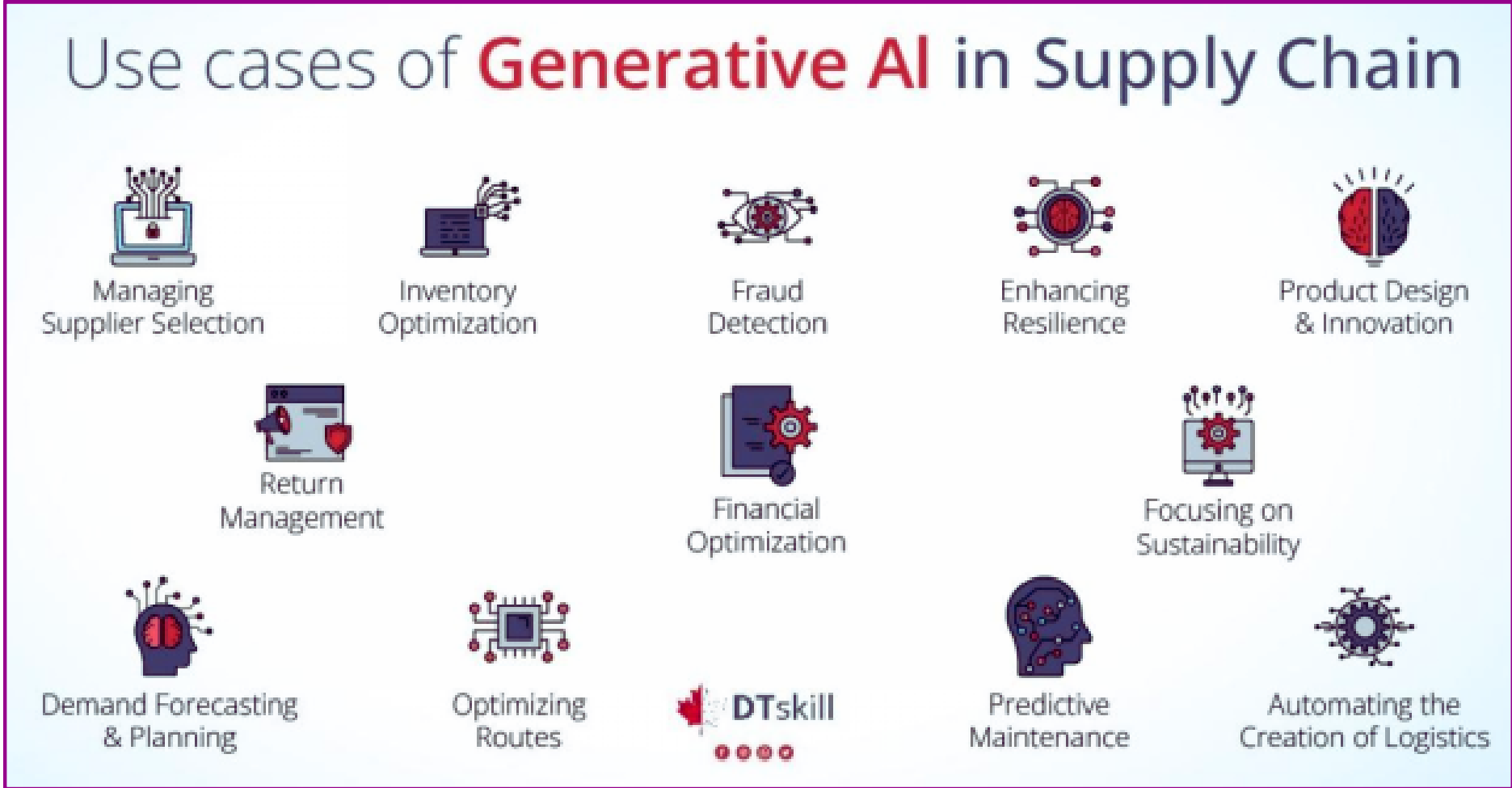


Offering Segment Overview

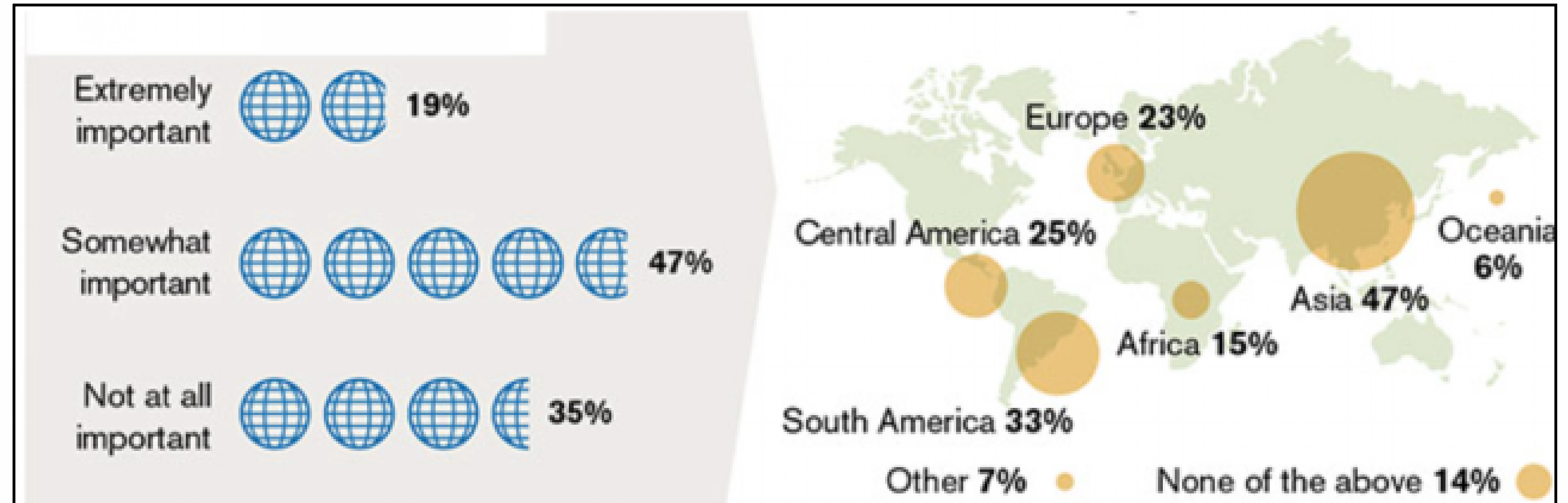
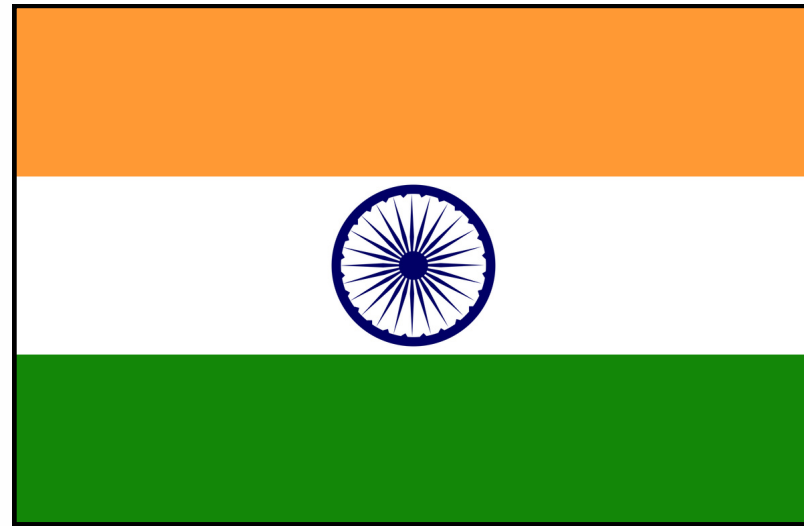


ARTIFICIAL INTELLIGENCE IN GLOBAL SUPPLY CHAIN

Use Cases



Company	Type of AI	Example of application	Example of main benefits
Amazon	Robots	Warehouse operations	Productivity improvement and errors minimisation
DHL	IDEA algorithm	Routes optimisation and staff allocation	Order-picking processes improvement, costs minimisation, and e-fulfilment optimisation
General Motors	Computer vision	Monitoring failing robotics in assembly operations	Predictive maintenance and downtime minimisation
Goodyear	AI sensors with IoT	Smart tyre	Monitoring and control of the tire changes and self-repair in case of damage
Nestlé	Augmented reality (AR)	Remote production and assistance, connecting suppliers, people and factories	Operations efficiency increase, quick response, CO ₂ minimisation
Netflix	Machine learning	Movies and content production	Resources and production process optimisation, and customer product prediction
Atomwise	Deep convolutional neural network	Drug discovery	Drug discovery process optimisation



OVERVIEW

1. Evolving State of Play

2. Shifting Lines as Opportunities

3. Disruptive Production

4. Logistics Capacity Upscaling

5. Fiscal Impact

6. Geo-energy Exchanges

SUPPLY CHAIN IN EMERGING ECONOMIES

CHALLENGES AND PROPOSED SOLUTION FOR SUPPLY CHAIN IN EMERGING ECONOMIES

**Transport and Logistics
Infrastructure Deficits**

**Invest in infrastructure
development**

**Low Technology,
Information Sharing,
and Communication**

**Enhance connectivity and
communication**

**Poor Human Capital
and Awareness**

**Capacity building and
skills development**

**Poor Regulation and
Policy Implementation**

**Streamlining regulatory
frameworks**

**Commitment Issues
in Relations**

**Promotion of
collaboration and
partnership**

**Non-adherence to
Sustainability Standards**

**Adoption of sustainable
practices**

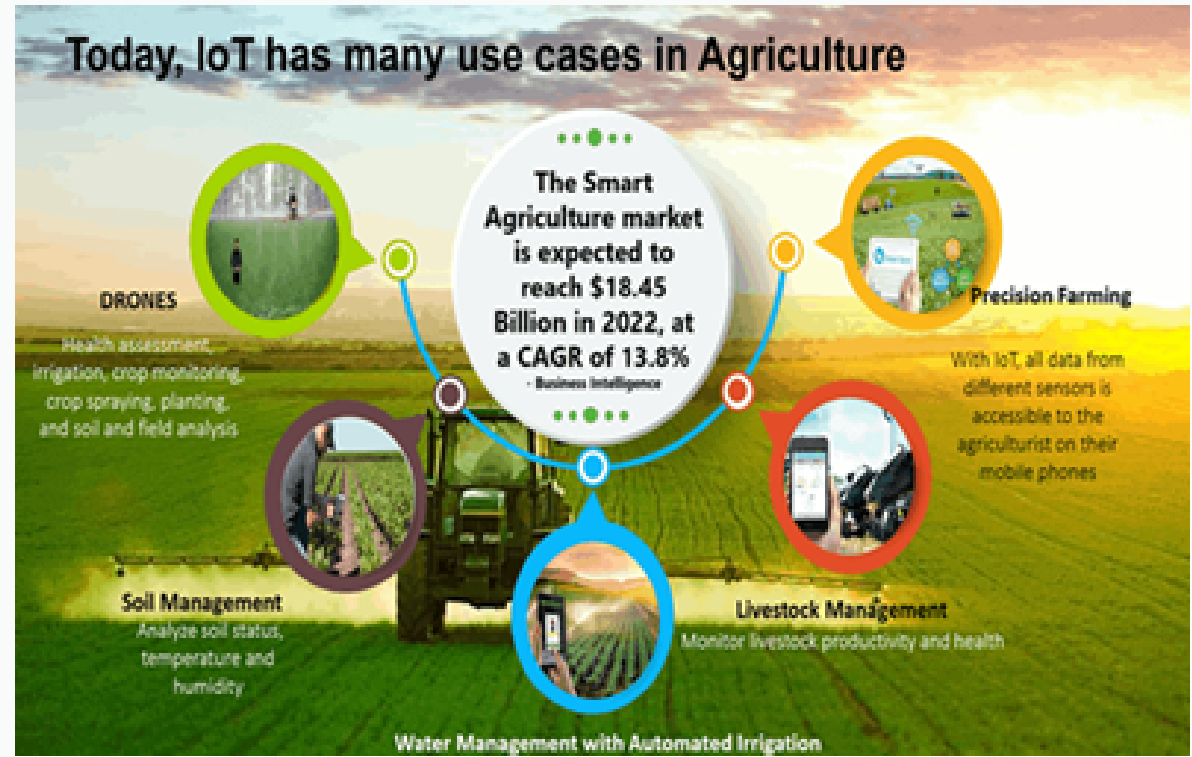
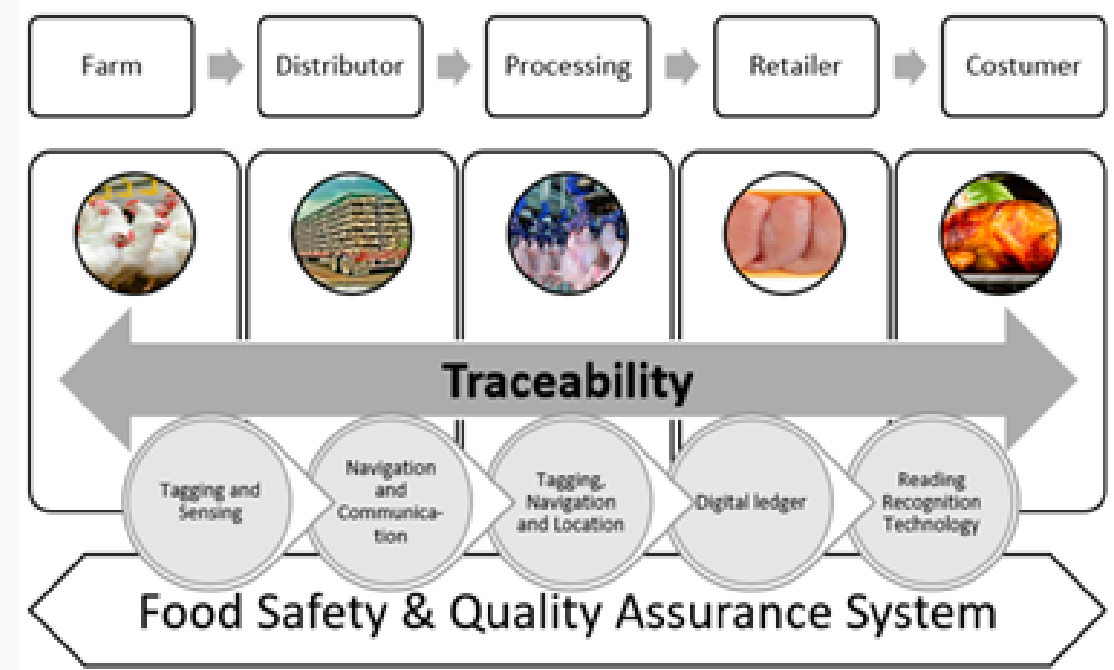
KEY TECHNOLOGIES FOR SUPPLY CHAIN ADOPTION IN EMERGING ECONOMIES

Agriculture Case Study - India

More efficient logistics and transportation solutions, powered by IoT, to reduce spoilage and improve delivery times. Data collected from IoT devices and blockchain transactions to power AI-driven insights for predictive analytics.

Case Study - Brazil

Designing IoT platforms that can seamlessly integrate devices from different manufacturers. Developing customized IoT sensors for specific agricultural applications.



Mining Case study - South Africa

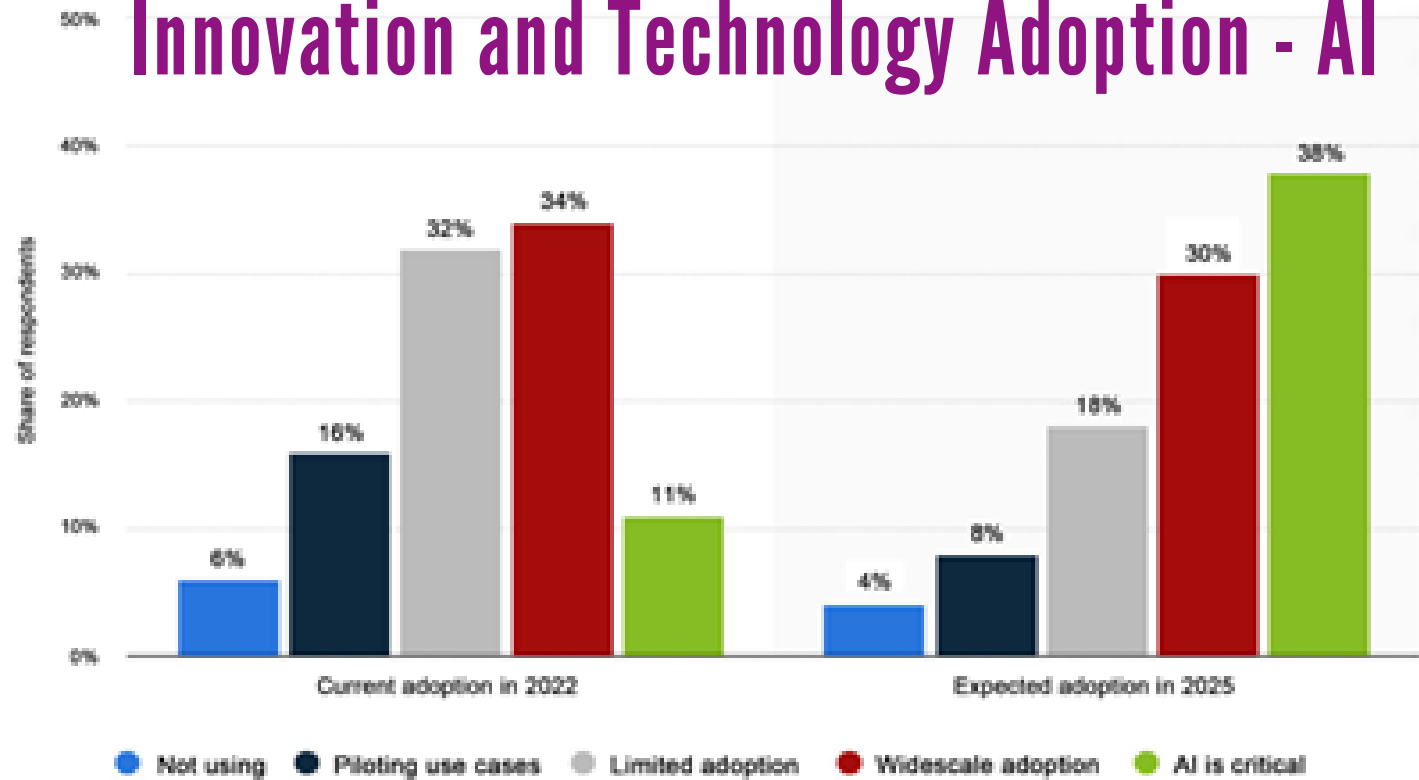
Drones in mineral exploration will involve advancements in data analysis and integration. With AI and ML algorithms, drones will be able to analyze large volumes of data quickly and accurately. Drones can also be integrated with robotics, virtual reality, and augmented reality.

Case Study - Mexico

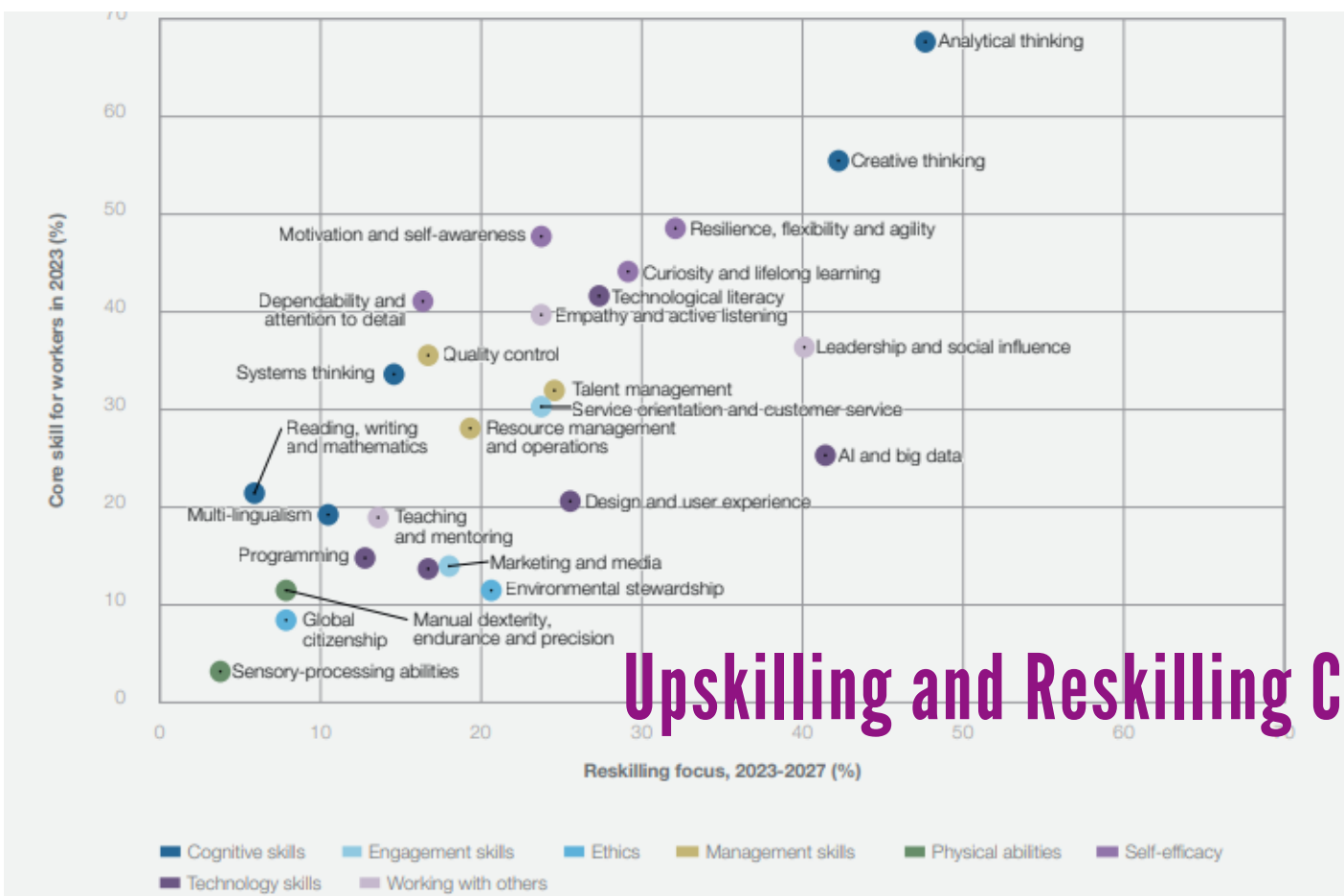
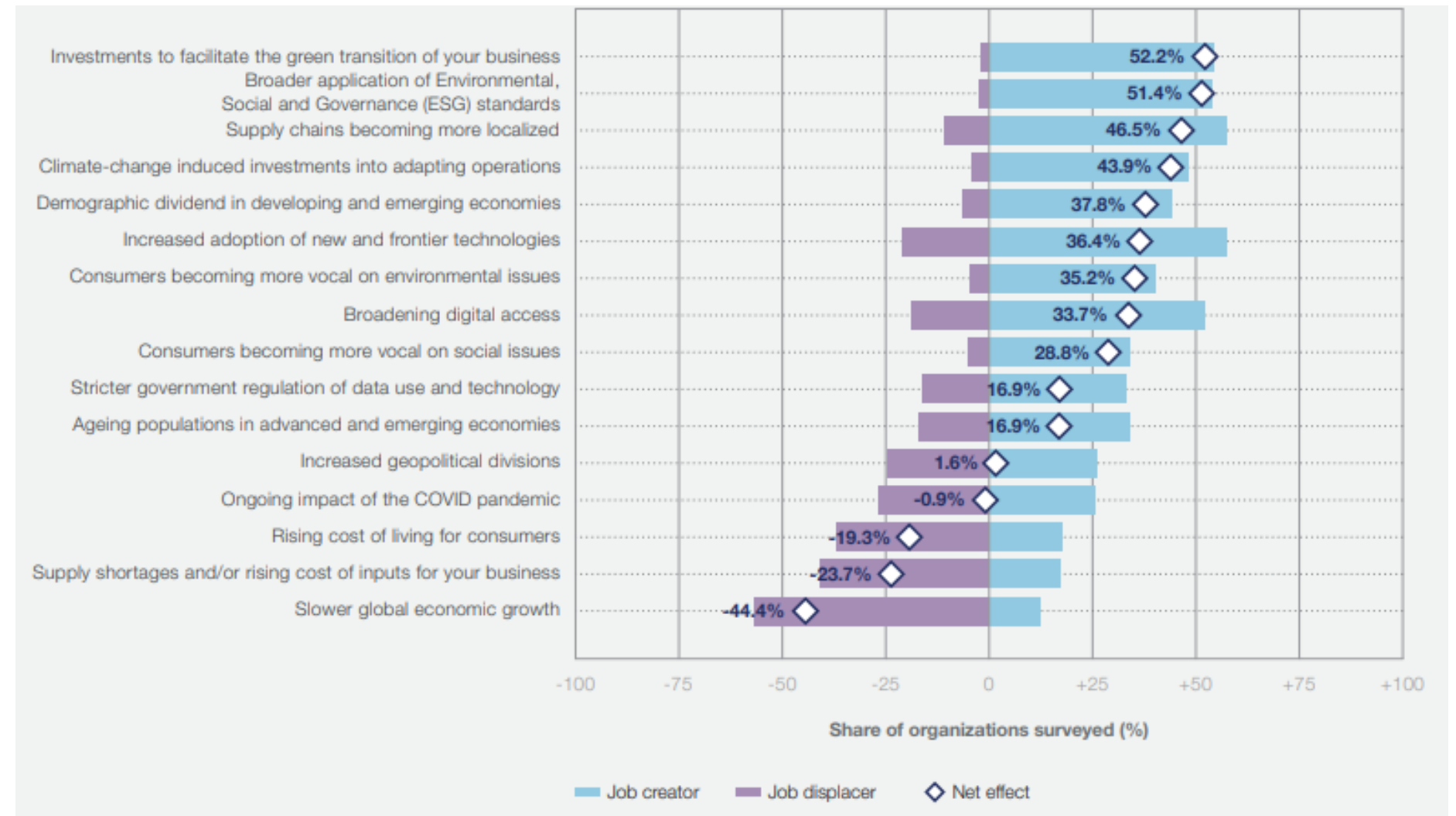
The use of digital twins, powered by AI and big data, can revolutionize the design and testing phases in automotive manufacturing. Integrate AI and big data into its automotive production lines to increase efficiency, reduce waste, and personalize production processes.

Manufacturing

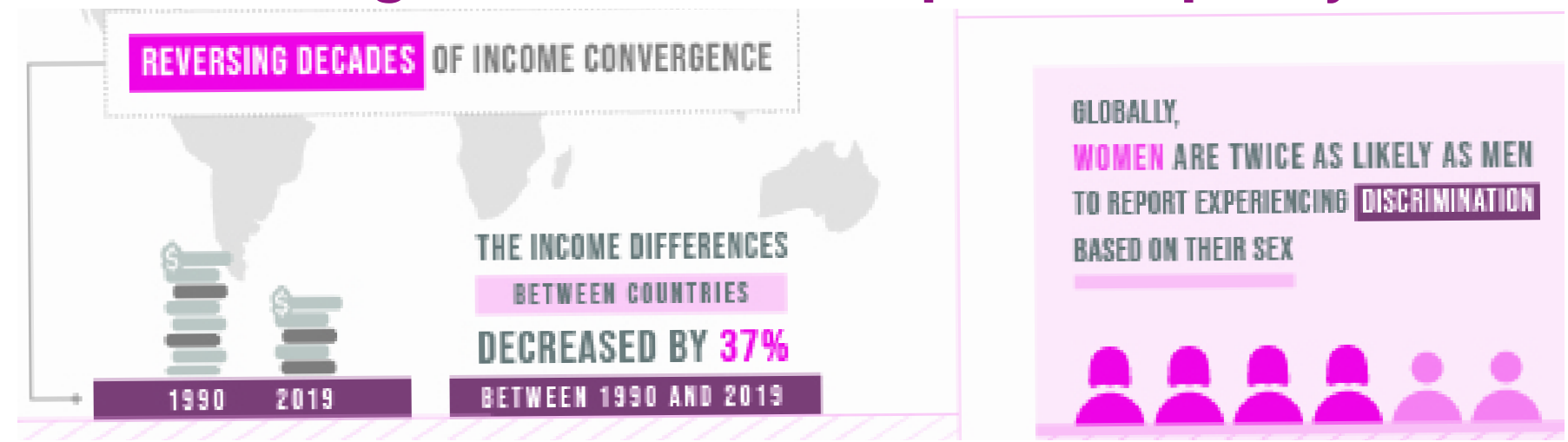
Innovation and Technology Adoption - AI



Impact of Innovation on Employment Generation



Wage Level - Gender Gap and Inequality



CHALLENGES FOR INNOVATING THE GLOBAL SUPPLY CHAIN ECONOMY

INNOVATION & TECHNOLOGY ADOPTION IN SUPPLY CHAIN

Invest in emerging technologies, collaboration and partnerships, data-driven decision making, supply chain visibility, sustainability initiatives, supply chain resilience, talent development, continuous improvement and regulatory compliance.

THE EFFECT OF INNOVATION ON EMPLOYMENT GENERATION

Upskilling and reskilling employees in different competences.

THE WAGE LEVELS AND GROWTH

Develop and implement more policies aimed at enhancing productivity, promoting skills development, and fostering inclusive growth for addressing wage stagnation and income inequality.

CHALLENGES & PROPOSED SOLUTIONS FOR INNOVATING THE GLOBAL SUPPLY CHAIN ECONOMY

THE NECESSITY OF STEM PROFESSIONALS FOR INNOVATING SUPPLY CHAIN ECONOMY

Enhancing ongoing training and professional development initiatives, boosting and sponsoring STEM programs at the universities, as well as promoting more internship positions in the supply chain for students associated with STEM.

GENDER AND WOMEN IN STEM POSITIONS GAPS

Promoting gender diversity and inclusion, providing support and resources, building networks and mentorship, creating a flexible working environment and raising awareness.

UPSKILLING & RESKILLING EMPLOYEES IN THE SUPPLY CHAIN ECONOMY

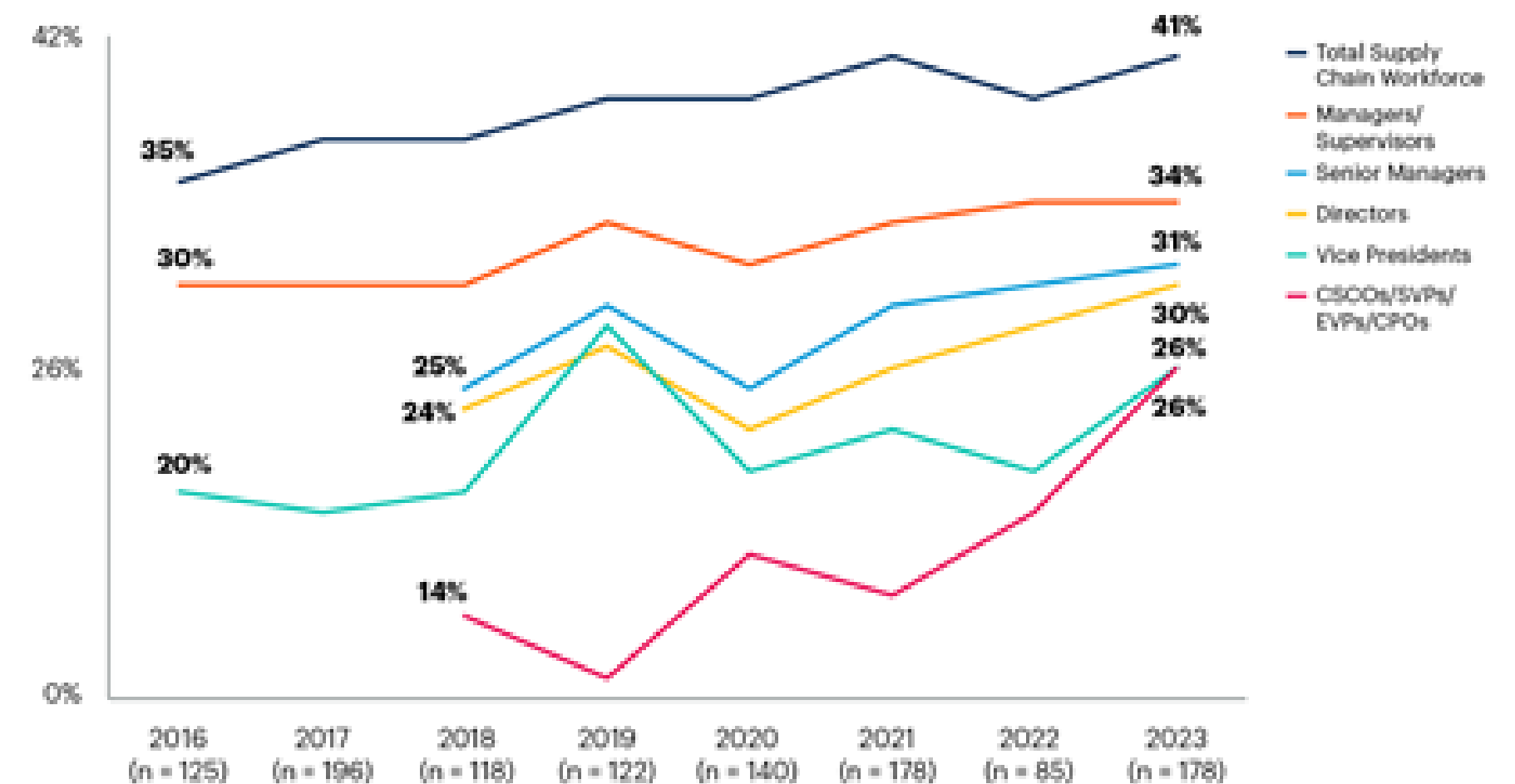
Prioritize digital literacy, risk management & contingency planning, project management, data analysis and forecasting, relationship management, and skills linked to standards & compliance.

OPPORTUNITIES FOR INNOVATING THE GLOBAL SUPPLY CHAIN ECONOMY

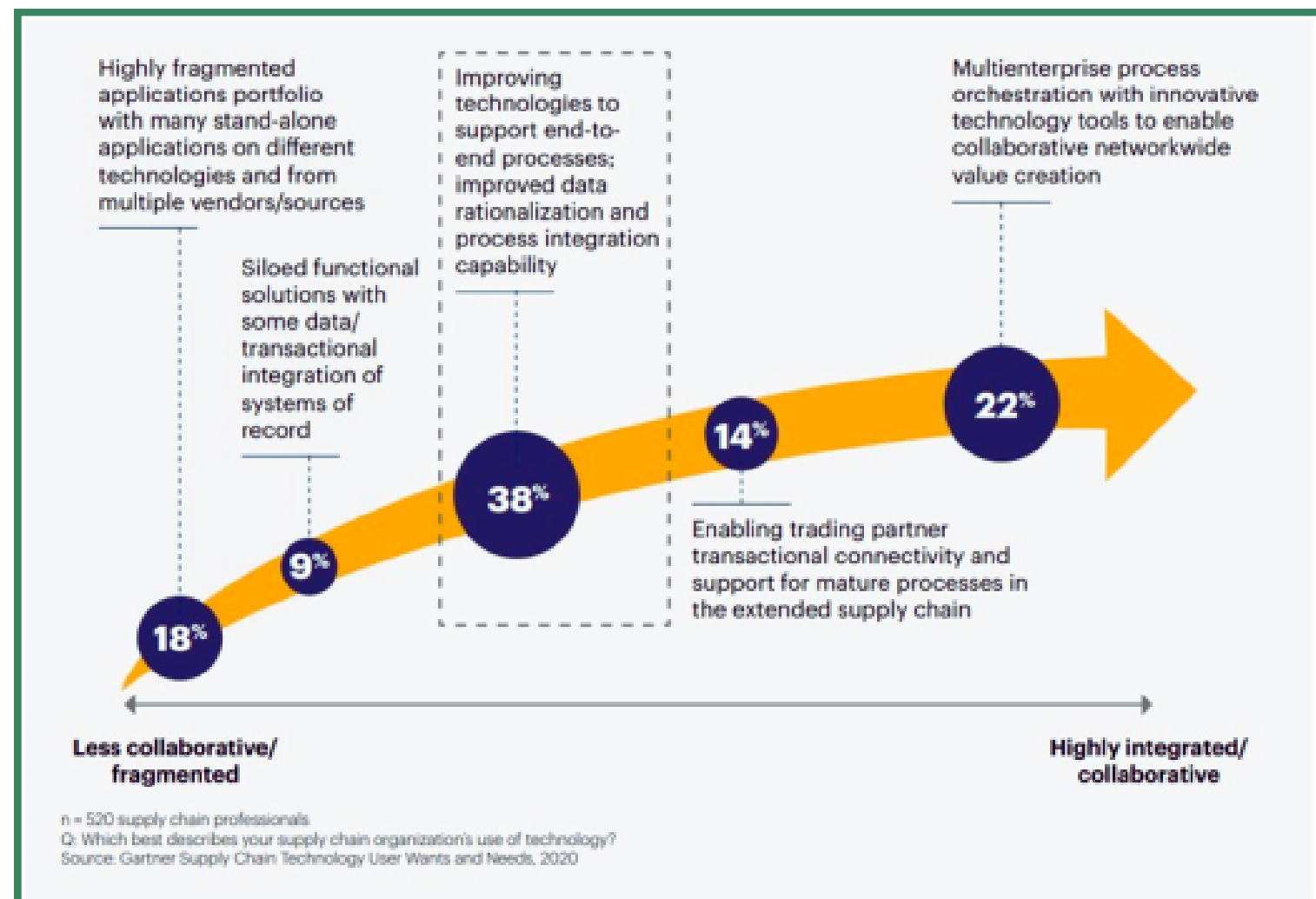
- Digital transformation
- Efficiency and transparency of the supply chain
- Predictive analytics and demand forecasting
- Sustainability and environmental programs
- Collaborative partnerships and ecosystems
- Resilience and risk management
- Empowering women in STEM and Leadership roles
- Elastic logistics

Women in Supply chain Leadership Roles

Mean Percentage



n = end-user respondents



Case studies:

SUCCESSFUL IMPLEMENTATION OF INNOVATIVE STRATEGIES IN SUPPLY CHAIN



JD.COM

Demand Forecasting and Inventory Management

- Continued investment in AI and Machine Learning (ML) technologies to enhance demand forecasting accuracy.
- Leveraging real-time data from online sales and customer behavior to further improve inventory optimization.
- Exploring the use of predictive analytics and digital twins to simulate supply chain scenarios and test new strategies.

Strategies

DELL Technologies

Social Discrimination and Supply Chain Efficiency

- § Expand diversity and inclusion initiatives throughout the supply chain, including supplier diversity programs.
- § Enhance the R&D for the development of new devices and platforms that support workers with physical limitations, implementing the use the robots and automation.
- § Invest in workforce development and training programs to upskill employees and foster a more equitable work environment.

General Mills

Supply Chain Sustainability

- Continued investment in renewable energy and clean transportation to reduce the company's carbon footprint.
- Collaboration with suppliers and partners to implement sustainable farming practices and reduce waste across the supply chain.
- Exploration of innovative packaging solutions, such as compostable or biodegradable materials, to minimize environmental impact.

Strategies

CONCLUSIONS

Innovation and technology adoption are key to the global supply chain's competitiveness and sustainability.

New technologies transforming the supply chain industry:
AI, IoT, big data analytics, robotics, 5G and blockchain.

AI applications include inventory optimization, demand forecasting, and logistics process automation.

Challenges in emerging economies:
infrastructure deficits, low tech adoption, and regulatory barriers.

Key challenges identified in this study: technology adoption, impact on employment, STEM professional demand, and gender and woman in STEM positions gaps.

Proposed strategies to tackle highlighted challenges: Invest in new technologies, data-driven decision-making, sustainability, automation, and talent development.

Opportunities for innovation: Digital transformation, predictive analytics, sustainability initiatives, and empowering women in STEM and leadership.

”

Case studies from JD.com, Dell Technologies, General Mills highlight successful supply chain innovation strategies.

A holistic approach combining technology, culture change, and partnerships in supply chain is essential for competitive advantage.



THANK YOU !

