Les Rencontres
CentraleSupélec Alumni

Vendredi 15 novembre 2024

L'IA et l'industrie du futur

Max Blanchet (91)

Senior Managing Director *Accenture Strategy*

accenture

AI in the Industry

Max Blanchet - November 15th 2024

Les Rencontres CentraleSupélec Alumni

Agenda – I wish to address 3 questions

1. What is the **impact of AI/GenAI** for the industry tomorrow ?

2. Where does **industrial companies** stand today ?

3. What is the **value** and **enablers** required to scale-up future capabilities?

~1,000 companies surveyed covering 10 industries and 6 geographies

1 Vision AI in the industry

AI is becoming generative thanks to recent LLMs progress

Diagnostic

Why did this happen?
Analyze
Correlate
Explain

Ex: Compressor failure RCA

Predictive

What might happen in the future?	Which option to consider ?
Pattern	Simulate
Forecast	Optimize
Model	Recommend

Ex: Gas lift optimization

Ex: planning what if scenario

Generative

Which solution / command ?
Advise
Create
Code
Augment
Protect

Ex: Pricing recommendation for trading, code generation

2000 → 2030

Vision for the industry : moving from automation to autonomous

Why striving towards full autonomy within SC is more than just siloed automation

	Automation	Autonomous	
Definition	• Executes pre-defined tasks based on known answers • Does not think, only does • Sometimes need human input	**Augmented Decisioning** • Recommends optimal output using dynamic constraints • Needs human input and validation	**Fully Autonomous** • Determines and executes best case action using dynamic constraints using AI • No human-in-the-loop
Example	*"Robotic Process Automation (RPA) software automates repetitive data entry tasks for a site manager"*	*"Application uses yard management system data to propose the best trailer to use for an outbound load"*	*"A webapp connected to both data sources and Dematic automatically calculates and programs AGV's for optimal unloading of loads"*

Example of AI / Gen AI supporting human along end to end supply chain

E2E OPS

My Safety buddy

My Strat plan research assistant

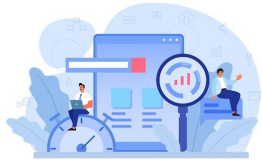
ENGINEERING & CAPEX

My Project Design assistant

My Sherpa Companion

My CAPEX portfolio mgt companion

MANUF.

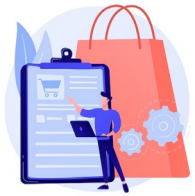


My Plant advisor

My Virtual Operator companion

My Maintenance assistant

C&P



My Buyer Companion

SC EXCELLENCE

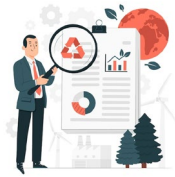
My Planner Companion

Customer Insights Companion

My Log. 3rd Parties mgt Assistant

Logistics Efficiency Optimizer

SUSTAINABILITY



My ESG reporting assistant

My ESG initiatives coach

T&T

My Traceability companion

PROJECTS

Knowledge, change mgt companion

My Data Mgt Companion

2 Maturity toward the next generation capabilities

We are scoring the maturity of have defined a 4-level digital maturity scale from basic to next gen

	PAST : Basic capabilities	NOW : Digital	NEAR: Advanced Digital	Next Gen
Digital maturity index	*Maturity index* : **< 17%**	*Maturity index* : **17-50%**	*Maturity index* : **50-83%**	*Maturity index* : **> 83%**
Maturity scale definitions	• **Mainly Excel-based tools (VBA), and manual tasks with papers** • **Few digital initiatives mainly based on legacy systems**	• **Rationalized practices and digitized process (paper less)** • **Real-time data visualization**	• **Cross processes advanced digital tool and collaborative ways of working** • **Interconnected data allowing simulation and prediction**	• **Autonomous operations process / self optimization** • **Co-pilot supporting human in action planning & generation**
Example Car Navigation & Driving assistance	 Paper printed roadmap	 Digital roadmap	 Advanced route optimization with advises and simulations	 Autonomous driving capability (co-pilot)

Source: 2024 Accenture survey

Our vision for E2E Supply chain & Operations is founded on 7 capabilities that will enable more and more autonomy

7 Integrated supply chain

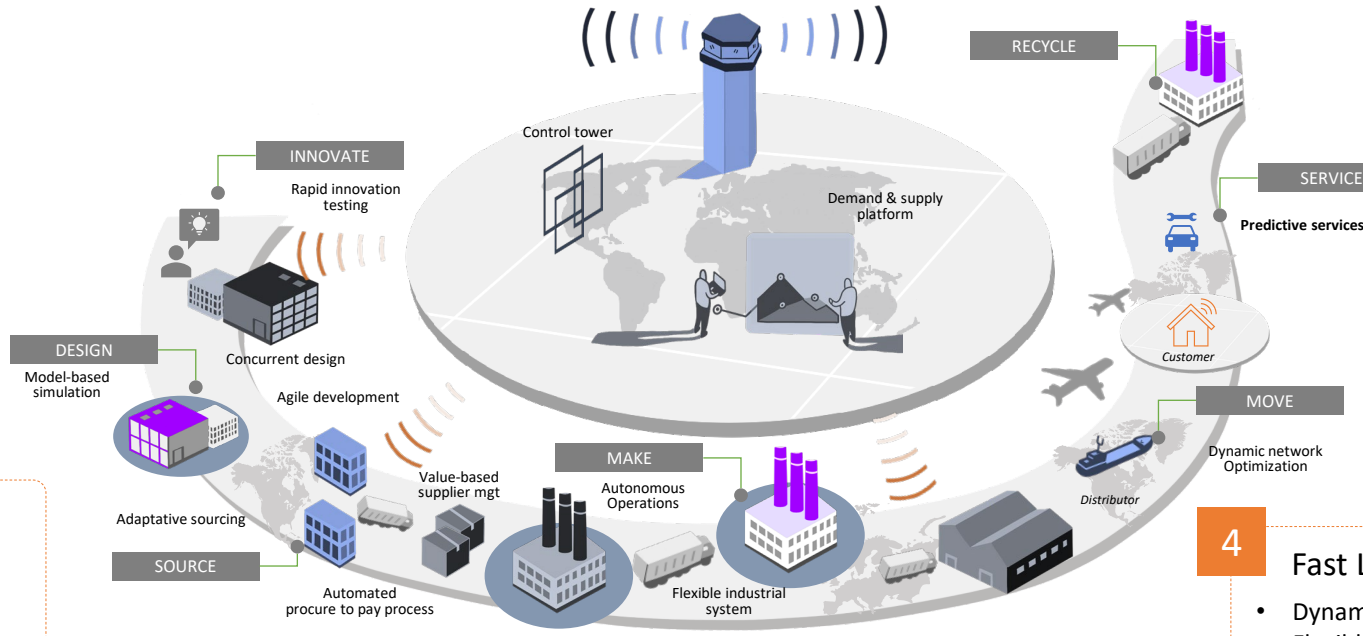
- Supply chain resilience capability (quick risk and root cause identification and action plan)
- End to end Supply chain control tower including N-Tier suppliers
- Supply chain network simulation capabilities
- Demand and supply planning platform with advanced signals detection and dynamic planning
- Autonomous integrated business planning

6 Sustainability by design

- Built-in sustainability by design in all products covering end to end supply chain along lifecycle
- Holistically managed product / parts return with a very wide range of potential reuse of every component

1 Agile design & industrialization

- User-centricity and wide experience-based design
- Concurrent Design with multiple stakeholders in agile mode
- Rapid and breakthrough innovation



5 Predictive services

- Built-in predictive services into products
- Remote support capability

2 Smart procurement

- Automated source-to-contract process
- Spend data analytics
- Adaptative sourcing strategies & dynamic costing / pricing
- Value-based supplier management through N-Tier network
- Integrated requisition to pay

3 Flexible manufacturing and Autonomous operations

- Augmented workforce capability
- Autonomous manufacturing covering numerous basic tasks
- Flexible production network with demand-driven pull model
- Make and buy used as flexibility lever

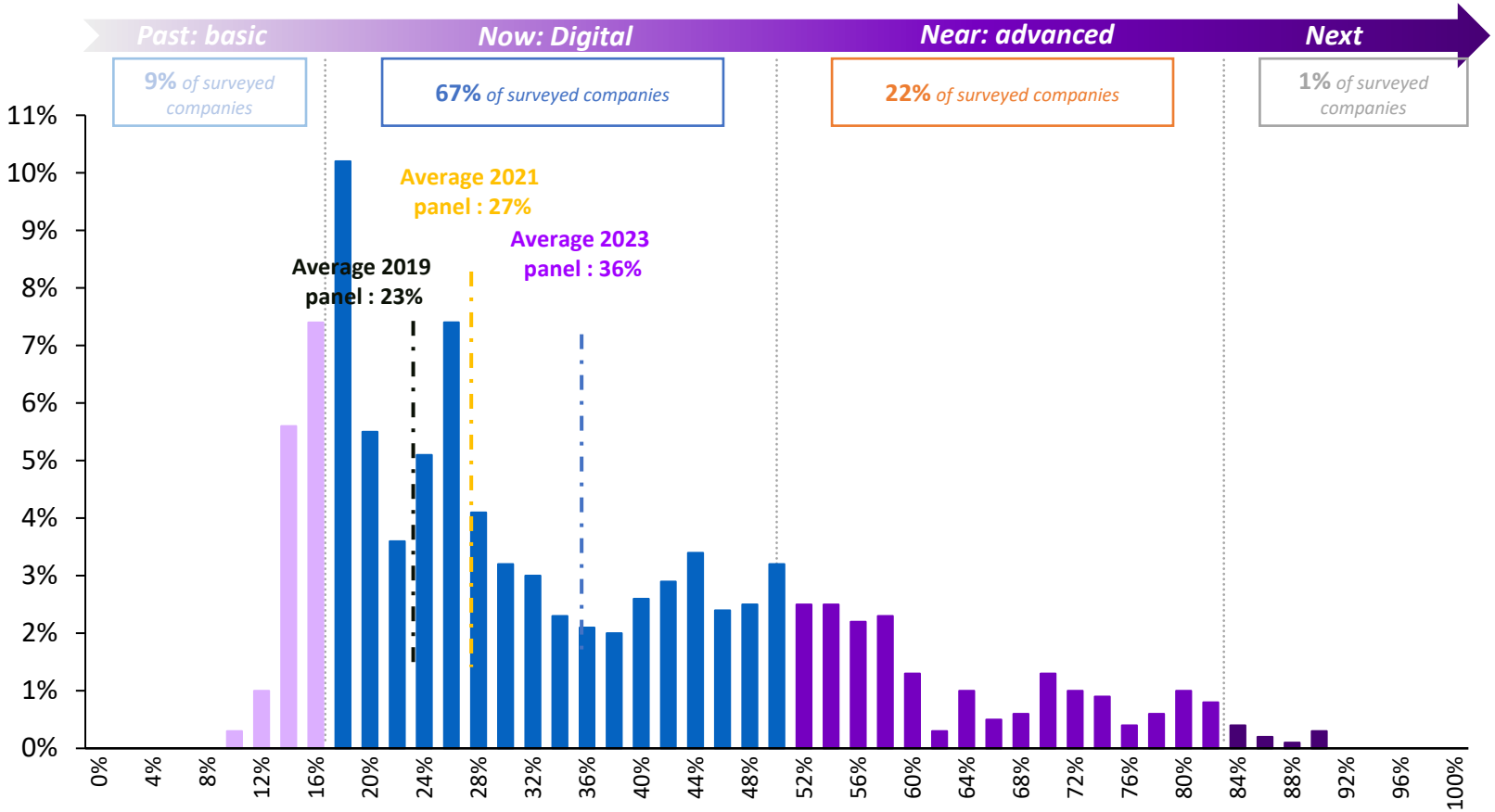
4 Fast Logistics

- Dynamic logistic network flexibility and optimization
- Flexible and platform-based warehouse management
- Dynamic order allocation through omnichannel seamlessly
- Real time transport load optimization platform

The global maturity has progressed quickly over the past years, with an increasing spread between leaders and laggers

Company Capability Maturity

[% of company]



Key highlights

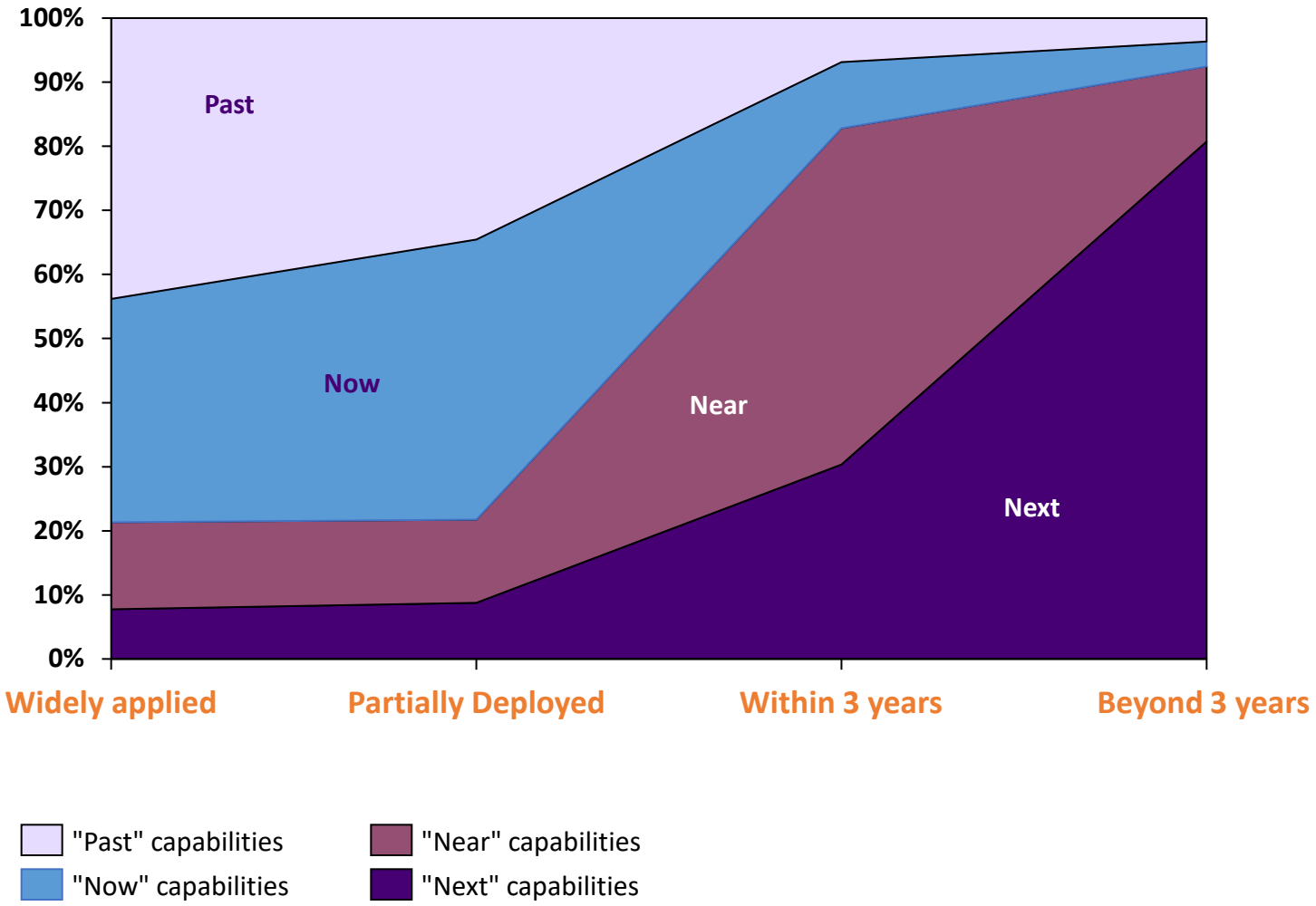
- **Overall, maturity average is around 36% (median is 30%), in the middle of digitization scale-up**
- **Maturity Index is showing a strong polarization with numerous companies still in the legacy / first digitization stage**
- **A set of leaders are in the near set of capabilities**

Source: Accenture Supply Chain & Operations capabilities global survey, 2023. Base: All Respondents (n=1000).

Global pace of transformation is ambitious – Near level to be reached in the next 2 years for 80% capabilities

Company pace of transformation of capabilities

[% of types of capabilities]



Key highlights

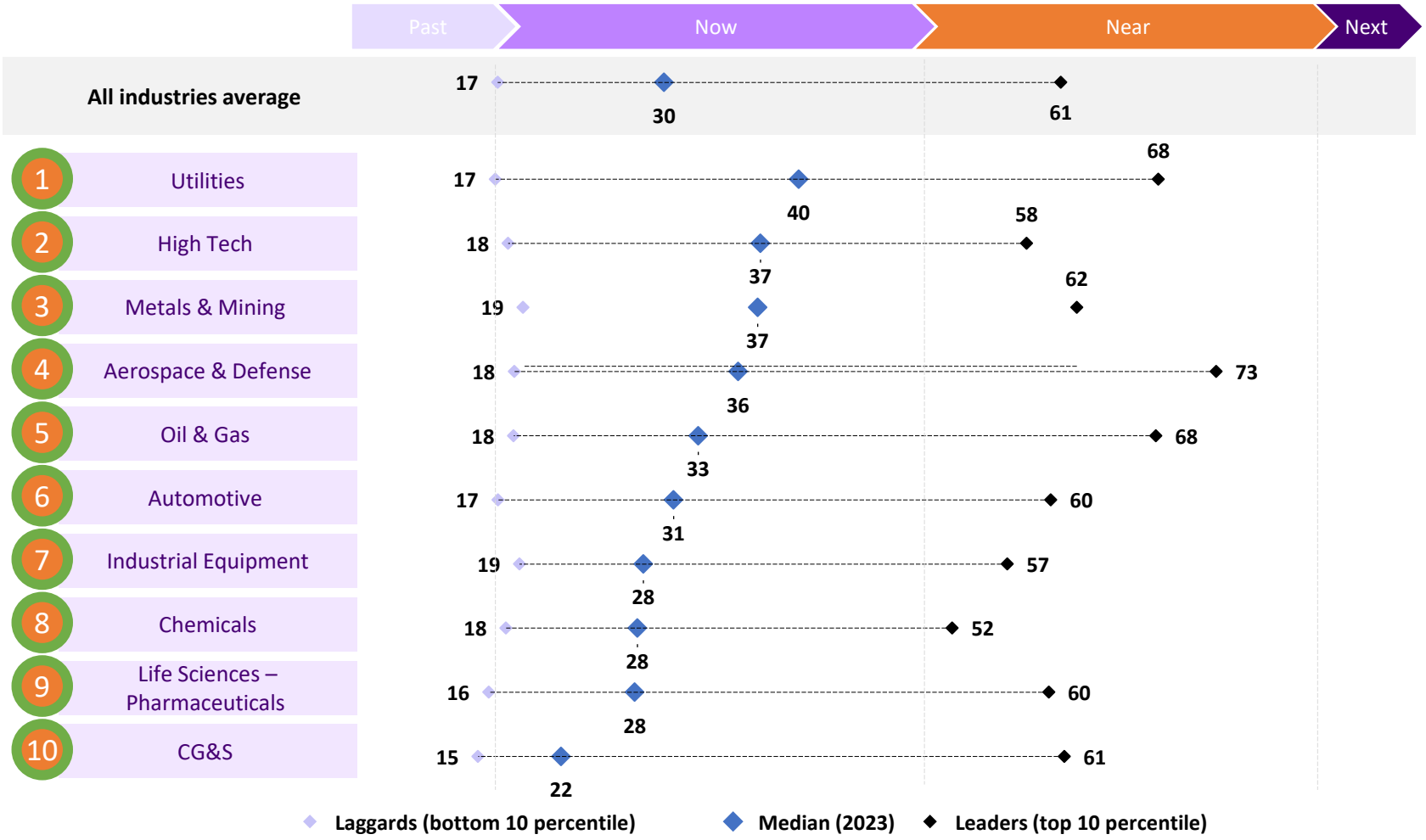
- **Still numerous capabilities are in legacy practice today**
- **Now capabilities are widely deployed or partially deployed**
- **Near capabilities are planned to be deployed within 2 years with a strong pace.**
- **Yet, Next generation of capabilities are planned but not significantly deployed > 2 years**

Source: Supply Chain & Operations global survey, 2023. Base: All Respondents (n=3000).

Supply chain maturity across industries

Supply chain capability maturity by industry

[Scope: Global]



Key highlights

- CG&S industry is relatively lower ranked in overall supply chain capability maturity
- Most industries median are in the digital scale-up phase
- High spread is seen within each industrial sector revealing a two-fold transformation pace
- Leaders in the industry have started implementing near capabilities

**Note: Leaders = respondents from top 10 percentile companies*

3 Value at stake and Enablers

Most mature companies are seeing higher value in the upcoming years

Top performance targets from our panel (average and leaders, target horizon in 2-3 years)

Business Agility & Responsiveness

28% (Avg. 16%)	Reduction of **product development lead time**
6% (Avg. 4%)	Improvement in **On Time Delivery**
x4	Level of responsiveness to a supply chain crisis

Resources & asset effectiveness

29% (Avg. 21%)	Improvement of **engineering resource efficiency**
31% (Avg. 21%)	Improvement in **manuf. labor efficiency**
18pts (Avg. 14pts)	Improvement of **Overall Equipment Effectiveness**

Environmental efficiency

49% (Avg. 34%)	Product development projects **including eco-design**
35% (Avg. 31%)	Reduction of **overall CO2 emissions**
23% (Avg. 15%)	Reduction of **scope 3 emission**

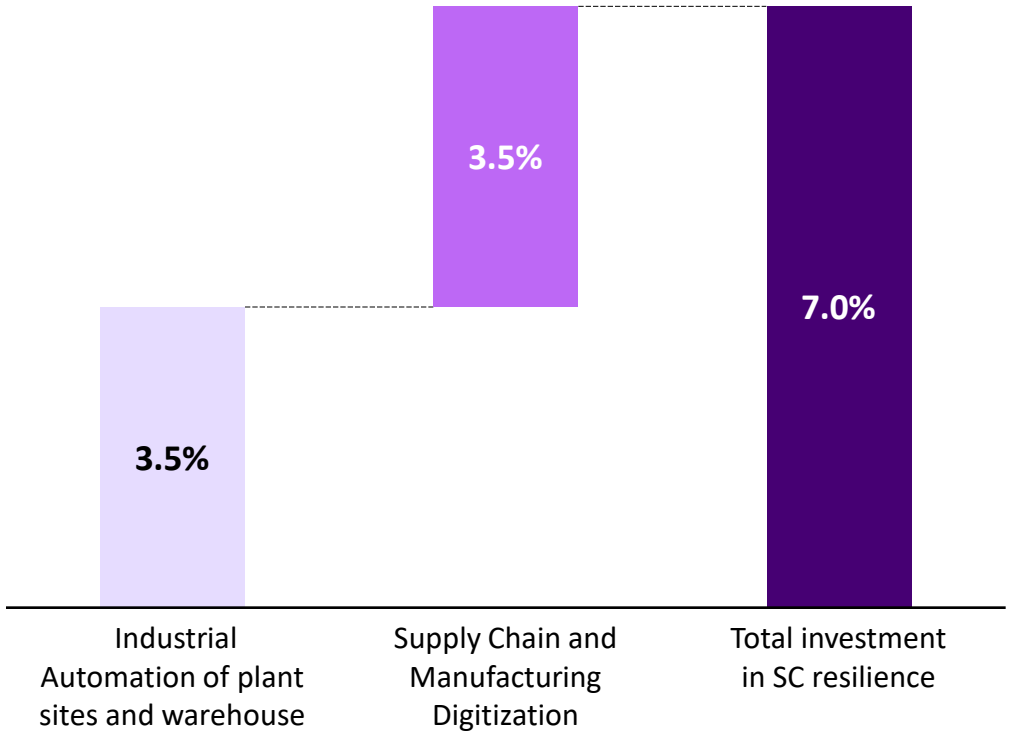
Source: Accenture Supply Chain & Operations capabilities global survey, 2023. Base: All Respondents (n=1148).

Leaders = Top 10 percentile.

Companies are enhancing the resilience of their supply chains by increasing investments in automation and digitalization

Investment in supply chain resilience over the next 2-3 years

[% company revenues]



Enablers

[as % of revenues]

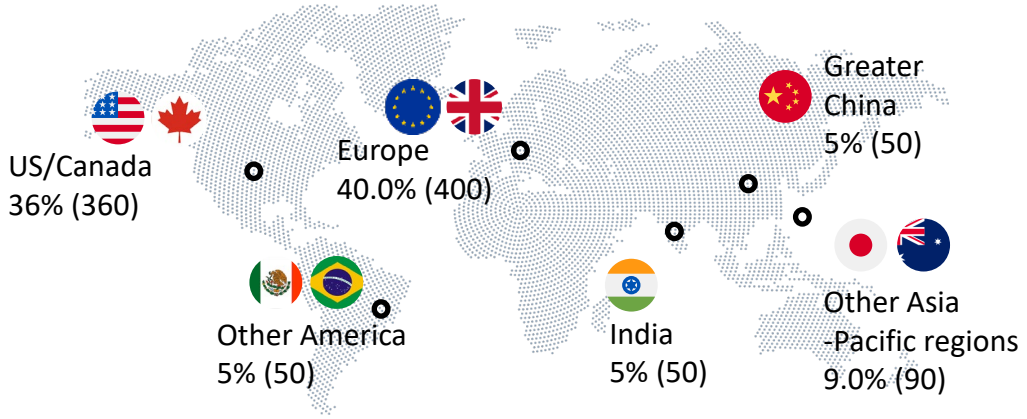
- **Data quality and smart data platform**
- **IT landscape modernization with digital continuity**
- **Skills development along news ways of working**

Source: Accenture Supply Chain & Operations capabilities global survey, 2023. Base: All Respondents (n=1148).

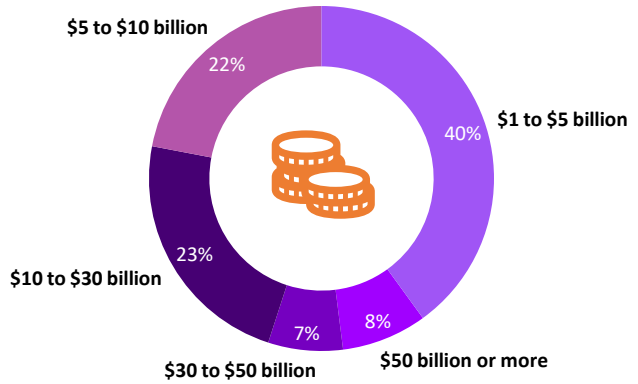
Appendix

We surveyed a global panel of 3,000+ respondents covering 1,000 companies spanning North America, Europe, and Asia Pacific, across 10 industry sectors

Company operational headquarter location
[% and number of companies]



Revenues
[Yearly revenue 2022 in USD]

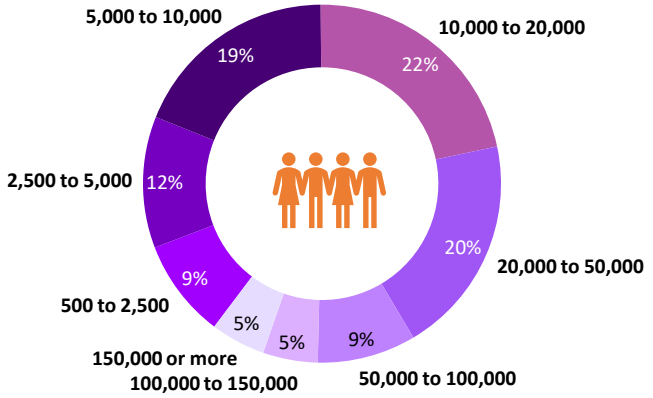


- Company revenue is between 1 billion to 50+ billion USD
- 60% are above 5 billion USD revenue

Sectors
[Panel: At least 70 companies/sector]

# of companies	107	73	85	110	82
	Oil & Gas Upstream and Downstream	Aerospace & Defense	Chemicals	High-Tech	Metal & mining
# of companies	105	106	81	138	113
	Automotive	Industrial Equipment	Life Sciences	Consumer Goods & Services	Utilities

Employees
[Company size in number of employees]



- Company panel is between 500 to 150k+ employees
- 79% of the company panel are above 5000 employees

The maturity of ~30 SC&O capabilities have been assessed through our panel

	Past	Now	Near	Next
Agile design	Design performed following V-cycle approach	Concurrent design	Concurrent design to optimize performances	Lifecycle concurrent design to optimize performances
	Innovation approach performed internally with techno experts	Open innovation	Agile usage-based innovation	Agile rupture innovation
	"Best of breed" approach for design solutions	Requirements based design	Experience based Design	Generative-based Design
Smart Procurement	Heavy procurement processes consistently used	Standard Source to Contract	Self-Service Source to Contract	Autonomous Source to Contract
	Spend data collected through internal tools and dash boarded	Spend Data & Insights	Internal data & insights	Internal and external data
	Supplier relation focused on product, price & functionality	Supplier Management	Supplier 360°	Nth Tier Visibility
	Centralized R2P process policies. Digitization in dev.	Integrated Requisition to Pay in development (R2P)	Networked R2P	Touchless R2P
	RM, goods & services sourced from lowest landed price	Supply bases closer to demand markets	Supplier prioritization models	Automatic adapting sourcing strategy
	Manual estimation of good / service cost	Standardized method and tools for costs estimation	Should Cost Modelling	Predictive Cost Modelling
	Minimal use of indexes ok price risk management strategies/tools	Indexed linked contracts	Commodity Price Risk Management	Suite of commodity price risk management tools
Flexible manufacturing & Autonomous operations	Digital dashboard in place to provide info. to workforce	Connected Machine + Worker	Augmented workforce with digital cockpit & tools	AI-enabled workforce
	Lean manufacturing in place	Digital and Lean Manufacturing	Remote Manufacturing	Autonomous manufacturing
	Pushed and batch production system	Pushed production system	Pulled and decoupled production system	Full pulled and flexible production system
	Assets with fixed capacity and availability	Fixed Assets	Flexible Assets	Seamless make or buy
Fast Logistic	Network is set-up and optimized during new product introduction	Network Optimization : Cost reduction	Network optimization : Service revenue	Dynamic network optimization
	Warehouse operations are manually managed or rely on basic tools	Warehouse Management and Automation Simulation	Dynamic Warehousing	Cross-company logistics services
	Rely on manual order allocation processes	Dynamic Order Allocation	Multi-Channel Fulfillment	Omni-Channel Fulfillment
	Widespread manual planning and transportation scheduling tasks performed locally	Transport management system	Automated modern tools	Unified shared platform beyond enterprise
Predictive Services	Products are sold with service contracts which fulfill additional revenue potential	Service as product add-on incl. service contracts	Value-added services	Output-based business model: selling uptime
	Aftermarket service field force in place to treat product failure or spare parts	Aftermarket services through connected devices	Proactive & predictive service (connected products)	Products designed for serviceability
	Industrial plants rely on a traditional field force for service operations	Field force supported by remote diagnostics	VR-enabled field force and remote-control center	Self-service with remote help/control center
Sustainability by Design	Emission reduction action plan mainly focuses on Scope 1 and 2 reduction	Reactive Sustainability on legacy footprint	Model based sustainability by design	Model based sustainability by lifecycle
	Product and parts returns are only for quality or other customer service issues	Circularity for cost – repair if cost effective	Circularity for margins – repair if resaleable	Circularity for purpose – reuse every component
Integrated Supply Chain	Manual alert system of any disruption by email	Disruptions alerts on Tier Nth supplier	Disruptions analysis on Tier Nth supplier	Disruption solution to minimize impact
	E2E visibility by manually aggregating various sources	E2E SC visibility	End-to-end SC visibility with recommendations	Network end-to-end SC visibility with recommendation
	Excel based and ad hoc simulation	Use-case driven digital twin	Functional Digital twin	Lifecycle Digital Thread / Data continuity
	Demand forecasting based on sales history & market survey	Demand Planning: Statistical forecasting w/ platforms	Demand Sensing to optimize short term corrections	The "Near" + Predictive tools allowing demand shaping
	Supply Planning: Done Locally	Supply Planning enabled by platforms	Interconnected software platform for supply planning	Fully integrated platform for supply planning
	S&OP aligning Demand and Supply	Sales & Operations Planning	Integrated Business Planning	Insight-driven IBP supported by orchestration layer

Next Gen capabilities will heavily rely on AI/ Gen AI technology to provide autonomous operations in all fields

1 Agile design

1. Concurrent design is collaboratively done involving a wider base of stakeholders like clients, users, recycling partners, etc. that are involved throughout the product lifecycle.
2. Agile innovation methodology is implemented to develop breakthrough innovation creating a rupture in the market.
3. Design process leverages GenAI technology and uses large datasets of client feedback, surveys, trends, etc., to propose highly optimized alternatives.

2 Smart procurement

4. Business users/buyers can conduct source-to-contract transactions without the need for involvement from the procurement team.
5. Both internal and external data and insights (provided by trusted 3rd parties) are available, purchased as-a-service.
6. Visibility and management of not just tier-1 suppliers, but their suppliers, and the extended supplier network to the nth tier. Maximum use of external data and partnerships.
7. Purchases that self-execute when predetermined condition(s) is/are met. Decision automation using technology to replace manual tasks or human intuition (i.e., touchless), for improved outcomes.
8. Technology is leveraged to anticipate supply chain disruptions across all risk dimensions and the evolution of markets; with the sourcing strategy adapting automatically based on the risks.
9. Analytics and statistical analysis of data done by computers and software with input from operators/users is used to estimate and forecast cost of good / service. Possible future cost scenarios for products, goods, and services can be generated.
10. A full suite of commodity price risk management tools is leveraged to protect margins for the company.

3 Flexible manufacturing and Autonomous operations

11. Workforce is augmented with a AI-enabled co-pilot with a seamless interactive mode to execute, improve, solve issues, etc.
12. Manufacturing plants can perform tasks autonomously such as planning & scheduling reconfiguration, product change, adapting to change, etc. and the plant is supervised by a remote control center doing steering, coaching and best practices implementation.
13. Production uses a fully demand-driven system with limited output levelling and has very short changeover times. High machine utilization rates are ensured by a high level of automation.
14. Ability to seamlessly balance products / components or semi-finished from one plant to another or from internal make to external buy across the network .

4 Fast logistics

15. The logistic network is dynamically optimized, using AI or GenAI technologies to continuously optimize and rebalance network resources and planning decisions in a dynamic and evolving environment, making real-time adjustments to optimize the allocation of resources, such as inventory, vehicles, and production capacity.
16. A centralized digital platform that connects multiple companies or stakeholders involved in the logistics and supply chain ecosystem is employed, which facilitates collaboration, information sharing, and coordination among different entities.
17. Orders are dynamically allocated through a seamless omni-channel fulfilment system, which considers a large range of variables, supporting the ability to deliver to the customers through any channel of their choice.
18. The end to end transportation management system is a unified shared platform with high automation level serving all entities, and possibly external partners or suppliers.

5 Predictive services

19. Product and services are sold in an output-based business model ability to sell and support service subscription model with full focus on uptime / output with minimal or no product sale; revenue through services.
20. Products have been designed for serviceability, allowing advanced functionalities such as predictive maintenance, over-the-air product or service upgrade, ability to reduce/minimize need for service events e.g., through feedback loop from service to R&D for next generation products.
21. Customer enabled to execute self-service without the need of field technician on-site – supported by a central remote center with product experts for live instructions.

6 Sustainability by design

23. Holistically managed product / parts return with a very wide range of potential reuse of every component.
24. Sustainability is fully embedded in the product design, supply chain & network, recycling, and end of life, utilizing advanced modeling capabilities and platform technologies.

7 Integrated Supply Chain

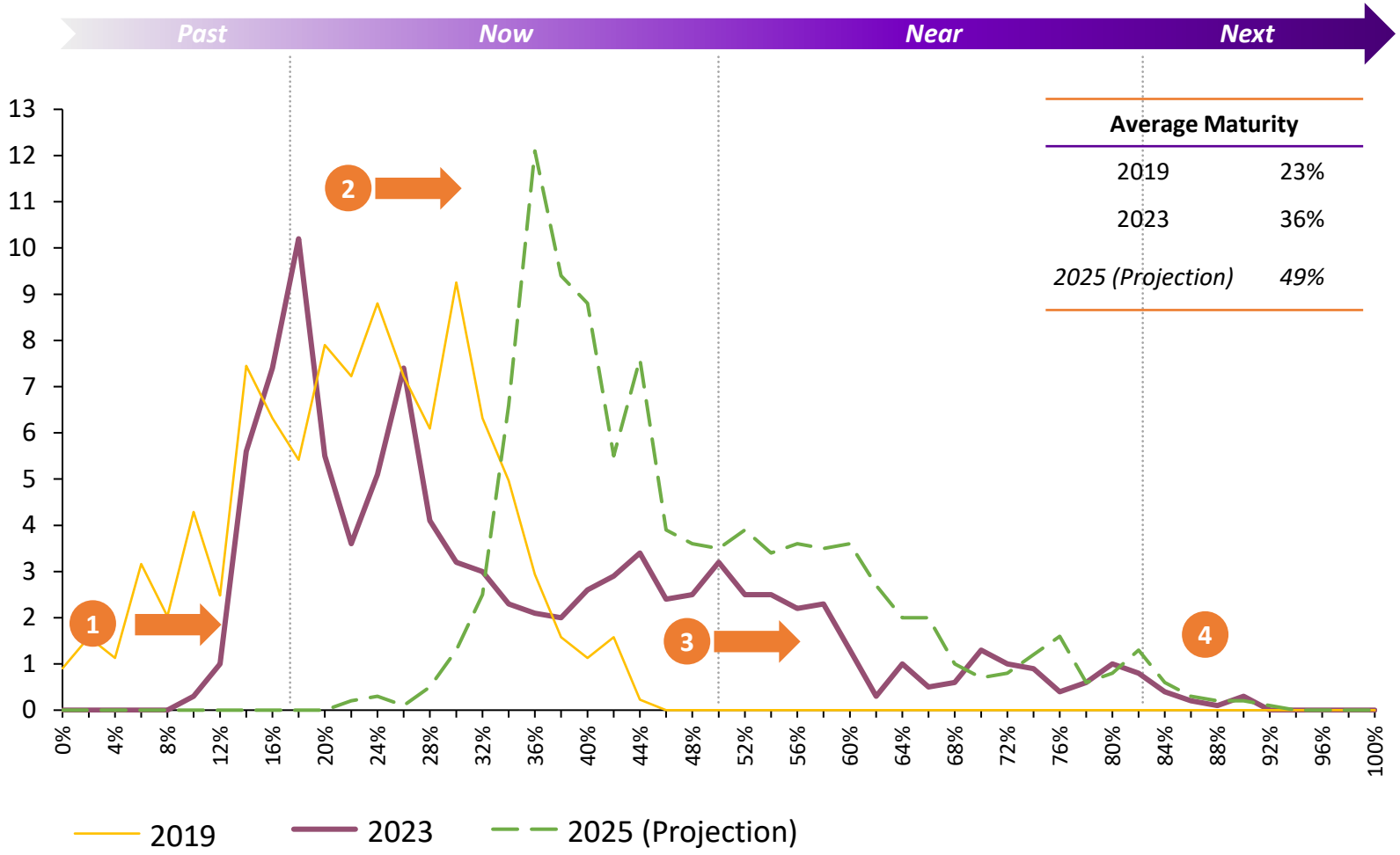
24. Current system allows to quickly understand the impact of disruption and propose a set of actions to be implemented to minimize impact.
25. Operates as a cross-network control tower, providing visibility across different tiers of the supply chain network, and generate prescriptive recommendations or directly launch an action without human intervention.
26. Digital twin system uses interconnected data across all functions and are used for comprehensive design and operational purposes throughout the entire product lifecycle.
27. Demand forecast is generated by a AI-based tools leveraging 360° information on markets, financial, environmental, and societal value across the product lifecycle. Demand forecast is adapted / fine-tuned by channels and product micro-segments and is refreshed in a continuous mode.
28. Fully integrated platform combining planning, production scheduling, execution / MES, inventory, procurement planning with N-tier suppliers. Real time platform with zero latency, 24/7 autonomous follow up/corrections integrated with IoT/MES system.
29. Insight-driven IBP supported by orchestration layer: Autonomous IBP based on a customer/Product-centric micro-segmented planning approach. Vertically and horizontally integrated (from financial plan to production schedule and from supplier to customer). Leverages a cross-functional orchestration layer based on company-wide KPI's with up-skilled planners leveraging the human + machine to the maximum. It is supported by 24/7 self-driving S&OE / Control tower.

Source: Accenture Supply Chain & Operations capabilities global survey, 2023.

Compared to previous years, the maturity is globally increasing quickly in average, but the spread is increasing significantly

Company Capability Maturity

[% of company]



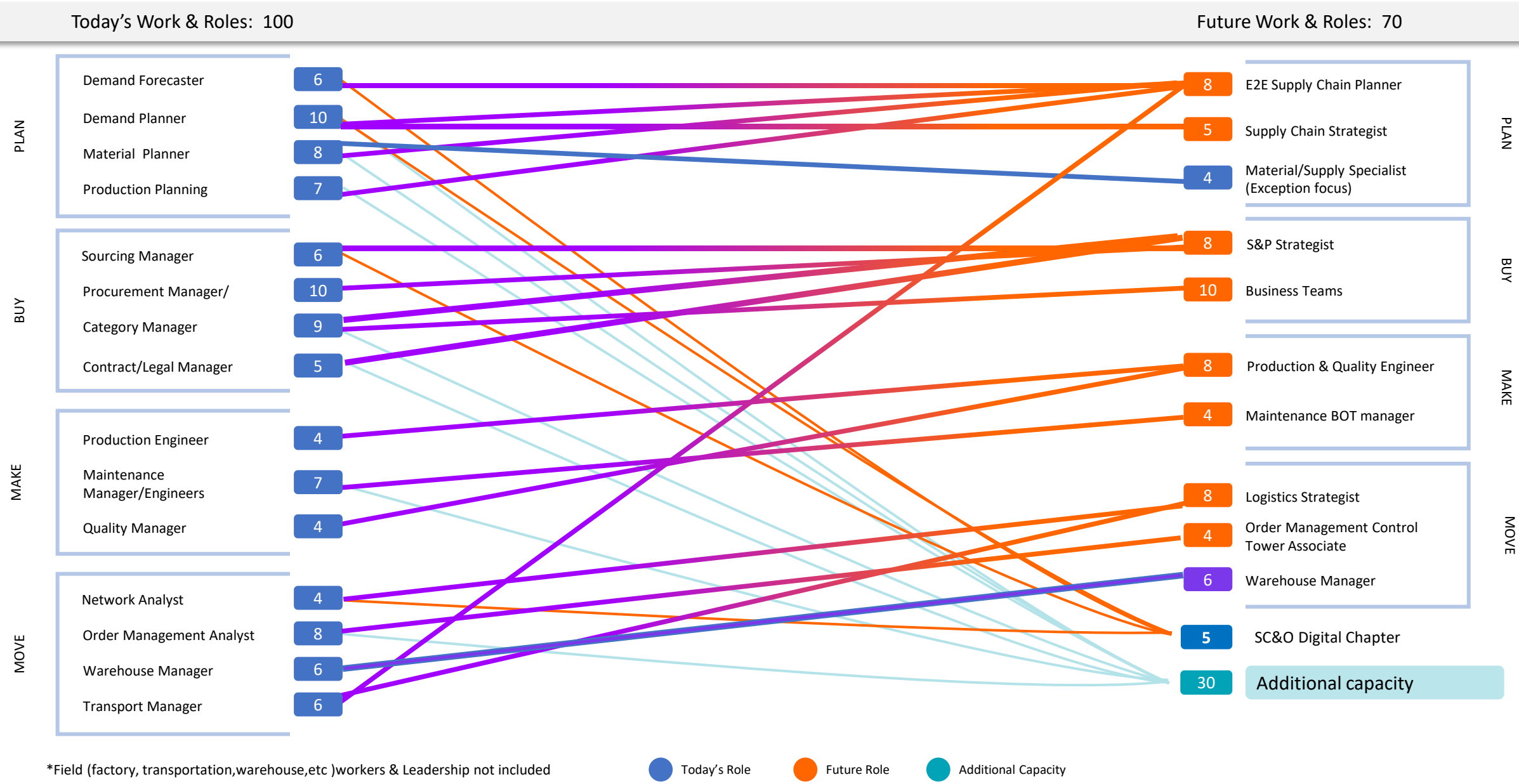
Average Maturity	
2019	23%
2023	36%
2025 (Projection)	*49%*

Key highlights

1. **Progressive reduction of "past" capabilities replaced by "now / digital" capabilities from before to after COVID**
2. **Stagnating laggards stuck in the deployment of simple digital capabilities with slow evolution**
3. **Acceleration of leaders to move from now to more advanced digital capabilities**
4. **Few leapfrog players moving quickly to NextGen capabilities**

Source: Accenture Supply Chain & Operations capabilities global survey, 2023. Base: All Respondents (n=1000).

Talent and New Ways of Working

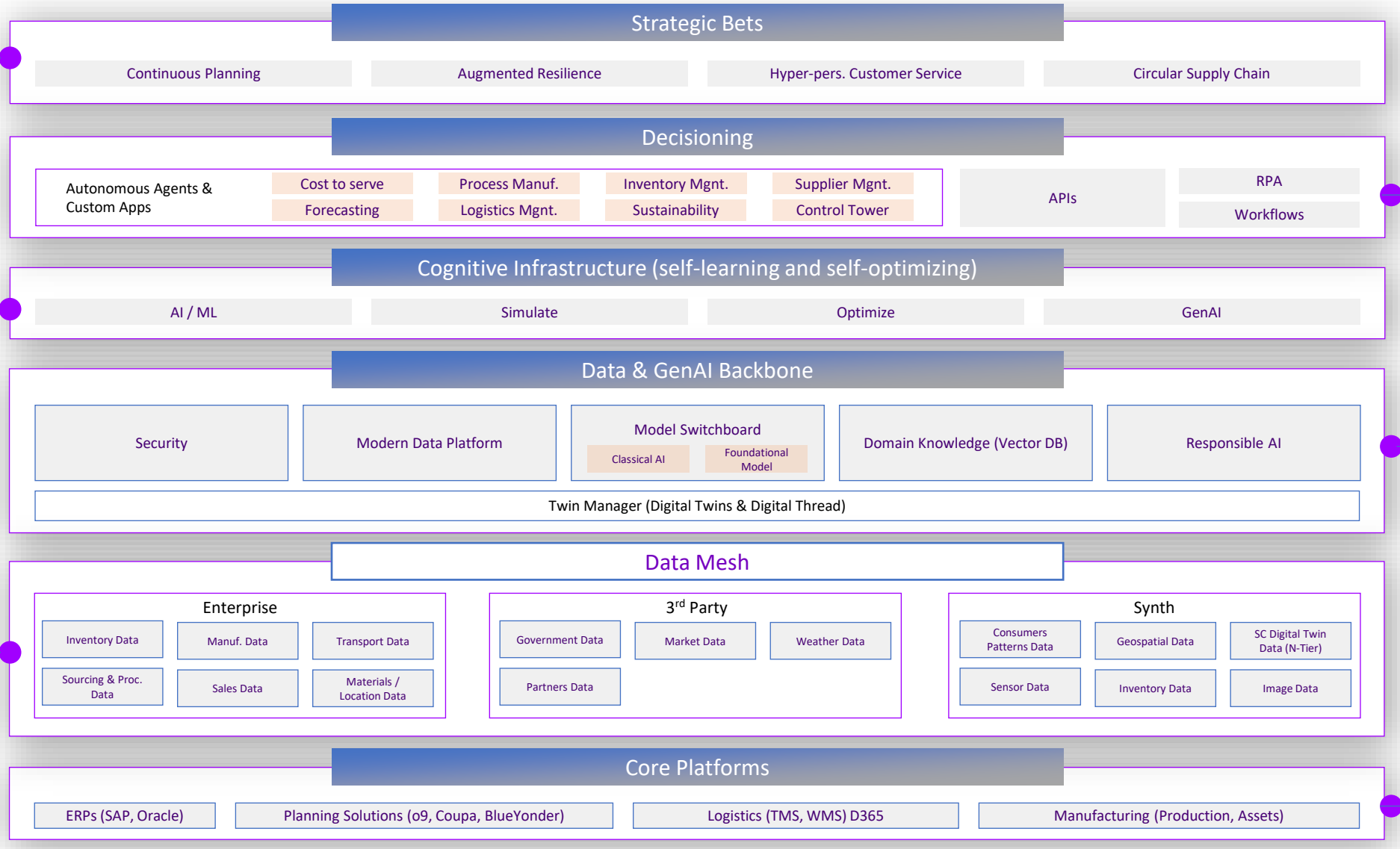


A strong Digital Core with a Reference Architecture is crucial

Cross-domain investment areas that frames the required architecture

Autonomy integrates and creates liquidity of all forms of cognitive infrastructure

Strong Mesh integrates enterprise and 3rd party sources with synthetic elements to augment data scope and enrich accuracy of insights created through AI



Agents & Custom Apps to drive outcomes, while unified user experience end-to-end

Cloud, AI and Twin Management capabilities, ensuring security and responsible use to extract full potential of key supply chain data

Pivotal role in enabling seamless, efficient, and scalable operations across the entire supply chain serving as the foundations