

Management of Innovation

Topic 5 Digital Transformation

Prof. Corrado Cerruti

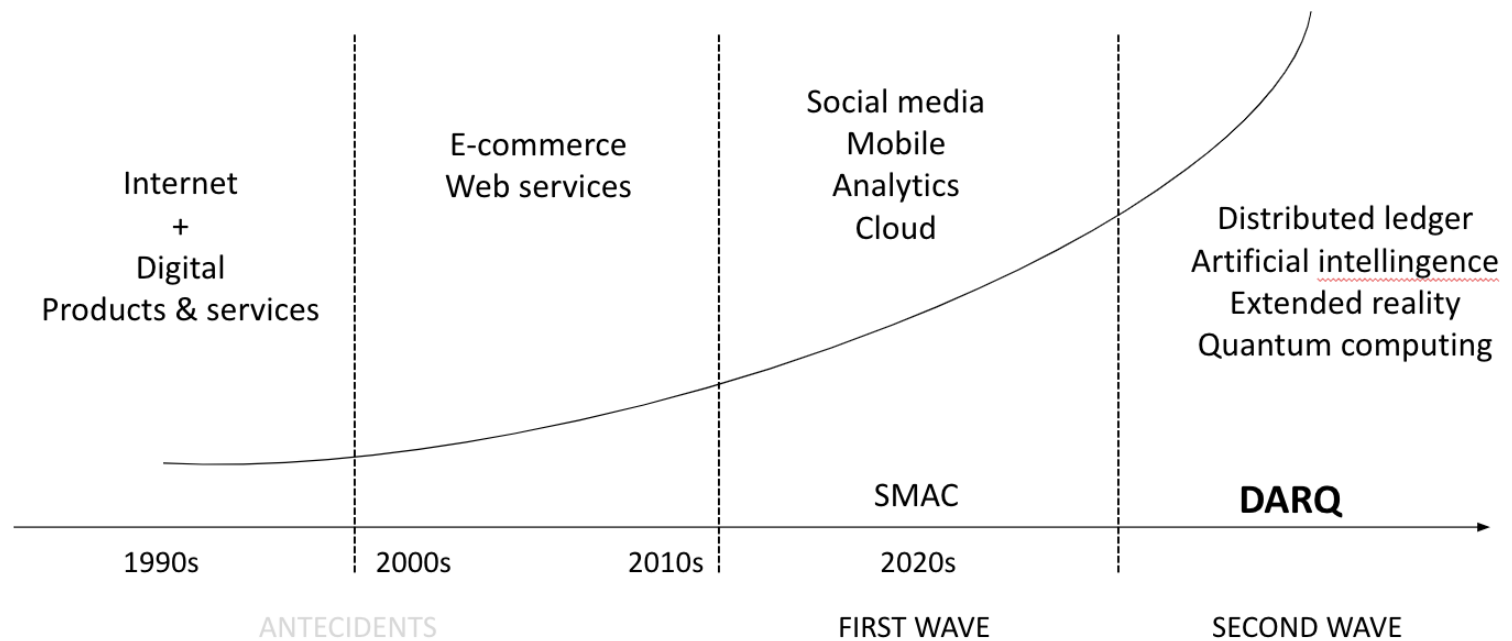
Slides are taken/adapted from different sources In particular in the second part:
D.R. Rogers, *Digital Transformation Playbook*
Columbia Business School Publishing, 2016
+ updates on AI - GenAI

Digital Transformation

Digital transformation can be defined as the integration of digital technologies into all business areas, fundamentally changing how companies operate (Enterprisers project, 2020). Digital transformation is not primarily about technology and its implementation, but it is mainly about the business impact technology can have.

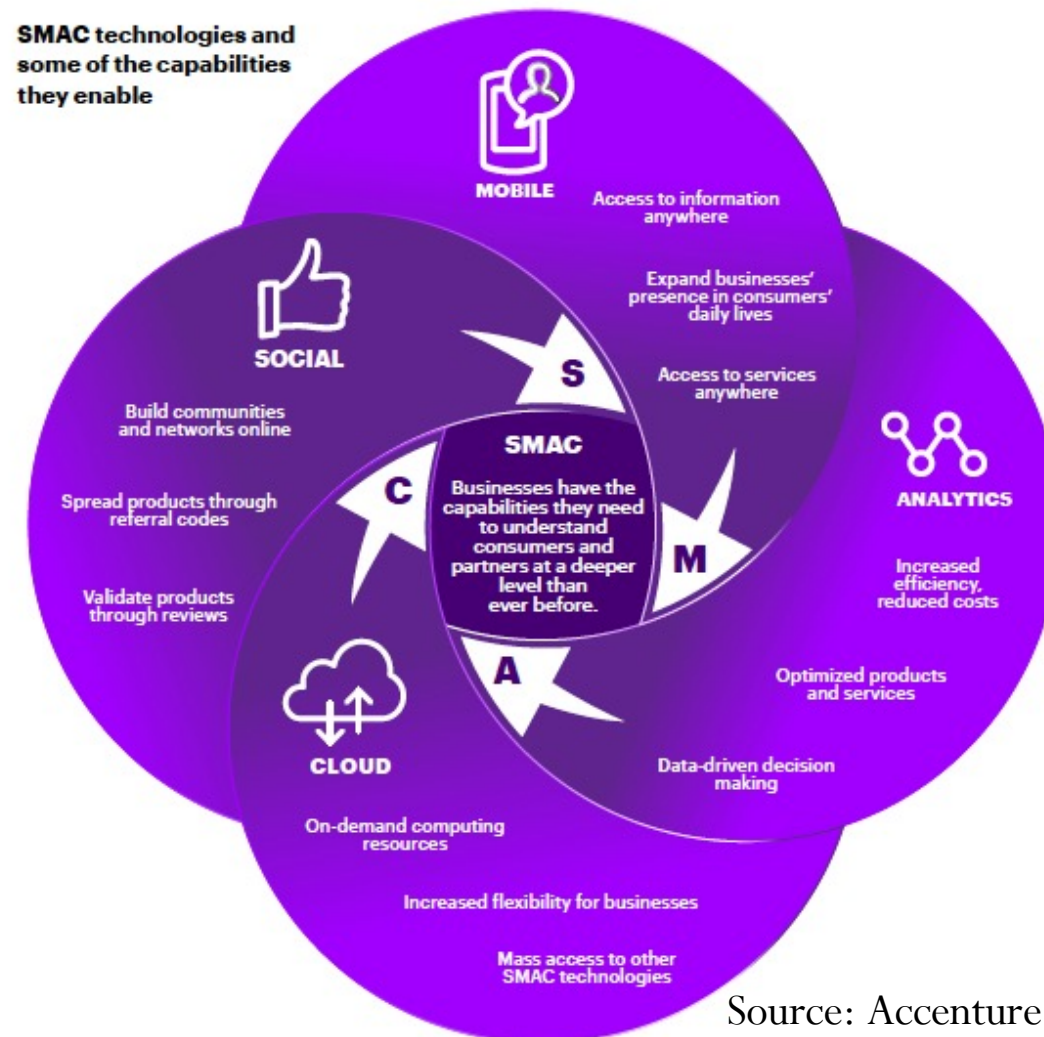
Digital technologies allows

- Exact replications
- Infinite times
- At zero marginal cost



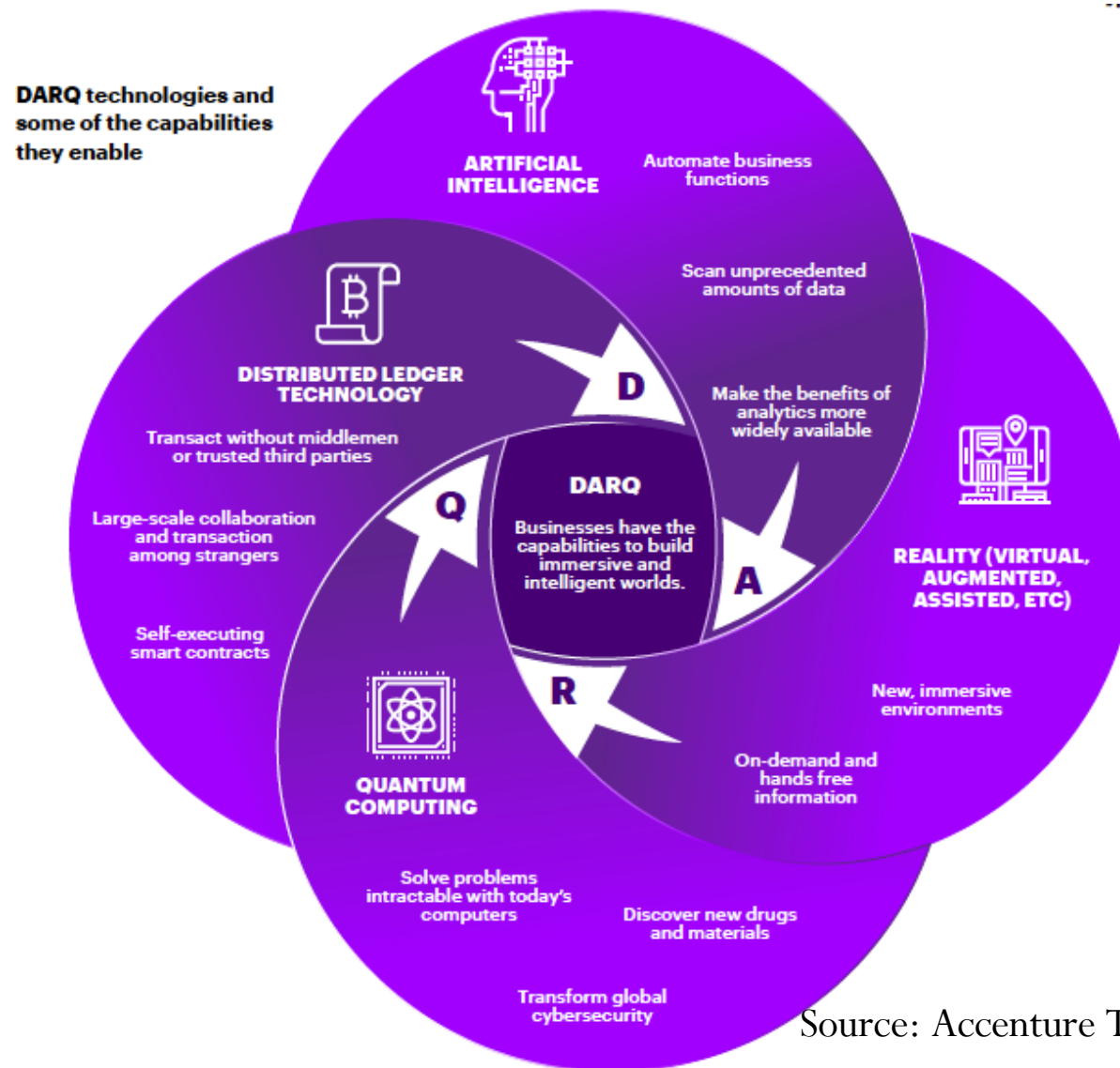
Main technologies driving DT

- «SMAC» technologies have driven the first wave of DT



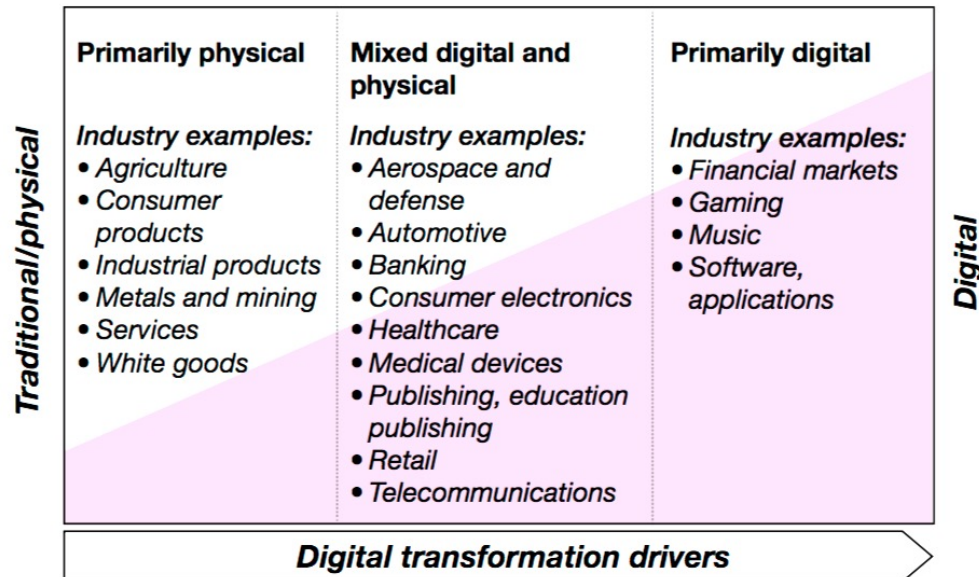
Main technologies driving DT

- «DARQ» technologies are driving the second wave of DT

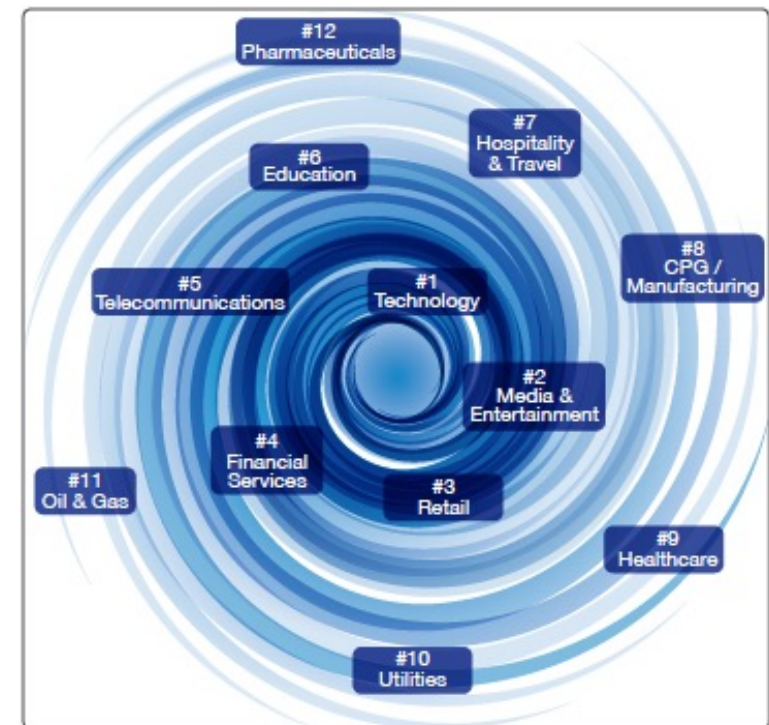


Digitalization trends

Degree of product and service digitization

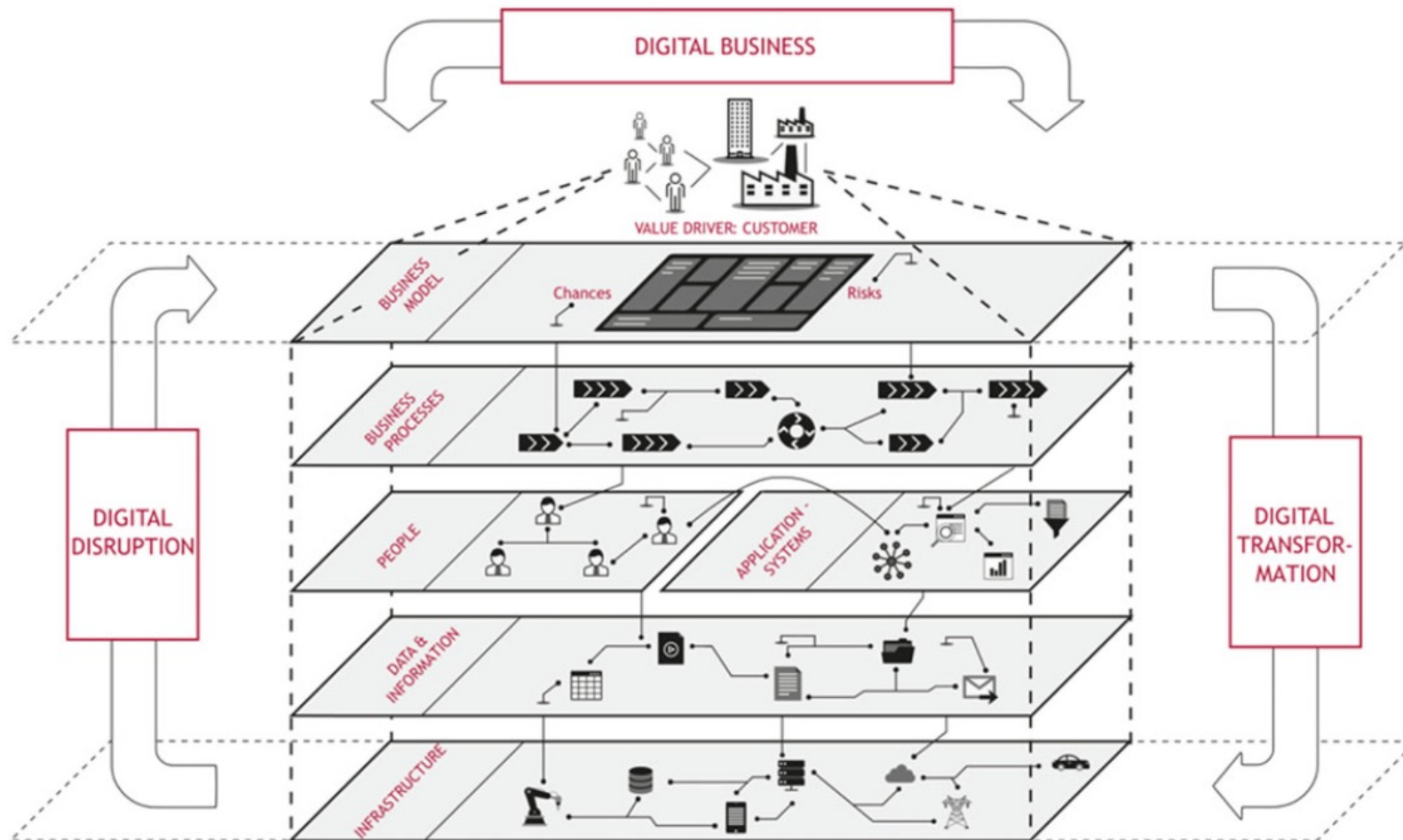


Source: IBM Institute for Business Value analysis.



Source: IMD/Cisco, Digital Vortex. How digital disruption is redefining industries, 2015

Overall impact of digital transformation

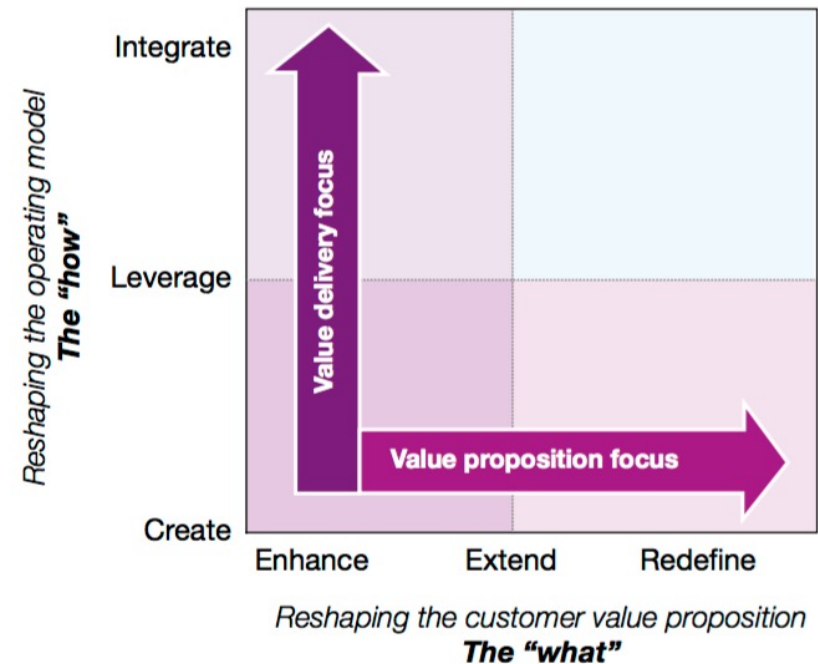


Dimensions of digital transformation: How and What

What do businesses need to do to get ahead of the widespread forces for change in our digital age?

- Reconfiguring the customer value proposition (**what** is being offered)
- Reshaping the operating model (**how** it is delivered).

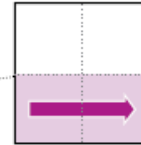
Elements of digital transformation



Source: IBM Institute for Business Value analysis.

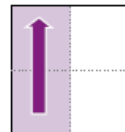
Dimensions of digital transformation

Reshaping the customer value proposition



Enhance or augment physical products or services with digital content, information, insight and engagement	Extend the physical or traditional products and services through digital content, creating new revenue streams	Redefine the value delivered to customers, replace physical with digital or build fully integrated digital/physical value and revenue
Key strategic moves • Augment the customer experience with digital content • Differentiate with digital community • Enhance customer experience across multiple touch-points	Key strategic moves • Add new revenue streams to traditional or mostly physical offerings • Create new revenue streams from stretching the brand • Integrate across touch-points to increase sales and transactions	Key strategic moves • Design new revenue models in which digital elements replaces physical ones • Recombine or reassemble "information elements" to create new or additional value • Transform the customer experience

Reshaping the operating model



Create the basic digital delivery capabilities required to improve operations and engage customers across multiple touch-points	Leverage by using information across channels and organizational structures, while optimizing capabilities within each element	Integrate and fully optimize all elements of the value delivery around customer touch-points and deliver efficiency/effectiveness
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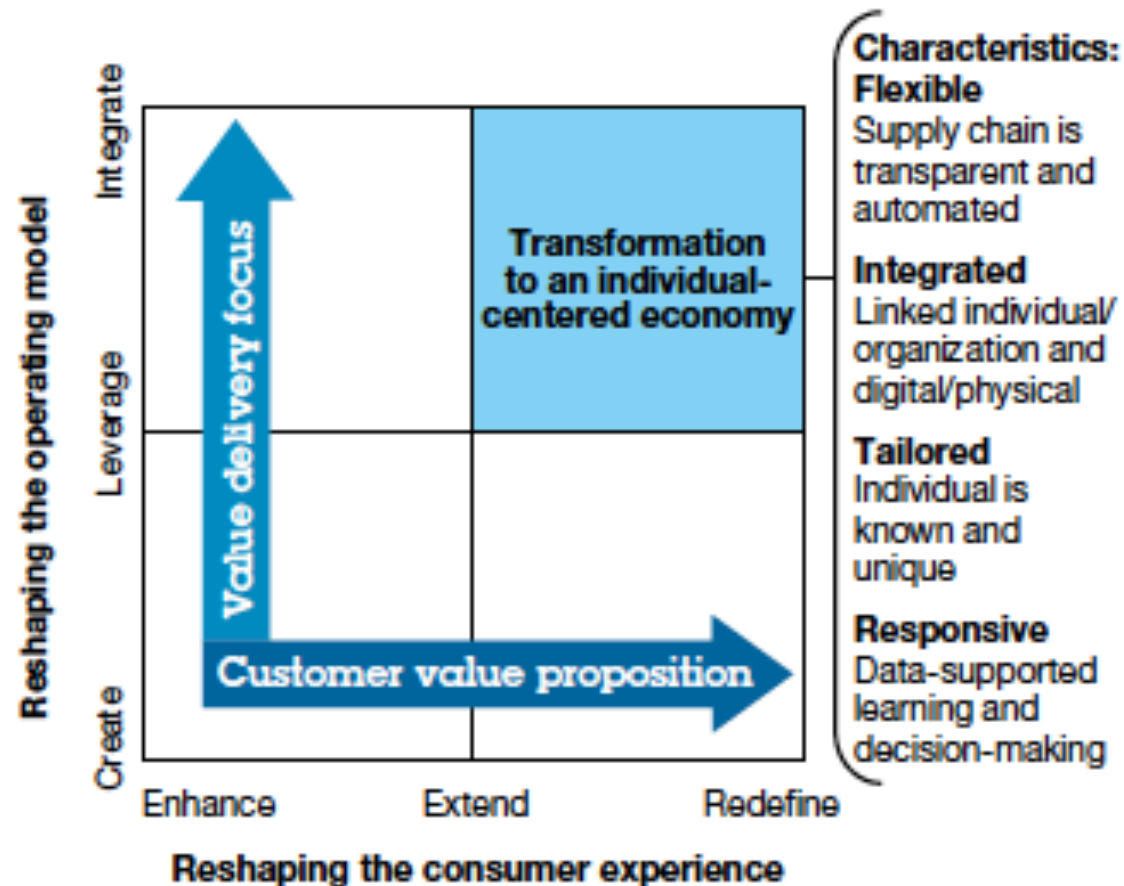
Source: IBM Institute for Business Value analysis.

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University

The essence of digital transformation

Digital transformation framework

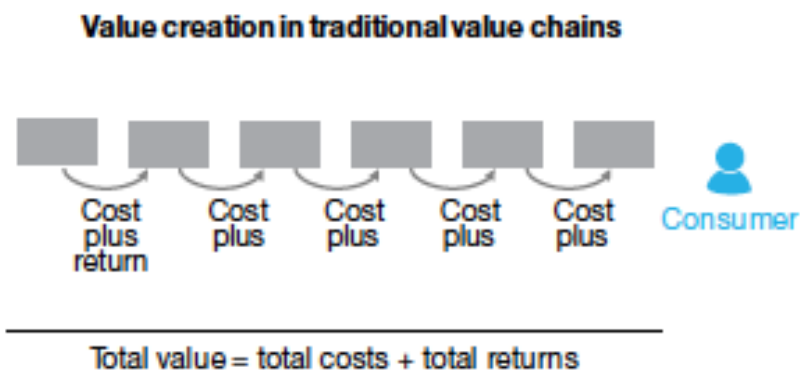


Source: IBM Institute for Business Value analysis; "Digital transformation: Creating new business models where digital meets physical." IBM Institute for Business Value.

The value chain/industry changes

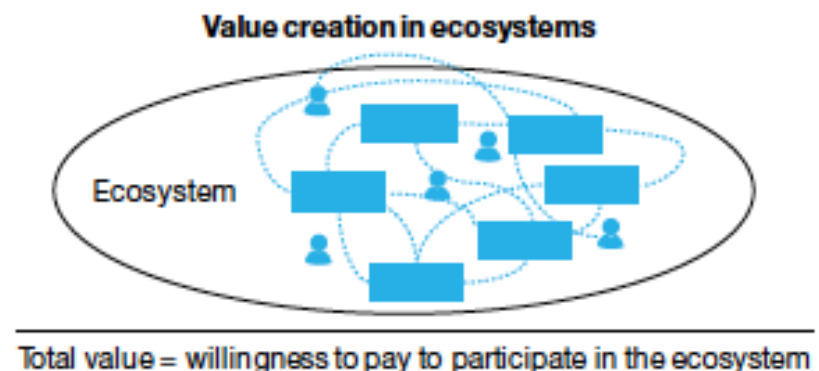
Value chains will fragment

New technologies will make value chains more transparent and easier to decompose (see Figure 4). In the past, value chain disruptions often involved replacing whole value chains or big chunks of value chains, such as replacing traditional banking processes with Internet-based, virtual banking. Next generation value chain disruption will involve contesting more specific elements or functions within value chains.



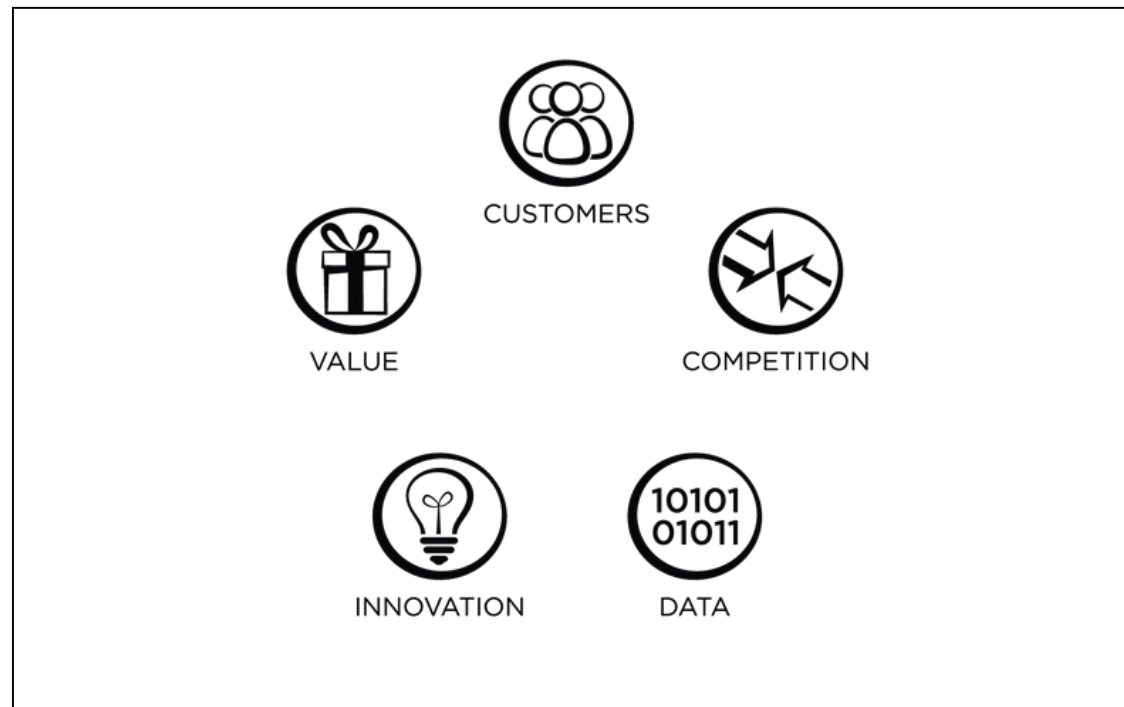
Industries will converge

As specific functions in value chains are contested, new competitors will emerge. Functional specialists from one industry will begin competing in specific value chain functions of other industries. This cannibalization across industries will begin to drive industry convergence (see Figure 5).



Five Domains of Strategy that Digital is Changing

Across these five domains, digital technologies are redefining many of the underlying principles of strategy and changing the rules by which companies must operate in order to succeed.





CUSTOMERS



COMPETITION



DATA



INNOVATION



VALUE

	From	To
Customers (chapter 2)	Customers as mass market Communications are broadcast to customers Firm is the key influencer Marketing to persuade purchase One-way value flows Economies of (firm) scale	Customers as dynamic network Communications are two-way Customers are the key influencer Marketing to inspire purchase, loyalty, advocacy Reciprocal value flows Economies of (customer) value
Competition (chapter 3)	Competition within defined industries Clear distinctions between partners and rivals Competition is a zero-sum game Key assets are held inside the firm Build product with unique features and benefits A few dominant competitors per category	Competition across fluid industries Blurred distinctions between partners and rivals Competitors cooperate in key areas Key assets reside in outside networks Build platforms with partners who exchange value Winner-takes-all due to network effects
Data (chapter 4)	Data is expensive to generate in firm Challenge of data is storing and managing it Firms only make use of structured data Data is managed in operational silos Data is a tool for optimizing processes	Data is continuously generated everywhere Challenge is turning data into valuable information Unstructured data is increasingly usable and valuable Value of data is in connecting it across silos Data is a key intangible asset for value creation
Innovation (chapter 5)	Decisions made based on intuition and seniority Testing ideas is expensive, slow, and difficult Experiments conducted infrequently, by experts Challenge of innovation is to find the right solution Failure is avoided at all cost Focus is on the "finished" product	Decisions made by testing and validating Testing ideas is cheap, fast, and easy Experiments conducted constantly, by everyone Challenge of innovation is to solve the right problem Failures are learned from, early and cheaply Focus is on minimum viable products and iterating after launch
Value (chapter 6)	Value proposition defined by industry Execute your current value proposition Optimize your business model as long as possible Judge change by how it impacts your current business Market success allows for complacency	Value proposition defined by changing customer needs Uncover the next opportunity for customer value Evolve before you must, to stay ahead of the curve Judge change by how it could create your next business "Only the paranoid survive"

Customer



CUSTOMERS

- In the digital age, we are moving to a world best described not by mass markets but by customer network.
- Customer are dynamically connected and interacting in ways that are changing their relationships to business and to each other and shaping business reputations and brands.
- Customer use digital tools to discover, evaluate, purchase and use products and how they share, interact and stay connected with brands.
- Therefore, businesses should rethink of their traditional marketing funnel and reexamine their customers' path to purchase.

Competition



COMPETITION

- How businesses compete and cooperate with other firms.
- Industry boundaries are blurring.
- A major shift in the locus of competitors.

Data



DATA

- How business produce, manage, and utilize information.
- Data generates from every conversation, interaction, or process inside or outside business (think about social media, mobile services, sensors,...)
- The “big data” tools allow firms to make new kinds of predictions, uncover unexpected patterns in business activity and unlock new sources of value.
- Data is a vital part of how every business operates, differentiates itself in the market, and generates new value.

Innovation



INNOVATION

- The process by which new ideas are developed, tested, and brought to the market by businesses.
- Traditionally, innovation mainly focuses on finished products, where market testing was difficult and costly, and the cost of failure was high.
- Digital technologies enable a very different approach to innovation based on rapid experimentation.
- Digital technologies makes it easier and faster to test ideas, having market feedback. Assumptions are repeatedly tested based on validation by real customers.
- The focus is on minimum viable prototypes that maximize learning while minimizing cost.

Value



VALUE

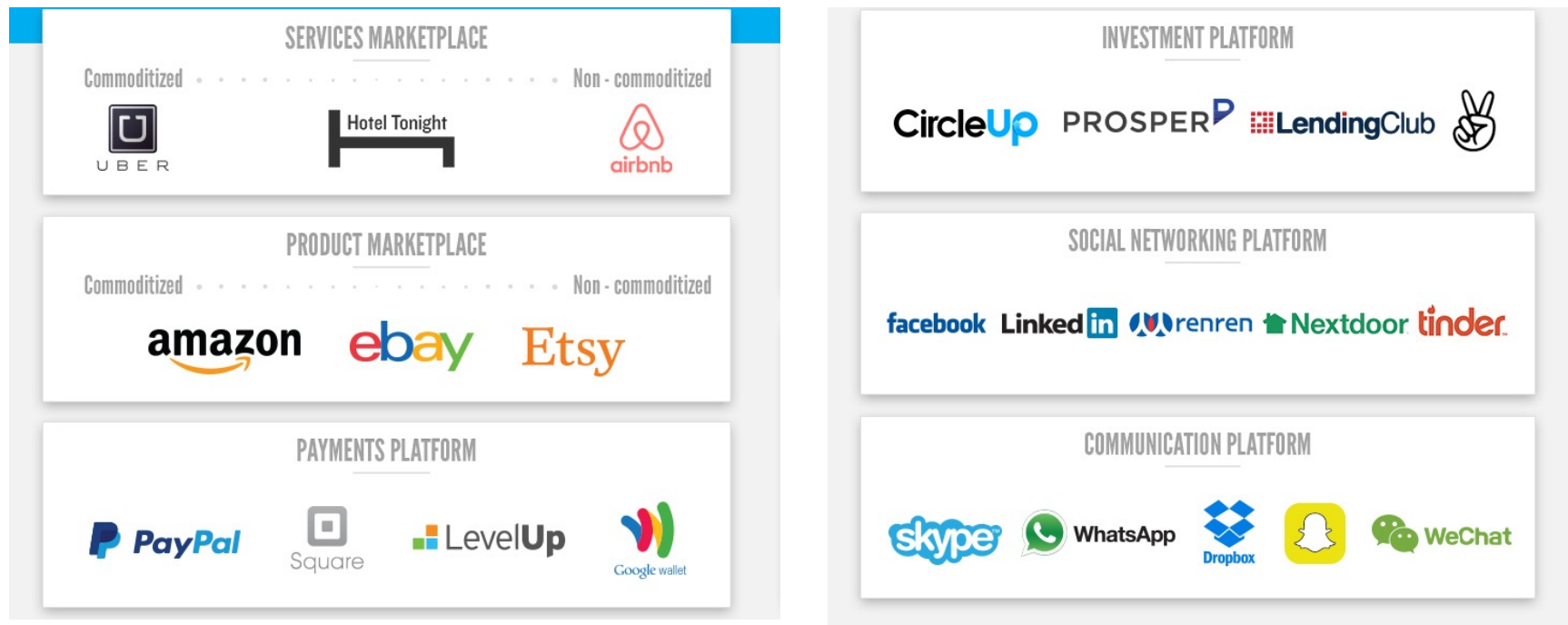
- Traditionally, a firm's value proposition was seen as fairly constant. A successful business was one that found a clear value proposition, found a point of market differentiation, and focus on executing and delivering the best version of the same value proposition to its customers.
- In the digital age, we can observe changing value propositions and disruption by new competitors.
- Any new technology may be a way to extend and improve the value proportions.
- Businesses need to seize emerging opportunities!

THE DIGITAL TRANSFORMATION PLAYBOOK

DOMAINS	STRATEGIC THEMES	KEY CONCEPTS
 CUSTOMERS	<i>Harness customer networks</i>	• reinvented marketing funnel • path to purchase • core behaviors of customer networks
 COMPETITION	<i>Build platforms, not just products</i>	• platform business models • (in)direct network effects • (dis)intermediation • competitive value trains
 DATA	<i>Turn data into assets</i>	• templates of data value • drivers of big data • data-driven decision making
 INNOVATION	<i>Innovate by rapid experimentation</i>	• divergent experimentation • convergent experimentation • minimum viable prototype • paths to scaling up
 VALUE	<i>Adapt your value proposition</i>	• concepts of market value • paths out of a declining market • steps to value prop evolution

Rise of the platform

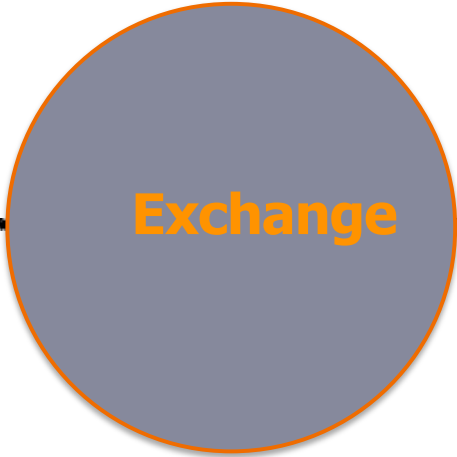
- Many business models related to digital transformation are platforms business models.



A definition of Platforms

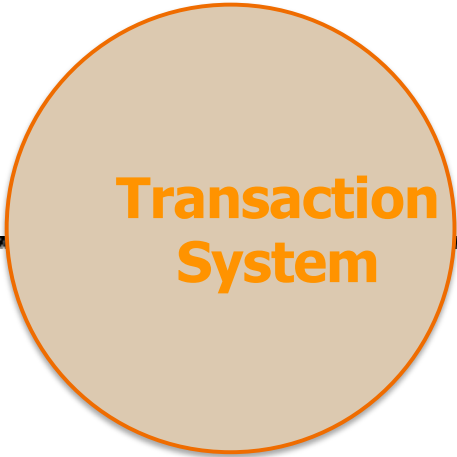
- “A platform is a business that creates value by facilitating direct interactions between two or more distinct types of customers.”
- Three key points:
 1. Distinct types of customers: two or more distinct sides (buyer and seller, software developers and consumers, ...)
 2. Direct interaction: direct interactions of two or more sides
 3. Facilitation

Types of Platforms



Exchange

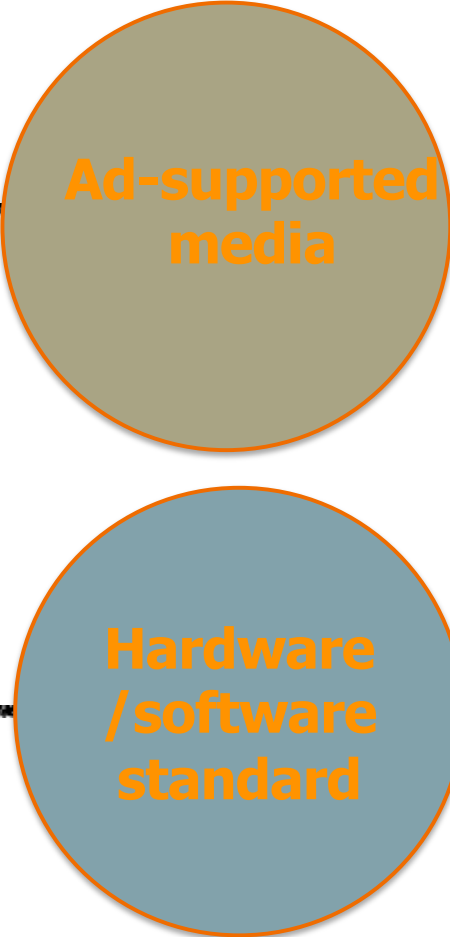
Bring together two distinct groups of customers for a direct value exchange.
example: real estate brokers, eBay, Airbnb



Transaction System

Act as an intermediary between different parties to facilitate payments and financial transactions.
Example: PayPal & Apple Pay

Types of Platforms



Ad-supported media

Play an additional role for creating (or sourcing) media content that is attractive to customers
As platform attract more people, its value to advertisers increases.

Hardware /software standard

Provide a uniform standard for the design of subsequent products to enable their interoperability and the benefit the ultimate consumer.
Apple's iOS and Google's Android

Direct and Indirect Network Effects

- *Network Effect*: the value of platforms increases as more customers use them.
- *Direct Network Effect*: the increase in the number of customers or users of a product drives an increase in value or utility for the same type of user (Facebook)
- *Indirect Network Effect*: the increase in the number and quality of customers on one side of the platform drives increasing value for customers on the other side of the platform (Airbnb and Paypal).

How digital impact Platforms?

- Digital technologies are supercharging the growth and power of multisided platforms: web, on-demand cloud computing, application program interfaces (APIs), social media, mobile computing devices,...
- Digital technologies are driving four key elements of platforms:
 1. Frictionless acquisition
 2. Scalable growth
 3. On-demand access and speed
 4. Trust

How digital impact Platforms?

- Frictionless acquisition: Thanks to the Web, APIs, and software development kits, the process of acquiring new customers for a platform is increasingly frictionless.
- Scalable growth: Cloud computing allows any size of business to rapidly scale the size of its platform as fast as it can acquire new customers.
- On-demand access and speed : By mobile computing, any platform can be accessible to all of its customers anywhere at any time.
- Trust: the possibility to authenticate customers through their social media identities (Facebook, Google, Twitter) makes it much easier for businesses to use a verification system for new customers on its platform.

The biggest impact of digital technology on platforms may be in the size of the businesses involved (from large enterprises to start-ups)

Competitive Benefits of Platforms

- Light in Assets: platforms tend to have few assets/employees for the revenue since customers can provide key assets and do much of the work that employees would do in a vertically integrated business. Thus, platform businesses can achieve extremely high operating margins on a percentage basis.
- Scaling fast: cloud computing architecture enables fast growth.
- Winner takes all: it is hard to be a direct competitor to catch up with Google. The real threat to Google is Apple Siri or Amazon's product search,
- Economic Efficiency: Platform business models enable the efficient use of distributed resources (labor, assets, skills), the "Sharing Economy".

Definitions of AI and GenAI

- Artificial Intelligence = the simulation of human intelligence in machines that are programmed to think and act like humans.

AI systems = autonomous + adaptive systems

- Weak or Narrow AI = designed for specific tasks vs. Strong or General AI = aiming to emulate human-level intelligence and consciousness
- Generative Artificial Intelligence (GenAI) = AI models able to generate text, images, videos, audio, software code or other forms of data.
 - built on foundational models, such as the Large Language Models
 - trained on massive datasets,
 - used for a wide range of tasks with no or minimal need for adaptation
 - capable of creative tasks such as generating text, images or music
 - efficient in knowledge processing activities

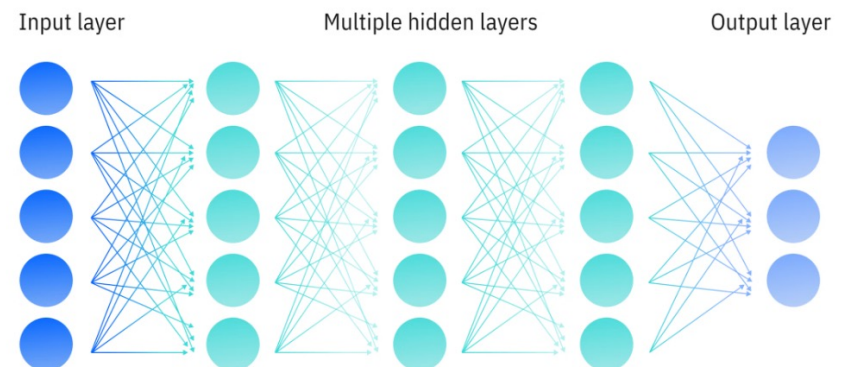
Key AI technologies

1. Machine Learning

- learn from data and generalize to unseen data, and thus perform tasks without being explicitly programmed
- Effective with pattern recognition, prediction, and optimization
- Deep learning is a subset of machine learning driven by multilayered neural networks whose design is inspired by the structure of the human brain.
- It works based on inputs, weights and regressions

Model training:

- Supervised learning
- Unsupervised learning



Key AI technologies

2. Computer Vision

- enables machines to understand and process visual information.
- Effective with: Object Detection and Recognition; Scene Understanding; Image Segmentation; Motion Analysis; and Face Recognition

3. Natural Language Processing

- supports interaction between computers and human language.
- Effective with: Text Understanding and Generation; Translation between Languages; Sentiment Analysis; Named Entity Recognition; and Question Answering

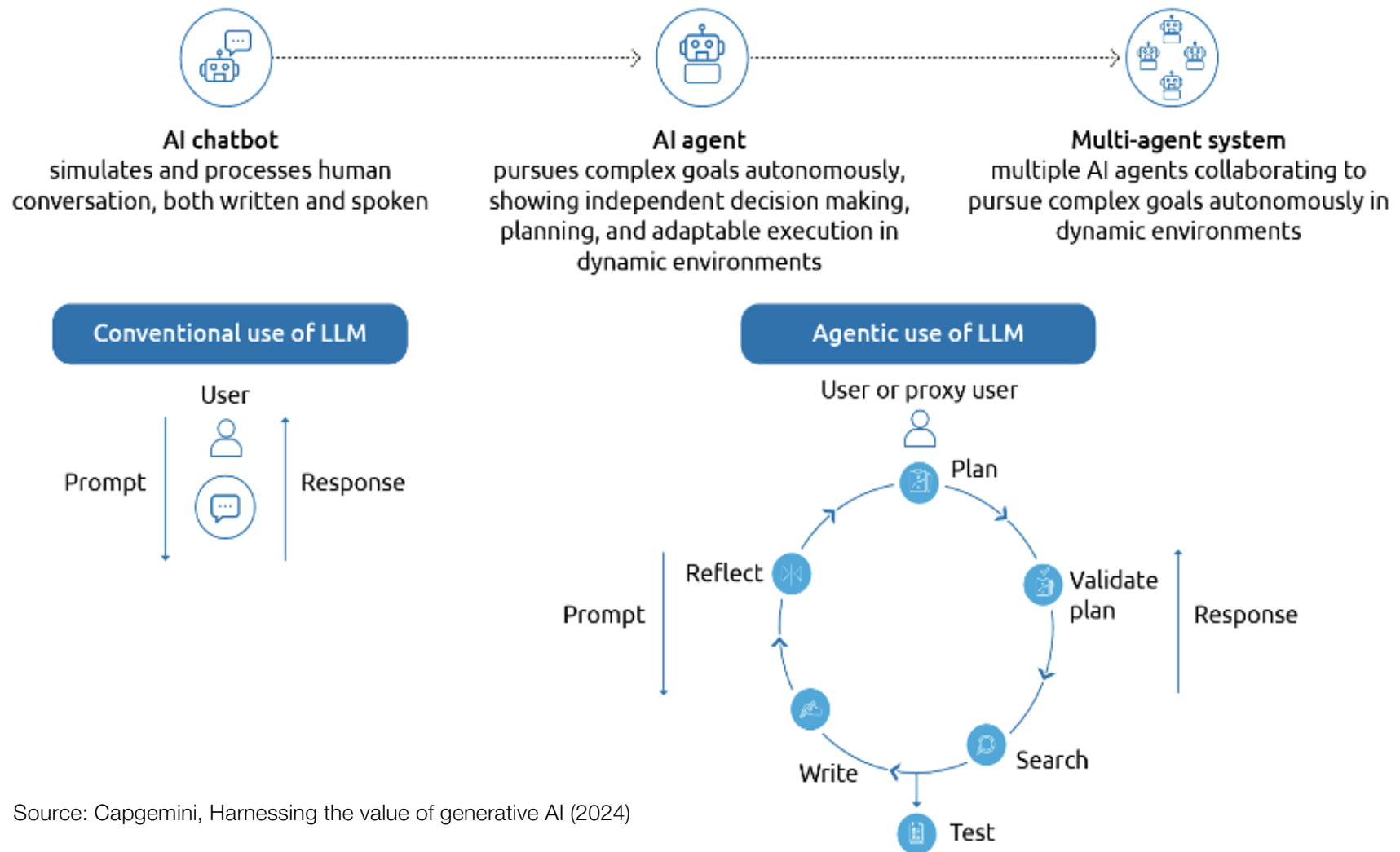
4. Robotics

- Integrates IT/AI with physical systems
- Effective with: Motion Planning and Control; Environmental Perception; Task Planning and Execution; and Human-Robot Interaction

Key AI technologies

- In the digital era, any relationship between two businesses is a shifting mix of competition and cooperation: co-opetition.
- Competition with rival is changing, becoming less of a direct contest.
- Industries definitions and boundaries are becoming more fluid (shift from symmetric to asymmetric competitors).
- More relationships between businesses and their supply chain partners
- Digital platforms are driving cooperation among business rivals (e.g. Google search engine in Apples' devices)
- Disruptive threats from new technologies are driving rival businesses to team together and cooperate.

GenAI evolution



Source: Capgemini, Harnessing the value of generative AI (2024)

GenAI as prompts

AI generating text, images, diagrams based on a request in natural language.
Prompt engineering

Functions



R&D



Procurement



Supply chain



Marketing and sales



Customer service

Key features

Horizontal use cases *Enterprise-wide*

Employee copilots

Employee use of copilots, such as Microsoft 365 Copilot, Google Workspace AI, and Zoom AI Companion

Generates meeting minutes, writes emails, and translates text

Chatbots

Internal deployments of general-purpose tools, such as ChatGPT, Gemini, and Claude

Secured access to external GPT capabilities enriched with company-specific data

Vertical use cases *Function-specific*

Idea generator

Summarizes research trends and proposes areas to explore

Negotiation assistant

Suggests negotiation levers and next best actions

Supply risk assessor

Generates risk profiles for suppliers to boost sourcing resilience

Sales assistant

Prioritizes and qualifies accounts

Support assistant

Supports staffers with suggested replies and knowledge base lookups

Function-specific copilots, triggered by a human prompt

Research curator

Auto-tags and organizes incoming scientific articles by topic

Request for proposal (RFP) generator

Auto-generates complete RFPs

Demand forecaster

Predicts demand based on internal and external data

Insights provider

Provides campaign performance insights based on predefined KPIs and frameworks

Ticket categorizer

Prioritizes tickets based on level of urgency

Individual task automation within a business workflow, triggered by a human prompt

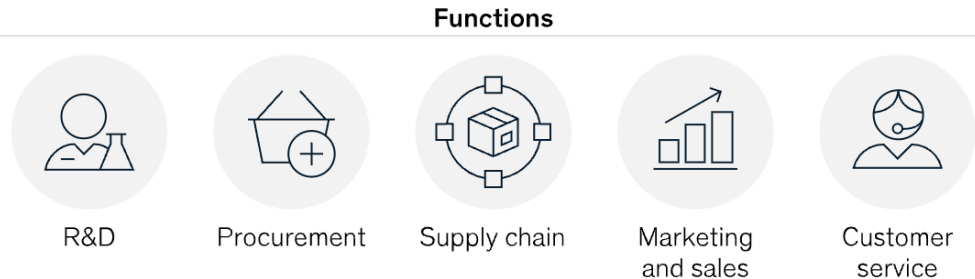
<https://www.mckinsey.com/capabilities/quantumblack/our-insights/seizing-the-agentic-ai-advantage>

McKinsey, 2025

GenAI as agents

AI agents are software systems that use AI to pursue goals and complete tasks on behalf of users.

Horizontal use cases
Enterprise-wide



Key features

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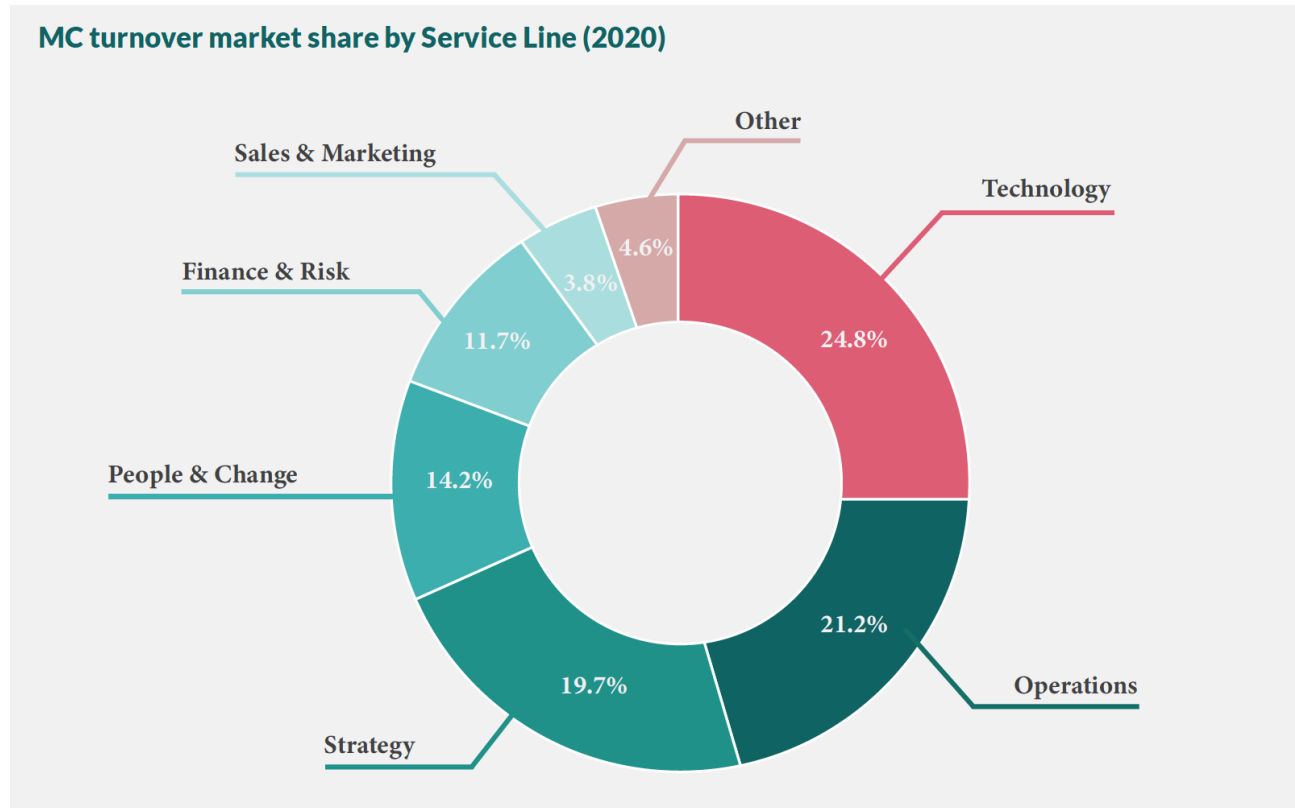
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<https://www.mckinsey.com/capabilities/quantumblack/our-insights/seizing-the-agentic-ai-advantage>

McKinsey, 2025

The digital transformation as a service line for Mgmt Consulting companies



The growth of the industry is strongly driven by Technology, while Strategy – the most traditional service line – is rather flat in terms of market share ... behind these figures there is a significant restructuring of the industry and of its business models driven by digital transformation.

The post-pandemic emergency has further strengthened such a trend.

[Source: FEACO 2020-21]

New business models in Mgmt Consulting

More traditional

More innovative

SOLUTION SHOP

- Structured to diagnose and solve problems whose scope is undefined
- Delivers value primarily through consultants' judgment rather than through repeatable processes
- Customers pay high prices in the form of fee-for-service

EXAMPLES
McKinsey, Bain, BCG, IDEO

VALUE-ADDED PROCESS BUSINESS

- Structured to address problems of defined scope with standard processes
- Processes are usually repeatable and controllable
- Customers pay for output only

EXAMPLES
Motista, Salesforce.com, McKinsey Solutions

Accenture, Deloitte (both moving toward solution shop)

FACILITATED NETWORK

- Structured to enable the exchange of products and services
- Customers pay fees to the network, which in turn pays the service provider

EXAMPLES
OpenIDEO, CEB, Gerson Lehrman Group, Eden McCallum, BTG

References

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