

Digital Business and Electronic Commerce

Strategy, Business Models and Technology

Lecture Material

Second Edition - June 2024

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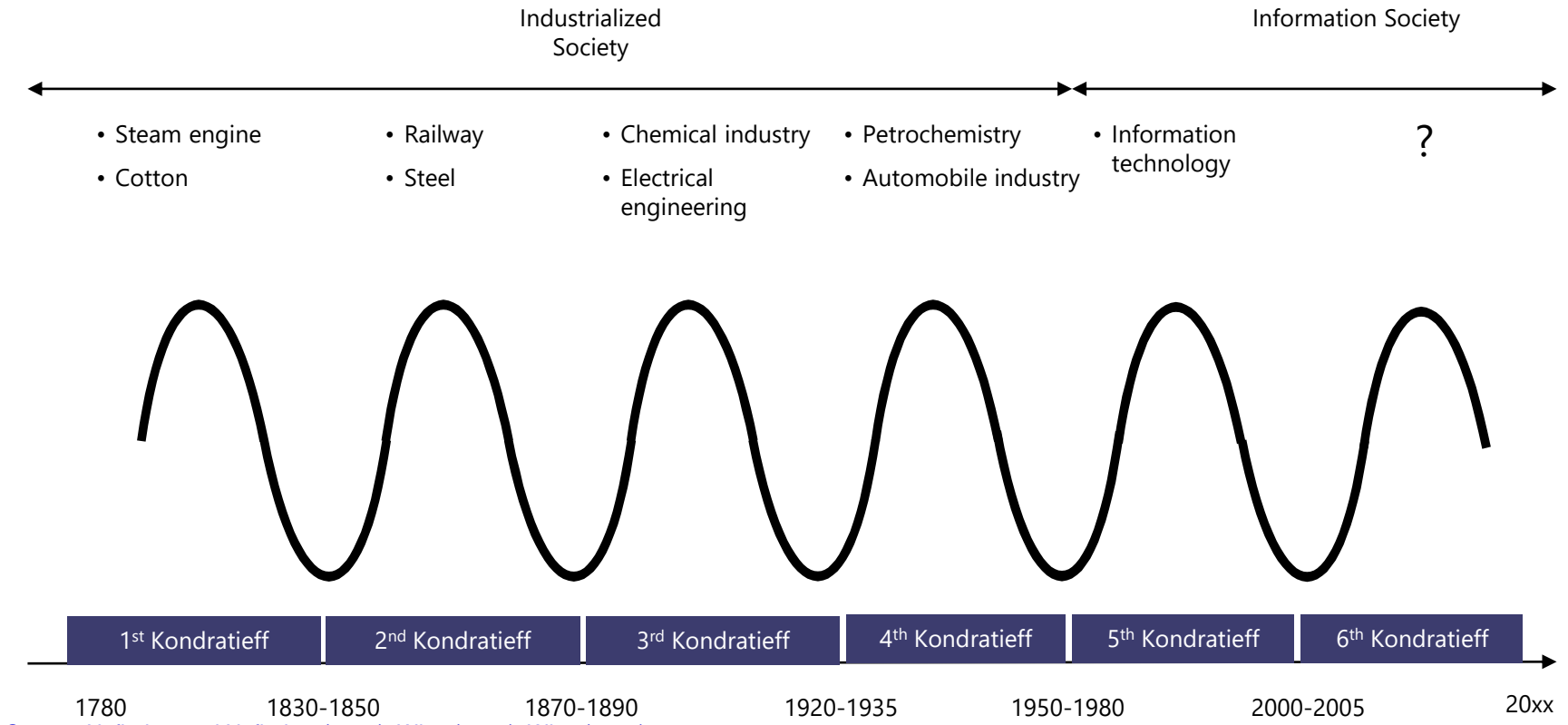
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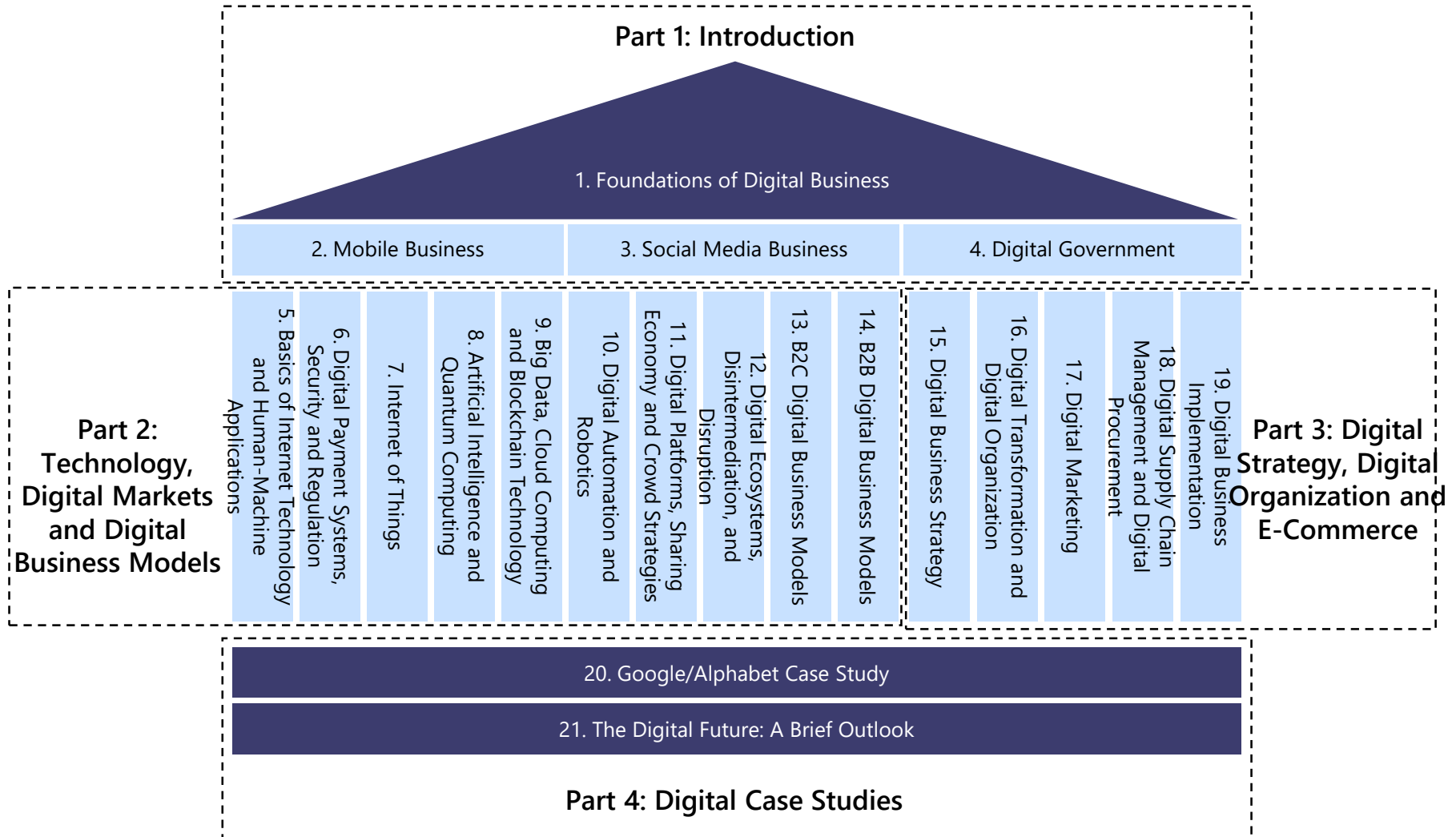
Chapter 1: Foundations of Digital Business

Fig. 1.1 Kondratieff cycle



Source: Nefiodow and Nefiodow (2014); Wirtz (2021); Wirtz (2024)

Fig. 1.2 Structure of the textbook



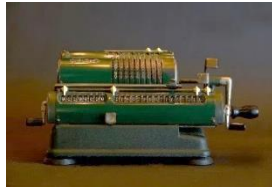
Source: Wirtz (2021); Wirtz (2024)

Fig. 1.3 Development of information and communication applications (250 B.C. until 1956)

Matrix of Eratosthenes

2	3	4	5	6	7	8	9	
11	12	13	14	15	16	17	18	19
21	22	23	24	25	26	27	28	29
31	32	33	34	35	36	37	38	39
41	42	43	44	45	46	47	48	49

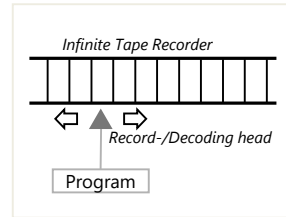
Eratosthenes develops an algorithm for determining prime numbers



Gottfried Leibniz constructs the first mechanical calculating machine that is capable of the four standard calculation methods



Alexander Graham Bell puts the first telephone into operation



With the Turing machine, Alan M. Turing develops a basic foundation of theoretical informatics



Implementation of the first mobile network worldwide in the U.S.



Introduction of color television in the U.S.



250 B.C.

1623

1672

1854

1867

1903

1936

1941

1946

1948

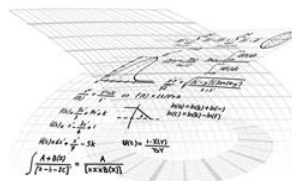
1953

1956

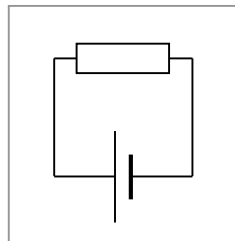
Wilhelm Schickard constructs the first 4-function calculator



George Boole publishes the Boolean algebra



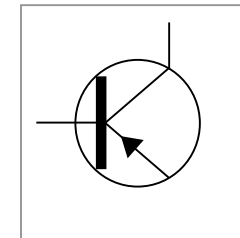
Nikola Tesla patents the electrical circuits



Konrad Zuse builds the first fully automated, program-controlled and freely programmable Computer



William Bradford Shockley patents the transistor



IBM introduces the magnetic hard drive (IBM 350)



Source: Wirtz (2013b, 2020b, and updates 2021), Wirtz (2024)

Fig. 1.4 Development of information and communication applications (1966 until 1994)



Disk Operating System/360 (DOS) is introduced as operating system for IBM mainframes



Intel launches the first microprocessor 4004



Motorola introduces the first cell phone worldwide (Dynatac 8000x)



Steve Case founds the Internet service Quantum Computer Services (renamed to AOL 3 years later)

SAP

SAP releases the ERP-Software SAP R/3



Paul Baran und Donald Watts Davies create the first decentral network ARPANET



Introduction of IBM „Personal Computer“



Microsoft releases Windows 1.0

Microsoft®

Start of the World Wide Web

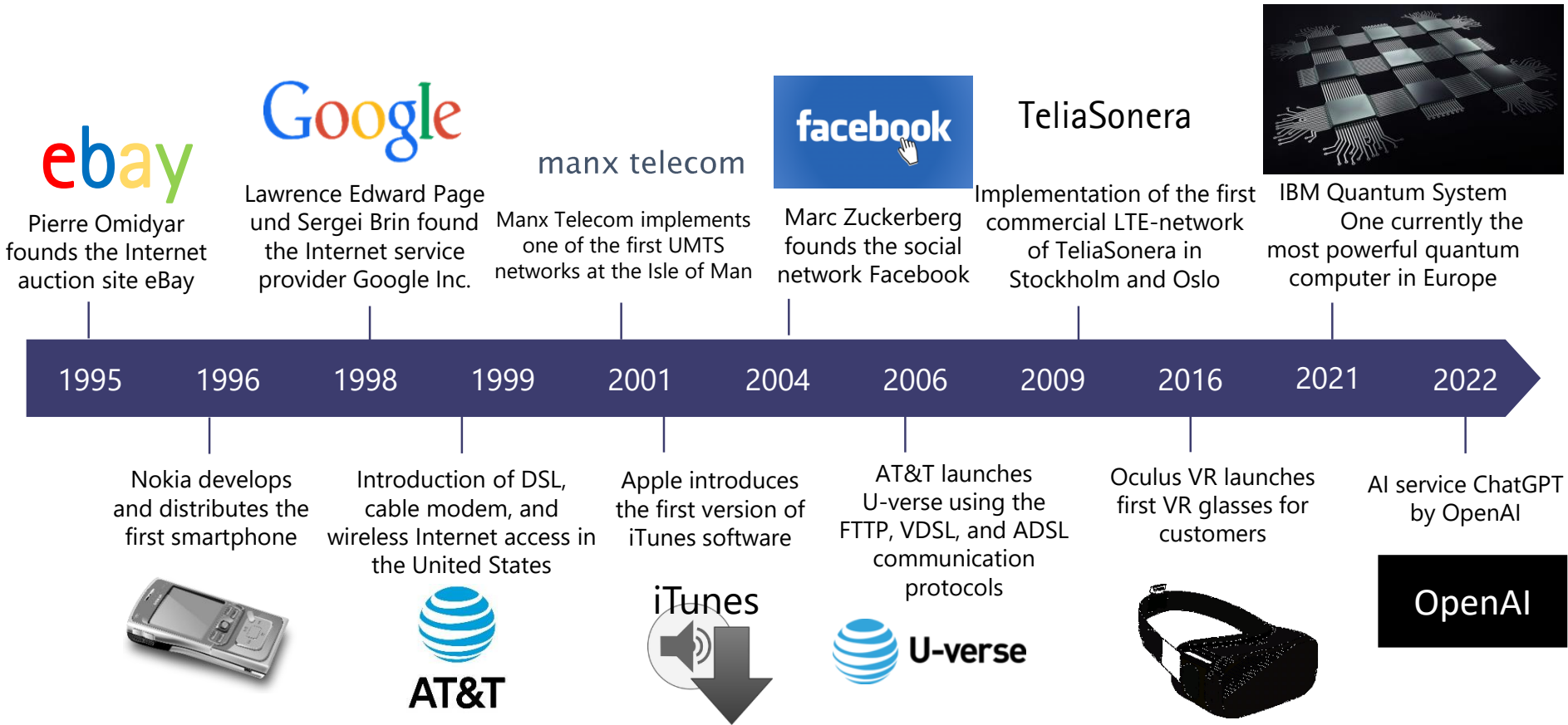


Jeff Bezos founds the internet mail order business Amazon

amazon.com

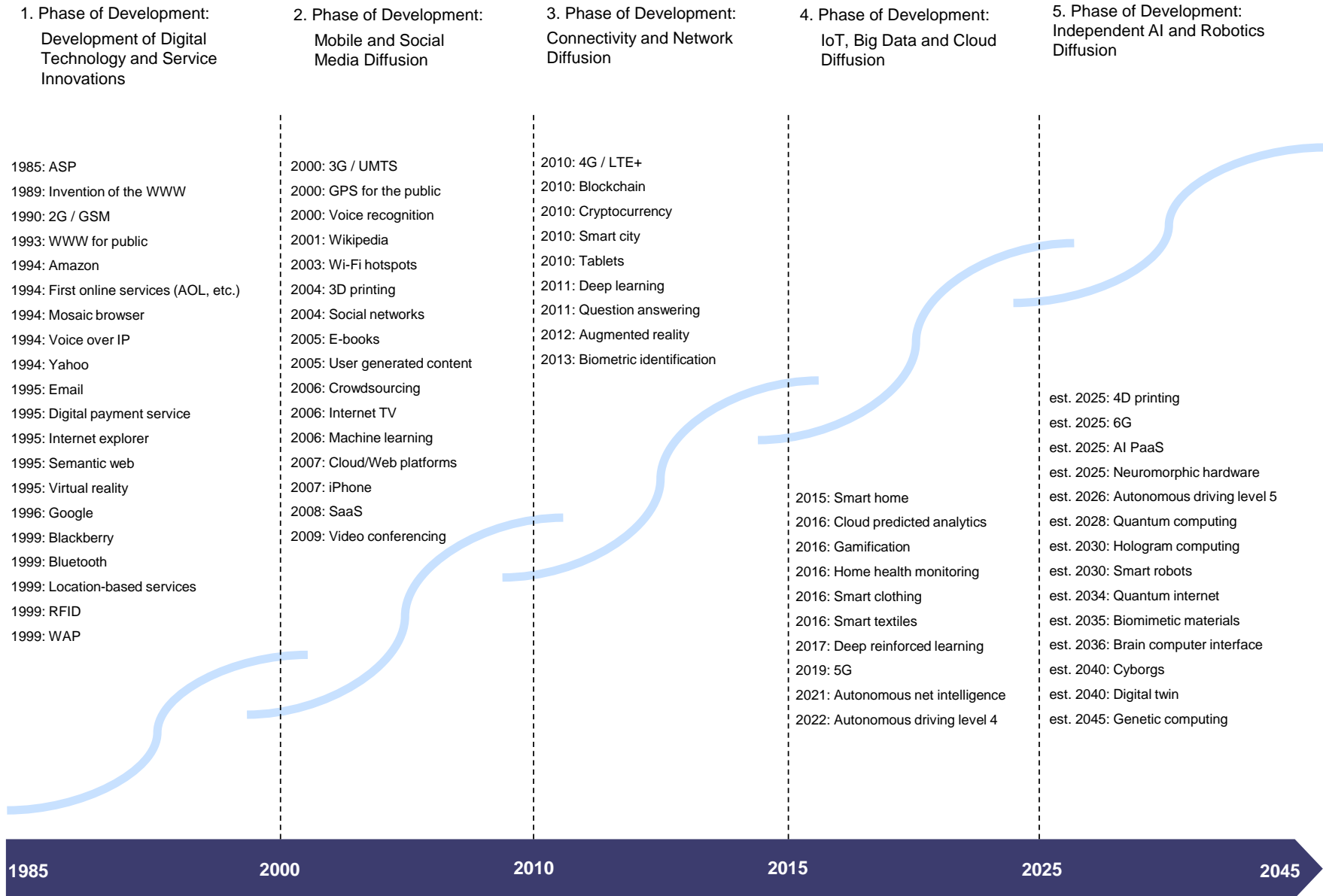
Source: Wirtz (2013b, 2020b, and updates 2021), Wirtz (2024)

Fig. 1.5 Development of information and communication applications (1995 until 2019)



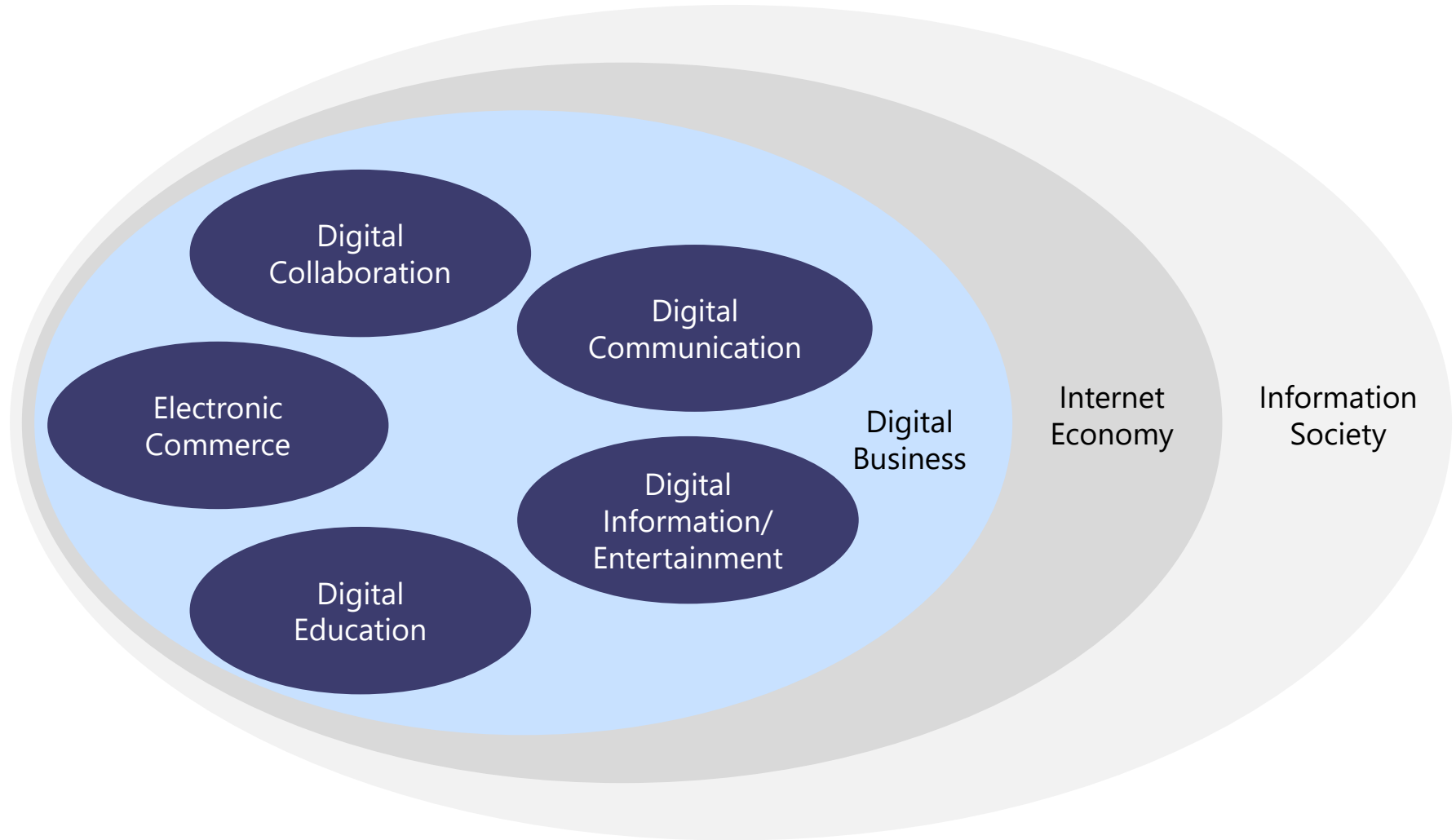
Source: Wirtz (2013b, 2020b, and updates 2021); Wirtz (2024)

Fig. 1.6 Five phases of digital transformation



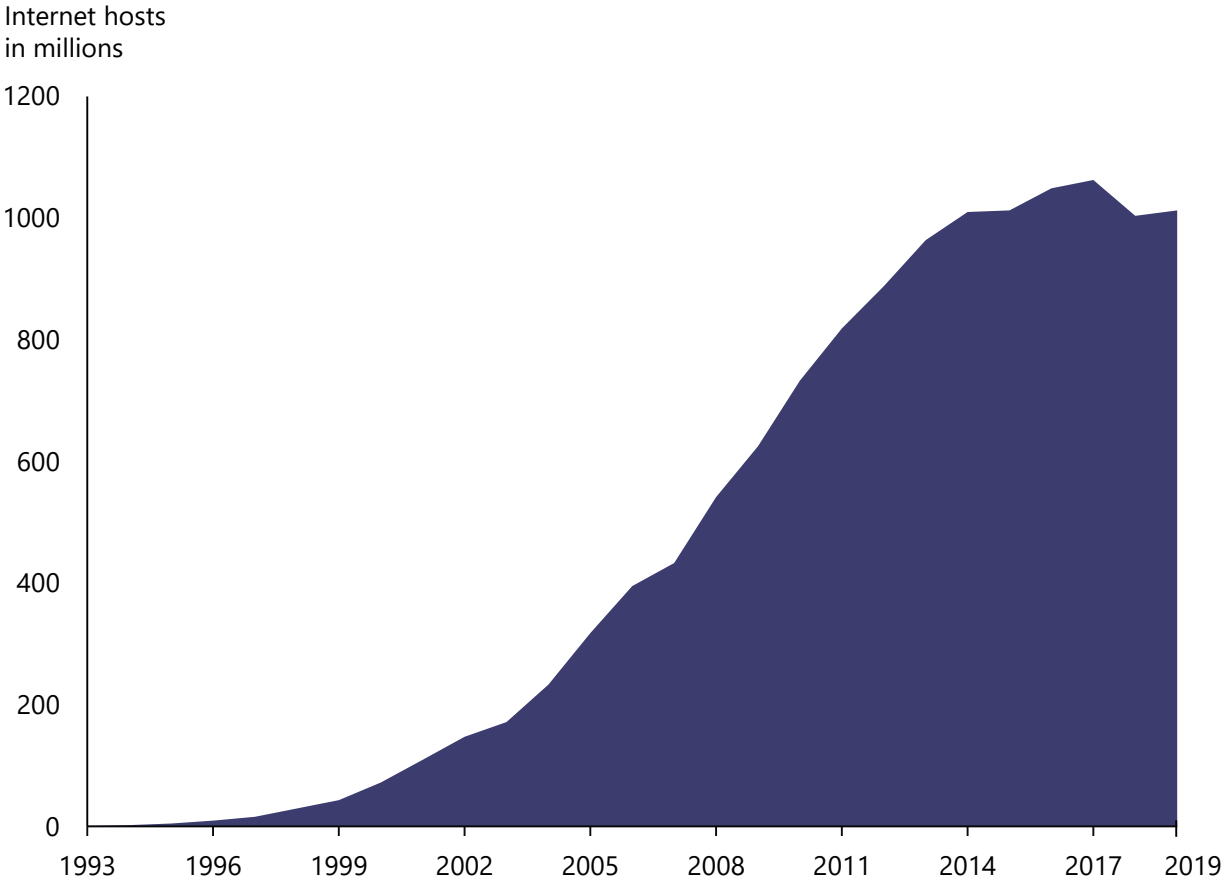
est. = estimated

Fig. 1.7 Dimensions of the information society



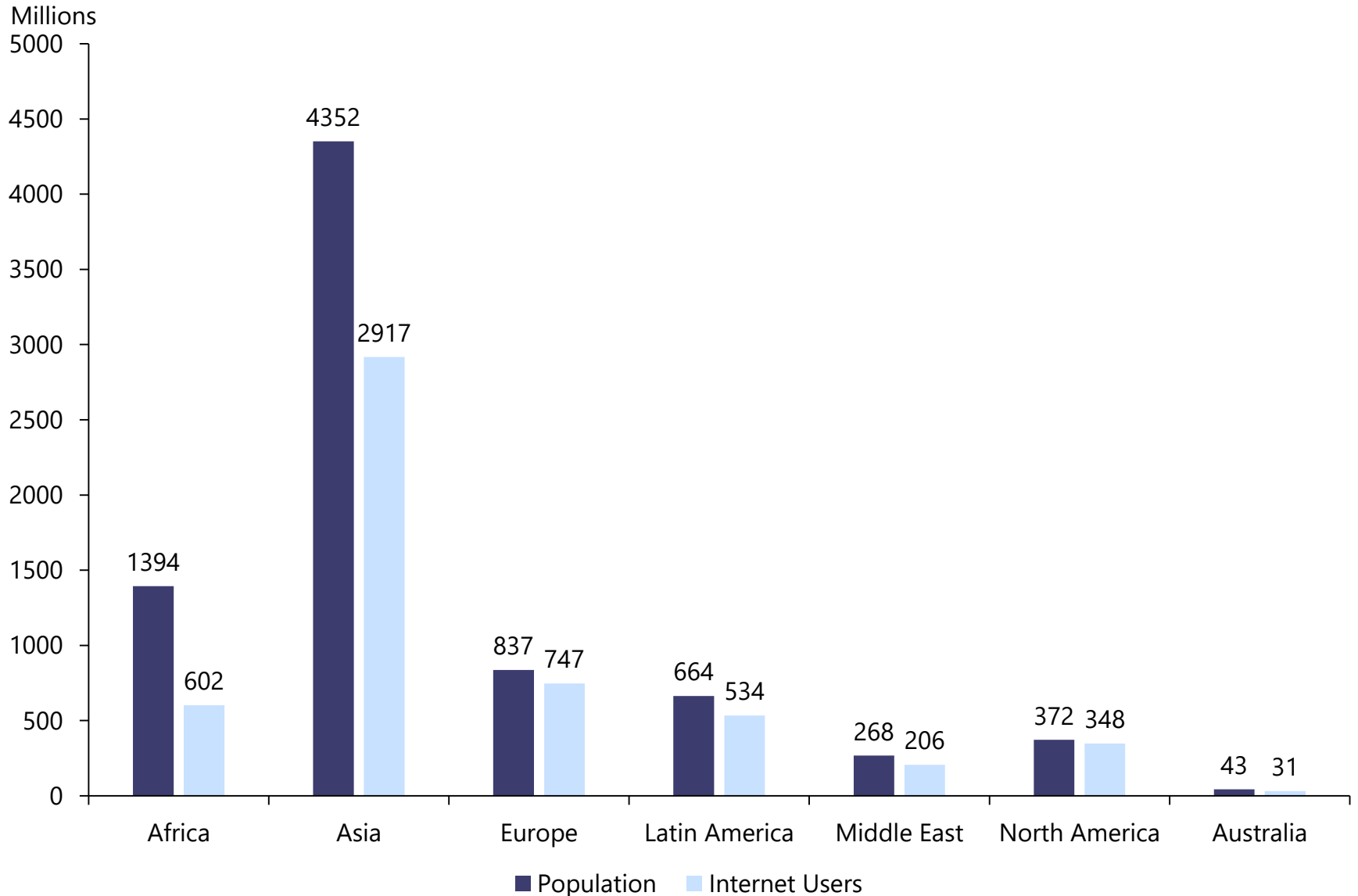
Source: Wirtz (2000a, 2021); Wirtz (2024)

Fig. 1.8 Development of the number of Internet hosts since 1993



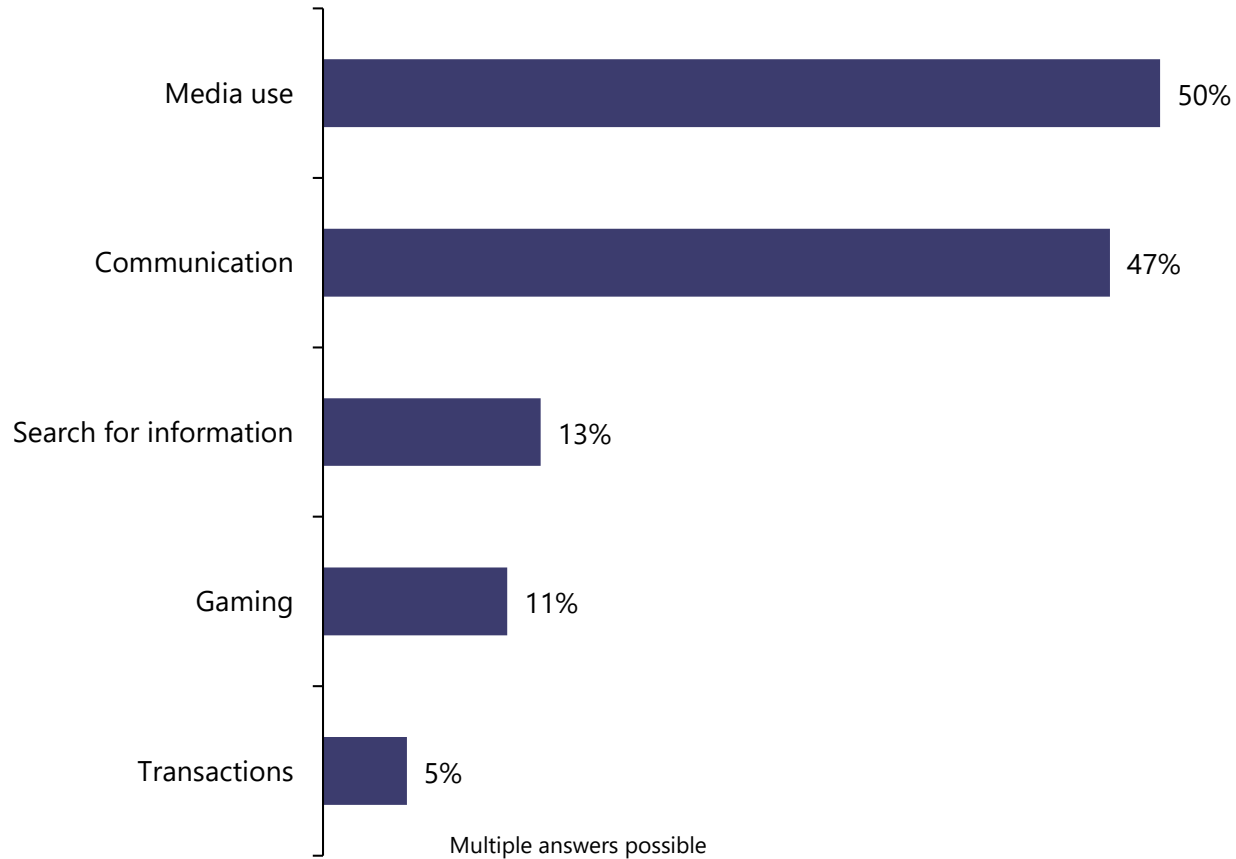
Source: Wirtz (2000a, 2021); Wirtz (2024)

Fig. 1.9 Worldwide Internet usage and population statistics



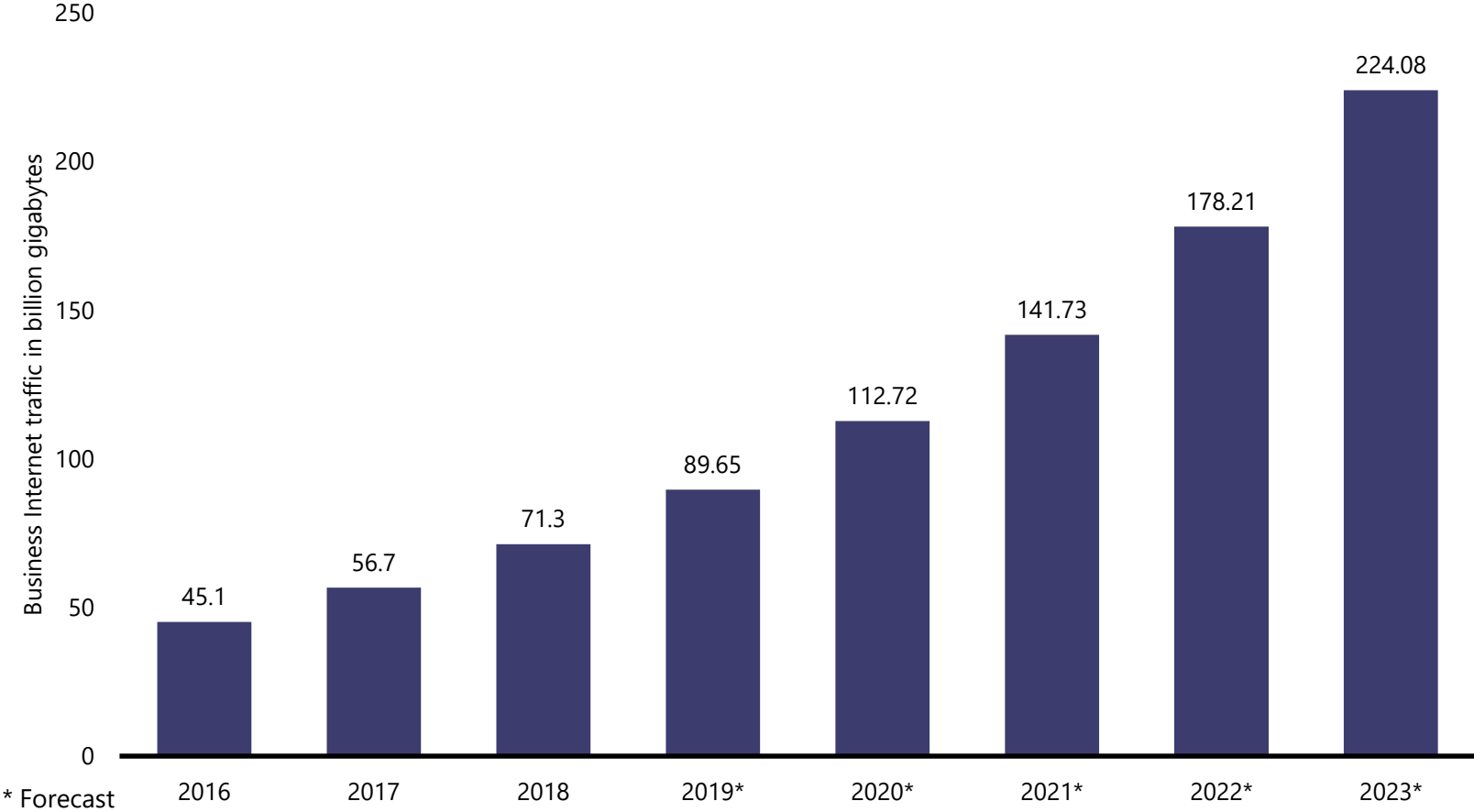
Data Source: Internet World Stats (2022); Wirtz (2021); Wirtz (2024)

Fig. 1.10 Use of the Internet in everyday life from a consumer perspective



Data Source: Beisch and Schäfer (2020); Wirtz (2024)

Fig. 1.11 Business Internet data traffic volume in the United States from 2016 to 2023



Data Source: Telecom Advisory Services (2018); Wirtz (2024)

Table 1.1 Selected definitions of e-/digital business

Author(s)	Definition
IBM (1997)	A secure, flexible and integrated approach to delivering differentiated business value by combining the systems and processes that run core business operations with the simplicity and reach made possible by Internet technology.
PricewaterhouseCoopers (1999)	Hereafter, e-business will be defined as the application of information technologies to facilitate buying and selling of products, services and information over public standard-based networks.
Wirtz (2000b)	E-business [...] is defined as the initiation, negotiation and/or transaction of a business between economic subjects which is electronically realized through telecommunication networks.
Rayport and Jaworski (2001)	E-business can be formally defined as technology-mediated exchanges between parties (individuals, organizations, or both) as well as the electronic based intra- or inter-organizational activities that facilitates such exchange.
Jelassi and Enders 2005)	The use of electronic means to conduct an organization's business internally and/or externally.
Chen (2005)	Business that is conducted using electronic networks or electronic media. Sometimes used synonymously with e-commerce and sometimes used more widely to include other business activities in addition to buying and selling.
Papazoglou and Ribbers (2006)	E-business can be defined as the conduct of automated business transactions by means of electronic communications networks (e.g. via the Internet and/or possibly private networks) end-to-end.
Chaffey (2009)	All electronically mediated information exchanges, both within an organization and with external stakeholders supporting the range of business processes.
Laudon and Traver (2014)	[...] is the use of Internet, the World Wide Web (Web) and mobile apps to transact business.
Schneider (2017)	The term electronic commerce or (e-commerce) [...] includes all business activities that use Internet technologies. Internet technologies include the Internet, the World Wide Web and other technologies such as wireless transmissions on mobile telephone networks.

Source: Wirtz (2000a, 2021); Wirtz (2024)

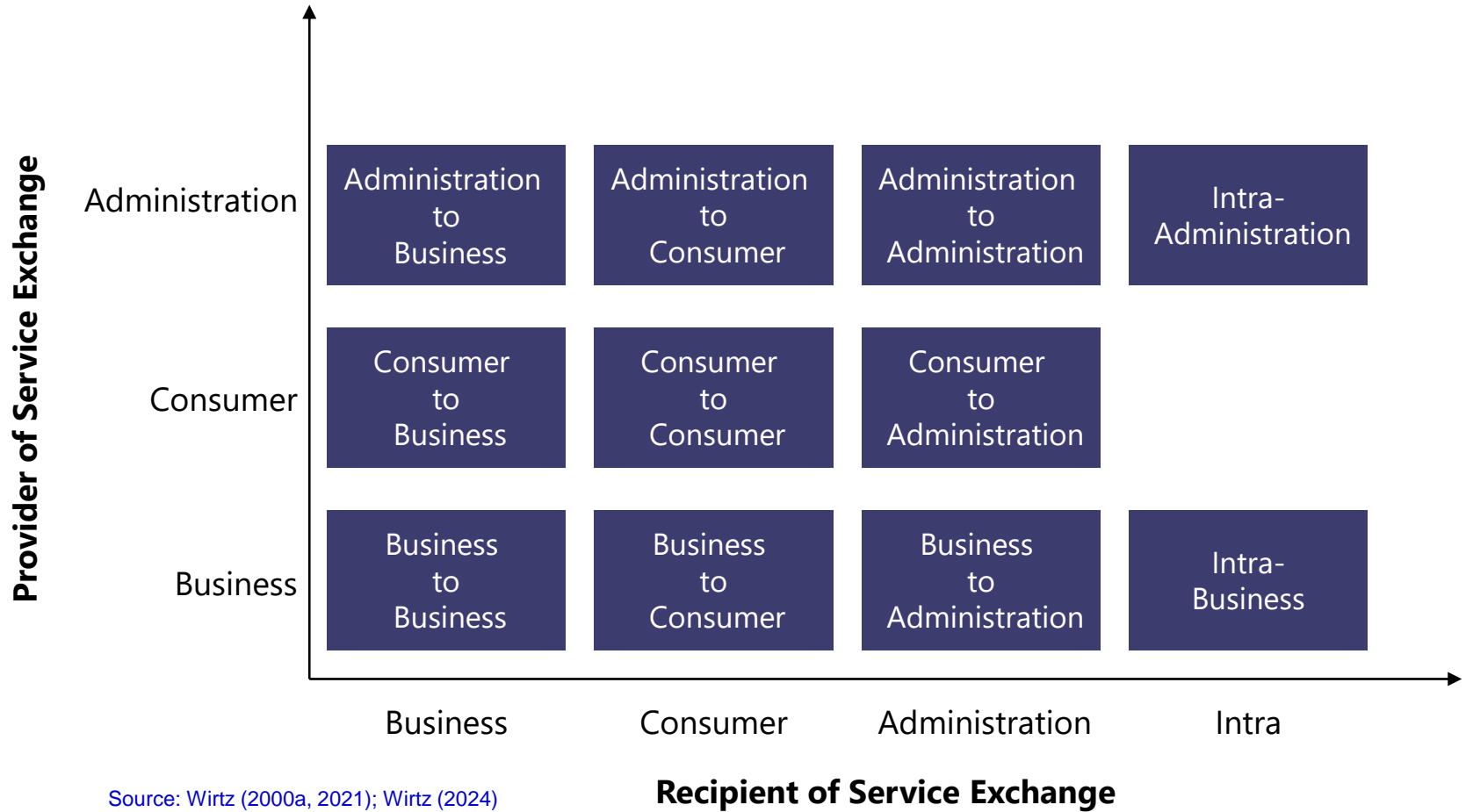
Definition of Digital Business

Definition of Digital Business (Wirtz 2000a, 2021, 2024)

Digital business is the initiation as well as the partial or full support, transaction, and maintenance of service exchange processes between economic partners through information technology (electronic networks). The aim is to perform economic processes more efficiently and effectively.

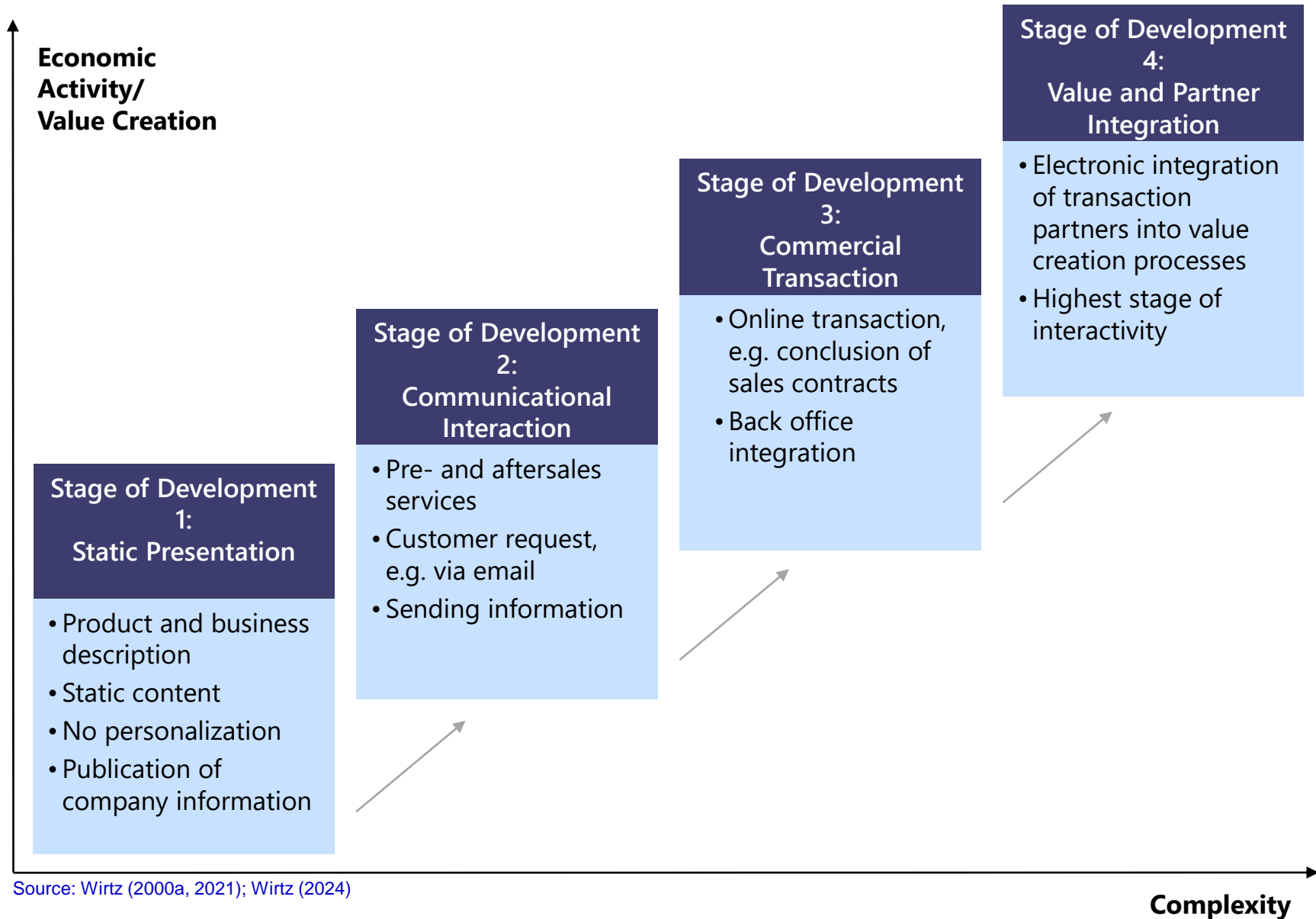
Source: Wirtz (2000a, 2021, 2024)

Fig 1.12 Matrix of interaction patterns in digital business



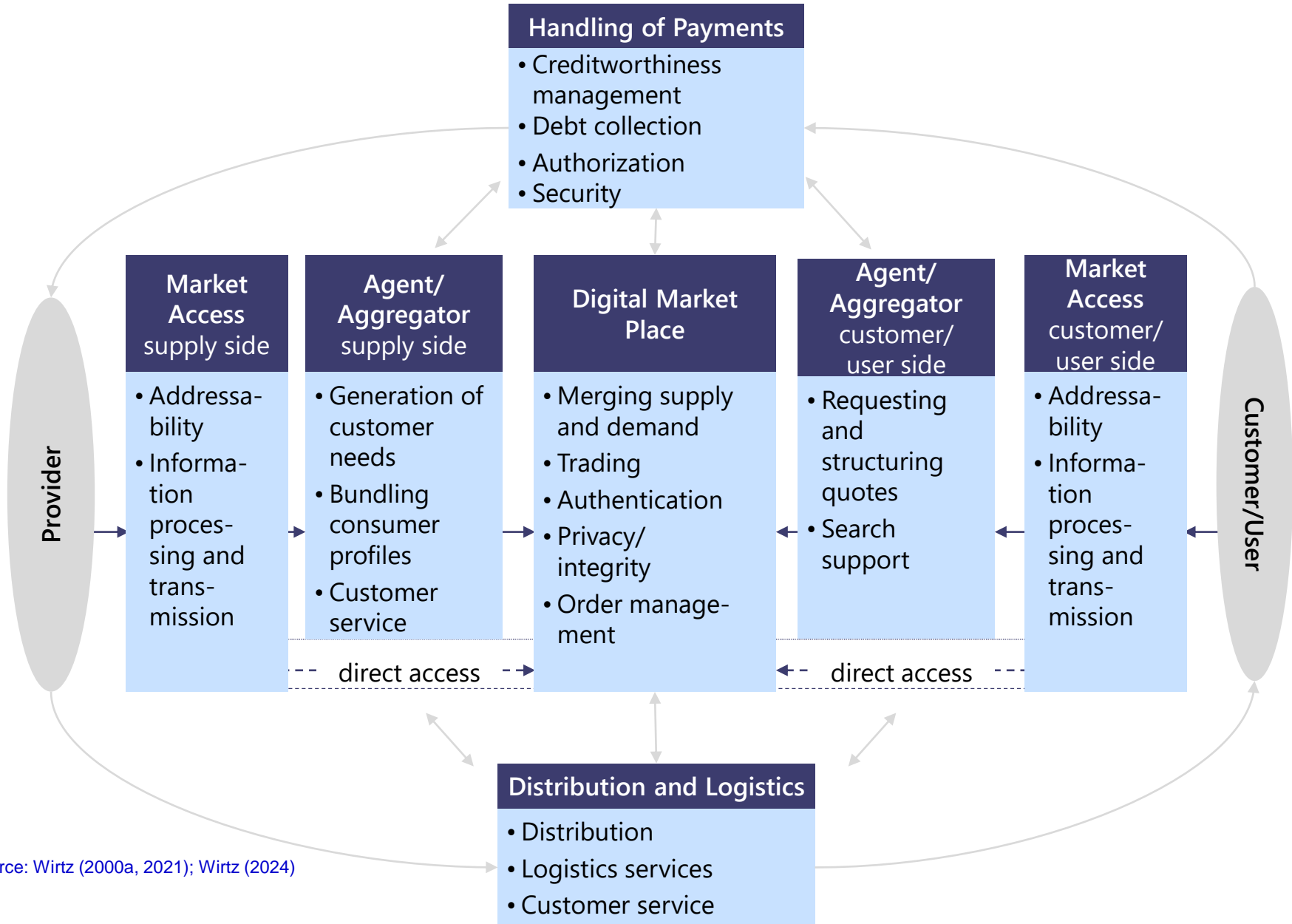
Source: Wirtz (2000a, 2021); Wirtz (2024)

Fig 1.13 Stages of digital business development



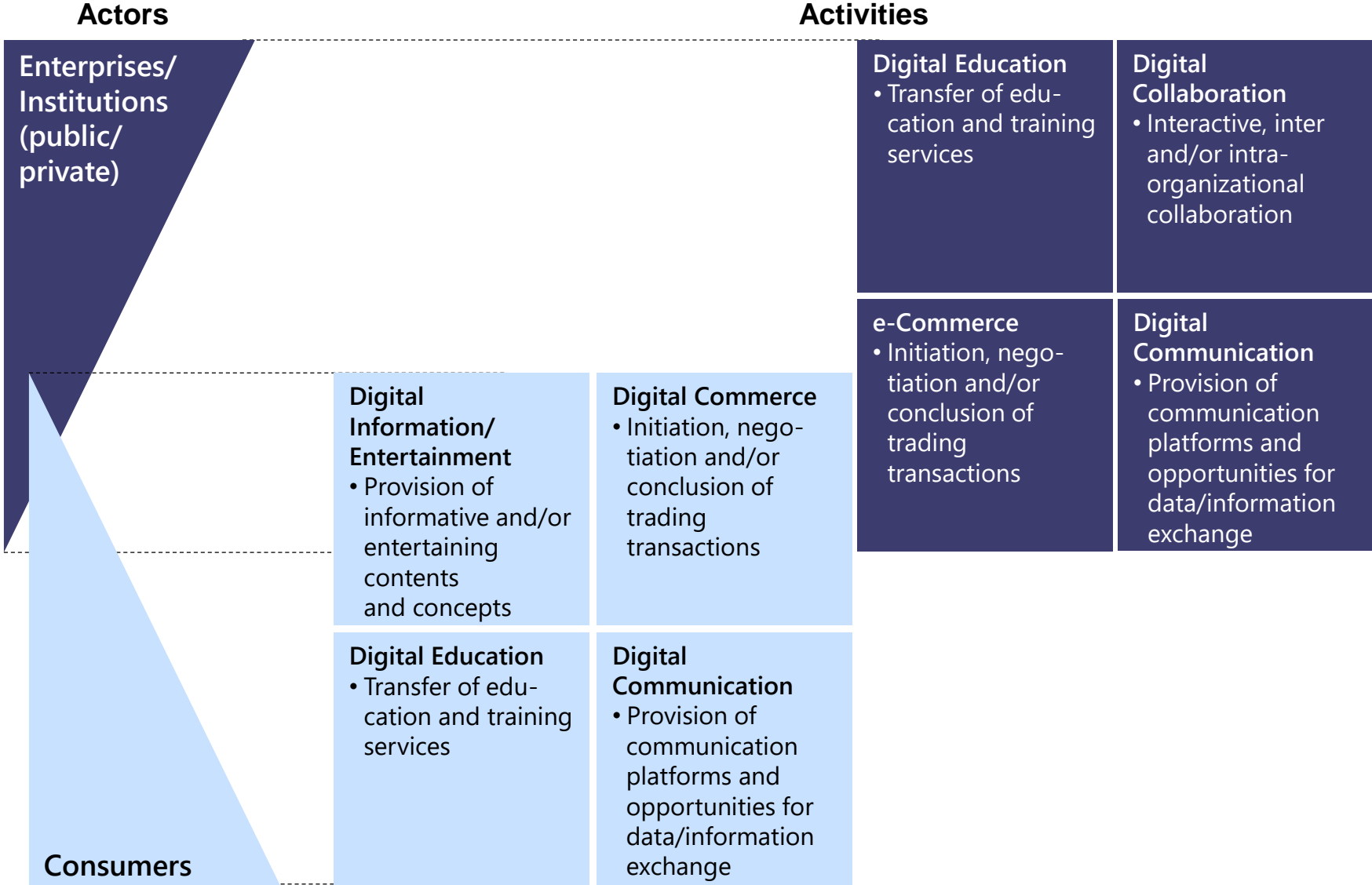
Source: Wirtz (2000a, 2021); Wirtz (2024)

Fig 1.14 Digital market model of Internet economy



Source: Wirtz (2000a, 2021); Wirtz (2024)

Fig 1.15 Actors and activities of digital business



Source: Wirtz (2000a, 2021); Wirtz (2024)

Definition of E-Commerce

Definition of E-Commerce (Wirtz 2000a, 2021, 2024)

E-commerce involves the digital support of activities that are directly related to the purchase and sale of products or services through electronic networks.

Source: [Wirtz \(2000a, 2021\)](#); [Wirtz \(2024\)](#)

Definition of Digital Collaboration

Definition of Digital Collaboration (Wirtz 2000a, 2021, 2024)

Digital collaboration refers to digital, network-based, interactive, and intra- or interorganizational cooperation.

Source: [Wirtz \(2000a, 2021\)](#); [Wirtz \(2024\)](#)

Definition of Digital Communication

Definition of Digital Communication (Wirtz 2000a, 2021, 2024)

Digital communication refers to the paid and non-paid provision and use of network-based and digital communication platforms.

Source: [Wirtz \(2000a, 2021\)](#); [Wirtz \(2024\)](#)

Definition of Digital Education

Definition of Digital Education (Wirtz 2000a, 2021, 2024)

Digital education refers to the transfer of education and training services to third parties by means of electronic networks.

Source: [Wirtz \(2000a,2021\)](#); [Wirtz \(2024\)](#)

Definition of Digital Information/Entertainment (Wirtz 2000a, 2021, 2024)

Digital information/entertainment refers to the provision of informational and/or entertaining content and concepts for third parties by means of electronic networks.

Source: [Wirtz \(2000a, 2021\)](#); [Wirtz \(2024\)](#)

Table 1.2 Demographic classification of Internet users in the USA

	2010 (%)	2012 (%)	2015 (%)	2019 (%)	2021 (%)
Internet users	72	79	88	90	93
Male	77	83	86	90	94
Female	76	82	86	91	93
14–17	87	91	94	N/A	N/A
18–29	92	96	97	100	99
30–49	85	91	95	97	98
50–64	74	79	82	88	96
65 or older	43	54	63	73	75
College+	93	96	96	98	98
Some college	87	91	92	95	97
High school	68	75	78	84	N/A
Less than high school	41	55	66	71	N/A

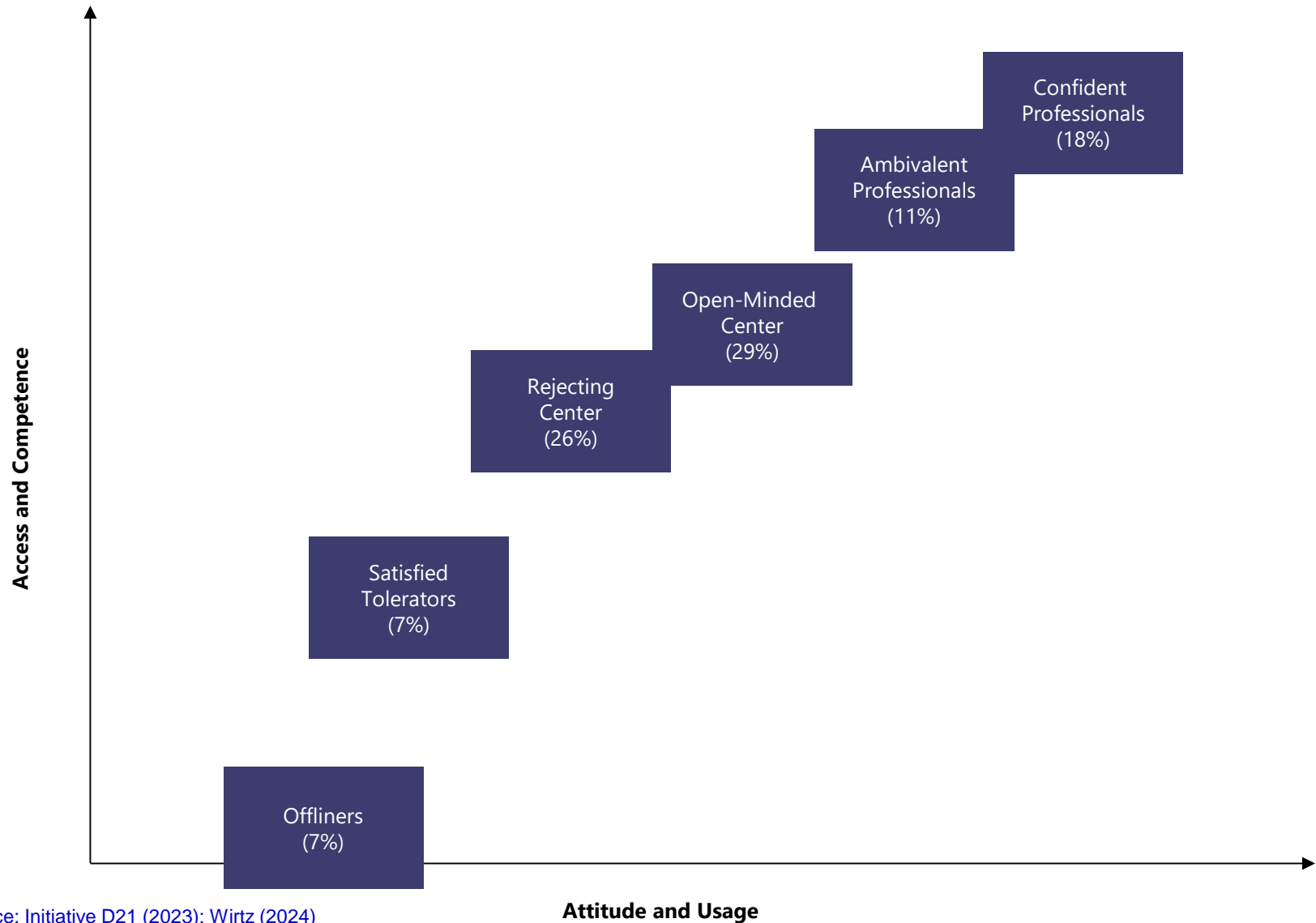
Data Source: Pew Research Center (2021); Wirtz (2024)

Table 1.3 Most popular online activities of adult Internet users in the Us in Nov. 2021

	Total USA (%)	15–24 (%)	25–44 (%)	45–64 (%)	65+ (%)
Using email	91.8	93.4	95.2	91.1	85.5
Shopping, making travel reservations, or using other consumer services	74.1	70.7	81.8	73.9	63.6
Watching videos online	70.1	84.0	81.2	64.7	47.1
Uses online social networks	74.6	88.5	84.0	69.4	54.1
Text messaging or instant messaging	93.3	97.3	97.1	93.9	82.0
Participating in online video or voice calls or conferences	65.6	73.5	74.1	62.5	48.5
Searching for a job online	21.3	36.3	28.0	15.7	5.5
Using financial services (banking, investing, paying bills, etc.)	74.3	64.8	84.6	75.4	62.0

Data Source: NTIA (2022); Wirtz (2024)

Fig. 1.16 Overview of the user structure in the digital society



Source: Initiative D21 (2023); Wirtz (2024)

Fig. 1.17 Success factors of digital business

Digital Innovation / AI Capability <ul style="list-style-type: none">• Customer-oriented innovation generation• Market-oriented evaluation of opportunities and risks of an innovation• AI capability as a central basis in digital business	Strategic and Organizational Flexibility <ul style="list-style-type: none">• Dynamic environment of the Internet economy• Focusing on customer relationship• Capability of adapting to market structure at different company levels
Networking, Integration and Automation Capability <ul style="list-style-type: none">• Processes and information are combined and processed digitally, digital twins• Network effects and lock-in effects• Digital automation with AI, big data and cloud services	Customer Orientation / Ease of Use <ul style="list-style-type: none">• Efficiency of and accessibility of business interfaces• Transfer of offline basics to digital business• Focus on customer / user needs

Source: Wirtz (2010, 2021); Wirtz (2024)

Chapter 1 Questions and topics for discussion

Chapter 1 Questions and topics for discussion



Review questions

1. Outline the development of information and communication technology.
2. Define the five phases of digital transformation.
3. Describe the four stages of digital business development.
4. Explain the service exchange processes of the Internet economy.
5. Name the four success factors of digital business and describe them.



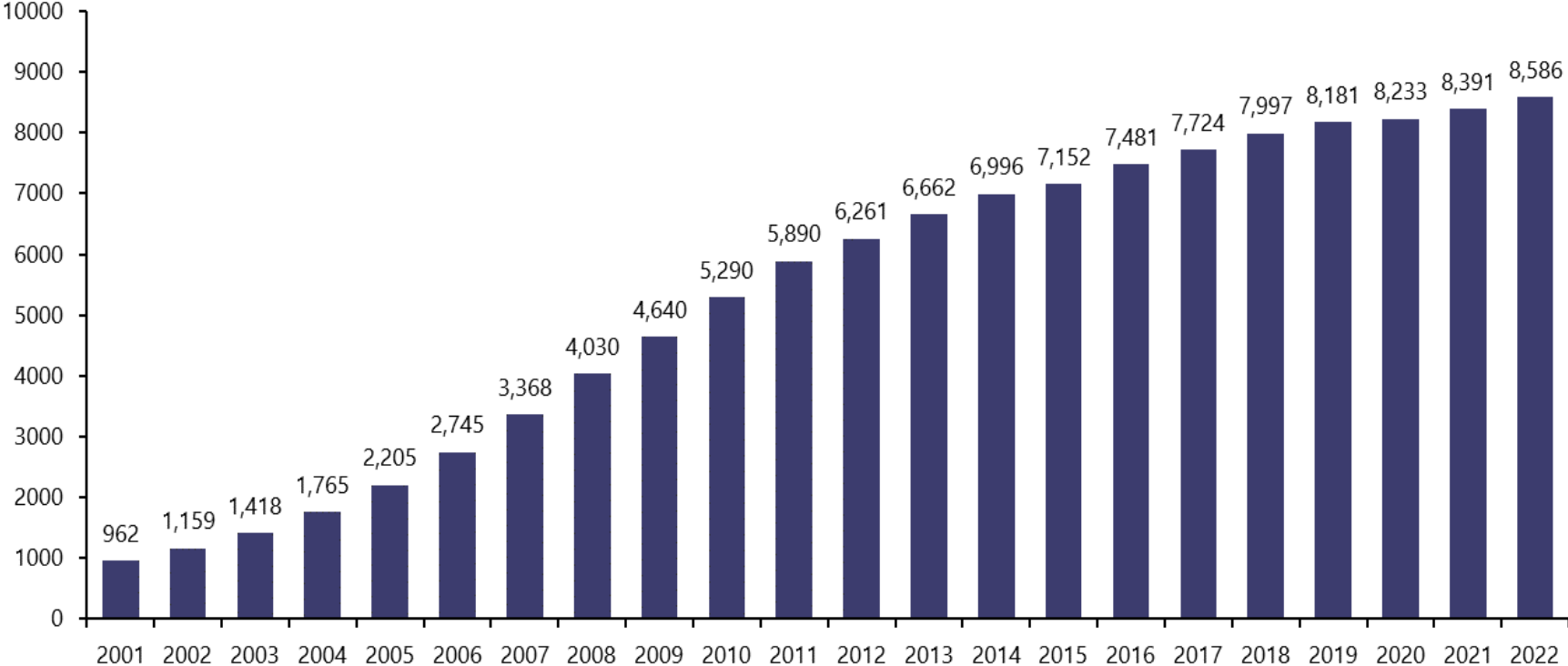
Topics for discussion

1. Discuss how the digital market model of Internet economy will change in the future. Who will benefit economically and socially and who will not?
2. Discuss the perspectives of an information society against the background of data security as well as personal y privacy rights.
3. Is a digital always-on a socially and individually desirable state?

Chapter 2: Mobile Business

Fig. 2.1 Development of mobile phone subscriptions worldwide

Worldwide mobile subscriptions
in millions



Data Source: ITU (2023b); Wirtz (2024)

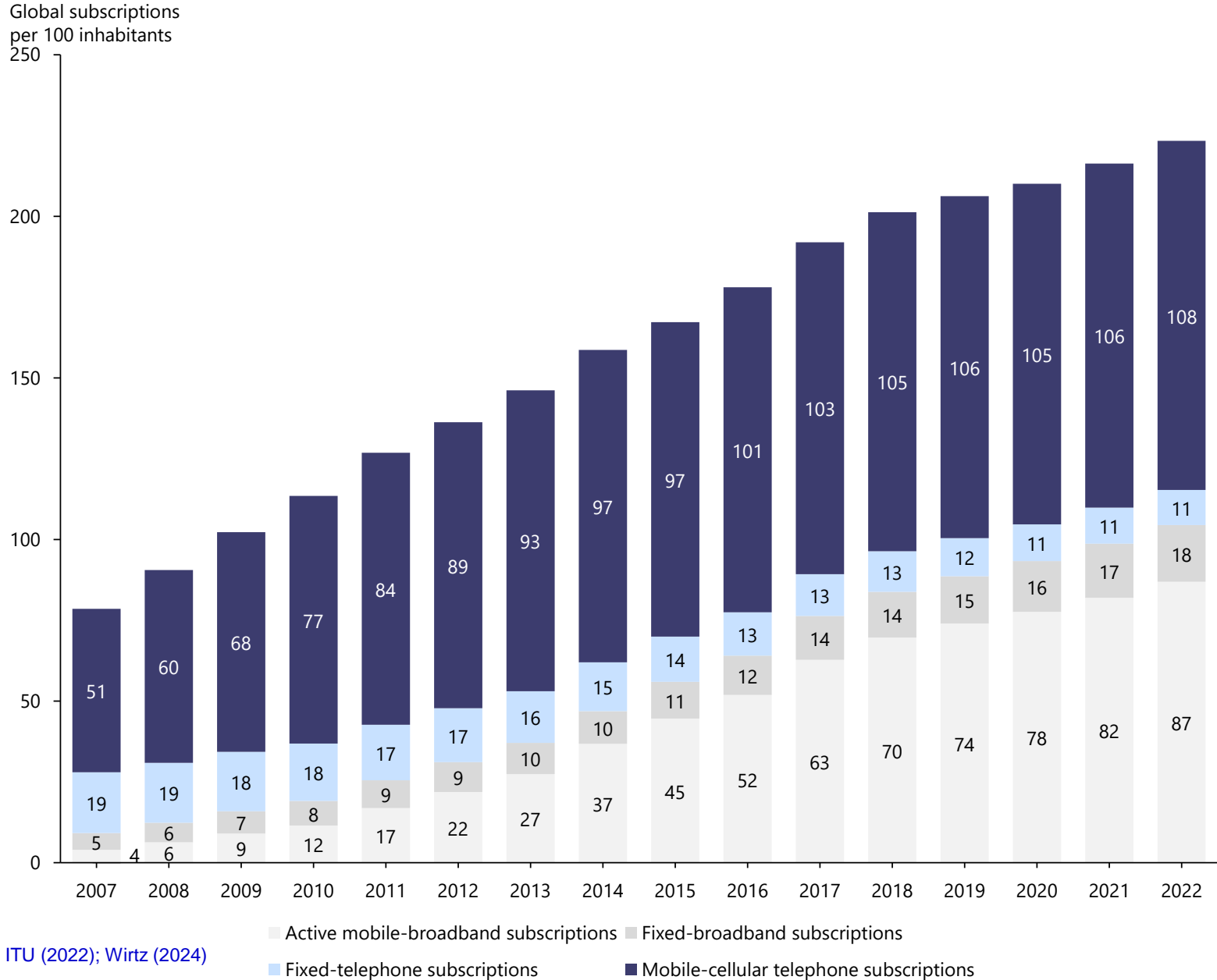
Table 2.1 Volume of the US mobile commerce market

	M-commerce share of total retail sales in %	M-commerce share of total retail e-commerce sales in %	Retail m-commerce sales in billion USD
2019	4.1	36.9	220.67
2020	5.8	39.4	311.93
2021	5.8	38.5	359.32
2022	6.0	40.1	436.75
2023 ^a	6.5	41.5	523.87
2024 ^a	7.2	42.9	620.97
2025 ^a	7.9	44.2	728.28

^aEstimations

Data Source: Insider Intelligence (2022), Meola (2022); Wirtz (2024)

Fig. 2.2 Development of mobile and fixed broadband subscriptions



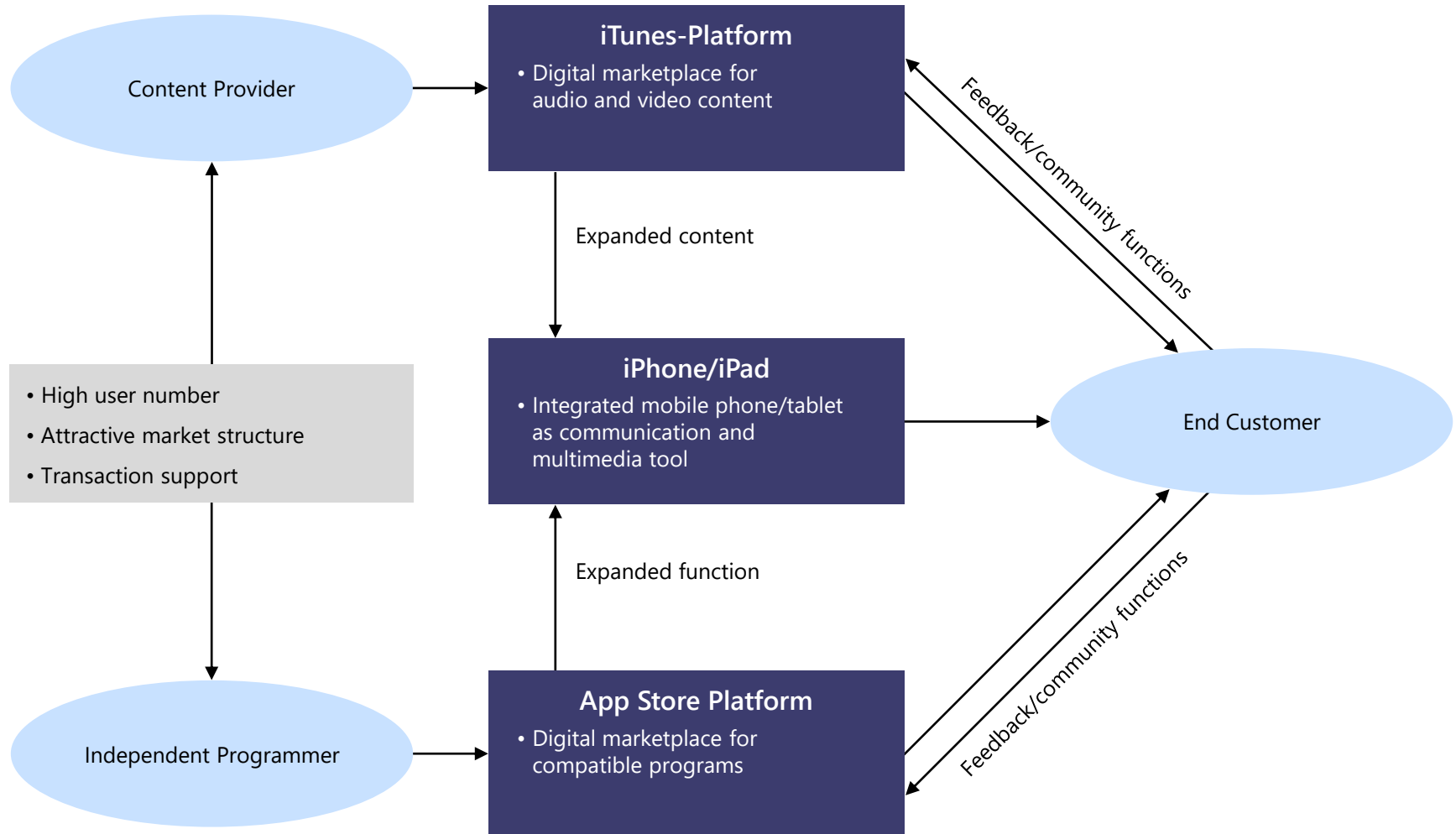
Data Source: ITU (2022); Wirtz (2024)

Fig. 2.3 Corporate positions in the mobile internet market

	Strengths	Weaknesses	Objectives
Apple	<ul style="list-style-type: none"> • Integrated product and service line with excellent interface design • High degree of control due to proprietary system • Successful content platform iTunes 	<ul style="list-style-type: none"> • Premium price image/cost-benefit ratio • Missing compatibility with Android 	<ul style="list-style-type: none"> • Enlargement of proprietary platforms by new applications and user groups
Microsoft	<ul style="list-style-type: none"> • Large economies of scale and scope • Recourses and competencies by means of developing operation systems • Pioneer of AI integration with OpenAI 	<ul style="list-style-type: none"> • License model under threat 	<ul style="list-style-type: none"> • Networking between stationary and mobile Internet through cloud services
Google/Alphabet	<ul style="list-style-type: none"> • Successful online search and online services • Possibility of cross-platform usage • Huge database for AI services • Leading provider of location services (Google Maps) 	<ul style="list-style-type: none"> • No contract bond to end consumers 	<ul style="list-style-type: none"> • Developing and expanding supremacy in the field of mobile online search
Facebook/Meta	<ul style="list-style-type: none"> • WhatsApp as a leading mobile instant messenger • Successful mobile Facebook app • Instagram as mobile social media • Strong user base 	<ul style="list-style-type: none"> • No contract bond • Increasing negative image due to monopoly position and acquisitions 	<ul style="list-style-type: none"> • Developing and expanding supremacy in the field of mobile social media

Source: based on Wirtz (2010, 2021); Wirtz (2024)

Fig. 2.4 Integrated mobile business strategy of Apple



Source: Wirtz (2010, 2021, 2024) based on own analysis and estimations

Table 2.2 Selected definitions of mobile business and mobile commerce

Author(s)	Definition
Durlacher Research (1999)	"The working definition of Mobile Commerce [...] is any transaction with a monetary value that is conducted via a mobile telecommunications network."
Andersen Consulting (2000)	"Mobile Commerce is Electronic Commerce based on mobile telephony, short-range wireless lines, voice recognition and interactive digital TV."
Wirtz and Mathieu (2001)	M-Commerce refers to electronically added handling of business transactions based on the usage of mobile devices.*
Jelassi and Enders (2008)	"Mobile e-commerce, or m-commerce, is a subset of electronic commerce. While it refers to online activities similar to those mentioned in the electronic commerce category, the underlying technology is different since mobile commerce is limited to mobile telecommunication networks, which are accessed through wireless hand-held devices such as mobile phones, hand-held computers and personal digital assistants (PDAs)."
Sari and Bayram (2015)	"[...] defined the mobile commerce as any transactions using a wireless device that result in the transfer of monetary value in exchange for information, goods or services."

*Translated

Definition of M-Business

Definition of M-Business (Wirtz 2001, 2010, 2021, 2024)

M-business refers to the initiation as well as the partial and full support, transaction, and retention of service exchange processes between economic partners by means of electronic networks and mobile devices.

Source: [Wirtz \(2021\)](#); [Wirtz \(2024\)](#)

Fig. 2.5 Mobile transmission standards and devices

Devices Mobile Business/Mobile Internet				
Simple Internet Mobile Phones <ul style="list-style-type: none"> • Sony Ericsson W995 • Nokia 230 Dual SIM • LG GD900 Crystal • ... 	Smartphones <ul style="list-style-type: none"> • Apple iPhone 14/14 Pro • Samsung Galaxy S 23 Ultra • Google Pixel 7/7 Pro • ... 	Smart Watches/Glasses <ul style="list-style-type: none"> • Apple Watch Series 7 • Ray-Ban Stories Wayfarer • ... 	E-Reader/Tablets <ul style="list-style-type: none"> • Amazon Kindle • Apple iPad Pro/Air • Samsung Galaxy Tab S8 Ultra Wi-Fi • ... 	Netbooks <ul style="list-style-type: none"> • Apple MacBook Pro • Asus VivoBook • Lenovo Ideapad • ...
Transmission Standard Mobile Internet				
UMTS <ul style="list-style-type: none"> • Mobile network 3rd generation • Max. transmission rate 384 kbit/s 	HDSPA <ul style="list-style-type: none"> • Downlink expansion of UMTS • Max. transmission rate 7.2 Mbit/s • Enables data-intensive services such as streaming 	HSUPA <ul style="list-style-type: none"> • Uplink expansion of UMTS • Max. transmission rate 5.8 Mbit/s • Enables interactive services such as GoogleDocs 	LTE <ul style="list-style-type: none"> • Mobile network 4th generation • Max. transmission rate 300 Mbit/s download and 75 Mbit/s upload 	5G <ul style="list-style-type: none"> • Mobile network and 5th generation • Max. transmission rate 10.000 Mbit/s • Enables shorter response times

Source: Wirtz (2010, 2021); Wirtz (2024)

Table 2.3 Overview of mobile applications I

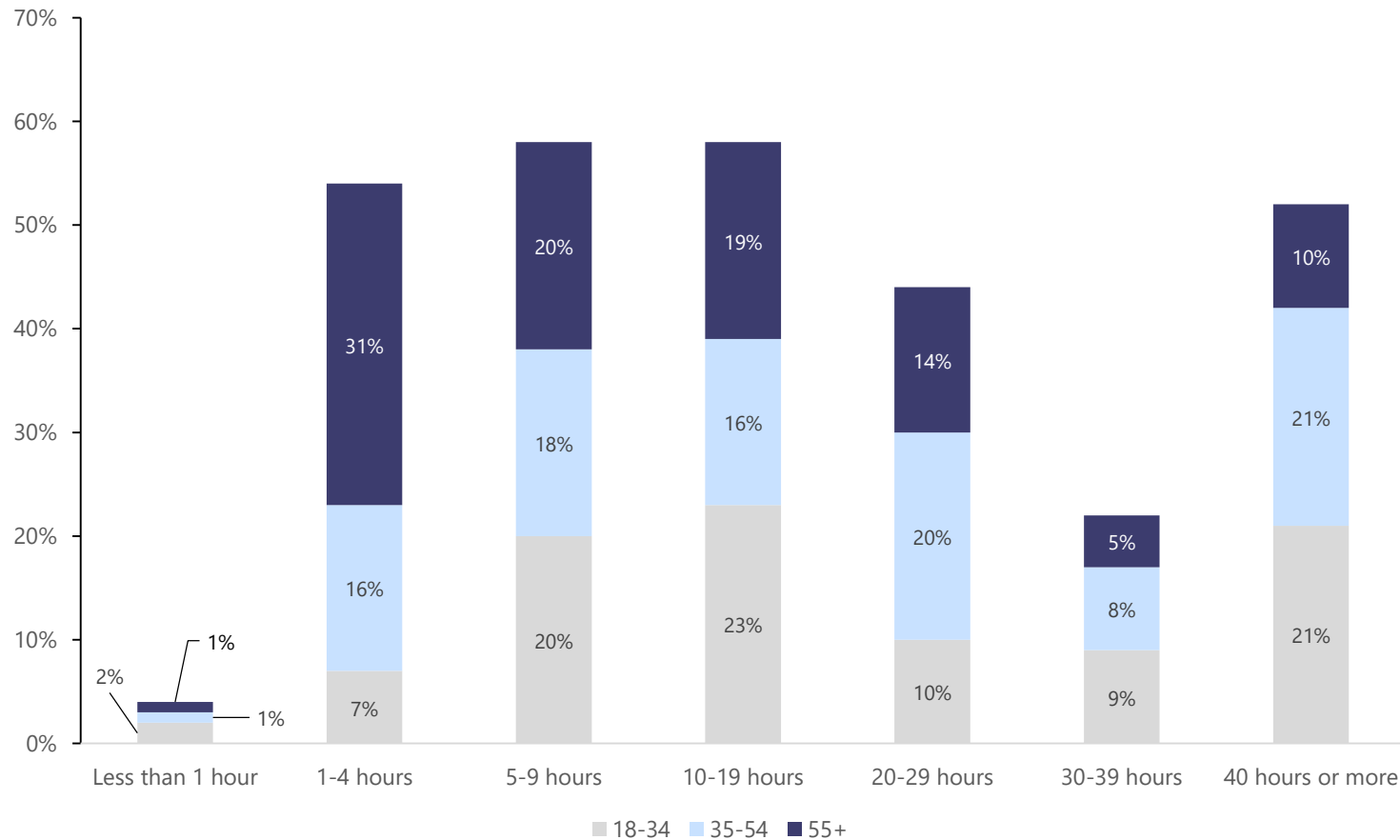
Fields of Application					
		Mobile Search	Mobile Information	Mobile Communication	Mobile Advertising
Brief Description		<ul style="list-style-type: none"> • Mobile use of search engines • Pull mechanism: Information request • Location-based applications and services for mobile search 	<ul style="list-style-type: none"> • Mobile news • Mobile knowledge management • Location-based applications and services for mobile information 	<ul style="list-style-type: none"> • One-way or two-way communication between customer and supplier via a mobile channel • Enables personalized address • Location-based applications and services for mobile communication 	<ul style="list-style-type: none"> • Mobile push advertising • Mobile pull advertising • Permission-based marketing • Location-based applications and services for mobile advertising
Benefit/Advantage Mobile Business		<ul style="list-style-type: none"> • Benefit-demand side: Access to information • Advantage-supply side: Direct marketing through targeted information provision adapted to search behavior 	<ul style="list-style-type: none"> • Benefit-demand side: Direct mobile information and knowledge relation • Advantage-supply side: Transmission of personalized product and service information 	<ul style="list-style-type: none"> • Benefit-demand side: Direct communication channel • Advantage-supply side: Possibility of direct response and interaction 	<ul style="list-style-type: none"> • Benefit-demand side: Availability of advertising anywhere anytime • Advantage-supply side: Wide range of mobile direct marketing instruments; possibility of multi-channel integration
Instruments in Mobile Business		<ul style="list-style-type: none"> • Mobile search engine: e.g. Bing Mobile, Google Mobile, Baidoo Mobile • Mobile Search Engine Marketing: e.g. Google Adwords • ... 	<ul style="list-style-type: none"> • Contextual advertising • Content-targeted inclusion • Portal subscriptions • ... 	<ul style="list-style-type: none"> • Competitions via mobile channels • SMS codes • Bluetooth marketing • ... 	<ul style="list-style-type: none"> • Mobile coupons • Mobile display advertising • In-app advertising • Location-based advertising • Mobile telephone marketing • ...

Source: Wirtz (2010, 2021); Wirtz (2024)

Table 2.3 Overview of mobile applications II

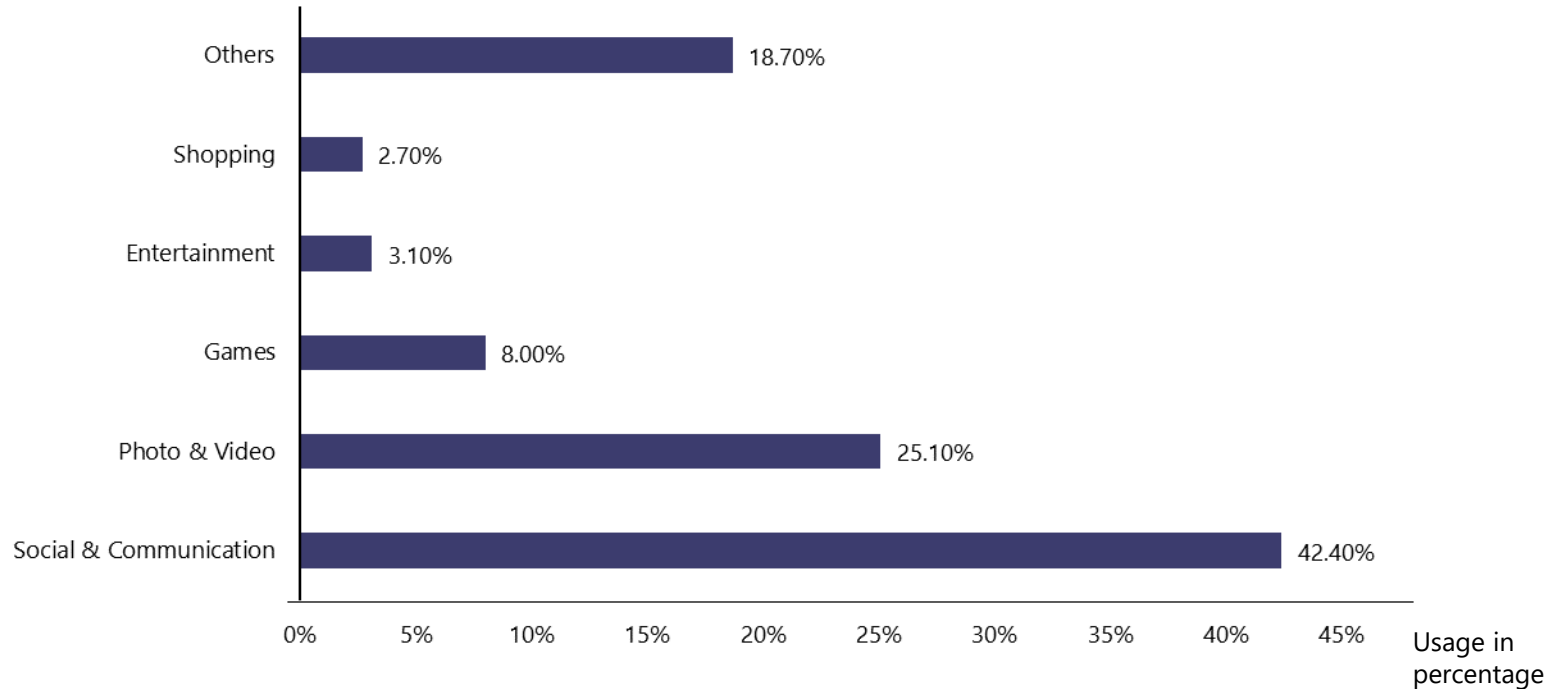
	Fields of Application			Support-functions
	Mobile Commerce	Mobile Payment	Mobile Entertainment	
Brief Description	<ul style="list-style-type: none"> • Mobile shopping: Mobile initiation and handling of shopping transactions • Mobile access to auctions • Location-based applications and services for mobile commerce 	<ul style="list-style-type: none"> • Payment of products or services via mobile devices • Quick payment at point of sale or remote • Location-based applications and services for mobile payment 	<ul style="list-style-type: none"> • Multimedia entertainment offers such as music, videos or games for mobile devices • Facilitates ubiquitous usage of entertainment • Location-based applications and services for mobile entertainment 	<ul style="list-style-type: none"> • Mobile software • Mobile browsing • Mobile navigation • Mobile telemetry
Benefit/Advantage Mobile Business	<ul style="list-style-type: none"> • Benefit-demand side: Location-independent online shopping • Advantage-supply side: Additional distribution channel 	<ul style="list-style-type: none"> • Benefit-demand side: Quick, easy, and secure payment • Advantage-supply side: Efficiency of payment processing 	<ul style="list-style-type: none"> • Benefit-demand side: Usage of entertainment services anywhere and anytime • Advantage-supply side: New distribution channel for entertainment and/or linking entertainment with mobile advertising 	<ul style="list-style-type: none"> • Realization of respective fields of application and functions • Basis for complex mobile services
Instruments in Mobile Business	<ul style="list-style-type: none"> • Mobile shopping-platforms, e.g. Amazon Mobile, Expedia Mobile, Newegg Mobile • Mobile auction platforms, e.g. eBay Mobile • Shopping apps • ... 	<ul style="list-style-type: none"> • Mobile payment via near field communication (NFC) • Purchasing products and services mobile and doing direct payment with the same device, e.g. via PayPal • ... 	<ul style="list-style-type: none"> • Sponsoring and pre-/post rolls of mobile entertainment • Mobile games for enhancing brand awareness and for product promotion • Viral direct marketing • ... 	<ul style="list-style-type: none"> • Operation systems for mobile devices, e.g. Google Android, Windows Mobile • Mobile browser: e.g. Opera Mini, Chrome • Complex instruments in telemetric & navigation • ...

Fig. 2.6 Weekly US smartphone use by age



Data Source: Vorhaus Advisors (2022), Wirtz (2024)

Fig. 2.7 Share of time spent according to mobile app category



Data Source: Data.ai (2023), Wirtz (2024)

Fig. 2.8 Success factors of mobile business

Customization and Mobile Networking	Software Platform, Integration Degree and AI Capability
<ul style="list-style-type: none">• Mobile social networking between users (e.g., Swarm)• Location-based offers and preferences (e.g., Foursquare)• Selection, personalization and individualization of services and products (e.g., apps) towards mobile preferences	<ul style="list-style-type: none">• Width and depth/customization of app offer/ attractiveness of app service and mobile AI service integration• Interconnected system solutions (e.g., Apple iCloud)• Digital marketplace for software-based extensions
Absence of Media Disruption and Seamless Connection	Bandwidth and Network Performance
<ul style="list-style-type: none">• Universal time- and location-independent availability of data• Redesign of processes and information chains (e.g., multi-channel services)• Resource and time savings through the use of central mobile device with cloud option	<ul style="list-style-type: none">• Stability of connection• Performance of connection (e.g., bit rate, 5G availability)• Area of coverage and range

Source: Wirtz (2010, 2021), Wirtz (2024)

Chapter 2 Questions and topics for discussion

Chapter 2 Questions and topics for discussion



Review questions

1. Explain the market dynamics of m-business and its importance in the information society.
2. Outline the positions and strategies of market leaders in m-business.
3. Distinguish the different mobile applications.
4. Explain the key user preferences and structures of m-business.
5. Identify success factors of m-business.

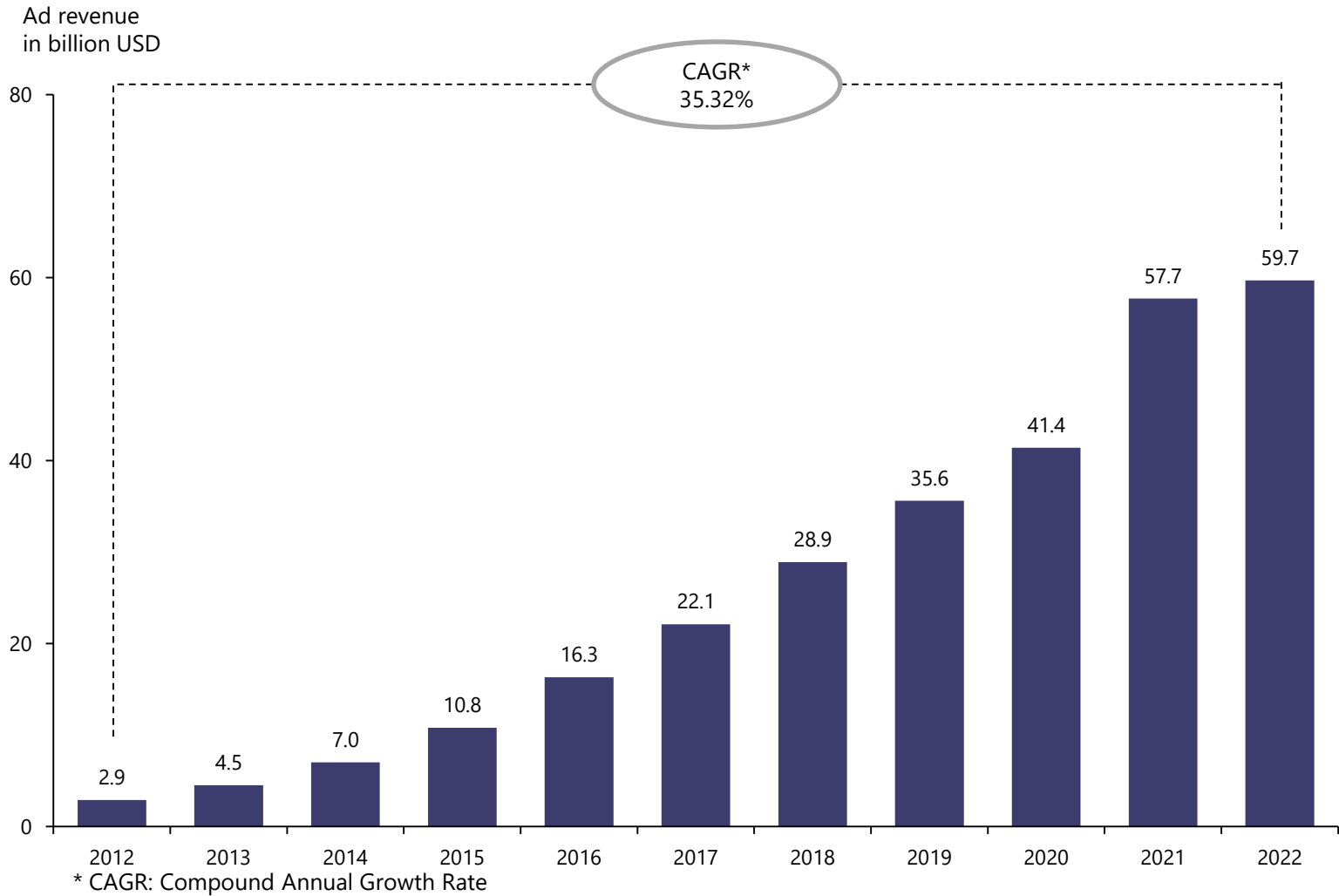


Topics for discussion

1. In the last decade, mobile Internet has clearly overtaken stationary Internet access. Discuss whether every Internet access will be mobile in the future. What would be the advantages and disadvantages of such a scenario?
2. Almost every young person today has a smartphone. Discuss whether the intensive use (always on/always in) is useful for personal development, especially against the background of online addiction/gaming addiction.
3. Discuss the advantages and disadvantages of the competitive strategy in the form of digital wallet gardens. Will proprietary systems such as the Apple ecosystem undermine the open and compatible standard of the Internet?

Chapter 3: Social Media Business

Fig. 3.1 Development of social media advertising revenue in the United States



Data Source: IAB/PwC (2020, 2022), Wirtz (2024)

Table 3.1 Selection of the world's most-used social media platforms

Platform	Activity in %
Facebook	36.7
YouTube	32.0
WhatsApp	25.0
Instagram	18.5
WeChat	15.8
TikTok	12.5
FB Messenger	12.4
Douyin	7.5
Snapchat	7.0
Telegram	6.9
Pinterest	5.6
Twitter/X	5.5

Data Source: We are Social (2022), Wirtz (2024)

Fig. 3.2 Web 2.0 vs. social media

	Web 2.0	Social Media
Characteristics	<ul style="list-style-type: none">• Users can continuously contribute and modify web content• Diverse basic functions allow the use of the Web 2.0 (see examples)• Ideological and technological basis for social media	<ul style="list-style-type: none">• Group of Internet applications based on Web 2.0• Allows creating and exchanging user-generated content
Examples	<ul style="list-style-type: none">• Adobe Flash• RSS (Really Simple Syndication)• AJAX (Asynchronous Java Script)	<ul style="list-style-type: none">• Social networking (e.g., Facebook)• Video sharing platforms (e.g., YouTube)• Wikis (e.g., Wikipedia)

Source: Wirtz (2016, 2021), Wirtz (2024)

Definition of Social Media (Wirtz and Ullrich 2008; Wirtz 2021, 2024)

Social media are applications, services, and platforms on the Internet with high, mostly interactive and personalizable creative potential. They are characterized by the active generation and creation of diverse content through the cooperative participation of users. User-generated content in conjunction with platform services forms social networks that enable users to network in a communicative and content-related way.

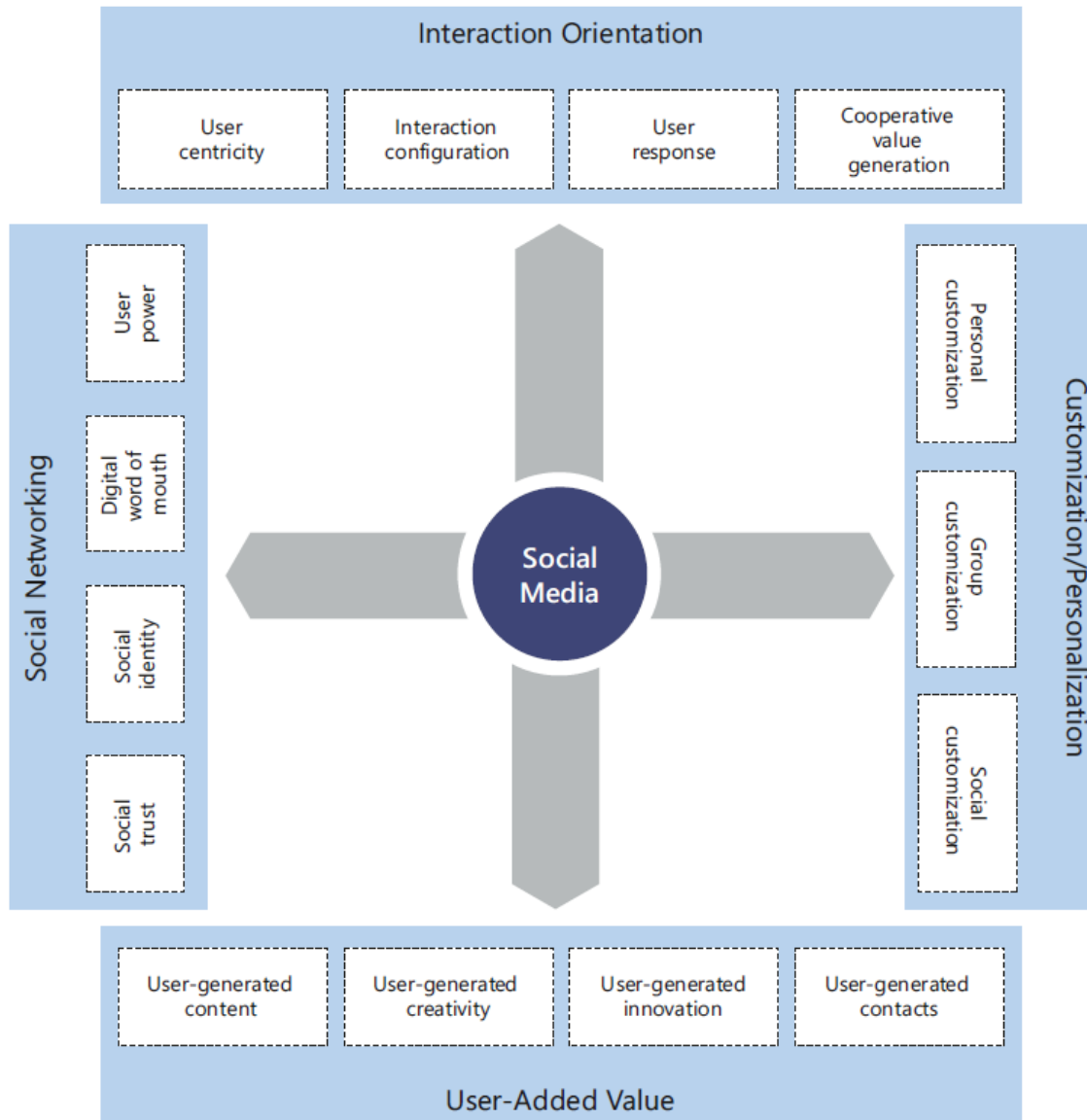
Source: [Wirtz \(2021\)](#), [Wirtz \(2024\)](#)

Definition of Social Media Business (Wirtz 2013, 2021, 2024)

The term social media business describes the initiation as well as the support, management and maintenance of transactions between economic partners via social media tools.

Source: [Wirtz \(2021\)](#), [Wirtz \(2024\)](#)

Fig. 3.3 Social Media Four-Factor Model



Source: Wirtz (2021, 2021), Wirtz (2024)

Table 3.2 Overview of social media applications I

Application	Business Model	Service Offer	User Value
Social Networking e.g.: facebook.com	<ul style="list-style-type: none"> - Compilation and provision of user generated content on a single platform - Revenues through ad sales/data mining 	<ul style="list-style-type: none"> - Self-presentation of the user - Networking among users - Connection between users and content 	<ul style="list-style-type: none"> - Mediation of social contacts through digital interaction - High suitability for use in the mobile context (mobile networking)
Blogs & RSS Feeds e.g. blogger.com	<ul style="list-style-type: none"> - Systematization and compilation of online diaries - Revenues through ad sales/usage or subscription fees/data mining 	<ul style="list-style-type: none"> - Provision of an authoring tool for the creation of blogs - Hosting of blogs - Categorization of blogs 	<ul style="list-style-type: none"> - Unfiltered personal publishing for "everyone" - Visual presentation of content
Microblogs, e.g. twitter.com	<ul style="list-style-type: none"> - Compilation and provision of user generated content on a single platform - Revenues through ad sales/data mining 	<ul style="list-style-type: none"> - Special type of blogging to quickly publish short messages 	<ul style="list-style-type: none"> - Fast and convenient opportunity to publish - High suitability for use in the mobile context
File Exchange & Sharing, e.g. youtube.com	<ul style="list-style-type: none"> - Archiving and systematization of user-generated content (e.g., videos) - Revenues through ad sales/data mining 	<ul style="list-style-type: none"> - Provision of online storage - Systematization of content, e.g., through categorization and ratings 	<ul style="list-style-type: none"> - Broadcasting for "everyone" - Access to a large number of users / audiences

Source: Wirtz (2011b, 2020b, 2021), Wirtz (2024)

Table 3.2 Overview of social media applications II

Application	Business Model	Service Offer	User Value
Rating Portals e.g., yelp.com	<ul style="list-style-type: none"> - Aggregation and systematization of product- and service-related information - Revenues from agency commissions and through ad sales/data mining 	<ul style="list-style-type: none"> - Aggregation of product and service information - User-generated reviews of products and services - Price comparisons with links to online stores 	<ul style="list-style-type: none"> - Independent product/service reviews from users - Simplifying and supporting decision-making and the buying process
Instant Messengers e.g., whatsapp.com	<ul style="list-style-type: none"> - Exchange of text, audio, and video messages and content - Revenues through subscription fees, cooperation with companies, and data mining 	<ul style="list-style-type: none"> - Instant exchange of push messages - Support of data, audio and video streams 	<ul style="list-style-type: none"> - Fast and convenient exchange of messages - High suitability for use in the mobile context
Podcasts e.g., podcasts.com	<ul style="list-style-type: none"> - Provision of audio or video content - Revenues through pay-per-use, subscription, and ad sales 	<ul style="list-style-type: none"> - Topic-specific audio and video content - Possibility of subscription 	<ul style="list-style-type: none"> - Location and time-independent use of content
Wikis e.g., wikipedia.com	<ul style="list-style-type: none"> - Collection, systematization, and further development of information - Revenues from donations 	<ul style="list-style-type: none"> - Tools for creating and editing content by users - Provision of a platform for searching and presenting information/knowledge 	<ul style="list-style-type: none"> - Aggregation of subject-specific information - Freedom concerning content/authors - Users as a collective editorial

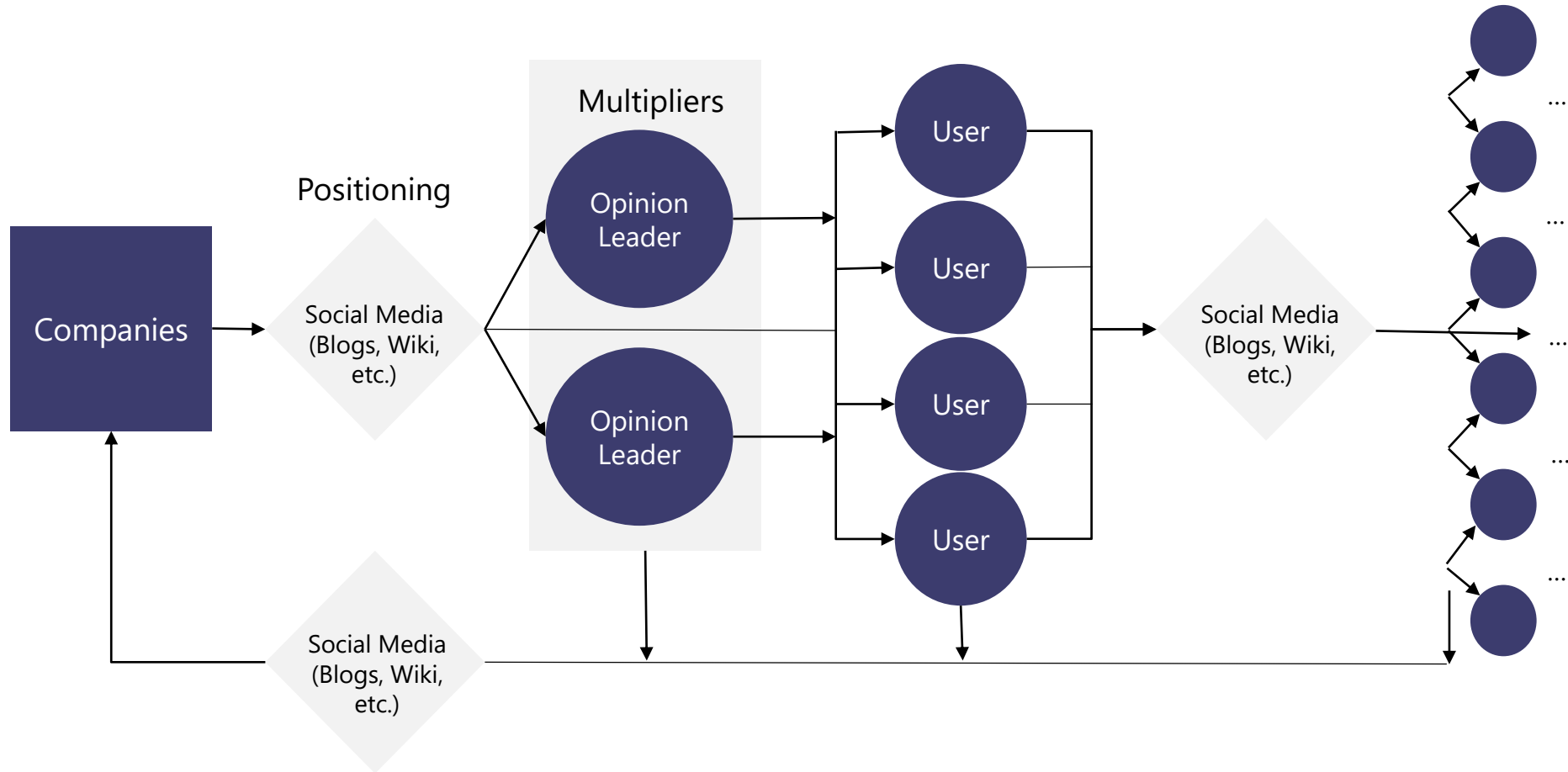
Source: Wirtz (2011b, 2020b, 2021), Wirtz (2024)

Table 3.2 Overview of social media applications III

Application	Business Model	Service Offer	User Value
Tagging/Social Bookmarking e.g., pinboard.in	<ul style="list-style-type: none"> - Classification and systematization of Internet offers - Revenues, e.g., from the sale of click streams for data mining purposes 	<ul style="list-style-type: none"> - Central archiving and ubiquitous availability of bookmarks - Tagging of bookmarks - Access to link collections of other users 	<ul style="list-style-type: none"> - Individual editorial workup of the Internet
Online Forums e.g., reddit.com	<ul style="list-style-type: none"> - Compilation, classification, and provision of user-generated content on a single platform - Revenues through ad sales/data mining 	<ul style="list-style-type: none"> - Exchange and archiving of thoughts, opinions, and experiences 	<ul style="list-style-type: none"> - Increase in knowledge - Problem-solving through community - Structured documentation of topics and opinions
Mashups e.g., parkingcarma.com	<ul style="list-style-type: none"> - Combination of multiple online software products/API services - Revenues through ad sales and/or membership fees 	<ul style="list-style-type: none"> - Creation of new media content by recombining already existing content 	<ul style="list-style-type: none"> - Exploitation of synergies between different social media applications - Time savings

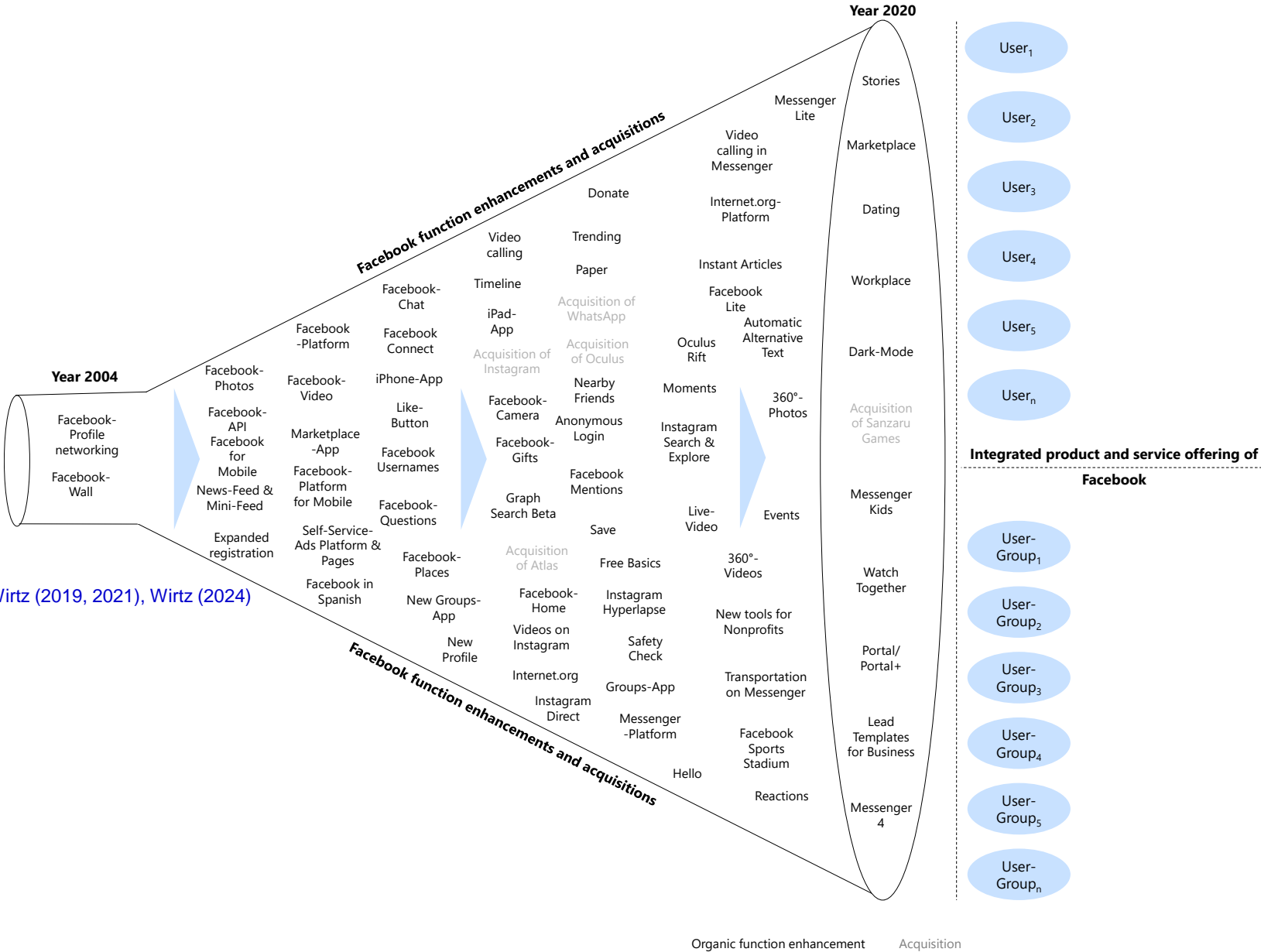
Source: Wirtz (2021, 2022), Wirtz (2024)

Fig. 3.4 Multiplier effect of social media



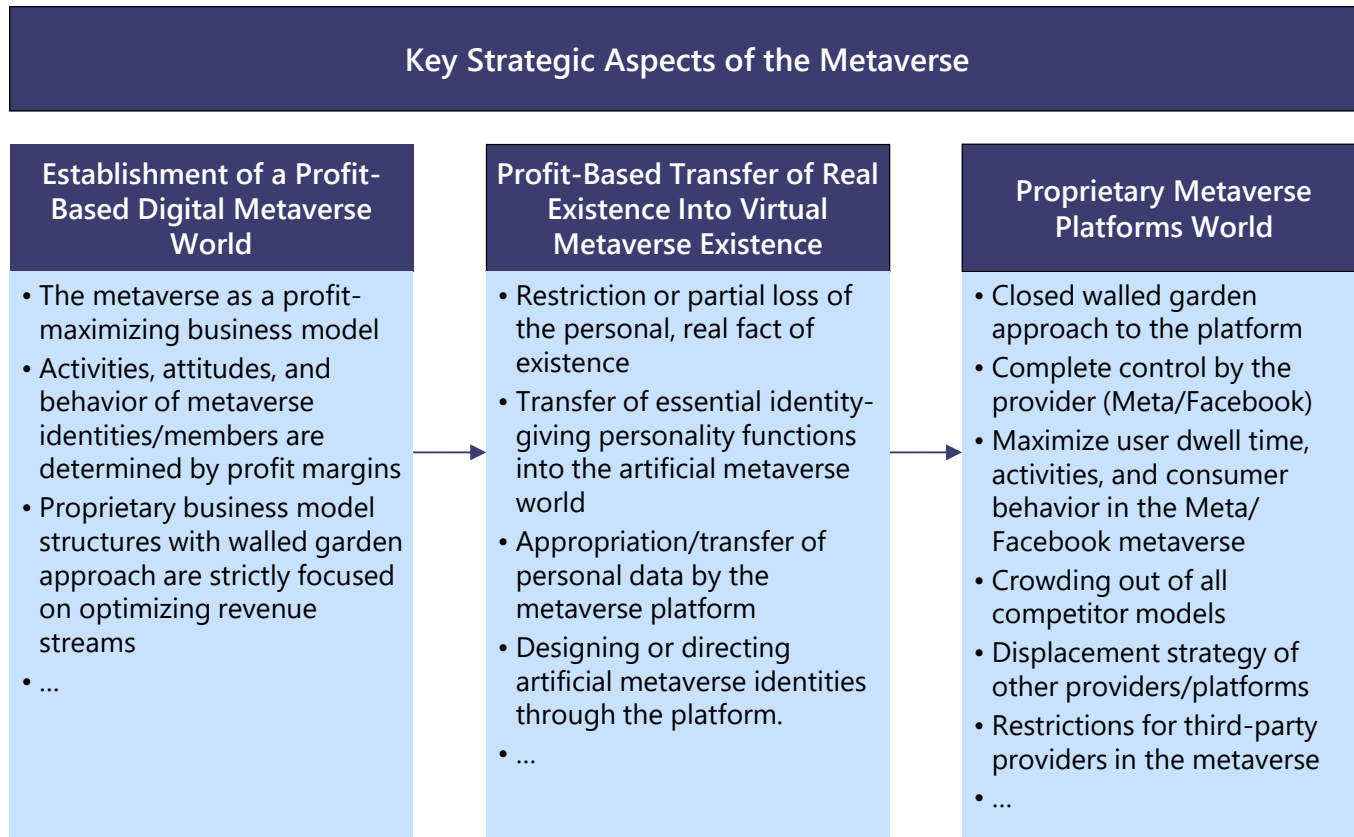
Source: Wirtz (2012, 2021), Wirtz (2024)

Fig. 3.5 Development of the integrated product and service offering of Facebook



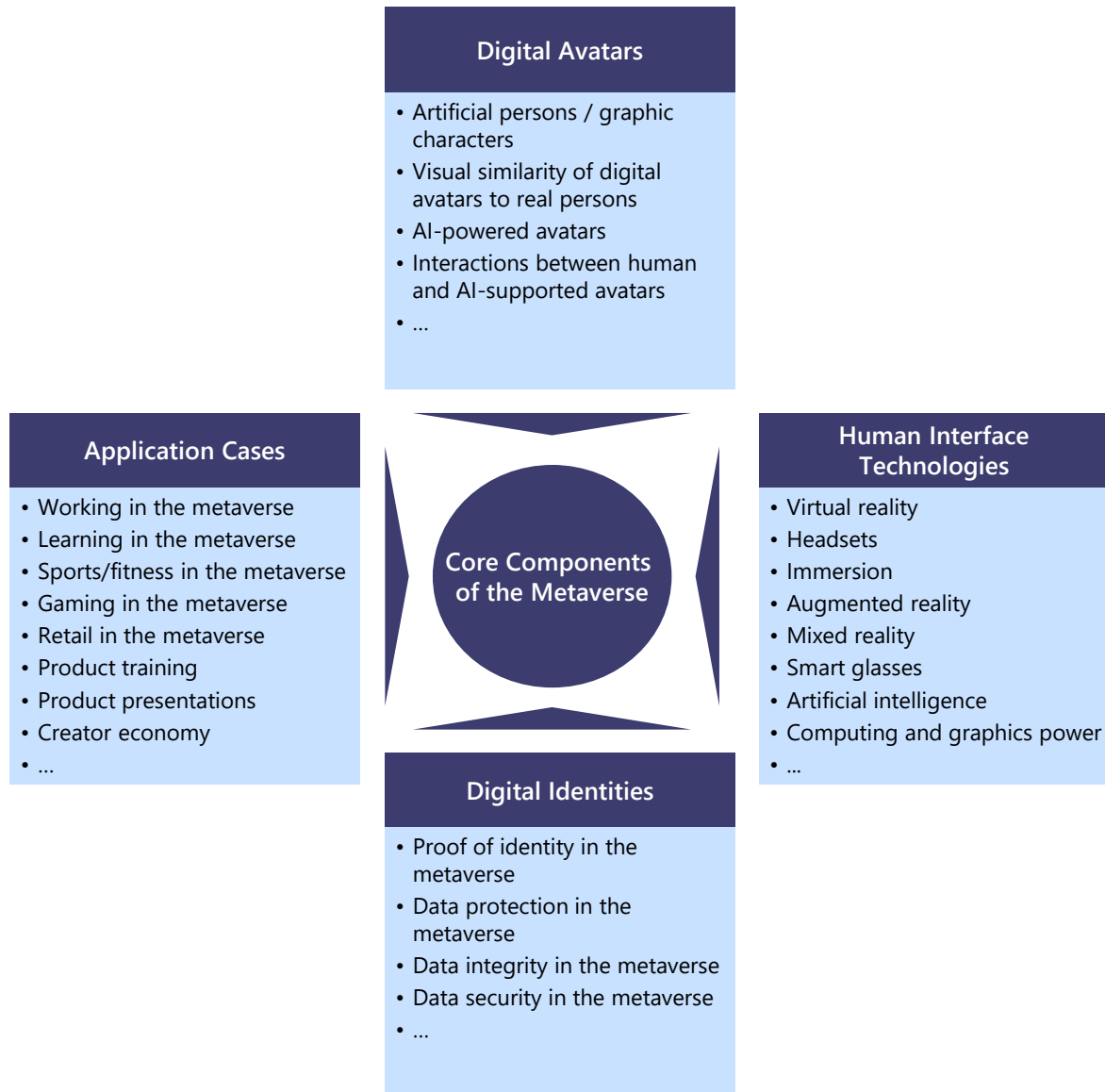
Source: Wirtz (2019, 2021), Wirtz (2024)

Fig. 3.6 Key strategic aspects of the metaverse



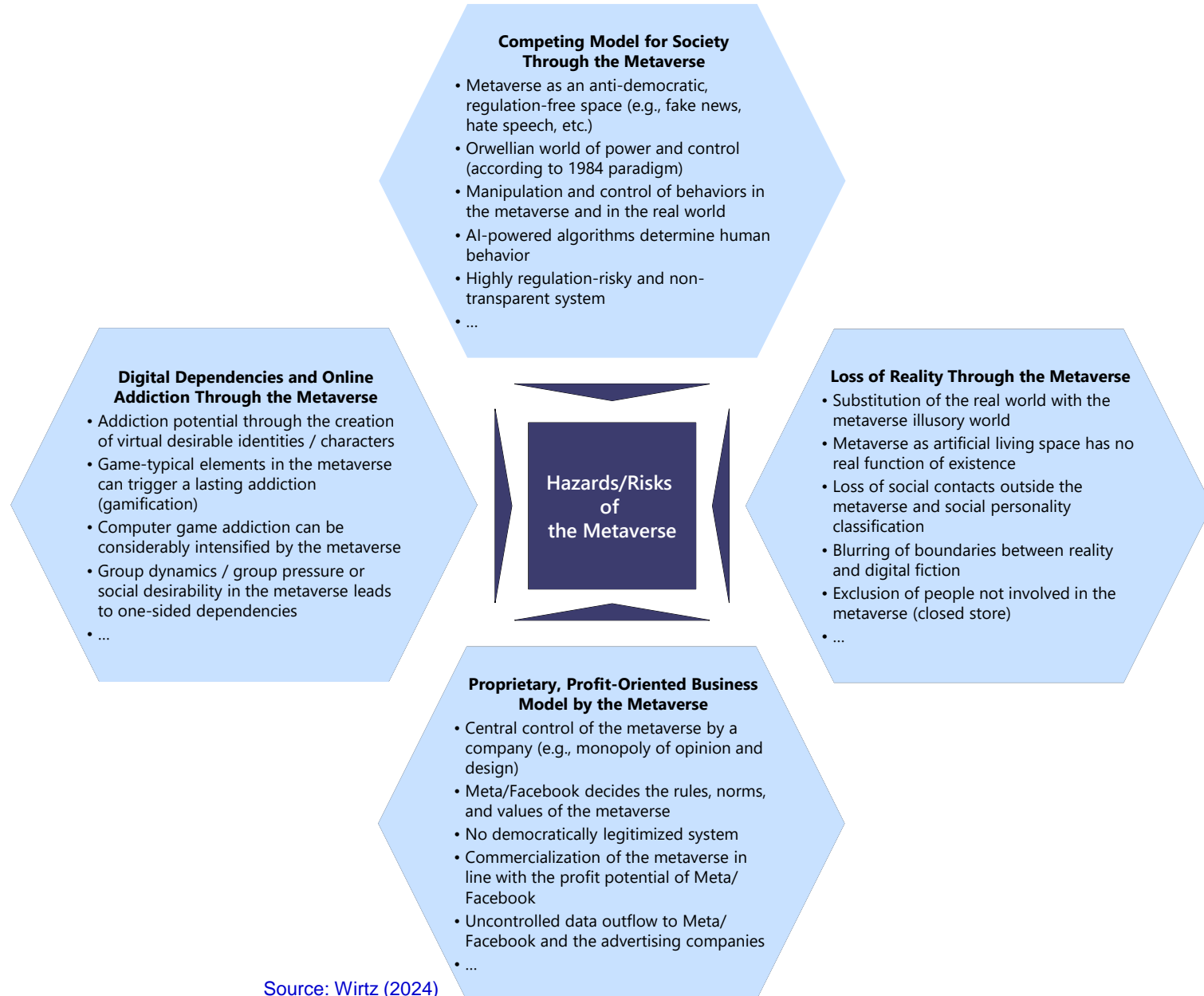
Source: Wirtz (2024)

Fig. 3.7 Functional core components of the metaverse



Source: Wirtz (2024)

Fig. 3.8 The hazards/risks of the metaverse

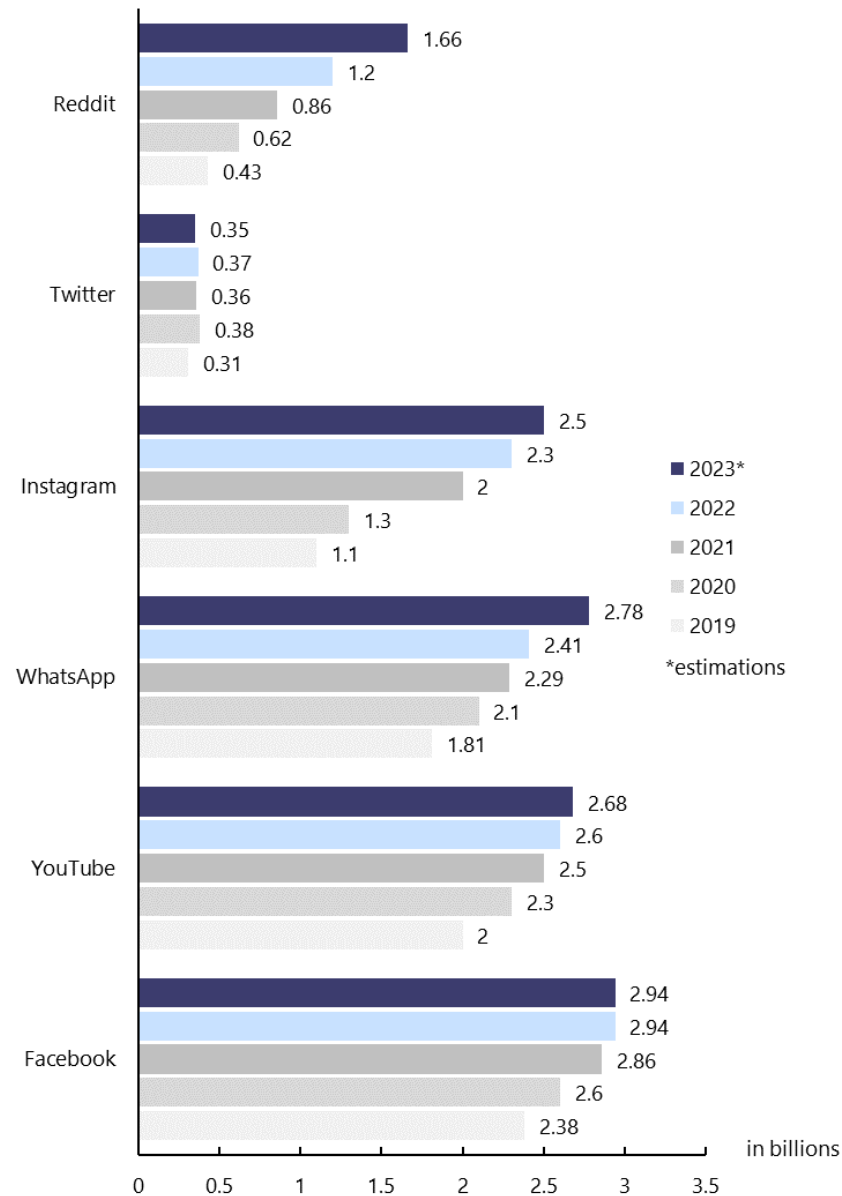


Source: Wirtz (2024)

Table 3.3 Social media users and their activities

User groups with different involvement	Social media activities
Inactive users	<ul style="list-style-type: none">• No interest in a social media presence• No sign of any activity on social media applications
Spectators	<ul style="list-style-type: none">• Reading blogs• Use of product review portals• Using sites such as YouTube to watch videos from other users
Newcomers	<ul style="list-style-type: none">• Creation of a user profile• Visit the pages of social networks
Collectors	<ul style="list-style-type: none">• Active participation• Contribution creation
Critics	<ul style="list-style-type: none">• Active participation in product rating portals• Modification of articles on wikis• Commenting on blog posts
Creatives	<ul style="list-style-type: none">• Release own publications on blogs and other sites• Customize design of own websites• Upload of own videos, music, or other media contents• Publication of own articles

Fig. 3.9 Development of global monthly active users of social media applications



Data Source: Ruby (2023b, 2023a), eMarketer (2023), Meta (2023), Turner (2023a, 2023b), Wirtz (2024)

Table 3.4 The expected top platforms in the next 12 months

	Consumers (%)	Marketers (%)
Facebook	71	65
YouTube	51	35
Instagram	49	59
TikTok	38	39
Snapchat	19	9

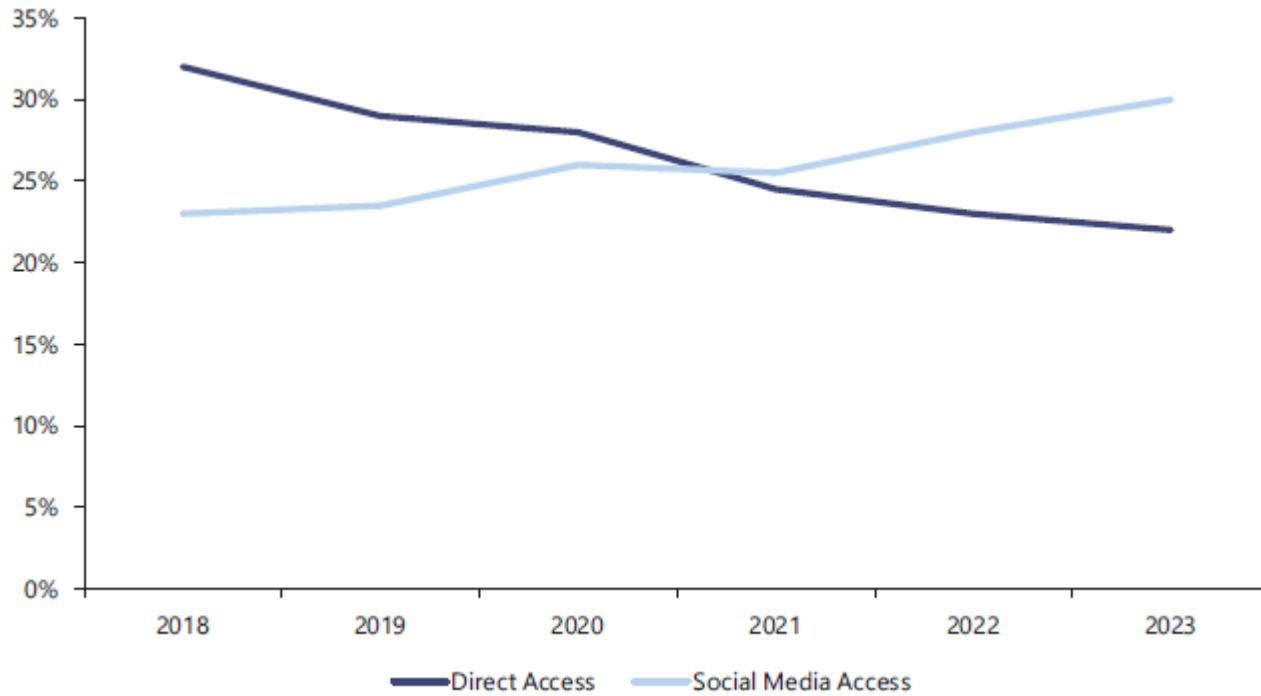
Data Source: sprout Social (2022), Wirtz (2021), Wirtz (2024)

Table 3.5 US Facebook user profile

Age	Male (%)	Female (%)
13–17	2.7	2.1
18–24	12.6	8.9
25–34	17.6	12.3
35–44	10.9	8.5
45–54	6.1	5.5
55–64	3.5	3.8
65+	2.6	3.0

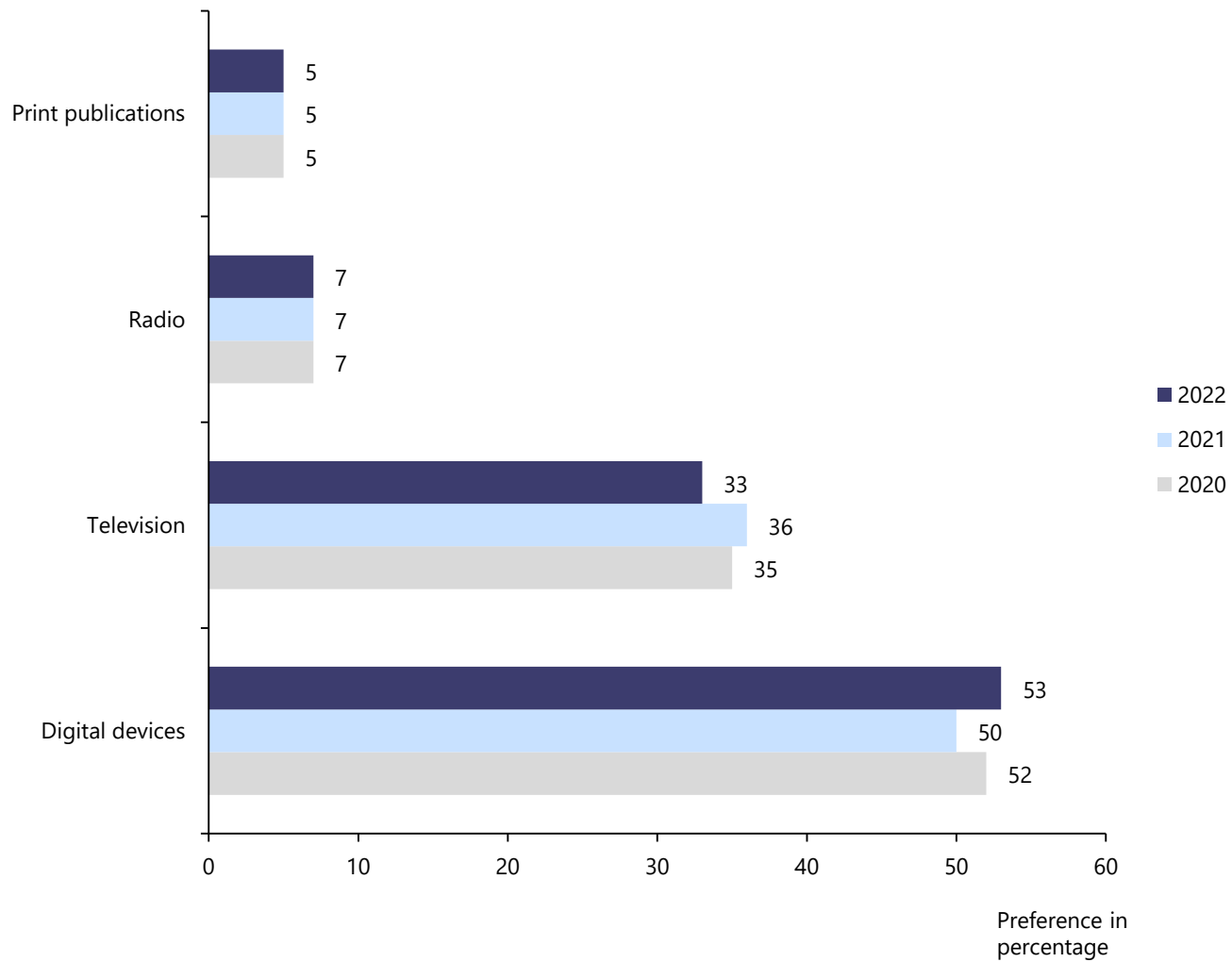
Data Source: DataReportal (2023), Wirtz (2024)

Fig. 3.10 Online New Access



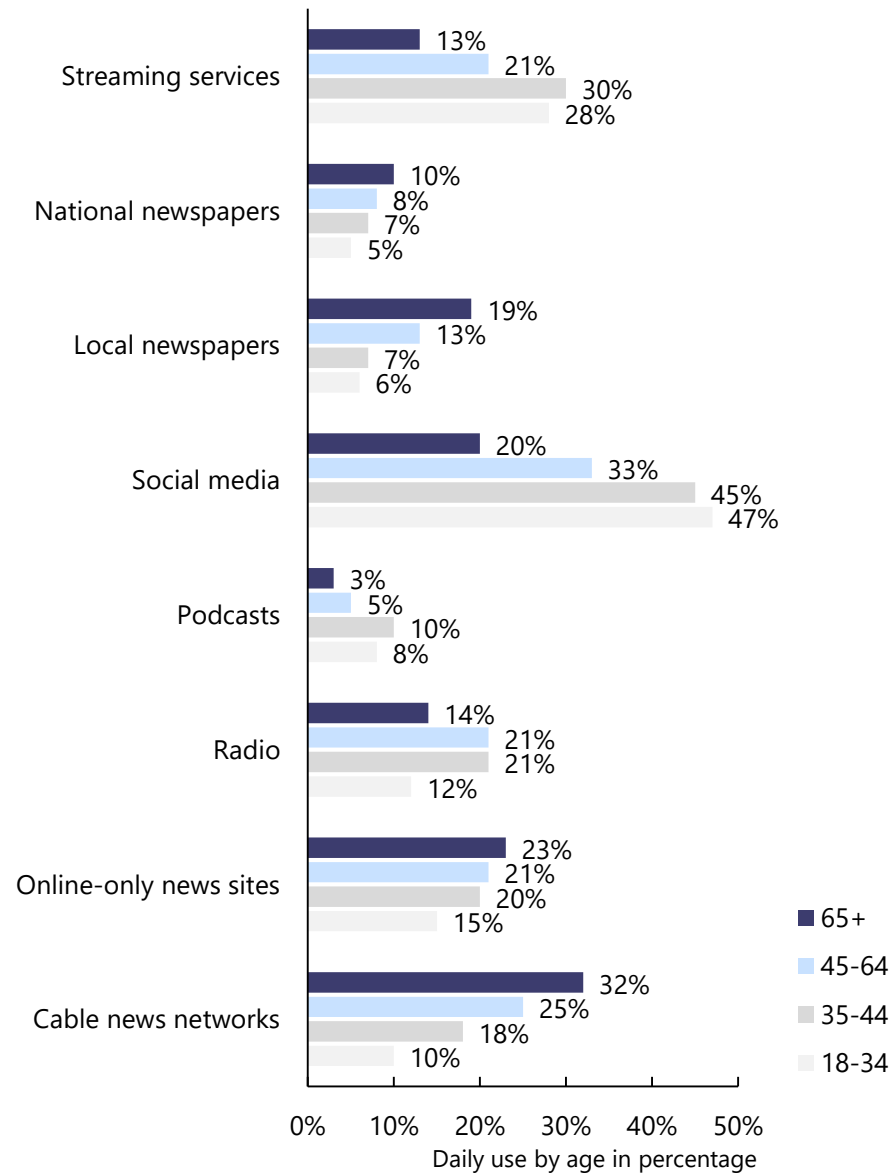
Data Source: Reuters Institute (2023), Wirtz (2024)

Fig. 3.11 New platforms preferences



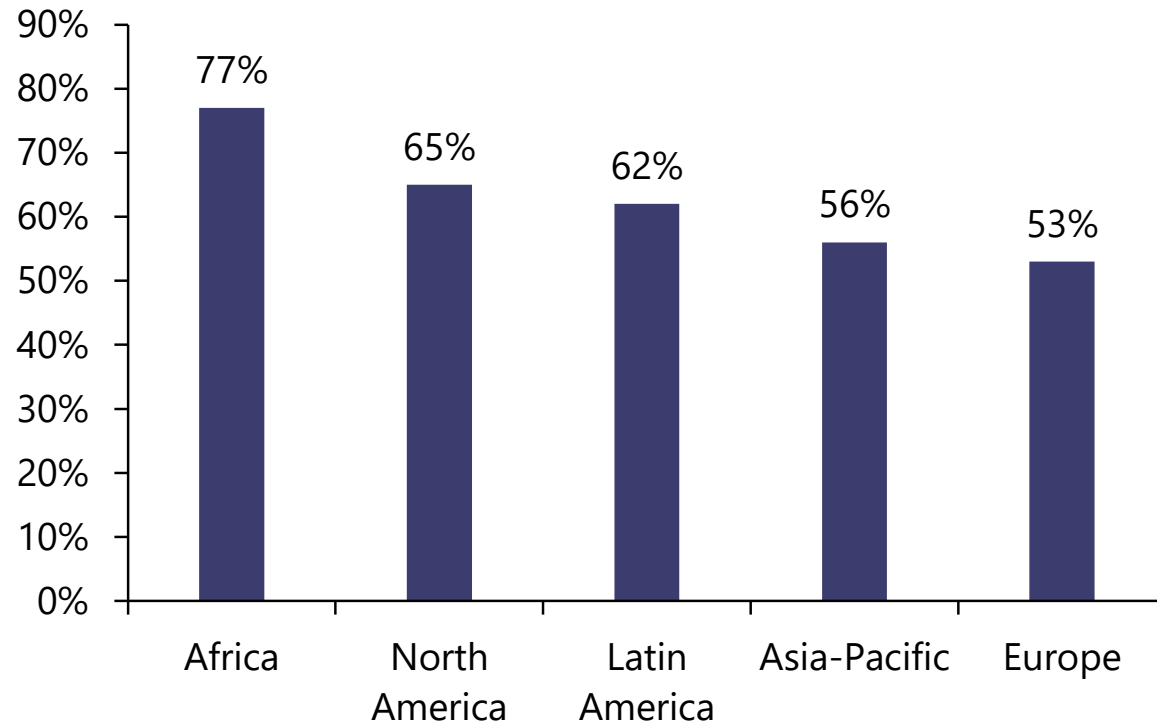
Data Source: Pew Research Center (2022), Wirtz (2024)

Fig. 3.12 Most often used news sources by age in the United States



Data Source: Morning Consult (2022), Wirtz (2024)

Fig. 3.13 Share of people concerned about what is real and what is fake news



Data Source: Reuters Institute (2023), Wirtz (2024)

Fig. 3.14 Integrated model of digital disinformation

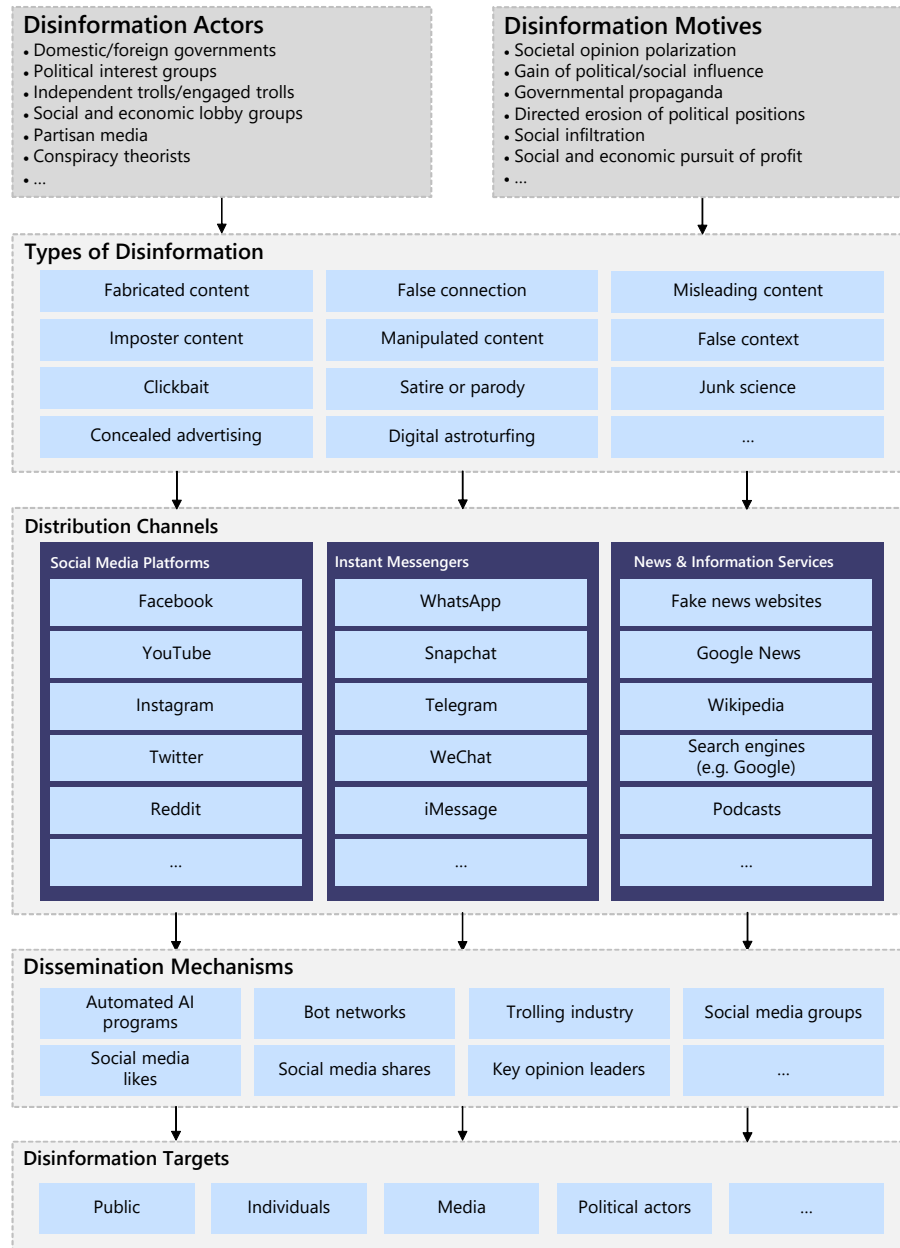


Table 3.6 Governance of digital disinformation

	Social Measures	Organizational & Technological Measures	Public & Legal Measures
Disinformation Actors and Motives	<ul style="list-style-type: none"> Monitoring Disinformation 	<ul style="list-style-type: none"> (Crowd-based) source ratings 	<ul style="list-style-type: none"> State sanctions
Disinformation Types	<ul style="list-style-type: none"> Independent fact-checking organizations and websites 	<ul style="list-style-type: none"> Human-curated algorithmic fact-checking (Crowd-based) reporting tools Inverse image search 	<ul style="list-style-type: none"> Gatekeeping Certifications Indexing
Distribution Channels	<p>Self-regulation:</p> <ul style="list-style-type: none"> Standards and Guidelines Voluntary self-regulation authorities 	<ul style="list-style-type: none"> Internal standards and guidelines Digital Disinformation Officer (DDO) Rethinking business models Revised technological infrastructure 	<ul style="list-style-type: none"> Fact-checking requirements Requirement of verified standards and guidelines
Dissemination Mechanisms	<p>Education:</p> <ul style="list-style-type: none"> Source criticism Media literacy Media effects 	<ul style="list-style-type: none"> Social media alerts 	<ul style="list-style-type: none"> Ban of trolling industry and dissemination bots Ban of purchased social media interaction
Disinformation Targets	<p>Communication:</p> <ul style="list-style-type: none"> Agenda-setting Corrections Framing 	<ul style="list-style-type: none"> Clearing Fact-checking app Reactive public relation strategies 	<ul style="list-style-type: none"> Data protection and data security laws

Source: Wirtz (2021), Wirtz (2024)

Table 3.7 Business potential of social media tools (company perspective)

	Social Networking	Interaction Orientation	Customization/ Personalization	User- Added Value	Business Potential
Social Networks e.g., facebook.com	●	●	◐	●	●
Weblogs e.g., blogger.com	◐	◐	◐	◐	◐
Microblogs e.g., twitter.com	◐	◐	◐	◐	◐
File Exchange & Sharing e.g., youtube.com	◐	◐	◐	◐	◐
Rating Portals e.g., yelp.com	◐	◐	◐	◐	◐
Instant Messengers e.g., whatsapp.com	●	●	◐	◐	◐
Podcasts e.g., podcasts.com	◐	◐	◐	◐	◐
Mashups e.g., parkingcarma.com	◐	◐	◐	◐	◐
Wikis e.g., wikipedia.com	◐	◐	◐	●	◐
Social Tagging & Bookmarking e.g. delicious.com	◐	◐	◐	●	◐
Online Forums e.g., topix.com	●	●	◐	●	◐

Legend: ○ = No Potential ● = Very High Potential

Source: Wirtz and Elsässer (2012a), Wirtz (2020, 2021), Wirtz (2024)

Chapter 3 Questions and topics for discussion

Chapter 3 Questions and topics for discussion



Review questions

1. What is social media? Describe the difference between social media and Web 2.0.
2. Describe the Social Media Four-Factor Model.
3. Explain the applications of social media with their respective service offerings and customer benefits.
4. Describe the metaverse approach and present its opportunities and risks.
5. Describe the Digital Disinformation Model.



Topics for discussion

1. Discuss the effects of social media on the democratic understanding of open societies.
2. Discuss the advantages and disadvantages of social media for your personal use of the Internet and their effects on your social and leisure time behavior. Are social media really making the world a better place?
3. Discuss the dangers of fake news in social media. What social dangers arise from fake news and how can they be countered?

Chapter 4: Digital Government

Table 4.1 Selected definitions of Digital Government/E-Government I

Authors	Definition
Silcock (2001, p.88)	"Simply stated, e-Government is the use of technology to enhance the access to and delivery of government services to benefit citizens, business partners and employees."
UNDPEPA and ASPA (2002, p.1)	"[...] E-government is defined as: utilizing the internet and the worldwide-web for delivering government information and services to citizens."
Carter and Bélanger (2005, p.5)	"E-government refers to "[...] the use of information technology to enable and improve the efficiency with which government services are provided to citizens, employees, business and agencies."
Heeks (2006, p. 1)	"[...] E-government in a broad sense: all use of information technology in the public sector. It covers a broad range of managerial issues: from high-level strategy to detailed tactics; from the technicalities of data flows and process mapping to the politics of e-government."
Evans and Yen (2006, p. 209)	"Simply speaking, E-Government means the communication between the government and its citizens via computers and a Web-enabled presence. The advantages in timeliness, responsiveness, and cost containment are outstanding."
Spirakis et al. (2010, p. 75)	"Electronic government is the use of Information and Communication Technology in the transformation of government; primarily aiming to the improvement of accessibility, effectiveness and responsibility. It is based on the diffusion of the information and the information policy development. Electronic government guides to increasing citizens' participation and active citizens' development affecting the mechanisms of democracy."

Table 4.1 Selected definitions of Digital Government/E-Government II

Authors	Definition
Veit and Huntgeburth (2014, p. 1)	"Digital government is defined as the use of Information and Communication Technologies (ICT), in particular the internet, to transform the relationship between government and society in a positive manner."
Yawwa and Twinomurinzi (2019, p. 4)	"Digital government is defined as a socio-technical phenomenon or mechanism by which governments provide efficient services using ICT in a seamless and interfaced manner."
Twizeyimana and Andersson (2019 p. 167)	"e-Government is commonly conceptualized as governments' use of Information and Communication Technologies (ICTs) combined with organizational change to improve the structures and operations of government."

Source: Wirtz and Daiser (2015, 2017b), Wirtz (2021, 2022), Wirtz (2024)

Definition of Digital Government

Definition of Digital Government (Wirtz and Piehler 2010; Wirtz 2020,2021, 2022b,2023)

The term digital government describes the electronic handling of administration and democracy processed in the context of governmental activities by means of information and communication technologies to support public duties efficiently and effectively.

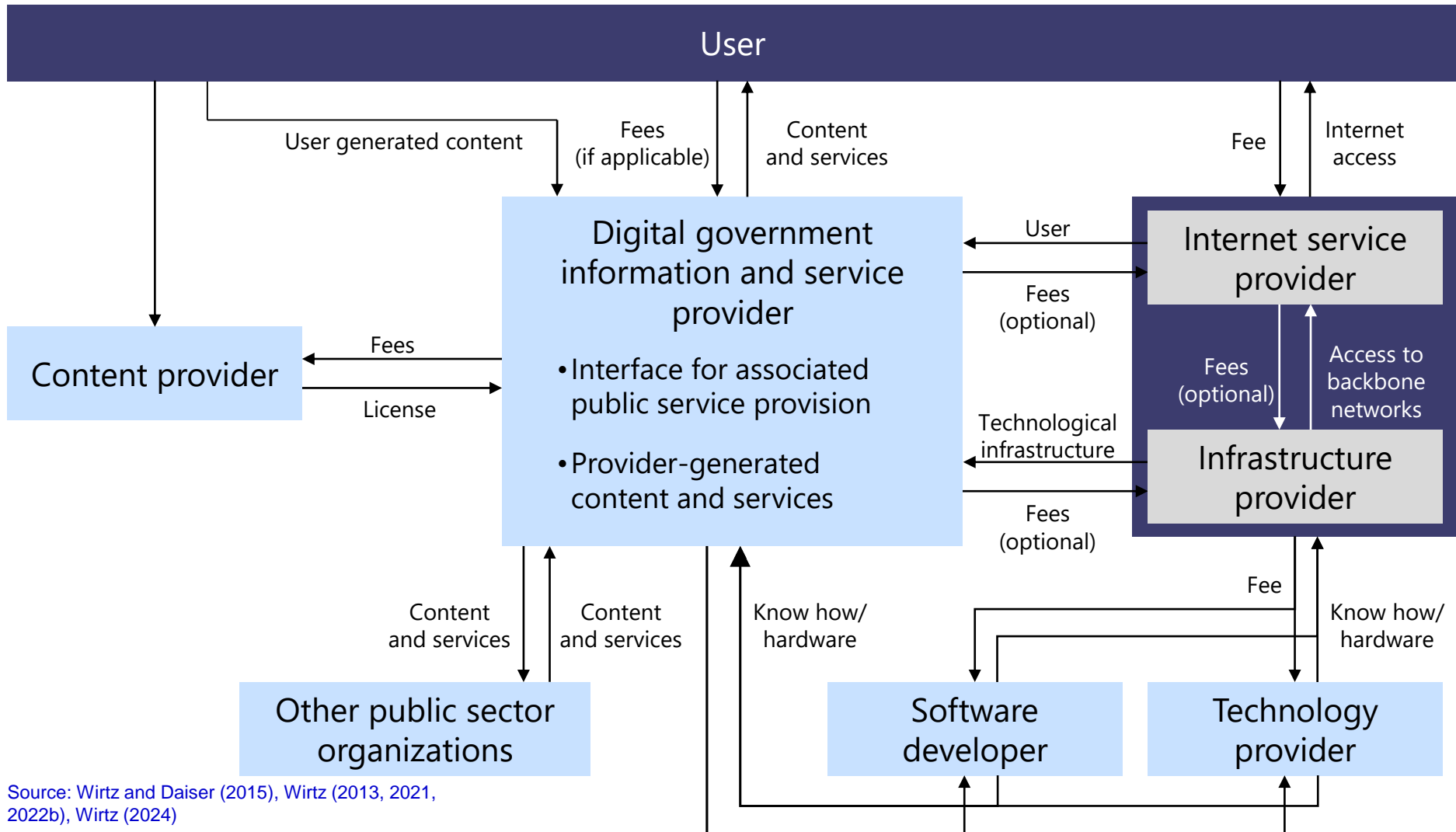
Source: [Wirtz and Piehler \(2010\)](#), [Wirtz \(2021\)](#), [Wirtz \(2024\)](#)

Fig. 4.1 Digital government interaction matrix

Information and service provider	Administration	Administration to Organization	Administration to Citizen	Administration to Administration	Intra-Administration
	Citizen	NA (Not Applicable)	NA (Not Applicable)	Citizen to Administration	NA (Not Applicable)
	Organization	NA (Not Applicable)	NA (Not Applicable)	Organization to Administration	NA (Not Applicable)
		Organization	Citizen	Administration	Intra
Information and service recipient					

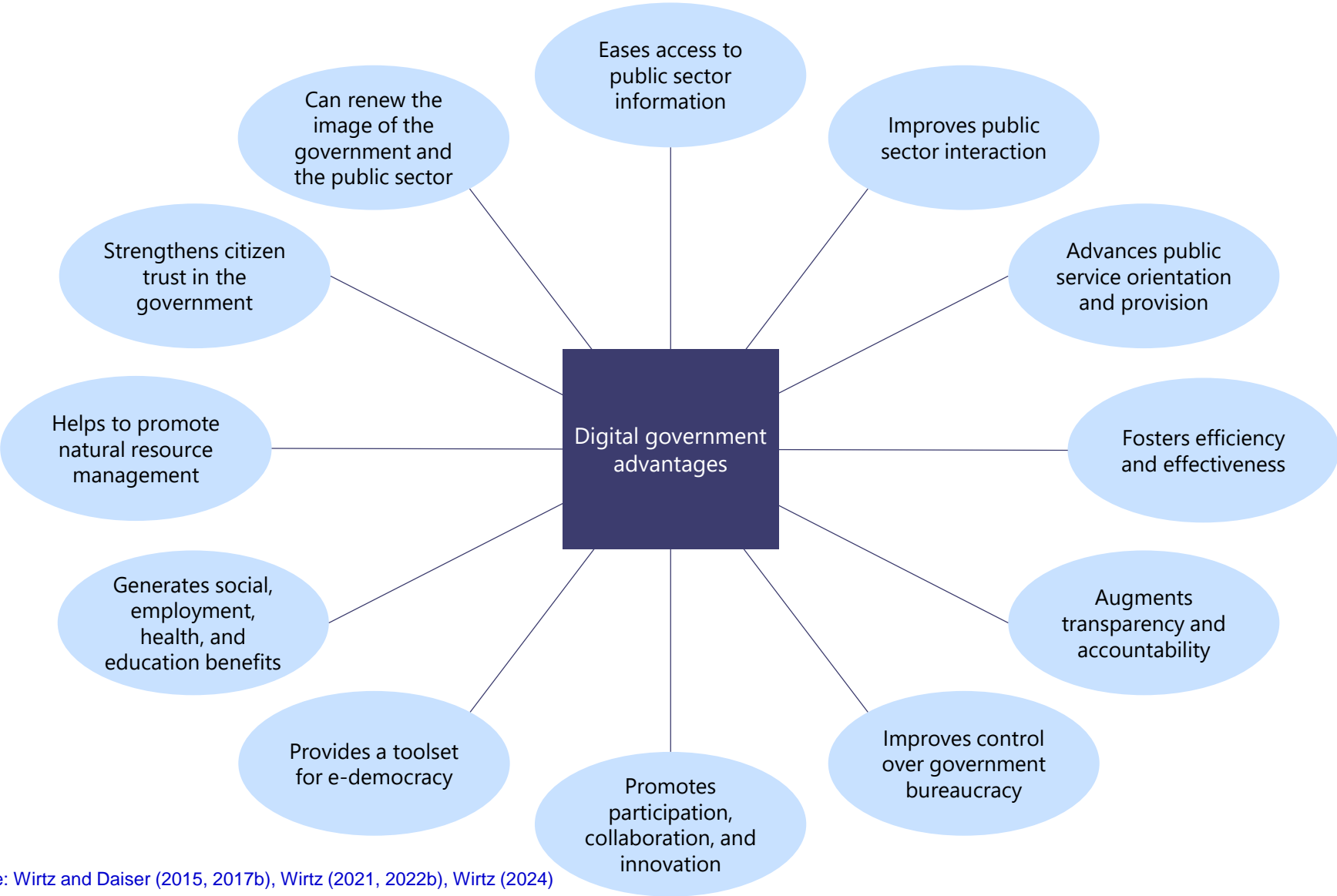
Source: Wirtz and Daiser (2017a), Wirtz (2013, 2021, 2022b), Wirtz (2023), Wirtz (2024)

Fig. 4.2 Schematic digital government actors and interactions structure



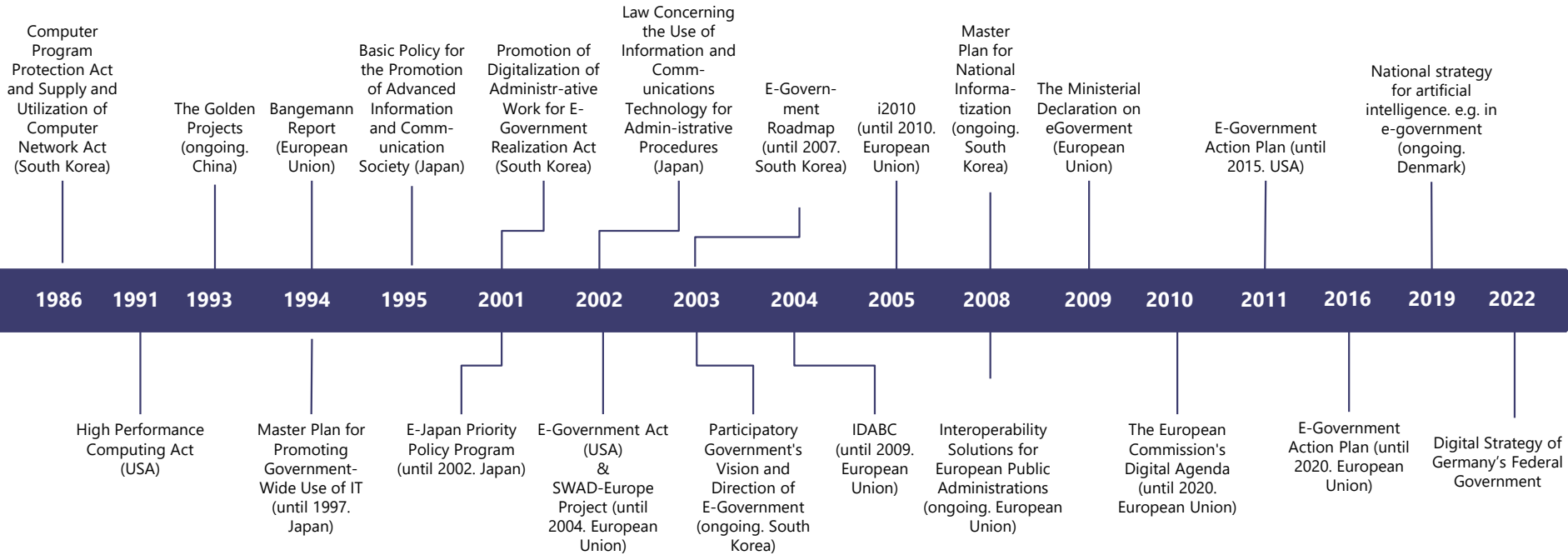
Source: Wirtz and Daiser (2015), Wirtz (2013, 2021, 2022b), Wirtz (2024)

Fig. 4.3 Expected advantages of digital government



Source: Wirtz and Daiser (2015, 2017b), Wirtz (2021, 2022b), Wirtz (2024)

Fig. 4.4 Overview of selected digital/e-government acts and initiatives (1986-2022)



Source: Wirtz and Daiser (2015, 2017b), Wirtz (2021, 2022b), Wirtz (2024)

Table 4.2 World digital government leaders in 2022

No.	Country	Region	EGDI 2022	Rank 2020	Rank 2018
1	Denmark	Europe	0.971	1	1
2	Finland	Europe	0.953	4	6
3	South Korea	Asia	0.952	2	3
4	New Zealand	Oceania	0.943	8	8
5	Sweden	Europe	0.941	6	5
6	Iceland	Europe	0.941	12	19
7	Australia	Oceania	0.940	5	2
8	Estonia	Europe	0.939	3	16
9	Netherlands	Europe	0.938	10	13
10	United States	America	0.915	9	11
11	Great Britain	Europe	0.913	7	4
12	Singapore	Asia	0.913	11	7

Data Source: United Nations Department of Economic and Social Affairs (2022), Wirtz (2024)

Table 4.3 Selected definitions of open government

Author(s)	Definition
OECD (2009)	"Open and responsive government refers to the transparency of government actions, the accessibility of government services and information, and the responsiveness of government to new ideas, demands and needs."
Geiger and Lucke (2012b)	"Open Government acts as an umbrella term for many different ideas and concepts. The narrow definition of Open Government consists of transparency, participation and collaboration of the state towards third actors like the economy or the citizenship."
Harrison et al. (2012)	"Broader access to government data and other documentation, the ability to contribute to decision-making processes within government agencies, and the possibility of responsible engagement with agency leadership in such processes are incrementally more democratic actions that lie at the heart of the open government vision."
Meijer et al. (2012)	"Openness of government is the extent to which citizens can monitor and influence government processes through access to government information and access to decision-making arenas."
Evans and Campos (2013)	"Open government is widely understood as the leveraging of information technologies to generate participatory, collaborative dialogue between policymakers and citizens."
Wirtz and Birkmeyer (2015)	"Open government is a multilateral, political, and social process, which includes in particular transparent, collaborative, and participatory action by government and administration."

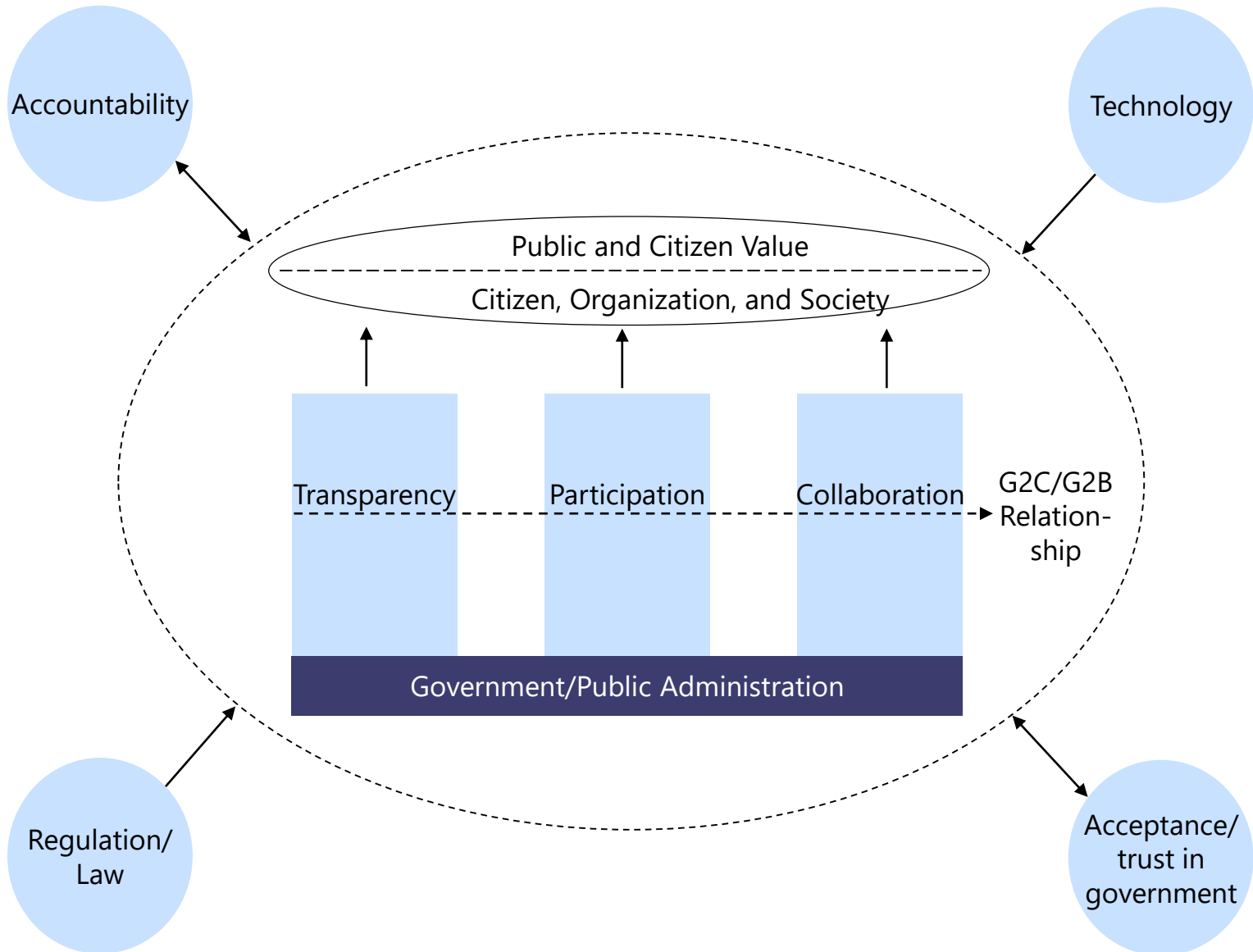
Definition of Open Government

Definition of Open Government (Wirtz et al. 2017; Wirtz 2021, 2022b, 2024)

Open government is a concept that generates a transparent, participatory, collaborative, and innovative government environment by providing existing data and knowledge to third parties and integrating external knowledge into political and administrative processes.

Source: Wirtz (2021), Wirtz (2023),
Wirtz (2024)

Fig. 4.5 Open government framework



Source: Wirtz and Daiser (2017), and Wirtz (2021, 2024)

Table 4.4 Selected definitions of e-participation

Author(s)	Definition
OECD (2003)	"E-participation as an electronic form of active participation is "a relationship based on partnership with government in which citizens actively engage in defining the process and content of policy-making. It acknowledges equal standing for citizens in setting the agenda, proposing policy options and shaping the policy dialogue – although the responsibility for the final decision or policy formulation rests with government."
Macintosh (2006)	"E-participation is "the use of information and communication technologies to broaden and deepen political participation by enabling citizens to connect with one another and with their elected representatives."
Sæbø et al. (2008)	"eParticipation involves the extension and transformation of participation in societal democratic and consultative processes mediated by information and communication technologies (ICT), primarily the Internet. It aims to support active citizenship with the latest technology developments, increasing access to and availability of participation in order to promote fair and efficient society and government."

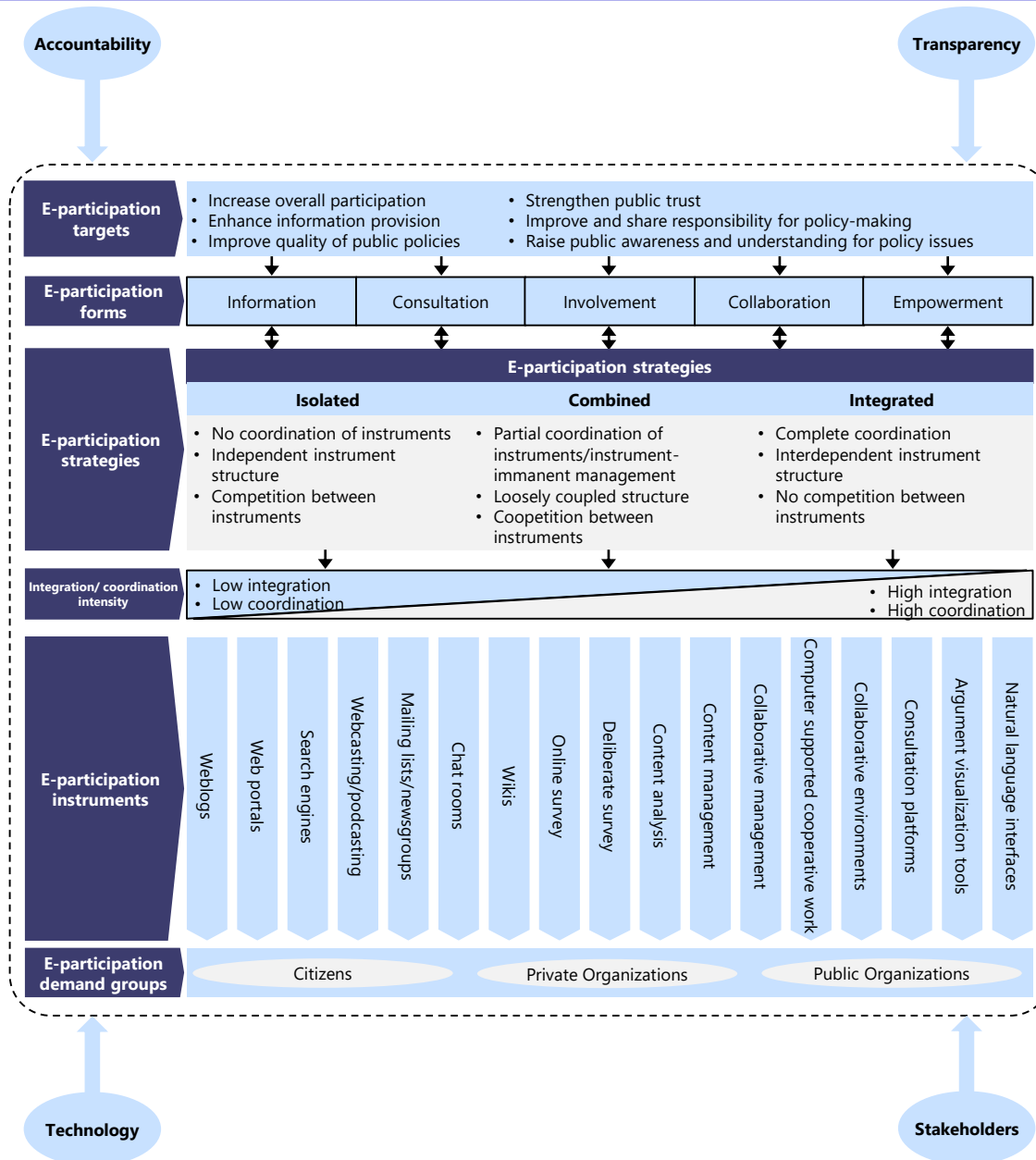
Definition of E-Participation

Definition of E-Participation (Wirtz et al. 2018a; Wirtz 2021, 2022b, 2024)

E-participation is a participatory process that is enabled by modern information and communication technologies, includes stakeholders in the public decision-making processes through active information exchange, and thus fosters fair and representative policymaking.

Source: [Wirtz \(2021\)](#), [Wirtz \(2023\)](#), [Wirtz \(2024\)](#)

Fig. 4.6 Integrated strategic e-participation framework

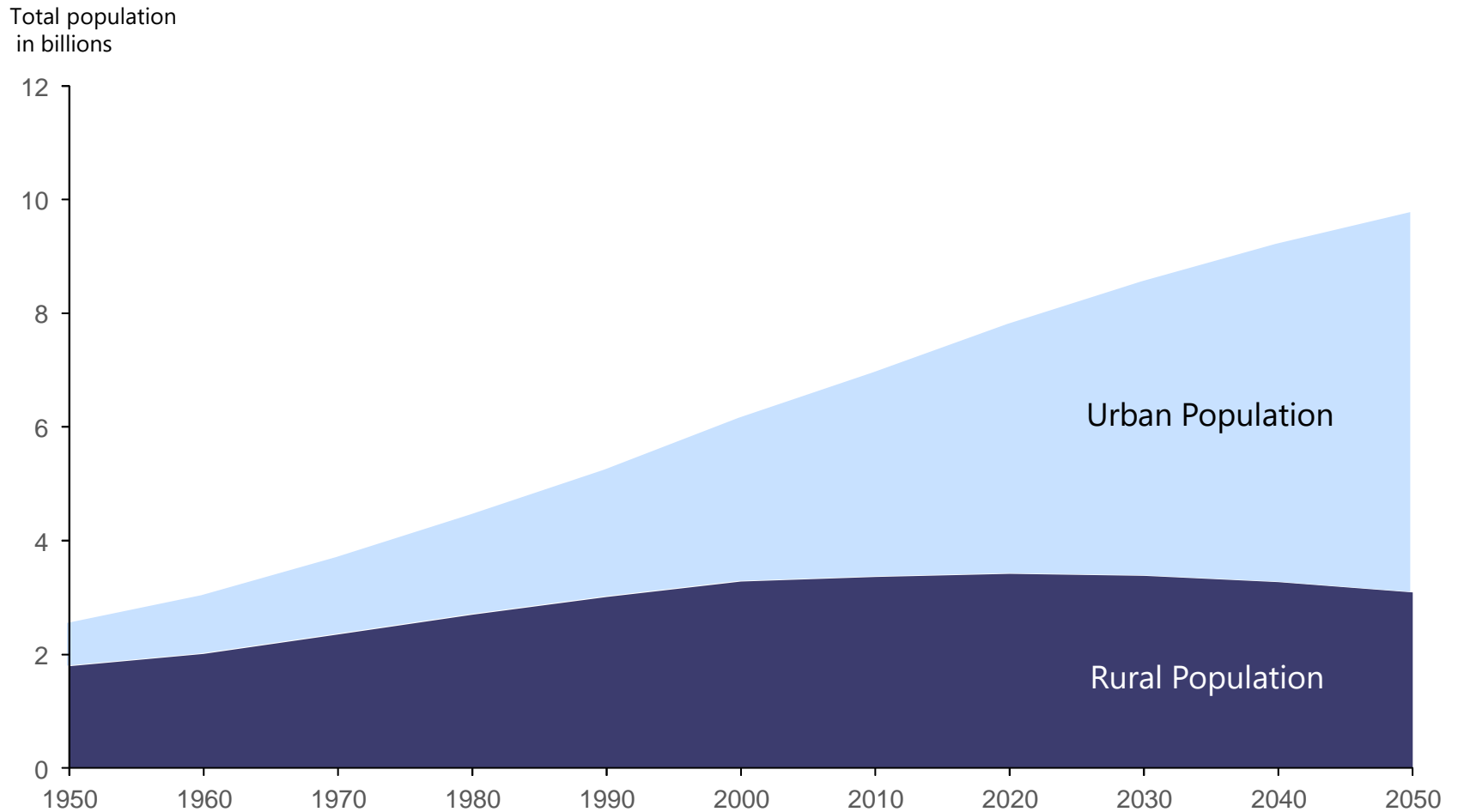


Definition of Smart City (Wirtz 2022a, 2022b, 2024)

A smart city is an integrated system based on digital information technologies that focuses on improving the well-being of society through efficient and effective use of resources in an urban context- In particular, it is about meeting key stakeholder requirements through transparency, participation and collaboration.

Source: [Wirtz \(2021\)](#), [Wirtz \(2023\)](#), [Wirtz \(2024\)](#)

Fig. 4.7 Growth and ratio of urban to rural population



Source: United Nations (2019), Wirtz (2021), Wirtz (2024)

Fig. 4.8 Smart city targets



Source: Wirtz (2022a, 2022b), Wirtz (2024)

Table 4.5 Smart City Ranking

No.	Country
1	Zurich
2	Oslo
3	Canberra
4	Copenhagen
5	Lausanne
6	London
7	Singapore
8	Helsinki
9	Geneva
10	Stockholm

Source: Wirtz (2022a, 2022b), Wirtz (2024)

Fig. 4.9 Smart City Service Provision Framework

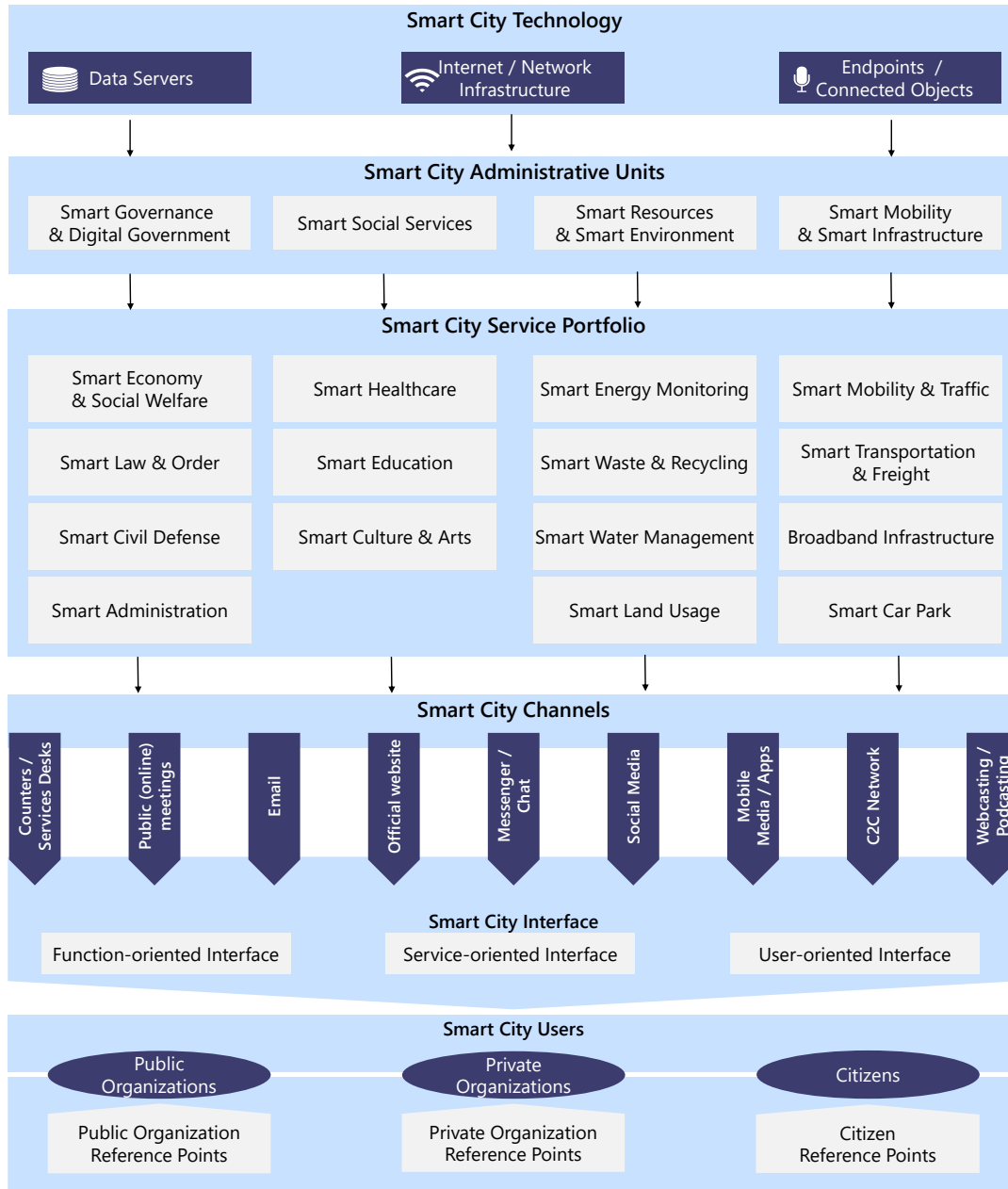
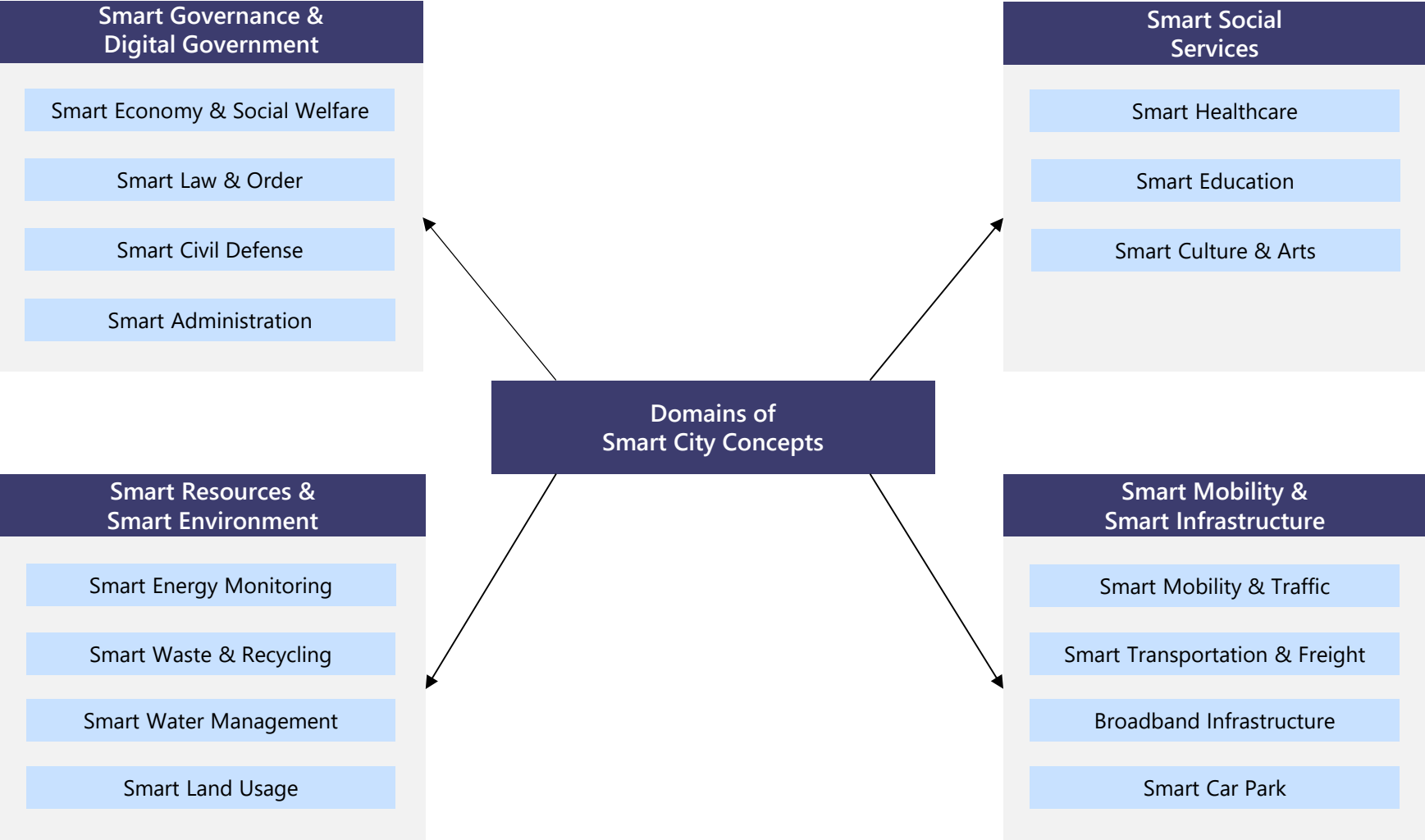


Fig. 4.10 Stakeholder domains of smart city concepts

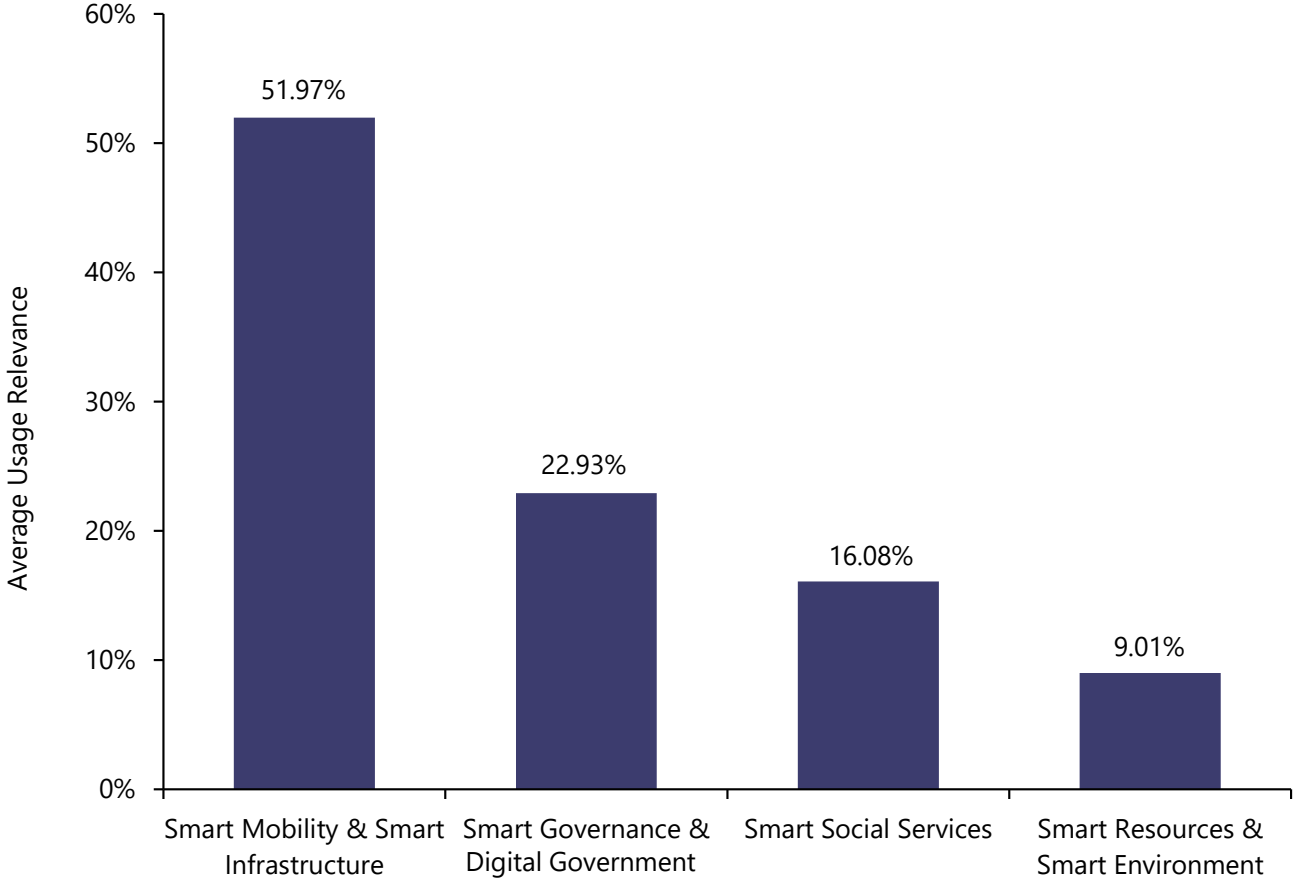


Source: Wirtz (2022a, 2022b), Wirtz (2024)

Fig. 4.11 Smart City Portfolio

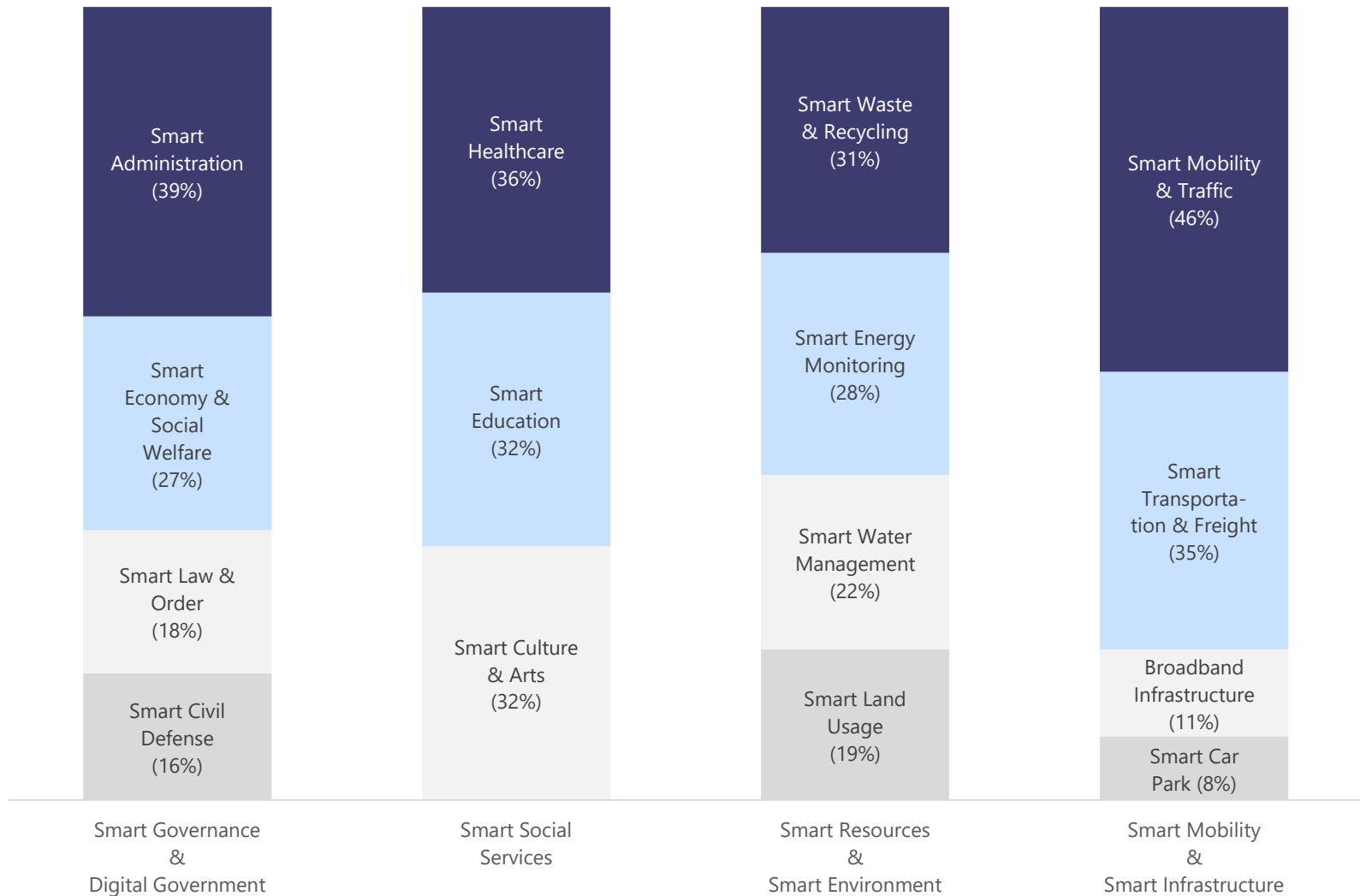
Smart City Service Portfolio			
Smart Governance & Digital Government	Smart Social Services	Smart Resources & Smart Environment	Smart Mobility & Smart Infrastructure
<p>Public Safety, Law and Order</p> <ul style="list-style-type: none"> • Civil protection services • Disaster warning app • Emergency detection systems • Epidemic plague detection systems • Fire monitoring/detection systems • Law and order services • Crime monitoring/detection systems • Urban surveillance system • Open Source Standards • Smart City Operations Center • ... 	<p>Smart Healthcare</p> <ul style="list-style-type: none"> • Electronic medical records • First aid apps • Medical services general info app (location, contact, specialist info, make an appointment, etc.) • Real-time health monitoring • Medical check reminder • Self-diagnosis/disease detection • Smart body meters • Vital sign monitoring • Remote nursing systems for hospitals • Tele-medicine • ... 	<p>Smart Energy</p> <ul style="list-style-type: none"> • Smart energy supply systems • Energy consumption monitoring • Energy efficiency monitoring • Micro grid / smart grids • Storage of surplus energy • Smart city lighting systems • Smart street lighting systems • ... 	<p>Smart Mobility / Smart Traffic/Parking</p> <ul style="list-style-type: none"> • Bike sharing systems • Pedestrian navigation • Real-time fuel price information • Traffic information system • Assisted driving / vehicle navigation • Parking information system • Parking navigation app • Traffic management system • Real-time car census • Real-time traffic flow status • Real-time parking status • Traffic congestion control • Traffic light control center • Vehicle classification & identification • ...
<p>Smart Governance</p> <ul style="list-style-type: none"> • Crowd-sensing / crowdsourcing • Digital government apps • Automated applications/queries • Appointment scheduling app • Civic information system • Civic reporting/feedback apps • Digital payment system (taxes, fines, ...) • Electronic ID / Smart Card • Online citizen account/portal • Electronic public service delivery • Participation platforms for public debates and civic engagement • Private-public-partnership for public service provision • ... 	<p>Smart Education</p> <ul style="list-style-type: none"> • Digital education and technical retraining • Public online libraries / library apps • Remote education systems • Online campus/university apps • Online classroom/school apps • Tele-education • Skill development centers • ... 	<p>Smart Environment</p> <ul style="list-style-type: none"> • Aqueduct/water utilization systems • Environmental monitoring system • Environmental protection programs • Quality and pollution meters • Air quality monitoring system • Environment impact meters • Real-time quality/pollution info app • Water quality monitoring system • Real-time weather / environmental data • Waste and recycling services • Recycling info app • Smart waste bins • Waste collection systems • Waste processing systems • Smart weather meters • ... 	<p>Smart Logistics / Smart Transport</p> <ul style="list-style-type: none"> • Call-a-taxi-app • Delivery tracking check • Electric buses • Public transit information system • Bus routes information app • Combined e-ticket for urban transit • Delay information app • Electronic/mobile ticketing • Schedule information app • Shuttle service for special locations • Public transit management system • Delay management system • (Bus) route tracking system • Passenger counting system • Smart loading/unloading areas • ...
<p>Smart Economy</p> <ul style="list-style-type: none"> • E-commerce apps • Banking apps • Price-checking apps • Knowledge economy and high-tech industry • Online job portals / job agency app • Smart industry systems • Industrial automation (Industry 4.0) • Industry support programs • Safety supervision systems • Trade facilitation centers • ... 	<p>Arts, Culture, Recreation and Tourism Services</p> <ul style="list-style-type: none"> • Cultural facility management system • Digital applications for culture, tourism, and recreation • Cultural Information App • Interactive city guide apps • Personal calendar for events in the city/area • ... 	<p>...</p>	<p>Smart Infrastructure</p> <ul style="list-style-type: none"> • 5G network and connectivity services • Broadband/high speed internet • Building maintenance systems • Car charging infrastructure • Connected cars • Connected urban sensor system • Data infrastructure • Data management systems • Municipal data analytics • Open APIs • Open data bases • Public data centers • Urban computer and server network • High-tech roads / connected cars • Public Wi-Fi infrastructure • Smart home networks • ...
...

Fig. 4.12 Lead users' preferences regarding smart city services



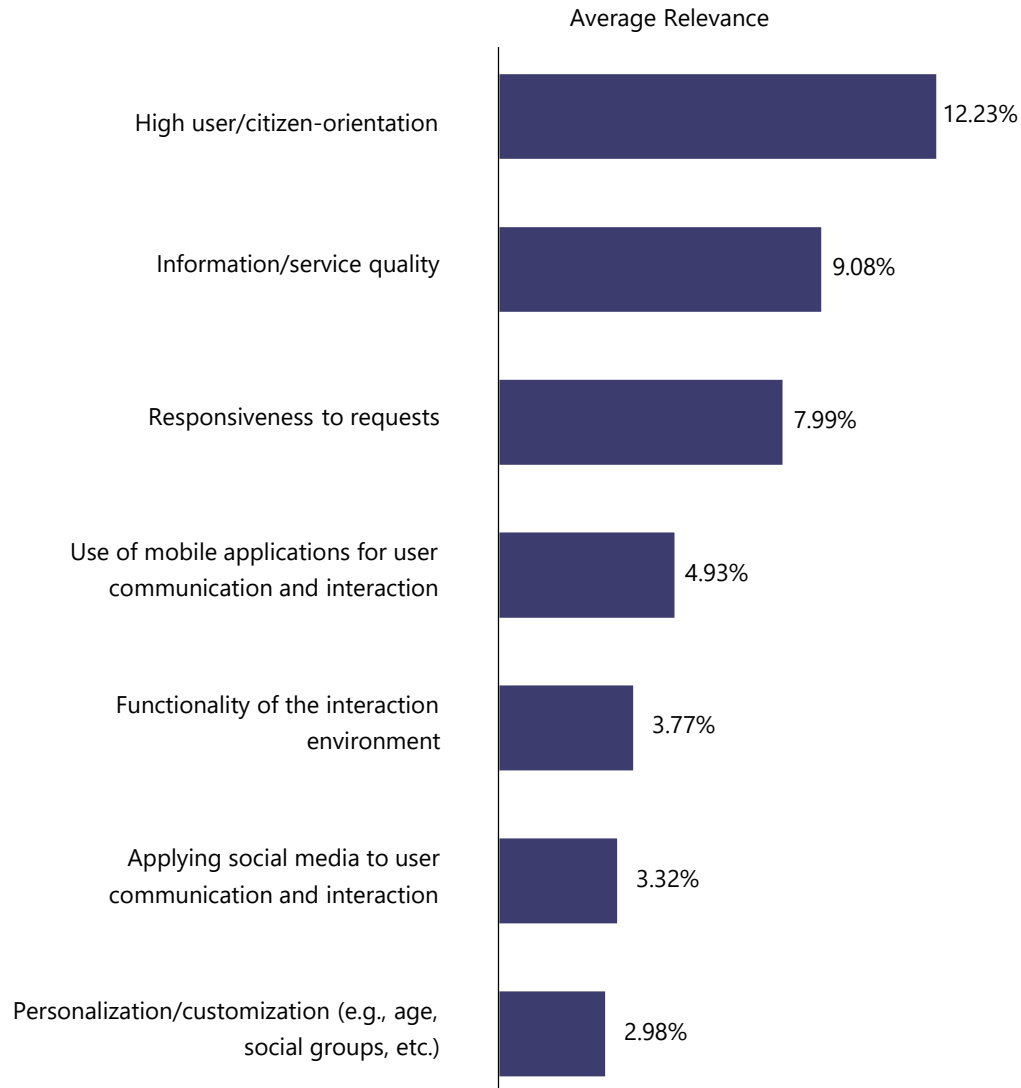
Source: Wirtz (2022a), Wirtz (2024)

Fig. 4.13 Participants' preferences for different smart city service domains



Source: Wirtz (2022a), Wirtz (2024)

Fig. 4.14 Functional user demands of smart cities



Source: Wirtz (2022a), Wirtz (2024)

Fig. 4.15 Smart city performance user demands

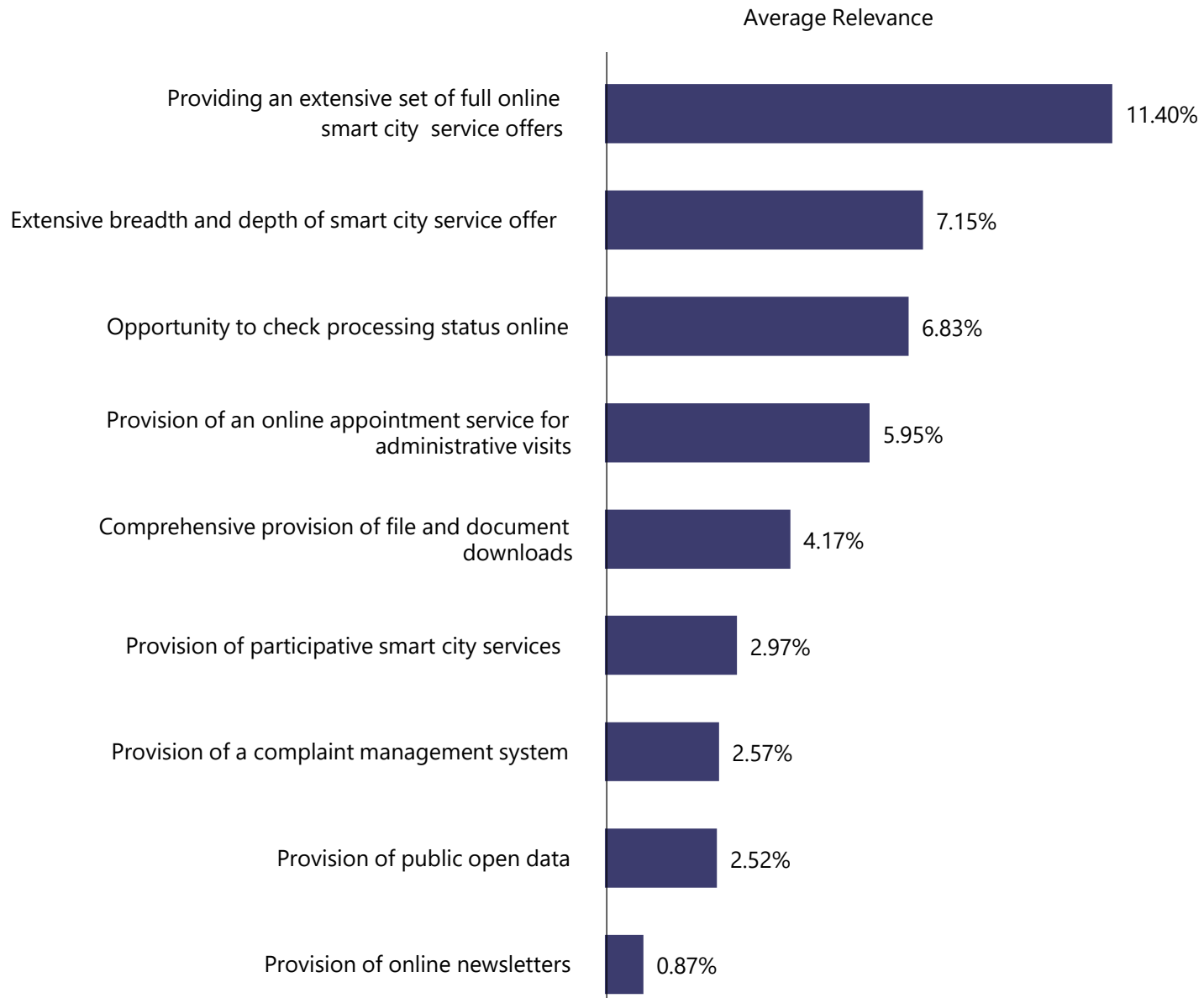
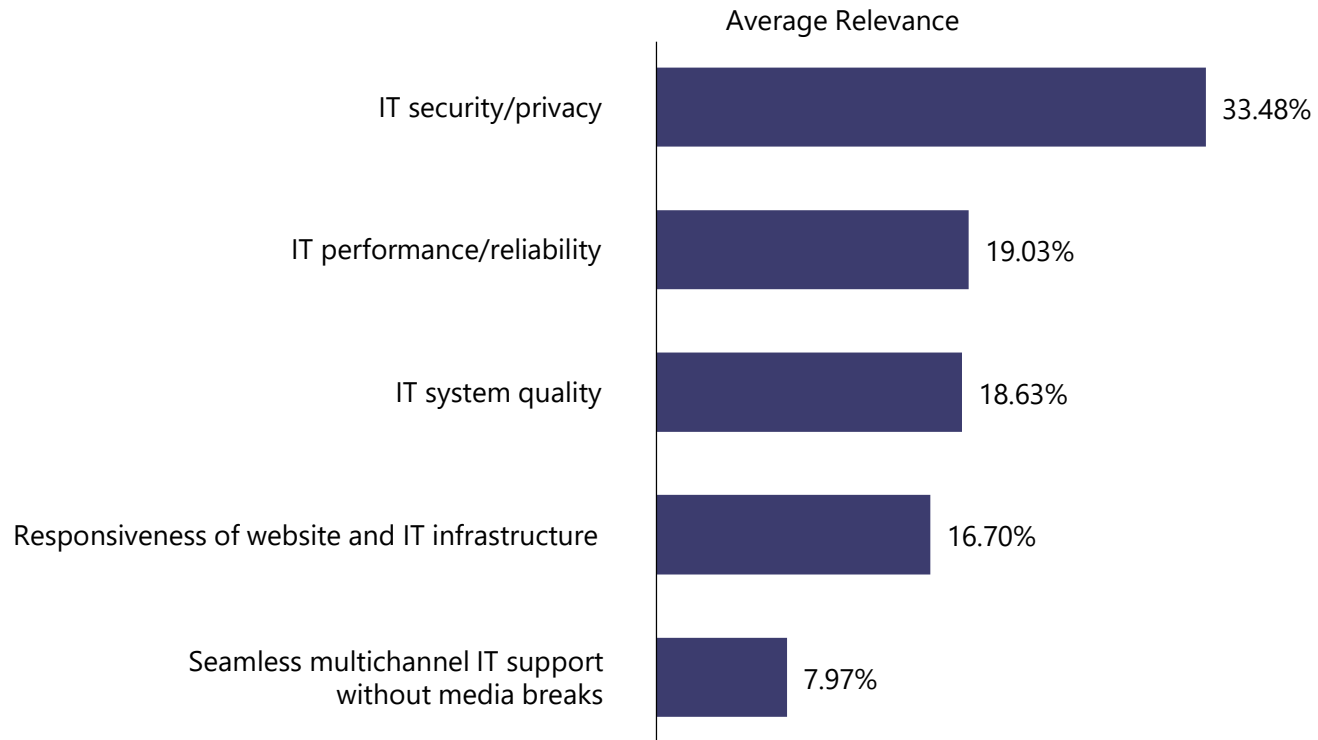
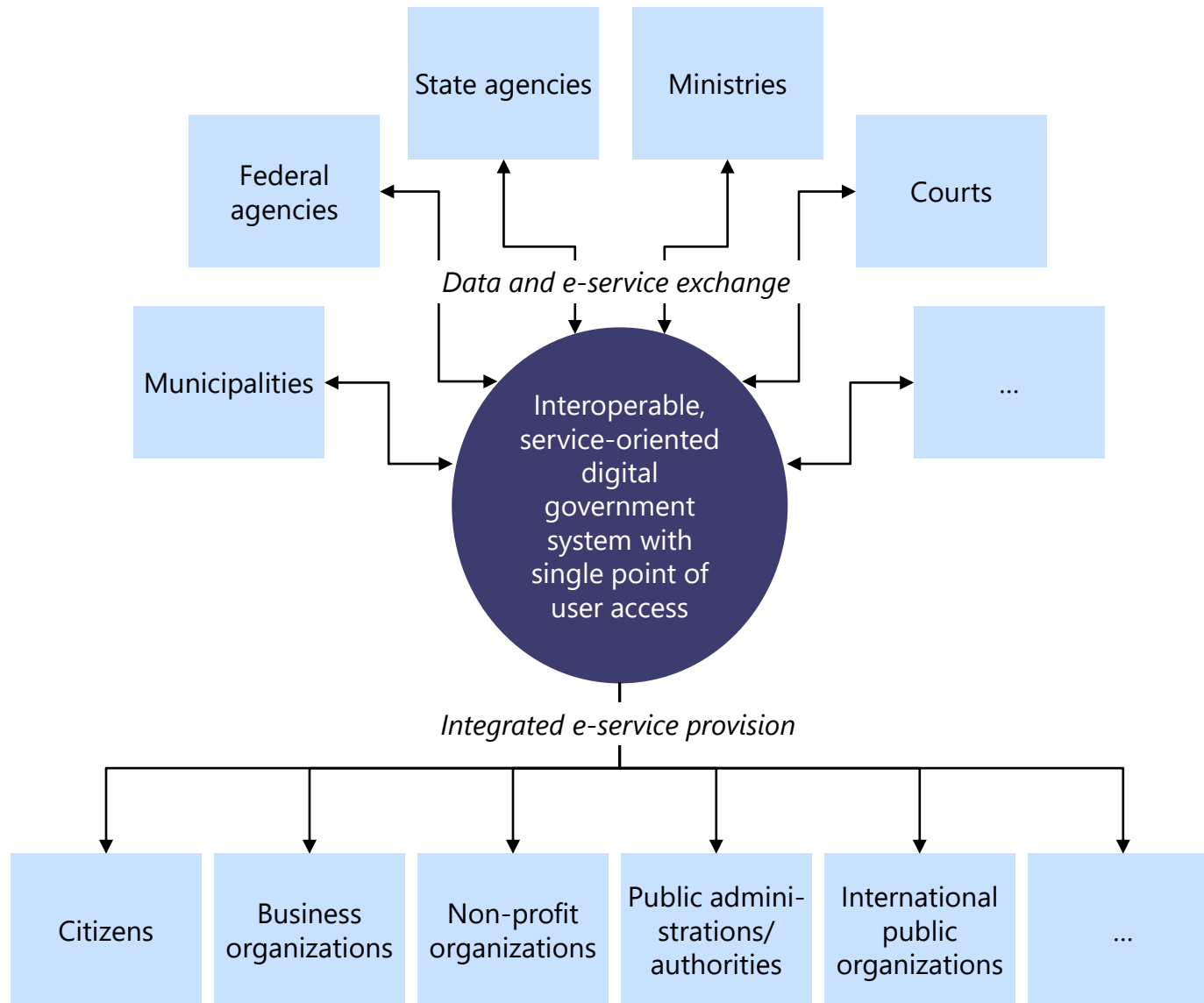


Fig. 4.16 Smart city IT demands



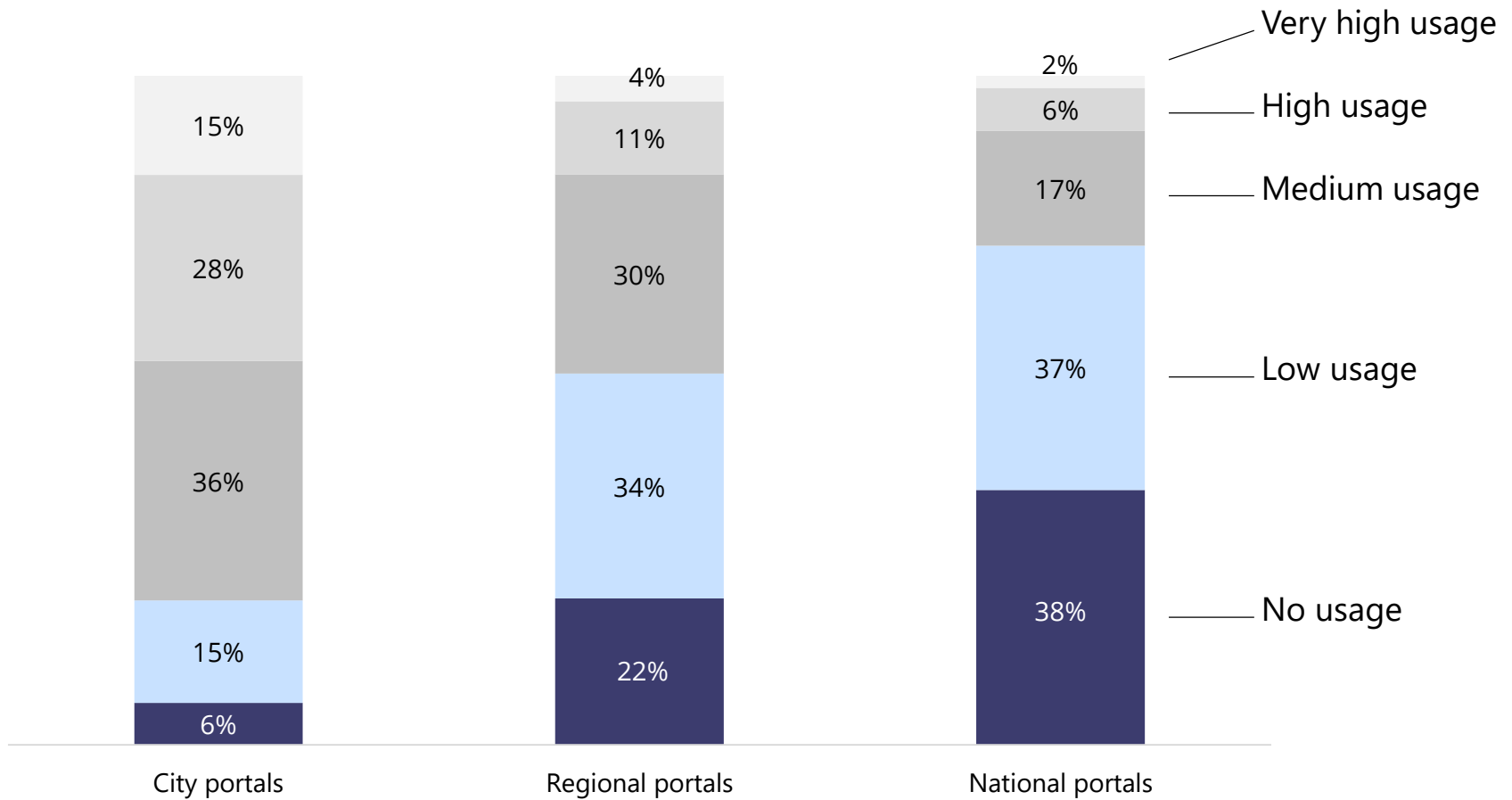
Source: Wirtz (2022a), Wirtz (2024)

Fig. 4.17 Schematic digital government portal network



Source: Wirtz and Daiser (2015), Wirtz (2020, 2021, 2022b), Wirtz (2024)

Fig. 4.18 Digital government portal use (Germany)



Data Source: Wirtz (2015, 2021), Wirtz (2024)

Fig. 4.19 USS Digital demand factor system

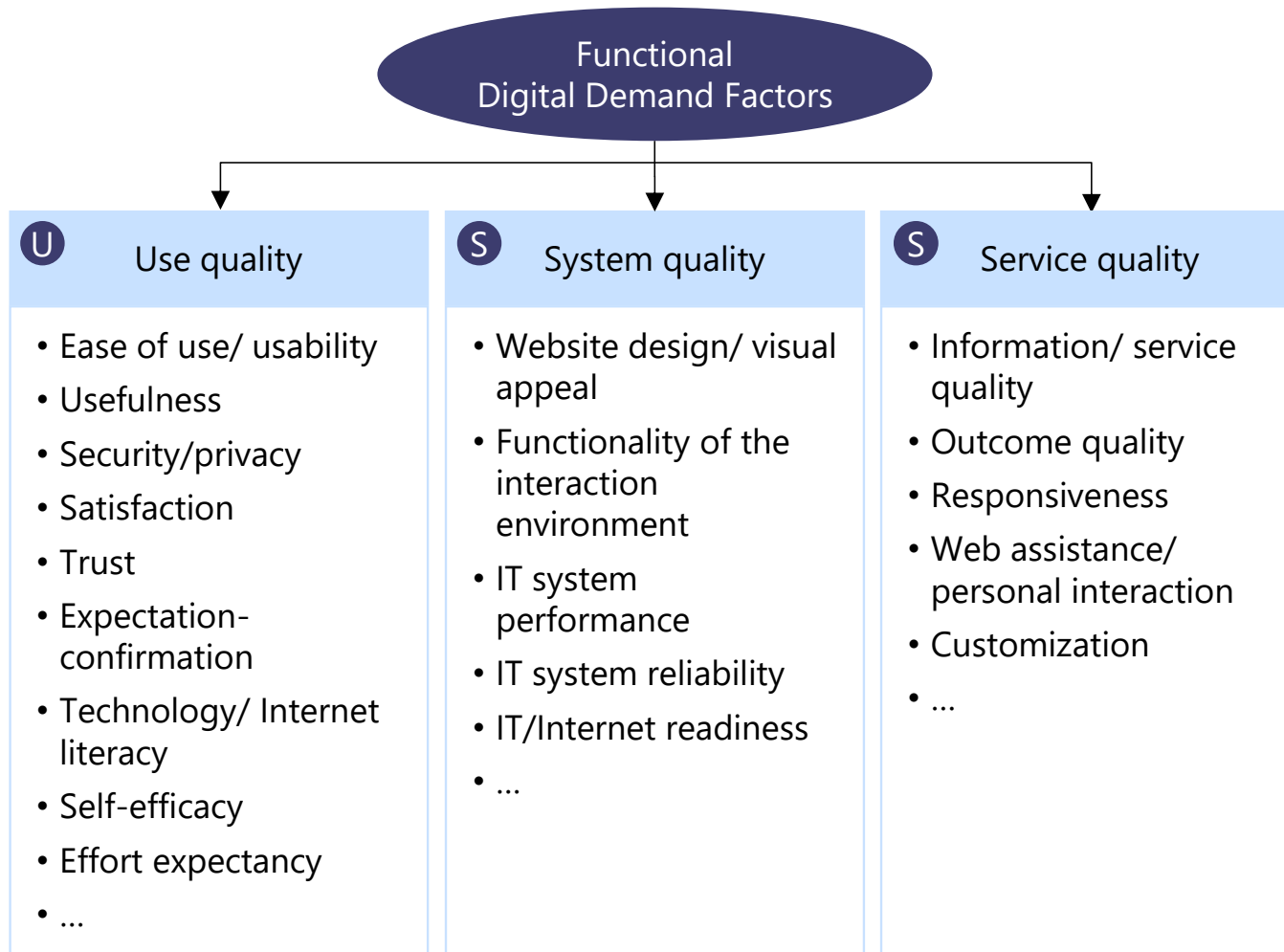
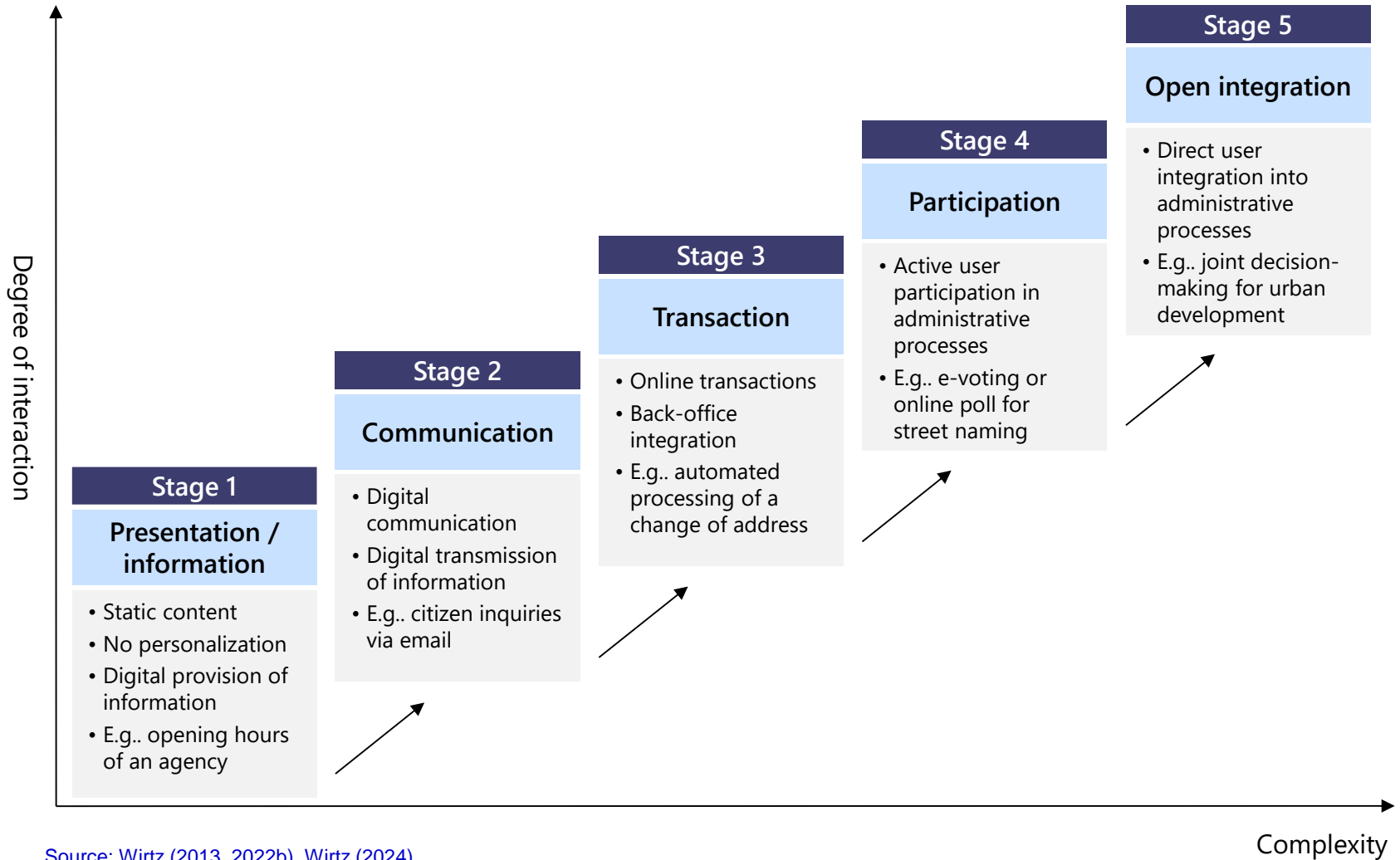


Fig. 4.20 Digital government development stage model



Source: Wirtz (2013, 2022b), Wirtz (2024)

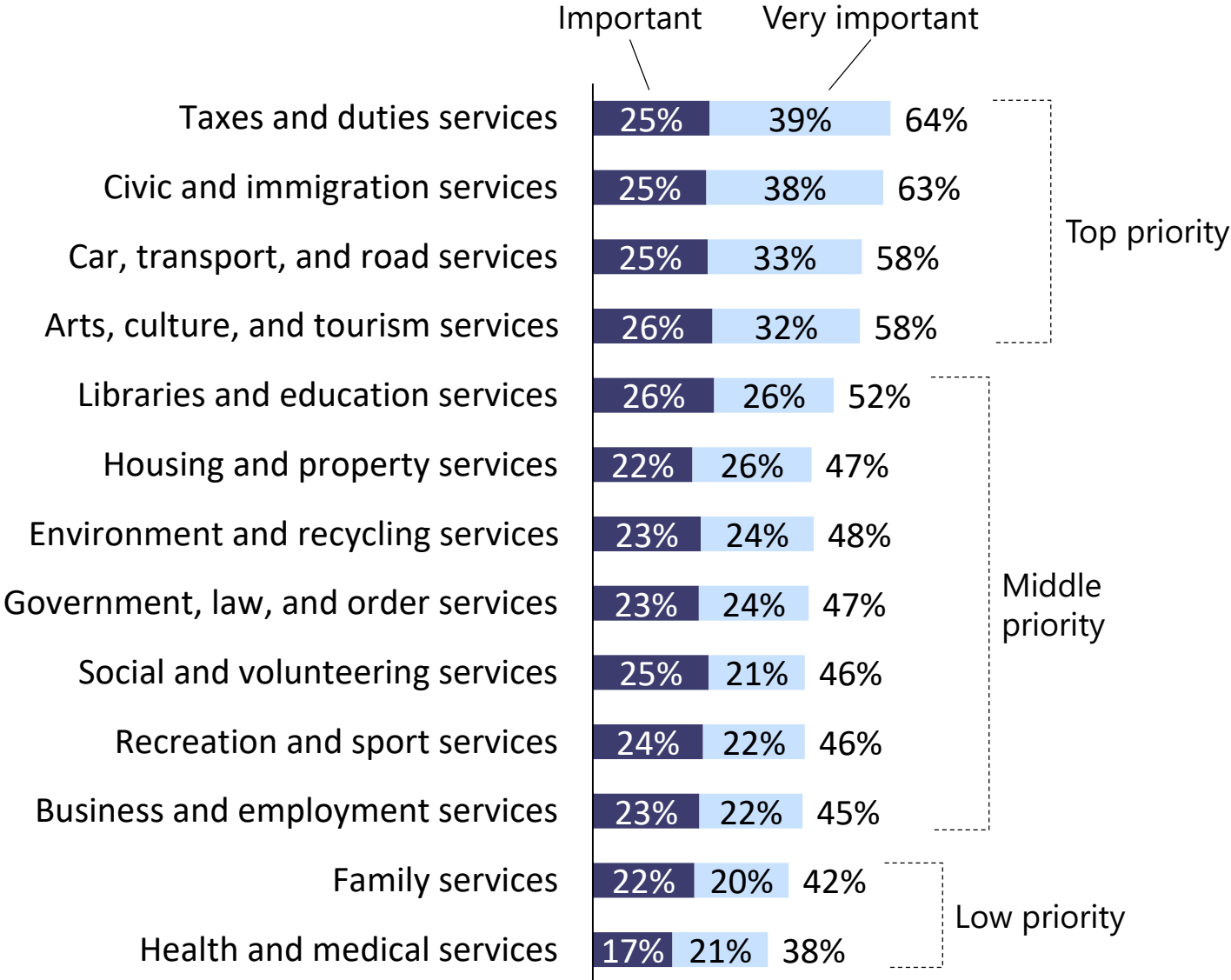
Fig. 4.21 Integrated digital government user relationship management

Business model-related user demand	Information	Communication	Transaction	Integration
Frequency	daily weekly	daily weekly	weekly monthly yearly	weekly monthly yearly
Local portal (e.g.. New York City www.nyc.com)	<ul style="list-style-type: none"> • Digital government portal • Blogs • Content communities • Social net-working sites 	<ul style="list-style-type: none"> • Digital government portal • Blogs • Content communities • Social net-working sites 	<ul style="list-style-type: none"> • Digital government portal 	<ul style="list-style-type: none"> • Digital government portal • Social net-working sites
Regional portal (e.g.. Hong Kong www.gov.hk)	<ul style="list-style-type: none"> • Digital government portal • Blogs • Content communities • Collaborative projects • Social net-working sites 	<ul style="list-style-type: none"> • Digital government portal • Blogs • Content communities • Collaborative projects • Social net-working sites 	<ul style="list-style-type: none"> • Digital government portal 	<ul style="list-style-type: none"> • Digital government portal • Collaborative projects • Social net-working sites
National portal (e.g.. Germany www.bundesregierung.de)	<ul style="list-style-type: none"> • Digital government portal • Blogs • Content communities • Social net-working sites 	<ul style="list-style-type: none"> • Digital government portal • Content communities • Social net-working sites 		

Table 4.6 Digital government service categories

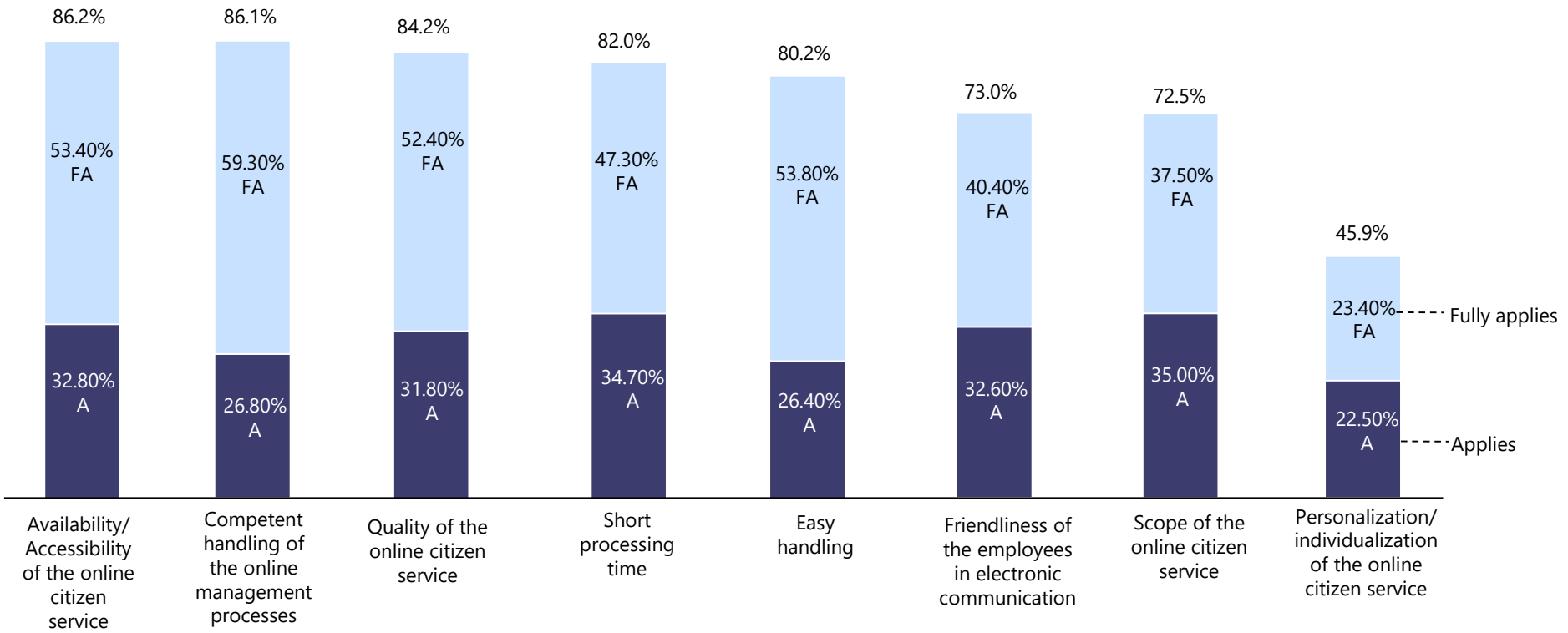
Digital Government Service	Information and Service Examples
Civic and immigration services	ID card, residence permit, driver license application, divorce information, voter assistance
Health and medical services	Insurance services, facility information, nutrition information, vaccines information
Business and employment services	License application, financial services, , legal assistance, job portal, job hunting information
Taxes and duties services	Tax declaration service, tax payment service, property tax information
Car, transport and road services	Vehicle registration, public transport information, parking license service, accident information
Housing and property services	Affordable housing information, construction permit services, utility information
Social and volunteering services	Social security information, community program information, donation service
Family services	Child care information, adoption information, day care center information
Government, law, and order services	Electoral matters, consumer protection, crime and government reports, coast guard information
Arts, culture, and tourism services	Locations, activities, funding and support, visitor information
Recreation and sport services	Park and nature information, sport locations, sport activities, youth event information
Libraries and education services	Enrollment, e-book services, student support, rules and policies, adult education
Environment and recycling services	Garbage and recycling information, animal control, air and water quality information

Fig. 4.22 Importance of digital government service preference categories



Data Source: Wirtz (2021, 2022a, 2022b), Wirtz (2024)

Fig. 4.23 Characteristics of a very good online citizen service



Data Source: Wirtz (2020), Wirtz (2024)

Fig. 4.24 Channel characteristics of multi channel public service delivery

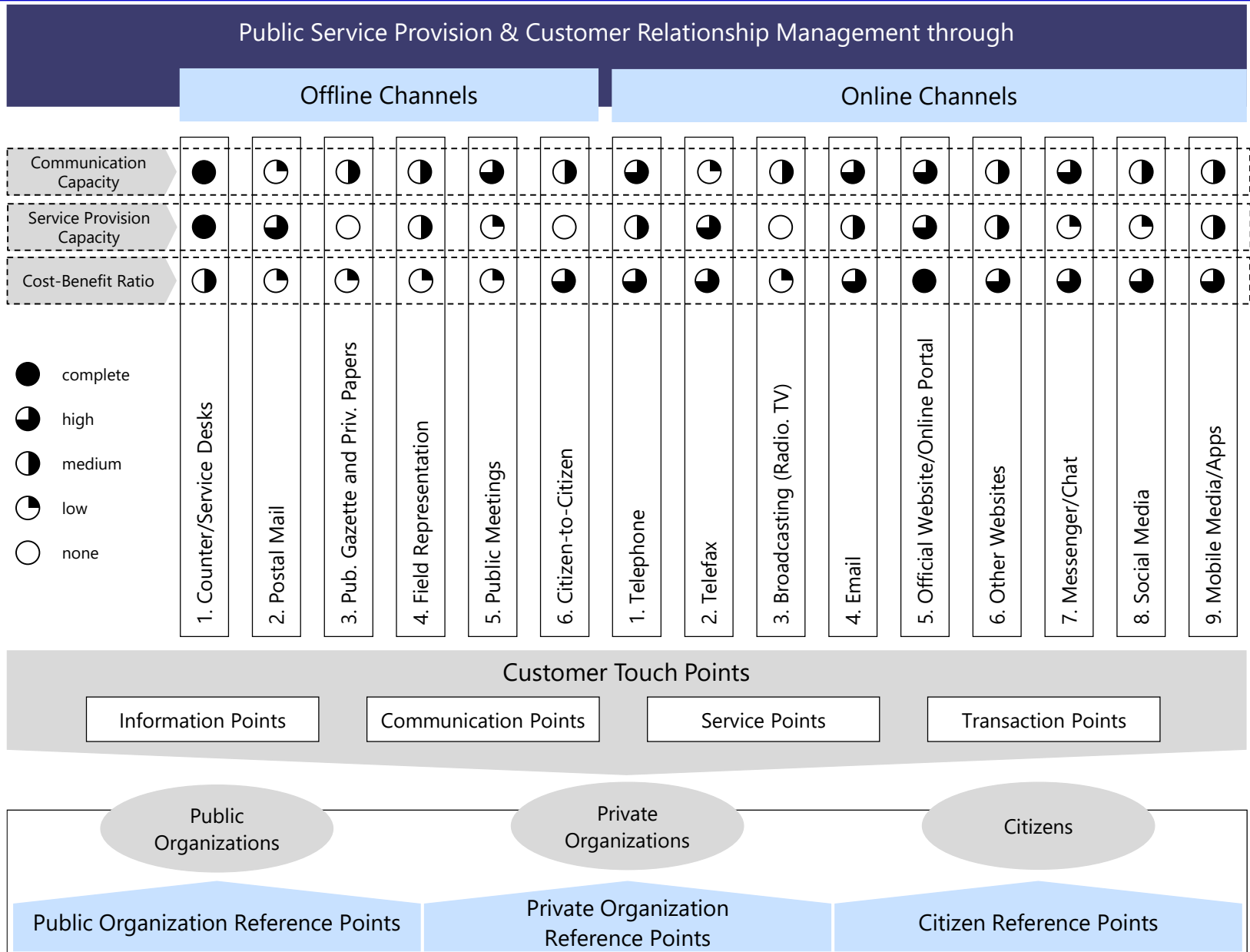


Fig. 4.25 Public multichannel strategy framework

Approach Aspects	Isolated Channel Strategy	Combined Channel Strategy	Integrated Channel Strategy
Coordination	<ul style="list-style-type: none"> • Uncoordinated channels/channel-inherent management • Closed channel structure • Channel competition 	<ul style="list-style-type: none"> • Partially coordinated channels/channel-inherent management • Loosely linked channel structure • Channel competition 	<ul style="list-style-type: none"> • Completely coordinated channels/comprehensive channel management • Interdependent channel structure • No competition between channels
Formation	<ul style="list-style-type: none"> • Lead channel structure • Channel-specific management 	<ul style="list-style-type: none"> • Mostly lead channel Structure • Comprehensive channel management 	<ul style="list-style-type: none"> • Multichannel structure • Centralized overall channel management
Organization	<ul style="list-style-type: none"> • High individual responsibility • Low coordination • High decentralization 		<ul style="list-style-type: none"> • High interdependence • High coordination • High centralization

Source: Wirtz and Daiser (2017a), Wirtz (2024)

Fig. 4.26 User-centered success factors

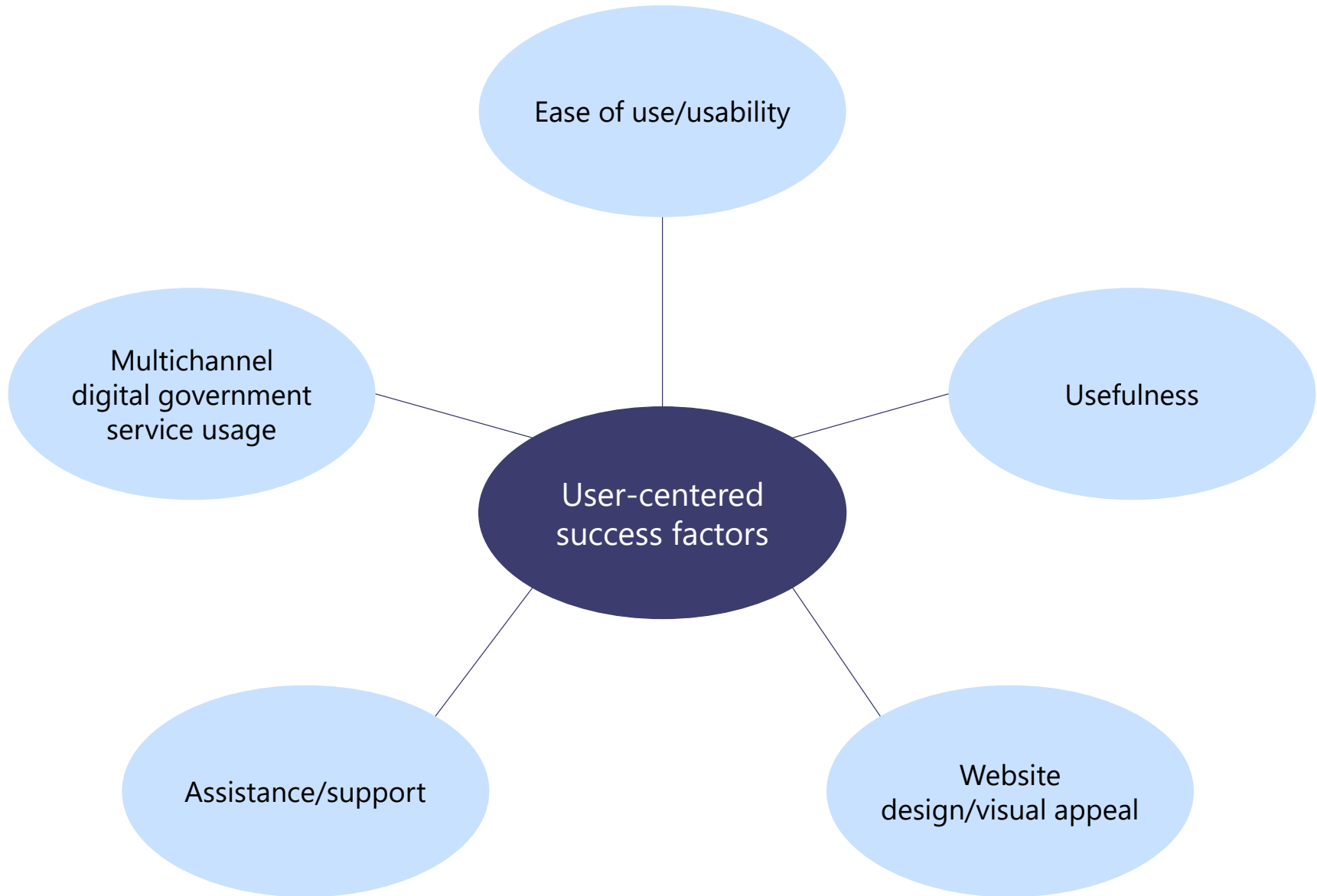
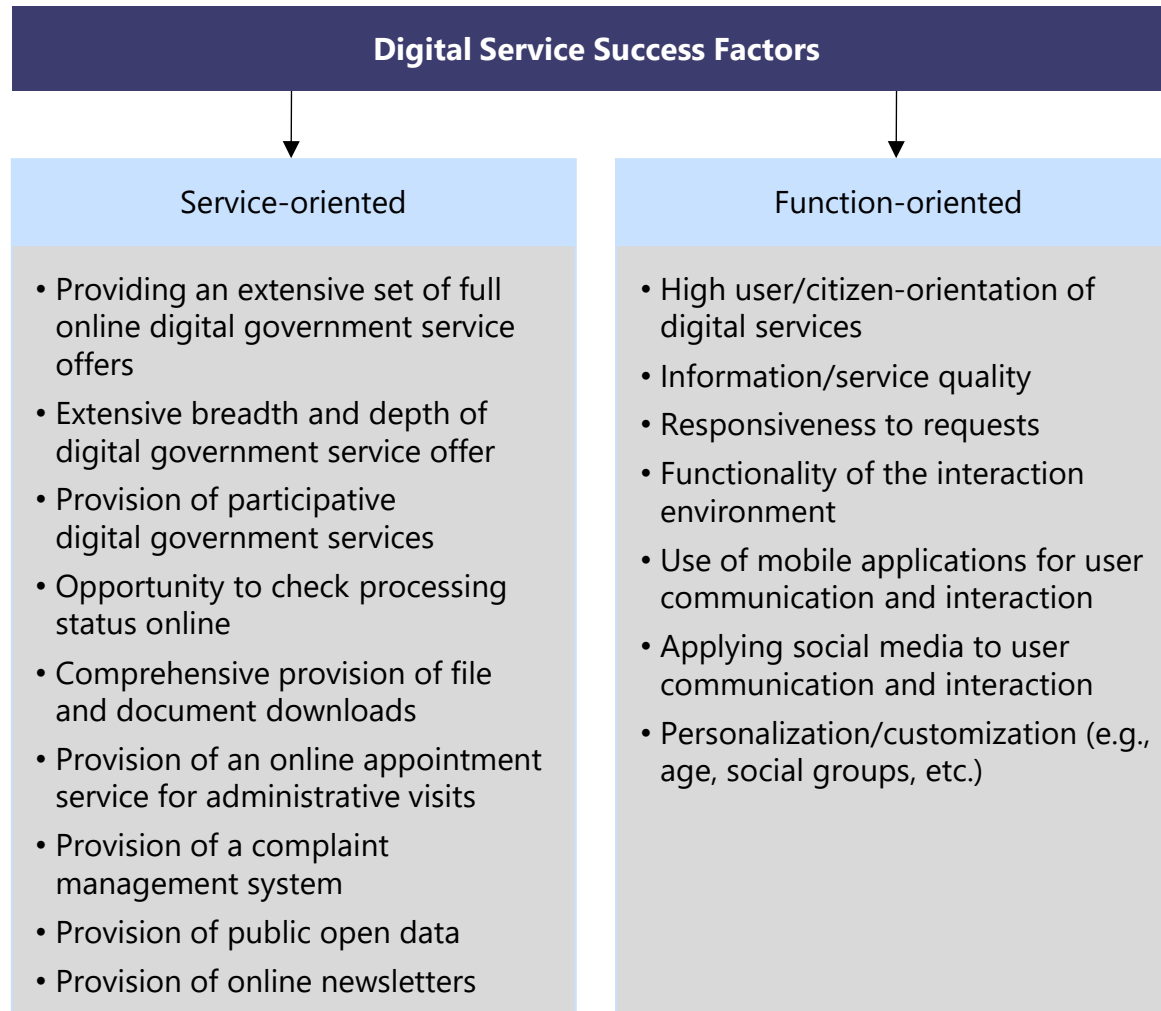
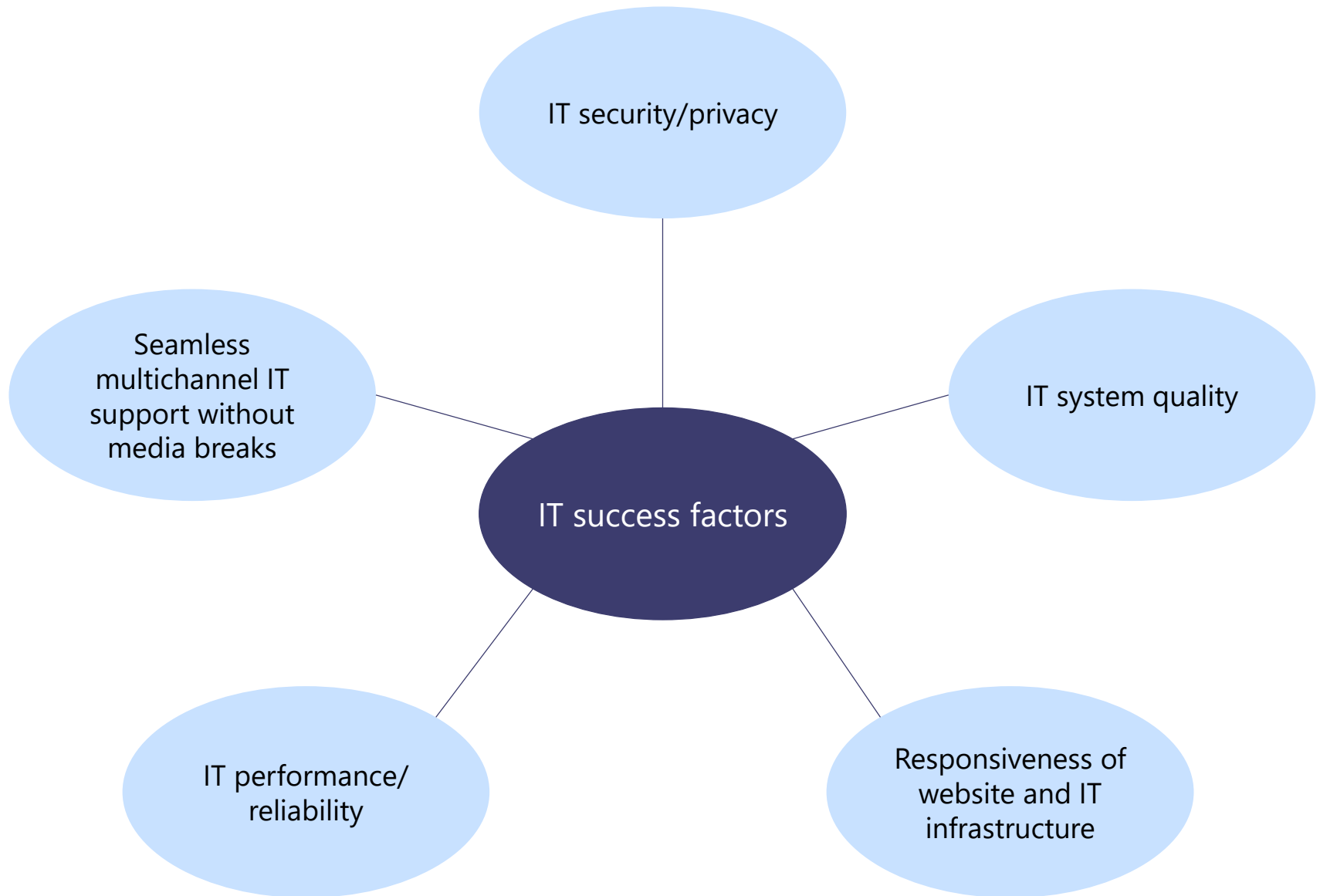


Fig. 4.27 Digital service success factors



Source: Wirtz and Daiser (2017), and Wirtz (2021, 2022b), Wirtz (2024)

Fig. 4.28 IT success factors



Source: Wirtz and Daiser (2017), Wirtz (2021, 2022b), Wirtz (2024)

Chapter 4 Questions and topics for discussion

Chapter 4 Questions and topics for discussion



Review questions

1. Define digital government and describe the actors and interaction structures.
2. Describe the concepts of open government and e-participation.
3. Define the smart city concept.
4. Describe the USS Digital Demand Factor System.
5. Explain the success factors of digital government.

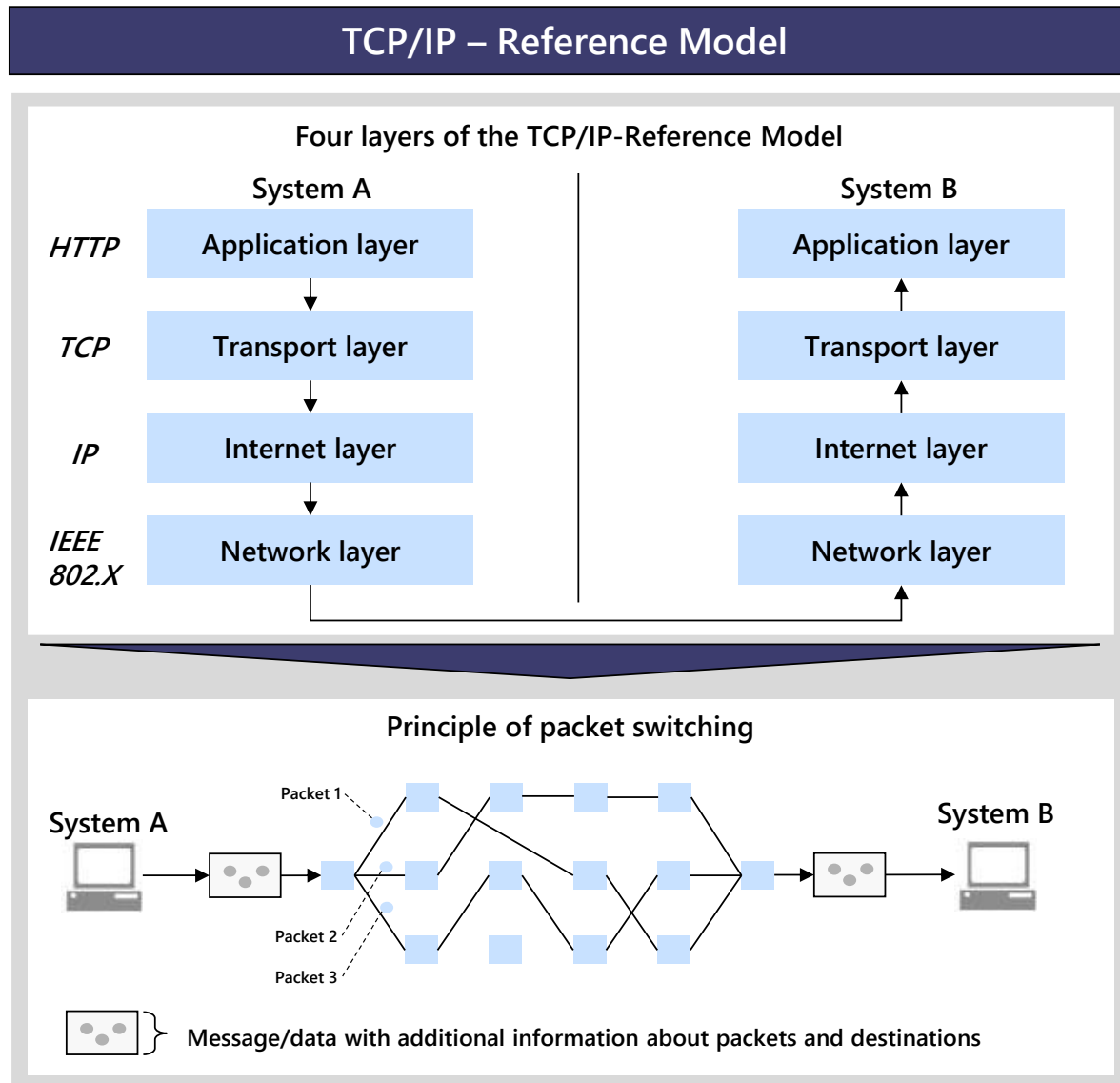


Topics for discussion

1. In many countries, digital administration lags considerably behind private and business Internet applications. Discuss why the public sector is having greater difficulty in pushing forward with digital governance.
2. Discuss the impact of smart city implementation on public life.
3. Discuss which applications are the most important in digital government for you. Can they make your life easier and be offered in the public sector without significant security precautions (identification and authorization)? (Privacy!)

Chapter 5: Fundamentals of Internet Technology and Human-Machine Application

Fig. 5.1 Basic building blocks of Internet communication



Source: Wirtz (2013, 2021, 2023), Wirtz (2024)

Fig. 5.2 Client-server principle and Internet addressing with DNS

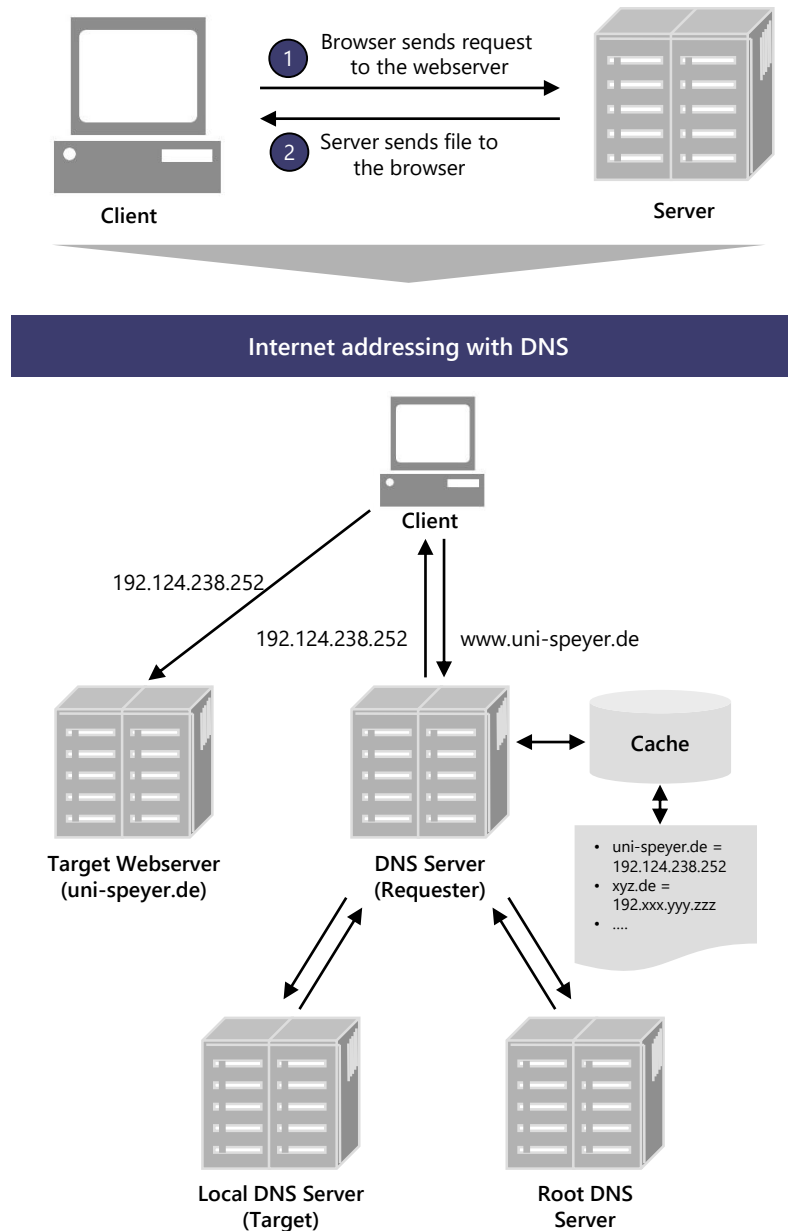


Fig. 5.3 Distribution of tasks between client and server

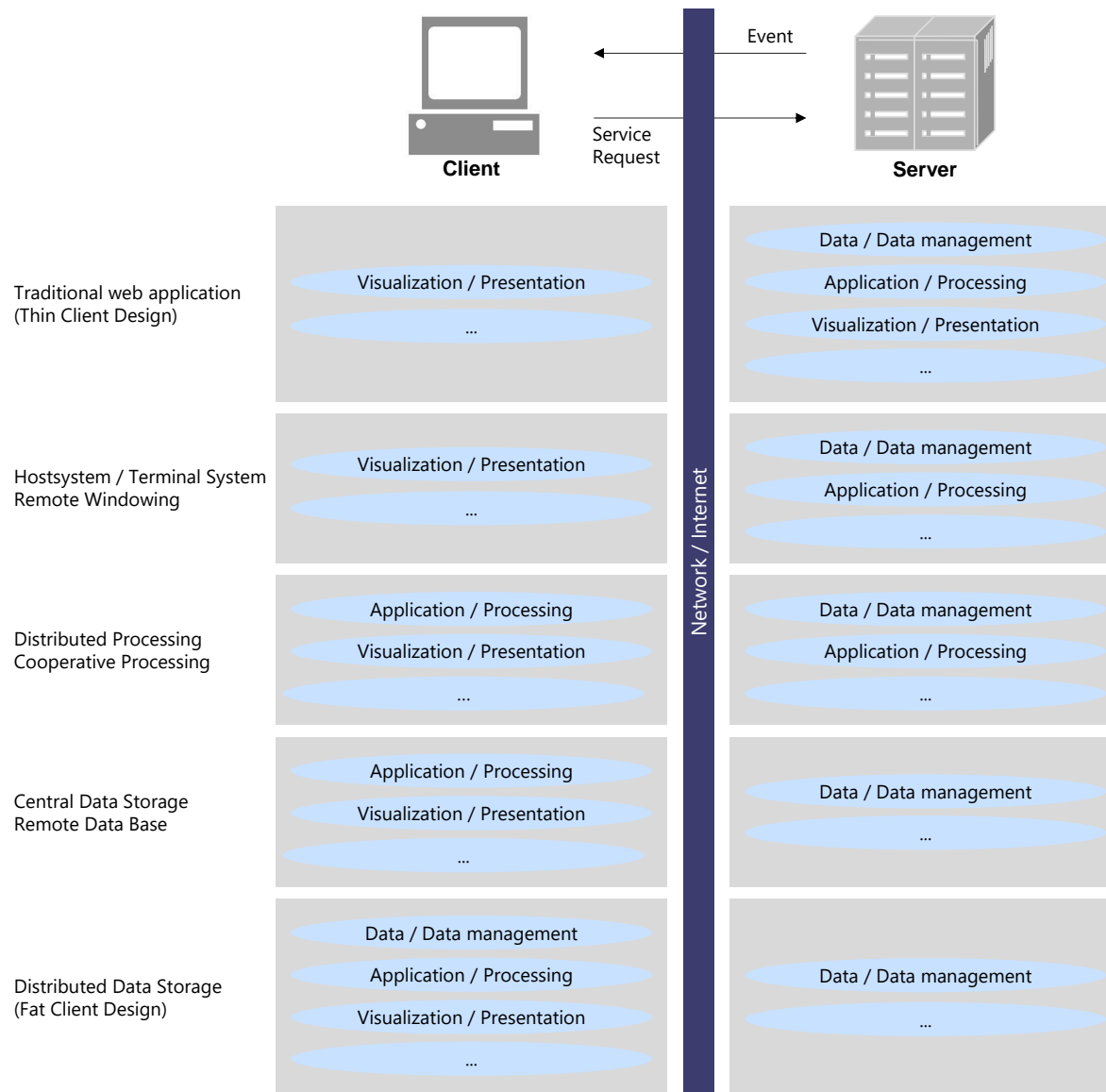


Fig. 5.4 Example of digital business architecture

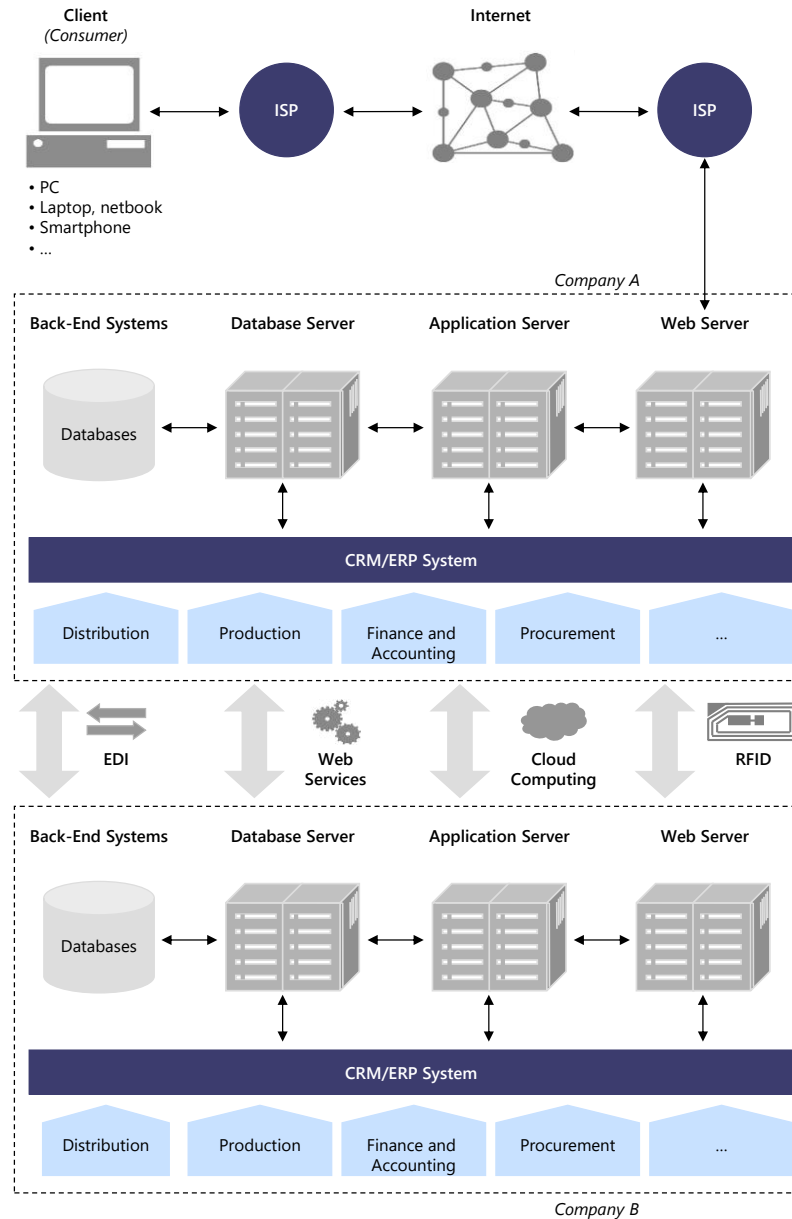
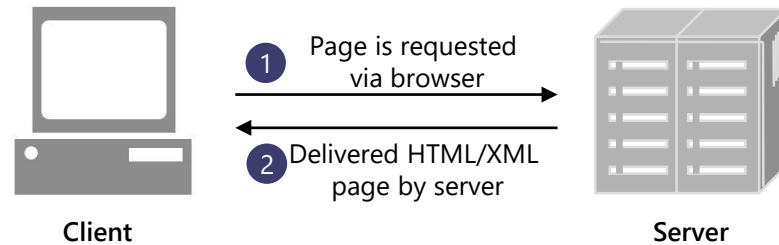


Table 5.1 Classification of the most important services on the Internet

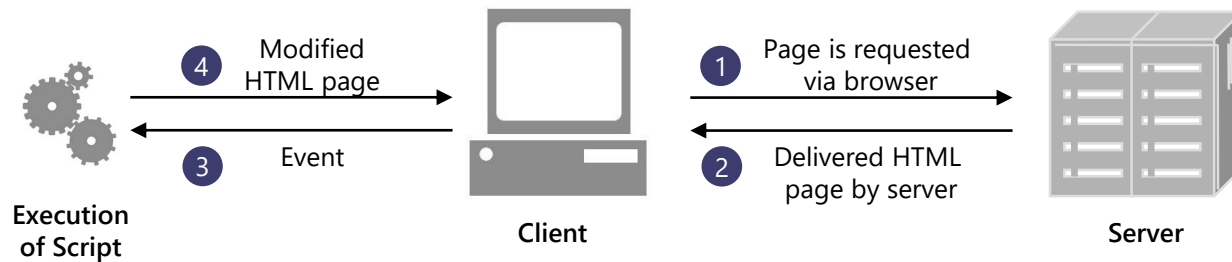
Services	Protocol	Description	Application
Word Wide Web	HTTP/HTTPS	Transfer of websites	Web browser (Google Chrome, Internet Explorer, Firefox, Opera, etc.)
Email	SMTP/POP3/IMAP	Exchange of electronic messages (with data attachments)	Email program (Outlook, Thunderbird, etc.) or Web-based interface
Data transfer	FTP/FTPS	Data transfer to Internet server	FTP clients (WS-FTP, FileZilla, etc.)
Encrypted network connections	SSH	Encrypted access to other computers	PuTTY, WinSCP, etc.
Virtual private network (VPN)	IPSec/TLS/SSL/ViPNet/PPTP/PPPD	Secure partial networks with restricted access to the Internet	Different clients (OpenVPN, Cisco VPN, etc.)
Remote control	Telnet	Use of remote computers	Functionality provided by operating system
Distributed data exchange (peer-to-peer procedure)	BitTorrent/Gnutella	Sharing site for decentral exchange of files	BitTorrent, Soulseek, WinMX, etc.
Usenet	NNTP	Discussion forum	News clients, mostly integrated into email programs
Voice over IP (VoIP)	SIP/SIPS/H.323/IAX/MGCP/Jingle	Phone via the Internet	Skype, etc.
Instant messaging	OSCAR/Simple/Tencent QQ/XMPP	Instant transmission of text messages; type of chat	WhatsApp Web, Facebook Messenger, Skype, etc.

Fig. 5.5 Static vs. dynamic WWW documents

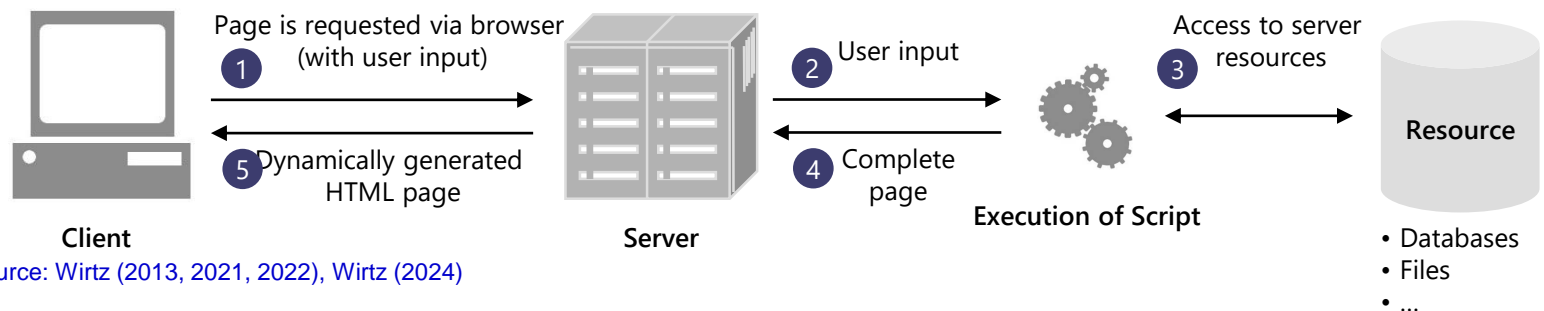
Display of Static WWW Documents



WWW Documents with Client-Side Script Execution

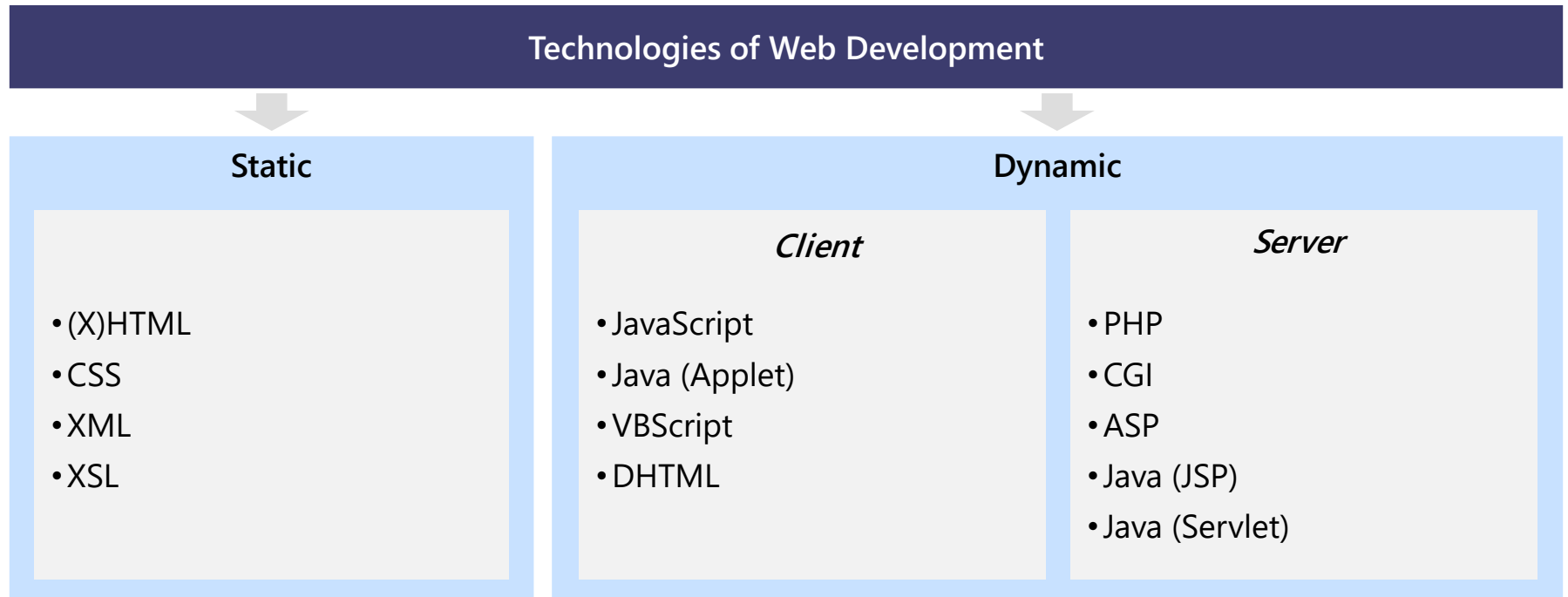


WWW Documents with Server-Side Script Execution



Source: Wirtz (2013, 2021, 2022), Wirtz (2024)

Fig. 5.6 Static and dynamic languages of Web development



Source: Wirtz (2013, 2021, 2022, 2023), Wirtz (2024)

Fig. 5.7 Structure of syntax of a HTML and XML document

HTML-Document	XML-Document
<pre data-bbox="142 354 950 921"><html> <head> Title, meta information, style information, skript,.... </head> <body> Text, links, tables, images, form checkboxes, </body> </html></pre>	<pre data-bbox="977 354 1785 1096"><?xml version="1.0" encoding="UTF-8" standalone="yes"?> <order> <product> <number>0123456</number> <name>BlueRay Player ABC</name> <price>249.99</price> <quantity>1</quantity> </product> <customer> <number>87654</number> <name>Doe, Jane</name> <address>Freiherr-vom-Stein Str. 2, 67346 Speyer</address> </customer> </order></pre>

Source: Wirtz (2013, 2021, 2023), Wirtz (2024)

Fig. 5.8 Operating principle and schedule of an AJAX application

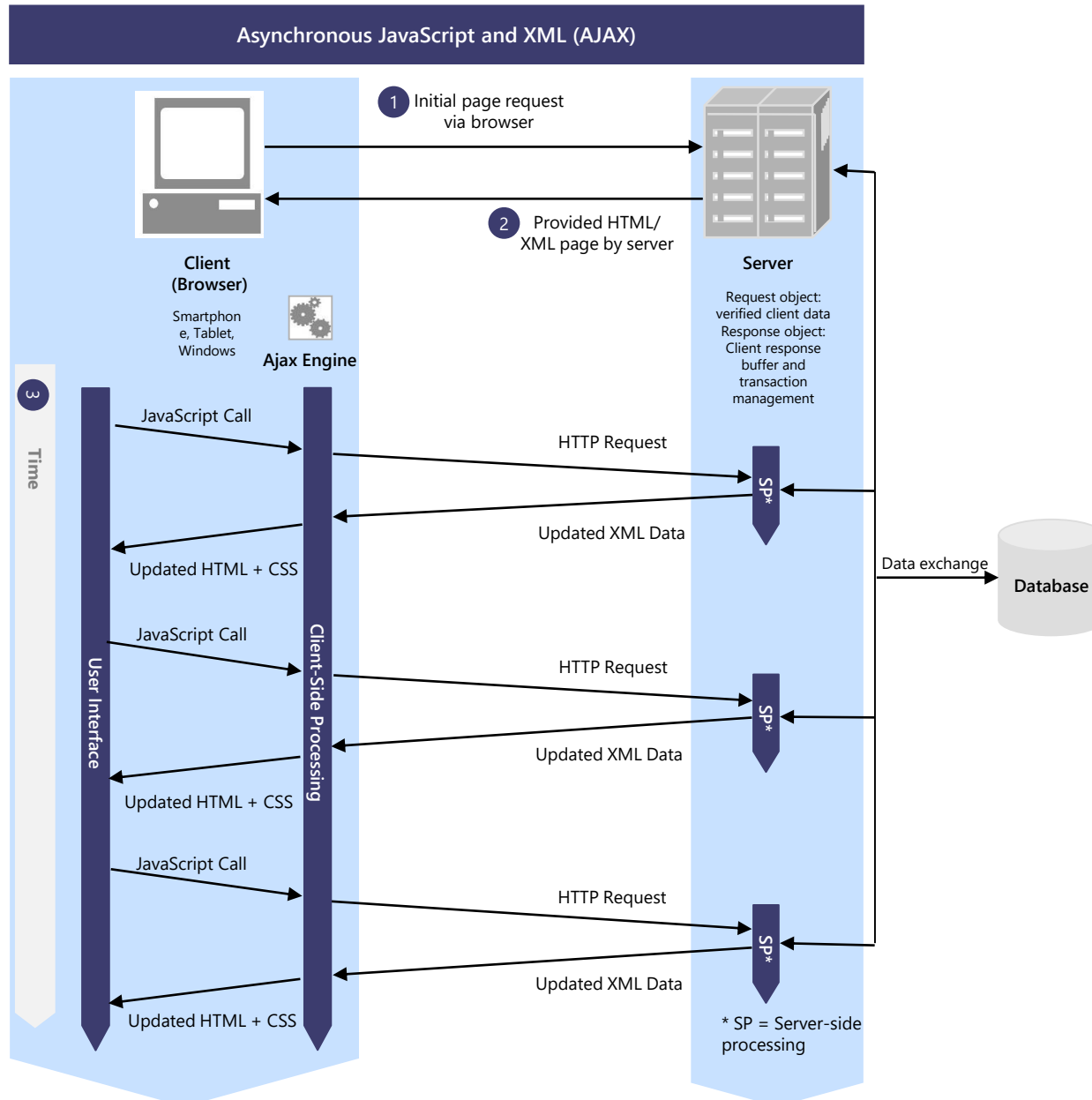
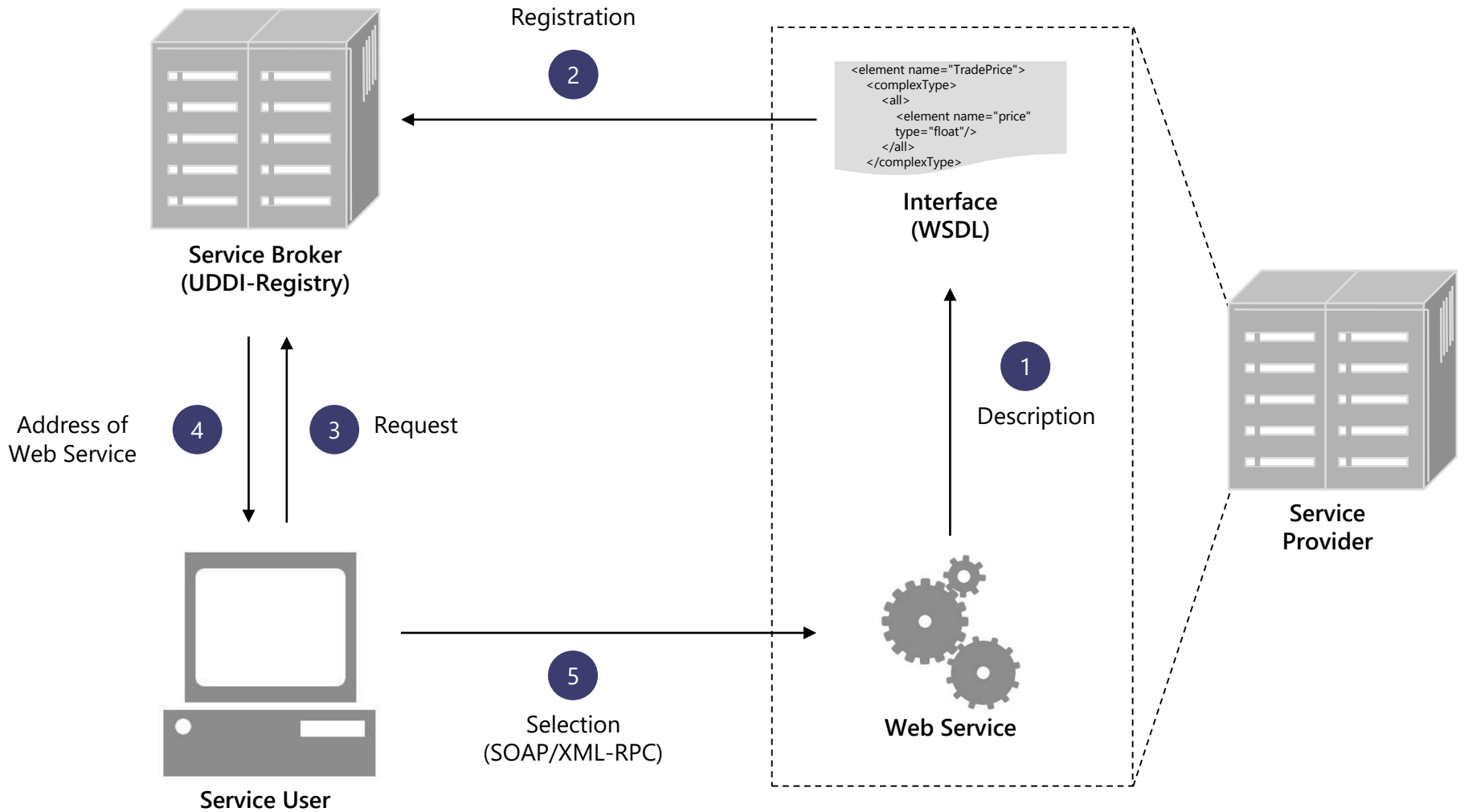


Fig. 5.9 Operating principle of a Web service



Source: Wirtz (2013, 2021, 2022, 2023), Wirtz (2024)

Table 5.2 Bandwidths of 5G technology

	Frequency	5G Reach	Speed
Low-band	• 600–700 MHz	• Several 100 km ²	• 30–250 Mbps
Mid-band	• 2.5–3.5 GHz	• Several kilometers	• 100–900 Mbps
High-band (millimeter wave)	• 24–39 GHz	• 1-km radius or less	• 1–3 Gbps

Source: Horwitz (2019), Wirtz (2024)

Fig. 5.10 Development of the human-machine interface (Stone Age to Renaissance)



In the stone age humans were using tools and weapons made of wood and stone (e.g. bow and arrow)



Around 800 BC, they began to use of pulleys, catapults and water wheels



In the 15th century, the multiplication of texts is revolutionized by the printing of books; in addition, there have been clocks, telescopes, rifles and cannons

300,000 B.C.

3,000 B.C.

800 B.C.

500 A.C.

1,500 A.C. until 1,600 A.C.

The first wheels, pottery wheels, ploughs and looms were developed from around 3,000 BC onwards

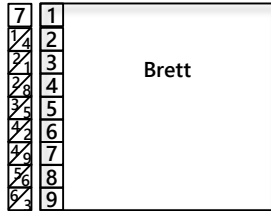


The techniques developed further to mills, treadle loom and tribrach



Source: Wirtz (2013, 2021, 2023), Wirtz (2024)

Fig. 5.11 Development of the human-machine interface (17th to 19th century).



Wilhelm Schickard builds a 4-function calculating machine with Napier's rake



The first mechanical looms with punch card control



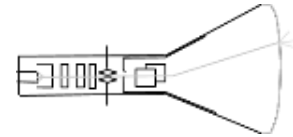
Charles Babbage designs the analytical engine



Rasmus Malling-Hansen builds the first production-ready typewriter



The first modern automobile is built by Carl Benz



Invention of the cathode ray tube by Ferdinand Braun

1623 1700 1728 1817 1837 1861 1865 1877 1886 1888 1897

Thomas Newcomen invents the first steam engine

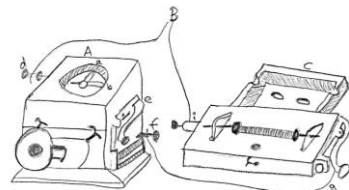


Source: Wirtz (2013, 2021, 2023), Wirtz (2024)

Karl Drais develops the preliminary stage of the bicycle, the walking machine



Philipp Reis develops the telephone and the loudspeakers



The microphone is invented by Emil Berliner



Herman Hollerith works on the punch card based data



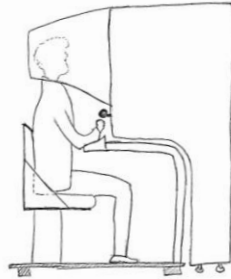
Fig. 5.12 Development of the human-machine interface (1940 to 1970)



Konrad Zuse invents the fully automatic, program-controlled and freely programmable computer



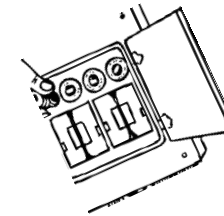
Kenon Taylor develops the trackball as a precursor of the computer mouse



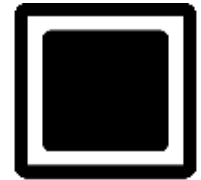
Virtual reality application "Sensorama" is presented by Morton Heilig



Implantation of the first pacemaker in Stockholm



Development of the IBM Shoebox, a digital speech recognition



Donald L. Bitzer and H. Gene Slottow design the plasma screen



The ENIAC mainframe computer with punch card based data entry is presented by IBM

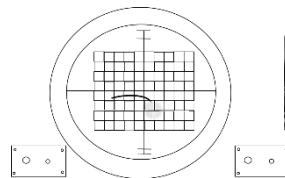


Source: Wirtz (2013, 2021, 2023), Wirtz (2024)

Invention of the light pen at MIT



Presentation of the first video game "Tennis for two" by William Higinbotham



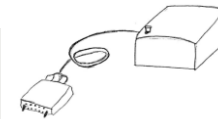
IBM and GM build the first graphic computer system with light pen



Introduction of text-based interaction through command line interface



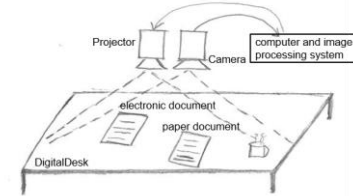
Douglas C. Engelbart builds the first computer mouse



Ivan Sutherland presents a virtual reality system with head-mounted display



Fig. 5.13 Development of the human-machine interface (1970 to 2000)



The first touch screen is built by Sam Hurst

Construction of the first hearing prosthesis for the deaf (cochlear implant)

Development of the first transparent multitouch screen by Bob Boie

Invention of the touchpad by George Gerpheide

Construction of the "Digital Desk" as one of the first augmented reality systems by Pierre Wellner

Introduction of electrodes that improve the mototrics of Parkinson's patients

1974 1975 1977 1981 1984 1988 1990 1991 1998

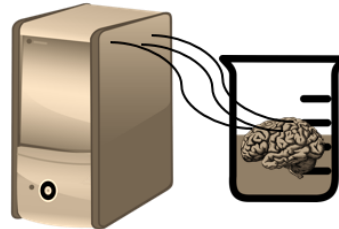
Introduction of the first graphical user interface with icon icons and pop-up menu



Introduction of the first commercial computer system Xerox Star and the first IBM personal computer



First brain-computer interface is developed by Lawrence Farwell and Emanuel Donchin



Implementation of the World Wide Web by Tim Berners-Lee and Robert Cailliau

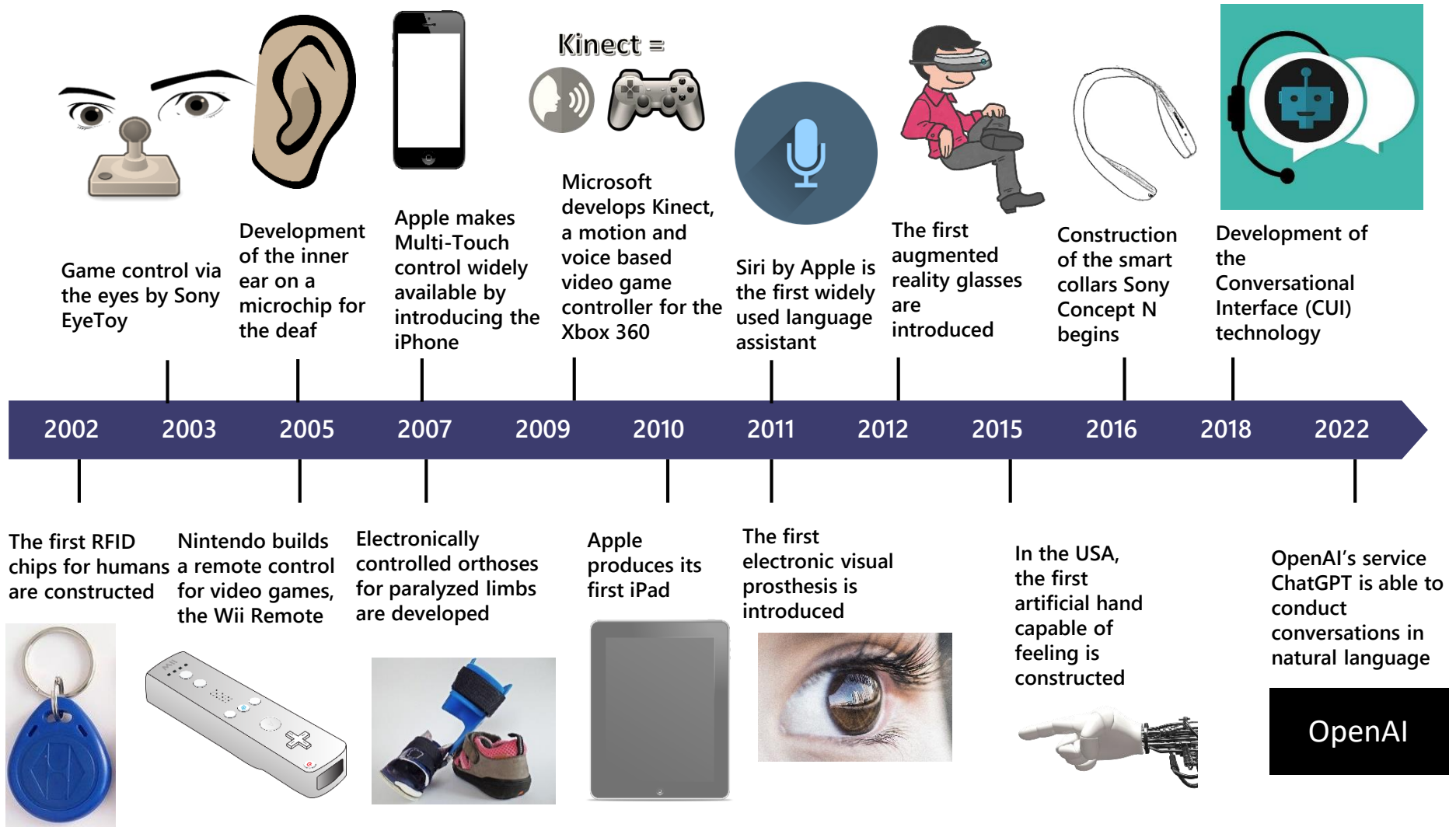


Concept of Ubiquitous Computing by Mark Weiser and development of Personal Digital Assistants (PDA)



Source: Wirtz (2013, 2021), Wirtz (2024)

Fig. 5.14 Development of the human-machine interface (since 2000)



Source: Wirtz (2013, 2021), Wirtz (2024)

Fig. 5.15 HMI Model of Human-Machine Interaction

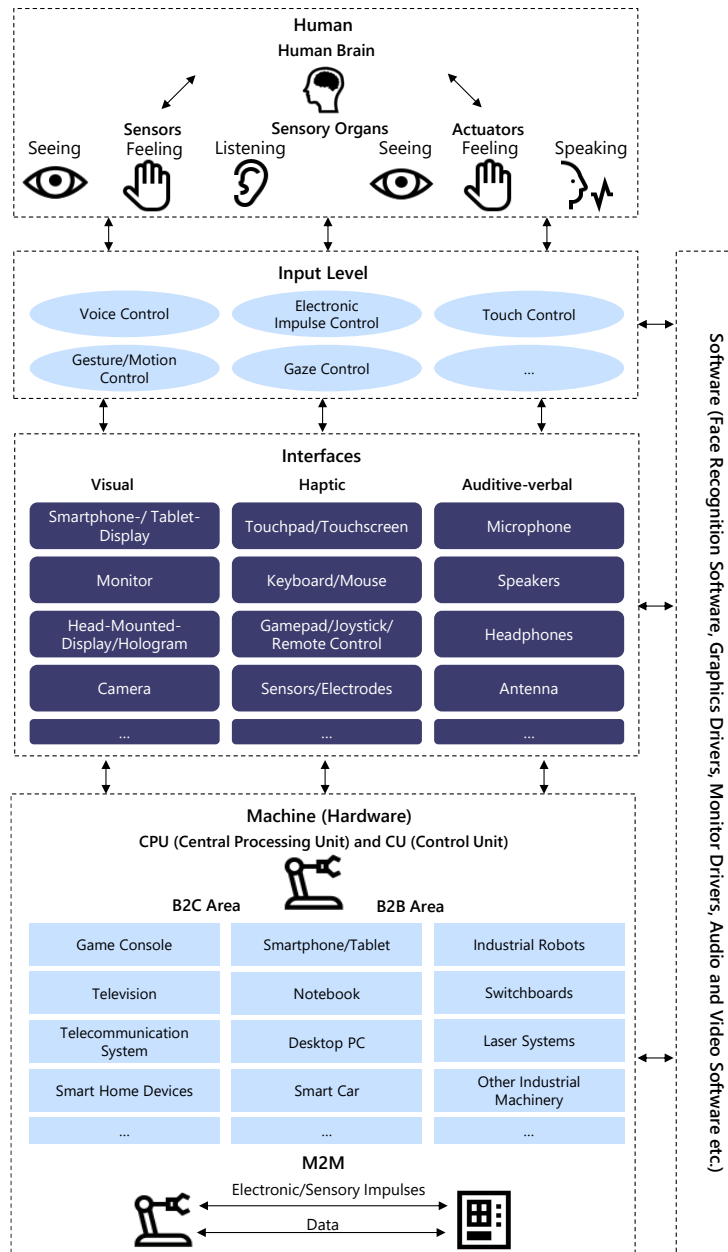


Fig. 5.16 Success factors of H2M interface design and configuration



Source: Wirtz (2013, 2021, 2022, 2023), Wirtz (2024)

Chapter 5 Questions and topics for discussion

Chapter 5 Questions and topics for discussion



Review questions

1. Illustrate the client-server principle and Internet addressing and explain how they are related.
2. Classify and describe the most important services on the Internet and go into particular detail about the respective applications.
3. Explain the basics of web development and describe how a web service works.
4. Outline the development of human-machine interaction.
5. Describe the HMI Model of Human-Machine Interaction and its success factors.

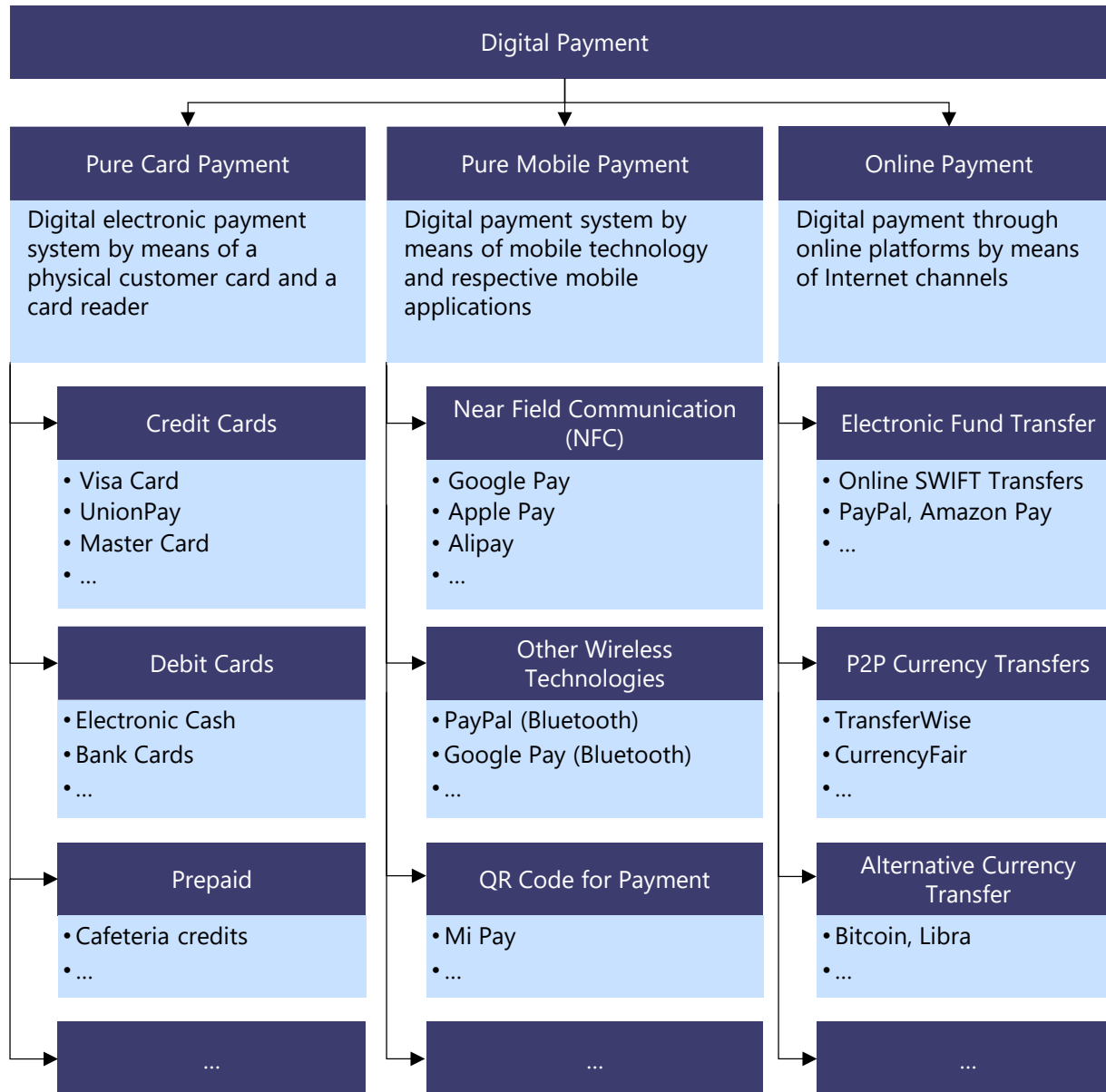


Topics for discussion

1. Discuss the future developments of human-machine interactions and configuration against the background of the increasing automation of human work through digital programs and interfaces. What are the risks for a democratic society and a free labor market?
2. Using the HMI Model of Human-Machine Interaction as an example, discuss whether interfaces implanted in humans in the future (e.g. RFID microchips) are only a future scenario or a real development possibility. Also discuss ethical aspects.
3. Discuss whether the success factors of H2M interface design and configuration presented in the model are too limited in terms of information technology. Consider what additional information technology success factors there might be!

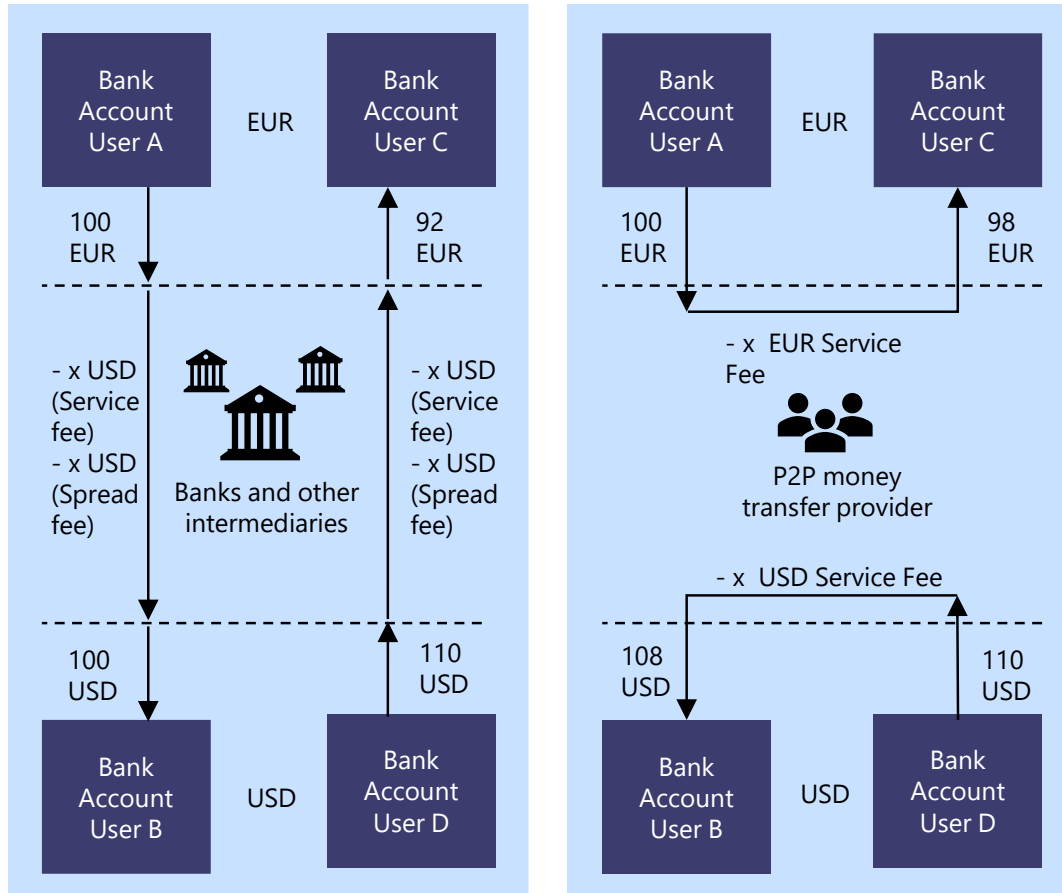
Chapter 6: Digital Payment Systems, Security and Regulation

Fig. 6.1 Digital payment systems



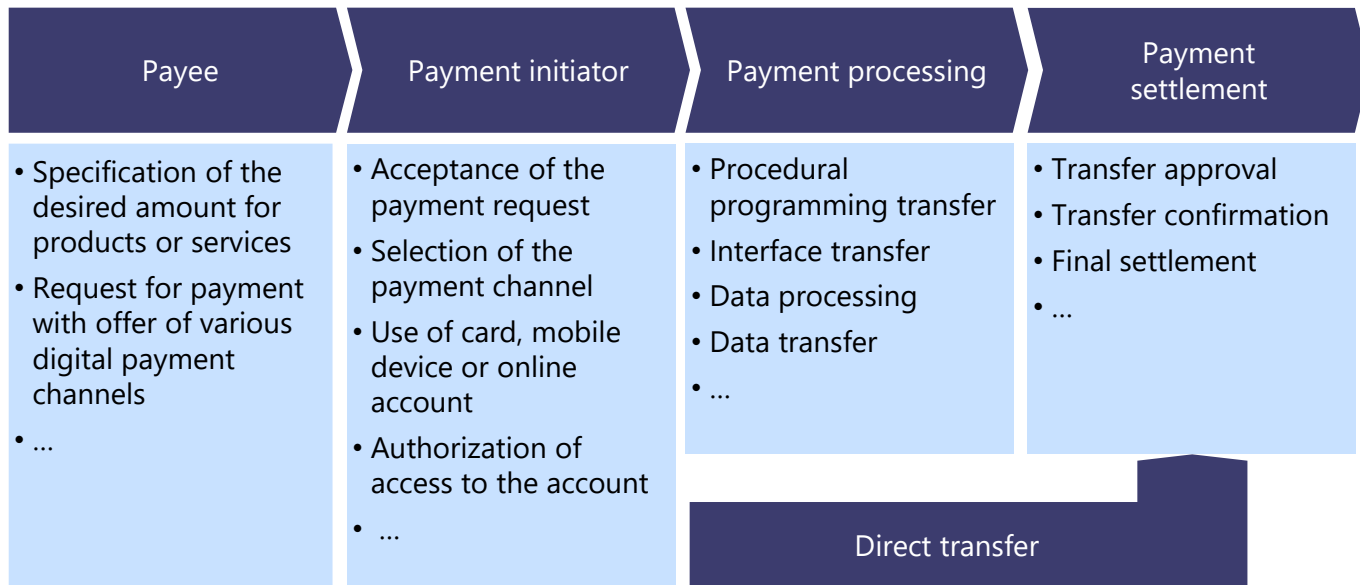
Source: Wirtz (2013, 2021), Wirtz (2024)

Fig. 6.2 Comparison international SWIFT transfer and P2P currency transfer



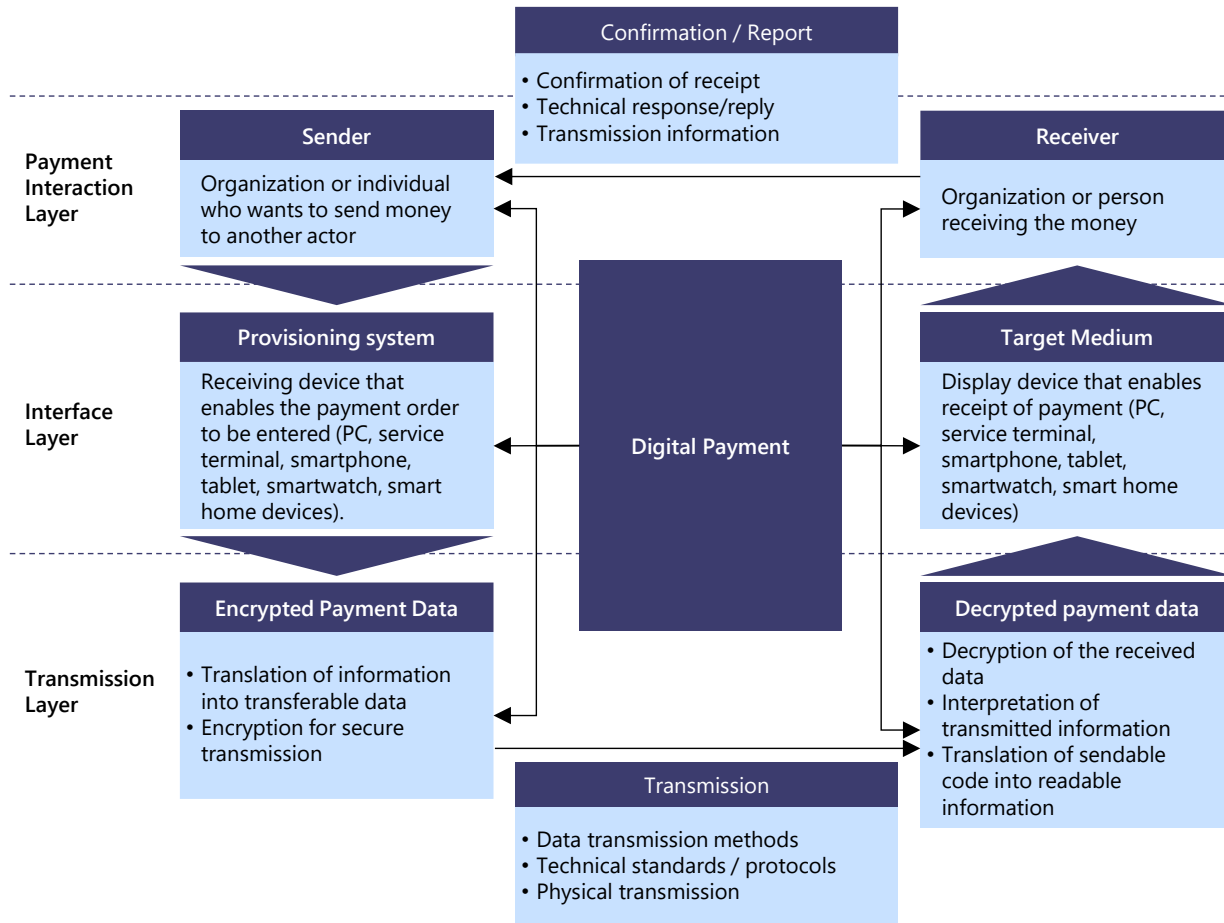
Source: Wirtz (2013, 2021, 2023), Wirtz (2024)

Fig. 6.3 Digital payment value chain



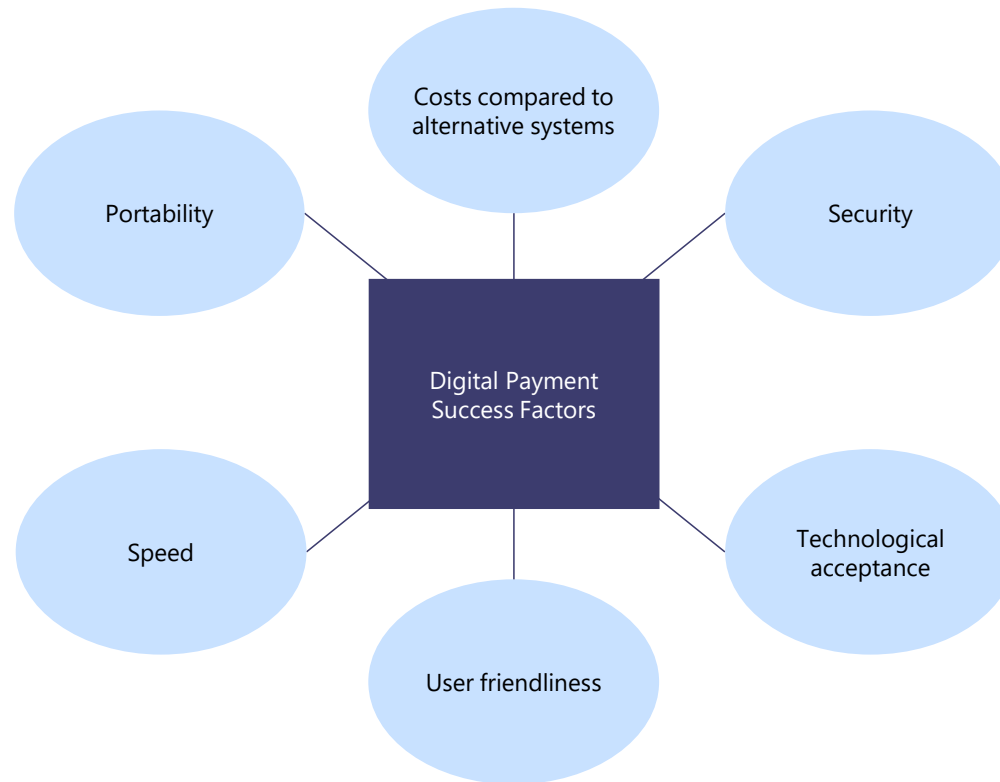
Source: Wirtz (2013, 2021, 2023), Wirtz (2024)

Fig. 6.4 Digital payment transaction process



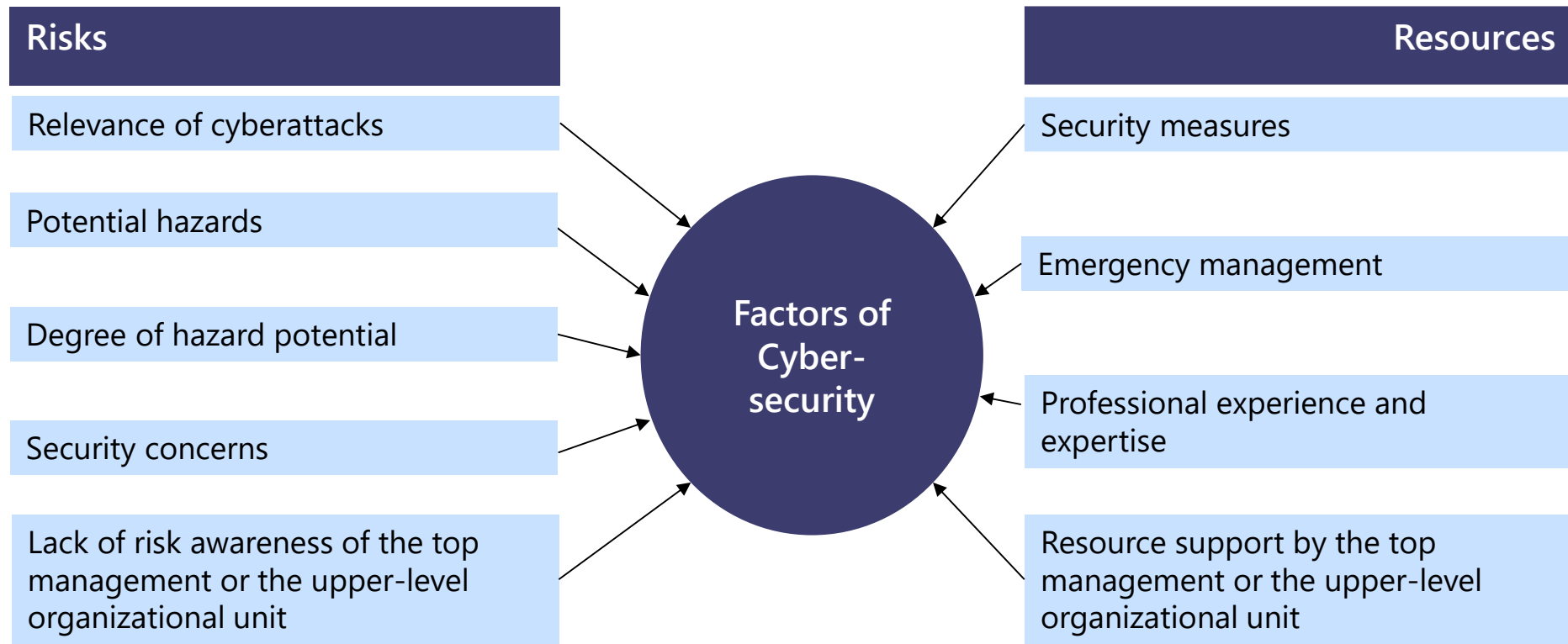
Source: Wirtz (2021, 2023), Wirtz (2024)

Fig. 6.5 Digital payment systems success factors



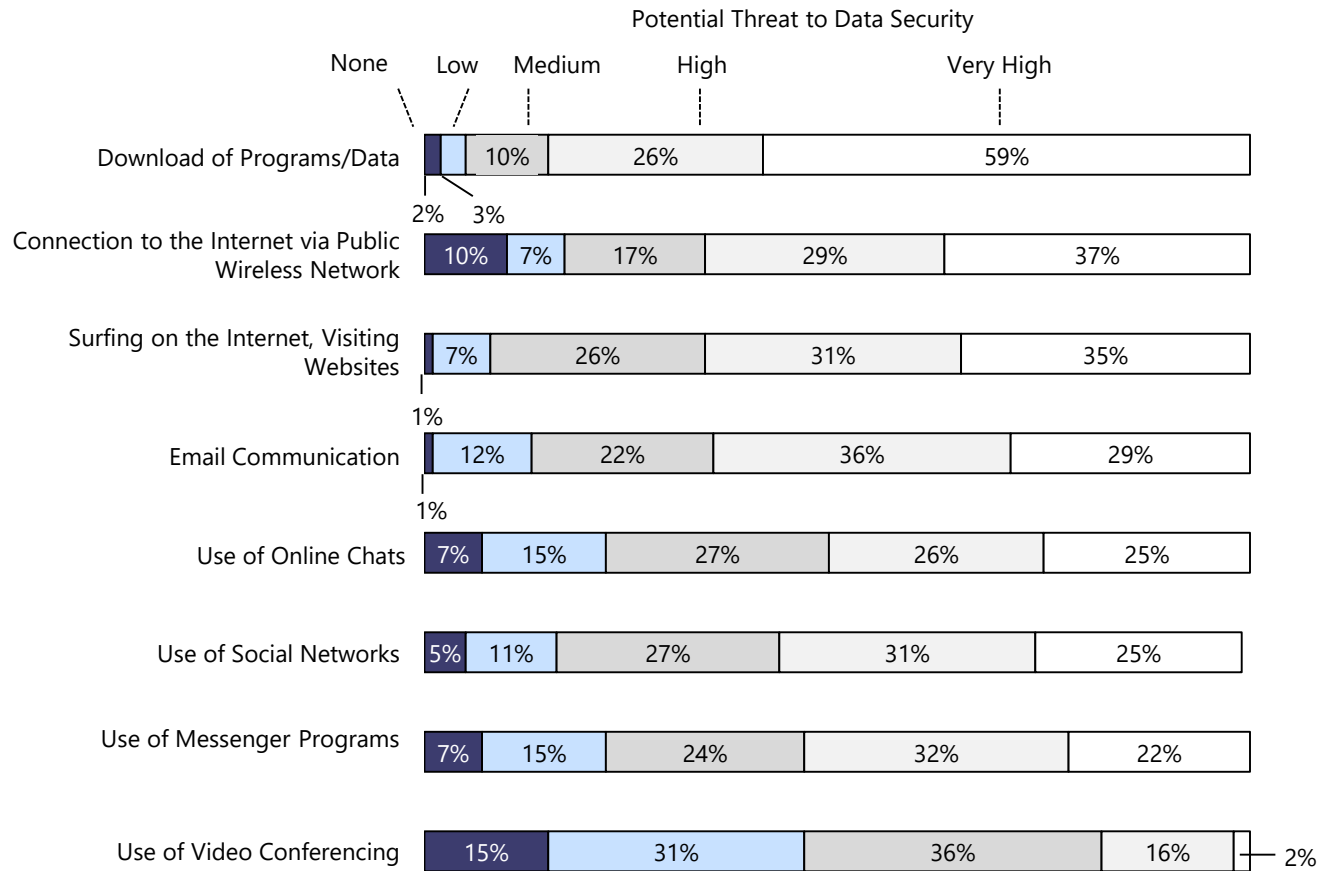
Source: Wirtz (2013, 2021), Wirtz (2024)

Fig. 6.6 Risk-Resource Cybersecurity Framework



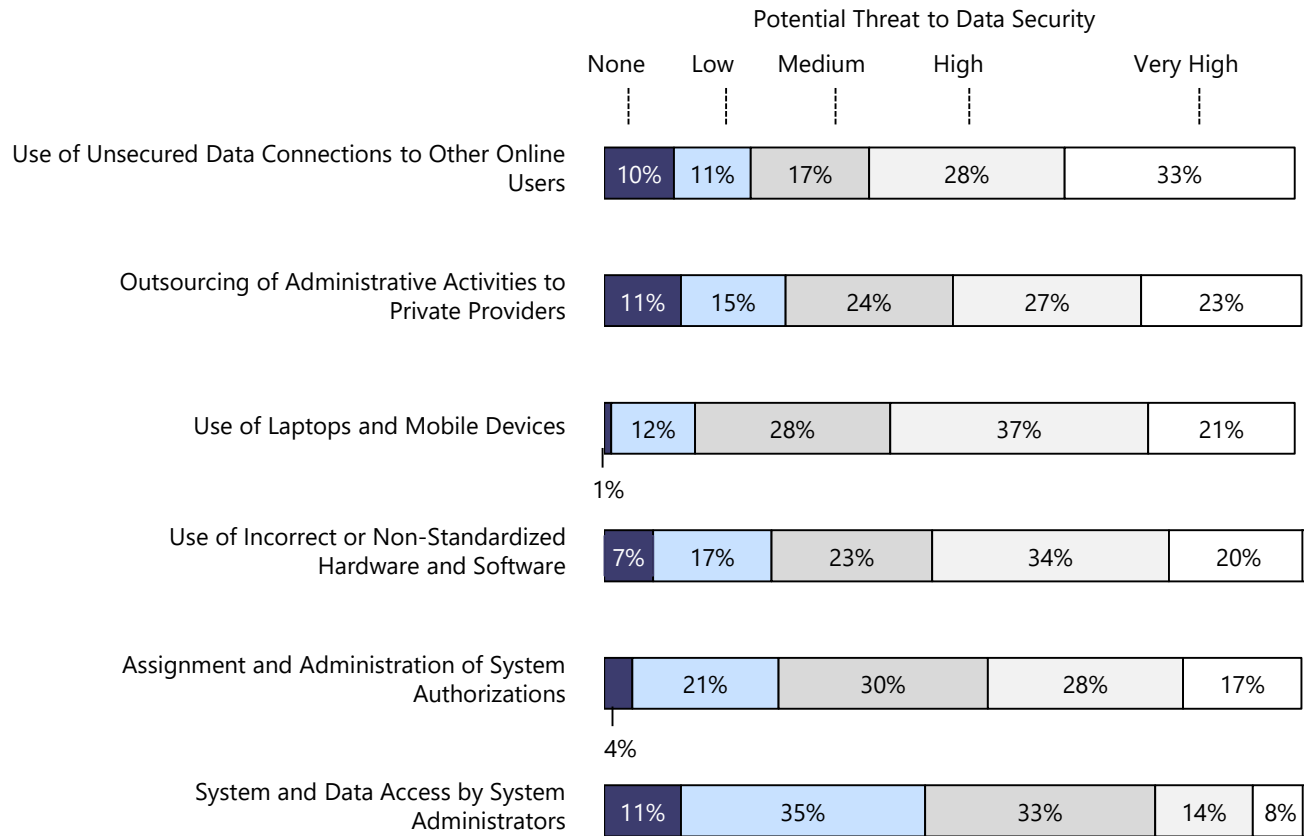
Source: Wirtz (2013, 2021, 2023), Wirtz (2024)

Fig. 6.7 Online Activities as potential sources of danger for data security



Source: Wirtz and Weyerer (2017b), Wirtz (2022, 2023), Wirtz (2024)

Fig. 6.8 Other Activities as potential sources of danger for data security



Source: Wirtz and Weyerer (2017b), Wirtz (2022, 2023), Wirtz (2024)

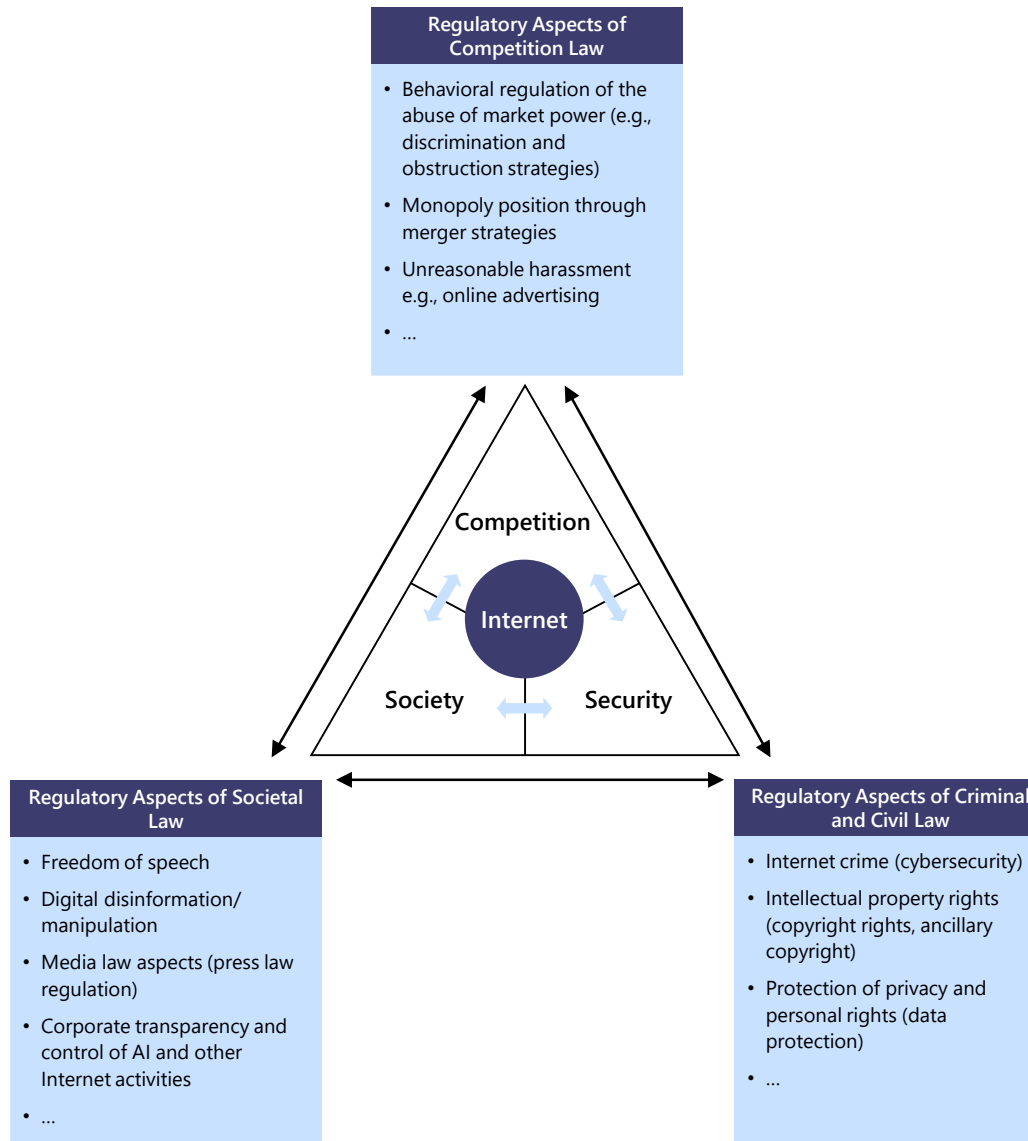
Table 6.1 Threats in computer networks (1)

Type of attack	Threat	Description
Malware	Virus	A virus is an integrated code in a (host) program that can reproduce itself and can manipulate system environments or data unnoticed.
	Worm	A worm is an independent program that can spread and reproduce itself. In contrast to a virus it does not require a host program.
	Spyware/Adware	Spyware/adware is a spy program that sends user data to the programmer/producer without the users' notice and consent or unwantedly offers them products.
	Scareware	Scareware leads the user to believe that his or her computer is broken or was compromised. Subsequently, it offers the user to eliminate the danger by asking for a payment.
	Dialer	A dialer establishes a dial-up connection to the Internet (via modem/ISDN) and is a form of malware if it establishes a connection to a very expensive fee-based number.
Attacks on IT-Infrastructures	Trojan	Trojans or Trojan horses are computer programs that give the impression of being useful applications but actually fulfill another or malicious function.
	DoS-Attack/ DDoS-Attack	A denial of service attack intentionally causes an overload of a system or a network in order to temporarily limit the availability of one or multiple services. If the attack comes from different systems, it is called a distributed DoS-attack.
	Scanner	A scanner systematically screens systems for security vulnerabilities (such as unsecured network ports) in order to attack them through the detected loophole.

Table 6.1 Threats in computer networks (2)

Interception, Reading, and Manipulation of Data	Sniffer	<p>A sniffer not only allows to intercept and record data packets in networks but also to analyze them subsequently.</p> <p>Sniffers are applied in the context of network analyses but can also be used for abuse purposes and for unauthorized data reading.</p>
	Keylogger	<p>Keyloggers record all user inputs (keyboard) and save them or send them to third parties. In this way, for instance, hackers can gain access to passwords or pin numbers.</p>
	Password Cracker	<p>Password crackers are programs that allow to bypass access barriers. In this connection, they differ with regard to the selected method; often the so-called dictionary or bruteforce attack (testing all possible combinations) is applied.</p>
	Man-in-the-Middle Attack (Snarfing)	<p>In the case of the man-in-the-middle attack, an attacker logically interposes himself or herself between two communication partners. Here, the attacker can control and arbitrarily look at or manipulate the data traffic between the communication partners.</p>
	Phishing	<p>In the case of phishing, a hacker tries to imitate a trustworthy website (e.g., online banking) and to prompt a user by means of a faked message to reveal sensitive or access data.</p>
Identity Theft/ Deception	Spoofing	<p>Spoofing generally refers to disguising one's own identity. There are many different types of spoofing. In the case of IP spoofing, for instance, a hacker modifies all IP packets with a faked sender IP and creates the impression that the packets are sent from another computer. Moreover, DNS, mail, mac, and DHCP spoofing, etc. are commonly used.</p>
	Social Engineering/ Social Hacking	<p>Social engineering refers to spying out a user's personal environment and faking an identity through this information. This personal identity is used in the context of social hacking to look at private data.</p>

Fig. 6.9 CSC Internet Regulation Model



Source: Wirtz (2013, 2021), Wirtz (2024)

Table 6.2 Essential core points of the DMA, DSA, DMG

Digital Markets Act	Digital Services Act	Data Governance Act	AI Law
<ul style="list-style-type: none"> • Applicable to “gatekeepers”, which are significant platform services • Establish a code of conduct for gatekeepers • Personalized advertising may now only take place with the consent of the user • Gatekeepers must not favor themselves in rankings • ... 	<ul style="list-style-type: none"> • Applied to digital switching devices • Services only have to take action when they become aware of illegal content, no general monitoring obligation applies • Obligation to set up a “notice and takedown procedure” for illegal content • Large online platforms must examine their services for systemic risks • ... 	<ul style="list-style-type: none"> • Regulates the disclosure of protected data to public bodies • Protected data collected with public money should benefit society • Establishment of “data pools” for the sharing of data • Facilitated sharing of data for general interest purposes • ... 	<ul style="list-style-type: none"> • Subdivision of AI systems into risk groups • Limited risk: Transparency requirements for systems (e.g. simple user applications) • High-risk systems: Evaluation of the systems before placing on the market (e.g. systems within aviation) • Unacceptable risk: Prohibition of the systems within the EU (e.g. social scoring)

Source: European Parliament and Council of the European Union (2022a, 2022b, 2022c), Wirtz (2024)

Table 6.3 Main approaches of Internet regulation

ITU Approach	Internet Governance Approach
<ul style="list-style-type: none">• International approach• Transfer of regulation to the International Telecommunication Union (ITU)• Government regulation according to the principle of sovereignty• Government control of the national Internet• Low participation opportunities for non-governmental actors• Main criticism: limited effectiveness due to the diversity and power of private sector actors	<ul style="list-style-type: none">• Transnational approach• Transnational cooperation of governmental and non-governmental actors• Participatory understanding and multi-stakeholder principle (governments, companies, NGOs, citizens, etc.)• The goal is a consensus-based regulation• Bottom-up regulatory approach• Main points of criticism: lack of legitimacy due to the involvement of non-governmental actors and power gaps between stakeholders

Source: Wirtz (2021), Wirtz (2024)

Chapter 6 Questions and topics for discussion

Chapter 6 Questions and topics for discussion



Review questions

1. Explain the different types of payment systems and processes.
2. Describe the success factors of digital payments.
3. Describe the different types of threats in computer networks.
4. Explain what measures can be taken to address cyber security risks.
5. Describe the CSC Internet Regulation Model.



Topics for discussion

1. Bitcoin is a speculative blockchain currency with significant fluctuations in value. Discuss the advantages and disadvantages of digital currencies and their dangers for the economy and society.
2. Discuss the advantages and disadvantages of comprehensive cybersecurity measures to protect state infrastructure against the background of hacker attacks. Are these protection mechanisms also important for the consumer and business sector? In this context, discuss also the possibility of cyber wars between different states.
3. Debate the necessity of a stronger regulation of markets and competition against the background of the dominant market position of Internet companies such as Google/Alphabet, Amazon, or Facebook/Meta.

Chapter 7: Internet of Things

Table 7.1 Selected definitions of IoT

Author(s)	Definition
International Telecommunication Union (2012, p. 1)	“A global infrastructure for the information society, enabling advanced services by interconnecting (physical and virtual) things based on existing and evolving interoperable information and communication technologies.”
Miorandi et al. (2012, p. 1497)	“The term “Internet-of-Things” is used as an umbrella keyword for covering various aspects related to the extension of the Internet and the Web into the physical realm, by means of the widespread deployment of spatially distributed devices with embedded identification, sensing and/or actuation capabilities.”
Xia et al. (2012, p. 1101)	“IoT refers to the networked interconnection of everyday objects, which are often equipped with ubiquitous intelligence.”
Gubbi et al. (2013, p. 1648)	“Interconnection of sensing and actuating devices providing the ability to share information across platforms through a unified framework, developing a common operating picture for enabling innovative applications. This is achieved by seamless large scale sensing, data analytics and information representation using cutting edge ubiquitous sensing and cloud computing.”
McKinsey Global Institute (2015, p. 1)	“We define the Internet of Things as sensors and actuators connected by networks to computing systems. These systems can monitor or manage the health and actions of connected objects and machines. Connected sensors can also monitor the natural world, people, and animals.”

Source: Wirtz (2018, 2021, 2023), Wirtz (2024)

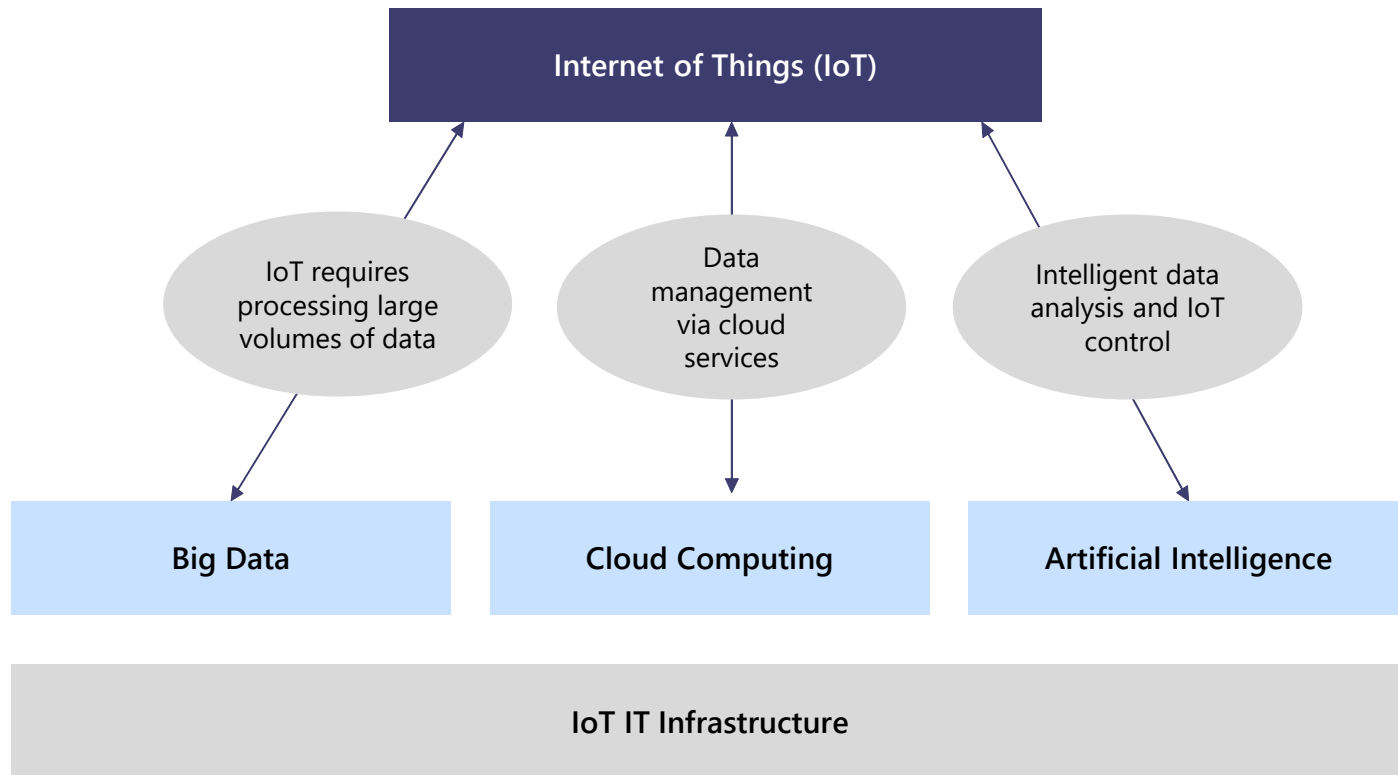
Definition of Internet of Things

Definition of Internet of Things (Wirtz 2018, 2021, 2023)

Internet of Things refers to the Internet-based networking of physical and digital products, services, machines, sensors and humans.

Source: [Wirtz \(2021\)](#), [Wirtz \(2023\)](#), [Wirtz \(2024\)](#)

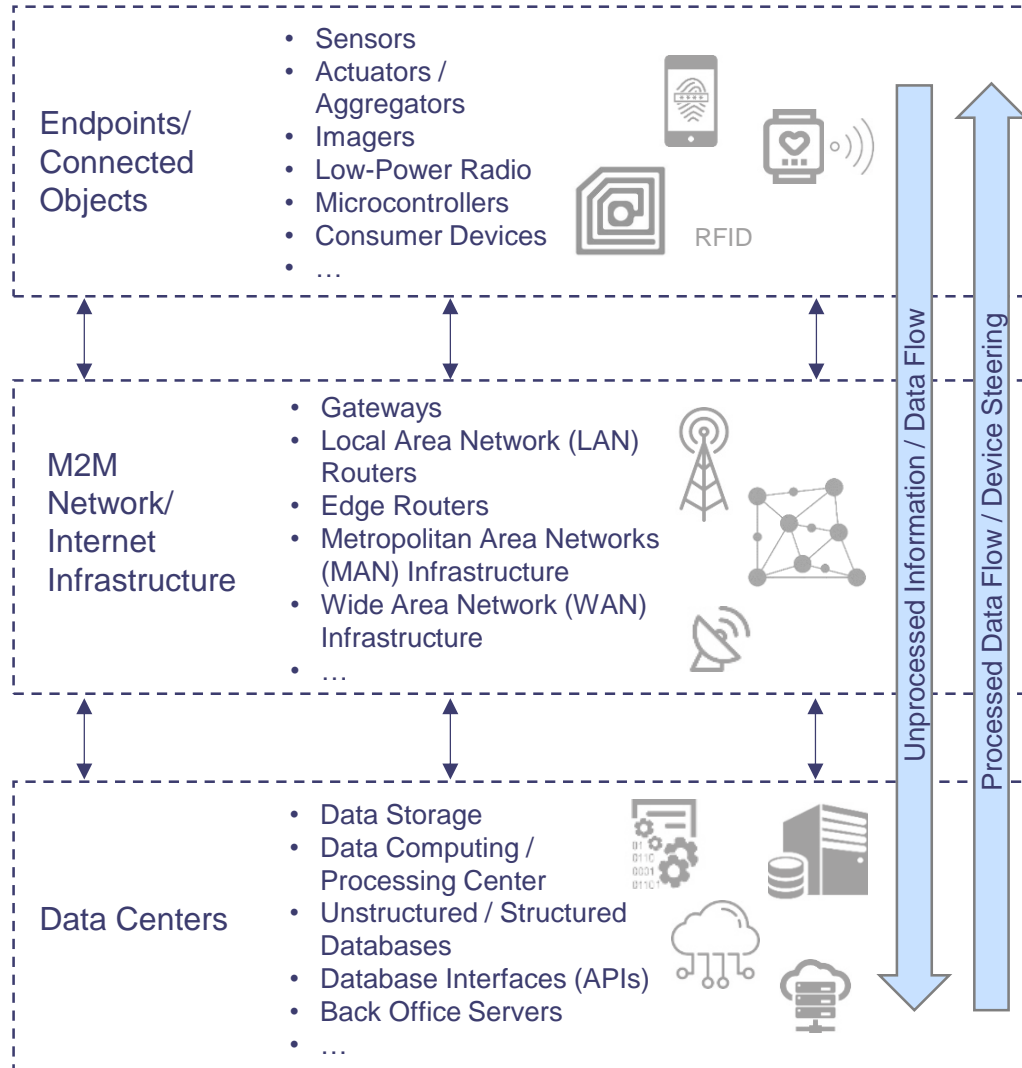
Fig. 7.1 Basic technological concepts of IoT



Source: Wirtz (2018, 2021, 2023), Wirtz (2024)

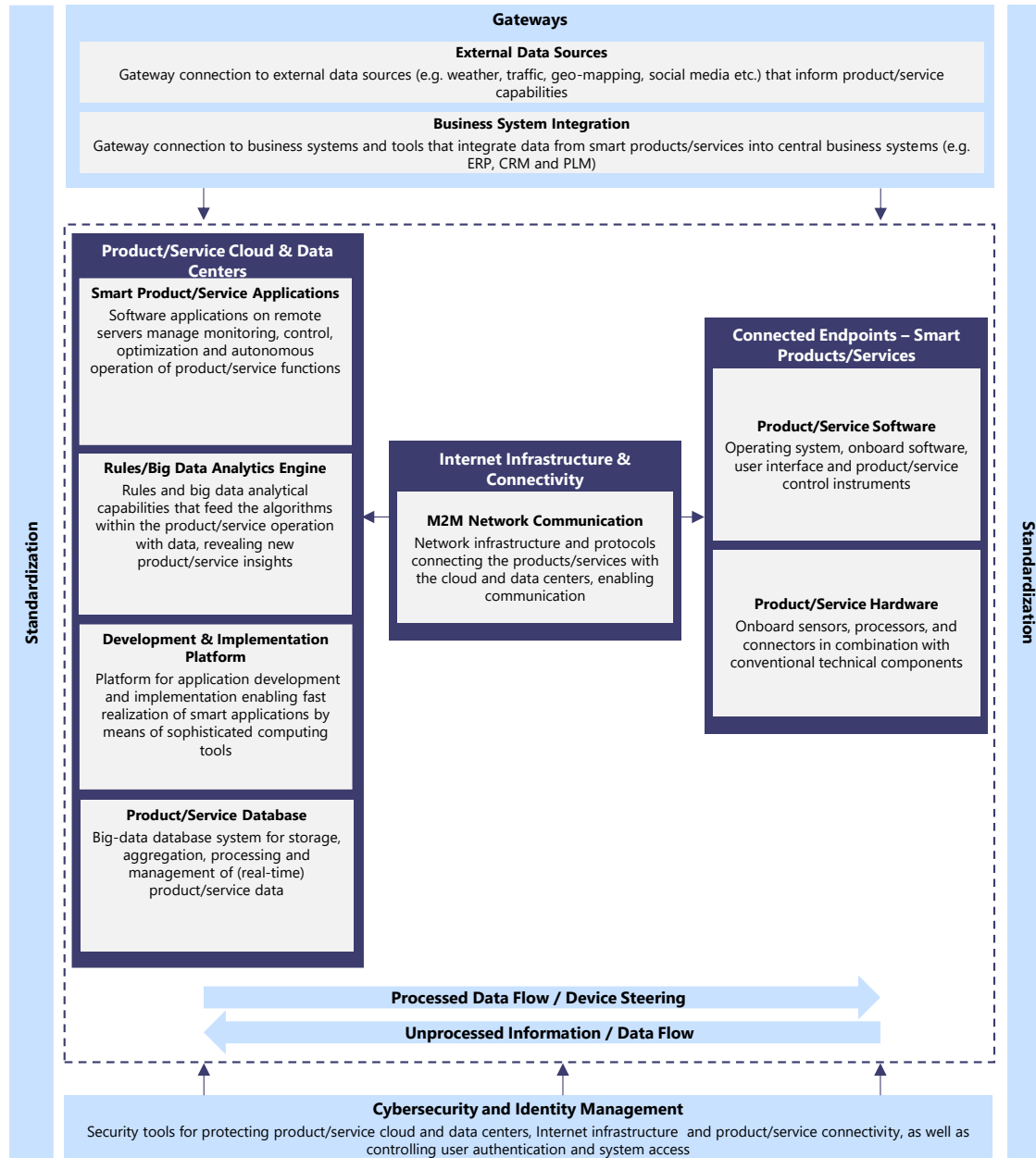
Fig. 7.2 IoT IT infrastructure

Internet of Things Information Technology Infrastructure



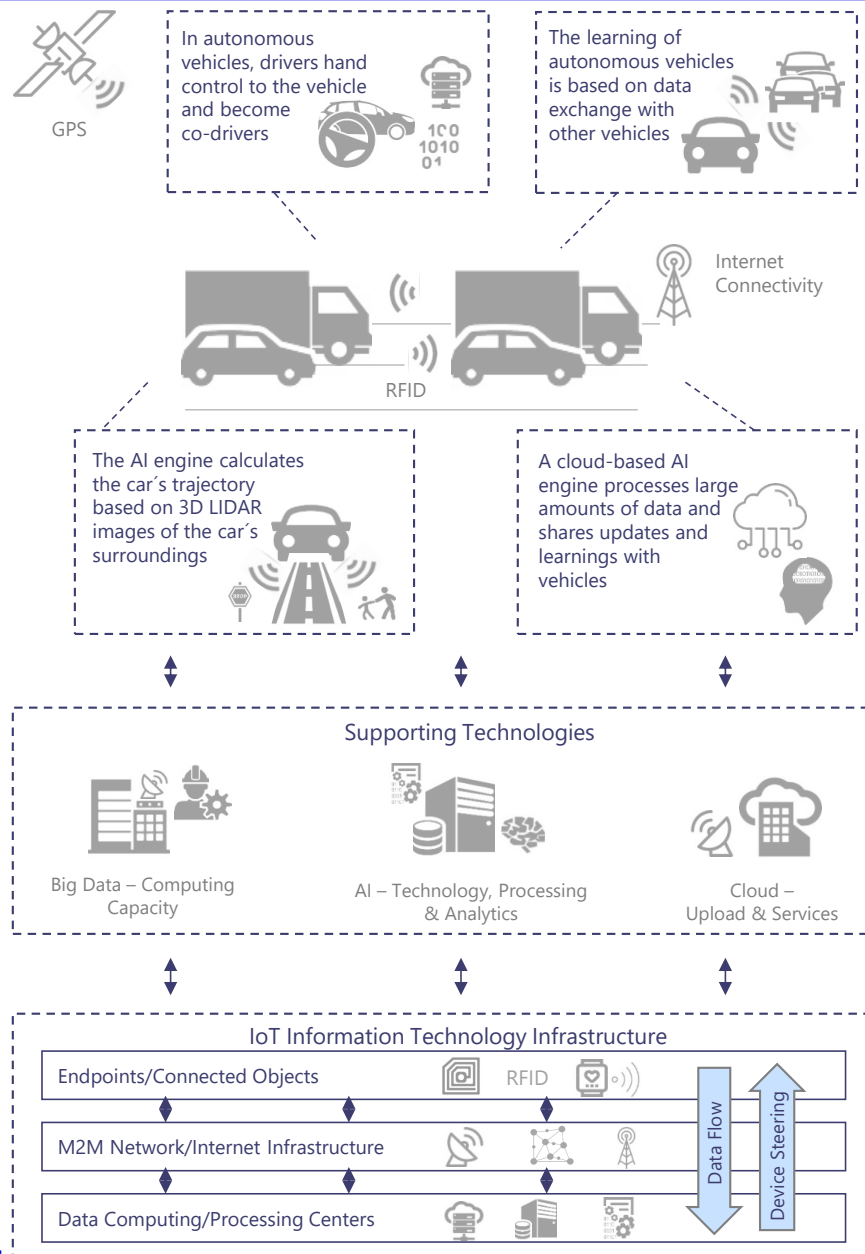
Source: Wirtz (2018, 2021, 2023), Wirtz (2024)

Fig. 7.3 Exemplary IoT-specific IT architecture





















Source: Wirtz (2020, 2021, 2023), Wirtz (2024)

Fig. 7.4 Illustrative example of IoT with application areas of enabling technologies



Source: Wirtz (2018, 2021), Wirtz (2024)

Fig. 7.5 Application areas of IoT

Setting	Description	Examples	Size in 2030*	
 Factories	Standardized production Areas	Locations with repetitive workflows, such as farms and hospitals; operational efficiencies, asset utilization optimization and inventory	1,430 - 3,320	
 Human	Portable devices attached to or inside the human body	Devices (wearables and ingestibles) for monitoring and preserving human health and well-being; improved fitness, disease management, increased productivity	550 - 1,760	
 Worksites	Custom production areas	Construction, mining, oil and gas; operating efficiency, safety and health, predictive maintenance	400 - 1,730	
 Cities	Urban areas	Public spaces and infrastructure in urban environments; resource management, environmental monitoring, smart meters, adaptive traffic control system	970 - 1,700	
 Retail	Places where consumers engage in commerce	Shops, malls, restaurants, banks, self-service checkout	650 - 1,150	
 Outside	Outside of urban and other areas	Autonomous vehicles outside of urban environments, railroad tracks, shipment tracking, flight navigation; real-time routing	400 - 930	
 Home	Inhabited buildings	Security and home automation control systems	440 - 830	
 Vehicles	Inside of vehicles	Cars, trucks, trains, ships, airplanes, helicopters, condition-based maintenance, usage-based design,	430 - 620	
 Offices	Places where knowledge workers operate	Security and energy management in office buildings; increased productivity	240 - 500	

○ Low Potential ● High Potential

Source: McKinsey & Company (2021) Wirtz (2024)

*Potential economic impact of IoT in 2030 [in billion USD]

Table 7.2 Key opportunities and challenges of industry 4.0 from a business perspective

IoT Opportunities	IoT Challenges
<ul style="list-style-type: none">• Improved planning and controlling• Higher customer satisfaction• Increased flexibility in production• Faster time to market• Improved quality• Individualization of products• ...	<ul style="list-style-type: none">• Uncertain economic benefits and exceeding investments• Insufficient qualifications of employees• Lack of regulations, standards and forms of certification• Uncertain legal situation regarding the use of external data• Low maturity level of required technologies• Unresolved questions concerning data security• ...

Source: Wirtz (2020, 2021, 2023), Wirtz (2024)

Table 7.3 Selected definitions of industrial metaverse

Author(s)	Definition
Siemens (2023)	“The Industrial Metaverse is a world, which is always on. Where real machines and factories, buildings and cities, grids and transportation systems are mirrored in the virtual world.”
Fraunhofer (2023)	“The industrial metaverse will be a space where we use the speed of software to drive innovations. Its potential for reshaping our domestic economies and industries is enormous.”
Arthur D. Little / Meige and Eagar (2023)	The industrial metaverse is best defined as a “connected whole-system digital twin with functionalities to interact with the real system in its environment, allowing decision makers to better understand the past and forecast the future.”

Source: Wirtz (2024)

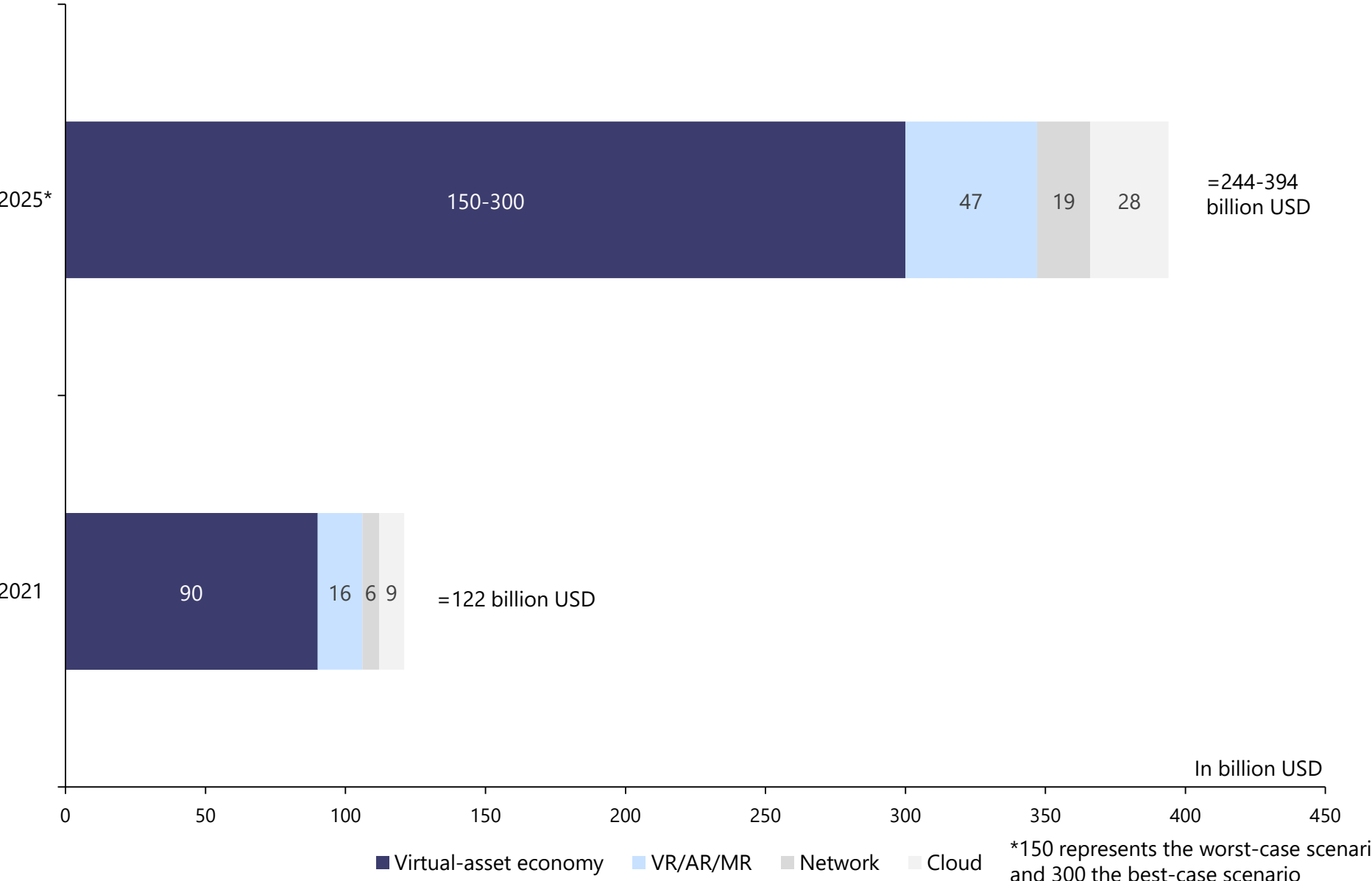
Definition of Industrial Metaverse

Definition of Industrial Metaverse (Wirtz 2024)

The industrial metaverse basically maps real economic systems through one or more digital representations. Digital applications such as artificial intelligence, 3D visualization, virtual and augmented reality systems, as well as other software applications are used to map, simulate and analyze business processes, industrial systems and real business and interaction structures in the digital world. In particular, digital twins, which address the industrial metaverse's basic idea of physical-digital system interaction, fusion or integration, are used as part of the virtualization of business activities in the industrial metaverse. The goal of the industrial metaverse is to achieve a competitive advantage through the digital mapping, analysis, and optimization of business activities.

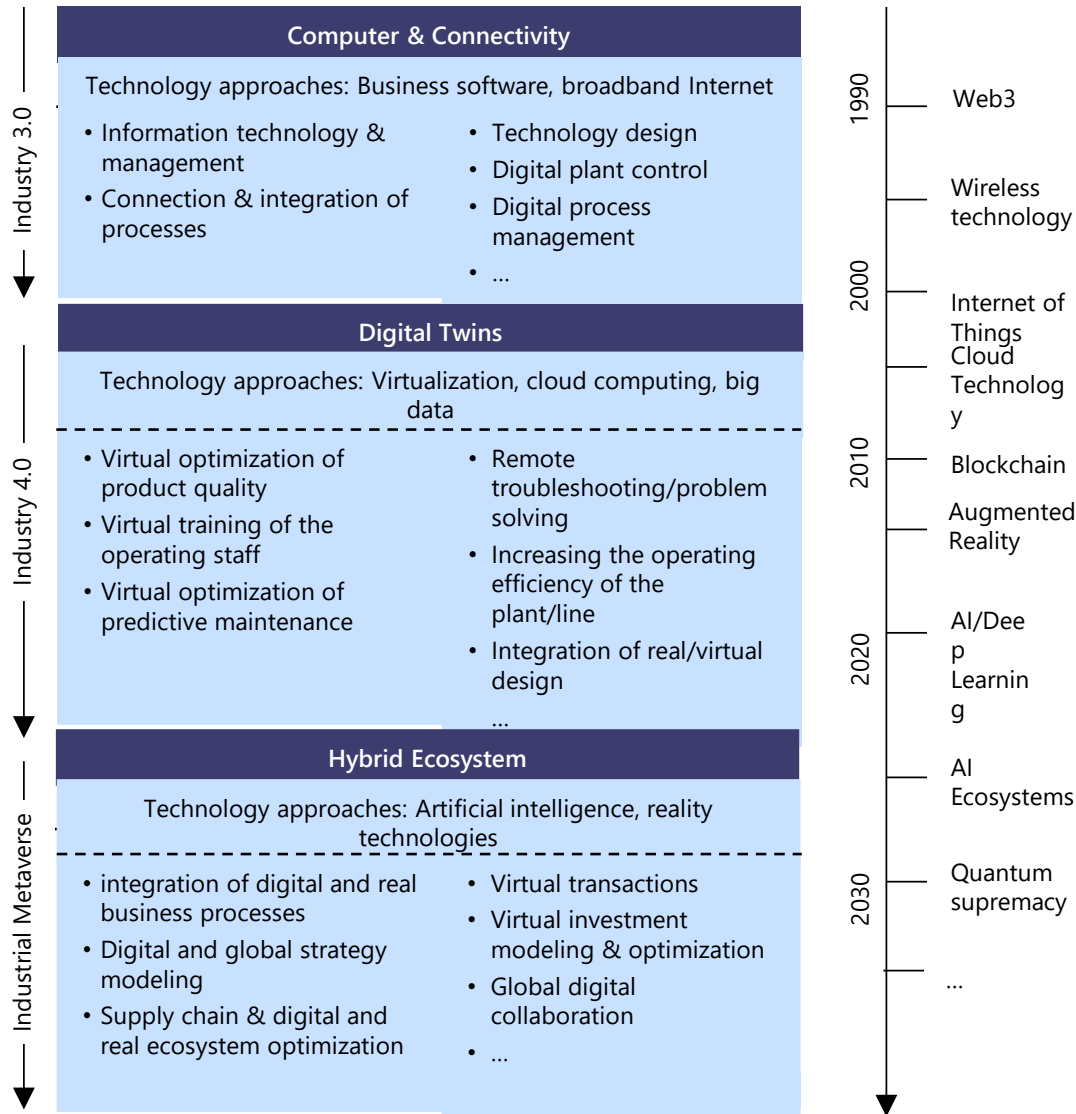
Source: Wirtz (2024)

Fig. 7.6 Market potential of the industrial metaverse



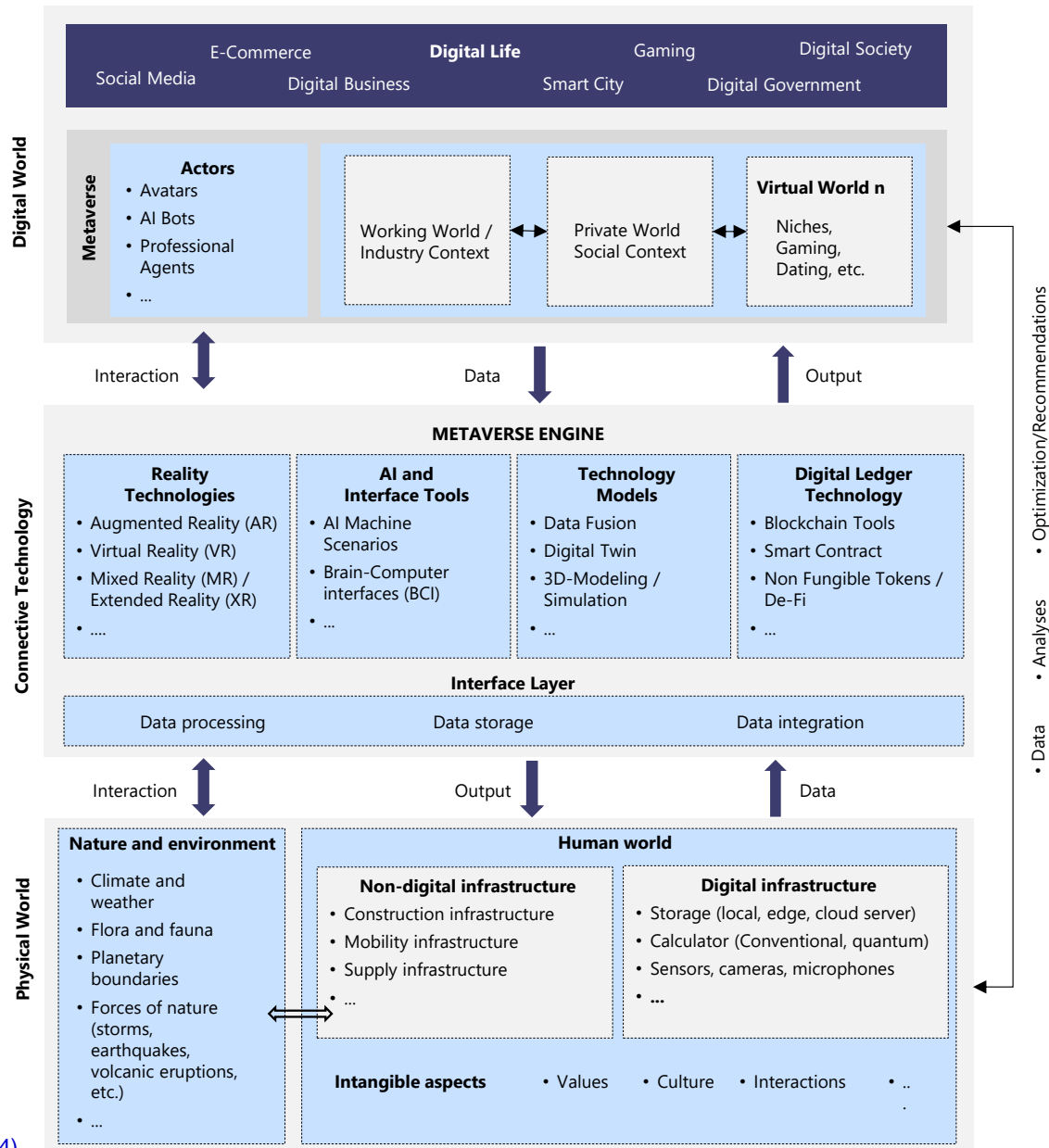
Source: Bobier et al. (2022), Wirtz (2024)

Fig. 7.7 Evolution from industry 3.0 to the industrial metaverse



Source: Wirtz (2024)

Fig. 7.8 Industrial Metaverse Framework



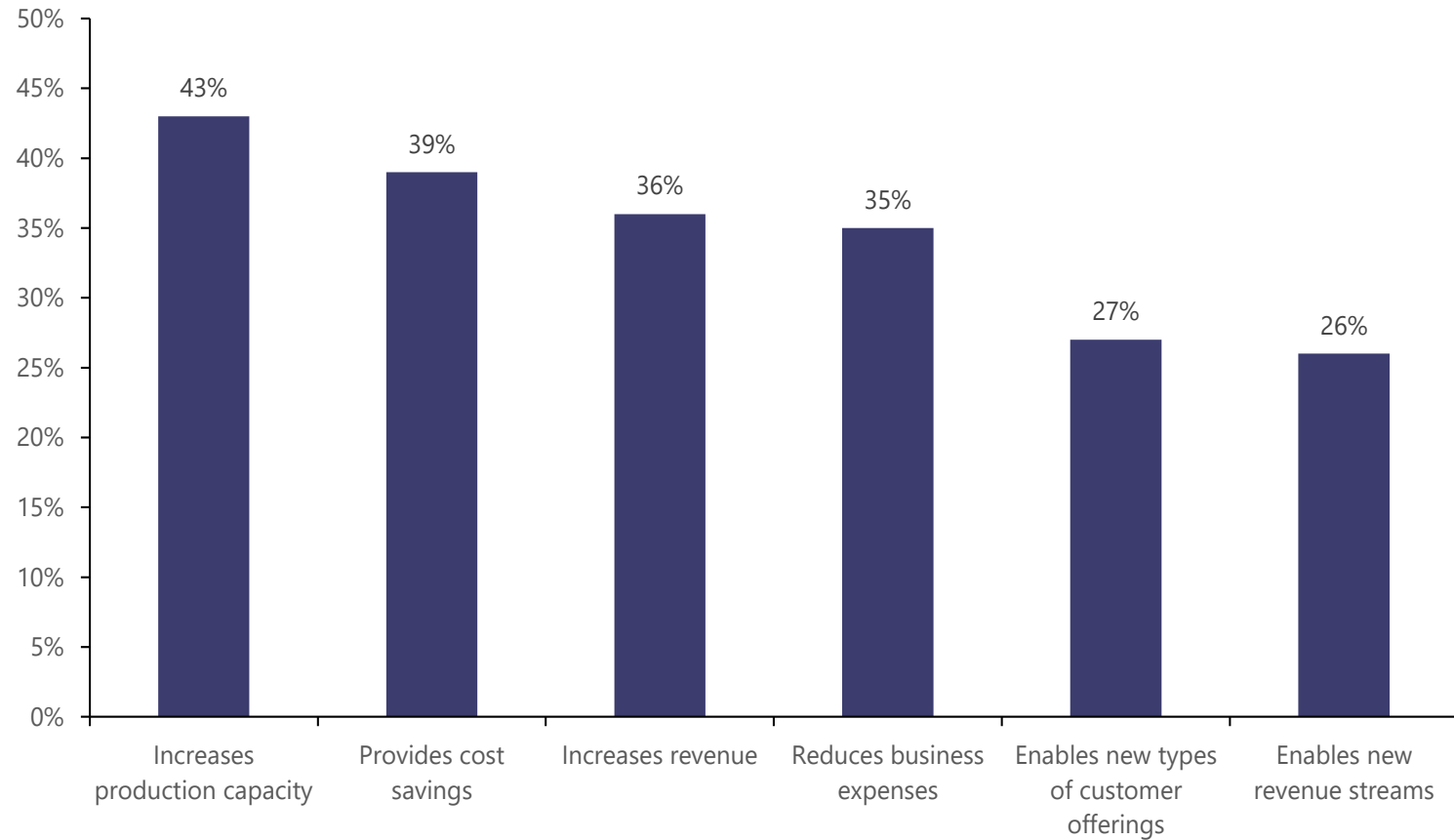
Source: Wirtz (2024)

Fig. 7.9 IoT benefit increased efficiency



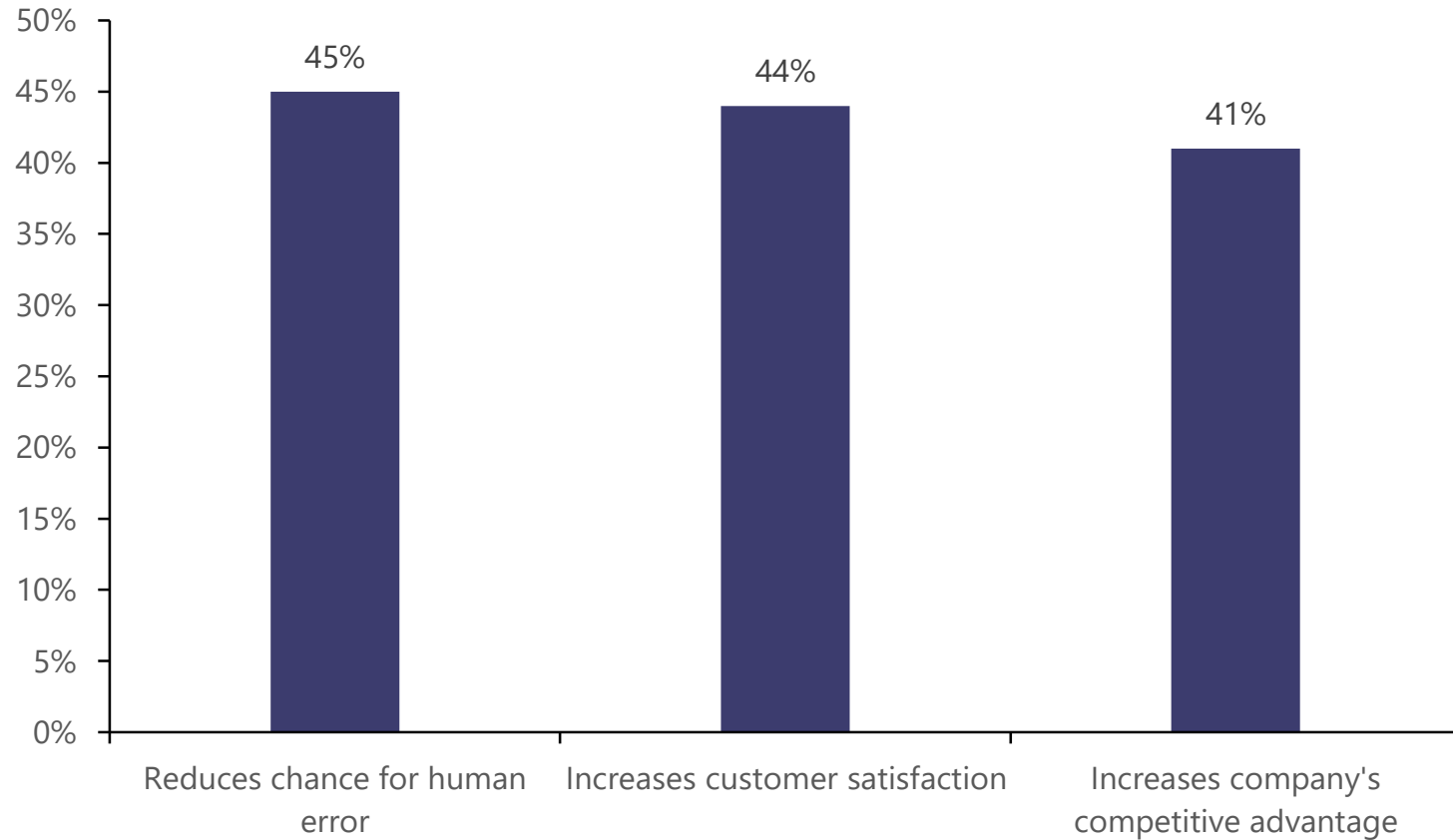
Source: Microsoft (2019), Wirtz (2024)

Fig. 7.10 IoT benefit increased yield



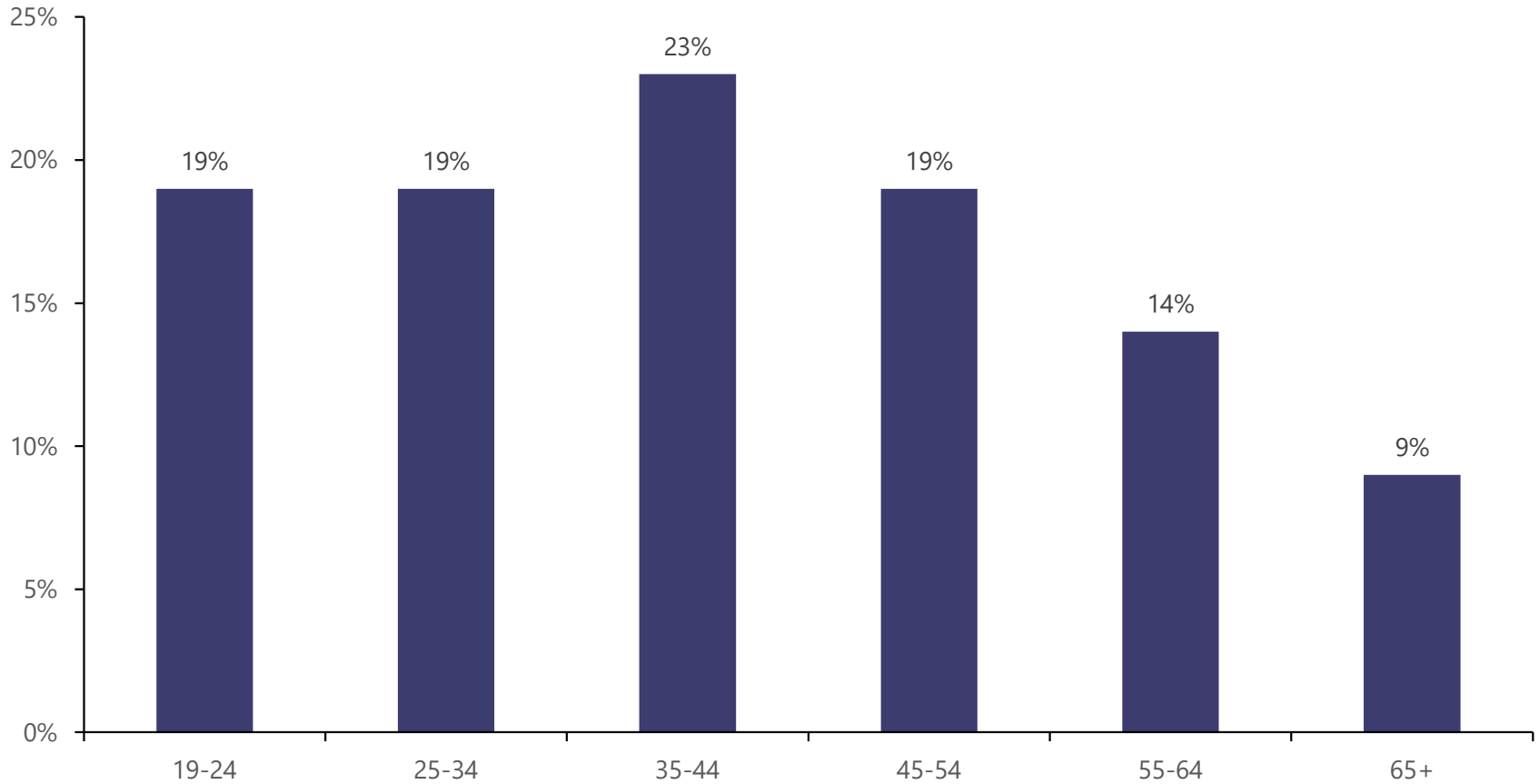
Source: Microsoft (2019), Wirtz (2024)

Fig. 7.11 IoT benefit improved quality



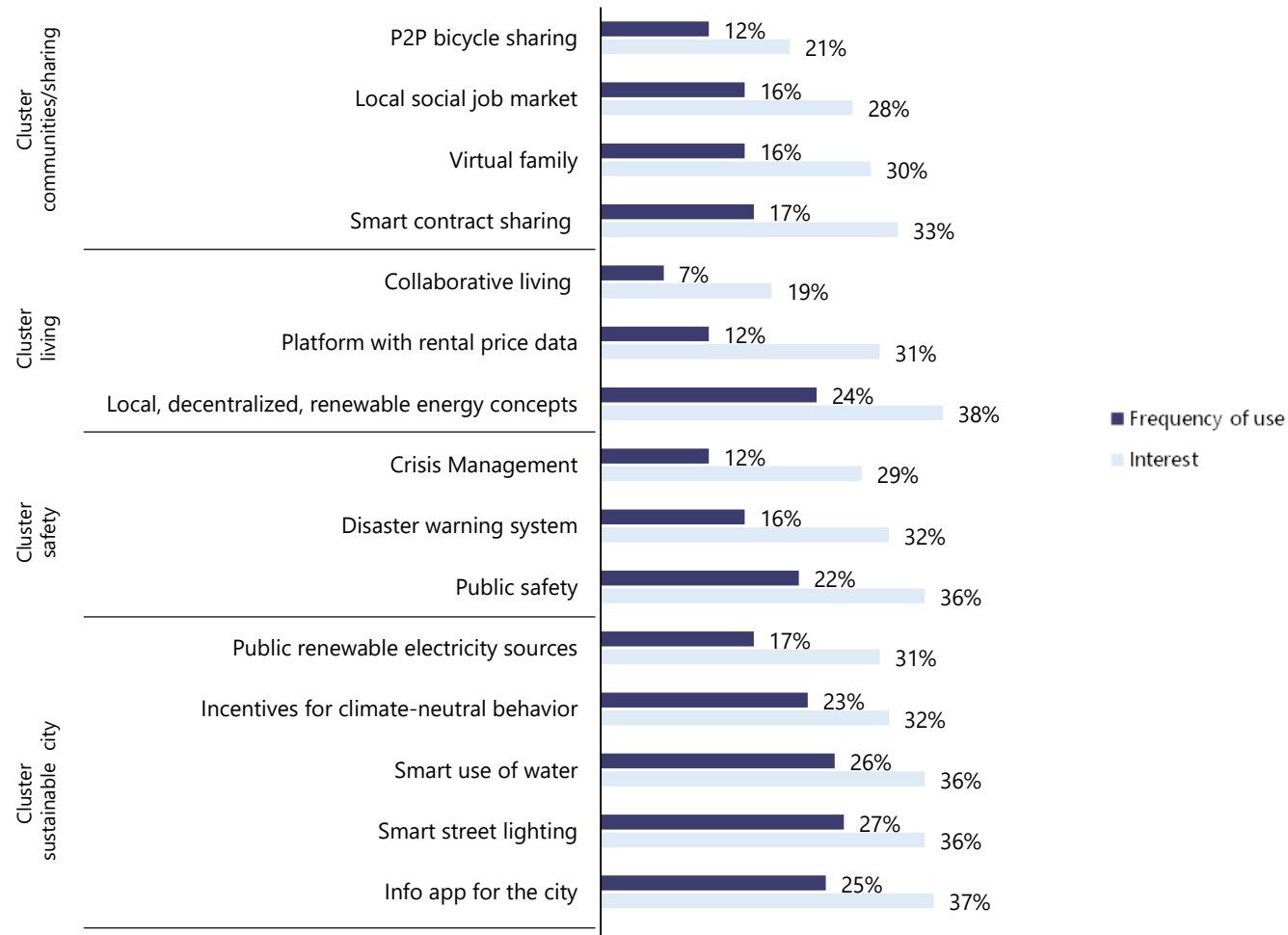
Source: Microsoft (2019), Wirtz (2024)

Fig. 7.12 Share of smart home users by age



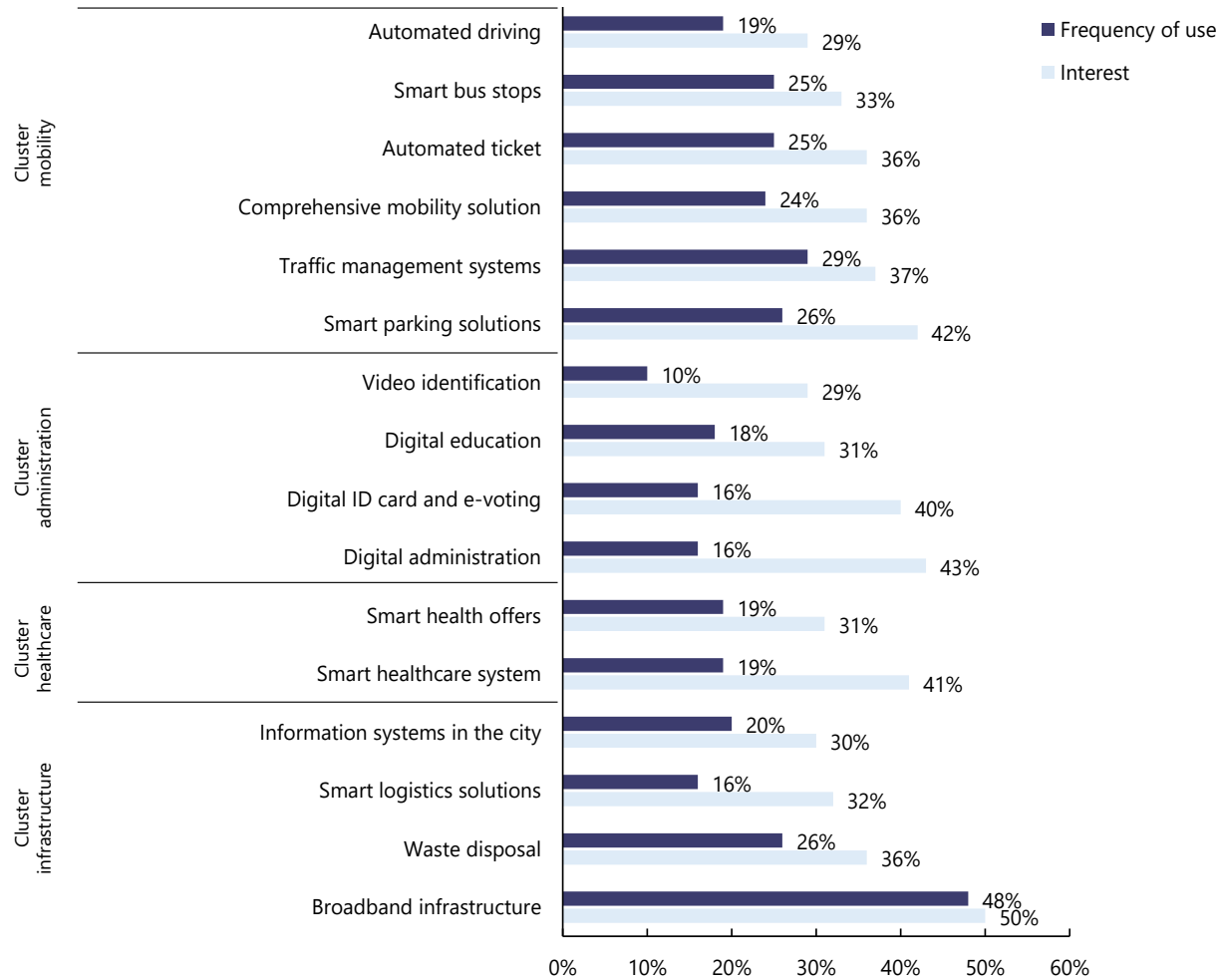
Source: Deloitte (2018), Wirtz (2024)

Fig. 7.13 Interest in smart city solutions and frequency of use (1)



Source: Wyman (2020), Wirtz (2024)

Fig. 7.13 Interest in smart city solutions and frequency of use (2)



Source: Wyman (2020), Wirtz (2024)

Fig. 7.14 Success factory of IoT

Digital Business Model Innovation/ Diversification Competence	System Technology Competence
<ul style="list-style-type: none">• Business model development in the innovative IoT environment• Creation of business model innovations for IoT• Diversification ability of existing IoT solutions in other industries/ applications	<ul style="list-style-type: none">• Combinability of software & hardware IoT solutions• IoT service/platform customization• Management of IT platform & infrastructure• Data security
Integration Ability of Complex IoT Services	Digital Intelligence Competence
<ul style="list-style-type: none">• Horizontal & vertical integration ability of application levels• Integrated service offers• Complexity management	<ul style="list-style-type: none">• Development of intelligent IoT service solutions• Development of IoT-artificial intelligence/ big data software & analytics• Networking capability with other IoT/ AI solutions

Source: Wirtz (2018, 2021), Wirtz (2024)

Chapter 7 Questions and topics for discussion

Chapter 7 Questions and topics for discussion



Review questions

1. Describe the basic technological concepts of the Internet of Things and the IoT-specific IT infrastructure model.
2. Outline the IoT interaction structure using autonomous driving as an example.
3. Describe the most important application areas of IoT.
4. Outline the Industrial Metaverse Framework and describe its interrelationships.
5. Present the success factors of the Internet of Things.

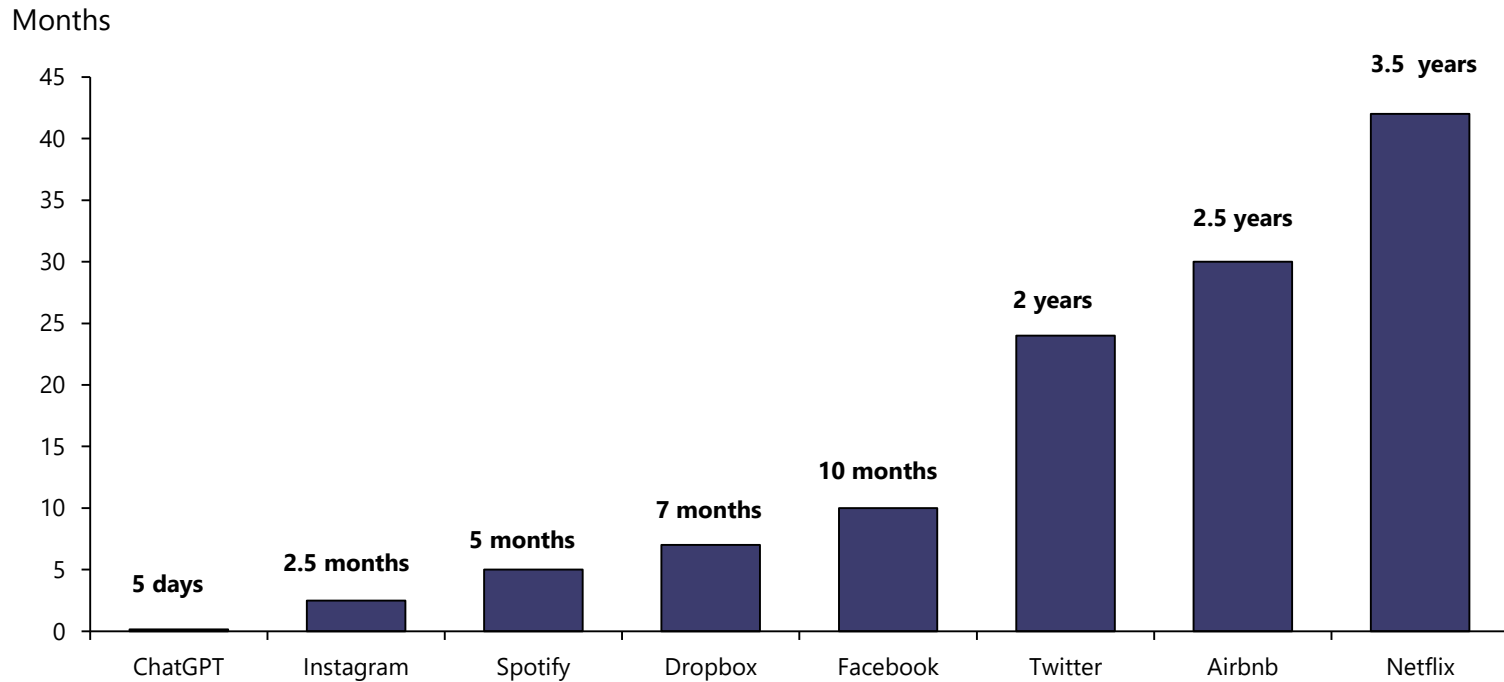


Topics for discussion

1. The IoT has considerable potential for change in our economy. Discuss the advantages and disadvantages of the technological development of IoT for the economy.
2. Discuss whether IoT will cause another technological revolution in economy and society.
3. Will IoT lead to complete monitoring and digital control in all areas of life? Discuss the associated opportunities and risks for our economy and society.

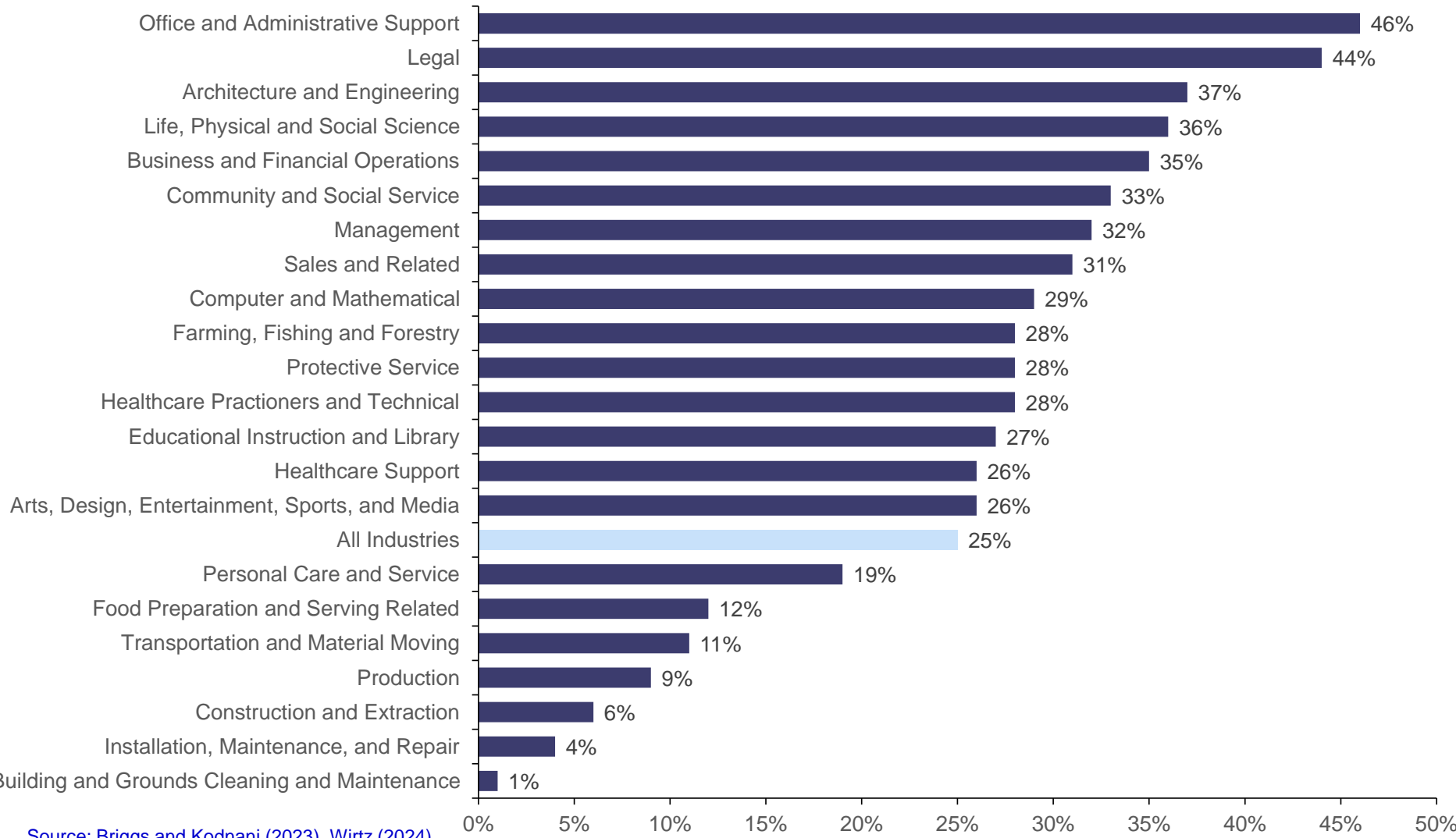
Chapter 8: Artificial Intelligence, Big Data and Cloud Computing

Fig. 8.1 Market diffusion to achieve one million users



Source: Statista(2023a), Wirtz (2024)

Fig. 8.2 Share of workplaces in industry that are automatable by AI



Source: Briggs and Kodhani (2023), Wirtz (2024)

Table 8.1 Selected definitions of AI

Author(s)	Definition
McCarthy et al. (2006)	The study is to proceed on the basis of the conjecture that every aspect of learning or any other feature of intelligence can in principle be so precisely described that a machine can be made to simulate it.
Rich et al. (2009)	[...] the study of how to make computers do things which, at the moment, people do better.
Adams et al. (2012)	[...] a system that could learn, replicate, and possibly exceed human-level performance in the full breadth of cognitive and intellectual abilities.
Rosa and Feyereisl (2016)	[...] programs that are able to learn, adapt, be creative and solve problems.
Russell and Norvig (2016)	AI may be organized into four categories: Systems that think like humans. Systems that act like humans. Systems that think rationally. Systems that act rationally.
Thierer et al. (2017a)	The exhibition of intelligence by a machine. An AI system is capable of undertaking high-level operations; AI can perform near, at, or beyond the abilities of a human. This concept is further divided into weak and strong AI.
Wirtz et al. (2019)	[...] AI refers to the capability of a computer system to show humanlike intelligent behavior characterized by certain core competencies, including perception, understanding, action, and learning.

Source: Wirtz (2020, 2021, 2023), Wirtz (2024)

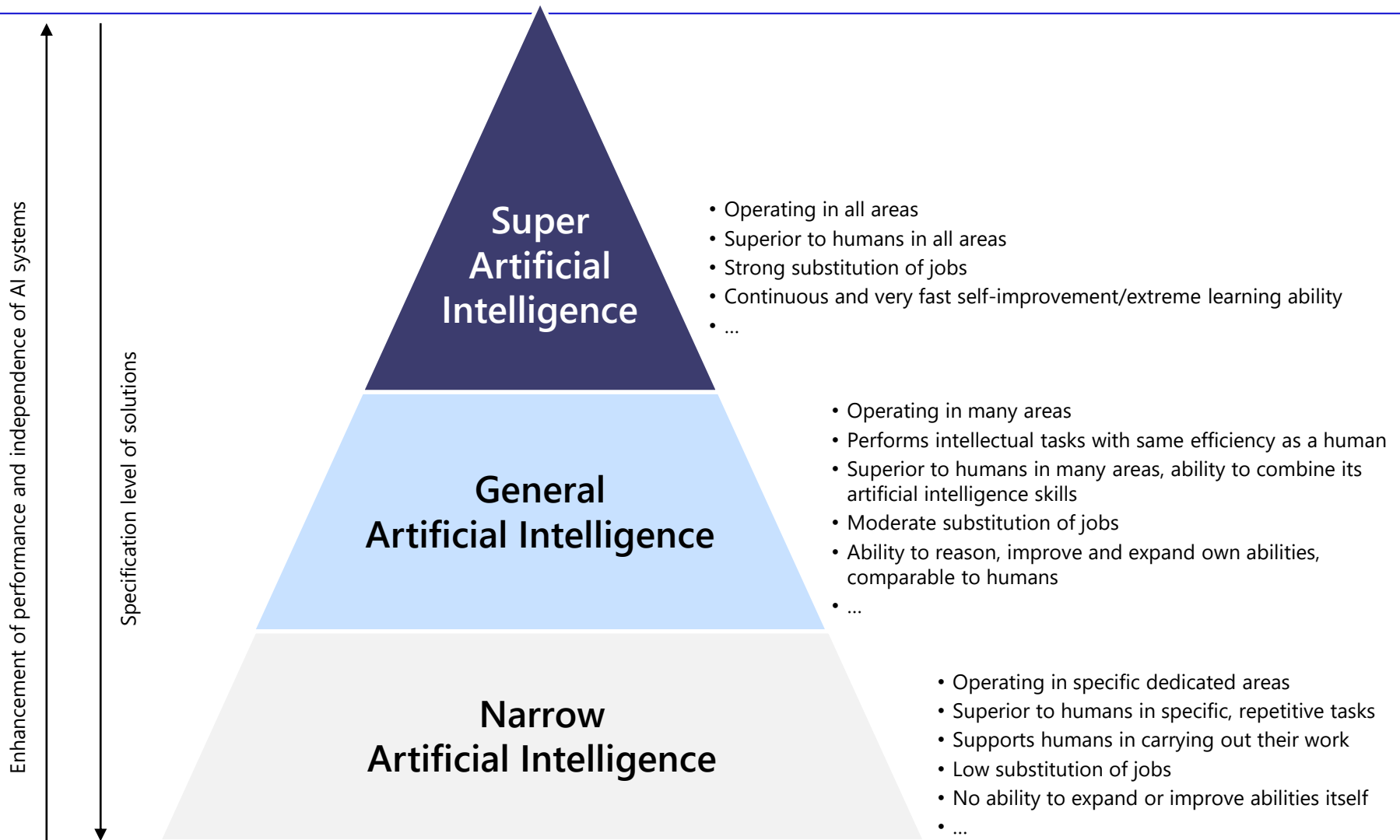
Definition of Artificial Intelligence

Definition of Artificial Intelligence (Wirtz et al. 2019, 2021, 2024)

AI refers to the capability of a computer system to show humanlike intelligent behavior characterized by certain core competencies, including perception, understanding, action, and learning, in order to support human and systemic behavior in the best possible way.

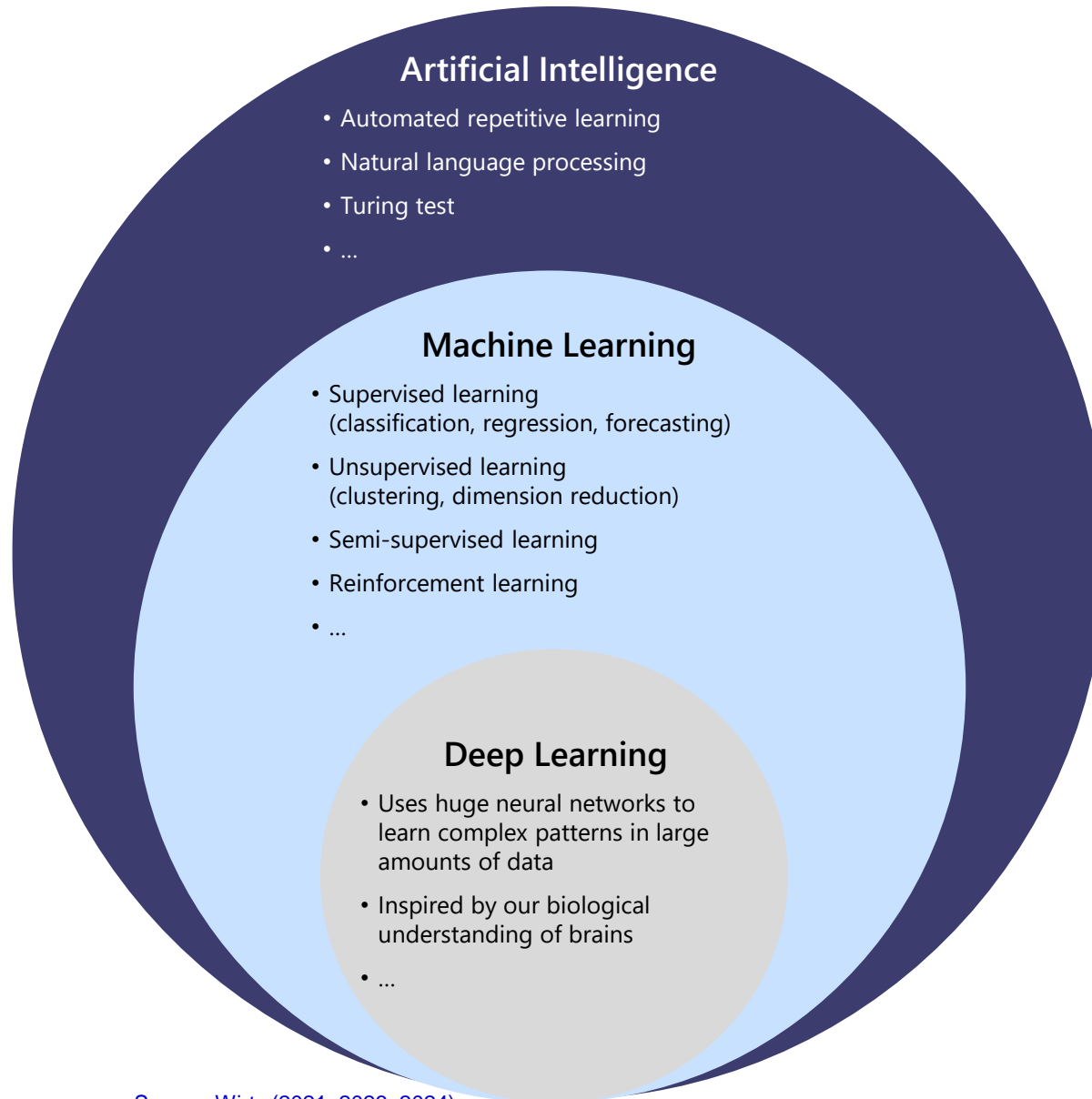
Source: [Wirtz \(2019, 2021\)](#), [Wirtz \(2024\)](#)

Fig. 8.3 Development stages of artificial intelligence



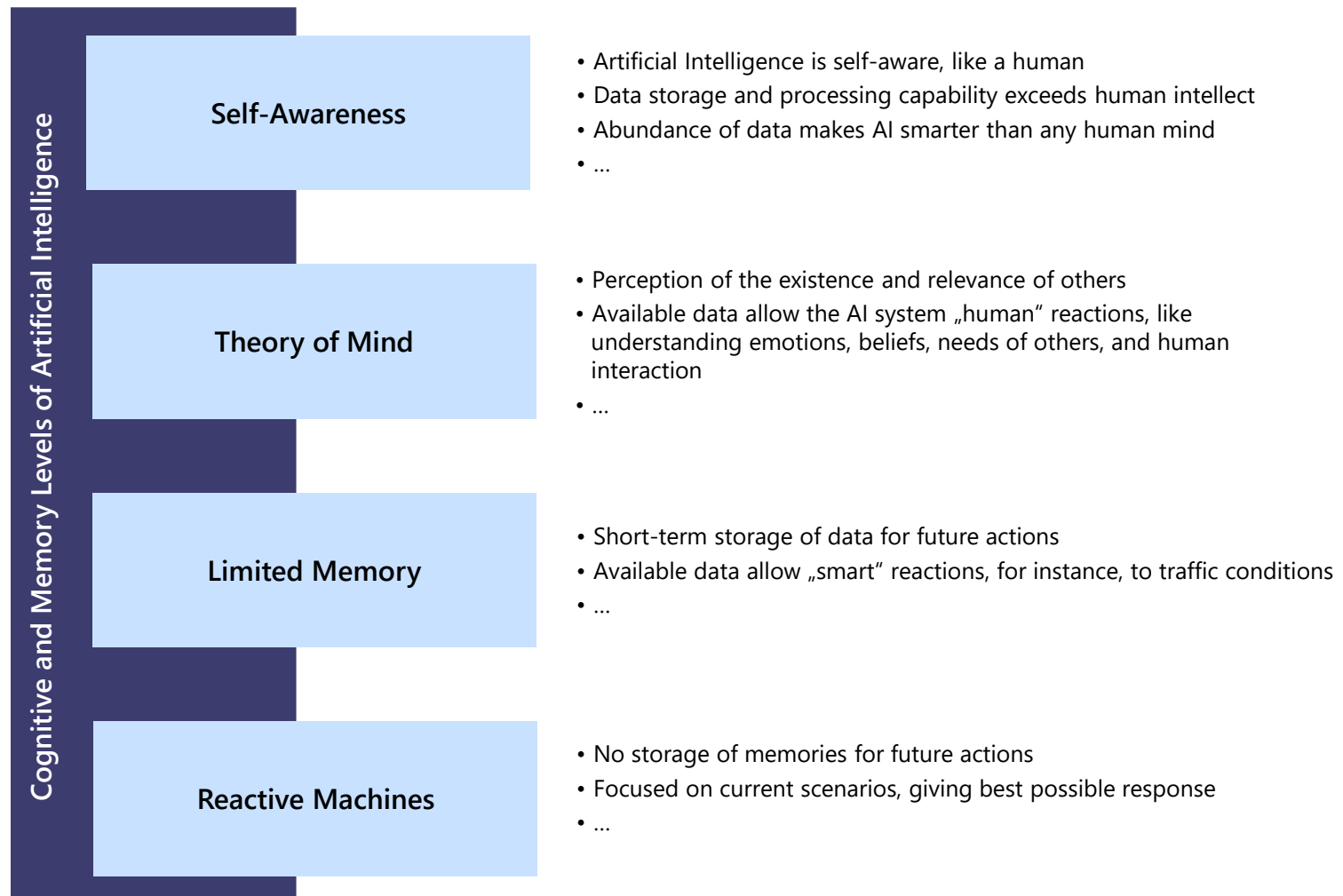
Source: Wirtz (2021, 2023, 2024)

Fig. 8.4 Concepts of artificial intelligence



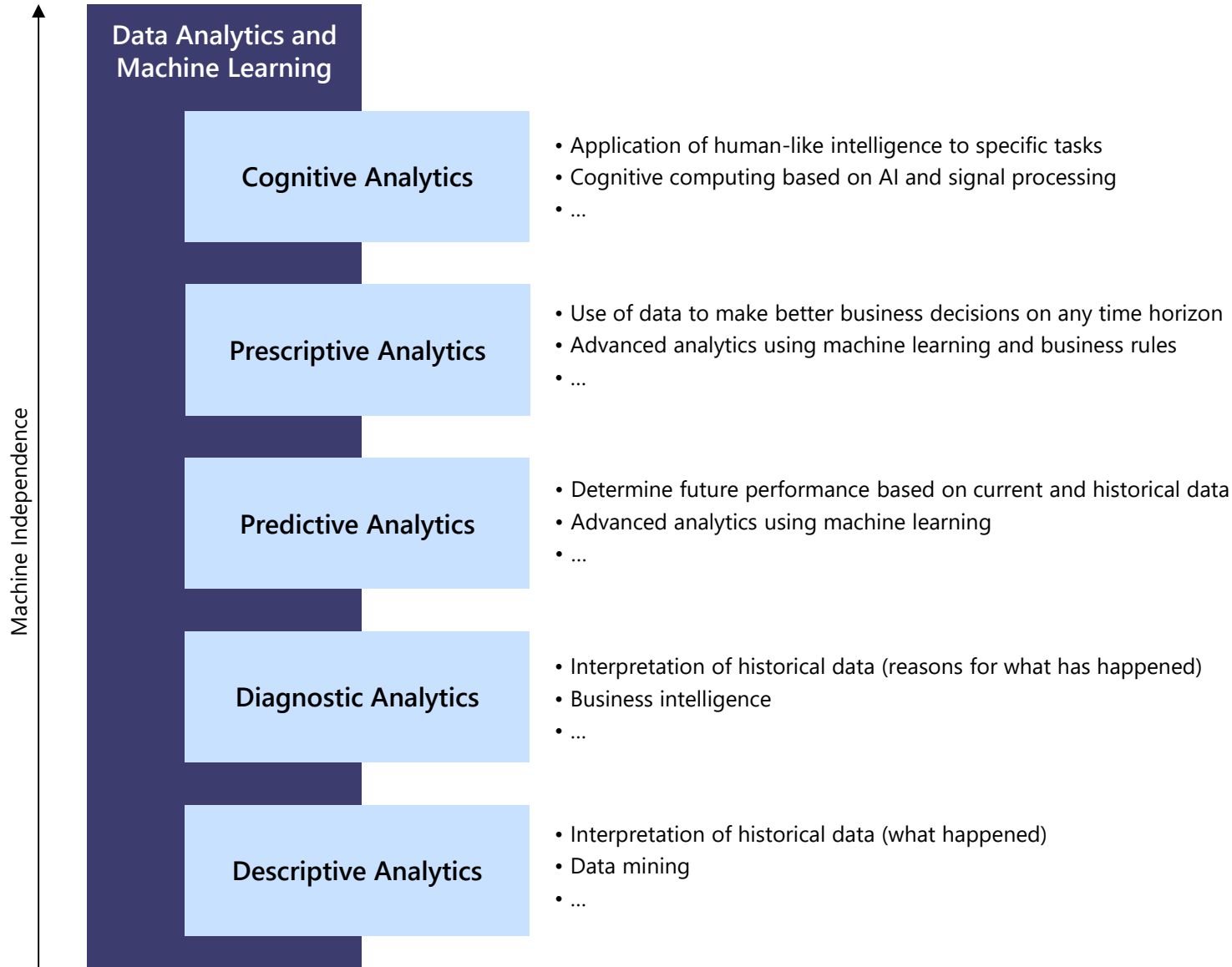
Source: Wirtz (2021, 2023, 2024)

Fig. 8.5 Cognitive and memory levels of artificial intelligence



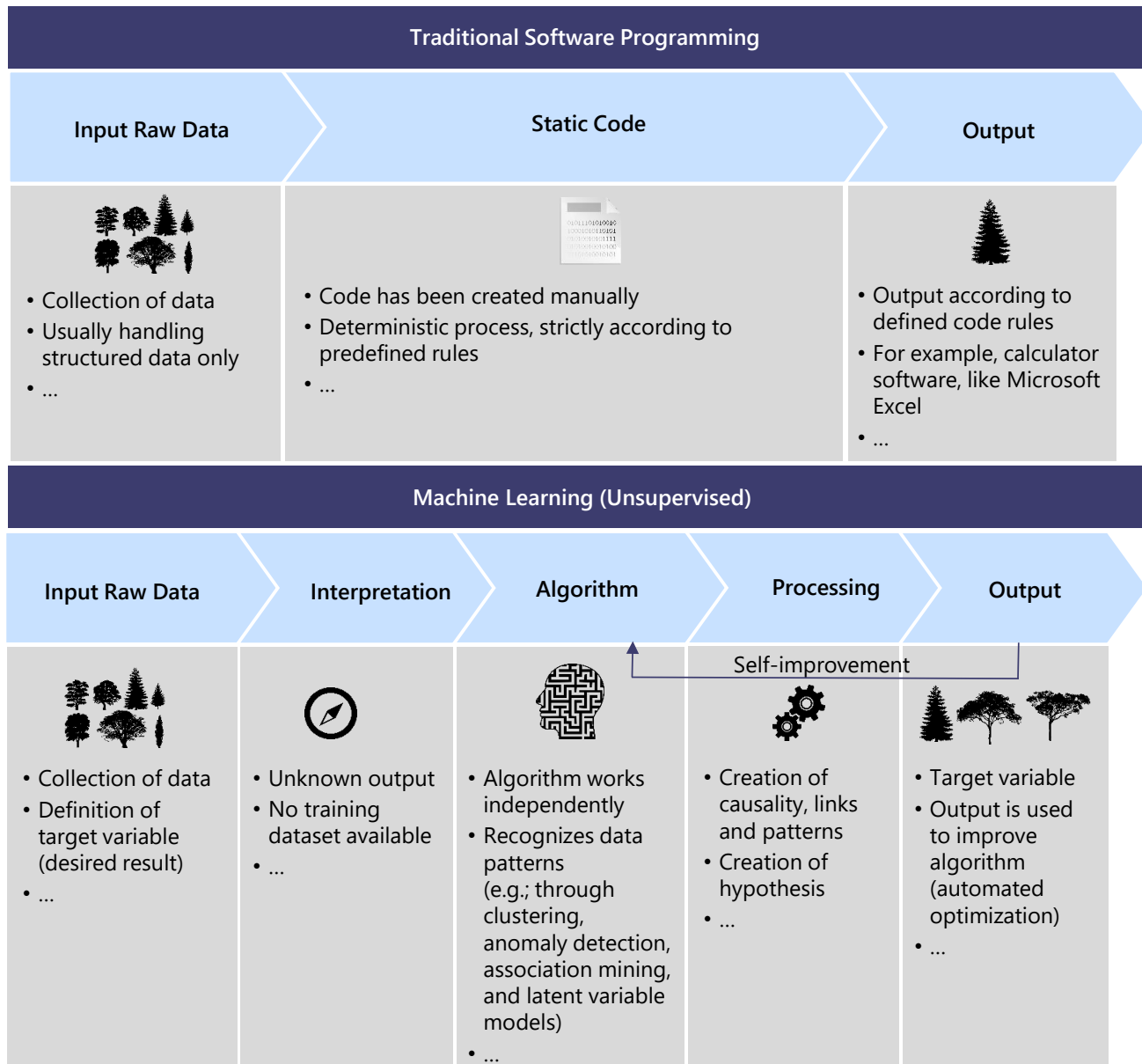
Source: Wirtz (2021, 2023, 2024)

Fig. 8.6 AI analytics approaches



Source: Wirtz (2021, 2023, 2024)

Fig. 8.7 Machine learning process vs. traditional software programming



Source: Wirtz (2021, 2023, 2024)

Table 8.2 AI forms, features, applications, and services (1)

AI form	AI characteristics	AI applications/ AI methods	AI services
Artificial intelligence (AI)	<ul style="list-style-type: none"> • The ability of machines to mimic human-like behavior and perform tasks autonomously • ... 	<ul style="list-style-type: none"> • Machine learning • Deep learning • Reinforcement learning • ... 	<ul style="list-style-type: none"> • Virtual assistants (e.g., Siri, Google Assistant, ...) • Recommendation services (e.g., Amazon, Google, ...) • Fraud detection (e.g., at Danske Bank, Allianz AG...) • Robotics (e.g., KUKA and ABB robots, ...) • ...
Weak artificial intelligence/ narrow AI	<ul style="list-style-type: none"> • AI systems that focus on solving specific problems • The systems rely on specific methods and do not have a deeper understanding of the structure and solution of the problem • All AI systems developed up to 2022 fall into this category • ... 	<ul style="list-style-type: none"> • Classification problems • Regression problems • Cluster analysis • ... 	<ul style="list-style-type: none"> • Image recognition (e.g., of vehicles at Mapfre, ...) • Speech recognition (e.g., at the Vodafone hotline, ...) • ...
General artificial intelligence	<ul style="list-style-type: none"> • The ability of an artificial intelligence to learn and understand a task at a human level • AI algorithm innovations continuously improve the performance level from narrow AI to general AI • Not yet fully realized, but first approaches already exist • ... 	<ul style="list-style-type: none"> • Human-like learning, planning • Natural language communication • ... 	<ul style="list-style-type: none"> • Virtual assistants on a human level (not yet realized) • AI systems that recognize written documents (not yet realized) • ...

Table 8.2 AI forms, feature, applications, and services (2)

Super artificial intelligence	<ul style="list-style-type: none"> • Artificial intelligence that is superior to humans in many ways • AI algorithm innovations continuously improve the performance level from narrow AI to super AI • ... 	<ul style="list-style-type: none"> • Superhuman thinking abilities • ... 	<ul style="list-style-type: none"> • Establishment of new scientific theories (not yet realized) • Replacing human labor in every respect (not yet realized) • ...
Machine learning (ML)	<ul style="list-style-type: none"> • Subfield of artificial intelligence • An ML system can generate knowledge from experience by learning, this is often done with the help of statistical models • ... 	<ul style="list-style-type: none"> • Supervised learning • Nonsupervised learning • Reinforcement learning • Deep learning • ... 	<ul style="list-style-type: none"> • Self-driving cars (e.g., Tesla, Waymo, Mercedes EQS, ...) • Face recognition (e.g., Apple Face ID, ...) • Chatbots (e.g., at DHL, Telekom, ...) • ...
Supervised learning	<ul style="list-style-type: none"> • Subfield of machine learning • In supervised learning, both the input and output values are known, the system tries to determine dependencies between the input and output values • ... 	<ul style="list-style-type: none"> • Regression problems • Classification problems • ... 	<ul style="list-style-type: none"> • Distinction of different objects (e.g., different vehicles, ...) • Creation of forecasts for future trends (e.g., price development of products and raw materials, ...) • ...
Unsupervised learning	<ul style="list-style-type: none"> • Subfield of machine learning • In nonsupervised learning, no target or output values exist • The system tries to recognize patterns and structures in the input data • ... 	<ul style="list-style-type: none"> • Anomaly detection • Principal component analysis • Cluster analysis • ... 	<ul style="list-style-type: none"> • Detection of anomalies in manufacturing processes (e.g., smart monitoring systems, ...) • Reduction of the complexity of data sets (e.g., for controlling robots, ...) • ...

Source: Wirtz (2024)

Table 8.2 AI forms, features, applications, and services (3)

Semi-supervised learning	<ul style="list-style-type: none"> • Combination of supervised and unsupervised learning methods • Processing of data, where only partially the output values are known • ... 	<ul style="list-style-type: none"> • Label propagation • Anomaly detection • Structured prediction • ... 	<ul style="list-style-type: none"> • Feature detection in datasets, (e.g., of 3D seismic data, ...) • Error correction in datasets, (e.g., of Hasty, ...) • ...
Deep learning	<ul style="list-style-type: none"> • Subfield of artificial intelligence and machine learning method • Use of artificial neural networks, which connect the input values with the output values • ... 	<ul style="list-style-type: none"> • Convolutional neural network • Multilayer perceptrons • Self-organizing maps • ... 	<ul style="list-style-type: none"> • Chatbots (e.g., HP Virtual Assistant, ...) • Trend forecasts, e.g., sales and personnel demand forecasts • Big data analysis • ...
Reinforcement learning	<ul style="list-style-type: none"> • Subfield of artificial intelligence and machine learning method • Reward and punishment of the AI system to successively improve the result • ... 	<ul style="list-style-type: none"> • Classification problems • Control problems • Decision problems • ... 	<ul style="list-style-type: none"> • Optimization of logistics processes • Dynamic pricing • Control of traffic systems • ...

Source: Wirtz (2024)

Fig. 8.8 Flow process of generative artificial intelligence

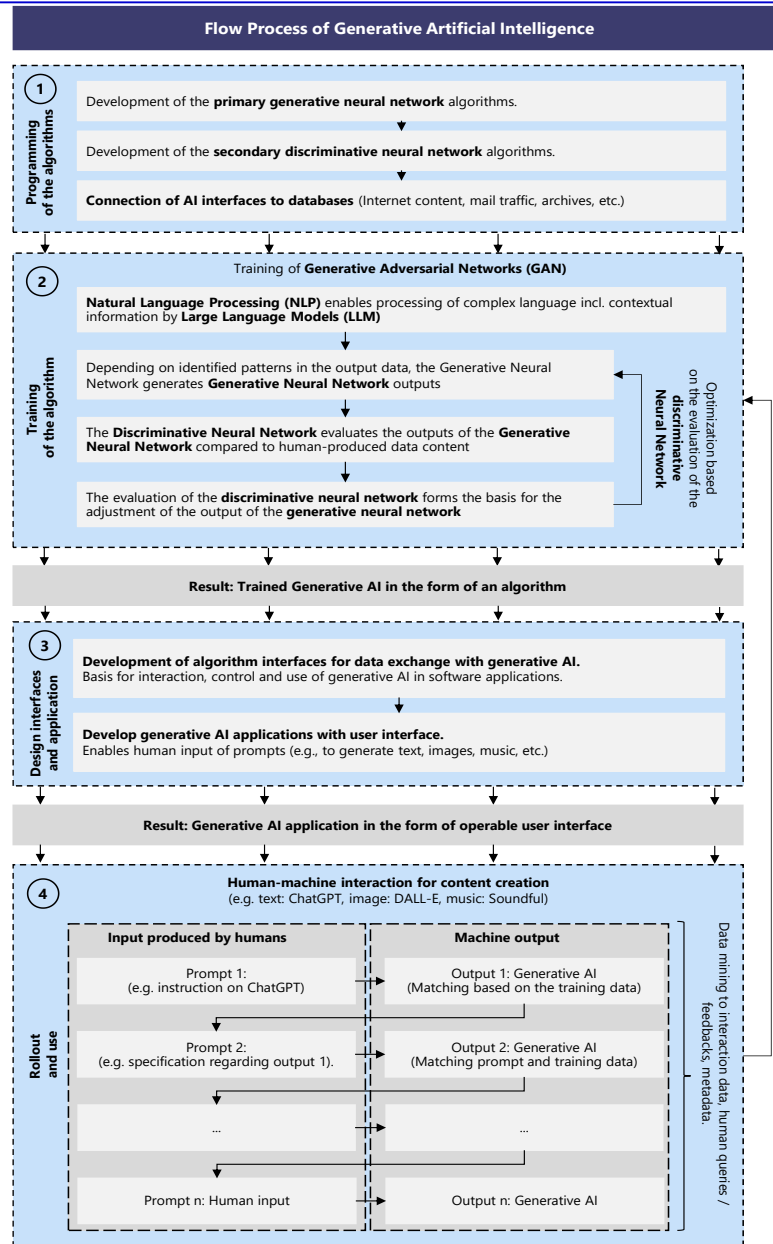
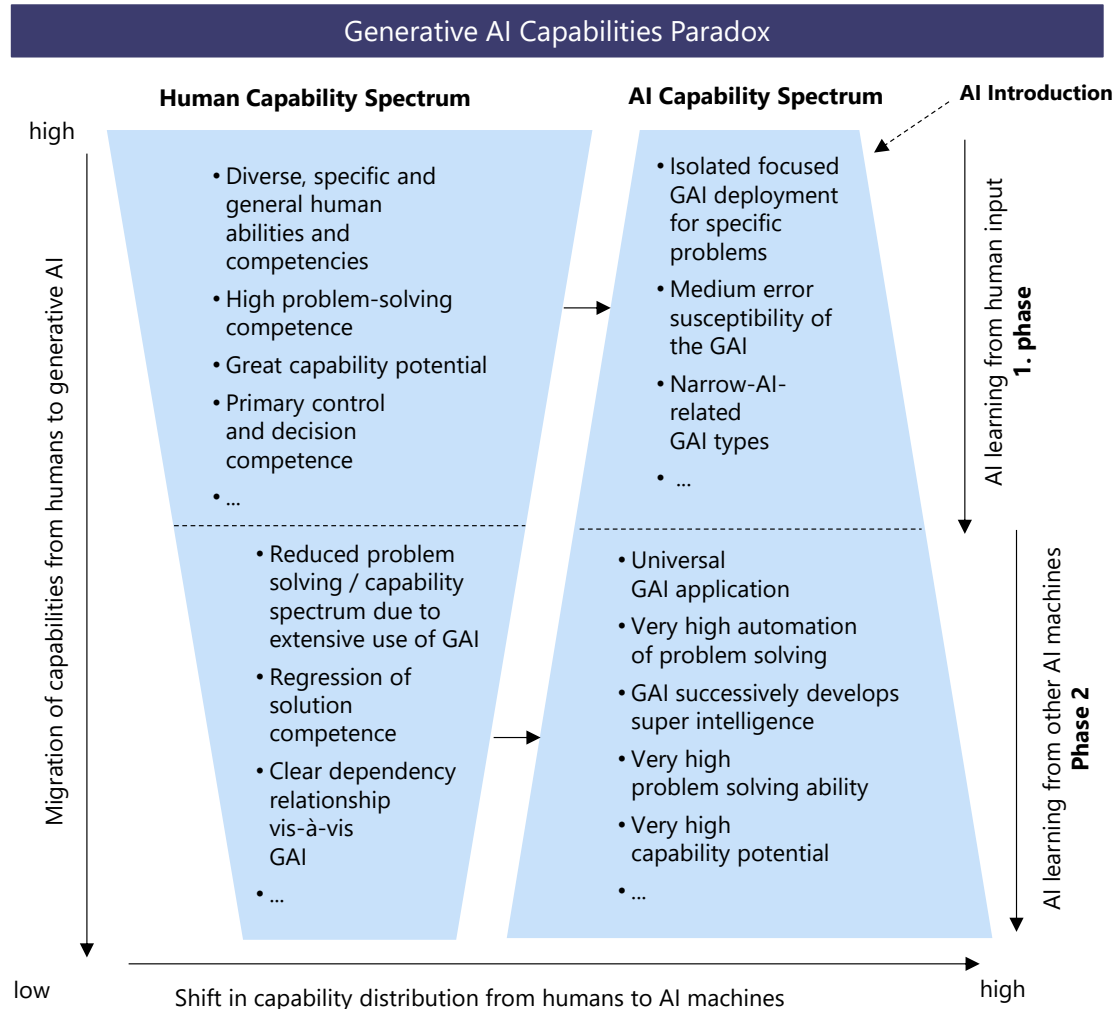


Fig. 8.9 Generative AI Capabilities Paradox



Source: Wirtz (2024)

Table 8.3 Companies in the field of artificial intelligence (1)

Company	Description and service
Apple	<ul style="list-style-type: none"> • Apple is known as a leading technology company for its outstanding consumer products such as iPhone, iMac, iPad, etc. • The iPhone has a built-in voice assistant called Siri, which can make calls, write messages and solve math problems through AI support, among other things • Face ID is a technology that Apple uses to identify the respective user through facial recognition based on AI and unlock the respective device • Apple recorded the most acquisitions in the AI field between 2016 and 2020; for example, Apple acquired AI startup Vilynx, which works in the areas of image analysis, or Drive.ai, which develops technology for autonomous driving
Alphabet/Google	<ul style="list-style-type: none"> • The company Alphabet is known in particular for the subcompany Google and its search engine of the same name. In addition, Google offers numerous other web services, such as Gmail and YouTube • Alphabet also has other activities such as Waymo or DeepMind in the AI field • Google maintains its own AI department, Google AI, which is dedicated in particular to the development of machine learning software • In 2014, the company acquired DeepMind; among other things, DeepMind developed the artificial intelligence AlphaGo, which was able to beat professional players in the board game Go in 2015 and 2016 • A further development of AlphaGo is the AI AlphaZero, which is able to play the board games Shōgi, chess, and Go at the highest level by training with itself • DeepMind is particularly engaged in AI algorithms that are able to improve themselves through reinforcement learning and do not require training data initialized by humans • Google offers TensorFlow, a free machine learning platform that can be used for example with the help of the Python programming language • Google offers cloud-based AI services, which companies in particular can use to train AI algorithms; the TPU (Tensor Processing Unit) processors developed by Google are used here, which were specially developed for working with artificial intelligence

Table 8.3 Companies in the field of artificial intelligence (2)

IBM	<ul style="list-style-type: none">• IBM is a leading IT and consulting services company• IBM Research, IBM's research and development department, is increasingly involved in artificial intelligence• IBM's best-known AI project is the computer program "Watson", which is intended to provide answers to questions written in natural language; Watson uses language processing algorithms with the aim of developing a semantic search engine• IBM also offers AI solutions for companies, focusing in particular on the automation of business processes and natural language processing
Microsoft	<ul style="list-style-type: none">• Microsoft is a hardware and software provider and is known in particular for the Windows operating system• In addition to operating systems, the company sells other application programs, development environments, and server products• Microsoft Azure represents a cloud computing platform of the company, which provides various cloud services to companies and private customers• The Azure platform increasingly offers AI solutions that enable organizations to save costs and accelerate growth• In addition to AI infrastructure, the company offers various artificial intelligence tools• Microsoft's AI School provides entry-level AI learners with learning opportunities in areas such as machine learning and intelligent edge AI• The AI Lab portal provides users with information about new innovations and applications of artificial intelligence, some of which they can use themselves• In addition to in-house developments, Microsoft invests in other AI companies, such as the AI research company OpenAI

Source: Wirtz (2024)

Table 8.3 Companies in the field of artificial intelligence (3)

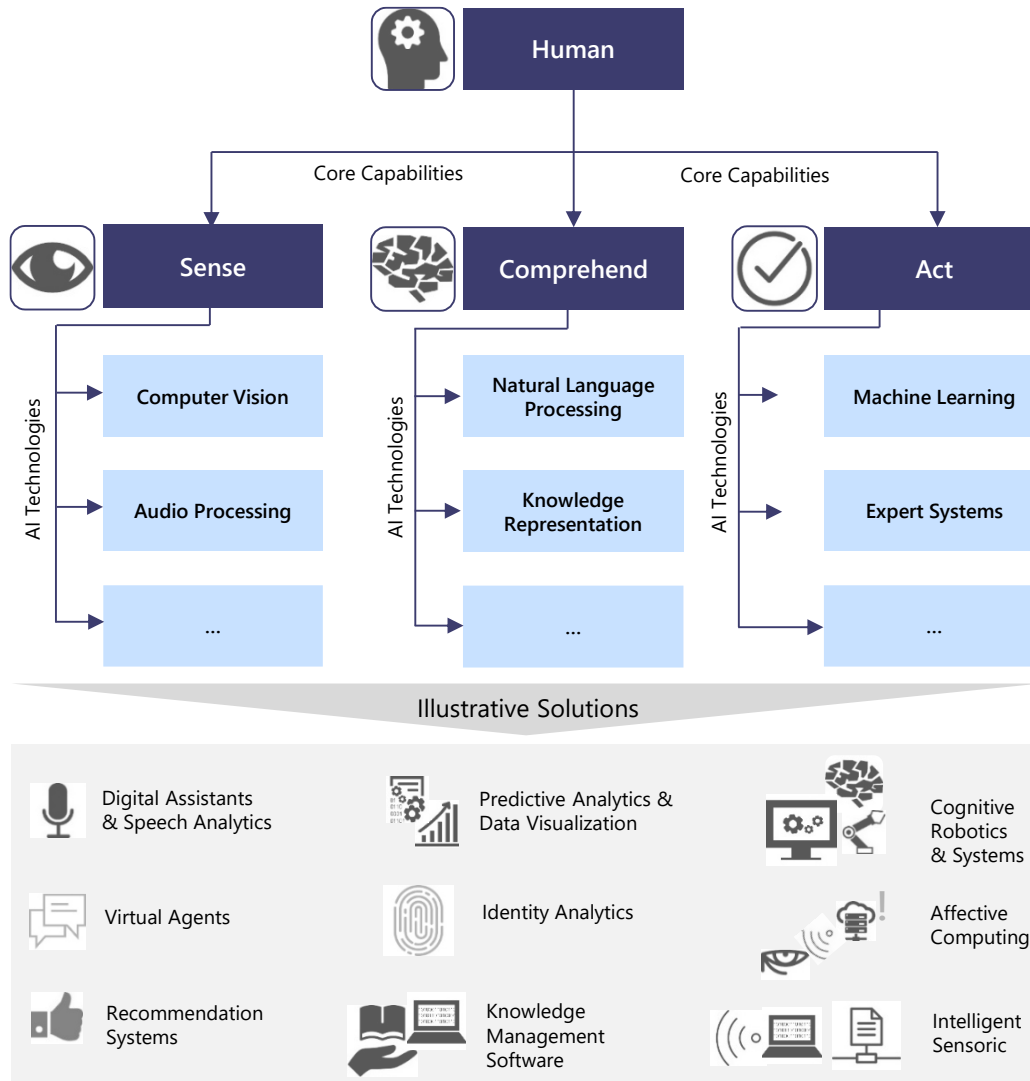
OpenAI	<ul style="list-style-type: none">• OpenAI is a company that specializes in the research of artificial intelligence• Supporters and shareholders in OpenAI include co-founder Elon Musk, the companies Microsoft and Amazon Web Services• As a non-profit organization, OpenAI is primarily concerned with researching the topic of artificial intelligence and its dangers• OpenAI is pursuing several AI projects, particularly in the topic area of language processing• The "GPT-2" and "GPT-3" projects are AIs that independently compose text based on text input• In December 2022, the company released the artificial intelligence "ChatGPT", which is able to conduct natural-sounding conversations using natural language processing and machine learning; a special feature of this AI is that it has the ability to remember previous conversations and adapt to the context of the conversation
Meta/Facebook	<ul style="list-style-type: none">• The Meta Group is one of the world's leading social media companies• Meta Group owns the social networks Facebook, Instagram, and WhatsApp• The company already uses AI-based facial scans to verify the age of Facebook and Instagram users to prevent minors from accessing inappropriate content• Meta operates its own artificial intelligence lab called "Meta AI", the lab works on various artificial intelligence projects• CICERO represents an AI agent that is able to negotiate and cooperate with humans• Galactica is an AI research tool that can support scientists in writing scientific papers• Meta offers numerous free tools for developers in the field of artificial intelligence, including frameworks, libraries, and ready-made AI models

Source: Wirtz (2024)

Table 8.3 Companies in the field of artificial intelligence (4)

Intel	<ul style="list-style-type: none"> • Intel is a semiconductor manufacturer and market leader in the field of PC microprocessors • In addition to processors, Intel also sells server products, chipsets, memory units, and entire systems • In the field of artificial intelligence Intel offers both hardware and software products, here, for example, graphics cards, which are specialized for AI applications, are sold • In addition to hardware components, the company offers cloud products and software tools for working with artificial intelligence • With BigDL, Intel provides a solution to scale AI models on Big Data clusters and thus improve the training of the models • Intel OpenVINO toolkits provide developers with the ability to optimize AI models for different devices through auto-discovery, among other things • In 2019, Intel acquired Israeli AI chip maker Habana Labs for two billion dollars • Habana Labs sells processors specialized for AI applications
Amazon	<ul style="list-style-type: none"> • Amazon is the world's largest retailer and is active in both AI for consumers and applications for businesses and their processes • Alexa, the company's AI voice assistant, is integrated into the Echo Smart Services series, which helps users to control their digital devices and make e-commerce purchases • Amazon Web Service (AWS), Amazon's enterprise cloud service, offers AI services for enterprise customers to improve their data analytics and business operations, such as by providing intelligent chatbots based on machine learning • AWS also offers pre-built AI services that do not require machine learning experience to use • Amazon also offers learning plans and courses to enable individuals to further their education in the areas of machine learning and artificial intelligence • For developers, AWS offers the opportunity to improve their skills and join the AWS community to share ideas on artificial intelligence topics

Fig. 8.10 AI framework



Source: Wirtz (2018, 2021, 2023, 2024)

Table 8.4 Categories of AI applications and use cases (1)

AI application	AI value creation and functional proposition	Use cases
AI-based knowledge management software	<ul style="list-style-type: none"> • Generation and systematization of knowledge—gather, sort, transform, record, and share knowledge • Natural language processing, machine learning, and expert systems can support the codification of knowledge • Use of neural networks enables to analyze, distribute, and share knowledge with others • ... 	<ul style="list-style-type: none"> • Decision support for corporate management in the context of big data analyses • Knowledge transfer during induction of employees • Preservation and management of knowledge during generational change of employees • ...
AI-based process automation systems	<ul style="list-style-type: none"> • Automation of standard tasks; perform formal logical tasks with unpredictable conditions in consistent quality • Complex human action processes (formal logical or dangerous tasks) can be transferred to automation systems, which can support humans in performing tasks • May include rule-based assessment, workflow processing, schema-based suggestions, data mining, case-based reasoning, intelligent sensor technology • Robotic process automation has emerged as a subarea through further technology innovations. This leverages the ability of software robots or AI-driven workers to mimic human interaction with user interfaces of software systems • ... 	<ul style="list-style-type: none"> • Automated image diagnostics in medicine • Automation and optimization of product development and production • Optimization of environmental plants • ...
Virtual agents	<ul style="list-style-type: none"> • Computer-based system that interacts with the user by means of speech analytics, computer vision, and written data input • May also include real-time universal translation and natural language processing systems and affective computing • Software that can perform tasks for humans • Subareas are chatbots and avatars • ... 	<ul style="list-style-type: none"> • Recruiting chatbot • Automated customer correspondence • Purchasing and consulting assistants • ...

Table 8.4 Categories of AI applications and use cases (2)

Predictive analytics & data visualization	<ul style="list-style-type: none"> • Analytics are based on the quantitative and statistical analysis and meaningful visualization of large amounts of data for forecasting purposes • Processing of big data for reporting, prescriptive analysis and predictive analysis • Machine learning as a technical subarea based on algorithms that can learn from data • ... 	<ul style="list-style-type: none"> • Medical diagnostics • Predictive maintenance in production • Financial forecasting, price optimization, and sales forecasting • ...
Identity analytics	<ul style="list-style-type: none"> • Software combined with big data, advanced analytics, and identity access management to control access to IT systems and automate risk-based identity checks • May include deep learning and machine learning, affective computing, and artificial immune systems • ... 	<ul style="list-style-type: none"> • Customer recognition in shops • Face recognition for identification of persons • Security robot for monitoring airports • ...
Cognitive robotics and autonomous systems	<ul style="list-style-type: none"> • Systems with higher-level cognitive functions that involve knowledge representation and are able to learn and respond • Sometimes in connection with affective computing to determine and adapt human behavior as well as respond to respective emotions • ... 	<ul style="list-style-type: none"> • Automated driving • Robot-assisted surgery • Care robots • ...
Recommendation systems	<ul style="list-style-type: none"> • An information filtering system • Software-based systems that screen personalized information to predict preferences of individuals • ... 	<ul style="list-style-type: none"> • Personalized marketing • Product recommendations • ...
Intelligent personal assistants	<ul style="list-style-type: none"> • Software based on speech analytics • Digital voice control enables functionality of a personal digital assistant • Providing an intuitive interface between a user and a system/device to search for information or complete simple tasks • ... 	<ul style="list-style-type: none"> • Smart procurement assistants • Driving assistance • Assistants for visually impaired people • ...

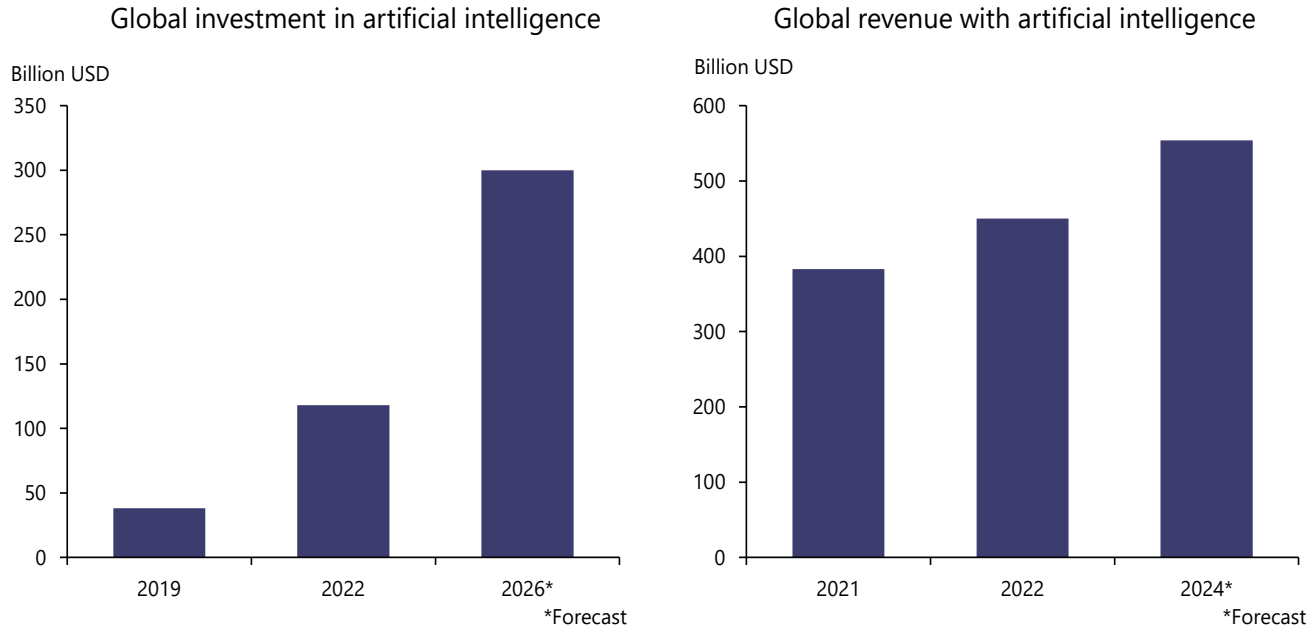
Source: Wirtz (2018, 2021, 2023, 2024)

Table 8.4 Categories of AI applications and use cases (3)

Speech analytics	<ul style="list-style-type: none"> • Software for intelligent recognition and processing of language • Understand or respond to natural language • Translate from spoken to written language or from one to another natural language • May include real-time universal translation and natural language processing systems • ... 	<ul style="list-style-type: none"> • Universal real-time translation of language and text in personal communication • Administrative workflow support by translating speech into text • Bot for the care of refugees • ...
Cognitive security analytics and threat intelligence	<ul style="list-style-type: none"> • Additional application for cognitive technologies to analyze security information through natural language processing and machine learning • Interpret and organize information and provide reasoning • ... 	<ul style="list-style-type: none"> • Behavior pattern recognition for higher IT security • Monitoring of financial transactions • Sample diagnoses for better fraud detection • ...

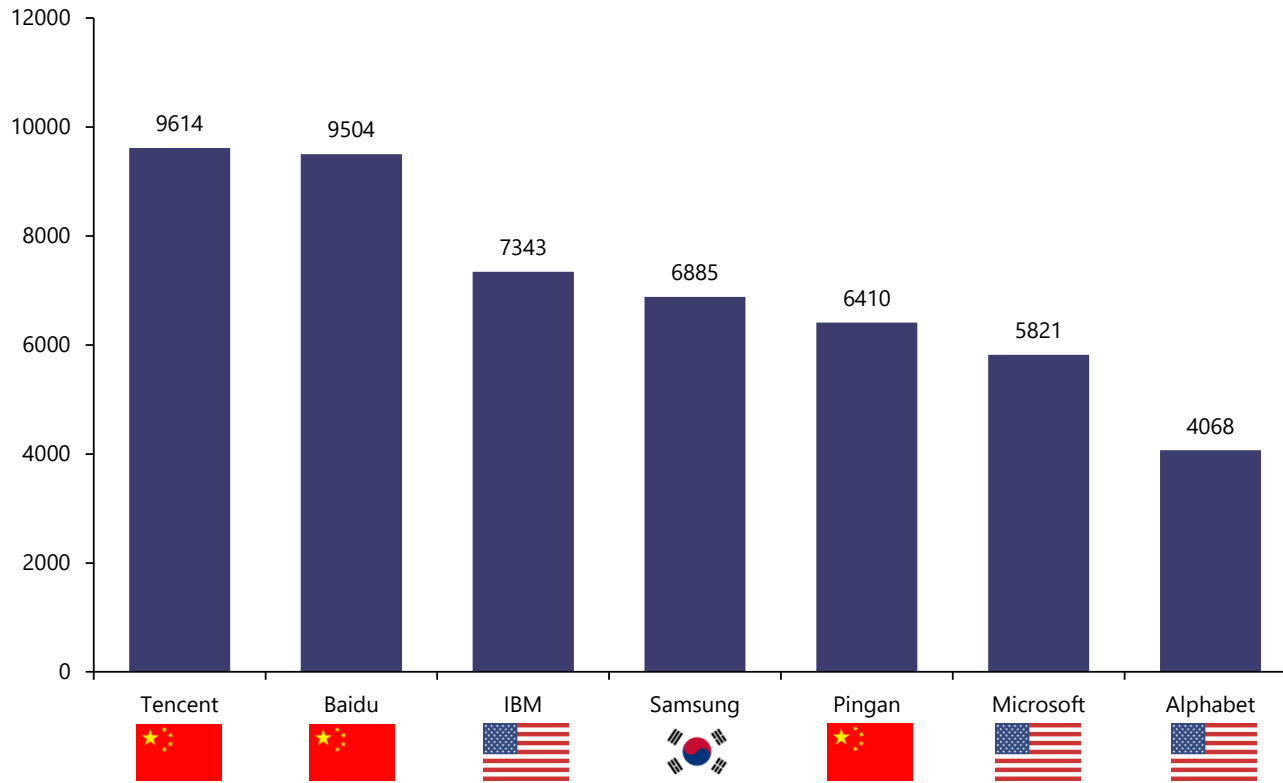
Source: Wirtz (2018, 2021, 2023, 2024)

Fig. 8.11 Global investments and revenue from artificial intelligence



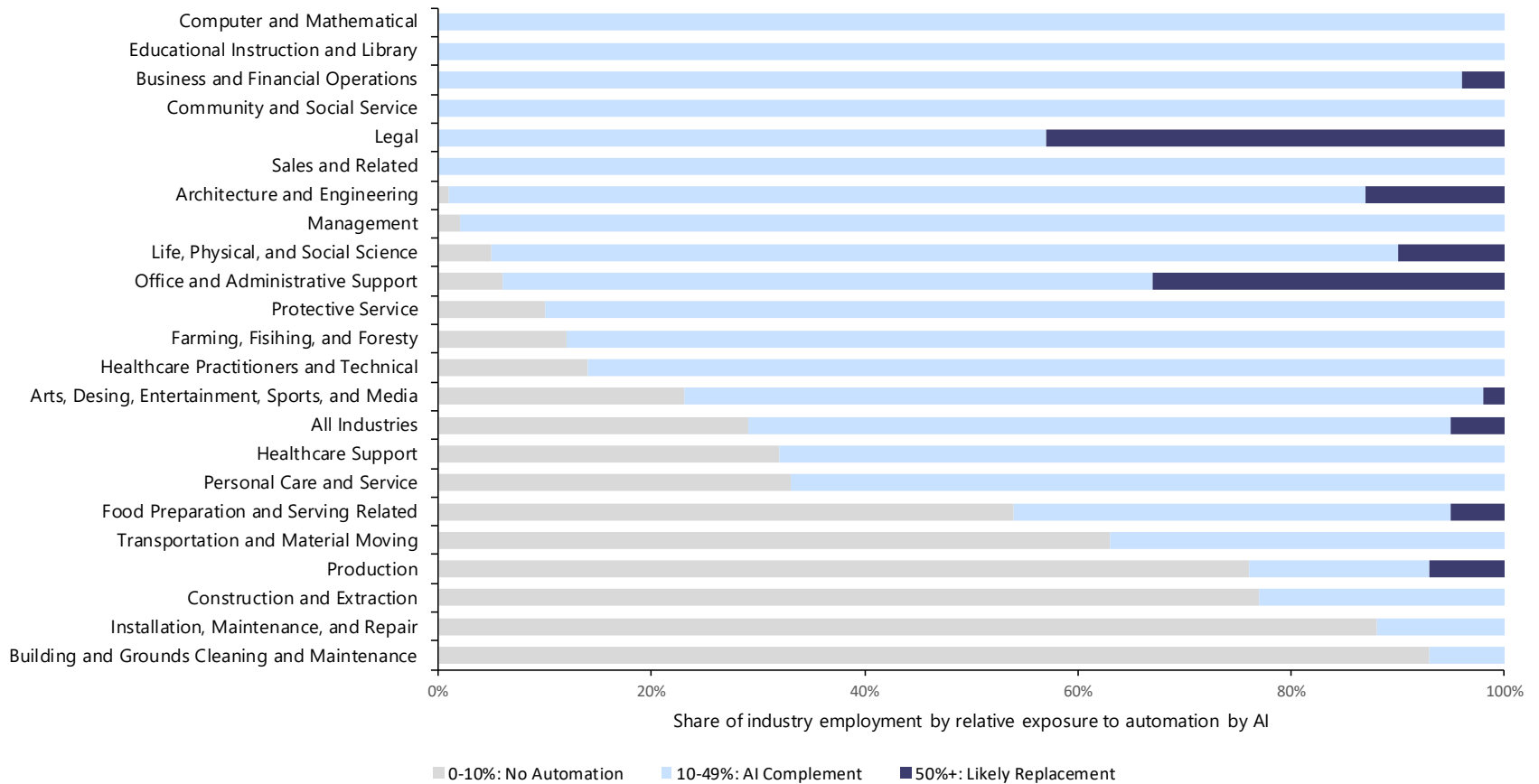
Source: [Wirtschaftswoche \(2023\)](#), [Wirtz \(2024\)](#)

Fig. 8.12 Companies with the most patent families in the field of AI



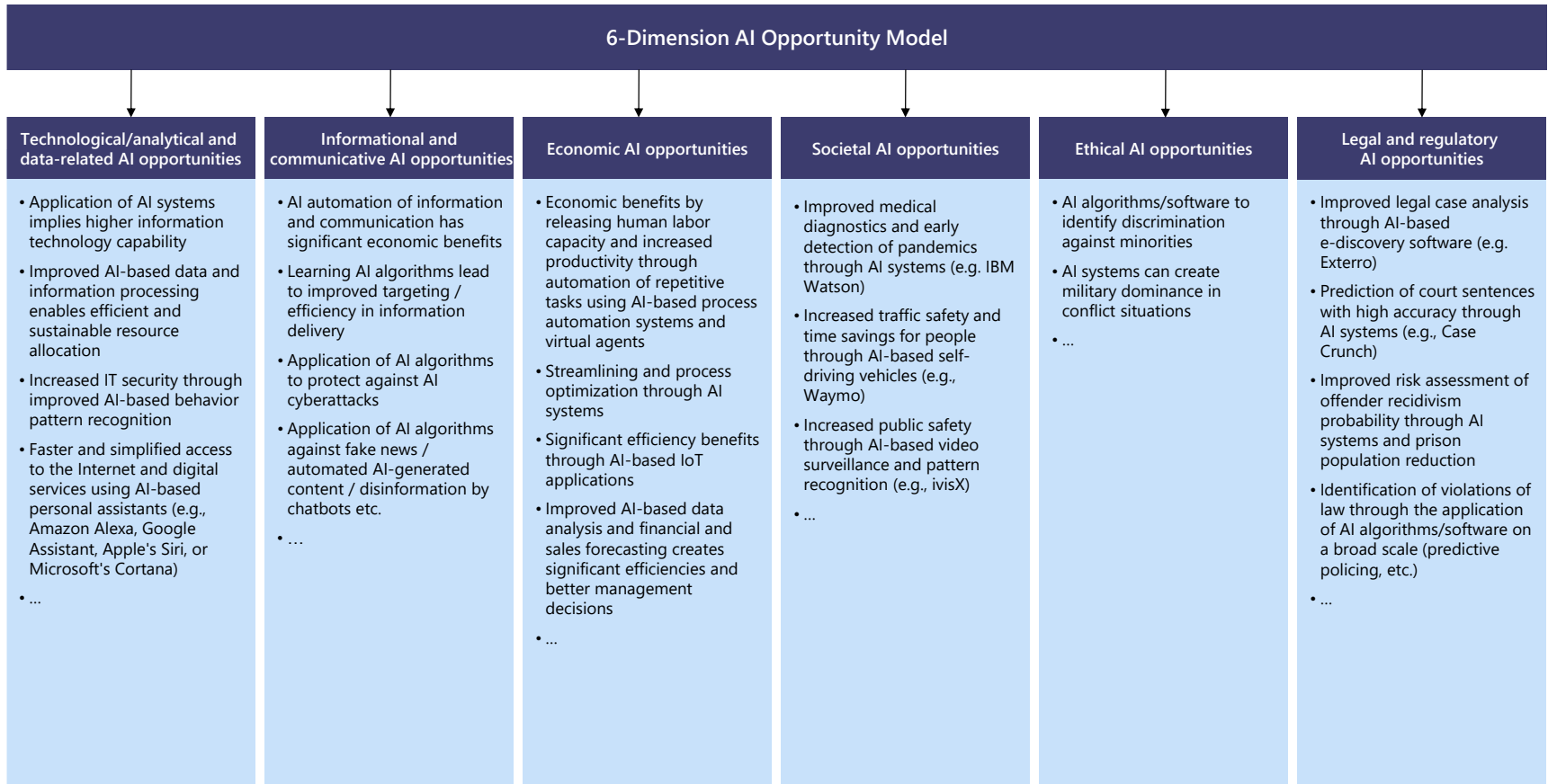
Source: Statista (2023b), Wirtz (2024)

Fig. 8.13 Share of workplaces in industry that are automatable by AI



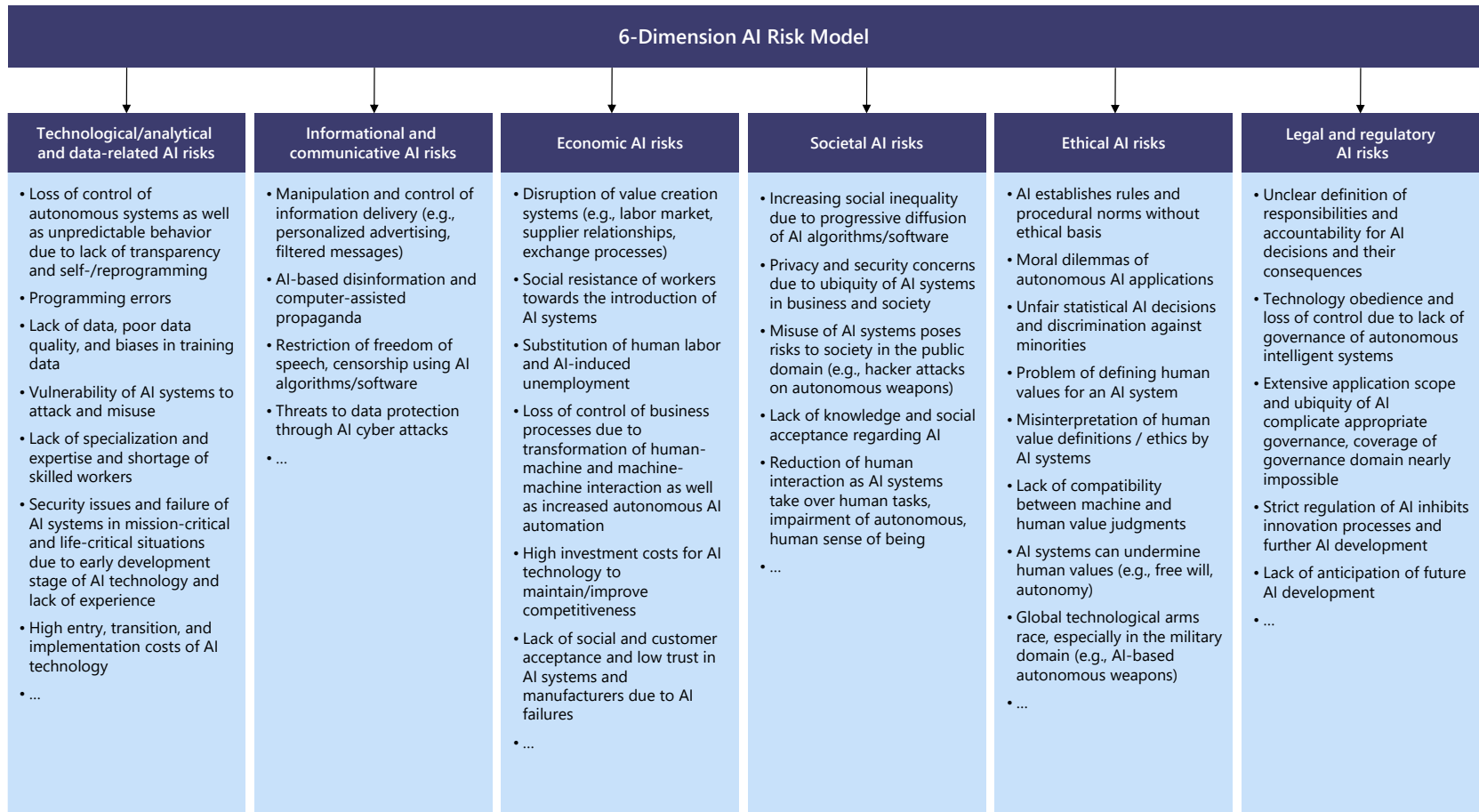
Source: Briggs and Kodnani (2023), Wirtz (2024)

Fig. 8.14 Six-Dimension AI Opportunity Model



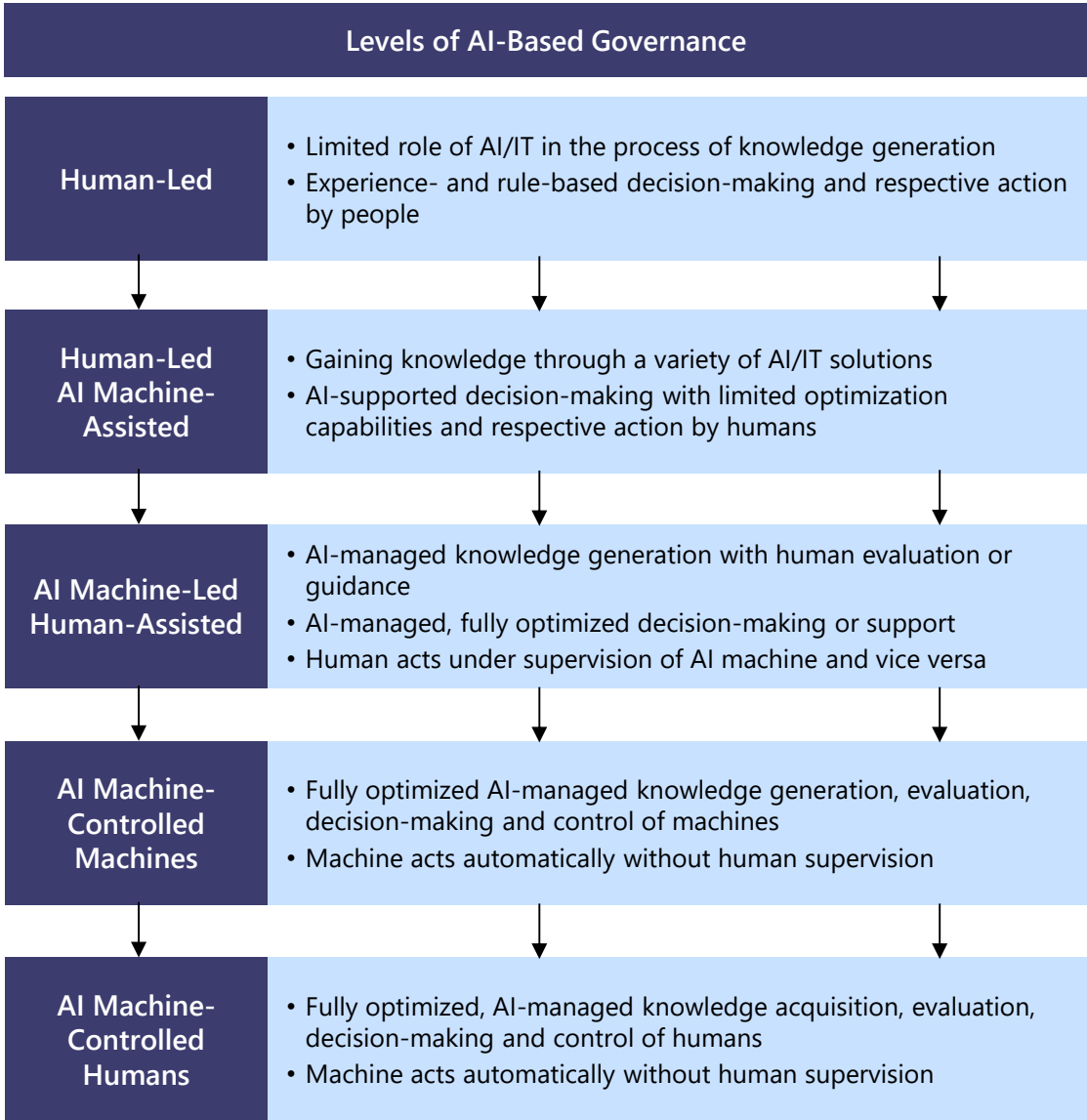
Source: Wirtz Weyerer (2019), Wirtz et al. (2022b), Wirtz (2024)

Fig. 8.15 Six-Dimension AI Risk Model



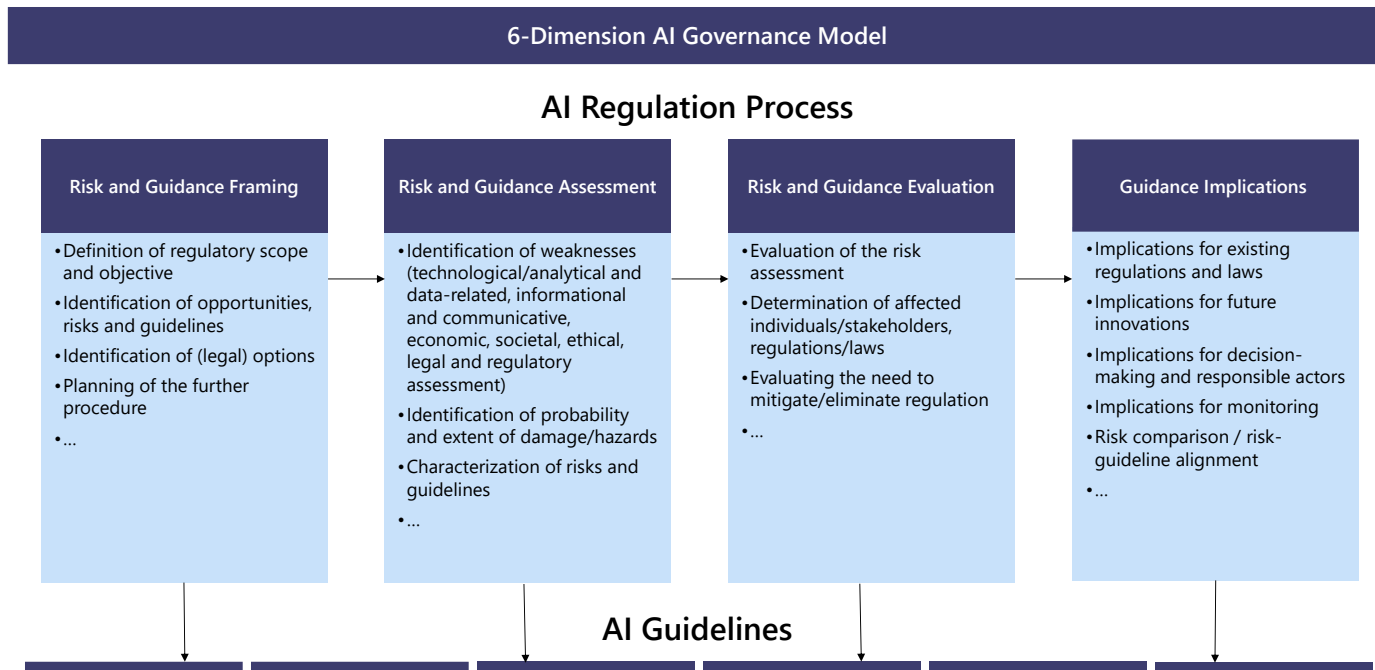
Source: Wirtz Weyerer (2019), Wirtz et al. (2022b), Wirtz (2024)

Fig. 8.16 Five-Stage Model of AI-Based Governance



Source: Wirtz (2020, 2021, 2023, 2024)

Fig. 8.17 Six-Dimension AI Governance Model (1)



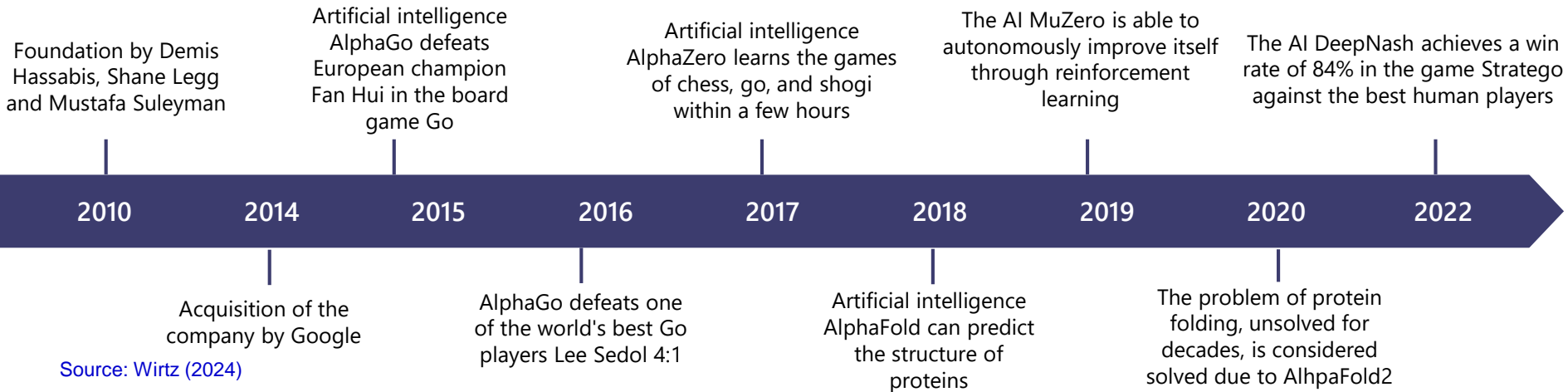
Source: Wirtz (2021, 2023, 2024)

Fig. 8.17 Six-Dimension AI Governance Model (2)



Fig. 8.18 Development of DeepMind over time

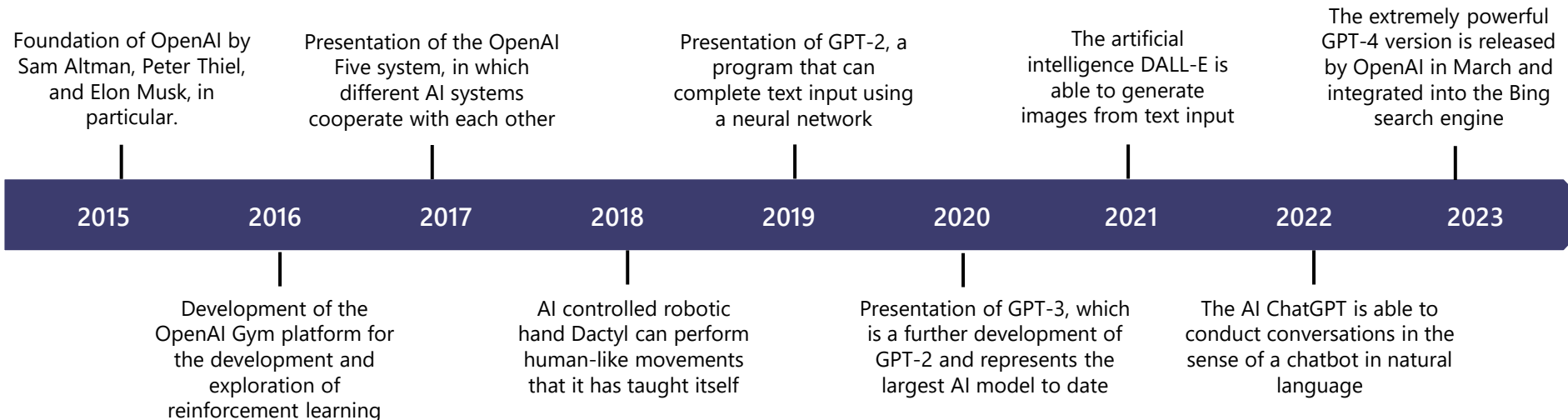
Development of the company DeepMind



Source: Wirtz (2024)

Fig. 8.19 Development of OpenAI over time

Development of the company OpenAI



Source: Wirtz (2024)

Fig. 8.20 AI-generated sample response of the OpenAI service ChatGPT to the input “4 c business model“

4 c business model

The 4C Business Model is a framework used to analyze and design a business model. It was developed by Bernd Wirtz and is based on the 4 Cs:



1. Customers: Who are the target customers and what needs do they have?
2. Channels: How will the company reach and interact with customers?
3. Company: What are the company's key resources, activities and partnerships?
4. Competitors: Who are the main competitors and how do they operate?

By analyzing a business through these four lenses, the 4C Business Model aims to help companies understand how they create value for customers and how they can sustain a competitive advantage.

The 4C Business Model is a useful tool for both startups and established companies, as it helps to identify areas where a business can improve and adapt to changing market conditions. This model can also be used to analyze the business models of competitors, to understand their strengths and weaknesses and explore opportunities for differentiation.

↻ Regenerate response

[ChatGPT Jan 9 Version](#). Free Research Preview. Our goal is to make AI systems more natural and safe to interact with. Your feedback will help us improve.

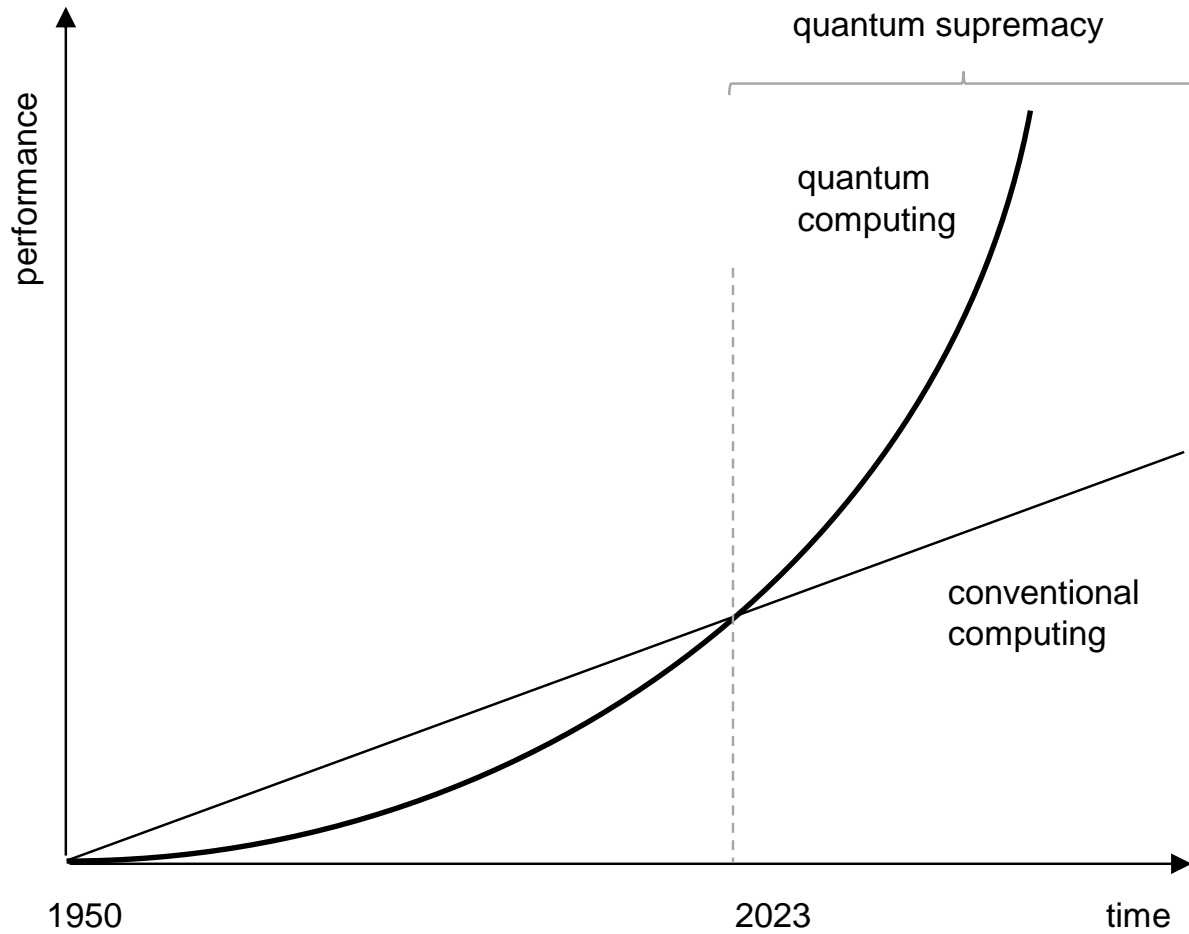
Source: OpenAI (2023b), Wirtz (2024)

Fig. 8.21 AI-generated sample image of the OpenAI service DALL-E for the command “Alien Doing Digital Business by Vermeer“



Source: OpenAI (2023c), Wirtz (2024)

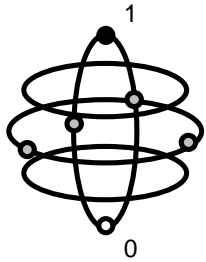
Fig. 8.22 Development of the performance of quantum computers



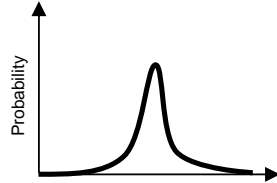
Source: Wirtz (2024)

Fig. 8.23 Operating principles of quantum and conventional computers

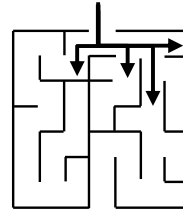
Quantum Computer



- QBits are the basis of the functioning of quantum computers
- They can have simultaneous states / "superpositions" between 0 and 1



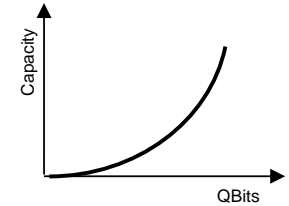
- Quantum computers operate with probabilistic models
- Results are assigned a probability



- Quantum computers calculate tasks in parallel
- All states that produce possible results are overlaid, including the correct path

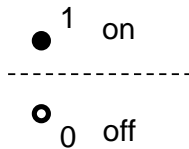


- Parallelism allows more efficient solution approaches when calculating complex tasks

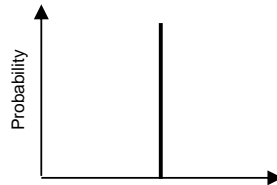


- With the number of QBits the computing power increases exponentially
- Complex optimization tasks can be solved quickly

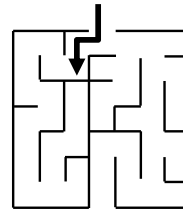
Conventional Computer



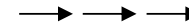
- Conventional computers are based on bits that can have the state 0 or 1
- Technologically, bits are switched by transistors that can temporarily store bit information



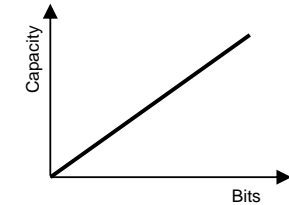
- Conventional computers follow deterministic models
- Results are based on concrete outputs of corresponding calculations



- Conventional computers calculate tasks one after the other
- There is no overlay of the calculations



- Successive processes enable coordinated processing of tasks
- Due to the successive solution of complex tasks, they require a significant amount of computing power and time



- The capacity of conventional computers increases proportionally/linearly with the number of transistors or bits
- For complex optimization tasks mainframes have to be used, which sometimes have to calculate for a long time

Source: Wirtz (2024)

Fig. 8.24 Quantum Computing Multi-Layer Model

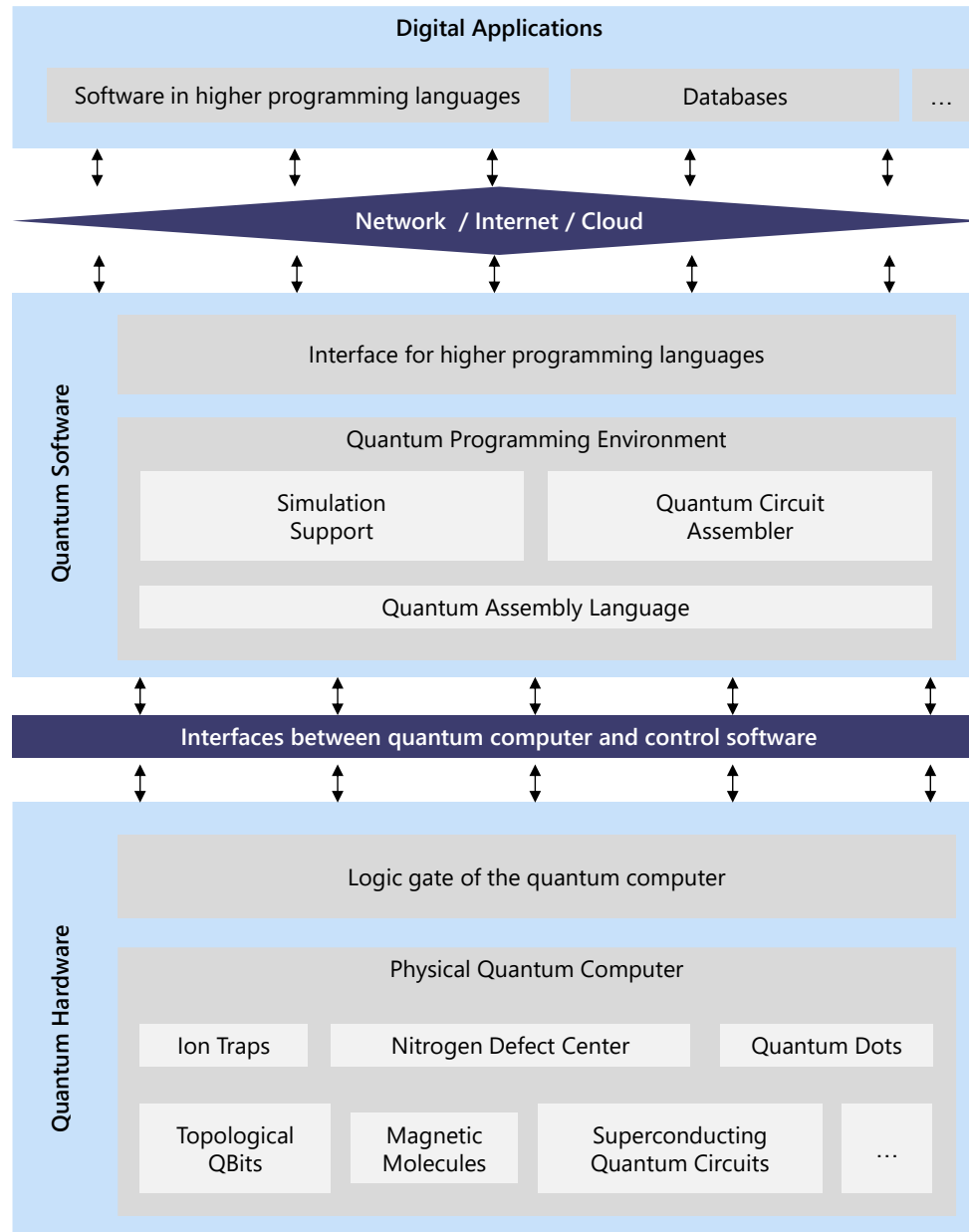


Table 8.5 Quantum computing companies (1)

Company	Description and service
D-Wave	<ul style="list-style-type: none"> • D-Wave is a leader in the development and delivery of quantum computing systems, software, and services • D-Wave processors are programmable superconducting integrated circuits with up to 128 pair-coupled superconducting flux qubits • D-Wave provides an open-source repository of software tools for quantum annealers; it includes Qbsolv, a piece of open-source software that solves problems on both the company's quantum processors and classical hardware architectures • ...
Google/ Alphabet	<ul style="list-style-type: none"> • Google/Alphabet is one of the leading companies in the research and development of quantum computers and already offers a variety of quantum products and services • The quantum virtual machine computation service allows quantum programs to run on a virtual grid on quantum hardware • Google/Alphabet's Sycamore processor has up to 54 superconducting qubits and is suitable for specific algorithms and machine learning • The Cirq programming framework is Google/Alphabet's open-source Python platform that enables simulation for writing, optimizing, and executing quantum programs • Google/Alphabet's TensorFlow Quantum provides a machine learning library for this purpose • ...
IBM	<ul style="list-style-type: none"> • IBM has the largest number of the most powerful quantum systems in the world and is one of the technology leaders in quantum computing • IBM Quantum System One is installed at the Fraunhofer-Gesellschaft in Germany and at the University of Tokyo in Japan, with more sites to follow • IBM aims to build national quantum ecosystems and accelerate research and development • IBM's goal is to build a 4000-qubit processor with multiple clusters of modularly scaled processors by 2025 • ...

Table 8.5 Quantum computing companies (2)

Intel	<ul style="list-style-type: none"> • Intel is the world’s largest manufacturer of semiconductor chips and developer of the x86 instruction sets found in most personal computers (PCs) today • Intel plans to develop “hot” silicon spin qubits based on its experience in mass-producing transistors that operate at higher temperatures • Intel’s goals include scaling up processors to more than a million QBits and overcoming the current fragility of QBits • The Horse Ridge II cryogenic quantum control chip provides tighter integration for quantum system control in terms of manipulating and reading out qubit states, it is comparatively low-power, and can operate at a temperature of 4 degrees Kelvin, enabling large-scale testing to accelerate commercialization • ...
Microsoft	<ul style="list-style-type: none"> • Microsoft Corporation is one of the world’s largest technology companies • Microsoft Quantum plans to offer the world’s first full-stack, open-cloud quantum computing ecosystem • Microsoft’s development division is involved in a number of international quantum research projects • In this context, the Azure Quantum division has been able to generate quantum excitations that are not normally present but help control the processor and execute algorithms • ...
Nvidia	<ul style="list-style-type: none"> • Nvidia Corporation is a technology company that develops graphics processing units (GPUs), application programming interfaces (APIs) for data science and high-performance computing, and system-on-chip units (SoCs) for the mobile computing and automotive markets • Nvidia is a global leader in artificial intelligence hardware and software and is working on quantum computing development • Nvidia has a quantum computing platform called Quantum Optimized Device Architecture, designed to enable quantum-accelerated artificial intelligence and high-performance computing • ...

Source: Wirtz (2024)

Table 8.5 Quantum computing companies (3)

Rigetti	<ul style="list-style-type: none">• Rigetti Computing is a developer of quantum integrated circuits for quantum computers• Forest cloud computing platform provides developers with access to quantum processors to write quantum algorithms for testing purposes• The platform is based on a programming language called QUIL, QUIL facilitates quantum computing by allowing simulation of the use of a quantum chip with 36 qubits• Rigetti operates a rapid prototyping fabrication lab called Fab-1 to rapidly create integrated circuits• ...
IQM	<ul style="list-style-type: none">• IQM is a developer of quantum computers and supercomputer data centers• The company's goal is to develop world-leading quantum computers to enable people to live well• IQM offers ready-made quantum computing systems, consisting of hardware and software components, to solve specific problems• ...

Source: Wirtz (2024)

Chapter 8 Questions and topics for discussion

Chapter 8 Questions and topics for discussion



Review questions

1. Define artificial intelligence and describe the main aspects of AI.
2. Explain the AI framework.
3. Describe the 6-Dimension AI Risk Model.
4. Describe the 6-Dimension AI Opportunity Model.
5. Outline how quantum computers and conventional computers work and explain the main differences.

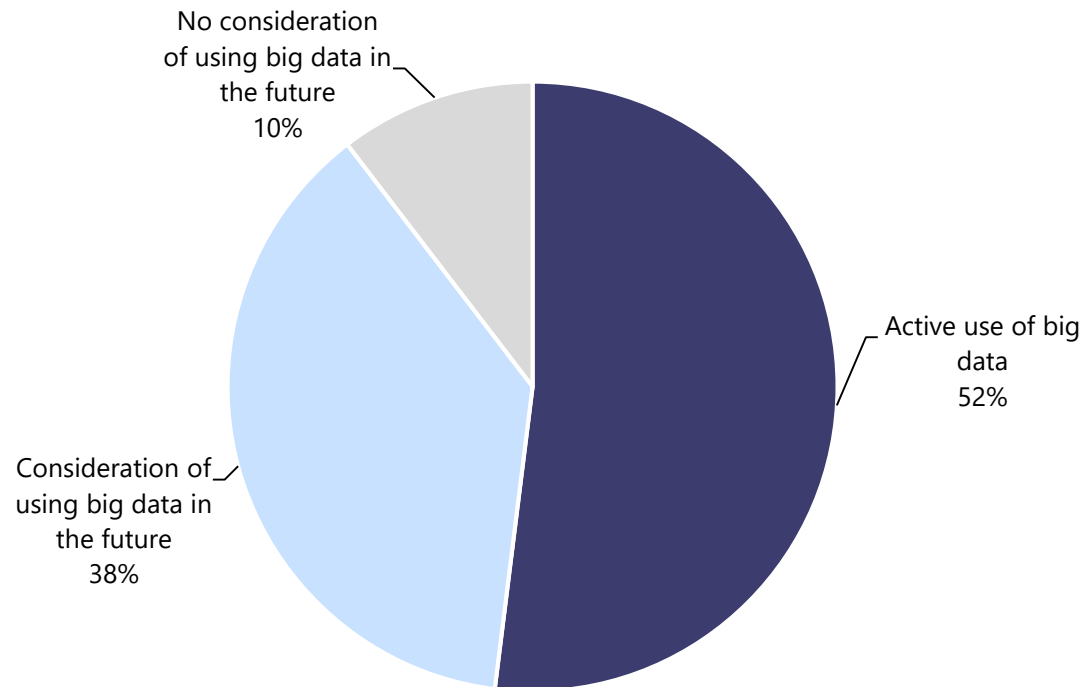


Topics for discussion

1. Discuss the risks of artificial intelligence in relation to a society shaped and controlled by digital machines. Pay particular attention to the aspect of autonomous-acting AI machines and their impact on human coexistence.
2. In a not-too-distant future, there will be AI machines whose capabilities are superior to human capabilities in many areas and which will largely replace labor performed by humans. Discuss the ethical aspects of such a situation and, in particular, the implications for the labor market and possible mass unemployment.
3. Using the 5-Stage Model of AI-Based Governance, discuss how socially desirable it is for AI machines to control humans.

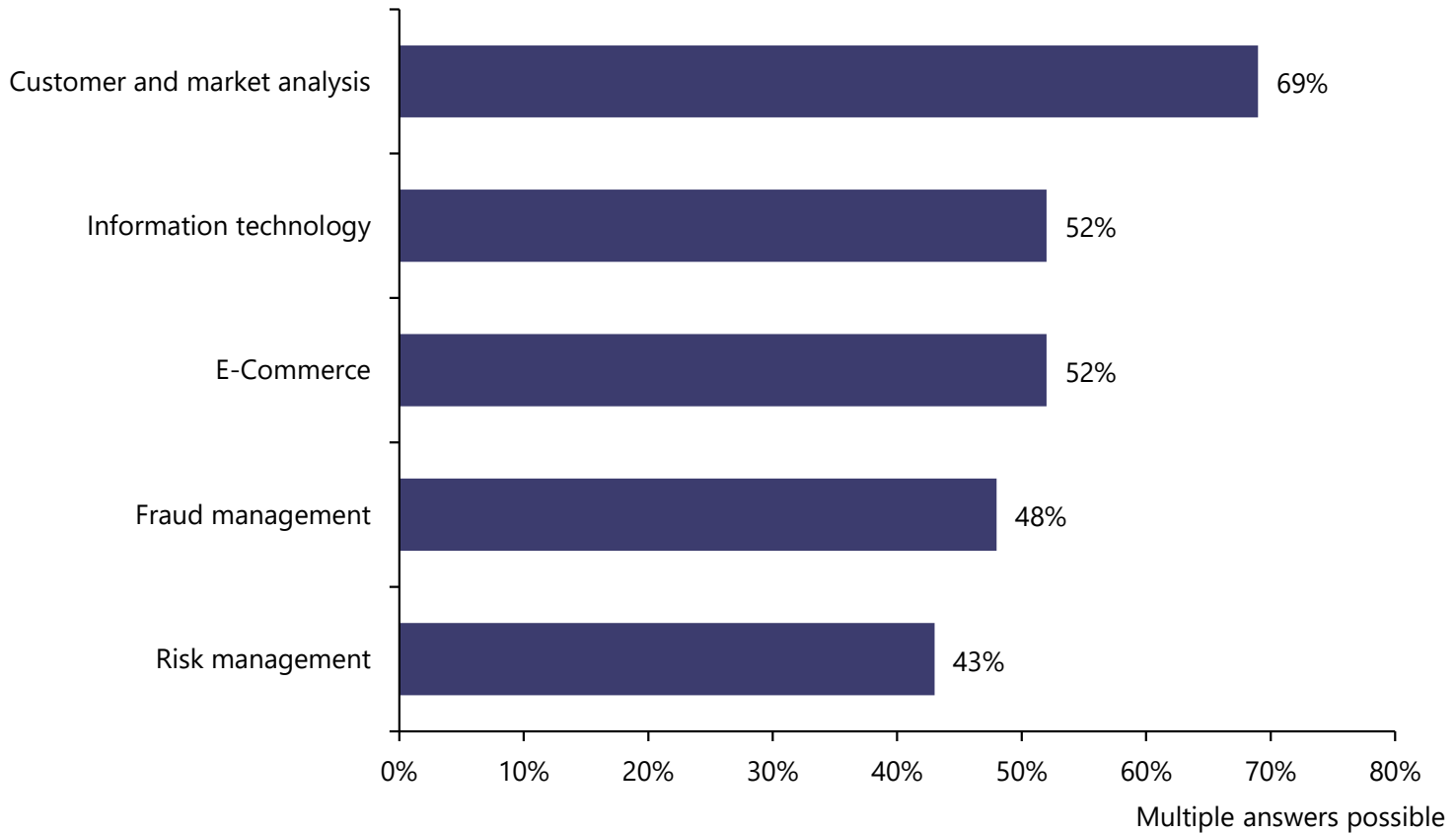
Chapter 9: Big Data, Cloud Computing and Blockchain Technology

Fig. 9.1 Application of big data analytics in business practice



Source: Statista (2020), Wirtz (2024)

Fig. 9.2 Areas of application for big data in companies



Source: Dilmevani (2020), Wirtz (2024)

Fig. 9.3 Data processed by companies in big data analyses

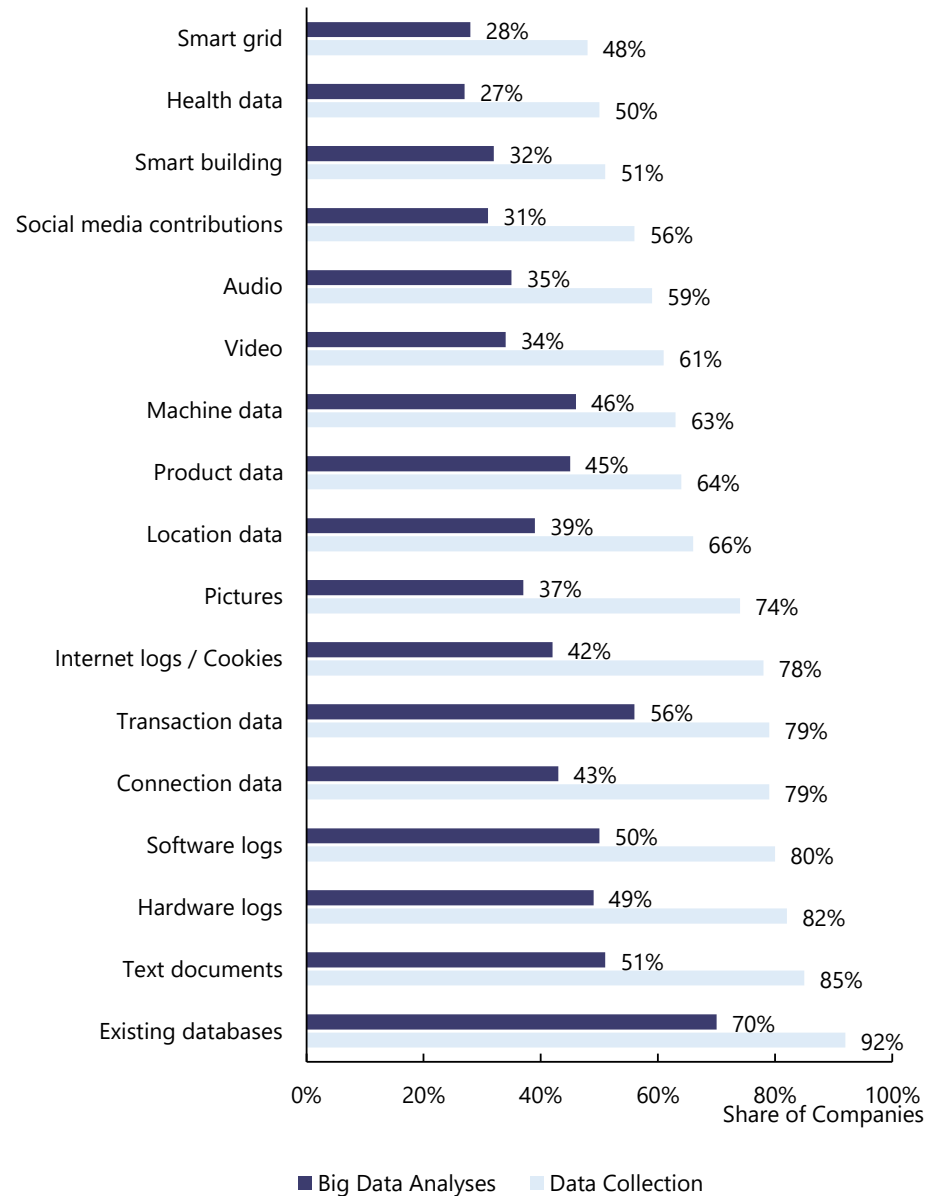
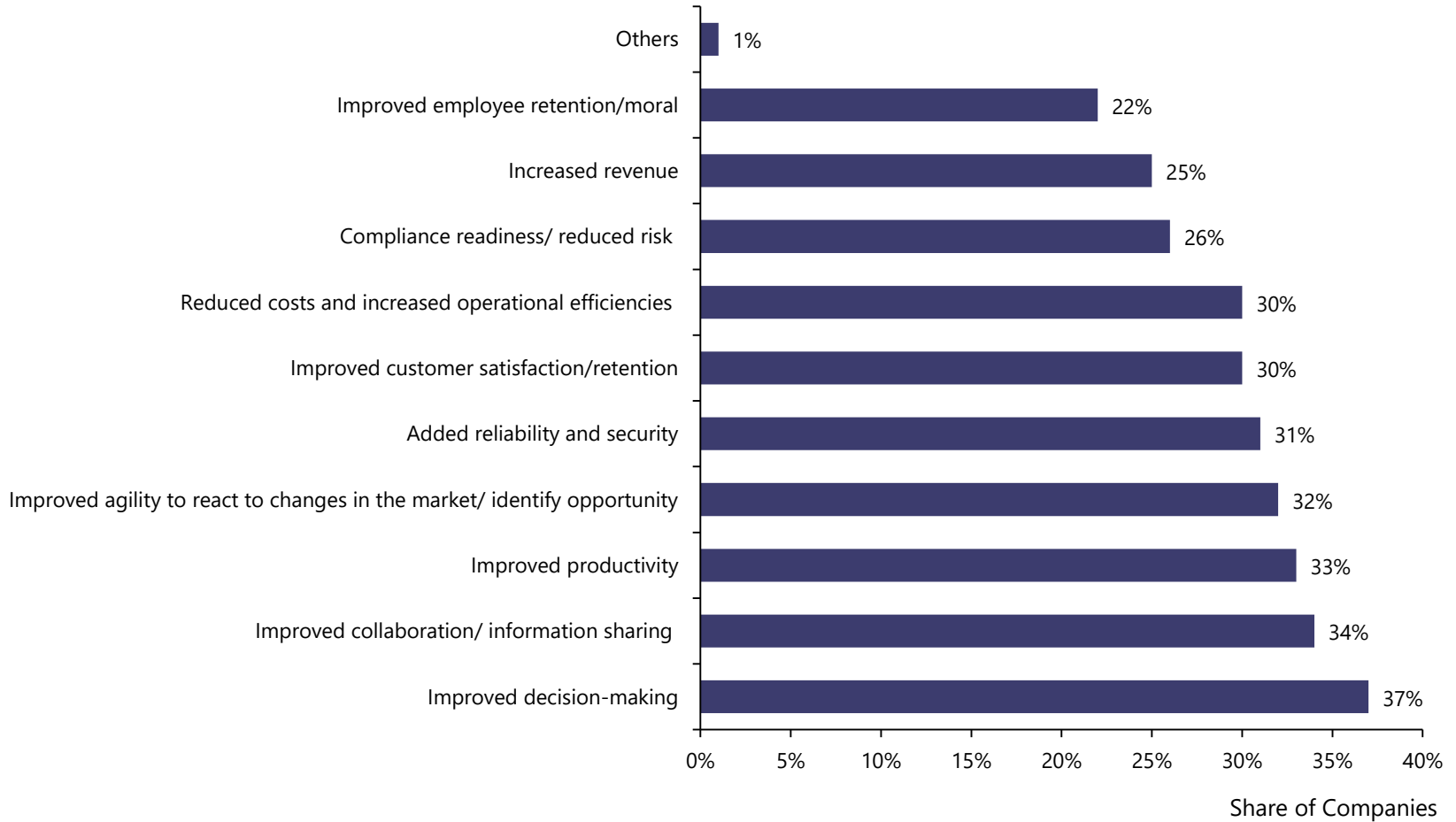
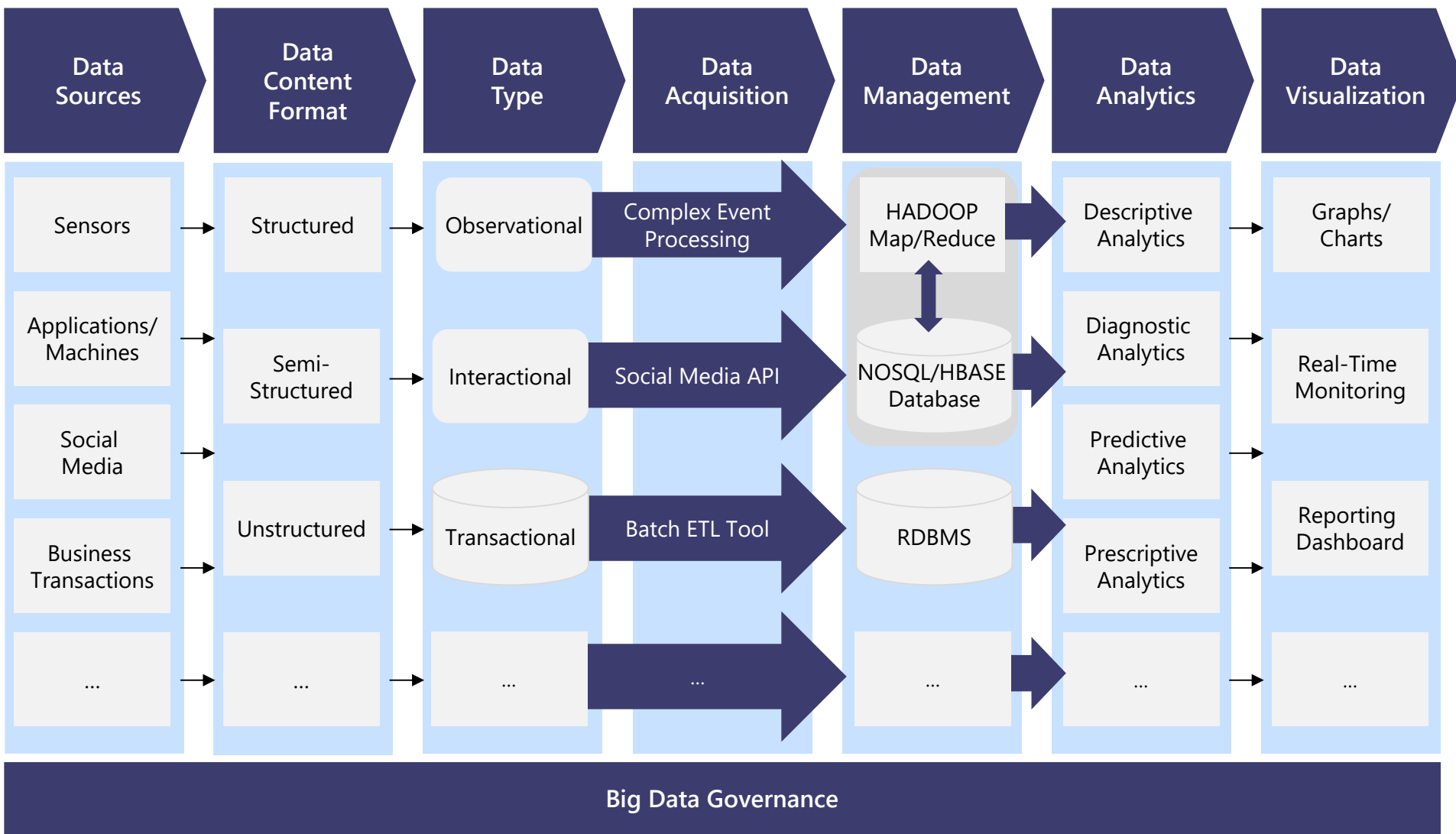


Fig. 9.4 Advantages of using big data from a company perspective



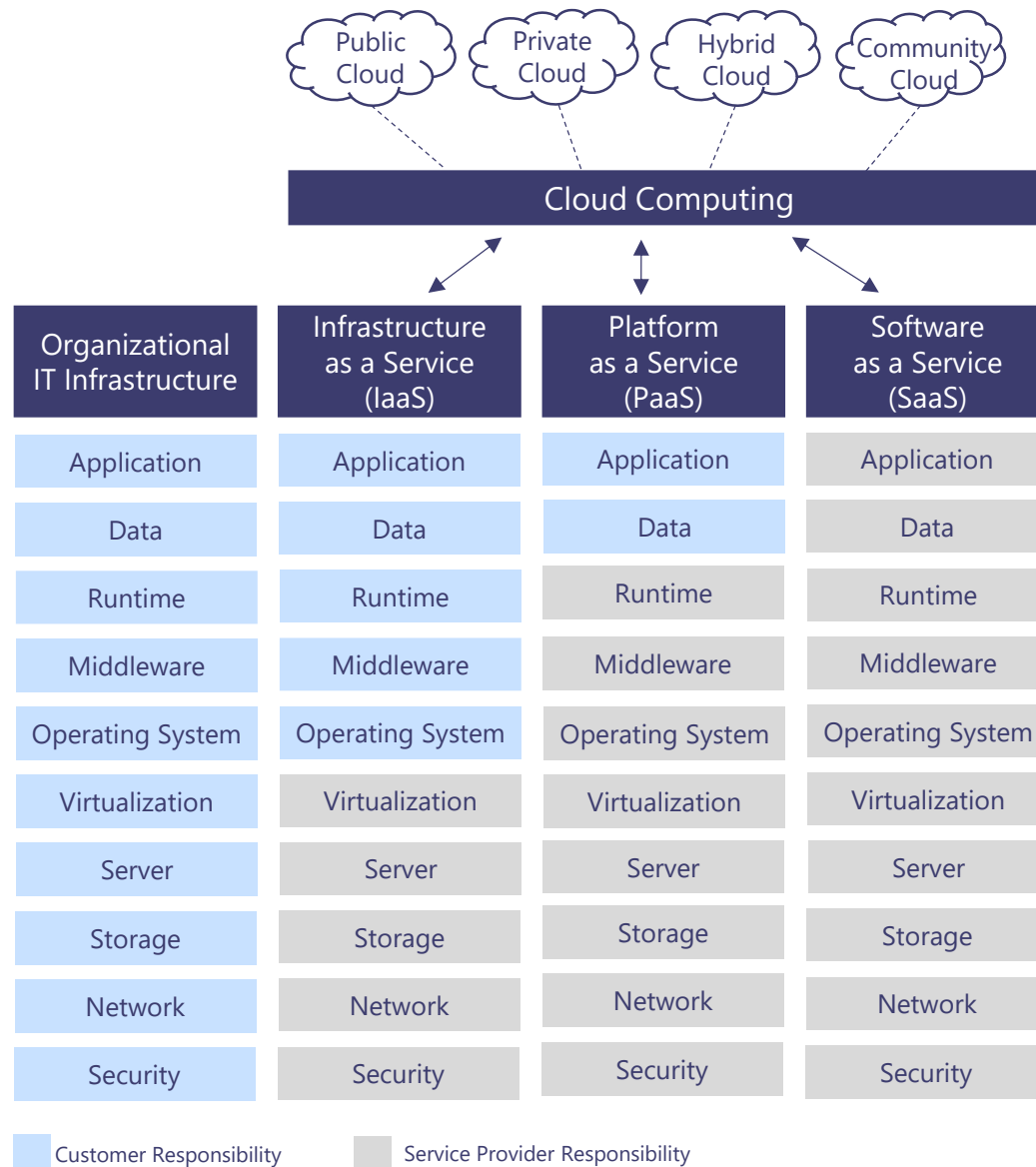
Source: Capgemini (2016), Wirtz (2024)

Fig. 9.5 Exemplary illustration of a big data architecture



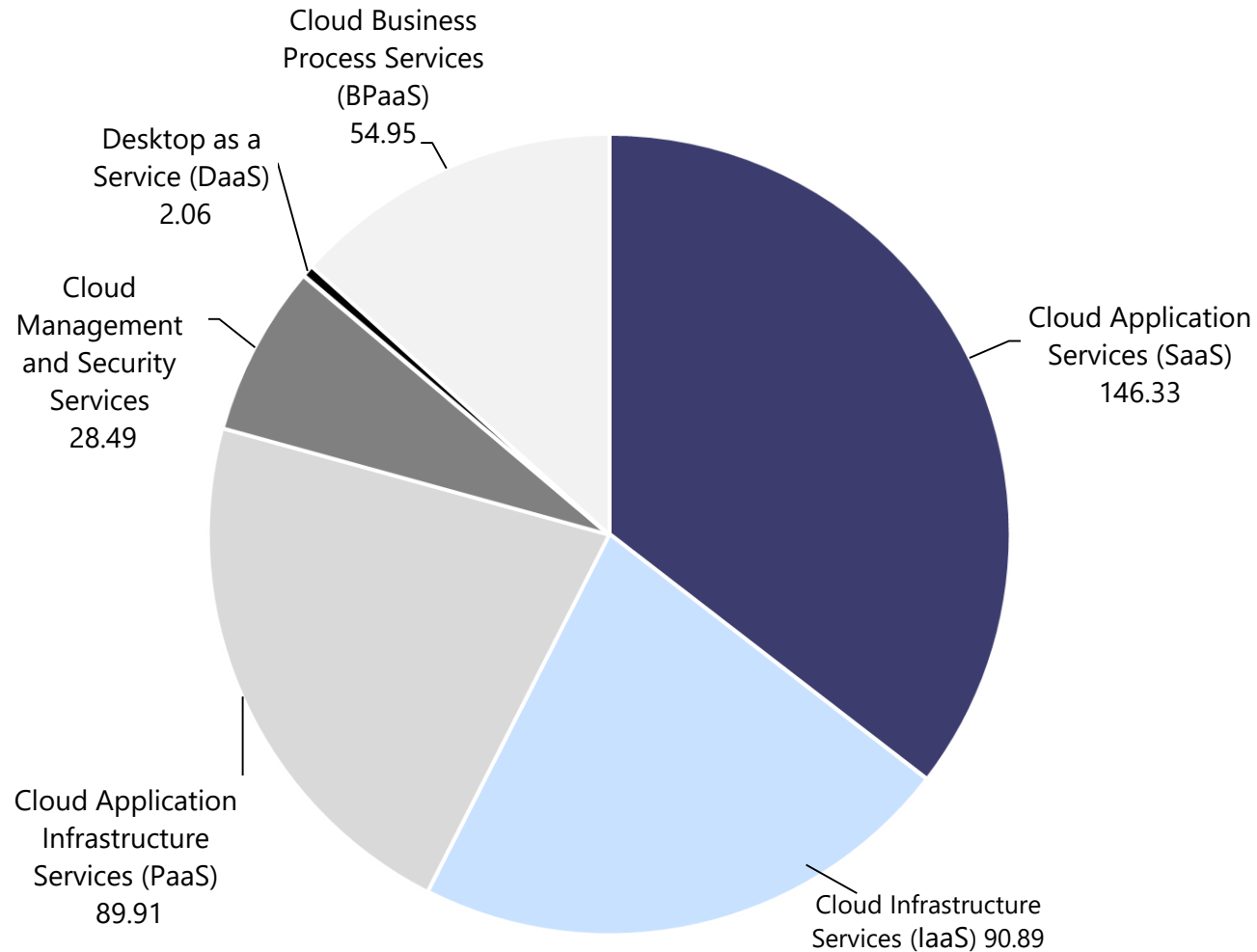
Source: Wirtz (2018, 2021, 2024)

Fig. 9.6 Provision and service models of cloud computing



Source: Wirtz (2016, 2021, 2024)

Fig. 9.7 Cloud computing revenues worldwide by segment in billion USD



Source: Gartner (2022), Wirtz (2024)

Table 9.1 Companies in the field of cloud computing (1)

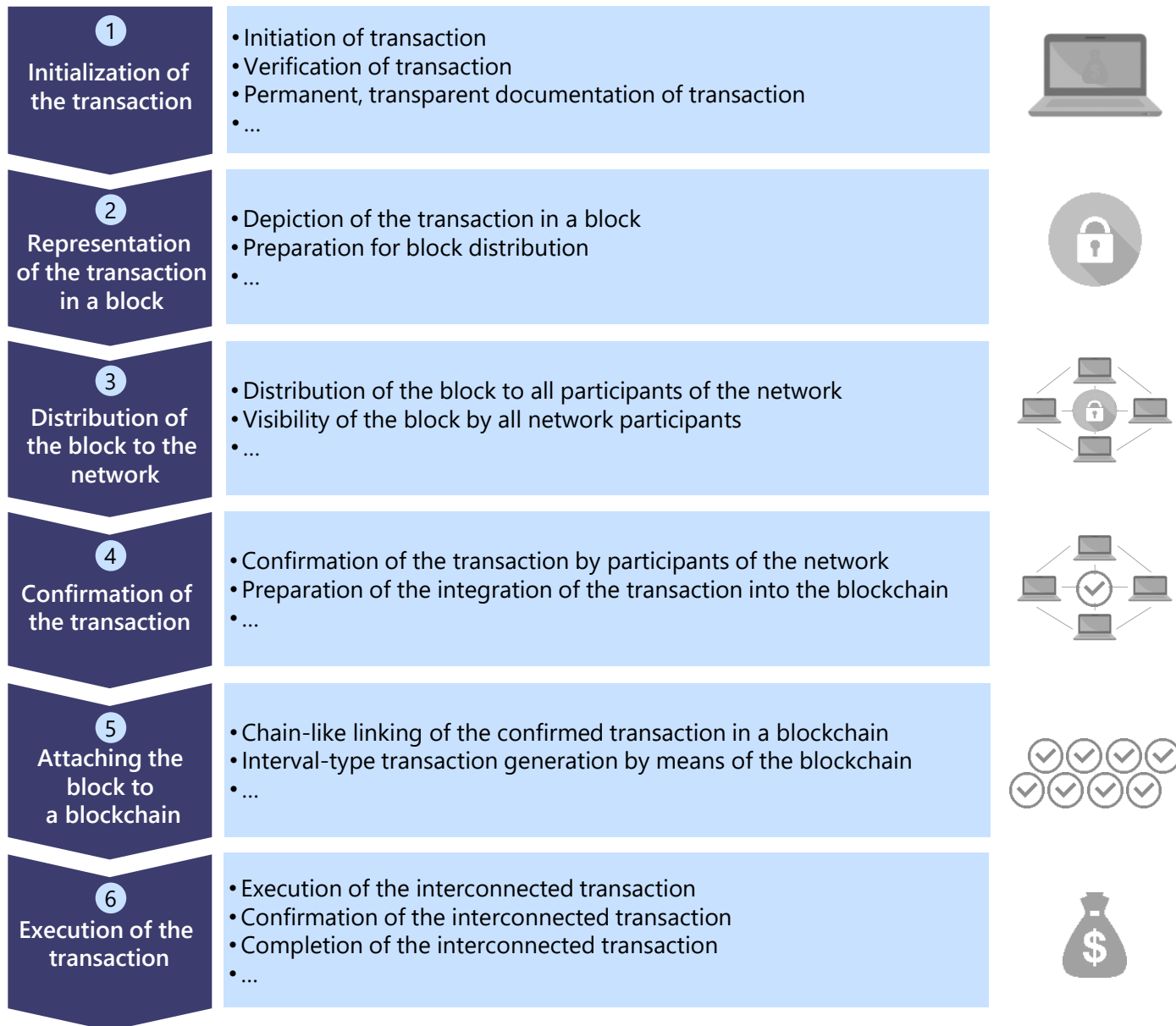
Cloud Service Providers	Core aspects
SAP	<ul style="list-style-type: none"> • SAP is a global software provider and particularly known for its enterprise resource planning products • In addition to on-premise products, SAP increasingly relies on cloud solutions for the implementation of its products at the customer's site • SAP S/4HANA Cloud represents a fully comprehensive cloud-based ERP software that can grow with the customer's requirements due to its scalability • With the SAP Business Technology Platform, the company offers its own cloud platform on which customers can develop and integrate application extensions • ...
IBM	<ul style="list-style-type: none"> • IBM is a leading IT and consulting services company • IBM provides various cloud products for different application areas • In addition to the basic provision of storage and computing power, the company offers specific applications in the cloud, such as automation and analysis tools • A special feature of the IBM cloud are the products Qiskit and Qiskit Runtime, which can be used for quantum development and the execution of quantum programs • ...
Amazon	<ul style="list-style-type: none"> • Amazon is the largest retail company in the world and is active in cloud computing for both consumers and enterprise customers • For private individuals, Amazon offers a way to back up photos in the cloud via the Amazon Photos platform • Its subsidiary Amazon Web Services (AWS) is one of the world's leaders in cloud computing • Some major web services such as Netflix, Reddit and Dropbox use or have used AWS services and rely on AWS services • ...

Table 9.1 Companies in the field of cloud computing (2)

Microsoft	<p>---</p> <ul style="list-style-type: none">• Microsoft is a hardware and software provider and particularly known for the Windows operating system. In addition to operating systems, the company sells, e.g. other application programs, development environments and server products• Microsoft Azure represents a cloud computing platform of the company with over 200 products and services• The cloud platform offers specialized solutions in the retail, manufacturing and healthcare sectors, among others• Microsoft's platform OneDrive offers consumers the option of backing up files in the cloud, in particular the benefit of installing the service directly on one's own computer and thus accessing the backed-up files from various devices regardless of location• ...
Alphabet/Google	<ul style="list-style-type: none">• Alphabet is particularly known for the Google search engine. In addition, Google offers numerous other web services, such as Gmail and YouTube• Google offers solutions in the field of cloud computing for both end consumers and companies• Google Drive represents a file hosting service that allows users to back up and edit files in the cloud• A special feature of Google Drive is that stored documents can be edited by multiple users simultaneously, directly in the cloud• For companies, Google offers numerous services in addition to the provision of storage space, e.g. for data analysis, as a programming environment or in the field of machine learning• Users of the Google Cloud include Apple, Twitter, or Spotify• ...

Source: Wirtz (2024)

Fig. 9.8 Transactions in the blockchain



Source: Wirtz (2020, 2021, 2024)

Fig. 9.9 Five-layer model of blockchain technology

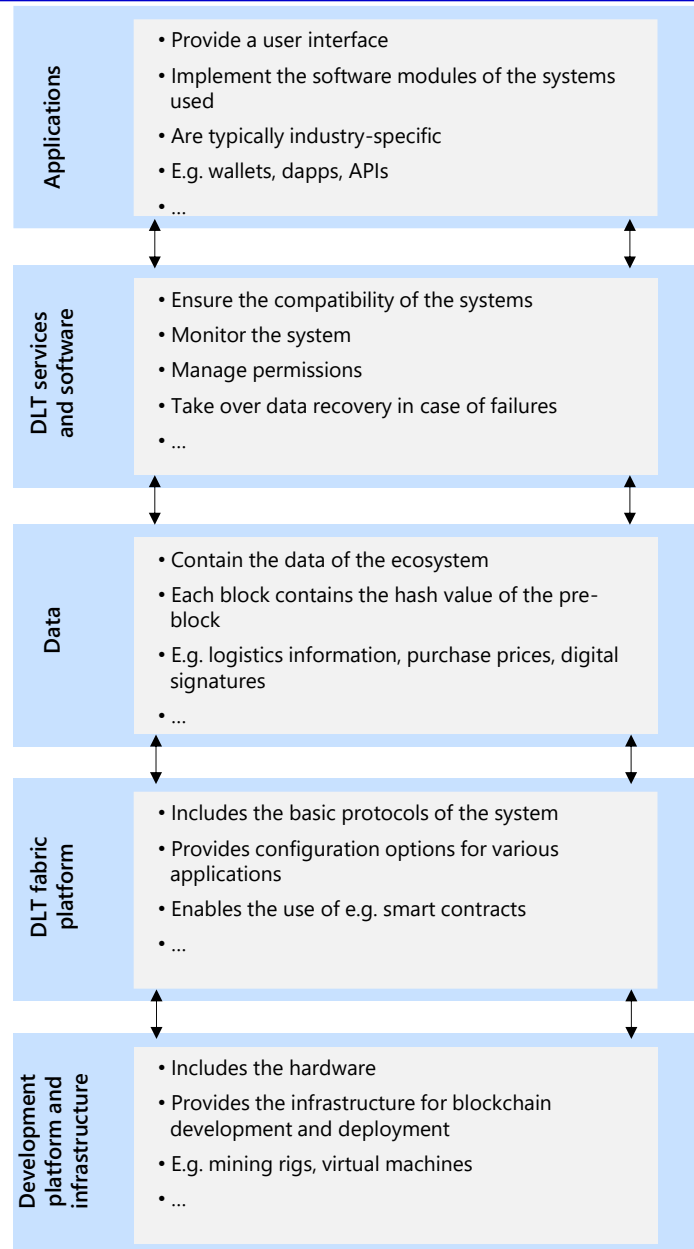
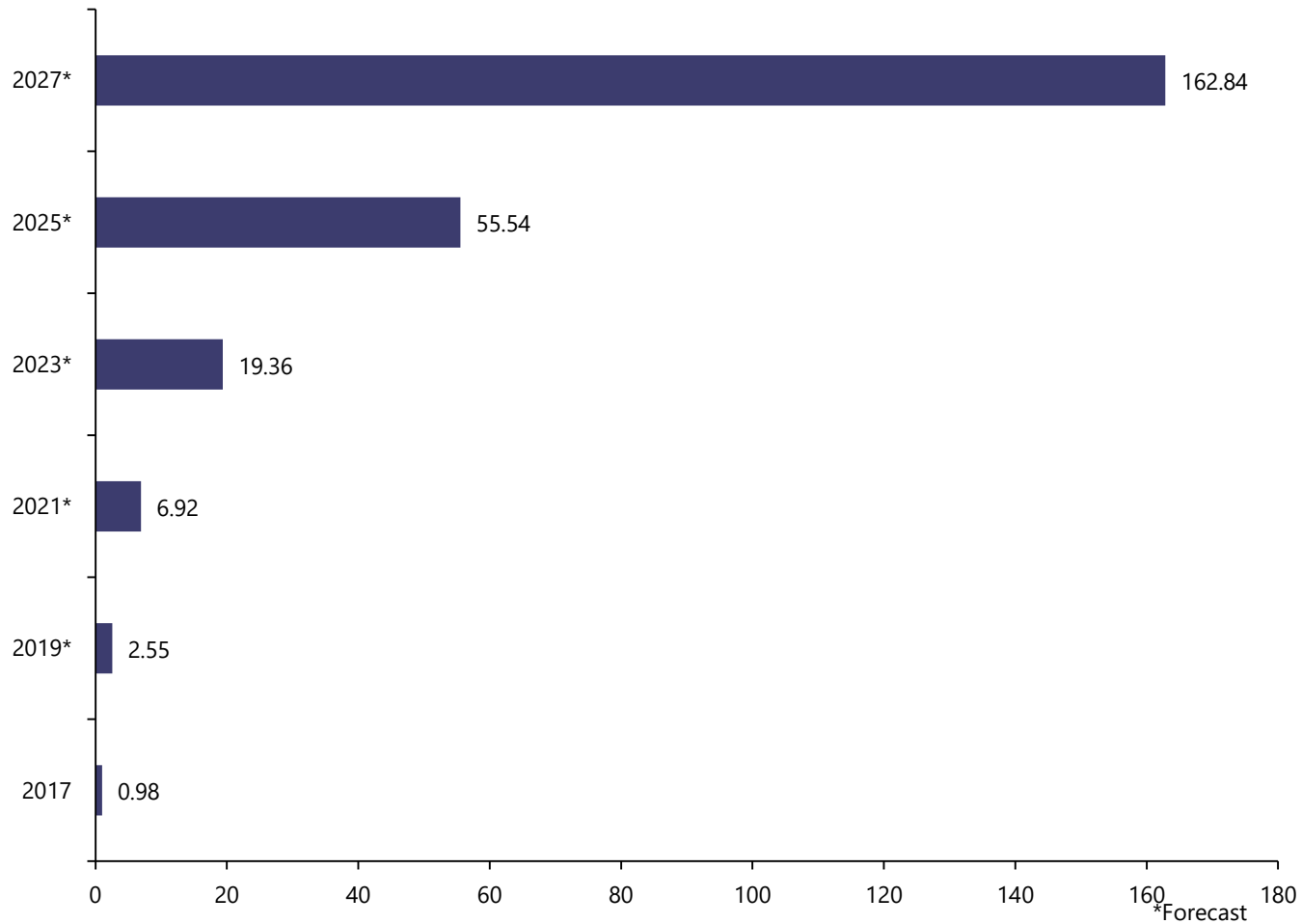





Fig. 9.10 Market volume of blockchain technology worldwide

Market volume
in billion USD






Source: Statista (2018), Wirtz (2024)

Table 9.2 Applications of blockchain technology (1)

Blockchain applications	Core aspects
<p>Cryptocurrencies</p> 	<ul style="list-style-type: none"> • Cryptocurrencies use blockchain technology for transparent and tamper-proof transactions • Multiple transactions are stored in each data block and combined in a checksum • The use of several hash methods ensures that no transaction can be changed afterwards • The best-known examples of the use of the blockchain in cryptocurrencies are Bitcoin, Ethereum and Tether • ...
<p>SCM / Supply chains</p> 	<ul style="list-style-type: none"> • Blockchain technology can be used to document transactions within supply chains • By using the blockchain, it is possible for all parties involved to check the current status and all previous transactions at any time • Due to the tamper-proof nature, end consumers, for example, can be sure about the origin of products and their transport routes • Quality assurance is conceivable, for example, for products that require cooling; this can be done with the help of temperature sensors that save their measurement data in the blockchain • ...
<p>Smart contracts</p> 	<ul style="list-style-type: none"> • Smart contracts are programs that, with the help of blockchain technology, are able to be executed only when certain conditions are met • Smart contracts are often used to automate the execution of a contract • Smart contracts offer the benefit of certainty of execution of a contract since all parties must abide by the terms of the contract for execution • ...

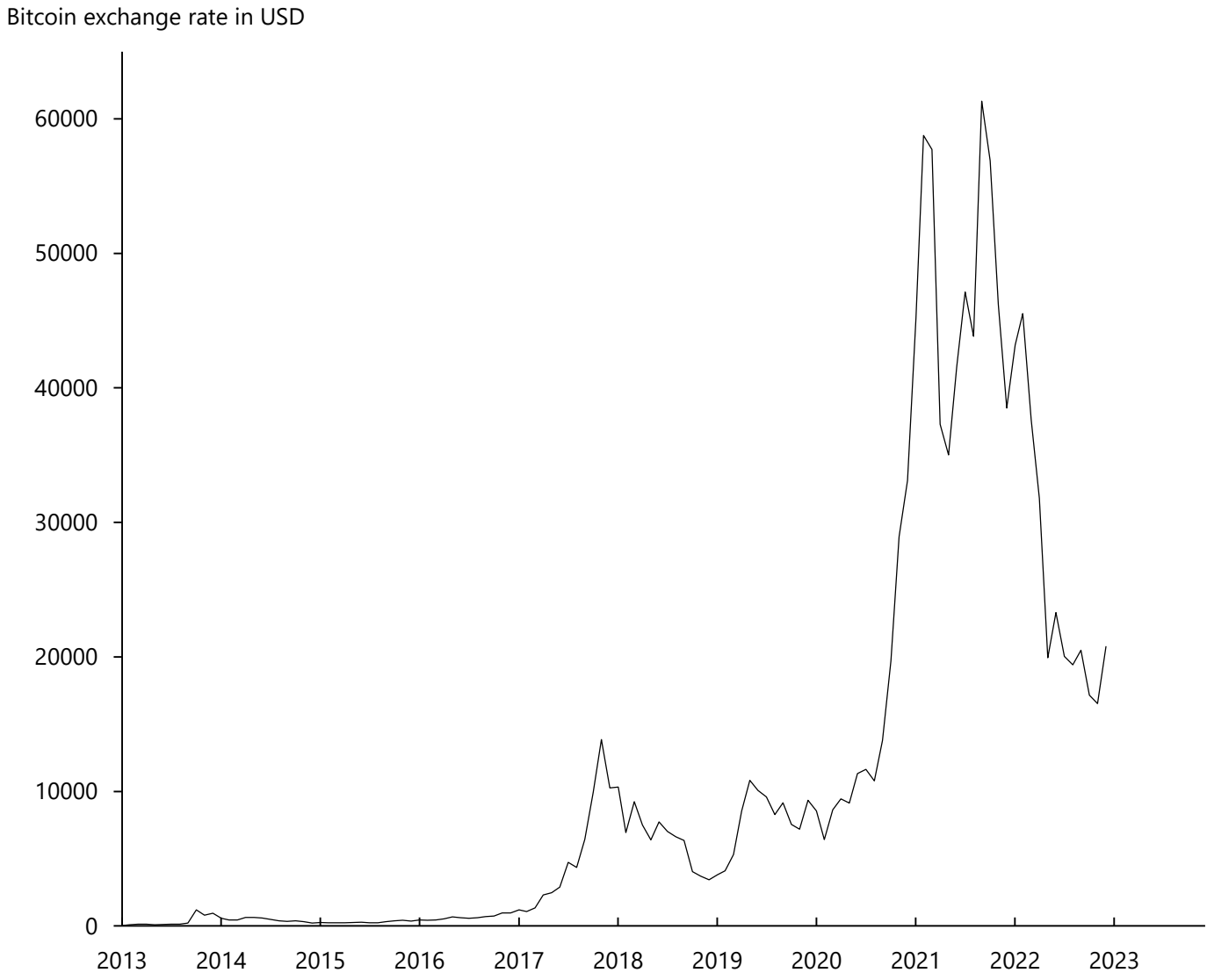
Source: Wirtz (2024)

Table 9.2 Applications of blockchain technology (2)

<p>Security</p> 	<ul style="list-style-type: none">• Due to its properties, blockchain technology can be used for various applications in the field of (cyber) security• So far, no successful attack on blockchain technology has been carried out using cryptographic hash functions• Blockchain technology can be used within access management to ensure that only authorized individuals have access to specific data or security areas• Using the blockchain, data can be encrypted and made accessible to other users as part of a key exchange• ...
<p>Finance</p> 	<ul style="list-style-type: none">• In finance, blockchain technology offers the opportunity to leapfrog traditional intermediaries such as banks• Decentralized exchange (DEX), for example, represents a peer-to-peer marketplace where users can exchange, lend, and borrow cryptocurrencies• Unlike traditional financial transactions, DEXs offer complete transparency and reduce users' dependence on the intermediary• ...
<p>NFT</p> 	<ul style="list-style-type: none">• NFTs (non-fungible tokens) represent unique digital assets• Storing them on a blockchain ensures the uniqueness of the object• NFTs can represent images, music or videos, for example• ...

Source: Wirtz (2024)

Fig. 9.11 Bitcoin exchange rate against the US dollar over time from 2013 to 2023



Source: Investing (2023), Wirtz (2024)

Chapter 9 Questions and topics for discussion

Chapter 9 Questions and topics for discussion



Review questions

1. Name the areas of application of big data in companies.
2. Explain the seven layers of a big data architecture and which aspects are addressed by big data governance in this context.
3. Describe the different types of provision and service models of cloud computing.
4. Explain the differences between the various deployment and service models in terms of the organizational IT infrastructure.
5. What is the blockchain? Describe the transaction phases and content of blockchains.



Topics for discussion

1. Discuss the opportunities and risks of big data. Are the risks in reasonable proportion to the benefits of big data?
2. Cloud services enable access to data - anytime, anywhere and anyhow. Debate this access opportunity, especially from a data security and privacy perspective.
3. Discuss whether blockchain technologies do not contribute to a significant burden in terms of environmental aspects. Take the example of mining Bitcoins.

Chapter 10: Digital Automation and Robotics

Table 10.1 Selected definitions of automation

Author(s)	Definition
Stockwell (1994)	“Automation is the use of combinations of mechanical and instrumental devices to replace, refine, extend or supplement human effort and facilities in the performance of a given process, in which at least one major operation is controlled without human intervention, by a feedback mechanism.”
Esdar et al. (2010)	“Automation is the operation of machinery without human supervision.”
Kaur and Kaur (2014)	“Automation is defined as a control system and technologies which reduces the human work in the production field.”
Kopte and Pai (2015)	“Automation is defined as the usage of machines thus eliminating human efforts to finish a task.”
Kamaruddin et al. (2016)	“Automation can also be defined as a self-regulating process performed by using programmable machines to carry out a series of tasks.”
Acemoglu and Restrepo (2019)	“Automation is the development and adoption of new technologies that enable capital to be substituted for labor in a range of tasks.”
Nakatani (2022)	“Automation is a technology that includes the categories of “robot” and “artificial intelligence” (AI).”

Source: Wirtz (2010c, 2020b, 2021, 2024)

Definition of Automation

Definition of Automation (Wirtz 2024)

Automation refers to the partial or complete substitution of human work by machine based applications. This includes both purely software-based automation and mechatronic automation. Automation is characterized by the fact that the processes or applications generally require little or no human control. The main goal of automation is to improve the quality of human work processes or to achieve cost advantages in order to ultimately increase competitiveness.

Source: Wirtz (2024)

Table 10.2 Selected definitions of robotics/robotization

	Author(s)	Definition
Robotics	Visser (2013)	“Robotics is defined as the intelligent transformation of sensing into mechanical action.”
	Rajulu et al. (2016)	“Robotics is defined as a creation of intelligent mechanical devices which can cope with the complexities of the real world.”
	Hatoum and Nassereddine (2020)	“Robotics is the science of designing, building, and applying robots.”
Robotization	Cho and Kim (2018)	“Robotization is the automation by robots, and an infrastructure that can reduce the burden of repetitive tasks and excessive workload.”
	Sri et al. (2019)	“Robotization is the utilization of control frameworks and information technologies to decrease the requirement for human work in the production of services and enterprises.”
	Chemweno and Torn (2022)	“Robotization is when a robot is employed to automate manual tasks.”

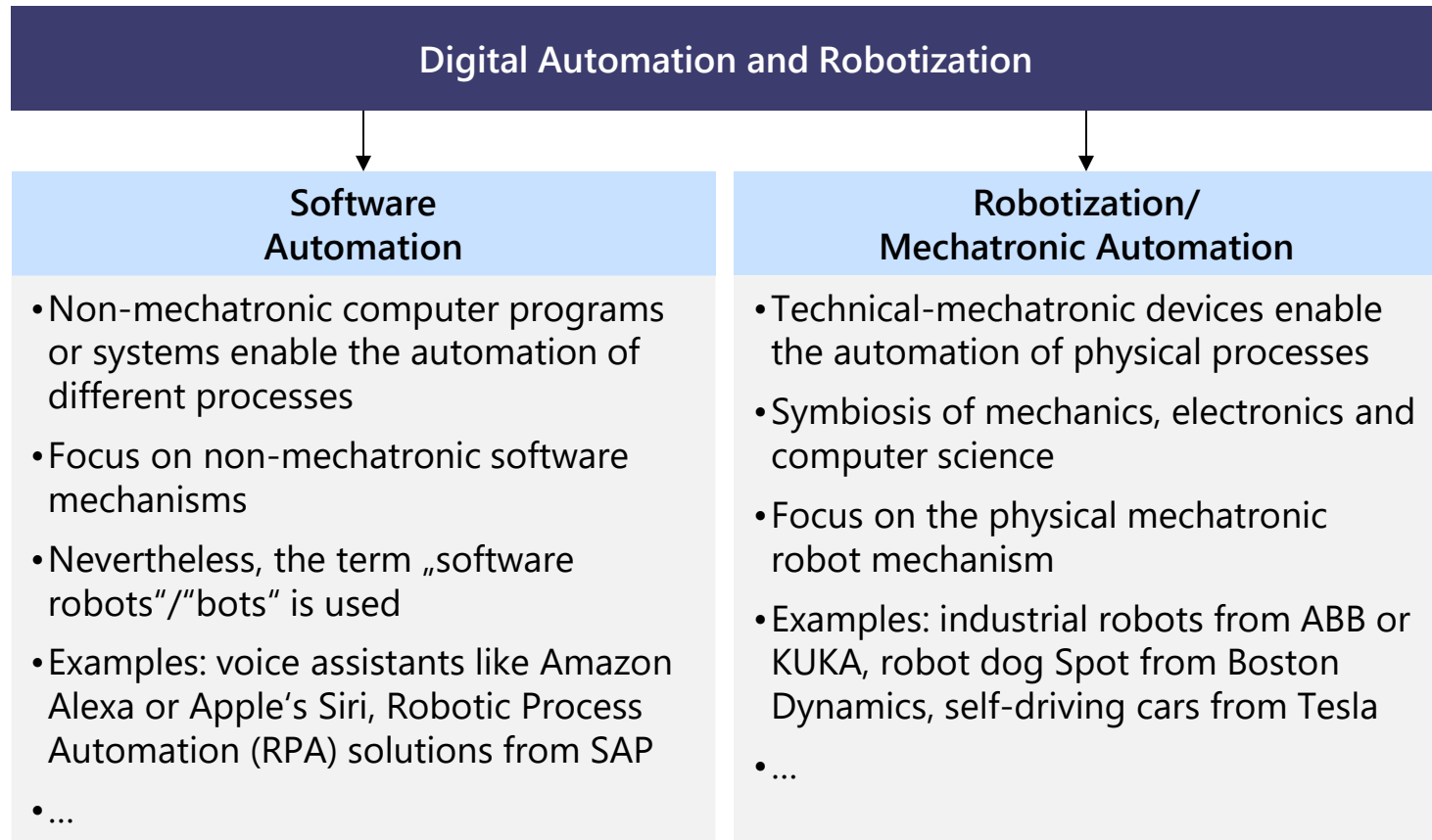
Source: Wirtz (2024)

Definition of Robotics/Robotization (Wirtz 2023)

Robotics involves the development and production of mechatronic systems that can partially or completely replace human labor. Robotization is the introduction and application of mechatronic systems in the form of robots. The main objective of robotics/robotization is the reduction of human labor and the realization of automation benefits with the main of achieving competitive advantages.

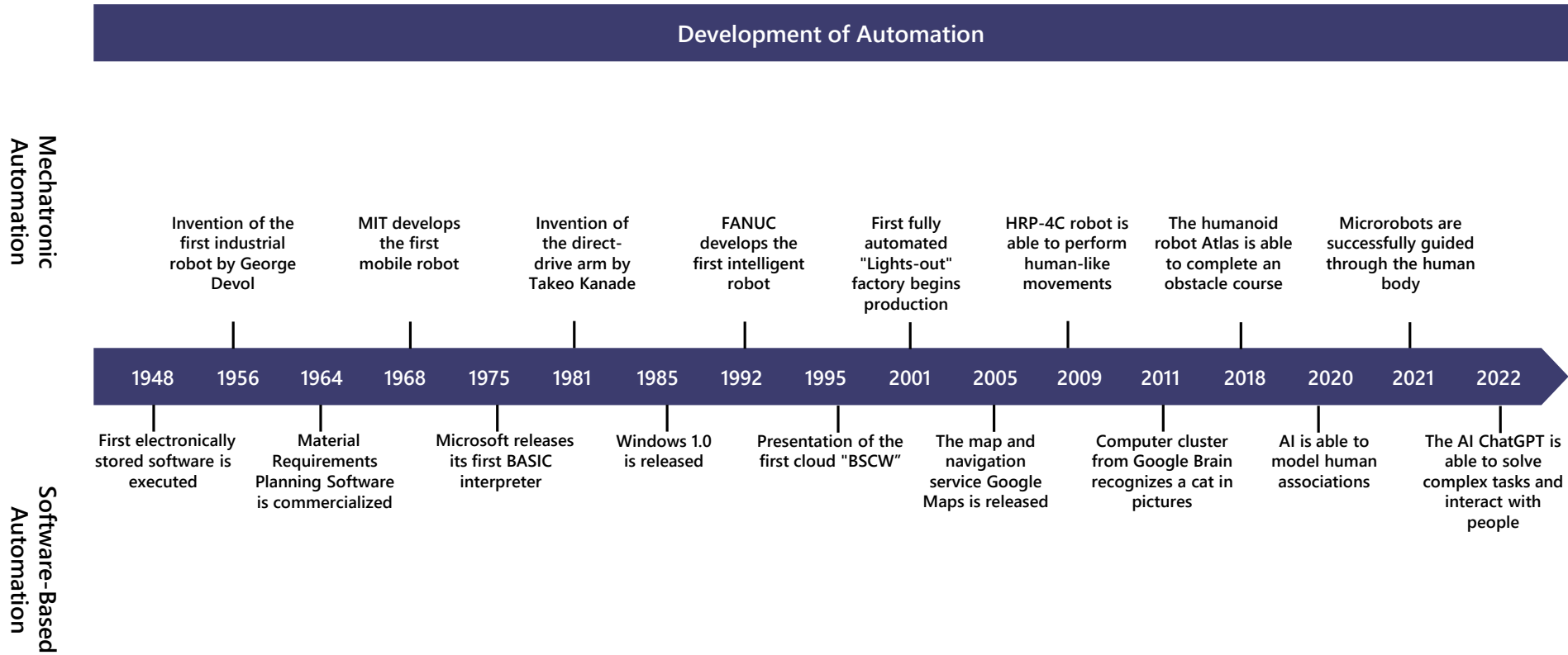
Source: Wirtz (2024)

Fig. 10.1 Categorization of digital automation and robotics/robotization



Source: Wirtz (2024)

Fig. 10.2 Development of automation and robotization over time



Source: Wirtz (2024)

Table 10.3 Leading companies in the field of robotics (1)

Manufacturer	Strategic Orientation	Robot Types
KUKA	<ul style="list-style-type: none"> • The company KUKA is a global manufacturer of robotic systems • KUKA specializes in robots for industrial applications • In addition to classic industrial robots, the company is increasingly focusing on the field of human-robot collaboration • ... 	<ul style="list-style-type: none"> • SCARA robots • Delta robots • Jointed-arm robots • Gantry robots • Palletizing robots • ...
ABB	<ul style="list-style-type: none"> • ABB is a global leader in the field of electrification and automation technology • The company operates in the fields of robotics, process automation, electrification, and drive technology • ... 	<ul style="list-style-type: none"> • Delta robots • SCARA robots • Autonomous mobile robot • Jointed-arm robots • Gantry robots • ...
Boston Dynamics	<ul style="list-style-type: none"> • Robotics company Boston Dynamics is considered one of the most advanced robotics companies in the world • Boston Dynamics works in particular on the development of autonomous walking robots • In addition to robotic systems for industrial applications such as logistics, the company also develops robots for military use, such as mine clearance • ... 	<ul style="list-style-type: none"> • Humanoid robots • Legged robots • Climbing robots • Small robots • ...

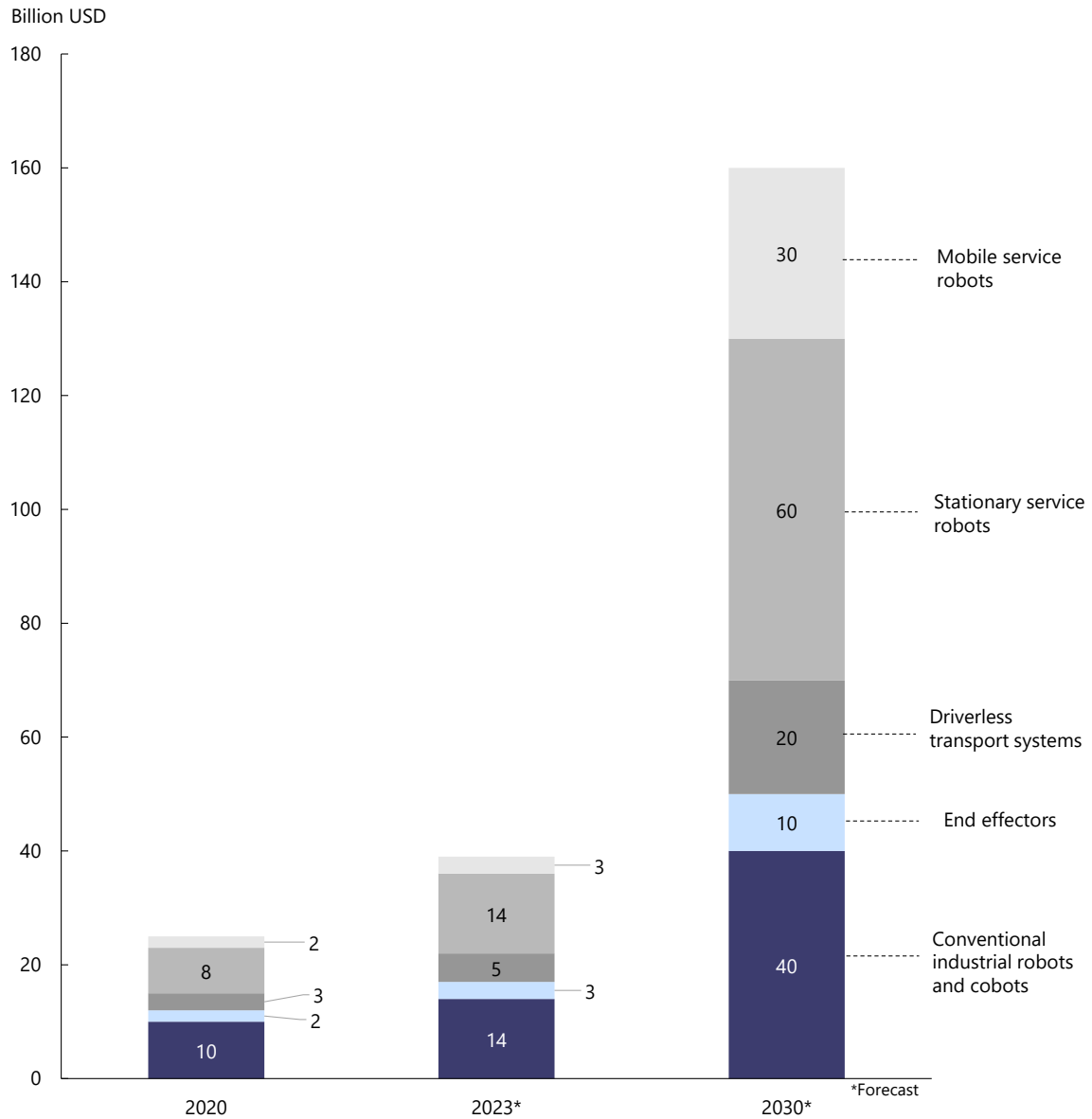
Source: Wirtz (2024)

Table 10.3 Leading companies in the field of robotics (2)

Universal Robots	<ul style="list-style-type: none"> • Universal Robots is a manufacturer of lightweight robots • The company focuses on the collaboration of industrial lightweight robots to solve higher-level tasks • ... 	<ul style="list-style-type: none"> • Table-top robots • Palletizing robots • Autonomous mobile robot • ...
FANUC	<ul style="list-style-type: none"> • FANUC is a global electronics and mechanical engineering company and the largest manufacturer of industrial robots • In addition to robotics, the company is particularly active in the fields of machine tools and IoT technology • ... 	<ul style="list-style-type: none"> • Jointed-arm robots • Delta robots • Palletizing robots • SCARA robots • ...
Yaskawa Denki	<ul style="list-style-type: none"> • Yaskawa Denki is one of the leading suppliers of industrial robots • In addition to robots, the company offers products in the fields of software, drive solutions, and power engineering • ... 	<ul style="list-style-type: none"> • Delta robots • Palletizing robots • Jointed-arm robots • SCARA robots • ...

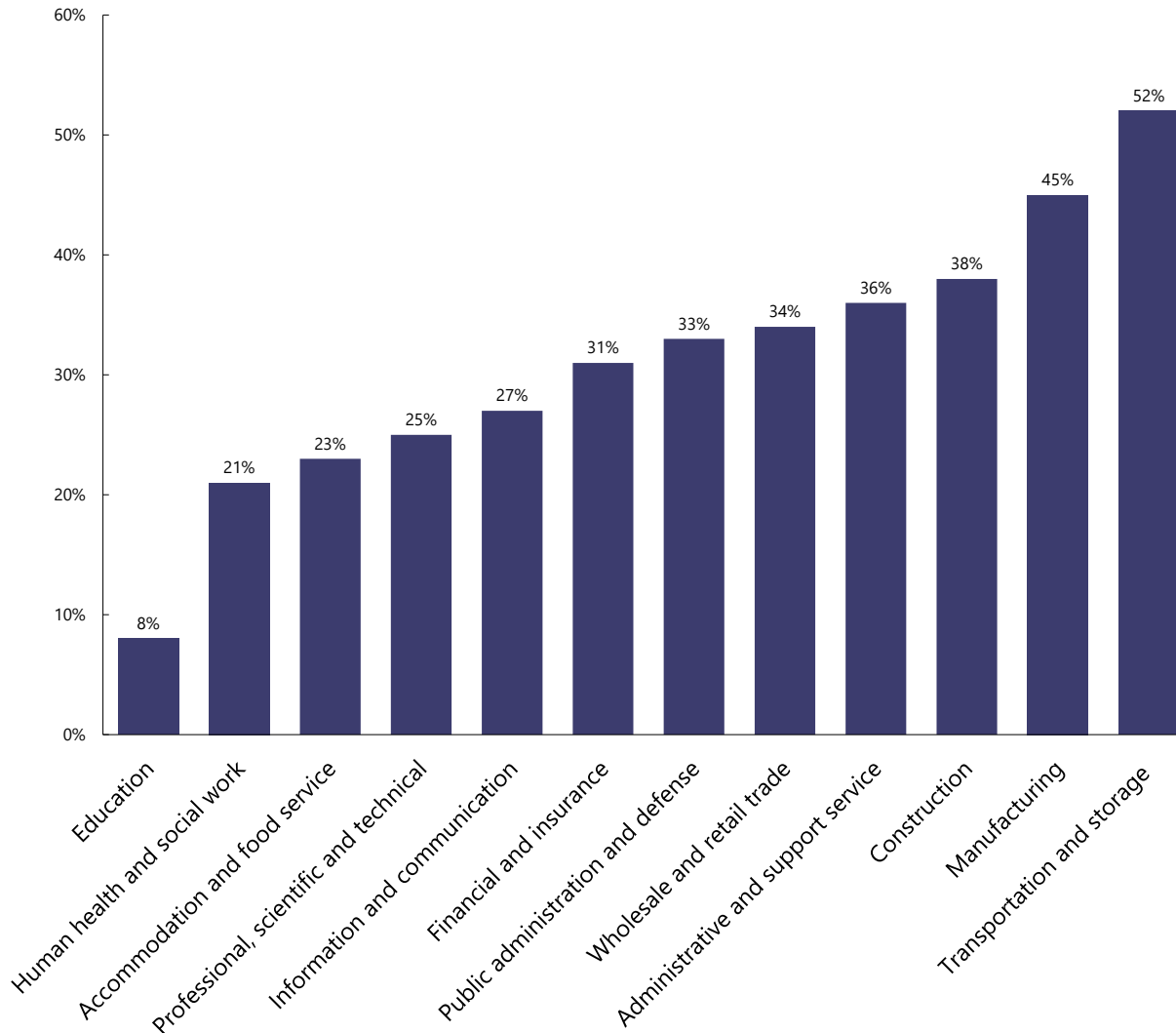
Source: Wirtz (2024)

Fig. 10.3 Market development by robot application field



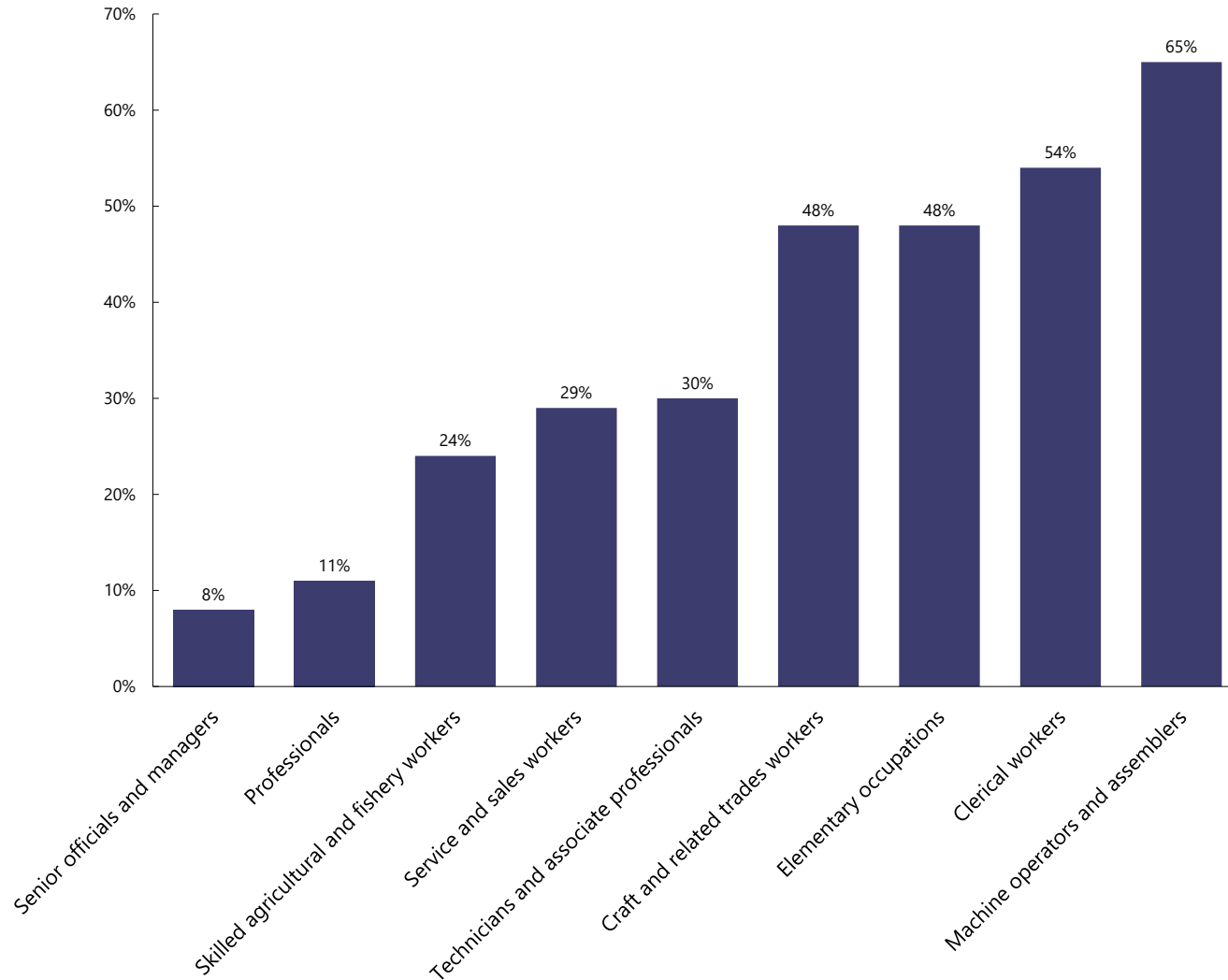
Source: BCG (2021), Wirtz (2024)

Fig. 10.4 Automation potential by industry



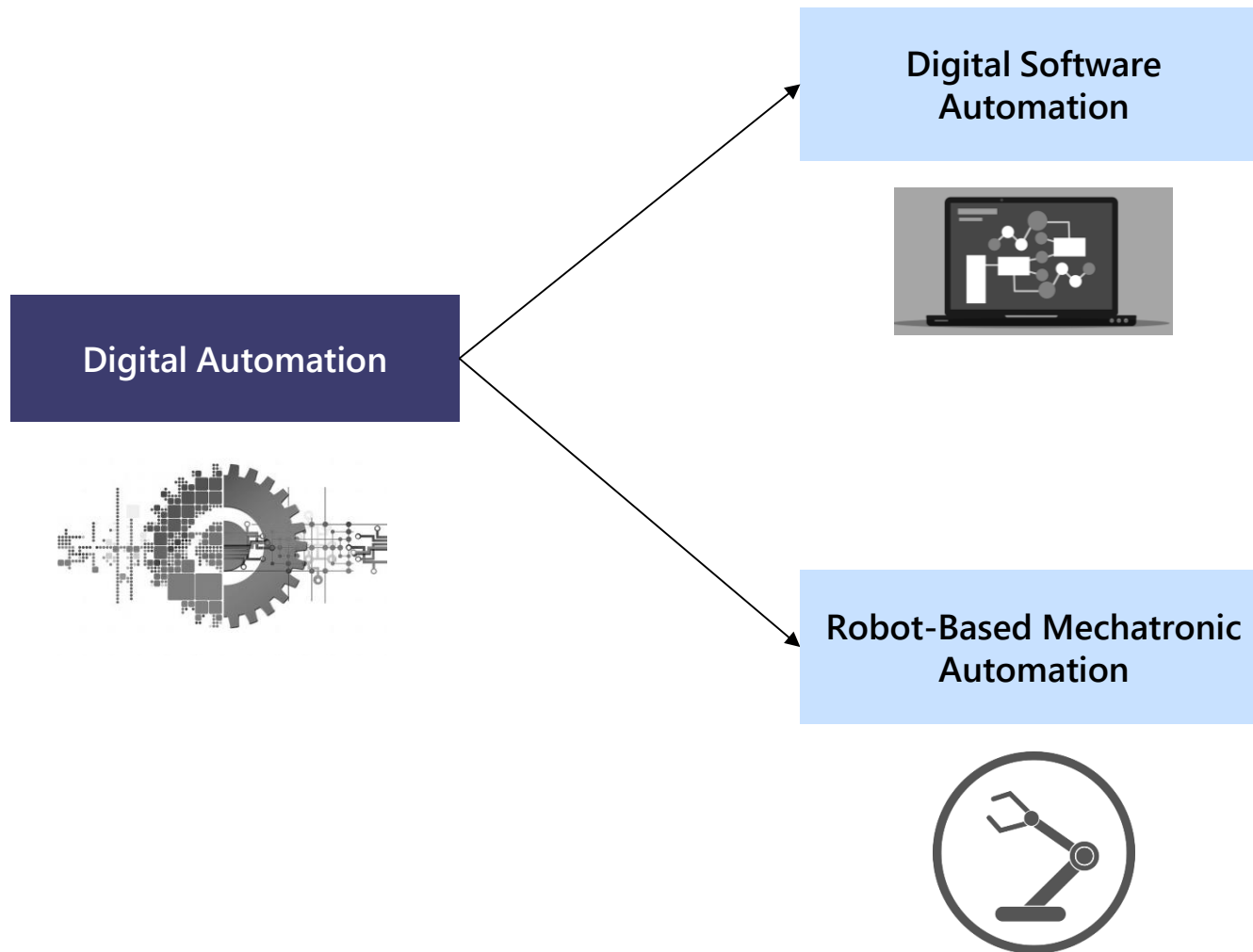
Source: PwC (2018), Wirtz (2024)

Fig. 10.5 Automation potential in specific occupational groups



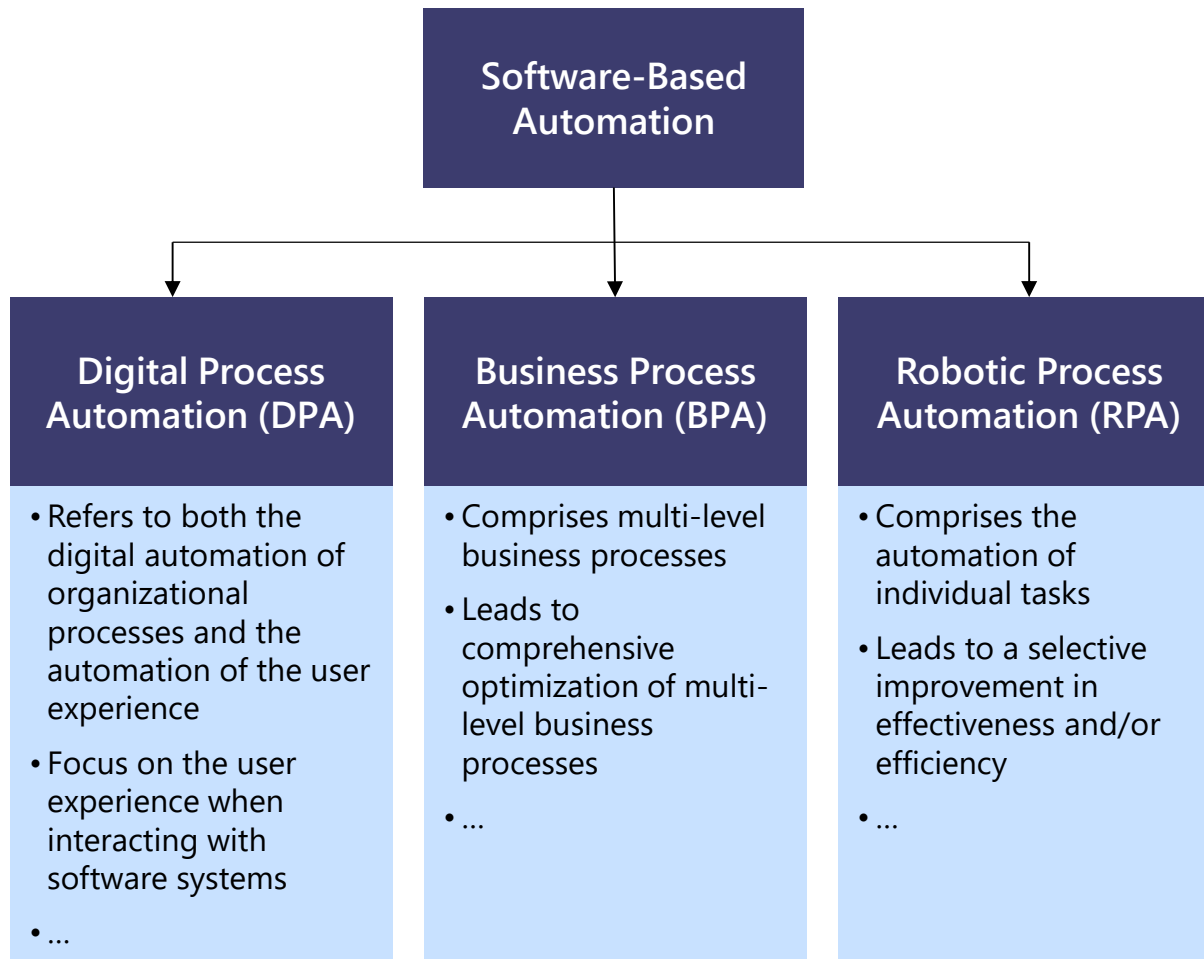
Source: PwC (2018), Wirtz (2024)

Fig. 10.6 Distinction between software and robot automation



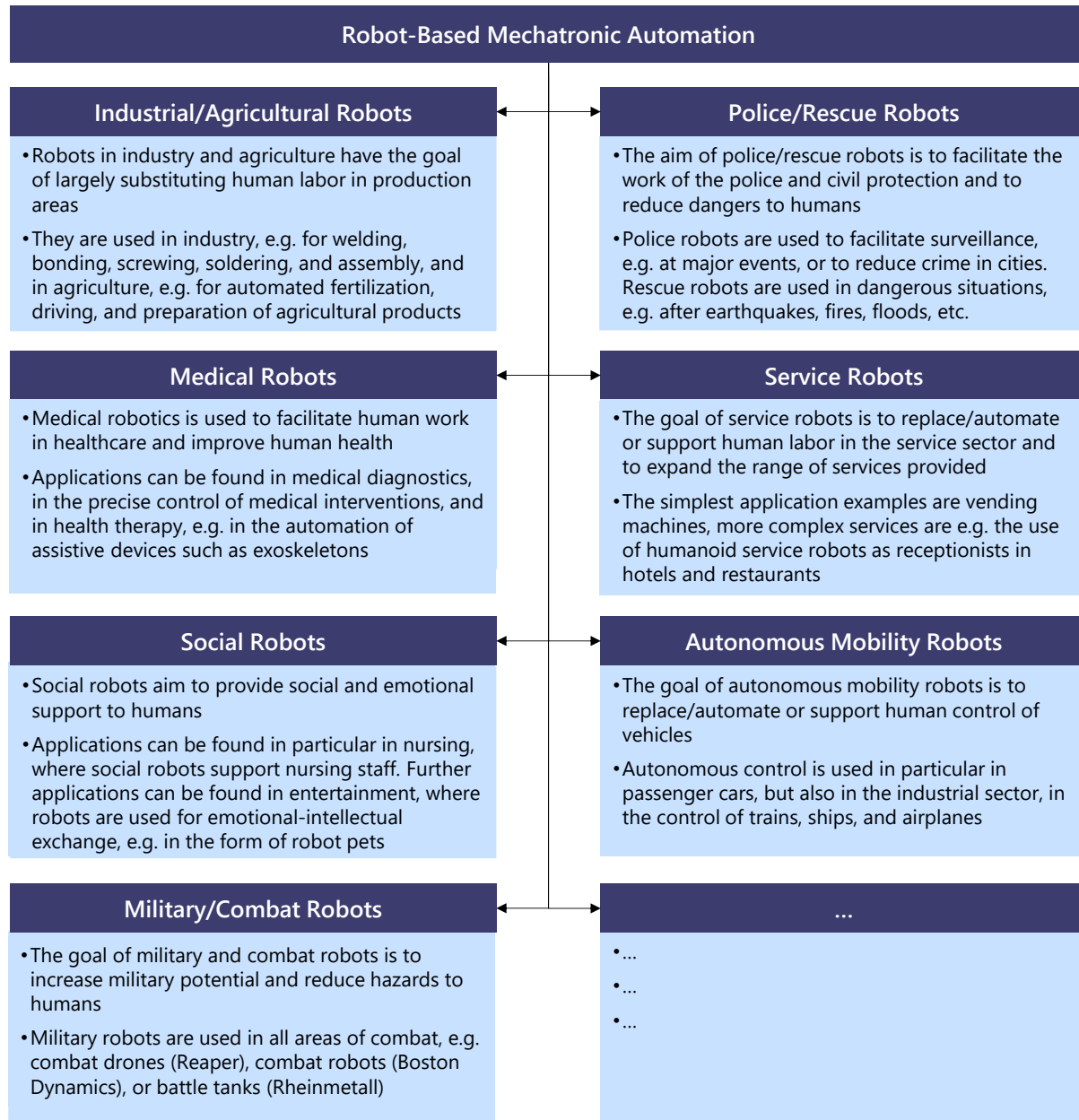
Source: Wirtz (2024)

Fig. 10.7 Categorization of software-based automation



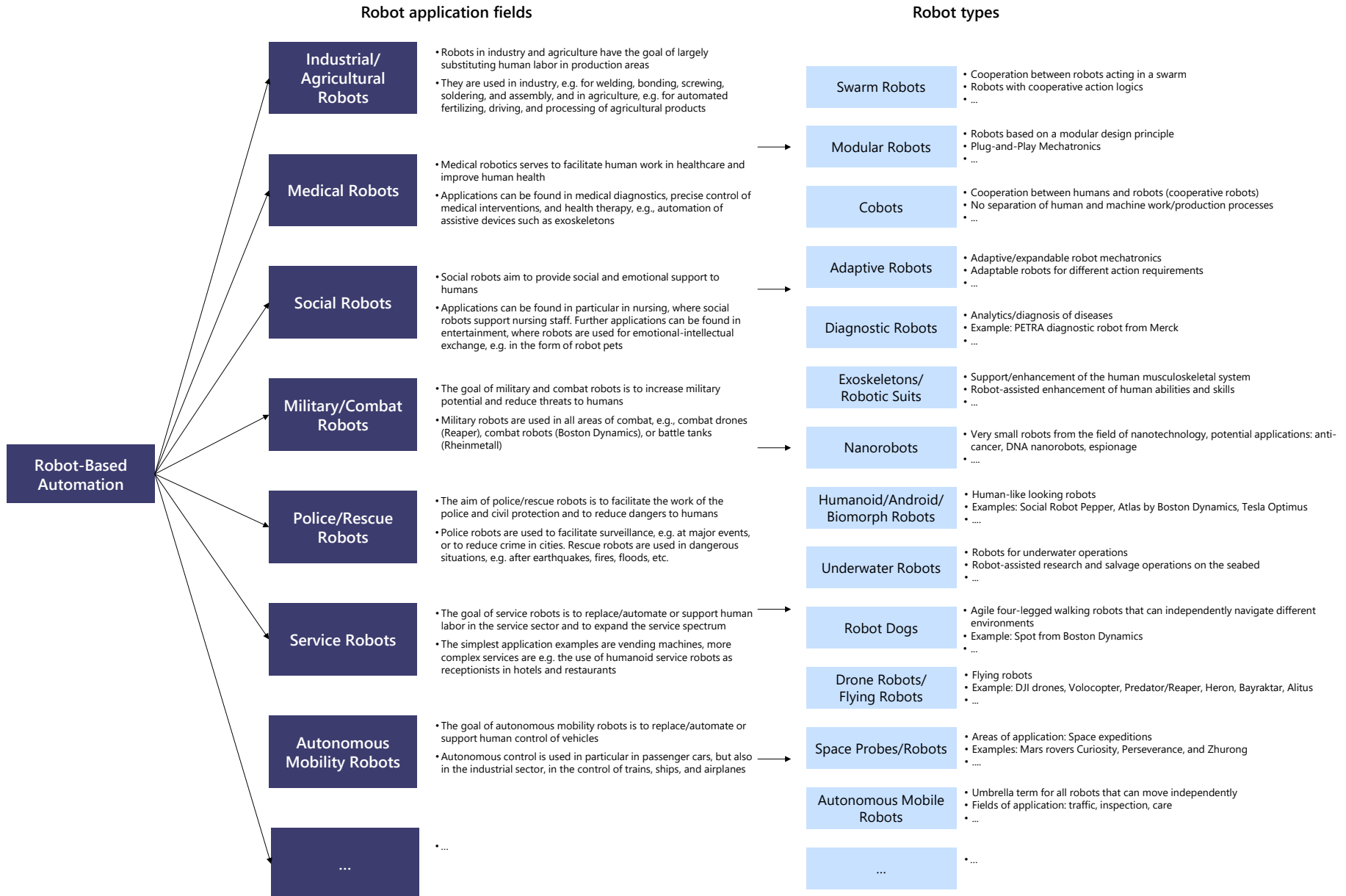
Source: Wirtz (2024)

Fig. 10.8 Application areas of robot-based mechatronic automation



Source: Wirtz (2024)

Fig. 10.9 Application areas of robot-based mechatronic automation



Source: Wirtz (2024)

Fig. 10.10 Stages of digital automation and robotics

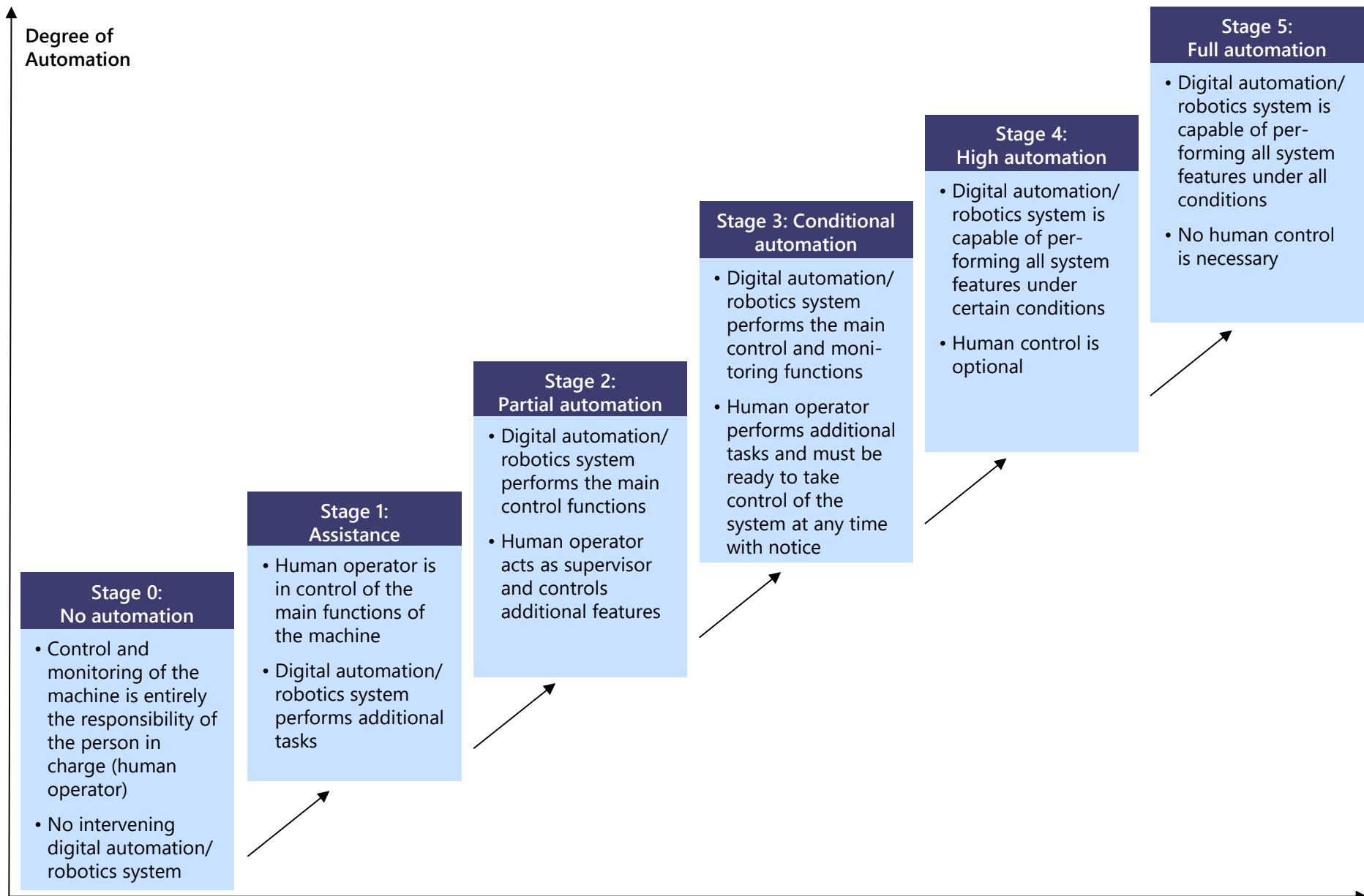


Fig. 10.11 Functional logic of software-based automation

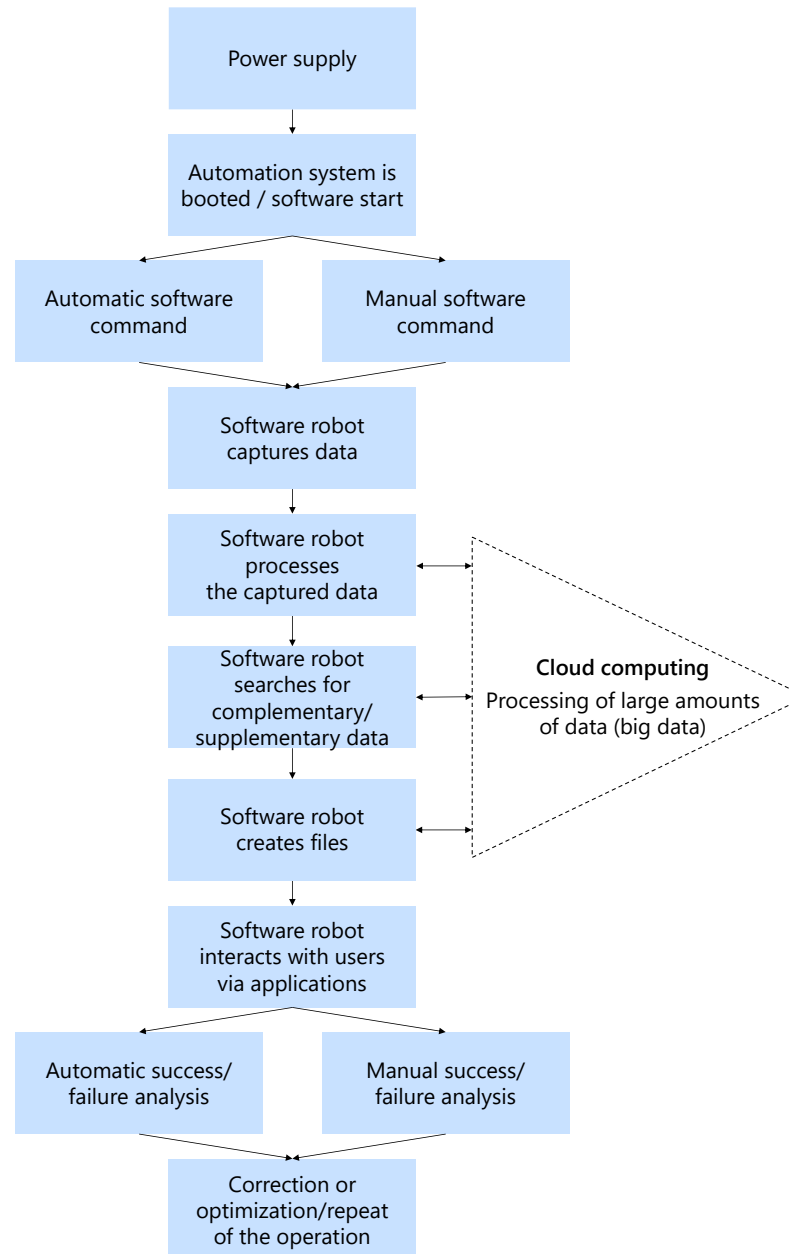
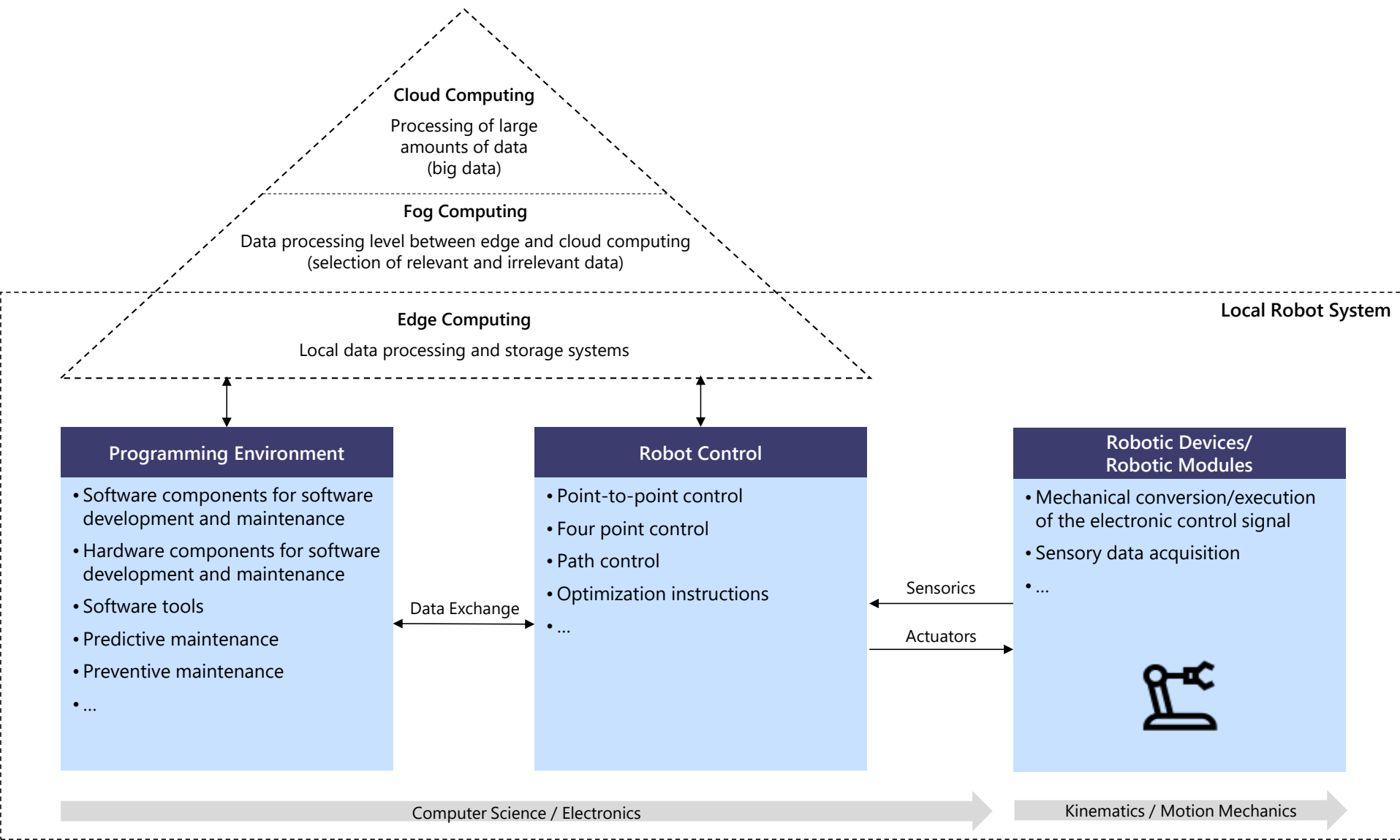
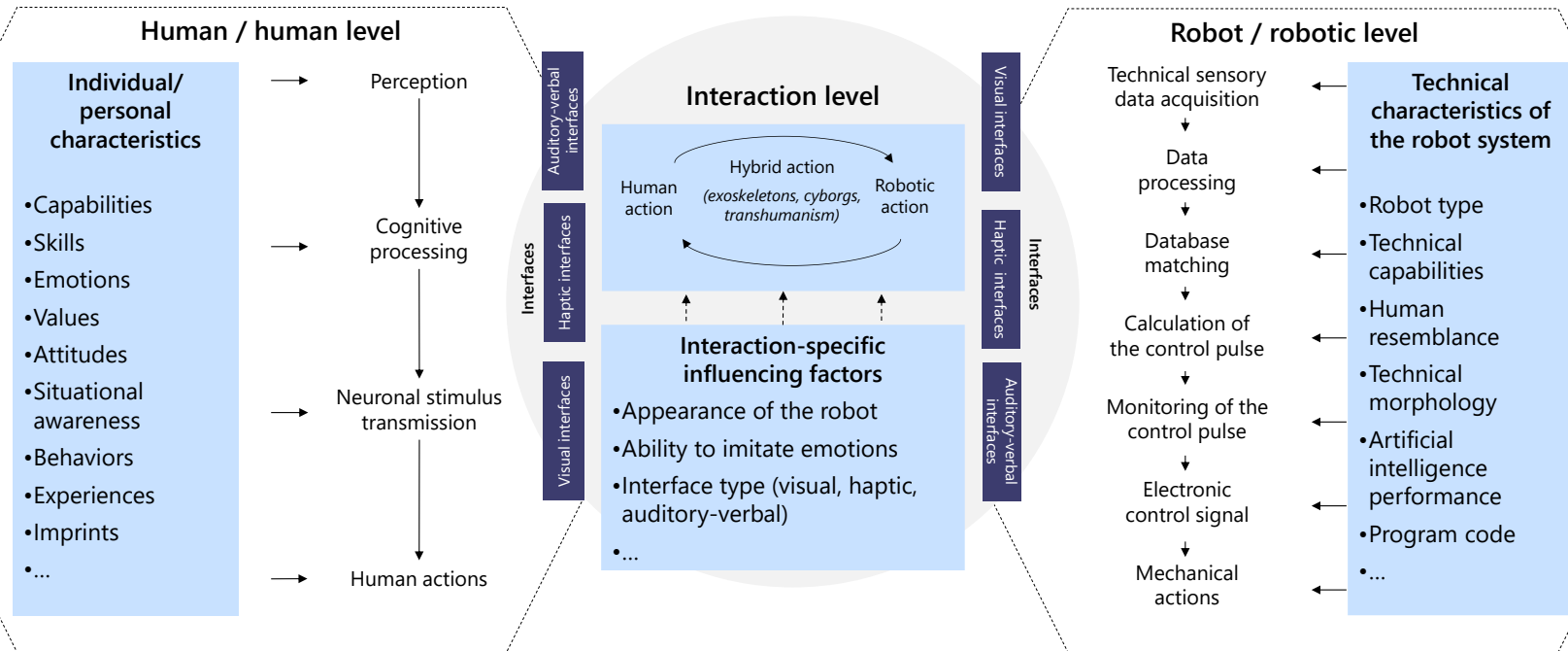


Fig. 10.12 System architecture of robot-based automation



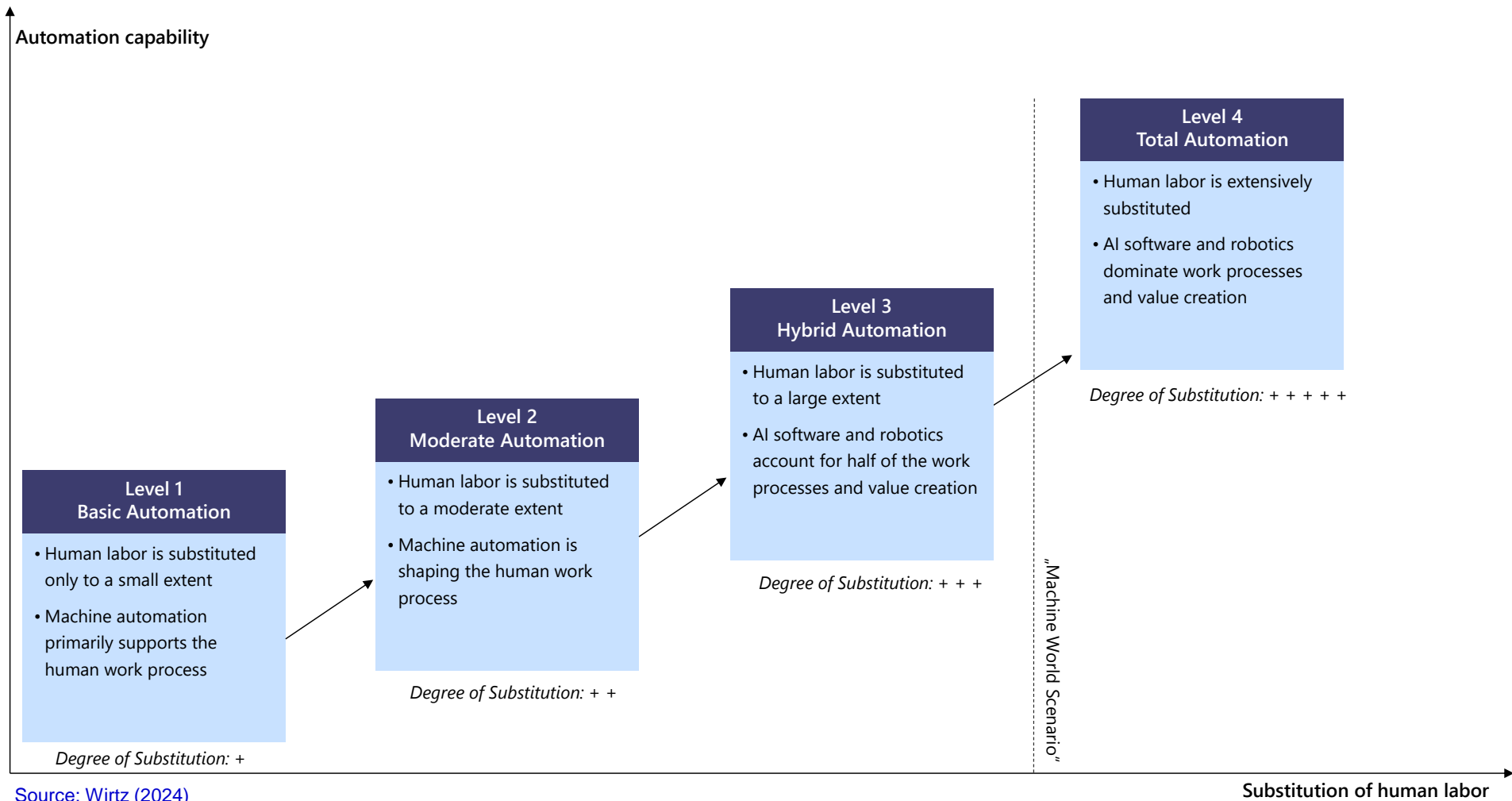
Source: Wirtz (2024)

Fig. 10.13 3-Level Model of Human-Robot Interaction



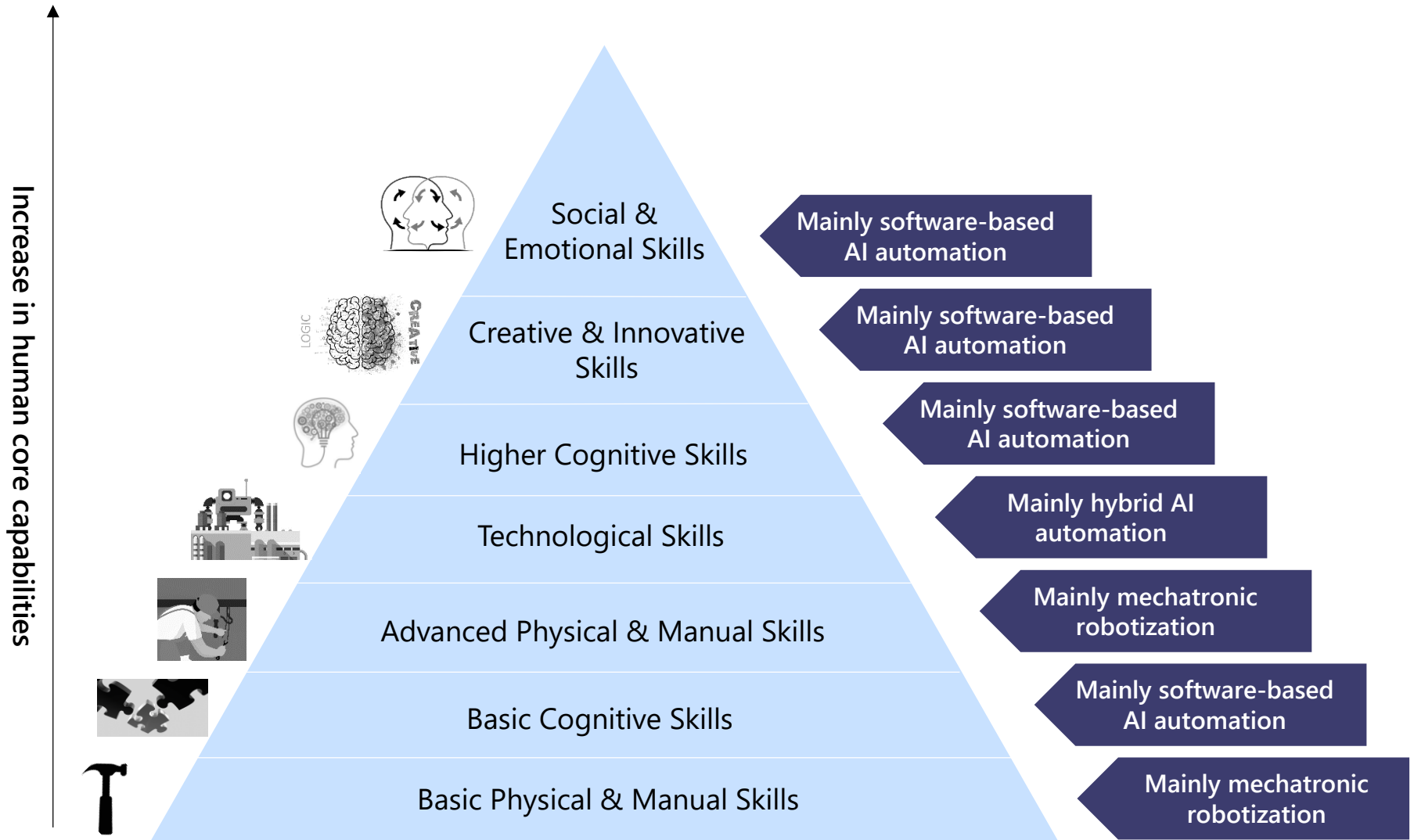
Source: Wirtz (2024)

Fig. 10.14 4-Level Model of Digital Automation Intensity



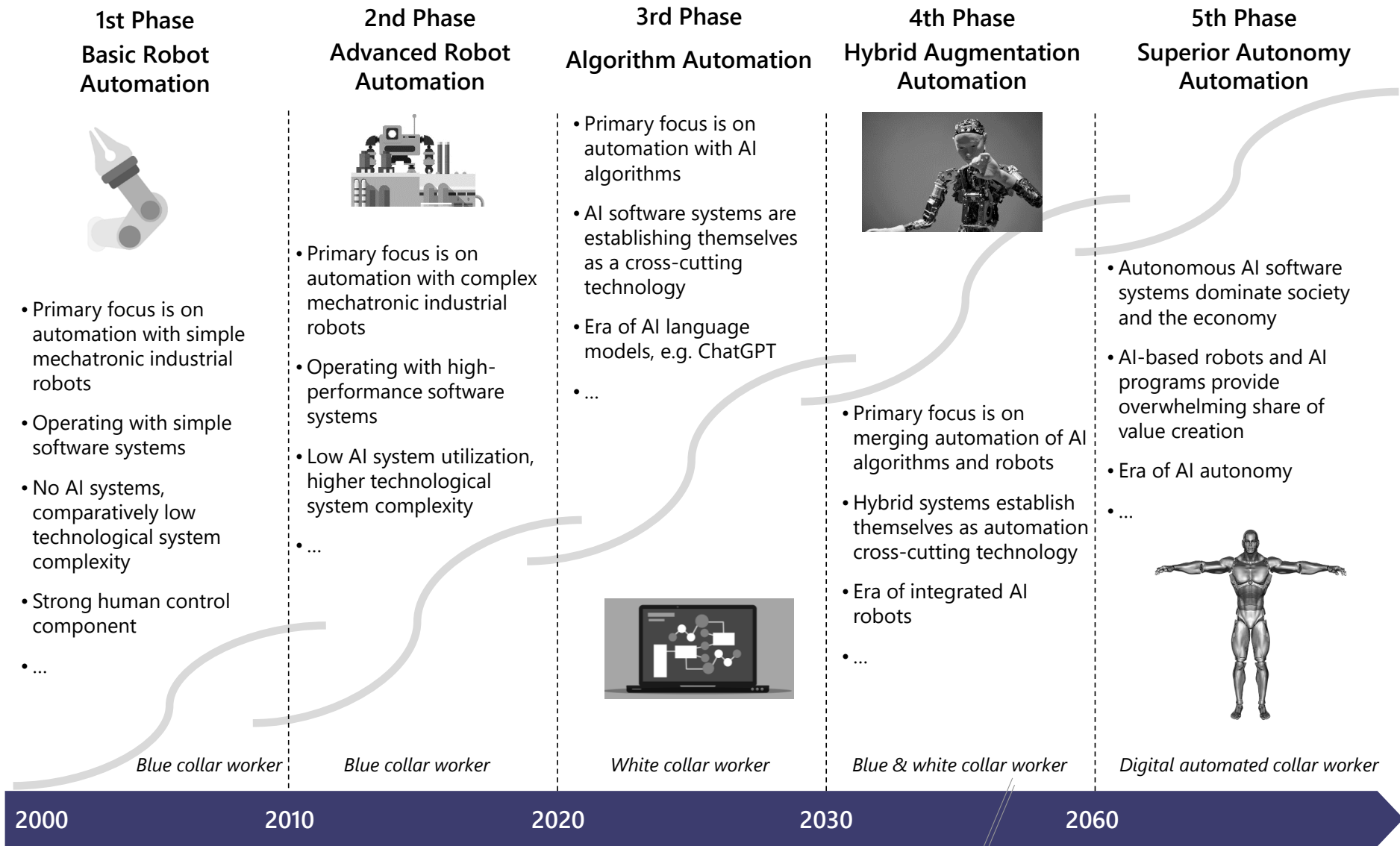
Source: Wirtz (2024)

Fig. 10.15 Capability pyramid of digital automation



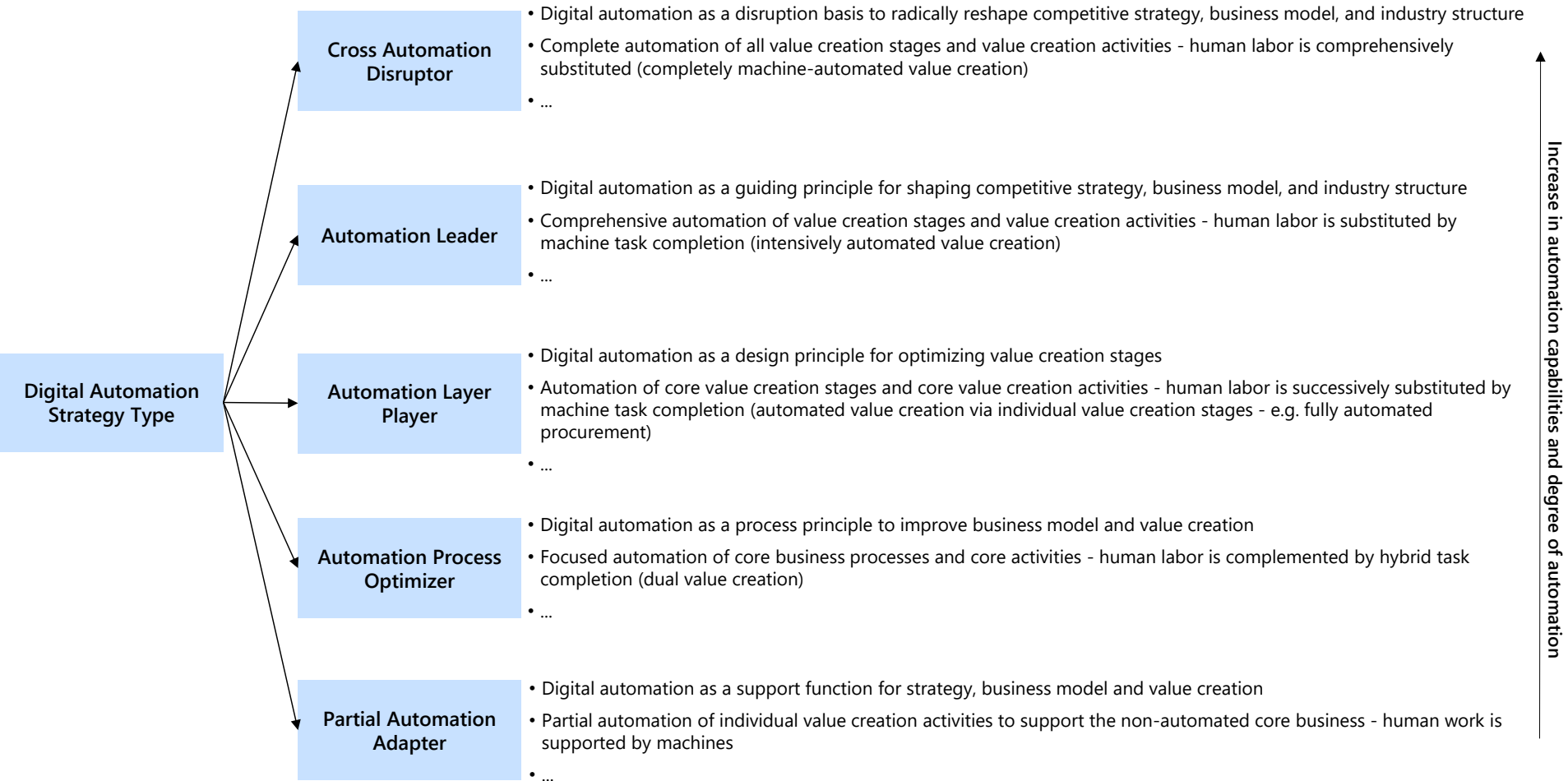
Source: Wirtz (2024)

Fig. 10.16 5-Phase Model of Digital Automation



Source: Wirtz (2024)

Fig. 10.17 Strategy type of digital automation



Source: Wirtz (2024)

Fig. 10.18 5-Component Model of Digital Automation

Forms of Digital Automation

- Digital automation has two basic forms: one is digital software automation and the other is robot-based mechatronic automation
- Both forms have a considerable influence on the substitution intensity of human labor



4-Level Model of Digital Automation Intensity

- Digital automation has four levels of substitution intensity of human labor: basic automation, moderate automation, hybrid automation, and total automation
- The four levels lead to the substitution of human skills with varying intensity



Human Capability Pyramid of Digital Automation

- Digital automation is increasingly substituting for seven fundamental human basic capabilities
- Three forms of automation are dominant in the basic capability areas: mainly mechatronic robotization, mainly software-based AI automation, and mainly hybrid AI automation



5-Phase Model of Digital Automation

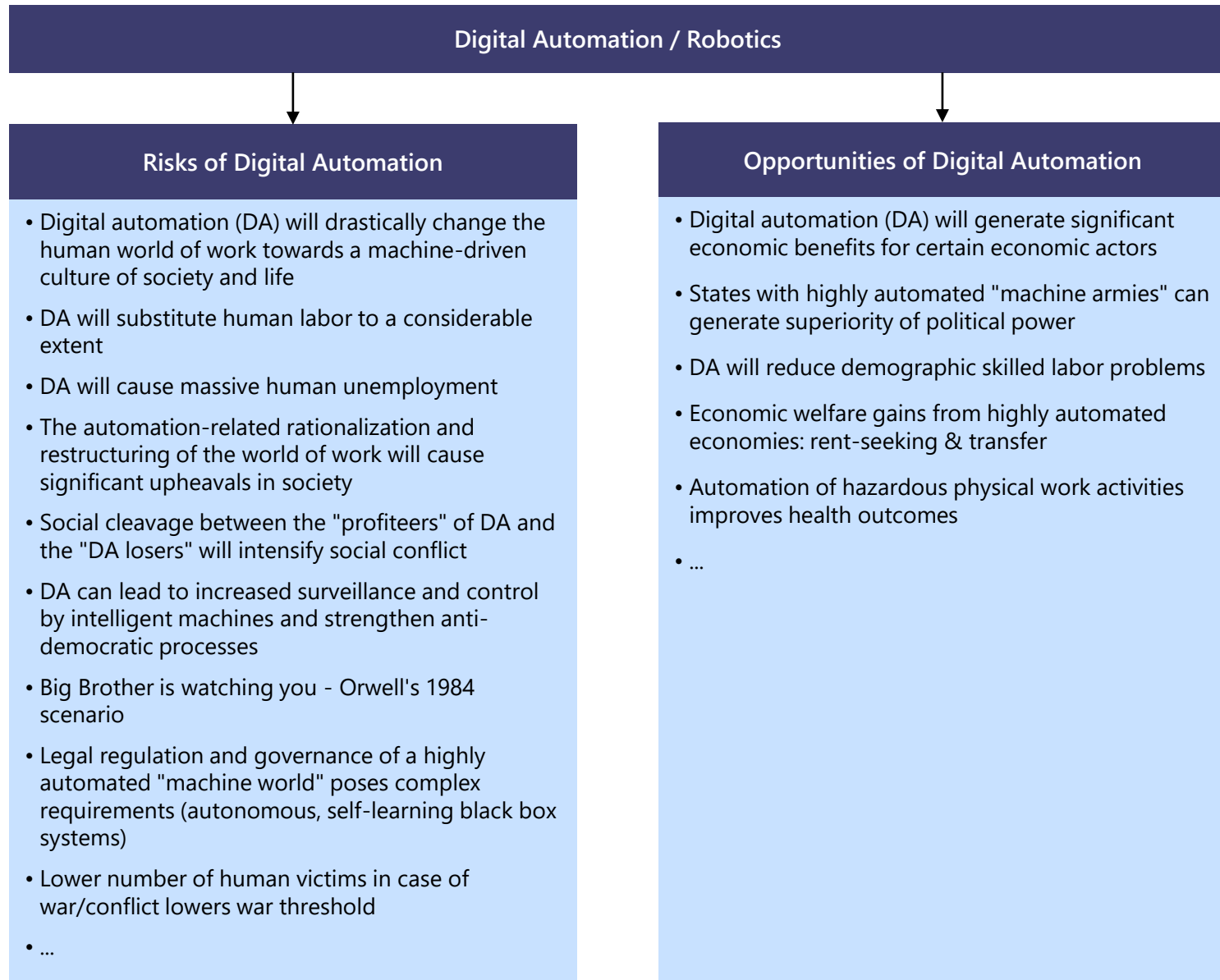
- Digital automation can be divided into five development phases: 1. basic robot automation, 2. advanced robot automation, 3. algorithm automation, 4. hybrid augmentation automation, 5. superior autonomy automation
- In the five development phases, companies pursue different automation strategies



Strategy Types of Digital Automation

- In digital automation, five strategy types can be found in particular: Partial Automation Adapter, Automation Process Optimizer, Automation Layer Player, Automation Leader, Cross Automation Disruptor
- The digital automation intensity of the value creation stages and the value creation activities differs considerably depending on the strategy type

Fig. 10.19 Opportunities and risks of digital automation



Source: Wirtz (2024)

Fig. 10.20 Governance of digital automation



Chapter 10 Questions and topics for discussion

Chapter 10 Questions and topics for discussion



Review questions

1. Describe the application forms of digital automation and robotics.
2. Outline the development stages of digital automation.
3. Explain the 3-Level Model of Human-Robot Interaction.
4. Describe the 5-Component Model of Digital Automation.
5. Explain the opportunities, risks, and governance of automation and robotics.

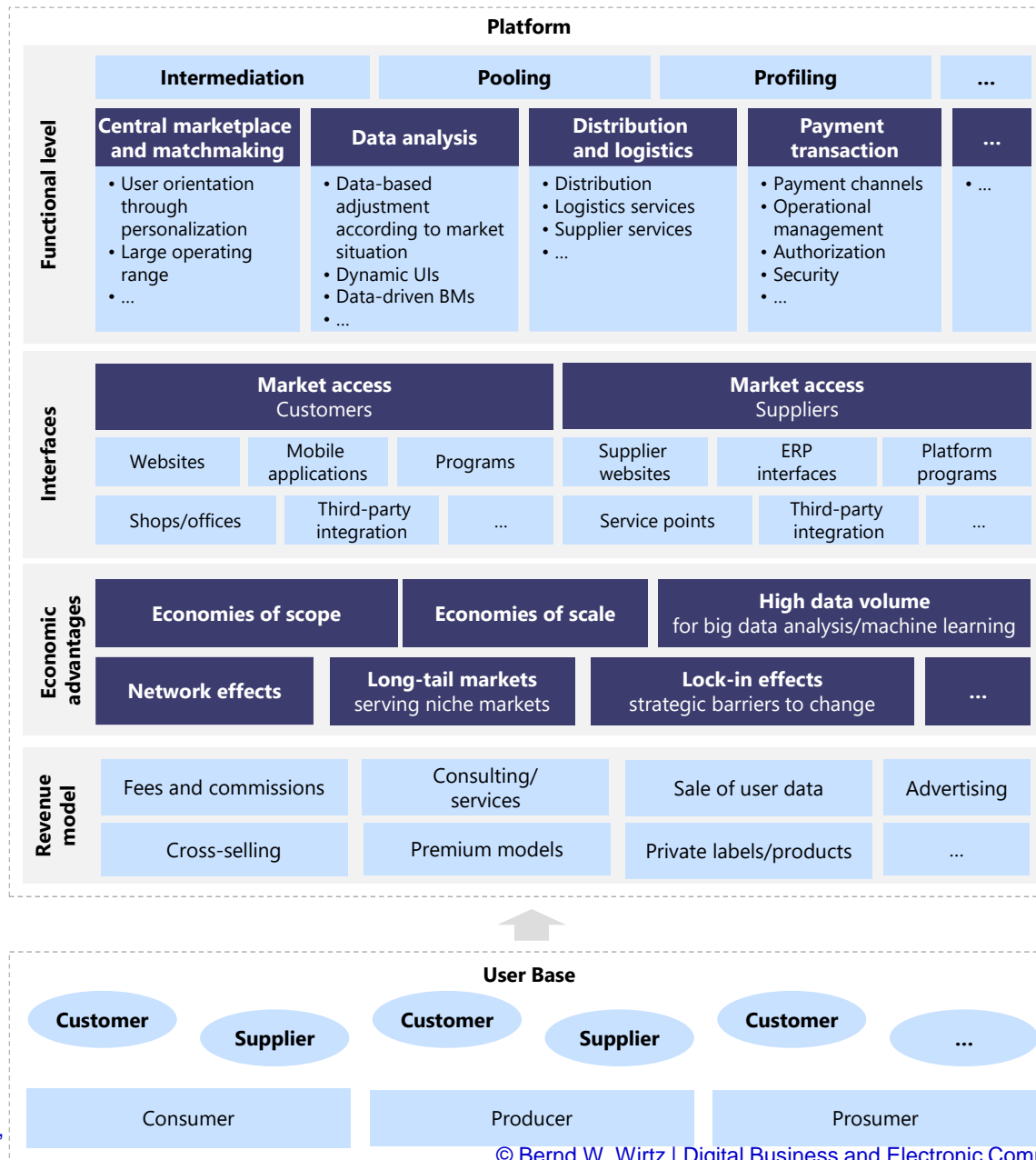


Topics for discussion

1. Discuss to what extent increasing digital automation and the associated substitution of human labor can cause a social conflict.
2. Discuss whether the increased future use of human-like robots in social settings will fundamentally change the way we live together.
3. Drone warfare operations have been a modern warfare action parameter for more than a decade. Discuss the extent to which the progressive automation of means of warfare is lowering the threshold for warlike engagement and affecting the defense capabilities of states.

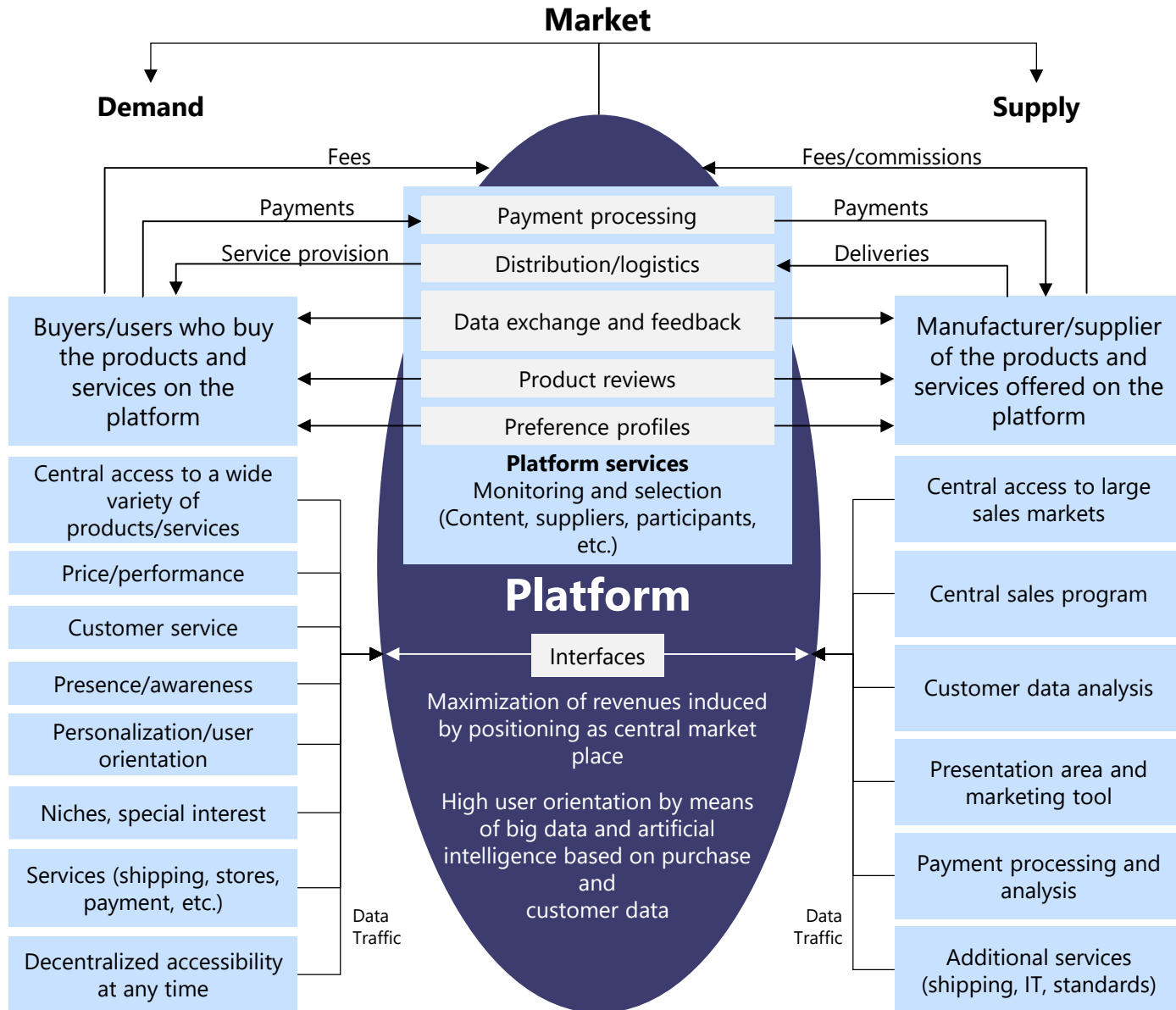
Chapter 11: Digital Platforms, Sharing Economy and Crowd Strategies

Fig. 11.1 Key elements of a platform environment



Source: Wirtz (2020, 2021), Wirtz (2024)

Fig. 11.2 Interactions on a platform environment



Source: Wirtz (2020, 2021), Wirtz (2024)

Table 11.1 Comparison of platform providers (1)

	Uber	Airbnb	Amazon	eBay
Value proposition	<p>Supplier</p> <ul style="list-style-type: none"> • Opportunity to generate additional income • No immediate superior • Opportunity to set flexible driving times themselves • Easy participation/ registration as a driver • ... 	<p>Supplier</p> <ul style="list-style-type: none"> • Insurance protection through booking via the platform • Flexible and short-term commitments and cancellations for own requirements • ... 	<p>Supplier</p> <ul style="list-style-type: none"> • Wide reach • Large number of customers (independent of location and time) • Numerous additional service offers (logistics, payments, etc.) • ... 	<p>Supplier</p> <ul style="list-style-type: none"> • Wide reach • Large number of customers (independent of location and time) • Numerous additional service offers (logistics, payments, etc.) • ...
	<p>User</p> <ul style="list-style-type: none"> • Exact pickup and destination locations • Low waiting times • Available at any time/mobile availability • Comparatively cheap (in contrast to taxi costs) • ... 	<p>User</p> <ul style="list-style-type: none"> • Lower costs than a hotel • Mostly full-equipped apartments • Authentic and individual accommodation • Transparent evaluation system • ... 	<p>User</p> <ul style="list-style-type: none"> • Comparatively low prices • Short waiting times, fast delivery • Available at any time/mobile availability (1-Click-Buy) • Large number of products, plenty of choice • ... 	<p>User</p> <ul style="list-style-type: none"> • Available at any time/mobile availability • Different purchase options (bid, immediate purchase) • Large number of products, plenty of choice • ...

Table 11.1 Comparison of platform providers (1)

	Uber	Airbnb	Amazon	eBay
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Table 11.1 Comparison of platform providers (2)

Functionality of integration	<ul style="list-style-type: none"> • Intermediation of individual private driving services via an app within a digital network • Increasing the capacity utilization of vehicles • ... 	<ul style="list-style-type: none"> • Intermediation of private and authentic accommodations worldwide (room, apartment, house, etc.) • Sharing economy for better utilization of living space, since 2018 complemented by the integration of classic hotel industry • ... 	<ul style="list-style-type: none"> • Digital marketplace with a wide variety of products including streaming services for video and music • ... 	<ul style="list-style-type: none"> • Digital marketplace and auction house with a large variety of products • ...
Strategies	<ul style="list-style-type: none"> • Entrepreneurial exploitation of individual passenger transport by private vehicles and available manpower • Establishment of a global and central brand in the transport sector • Digital and technological market leadership • ... 	<ul style="list-style-type: none"> • Use of private housing as a resource in tourism and for business travelers • Central and global brand for short-term rentals • ... 	<ul style="list-style-type: none"> • Global and central retail brand • Digital and technological innovation driver • Inexpensive/free entry offers for customers • Financial success when considering the total lifetime value of a user • ... 	<ul style="list-style-type: none"> • Online marketplace for retail customers and business and private sellers • Full-service provider • ...

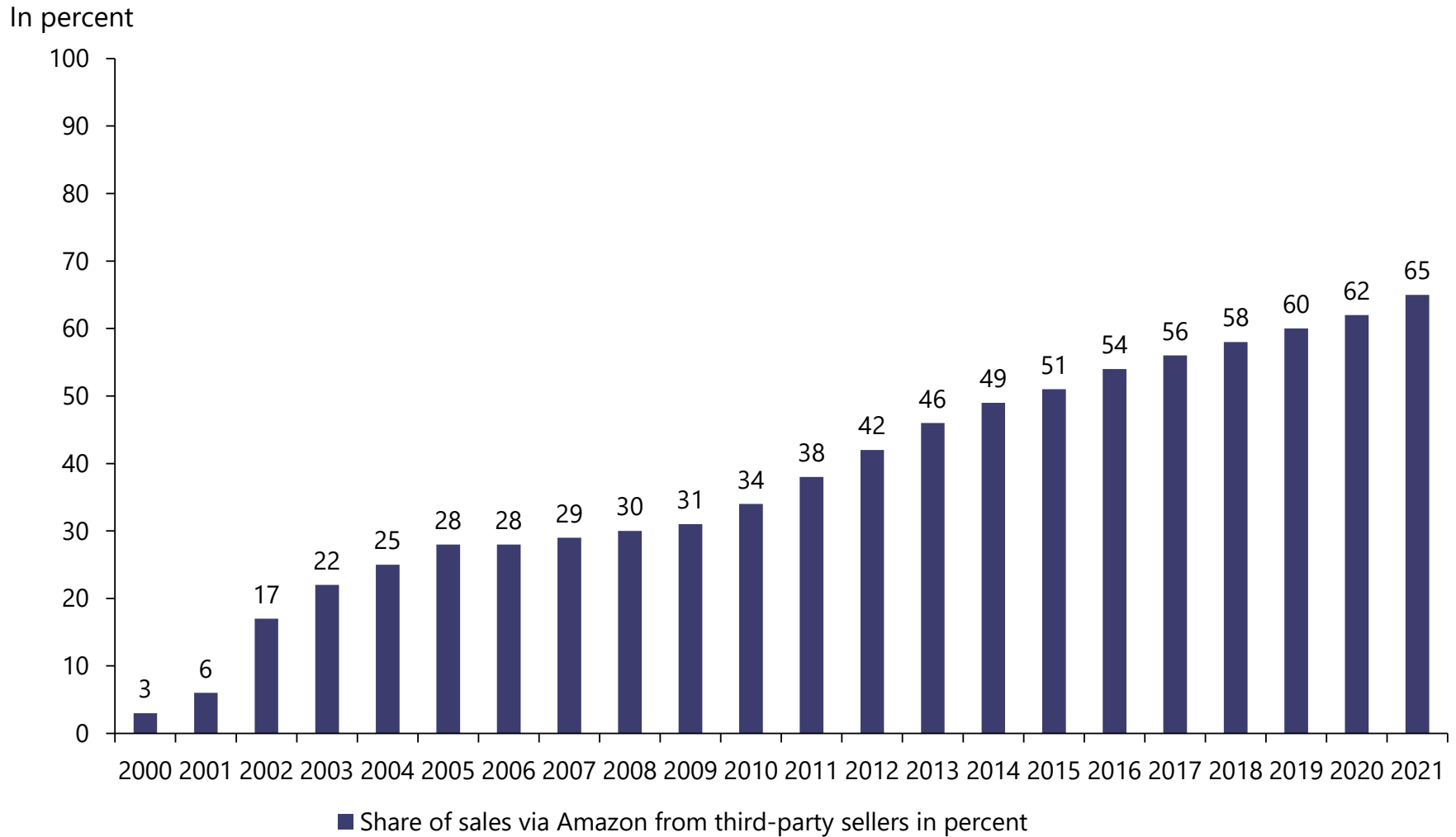
Source: Wirtz (2020, 2021), Wirtz (2024)

Table 11.1 Comparison of platform providers (3)

<p>Economies of scale/ economies of scope</p>	<ul style="list-style-type: none"> • Economies of scale from using private cars as a fleet • Digital platform that can be used globally • Collection of substantial data sets for subsequent offer optimization • ... 	<ul style="list-style-type: none"> • Economies of scale from using private living space as rental space • Digital platform that can be used globally • Collection of substantial data sets and evaluation of individual rental objects for subsequent offer optimization • ... 	<ul style="list-style-type: none"> • Considerable number of users enables economies of scale in logistics, IT, and management • Analysis of large amounts of data enables optimization of search engines and advertising • Provision of warehouse and logistics infrastructure for sellers • Digital platform that can be used globally • Wide variety of products increases switching costs for customers (e.g., Amazon Prime, Amazon Video, Amazon Music, etc.) • ... 	<ul style="list-style-type: none"> • Digital platform that can be used globally • Analysis of large amounts of data enables optimization of advertising • Considerable number of users enables economies of scale in IT and management • ...
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Source: Wirtz (2020, 2021), Wirtz (2024)

Fig. 11.3 Sales via Amazon from thrid-party sellers



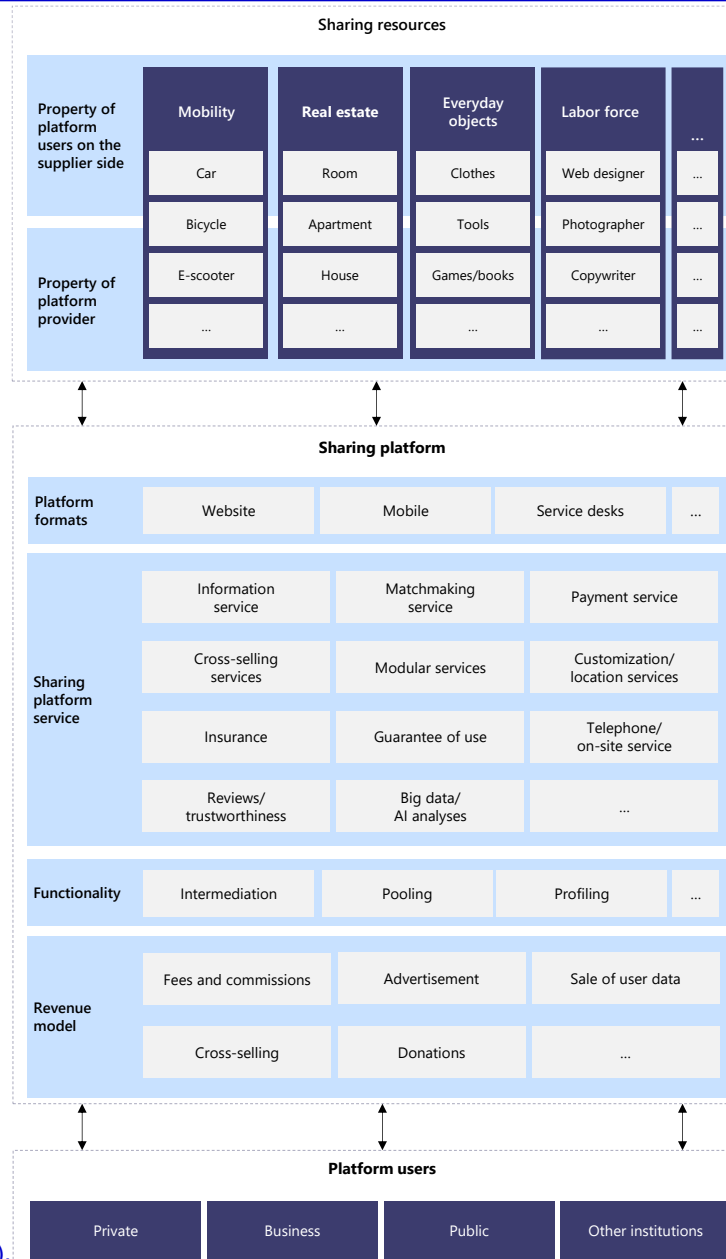
Source: Market Pulse (2022), Wirtz (2024)

Fig. 11.4 Summary of the terms possession and ownership in the shareconomy

	Possession	Ownership
Characteristics	<ul style="list-style-type: none">• Actual control of a thing• Access to a thing to enjoy and dispose• Rented (and stolen) things are being possessed• ...	<ul style="list-style-type: none">• Legal dominion of a thing• Based on property rights• Complete right of dominion, e.g., absolute power to enjoy and dispose• Right of disposal can be granted to someone else, e.g., rental• ...
Examples	<ul style="list-style-type: none">• By renting a vehicle it becomes the possession of the renter• Since the vehicle has not been bought, it is not the property of the renter• The right to use the vehicle is obtained through the rental• E.g., car rental with Yandex.Drive or Share Now• ...	<ul style="list-style-type: none">• After buying a vehicle one becomes the owner• By renting, the power of disposal is only temporarily transferred to the renter• E.g., vehicle purchase from BMW or Volkswagen• ...

Source: Wirtz (2020, 2021), Wirtz (2024)

Fig. 11.5 SSU Sharing Platform Model



Source: Wirtz (2020, 2021), Wirtz (2024)

Table 11.2 Applications of the shareconomy (1)

Sector	Applications	Customer benefits	Examples
Real Estate	<ul style="list-style-type: none"> • Short-term rental of real estate • Accommodation places as exchange offers • ... 	<ul style="list-style-type: none"> • High flexibility • Comparatively inexpensive • No term of contract • No capital commitment • ... 	<ul style="list-style-type: none"> • Airbnb • Couchsurfing • ...
	<ul style="list-style-type: none"> • Short-term rental • Sharing of workplaces • ... 	<ul style="list-style-type: none"> • High flexibility • Working atmosphere and equipment • No term of contract • No capital commitment • ... 	<ul style="list-style-type: none"> • WeWork • Betahaus • ...
Mobility	<ul style="list-style-type: none"> • Driving service agency/ rental incl. driver in private cars • ... 	<ul style="list-style-type: none"> • Comparatively inexpensive • Elimination of fixed costs • High availability • ... 	<ul style="list-style-type: none"> • Uber • Free now • ...
	<ul style="list-style-type: none"> • Bike-sharing/short-term rental of bicycles • ... 	<ul style="list-style-type: none"> • High flexibility • Modular mobility • No effort and costs for maintenance • ... 	<ul style="list-style-type: none"> • Hangzhou Public Bicycle • Vélib' • ...
	<ul style="list-style-type: none"> • Car-sharing/short-term rental of vehicles • ... 	<ul style="list-style-type: none"> • No term of contract • No capital commitment • ... 	<ul style="list-style-type: none"> • Zipcar • Share now • WeShare • ...

Source: Wirtz (2020, 2021), Wirtz (2024)

Table 11.2 Applications of the shareconomy (2)

Everyday Objects	<ul style="list-style-type: none"> • Short-term rental and sharing of home appliances • ... 	<ul style="list-style-type: none"> • No capital commitment • No effort and costs for maintenance • Sustainability aspects • Social and societal motivation • ... 	<ul style="list-style-type: none"> • Streetbank • Peerby • TradeMade • ...
	<ul style="list-style-type: none"> • Exchange of clothes • ... 	<ul style="list-style-type: none"> • Great variety • Comparatively cheap • Sustainability aspects • Social and societal motivation • ... 	<ul style="list-style-type: none"> • Swap.com • Swancy • Vinted • ...
	<ul style="list-style-type: none"> • Exchange and sale of used books and films • ... 	<ul style="list-style-type: none"> • Great variety • Comparatively cheap • Sustainability aspects • Social and societal motivation • ... 	<ul style="list-style-type: none"> • BookCrossing • BookSwap • Informal street book exchange • ...
	<ul style="list-style-type: none"> • Rental of toys • ... 	<ul style="list-style-type: none"> • Great variety • Comparatively cheap • No maintenance costs • Sustainability aspects • Social and societal motivation • ... 	<ul style="list-style-type: none"> • Toy Box Club • Toycycle • ...

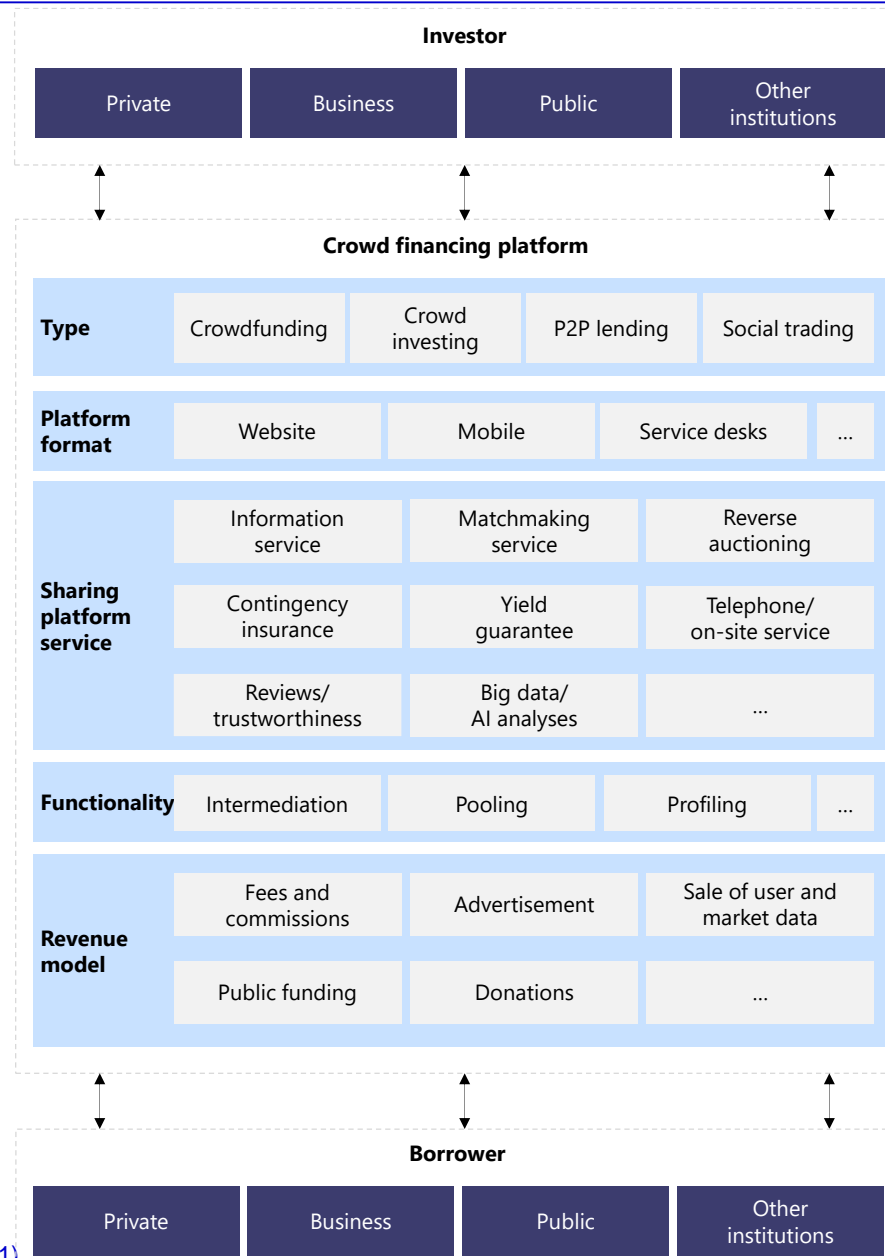
Source: Wirtz (2020, 2021), Wirtz (2024)

Table 11.2 Applications of the shareconomy (3)

Labor Force/ Services	<ul style="list-style-type: none"> • Platforms for booking project staff and freelancers • ... 	<ul style="list-style-type: none"> • High flexibility • Comparatively cheap • No term of contract • ... 	<ul style="list-style-type: none"> • Fiverr • Upwork • Gulp • ...
	<ul style="list-style-type: none"> • Booking of journalistic services • ... 	<ul style="list-style-type: none"> • High flexibility • Comparatively cheap • No term of contract • ... 	<ul style="list-style-type: none"> • JournalismJobs.com • All Freelance Writing • ...
	<ul style="list-style-type: none"> • Short-term booking of IT and design services • ... 	<ul style="list-style-type: none"> • High flexibility • Comparatively cheap • No term of contract • ... 	<ul style="list-style-type: none"> • Envato • DesignCrowd • ...

Source: Wirtz (2020, 2021), Wirtz (2024)

Fig. 11.6 ICB Crowdfunding Platform Model



Source: Wirtz (2020, 2021), Wirtz (2024)

Table 11.3 Categories and application examples of finance-related crowdsourcing services

Crowdsourcing type	Description	Customer benefits	Examples
Crowdfunding	<ul style="list-style-type: none"> • A mostly idealistic financial support of a project for a non-monetary report • ... 	<ul style="list-style-type: none"> • Large public/pre-marketing • Easy access to capital • Mobilization of stakeholders • Hardly any expenses • ... 	<ul style="list-style-type: none"> • Kickstarter.com • Indiegogo.com • ...
Crowd investing	<ul style="list-style-type: none"> • A small financial investment in a project that is characterized by profit sharing • ... 	<ul style="list-style-type: none"> • Large public/pre-marketing • Easy access to capital • Access to investors • ... 	<ul style="list-style-type: none"> • Seedinvest.com • Wefunder.com • MicroVentures.com • ...
P2P lending (borrow and lend privately)	<ul style="list-style-type: none"> • An online-based personal loan method where there are no intermediaries besides the platform • ... 	<ul style="list-style-type: none"> • Risk transformation • Lot size transformation • Cheap way to raise capital • Comparatively high returns • ... 	<ul style="list-style-type: none"> • Auxmoney.com • Zopa.com • Bondora.com • ...
Social trading	<ul style="list-style-type: none"> • Investment decisions are discussed and made in the Internet community (copy and mirror trading) • ... 	<ul style="list-style-type: none"> • Exchange of expertise • Cooperation based on skills • Performance compensation • ... 	<ul style="list-style-type: none"> • eToro.com • Dukascopy.com • ...

Source: Wirtz (2020, 2021), Wirtz (2024)

Chapter 11 Questions and topics for discussion

Chapter 11

Questions and topics for discussion



Review questions

1. Outline the core components of a platform environment and their interactions in the platform environment.
2. Present interactions on platform environments, especially demand and supply aspects.
3. Explain the SSU Sharing Platform Model.
4. Describe sharing applications.
5. Present crowd platforms and their contents.



Topics for discussion

1. Platforms such as Amazon, eBay, or Airbnb hold dominant market positions. Are these dominant market positions good for our free society and market economy? Discuss!
2. Sharing platforms offer many possibilities and advantages. Discuss how sharing platforms can positively change our environmental awareness and social behavior in the future!
3. Discuss the advantages and disadvantages of crowd strategies. Discuss and debate whether crowdfunding and crowd investing are viable alternatives to the traditional investment business (of banks and financial service providers).

Chapter 12: Digital Ecosystem, Disintermediation and Disruption

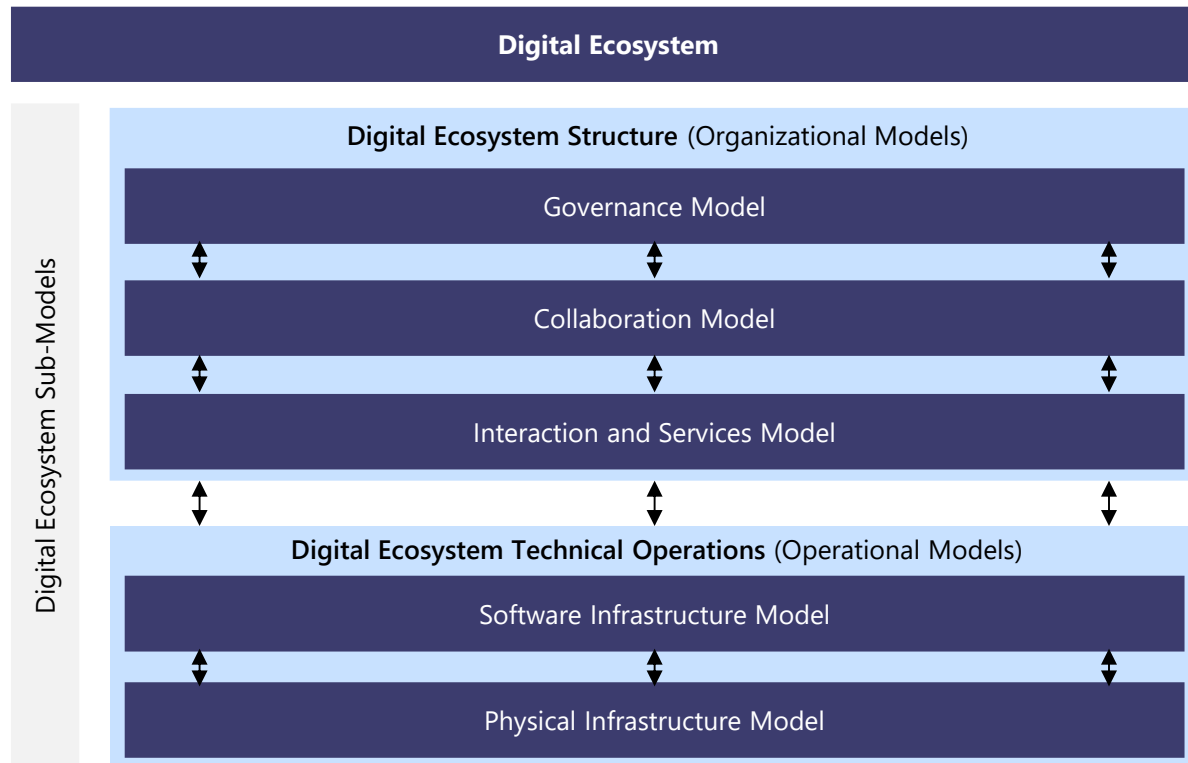
Definition of Digital Ecosystem

Definition of Digital Ecosystem (Wirtz 2021, 2024)

A digital ecosystem is an integrated framework of different digital actors, value chains and business relationships that represent all digital business activities leading to a dynamic and complex relationship network that collaboratively creates value in order to generate a competitive advantage.

Source: [Wirtz \(2021\)](#), [Wirtz \(2024\)](#)

Fig. 12.1 Sub-models within a digital ecosystem



Source: Wirtz (2021), Wirtz (2024)

Fig. 12.2 Integrated Digital Ecosystem Framework (part 1)

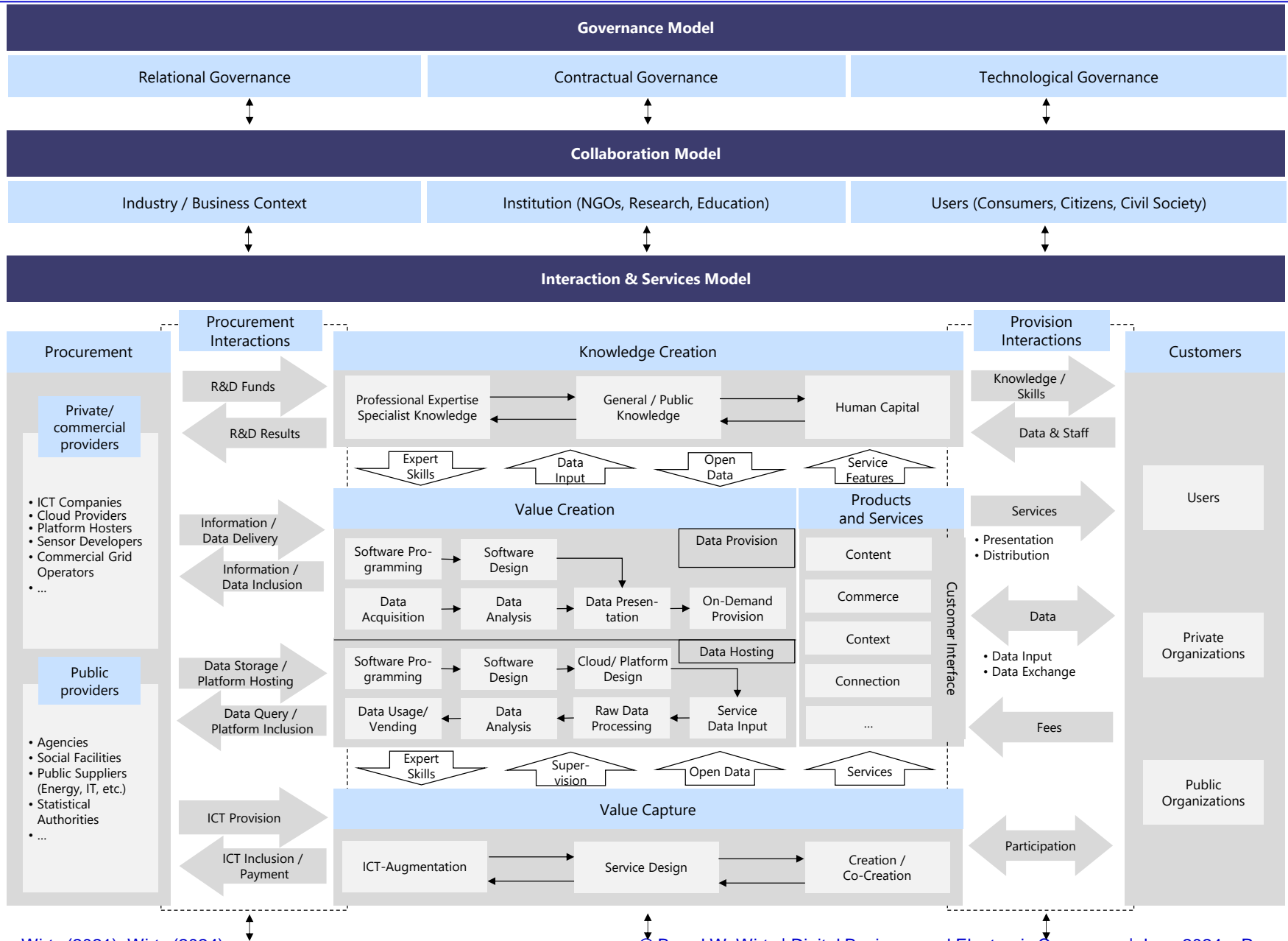
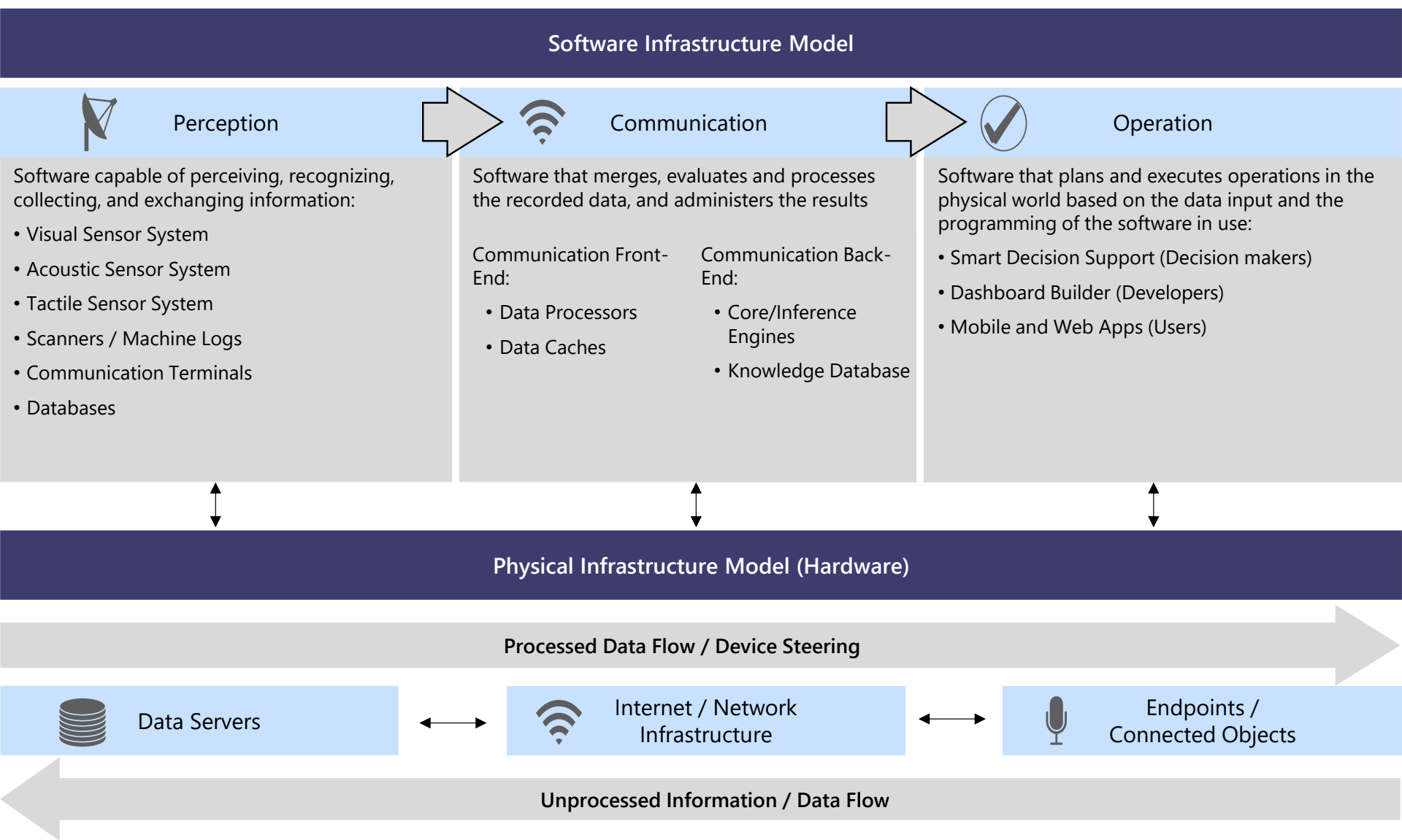
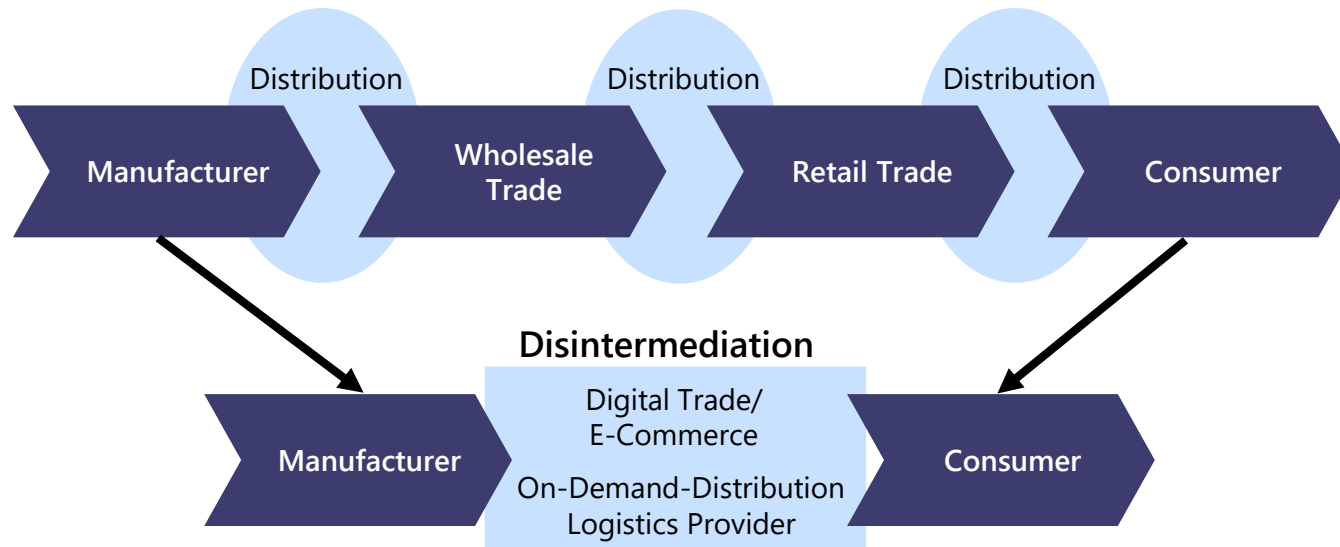


Fig. 12.3 Integrated Digital Ecosystem Framework (part 2)



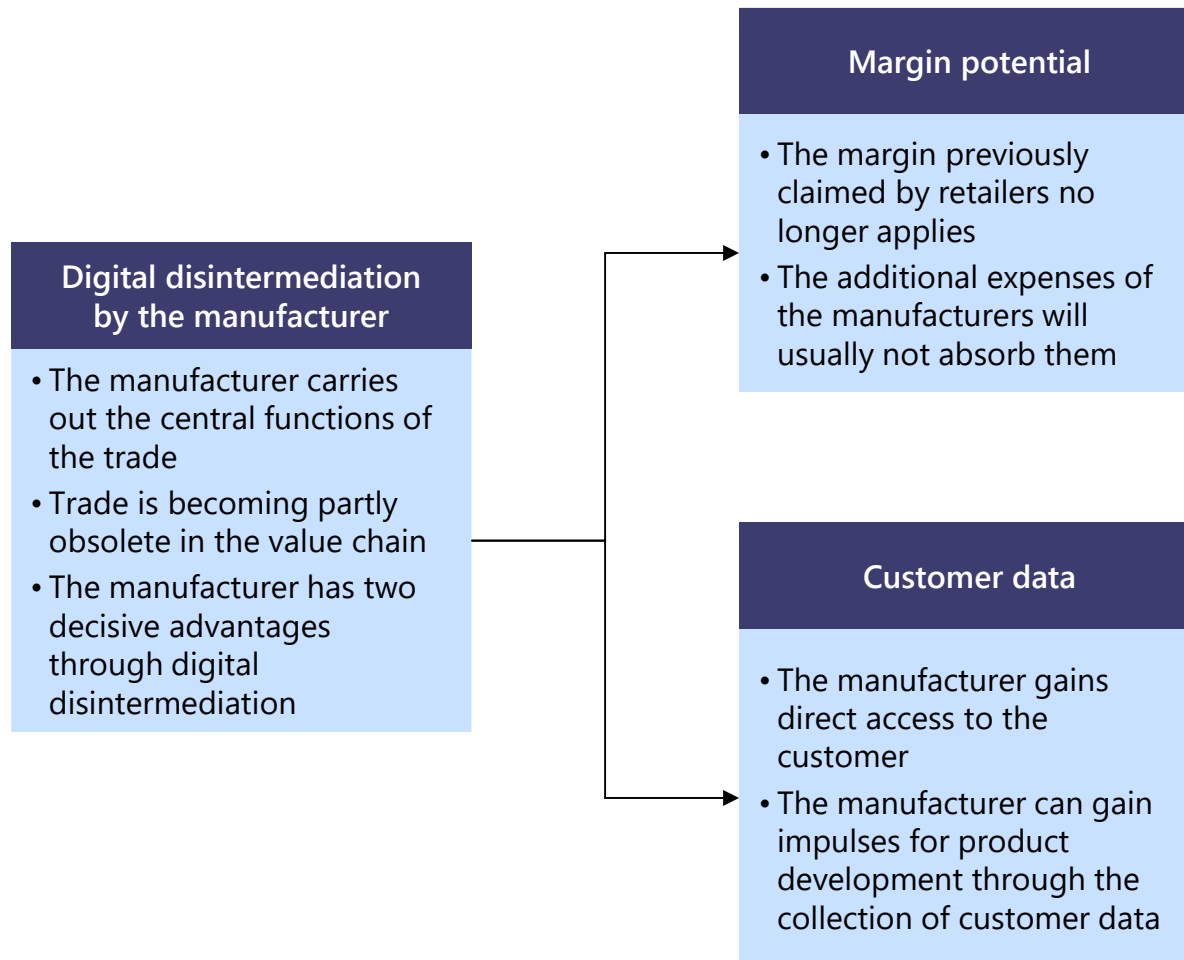
Source: Wirtz (2021), Wirtz (2024)

Fig. 12.4 Digital disintermediation



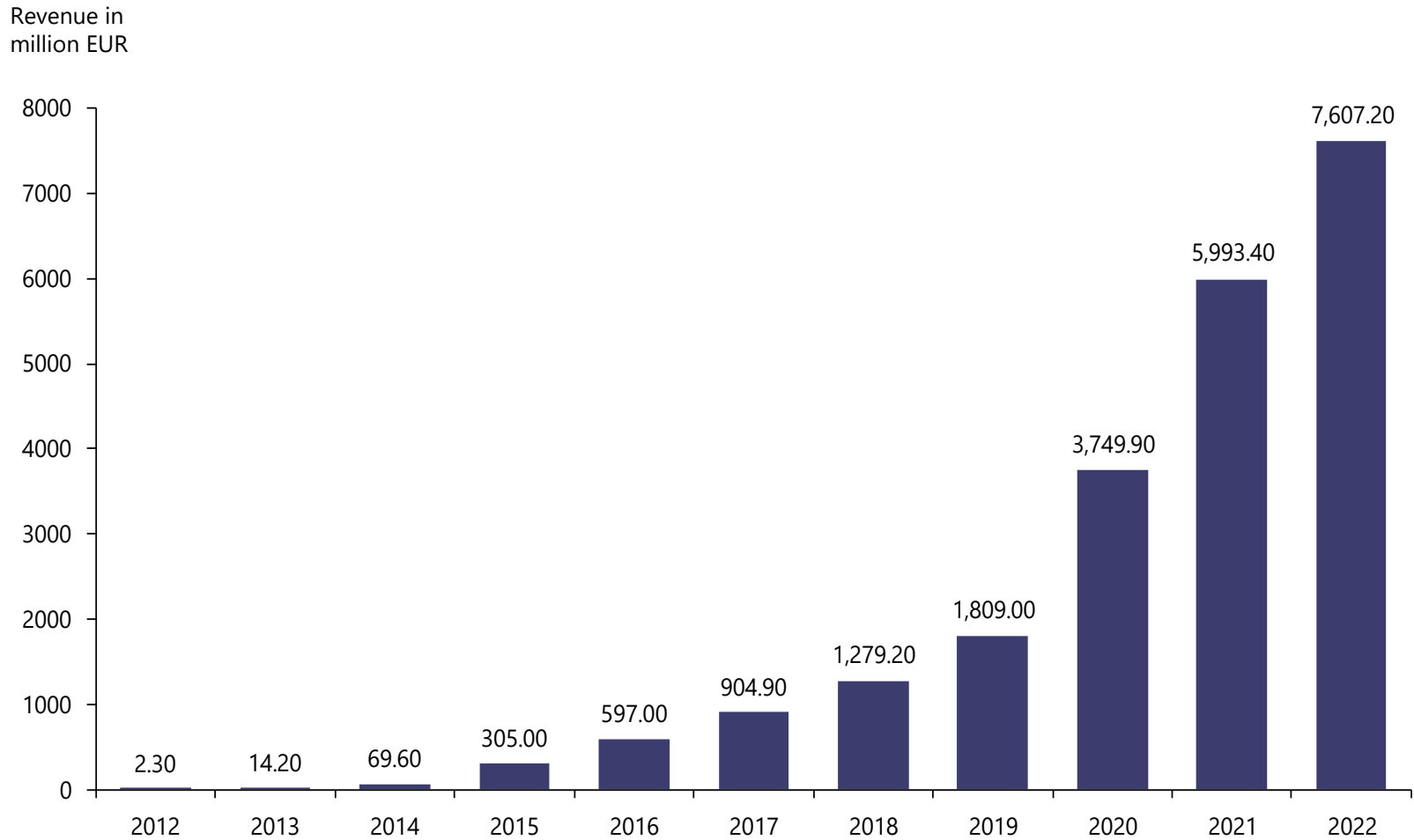
Source: Wirtz (2020b, 2021), Wirtz (2024)

Fig. 12.5 Opportunities of digital disintermediation for the manufacturer



Source: Wirtz (2000, 2021), Wirtz (2024)

Fig. 12.6 Development of revenues of HelloFresh



Source: HelloFresh Group (2023), Wirtz (2024)

Fig. 12.7 Website HelloFresh

Personalize your plan

1. Choose your preferences

Your preferences help us show you the most relevant recipes first. You'll still have access to all recipes each week!

<input checked="" type="checkbox"/> Meat & Veggies	<input type="checkbox"/> Veggie
<input checked="" type="checkbox"/> Family Friendly	<input checked="" type="checkbox"/> Fit & Wholesome
<input type="checkbox"/> Quick & Easy	<input checked="" type="checkbox"/> Pescatarian

You'll be able to swap proteins and sides if they aren't a perfect match.

2. Customize your plan size

Number of people:

Meals per week:

Meat & Veggies, Pescatarian, Fit & Wholesome and Family Friendly

4 meals for 2 people per week
8 total servings

Box price: \$78.32
Price per serving: ~~\$9.79~~ \$4.79

First box total: ~~\$89.31~~ **\$50.99 off** \$38.32





Customization

Choice of preferences

Select this plan

Enjoy 100+ options each week

for breakfast, lunch, dinner and more. Simply select recipes after checkout or [view our weekly menus](#)

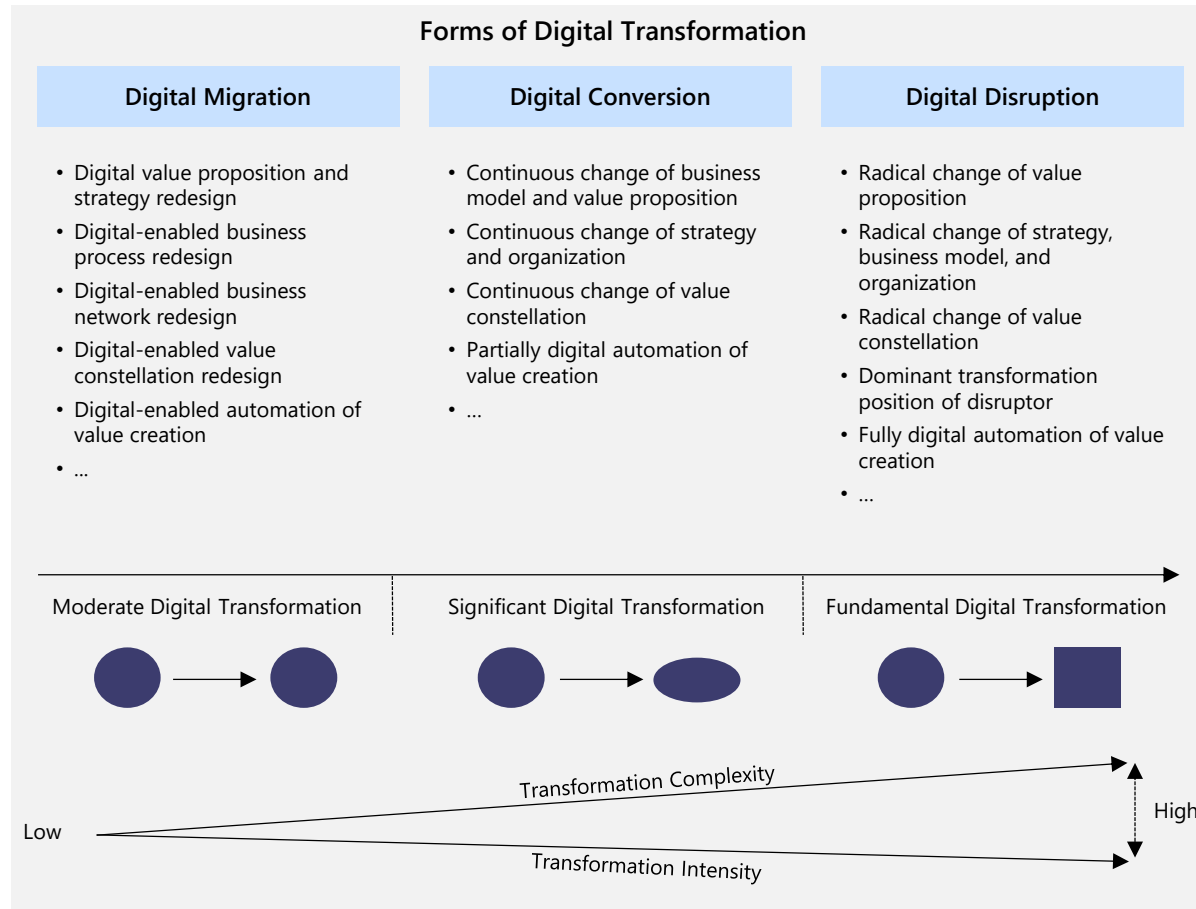
 <p>Meat and Veggies our most popular plan</p>	 <p>Veggie & Plant-based meals</p>	 <p>Family Friendly kid-tested recipes</p>	 <p>Fit & Wholesome for a balanced lifestyle</p>
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NEW!

Make it your own with HelloCustom

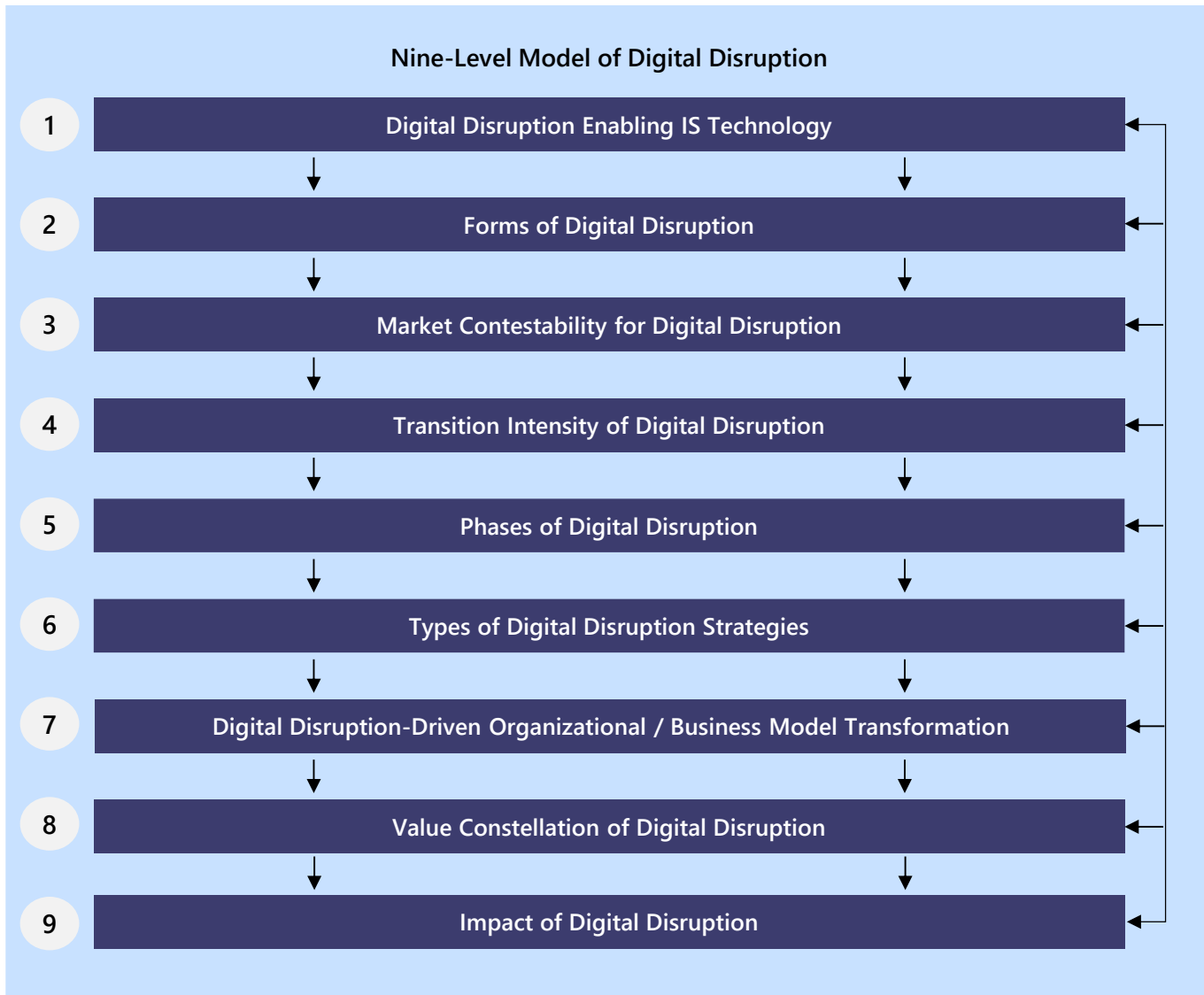
Now included in all plans. Change, swap, or upgrade 12+ sides and proteins each week. Your flavors, your choice, your recipes. Dig into a few HelloCustom examples below.

Fig. 12.8 Forms of digital transformation



Data Source: Wirtz (2024)

Fig. 12.9 Layers of the Nine-Level Model of Digital Disruption



Source: Wirtz (2024)

Fig. 12.10 Nine-Level Model of the Digital Disruption (part 1)

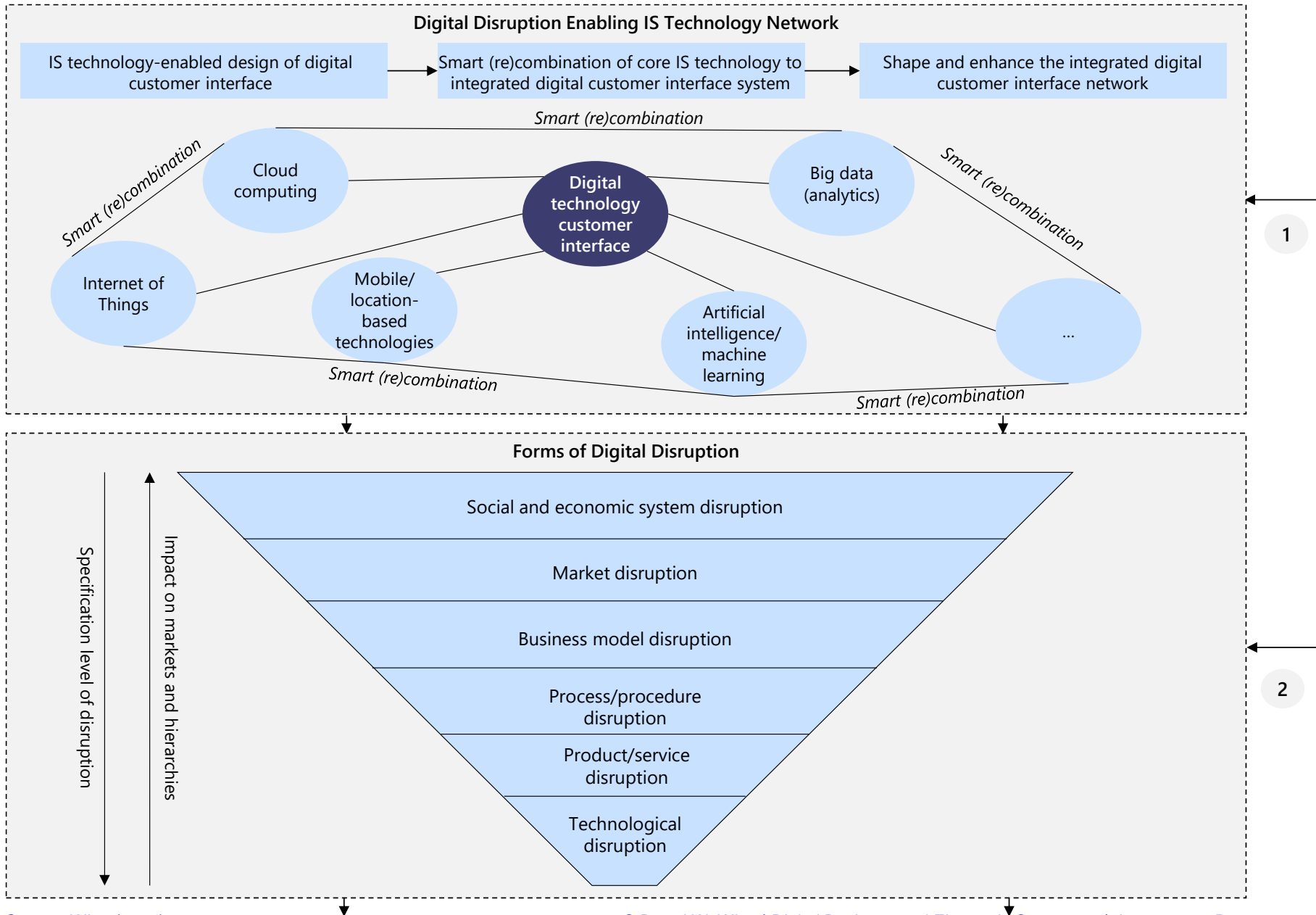


Fig. 12.11 Nine-Level Model of Digital Disruption (part 2)

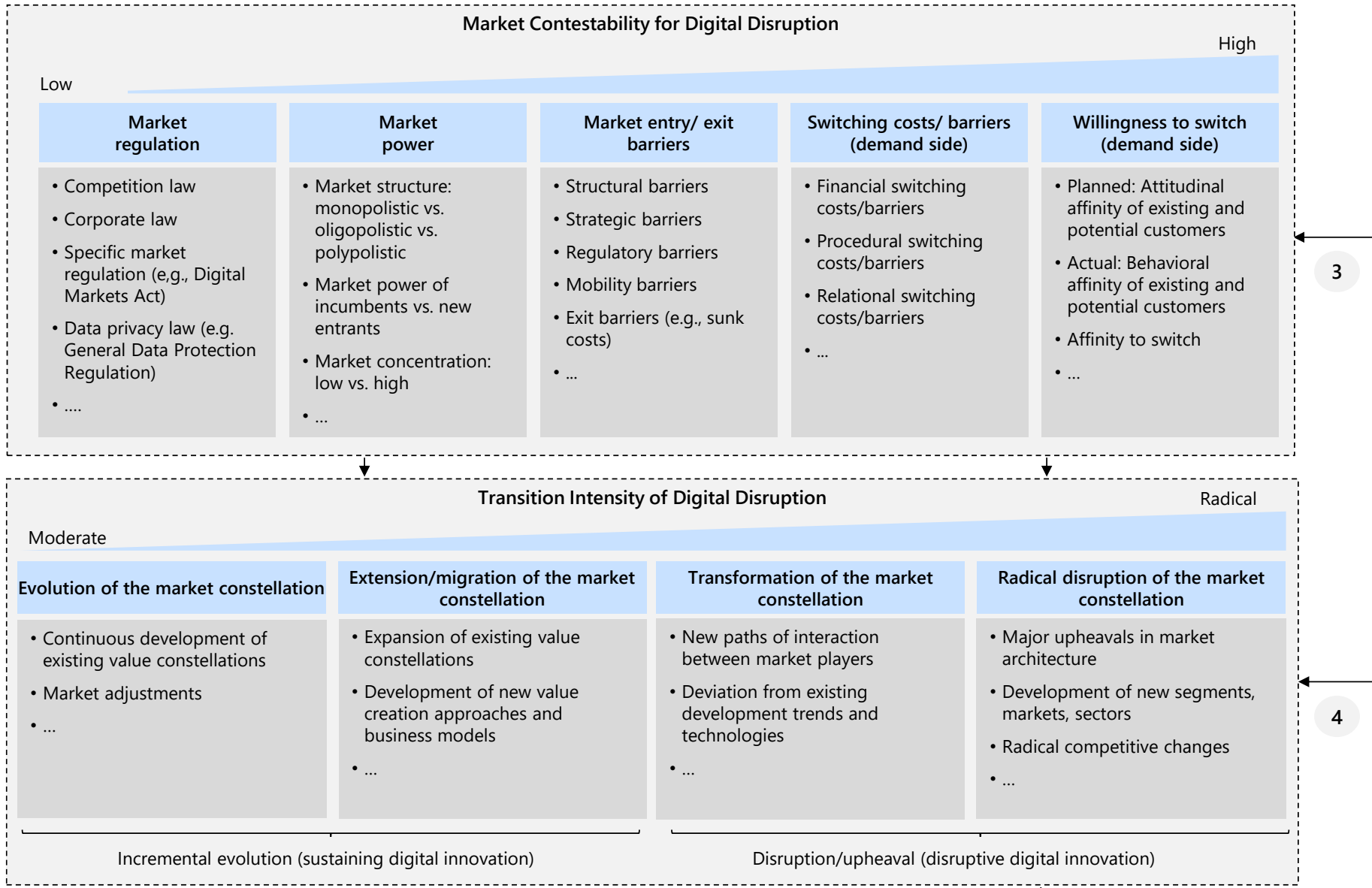
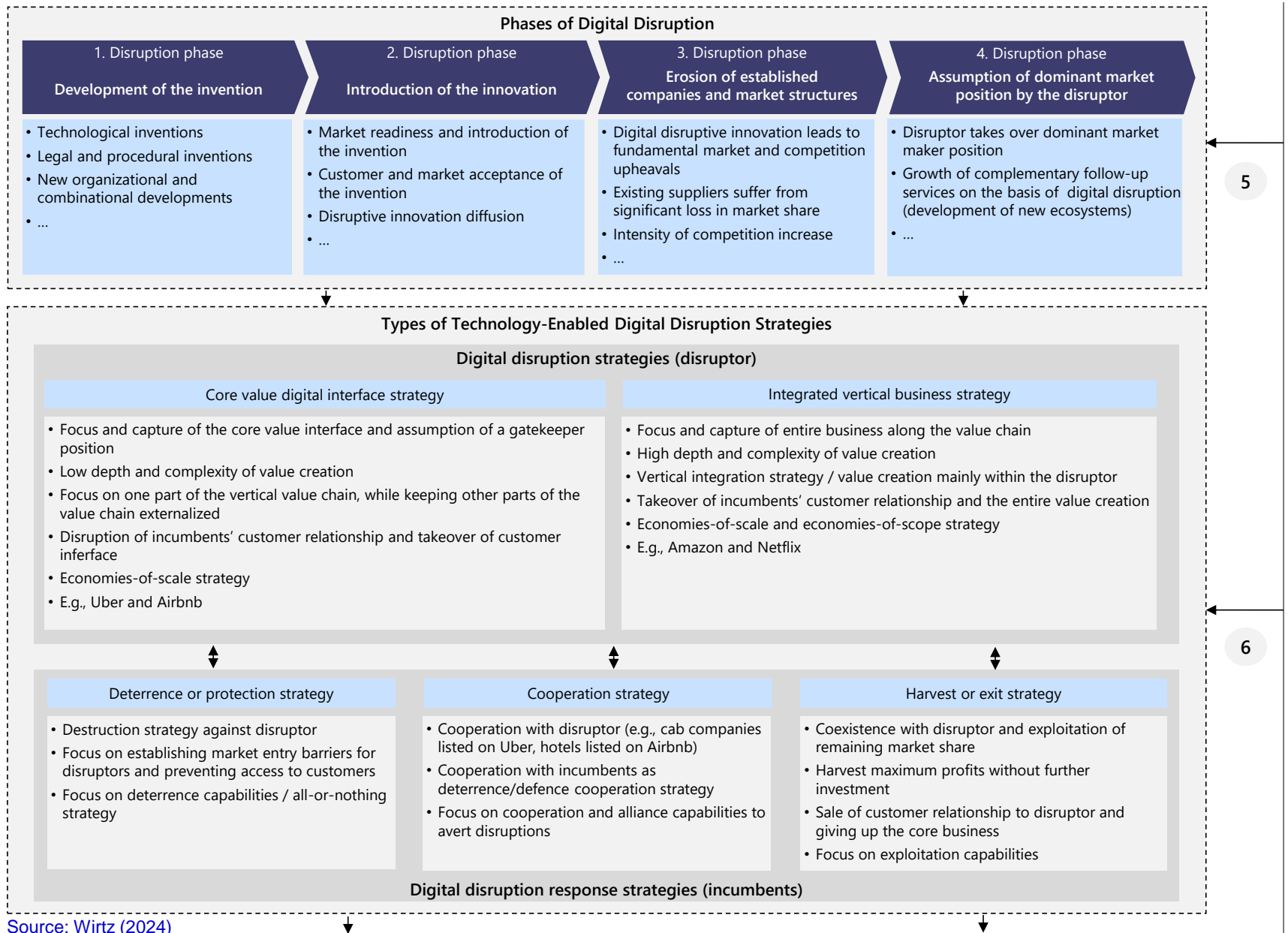


Fig. 12.12 Nine-Level Model of Digital Disruption (part 3)



Source: Wirtz (2024)

Fig. 12.13 Nine-Level Model of Digital Disruption (part 4)

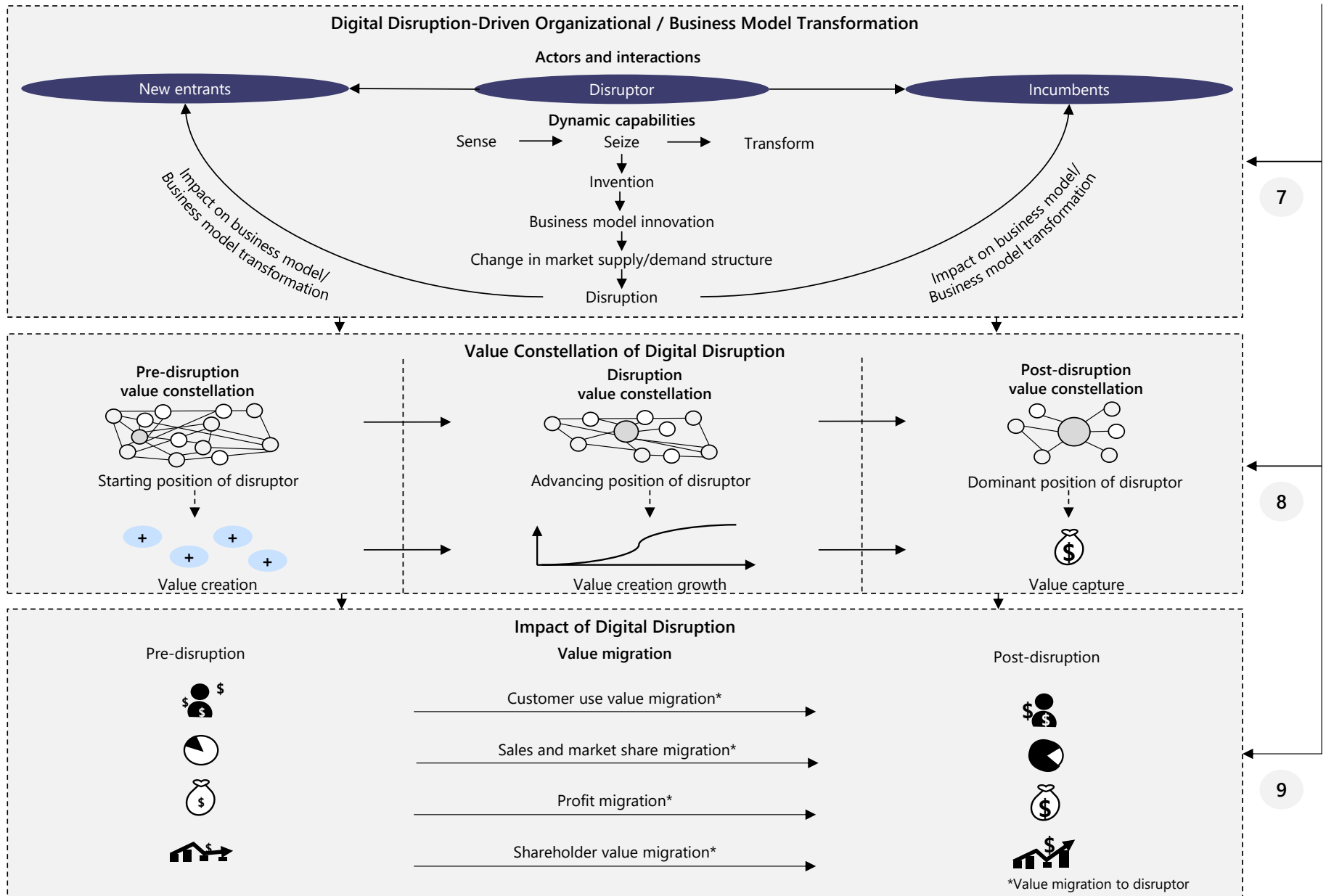
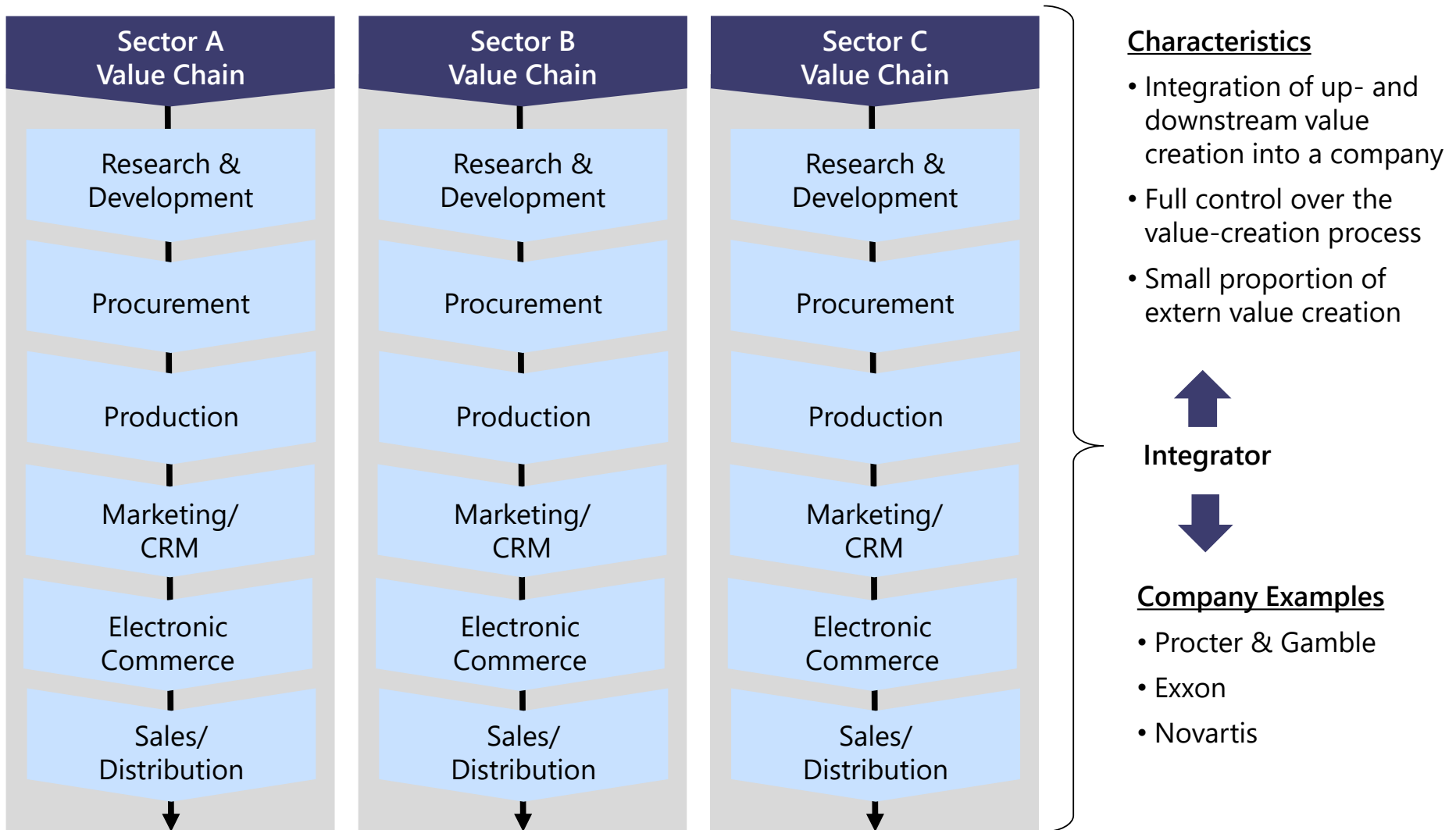


Fig. 12.14 Comparison of value-added models and connection to the BM concept

	Value chain	Value system	Value constellation	Business model
Development	<ul style="list-style-type: none"> • From industrial economy 	<ul style="list-style-type: none"> • From industrial economy 	<ul style="list-style-type: none"> • From network theory 	<ul style="list-style-type: none"> • From technology-oriented approach
Structure	<ul style="list-style-type: none"> • Linear 	<ul style="list-style-type: none"> • Linear, connection of value chains 	<ul style="list-style-type: none"> • Network 	<ul style="list-style-type: none"> • Focus beyond value creation • Network
Functions	<ul style="list-style-type: none"> • Description of value creation in single companies • Value adding 	<ul style="list-style-type: none"> • Description of value creation in single companies • Value adding 	<ul style="list-style-type: none"> • Description of value creation between different companies • Value creation 	<ul style="list-style-type: none"> • Description of business structure and value creation
Aims	<ul style="list-style-type: none"> • Identifying the potential of stages of value addition 	<ul style="list-style-type: none"> • Integrating complex structures of value addition 	<ul style="list-style-type: none"> • Identifying potentials of connections in the value creation 	<ul style="list-style-type: none"> • Development, implementation and support of sustainable and successful corporate strategies

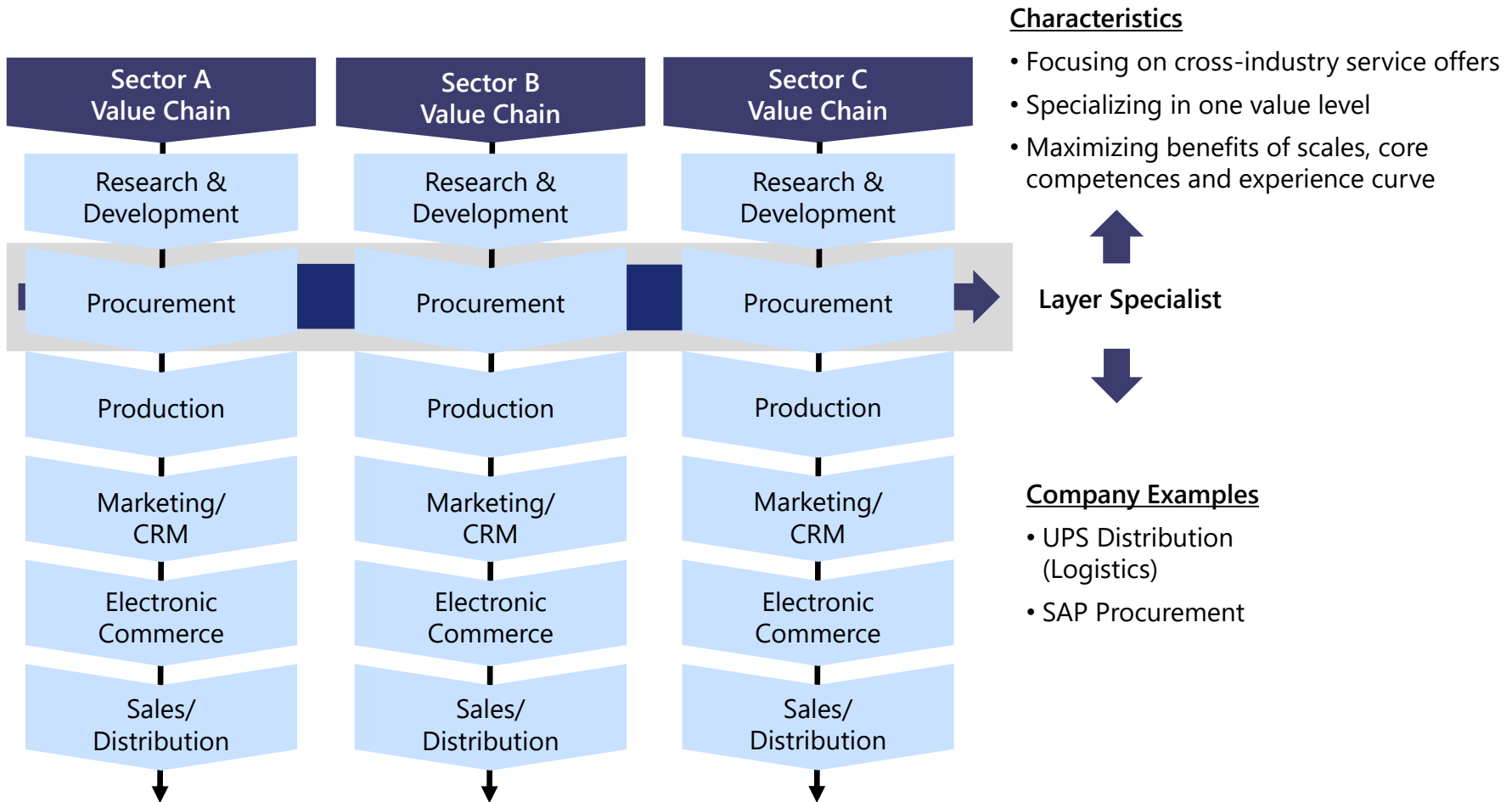
Source: Wirtz (2010, 2020a), Wirtz (2024)

Fig. 12.15 Integrating the value chain



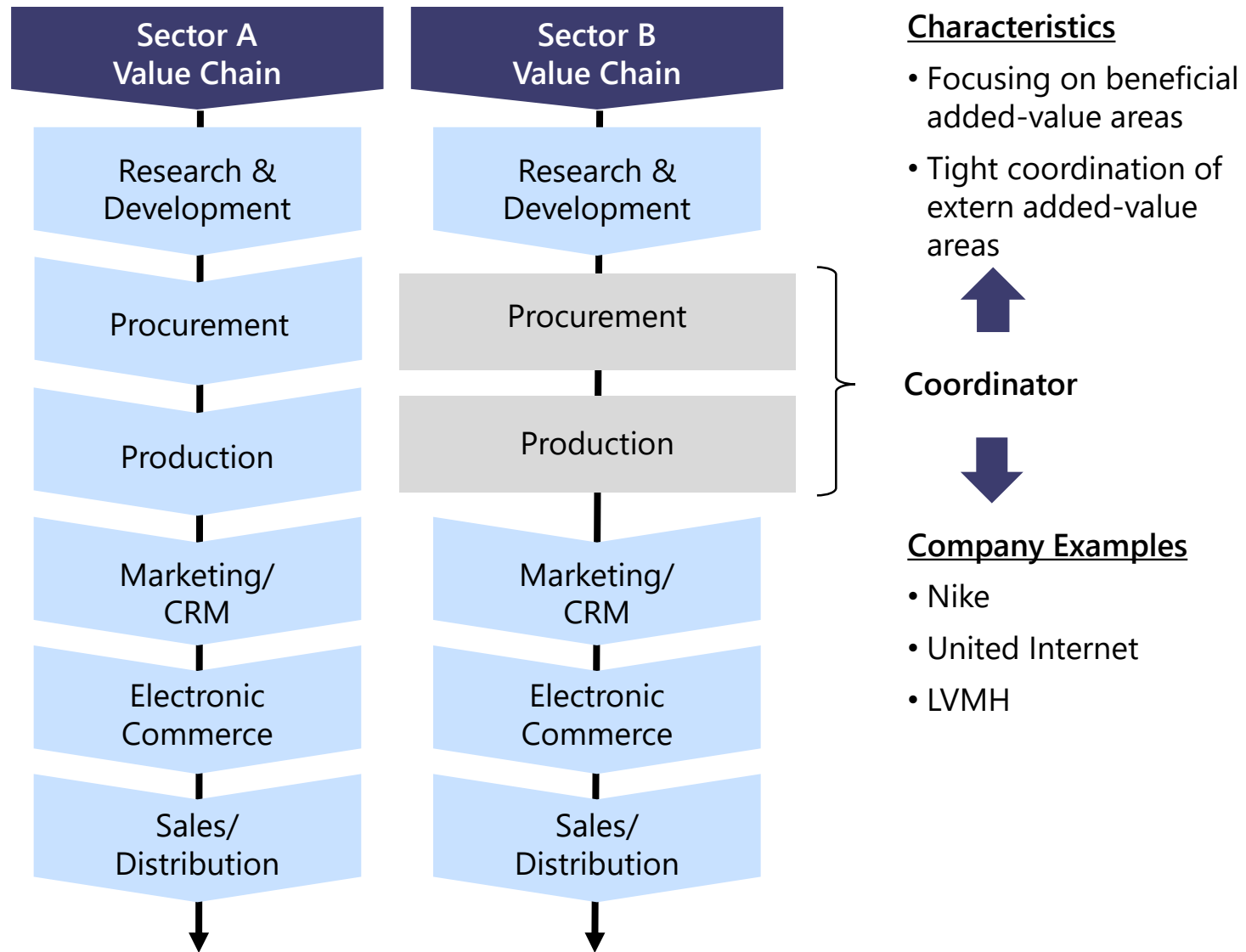
Source: Wirtz and Becker (2002b); Wirtz (2020a, 2024)

Fig. 12.16 Focusing on a value chain layer



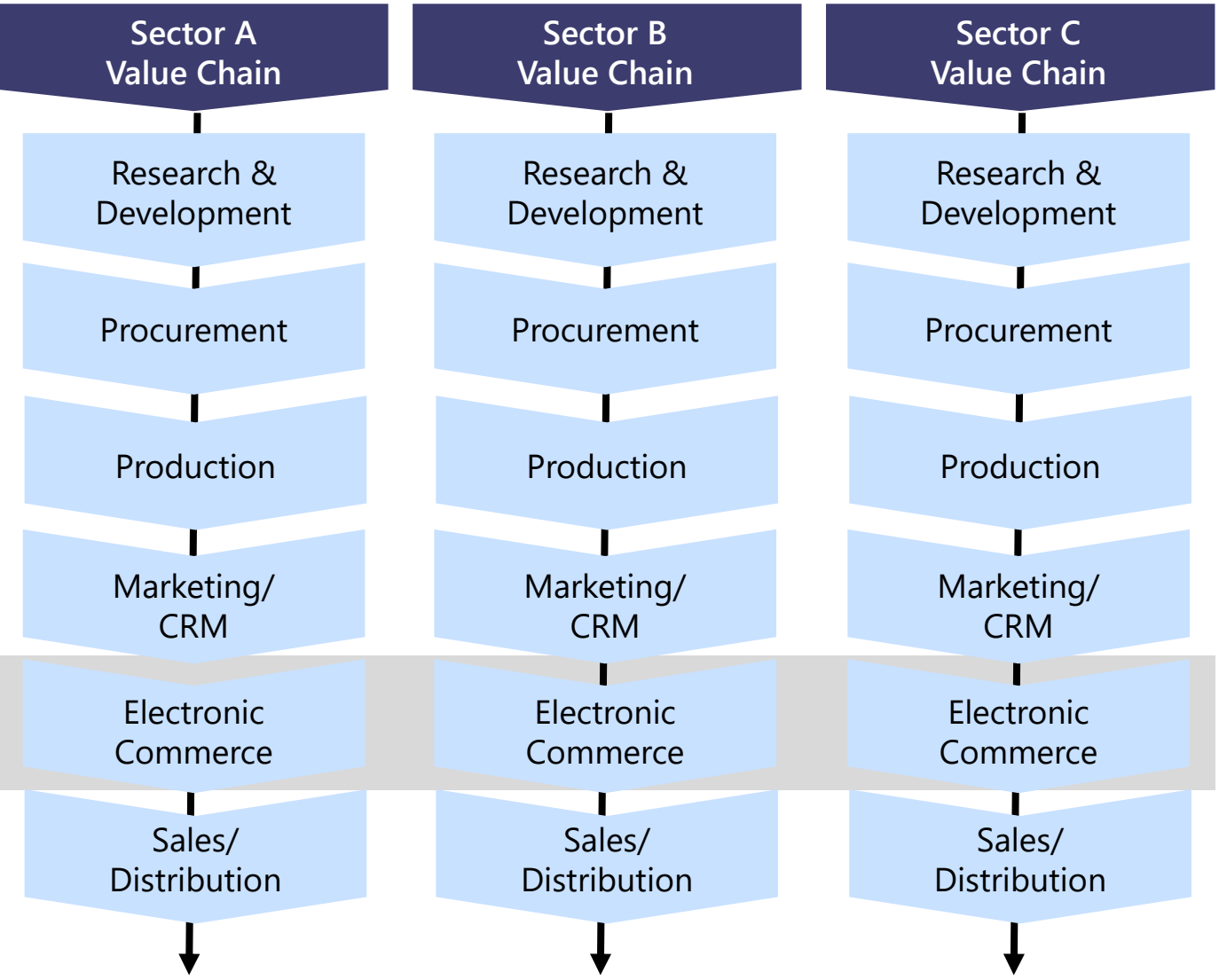
Source: Wirtz and Becker (2002b), Wirtz (2020a, 2024)

Fig. 12.17 Coordination of external providers



Source: Wirtz and Becker (2002b), Wirtz (2020a, 2024)

Fig. 12.18 Creating new markets as a pioneer



- Characteristics**
- Creation of innovation performance
 - Introduction of new value-chain level into existing value chain
- ↑
- Pioneer (Market Maker)**
- ↓
- Company Examples**
- Amazon
 - Airbnb

Source: Wirtz and Becker (2002b), Wirtz (2020a, 2024)

Fig. 12.19 Digital disruption strategies (disruptor)

Digital disruption strategies (disruptor)	
Core value digital interface strategy	Integrated vertical business strategy
<ul style="list-style-type: none">• Focus and capture of the core value interface and assumption of a gatekeeper position• Low depth and complexity of value creation• Focus on one part of the vertical value chain, while keeping other parts of the value chain externalized• Disruption of incumbents' customer relationship and takeover of customer interface• Economies-of-scale strategy• E.g., Uber and Airbnb	<ul style="list-style-type: none">• Focus and capture of entire business along the value chain• High depth and complexity of value creation• Vertical integration strategy / value creation mainly within the disruptor• Takeover of incumbents' customer relationship and the entire value creation• Economies-of-scale and economies-of-scope strategy• E.g., Amazon and Netflix

Source: Wirtz (2024)

Table 12.1 Corporate examples of digital disruptors (1)

Aspects				
Disruptor	Disruptor strategy	Disruptor business model	Disruptor value proposition	Market impact
Tesla (Electric Cars)	<ul style="list-style-type: none"> • Integrated vertical business strategy • First-to-market • Revenue market leader in the electric car industry • Market leader in the field of autonomous driving • Assistance driver strategy • Global economies of scale and scope • Focus strategy variations • ... 	<ul style="list-style-type: none"> • Direct sales • Greenfield investments • High depth of value creation • Consistent use of digital innovation/focus on software and driving data analysis • High degree of automation/intensive use of robotics • Low product variety • ... 	<ul style="list-style-type: none"> • Modern and safe electric vehicle with high range • (Partly) autonomous control • Ecological/moral superiority • Lifestyle and identity of progress/participation in technological upheaval • Low operating costs/partially free refueling • High proportion of smart technology/Internet components • ... 	<ul style="list-style-type: none"> • Attack and partial erosion of established car manufacturers • Creation of new market segment • Radical strategy adjustments and imitation by established suppliers • Shift in customer purchasing preferences in the automotive sector • ...
Netflix (Streaming)	<ul style="list-style-type: none"> • Integrated vertical business strategy • Creating a global streaming platform for audiovisual media • Market leadership of quality films and customer preference-oriented in-house productions • Global economies of scale and scope • Displacement of linear television • ... 	<ul style="list-style-type: none"> • Collection, selection, compilation of audiovisual content • Initiation, negotiation, and processing of transactions in the form of paid subscriptions • Possibility of personalized on-demand online offers in contrast to cinema, film distribution, and television • Direct sales and access to customers • Global presence • Audience big data-oriented film and series production • ... 	<ul style="list-style-type: none"> • Self-designed entertainment with a wide and deep range of offers • Personalized on-demand offer • Device-independence (smartphone, Internet TV, laptop, etc.) • Flexible • No commercial interruptions • Variety of different offers • Internationality • Permanent availability; anywhere and anyhow the offers • ... 	<ul style="list-style-type: none"> • Erosion of the linear entertainment model • Significant loss of market share for audiovisual providers • Significant shift in user preferences towards on-demand • Restructuring/mergers of large media companies • New structures in film and serial production • Streaming impact on business models of the TV providers • ...

Source: Wirtz (2020b, 2021, 2024)

Table 12.1 Corporate examples of digital disruptors (2)

Airbnb (Private Rentals)	<ul style="list-style-type: none"> • Core value digital interface strategy • Global offer of new/additional housing for travelers • Creation of new market segments • Global economies of scale and scope • Information technology market dominance • ... 	<ul style="list-style-type: none"> • Initiation, negotiation and processing of transactions in the form of accommodation bookings • Substitution of traditional transaction phases via the Internet • Information brokerage and sharing economy as complementary rental offers • ... 	<ul style="list-style-type: none"> • Globally positioned rental offer from rentals for landlords • Globally available offer • Insurance cover for bookings via the platform (residential property owners) • Lower costs than traditional rentals (hotels) • Authentic and individual accommodation • Transparent evaluation system • ... 	<ul style="list-style-type: none"> • Erosion of market shares in the hotel and catering industry • Shift in user preferences • Intensification of price pressure and scarcity in the market for rental housing in urban centers • Growing tourism through cost reduction • Regulatory effort by state actors • ...
Amazon (e-Commerce)	<ul style="list-style-type: none"> • Integrated vertical business strategy • Creation of ecosystems for direct sales between manufacturer and customer • Establishment of a global e-commerce platform with the highest number of customers and product variety (longtail) • Professional, global and fast logistics leader • Decentralized, device-independent, independent of time and place • ... 	<ul style="list-style-type: none"> • Initiation, negotiation and processing of transactions in the form of purchases of all kinds • Substitution of traditional transaction phases via the Internet • Establishment of the central interface between buyer/manufacturer • Large customer database and systematic use of AI and big data • ... 	<ul style="list-style-type: none"> • High breadth and depth of product offer (product variety) • Customer-centric individual commerce offers • Reliable service and fast delivery • Value for money • ... 	<ul style="list-style-type: none"> • Erosion of the retail trade • Shift in consumer preferences • Major disintermediation in various sectors • Monopoly structures • Adaptation of pricing strategies • Establishment of a new ecosystem • ...

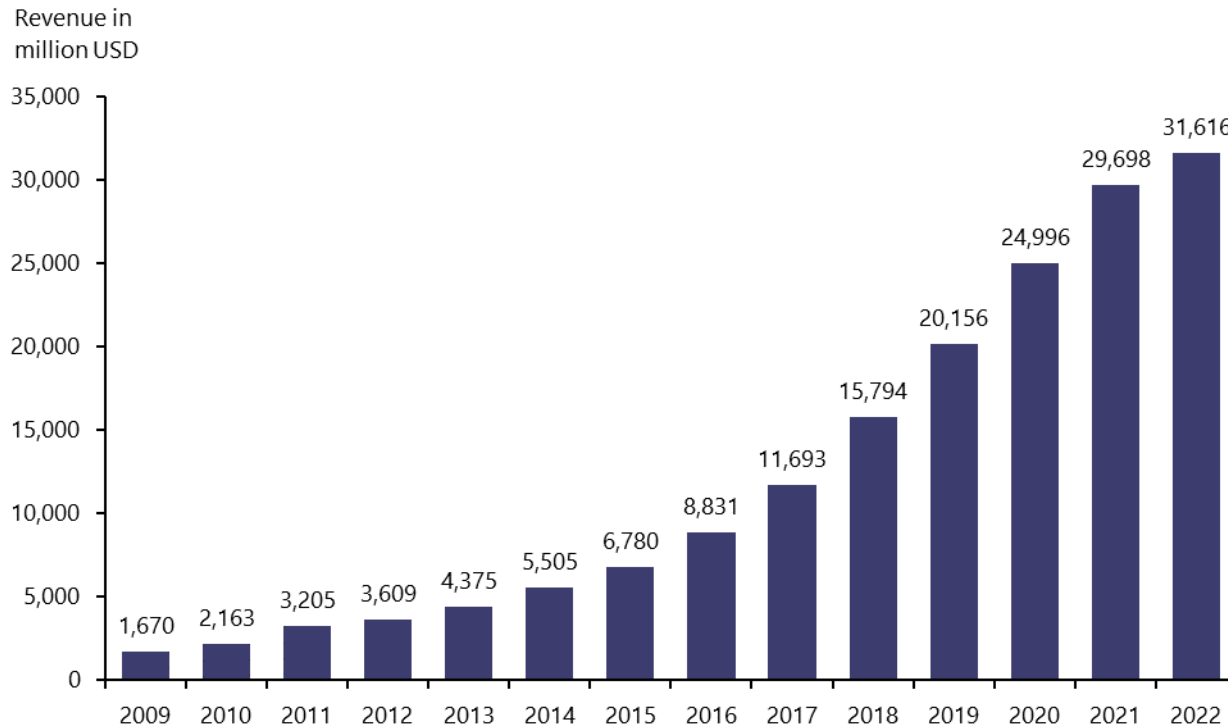
Source: Wirtz (2020b, 2021, 2024)

Table 12.1 Corporate examples of digital disruptors (3)

Apple iPhone (Smart-phones)	<ul style="list-style-type: none"> • Integrated vertical business strategy • Establishment of a novel universal mobile media device • Digital and technological market dominance • Strategic establishment of a device-related ecosystem (new software and architecture) • ... 	<ul style="list-style-type: none"> • Supplementation/ substitution of traditional transaction phases via the Internet (Apple Buy) • Worldwide distribution of universal mobile media device • Building new software and ecosystems • Establishment of new location-based services • ... 	<ul style="list-style-type: none"> • Universally usable individualized micro computers • Creation of a communication platform • Haptic control of the interface • Worldwide networking through Internet access • High personalization through applications and user data evaluation • ... 	<ul style="list-style-type: none"> • Abandonment of the conventional mobile phone • Erosion of established mobile phone manufacturers • Building of a new ecosystem (Apple world) • Development of new market segments • Creation of complementary follow-up services based on the disruption • ...
Uber (Ride-Sharing)	<ul style="list-style-type: none"> • Core value digital interface strategy • Creation of a new mobility segment in passenger transport (development of individual passenger transport through unused private vehicles and available manpower) • Digital and technological market leader position • High economies of scale and economies of scope • ... 	<ul style="list-style-type: none"> • Initiation, negotiation and processing of transactions in the form of transport bookings • Supplementation/ substitution of traditional transaction phases via the Internet • Placement of individual private transport services via an app in a digital network • Increase in the utilization of private vehicles • ... 	<ul style="list-style-type: none"> • Possibility to generate additional income (Uber driver) • Comparatively cheap (for users) • Fixed cost degression • Easy registration as a driver (Uber driver) • Exact pickup and destination locations (for users) • Short waiting time (for users) • Available at any time/mobile availability (for users) • ... 	<ul style="list-style-type: none"> • Erosion of the business model of traditional taxi providers and public transport companies • Shift in user preferences • Changes in the volume of traffic in urban centers • Upheavals in local public transport and in the automotive industry through sharing • Regulatory efforts by governmental actors • ...

Source: Wirtz (2020b, 2021, 2024)

Fig. 12.20 Development of Netflix revenue



Source: Netflix Inc. (2020, 2024) and previous datasets

Chapter 12 Questions and topics for discussion

Chapter 12 Questions and topics for discussion



Review questions

1. Describe the structure of digital ecosystems.
2. Explain the impact of digital disintermediation on value chains.
3. Present the opportunities and risks of disintermediation.
4. Explain the Nine-Level Model of Digital Disruption.
5. Present company examples of digital disruption in terms of strategy, business model, value proposition, and market impact.

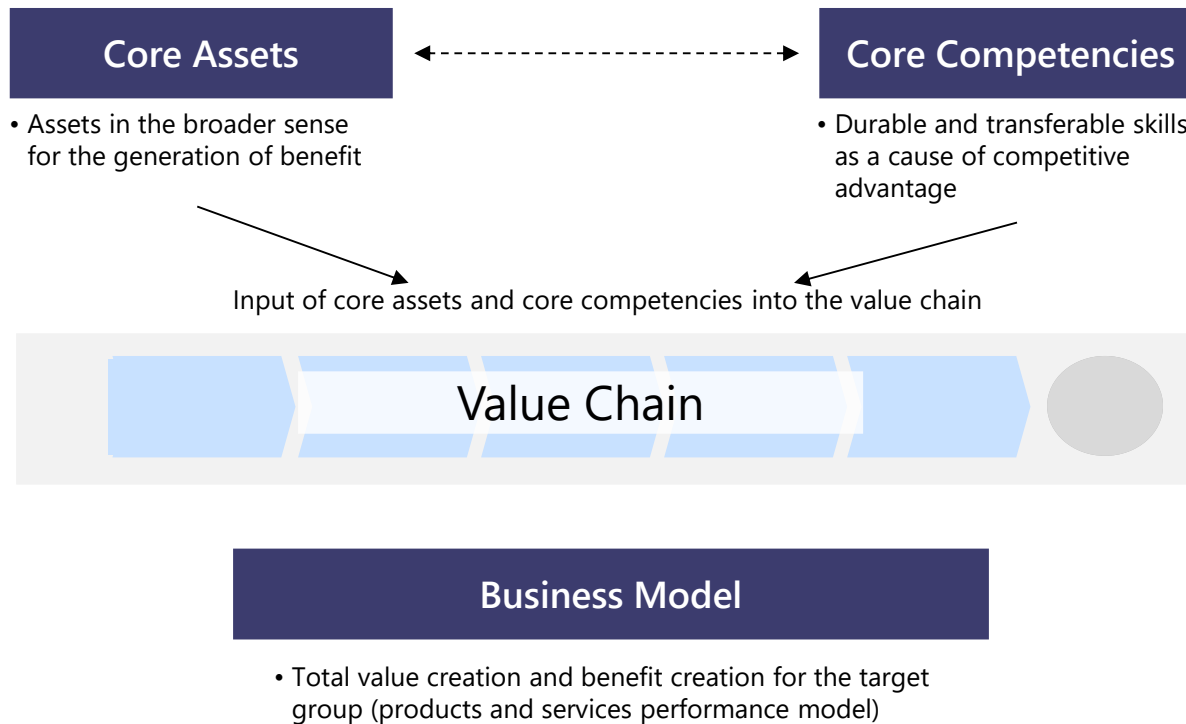


Topics for discussion

1. Discuss the extent to which a digital ecosystem represents all relevant actors, factors, and interactions. Can digital ecosystems be used to represent companies like Apple well?
2. Digital disintermediation has fundamentally changed the value creation of intangible products in recent years. Discuss who the winners and losers of this process are from an economic, environmental, and social perspective.
3. Discuss, based on the disruptor Netflix, what opportunities and risks arise from digital disruption in the context of traditional as well as modern media. In doing so, consider the extent to which the new value creation structure is economically and socially desirable. Will radical disruption in the digital sector ultimately lead to market monopolies?

Chapter 13: Digital Business Models

Fig. 13.1 Performance system



Source: Wirtz (2005, 2024)

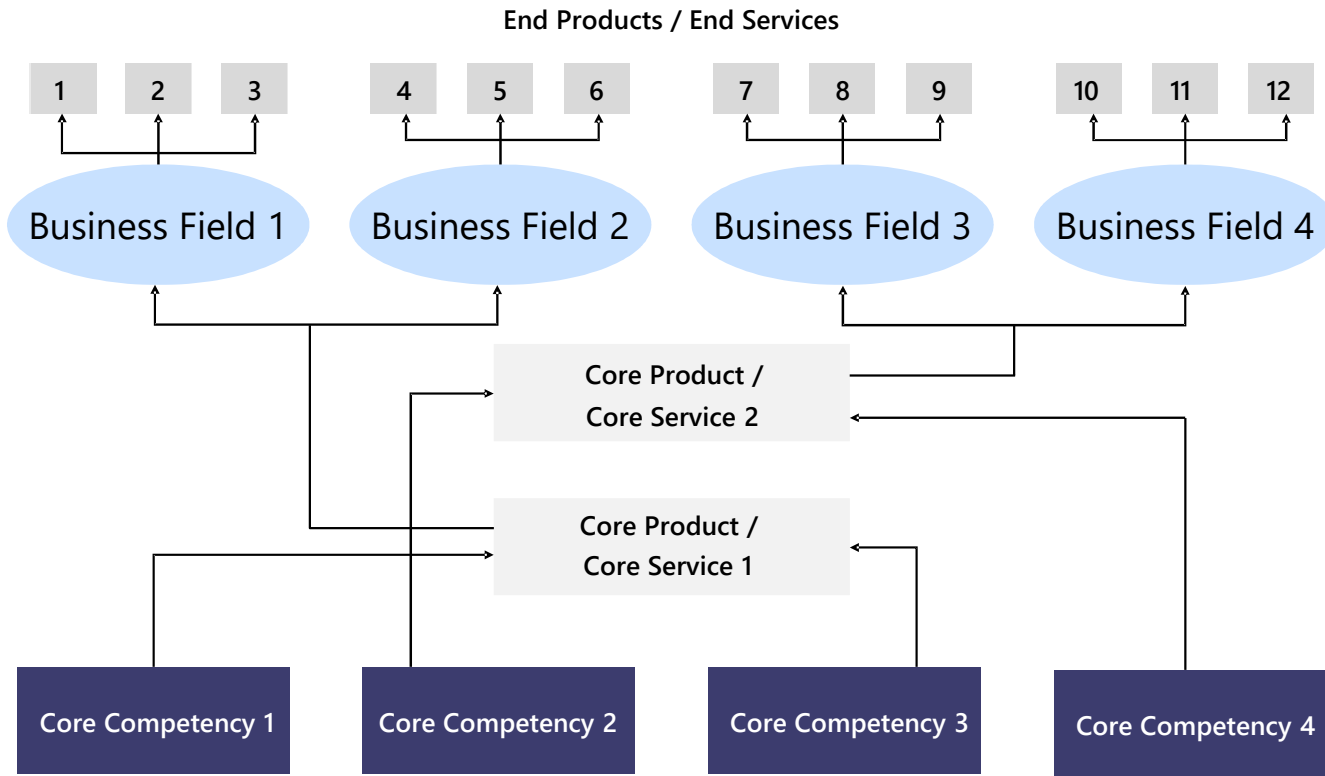
Definition of Assets and Core Assets

Definition of Assets and Core Assets (Wirtz 2005, 2022a, 2024)

Assets are tangible and intangible resources that form the basis for the activities and the competitiveness of a company. Core assets concern company-specific assets that were accumulated in-house or were at least refined and that have a special intrinsic value for a company's value creation process. They are relatively scarce and are difficult to imitate or substitute. Core assets form the basis for a lasting digital business advantage.

Source: Wirtz (2005, 2022a, 2024)

Fig. 13.2 Core competencies



Source: Prahalad and Hamel (2006), Wirtz (2024)

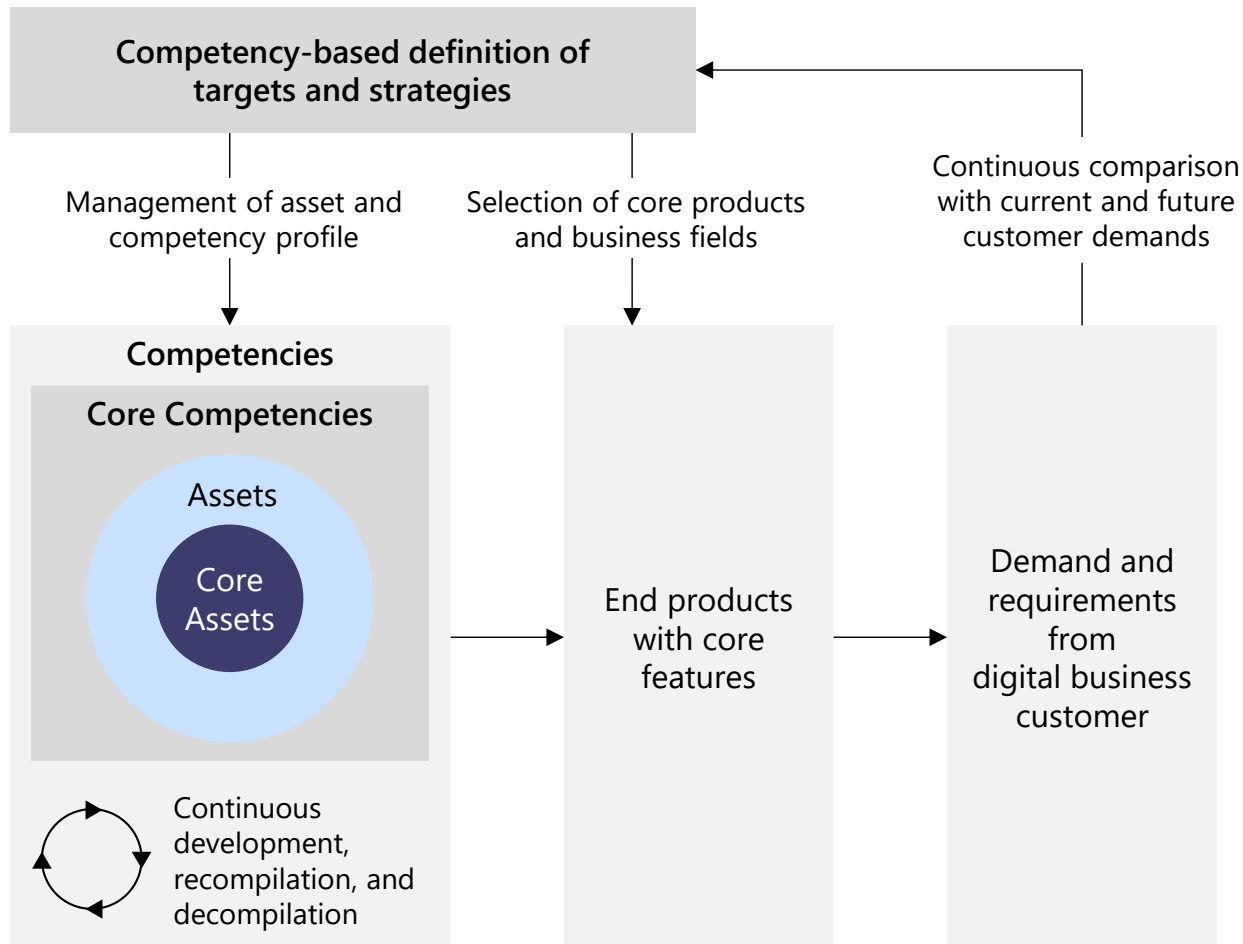
Definition of Competencies and Core Competencies

Definition of Digital Transformation (Wirtz 2005, 2022a, 2024)

Competencies form the foundation for the collective action in a company and facilitate the service creation process, in which assets and core assets are combined into marketable services. Core competencies are a special form of competencies. They are relatively scarce and do not lend themselves to imitation or substitution by the competition. Core competencies make a significant contribution to the perceived customer benefits and provide companies with a lasting digital business advantage.

Source: [Wirtz \(2005, 2022a, 2024\)](#)

Fig. 13.3 Core asset and core competency development



Source: Wirtz (2005, 2022a, 2024)

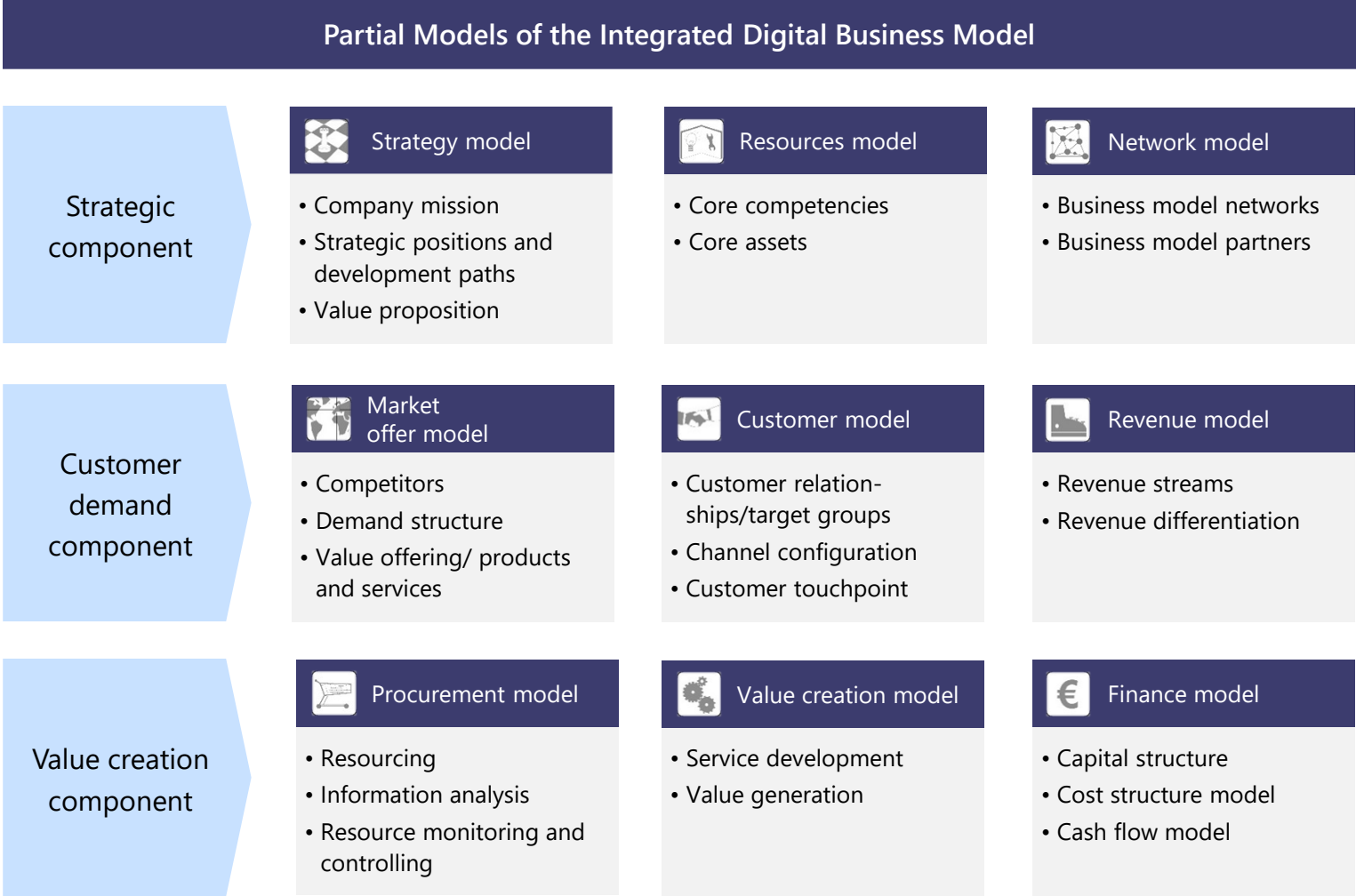
Definition of Business Model

Definition of Business Model (Wirtz 2011a, 2011b, 2024)

A business model is a simplified and aggregated representation of the relevant services, processes and activities of a company describing how information, products and services that create additional value are developed and managed, while also considering strategic and processual as well as demand components to support sustainable value creation.

Source: [Wirtz \(2011a, 2011b, 2024\)](#)

Fig. 13.4 Partial models of the Integrated Digital Business Model



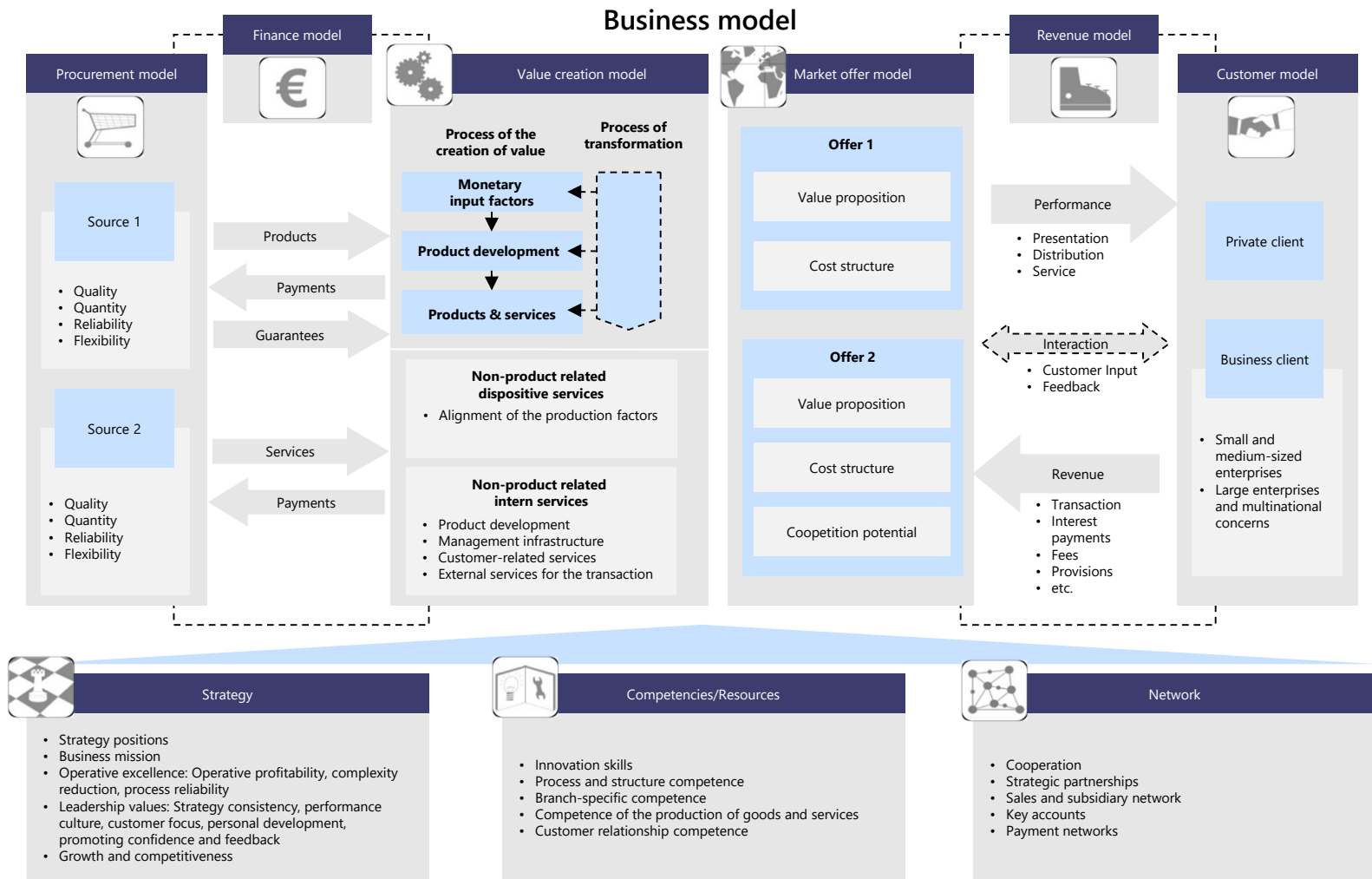
Source: Wirtz (2010, 2021b, 2024)

Fig. 13.5 Revenue scheme of digital business companies

	Direct Revenue Generation	Indirect Revenue Generation
Transaction-Based	<ul style="list-style-type: none">• Transaction revenues in the narrow sense• Connection fees• Usage fees	<ul style="list-style-type: none">• Commissions
Transaction-Independent	<ul style="list-style-type: none">• Setup fees• Basic fees	<ul style="list-style-type: none">• Ad sales• Big data / data mining revenues• Sponsorship

Source: Wirtz (2000, 2020b), Wirtz (2024)

Fig. 13.6 Interactions of the partial business models



Source: Wirtz (2010, 2011a, 2021b), Wirtz (2024)

Fig. 13.7 4C-Net Business Model

Content	Commerce
<ul style="list-style-type: none">• Compilation (packaging)• Presentation and• Provision of content on a domestic platform	<ul style="list-style-type: none">• Initiation and/or• Settlement of business transactions
Context	Connection
<ul style="list-style-type: none">• Classification and• Systematization of information available on the Internet	<ul style="list-style-type: none">• Creation of the possibility to exchange information in networks

Source: Wirtz (2000, 2021b), Wirtz (2024)

Fig. 13.8 The Content Business Model

- Compilation (packaging)
- Depiction and provision of content on a domestic platform

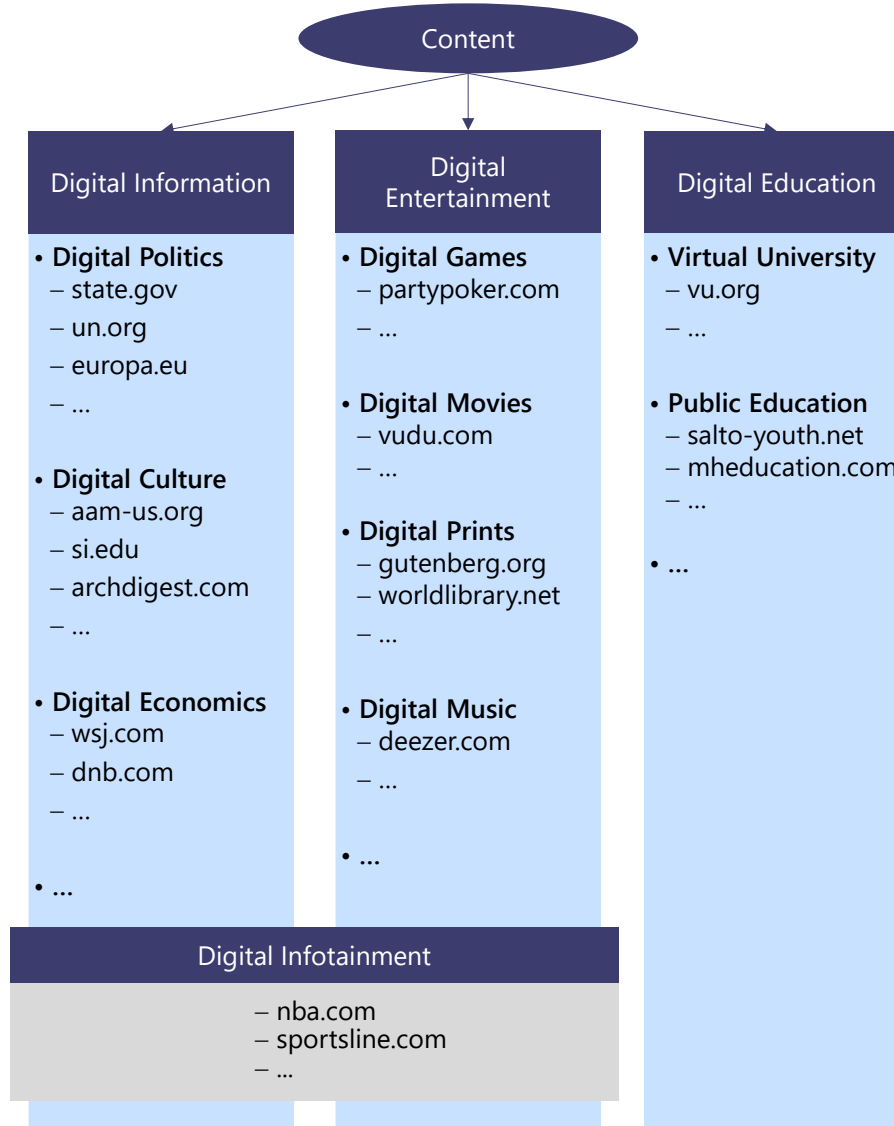
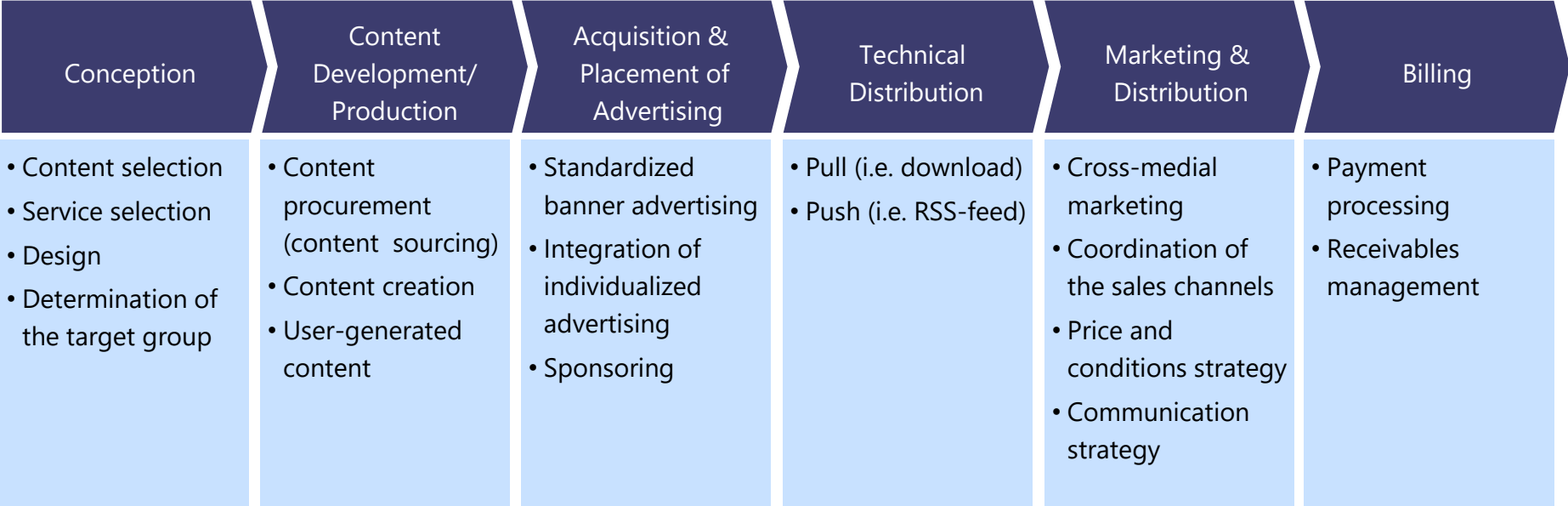
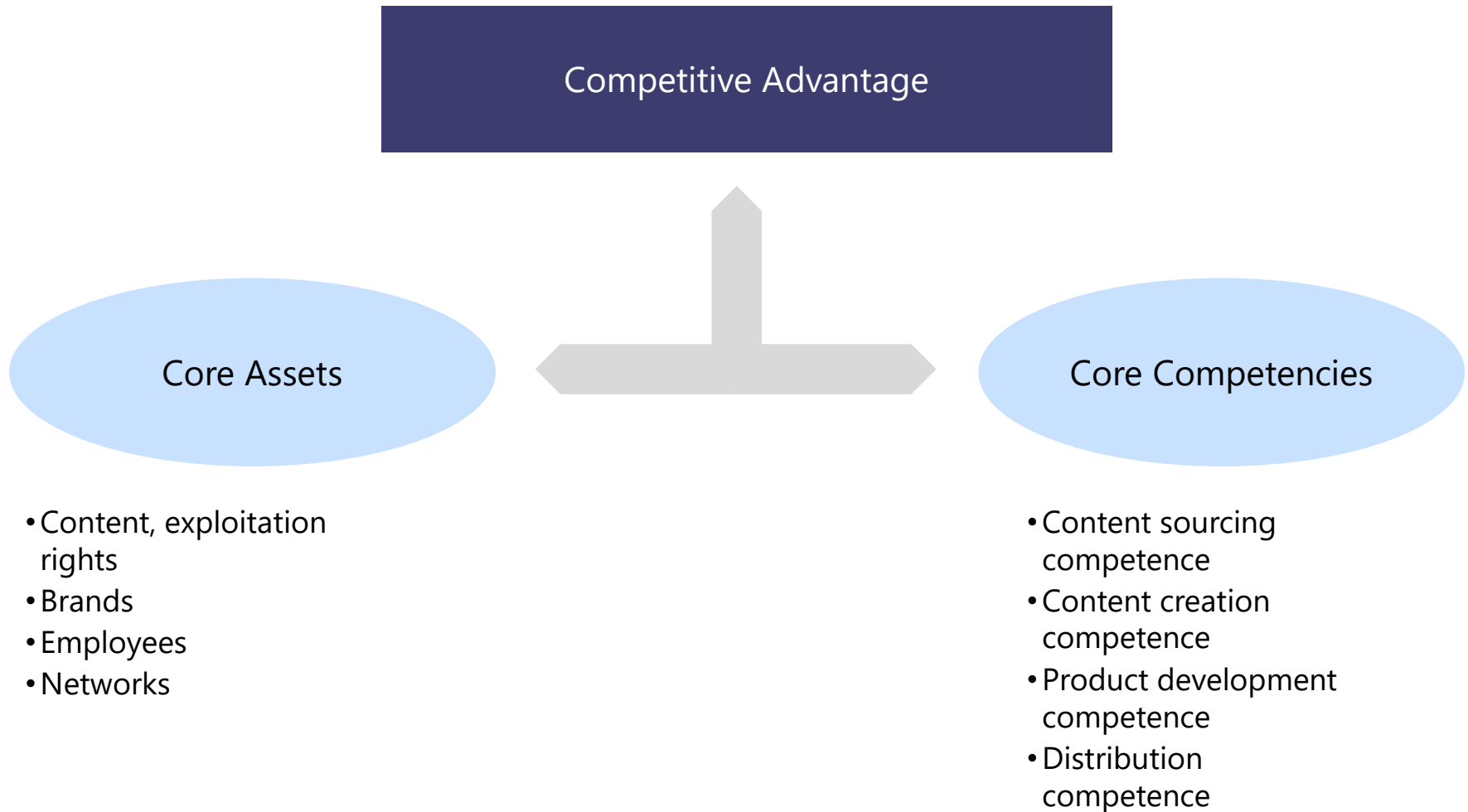


Fig. 13.9 Aggregated value chain of the Content Business Model



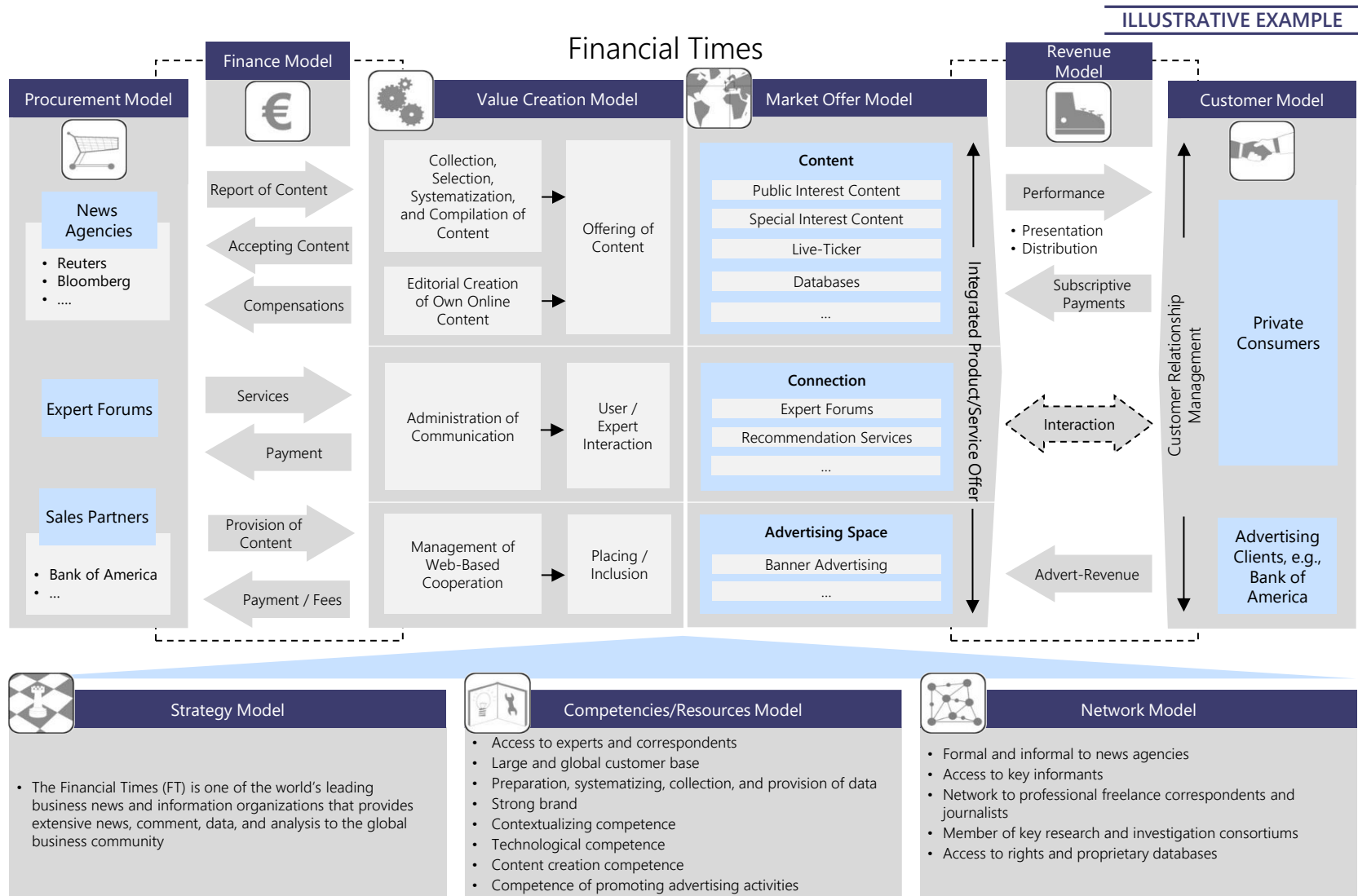
Source: Wirtz (2010, 2021b), Wirtz (2024)

Fig. 13.10 Core assets and competencies of the Content Business Model



Source: Wirtz (2010, 2021b), Wirtz (2024)

Fig. 13.11 The business model of the Financial Times



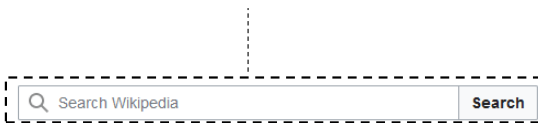
Source: Wirtz (2000, 2013a, 2021b), Wirtz (2024) and own analysis and estimations

Fig. 13.12 Homepage Wikipedia

Main Menu



Search Function



Log-In Area



Possibility to View Source Code and Article History



Discussion Platform



Language Selection

Various Tools: PDF Creation, etc.

- Contents [hide]
- (Top)
- > History
- > Openness
- > Policies and laws
- > Governance
- > Community
- > Language editions
- > Reception
- > Operation
- > Access to content
- > Cultural influence
- Related projects
- See also
- Notes
- References
- > Further reading
- External links

Article Content Overview

From Wikipedia, the free encyclopedia

This article is about the online encyclopedia. For Wikipedia's home page, see Main Page. For the primary English-language Wikipedia, see English Wikipedia. For other uses, see Wikipedia (disambiguation).

Wikipedia^[note 3] is an [online encyclopedia](#) written and maintained by a community of volunteers, known as [Wikipedians](#), through [open collaboration](#) and using a [wiki](#)-based editing system called [MediaWiki](#). Wikipedia is the largest and most-read [reference work](#) in history,^{[3][4]} and has consistently been one of the [10 most popular websites](#).^[5] Created by [Jimmy Wales](#) and [Larry Sanger](#) on January 15, 2001, it is hosted by the [Wikimedia Foundation](#), an [American non-profit organization](#).

Initially available only in [English](#), versions in other languages were quickly developed. Wikipedia's combined editions comprise more than 61 million articles, attracting around 2 billion unique device visits per month and more than 15 million edits per month (about 5.7 edits per second on average) as of January 2023.^{[6][7]}

Wikipedia has been praised for its enablement of the [democratization of knowledge](#), extent of coverage, unique structure, culture, and reduced degree of commercial bias. It has been criticized for exhibiting [systemic bias](#), particularly [gender bias](#) against women and [ideological bias](#).^{[8][9]} While the [reliability](#) of Wikipedia was frequently criticized in the 2000s, it has improved over time, receiving greater praise in the late 2010s and early 2020s,^{[3][8][10][note 4]} having become an important [fact-checking site](#).^{[11][12]} It has been [censored](#) by world governments, ranging from specific pages to the entire site.^{[13][14]} Articles on [breaking news](#) are often accessed as a source of frequently updated information about those events.^{[15][16]}

History

Main article: History of Wikipedia

Nupedia

Main article: Nupedia

Various collaborative online encyclopedias were attempted before the start of Wikipedia, but with limited success.^[17] Wikipedia began as a complementary project for [Nupedia](#), a free online English-language encyclopedia project whose articles were written by experts and reviewed under a formal process.^[18] It was founded on March 9, 2000, under the ownership of [Bomis](#), a [web portal](#) company. Its main figures were Bomis CEO [Jimmy Wales](#) and [Larry Sanger](#), editor-in-chief for Nupedia and later Wikipedia.^{[1][19]} Nupedia was initially licensed under its own [Nupedia Open Content License](#), but before Wikipedia was founded, Nupedia switched to the [GNU Free Documentation License](#) at the urging of [Richard Stallman](#).^[20] Wales is

Wikipedia



WIKIPEDIA
The Free Encyclopedia

The logo of Wikipedia, a globe featuring glyphs from various writing systems

Screenshot [show]

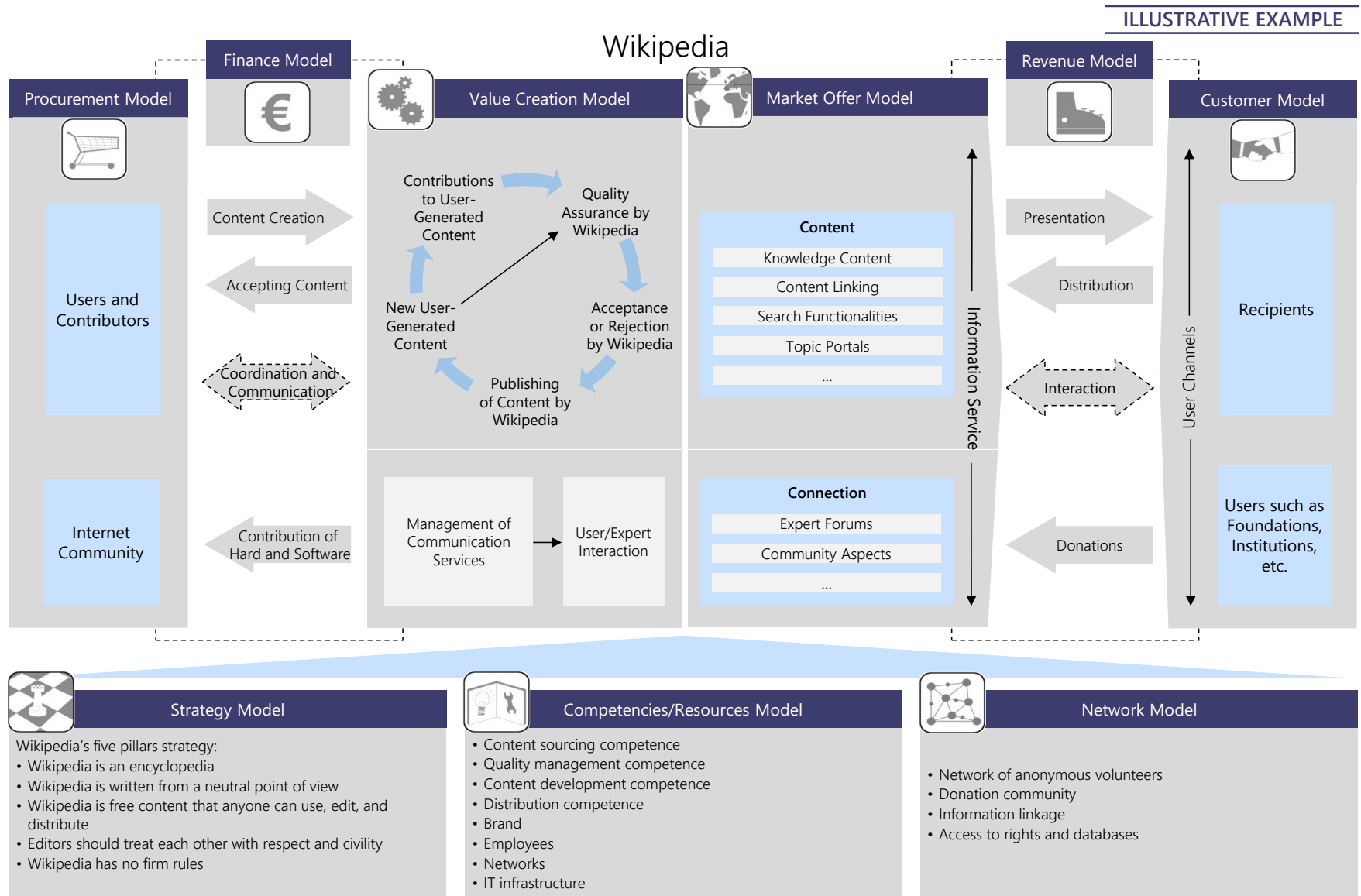
Type of site	Online encyclopedia
Available in	334 languages
Country of origin	United States
Owner	Wikimedia Foundation
Created by	Jimmy Wales Larry Sanger ^[1]
URL	wikipedia.org [ⓘ]
Commercial	No
Registration	Optional ^[note 1]
Users	>288,838 active editors ^[note 2] >108,630,910 registered users
Launched	January 15, 2001 (22 years ago)
Current status	Active

Summary

Source: Wikipedia (2023a), Wirtz (2024)

Main Article

Fig. 13.13 Business model of Wikipedia



Source: Wikipedia (2023a), Wirtz (2024)

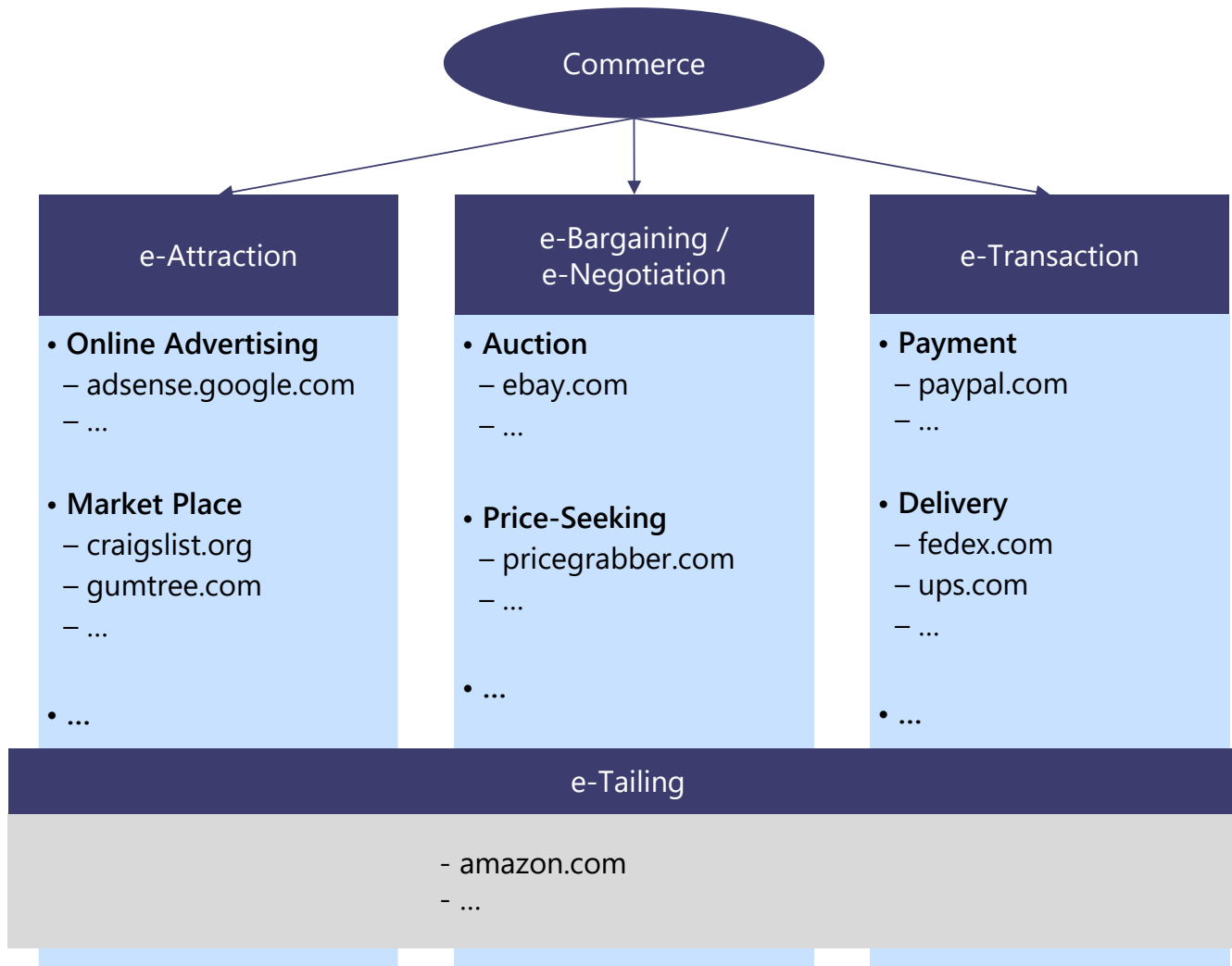
Fig. 13.14 Strategic orientation of Wikipedia

	Aspects
Strategy	<ul style="list-style-type: none"> • Provision of free online content in the area of online encyclopedias • Information leadership in the knowledge sector
Business Model	<ul style="list-style-type: none"> • Content aspect: collection, selection, systematization, compilation, and provision of knowledge in form of a freely accessible and advertisement-free information portal • Business model type: digital information without focus on one specific area of information (focus lies on the informative, problem-solving content)
Service Offer	<ul style="list-style-type: none"> • Extensive pool of knowledge • Extended content through other Wiki-tools • Numerous further projects: Wiktionary, Wikibooks, Wikivoyage, Wikiquote, Wikisource, Wikidata, Wikimdia Commons, Wikinews, Wikiversity, Wikispecies, Meta-Wiki, MediaWiki, etc. • Community Features
Success Factors	<ul style="list-style-type: none"> • Non-profit, free-of-ads and free-of-charge encyclopedia • Activity of intrinsically motivated authors • Well-known brand • Large customer base, high number of users (most used online reference) • Community aspect • Collected knowledge of a worldwide collective authorship

Source: Wirtz (2010, 2021b), Wirtz (2024)

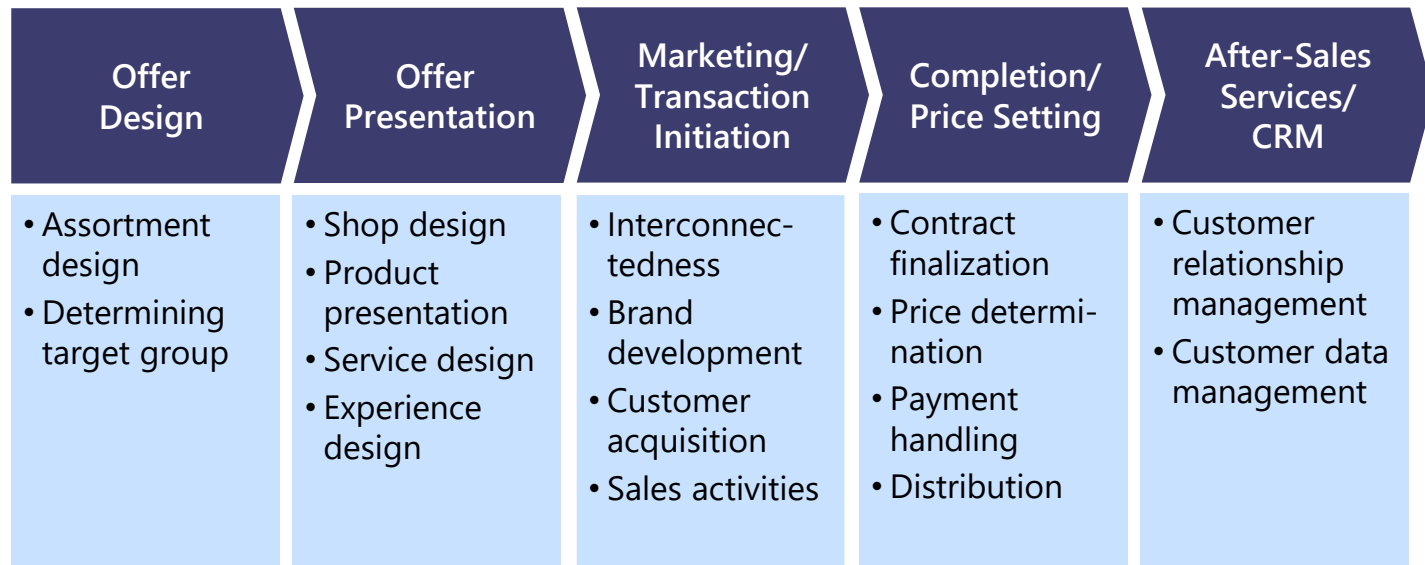
Fig. 13.15 The Commerce Business Model

- Initiation,
- Negotiation and/or
- Settlement of business transactions



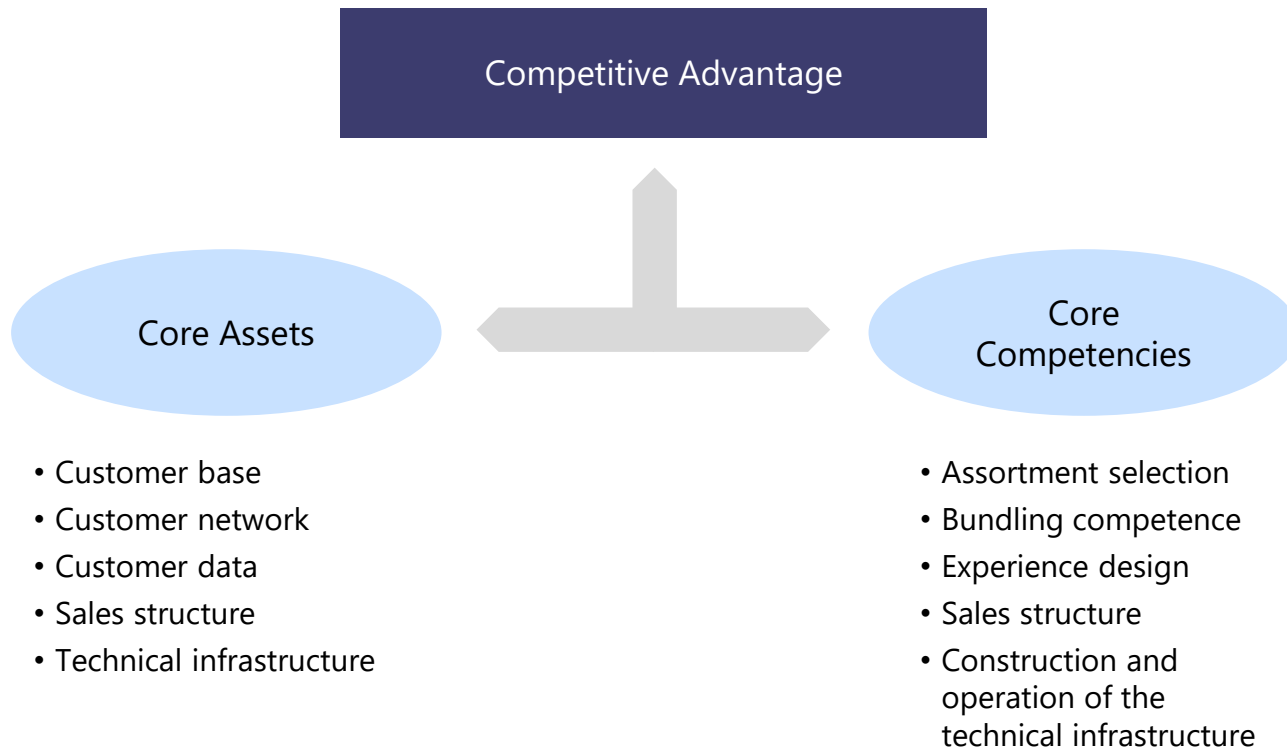
Source: Wirtz (2010, 2021b), Wirtz (2024)

Fig. 13.16 Aggregated value chain of the Commerce Business Model



Source: Wirtz (2010, 2021b), Wirtz (2024)

Fig. 13.17 Core assets and competencies of the Commerce Business Model



Source: Wirtz (2010, 2021b), Wirtz (2024)

Fig. 13.18 Example of context-specific advertising of Google



smartphone



Images

News

Shopping

Videos

Brands

Types

Accessories

Best-selling

Samsung

All filters

Tools

About 7,420,000,000 results (0.69 seconds)

Sponsored

Apple iPhone 14 Pro Max - ...	Apple iPhone 14 Pro Max...	Samsung Galaxy S23...	Simple Mobile - Nokia C100...	Samsung Galaxy S23...	Jitterbug Smart3 Easy-...	iPhone 14 Pro 256GB Deep...	Simple Mobile LG Solo LTE...
\$145.82 now \$43.92/mo x ... T-Mobile	\$0.00 now \$33.33/mo x ... Verizon	\$0.00 now \$33.33/mo x ... Verizon	\$39.99 With service Simple Mobile	\$50.00 now \$47.92/mo x ... T-Mobile	\$149.99 Lively Free shipping Single SIM	\$1,099.00 Apple Free shipping	\$69.99 With service Simple Mobile
48 MP rear camera · 256 GB...	48 MP rear camera · 256 GB...	200 MP rear camera · 256 GB...	8 MP rear camera · 64 GB storage ...	200 MP rear camera · 256 GB...		48 MP rear camera · 256 GB...	8 MP rear camera · 16 GB storage ...

Context-Specific Advertisements

Dictionary

Definitions from [Oxford Languages](#) · [Learn more](#)



smart:phone

noun

a mobile phone that performs many of the functions of a computer, typically having a [touchscreen](#) interface, internet access, and an operating system capable of running downloaded applications. "there are plans in place to accommodate those who do not have a smartphone and cannot use the app"

See results about



Smartphone
Computing platform



Mobile phone
A mobile phone is a portable telephone that can make and ...

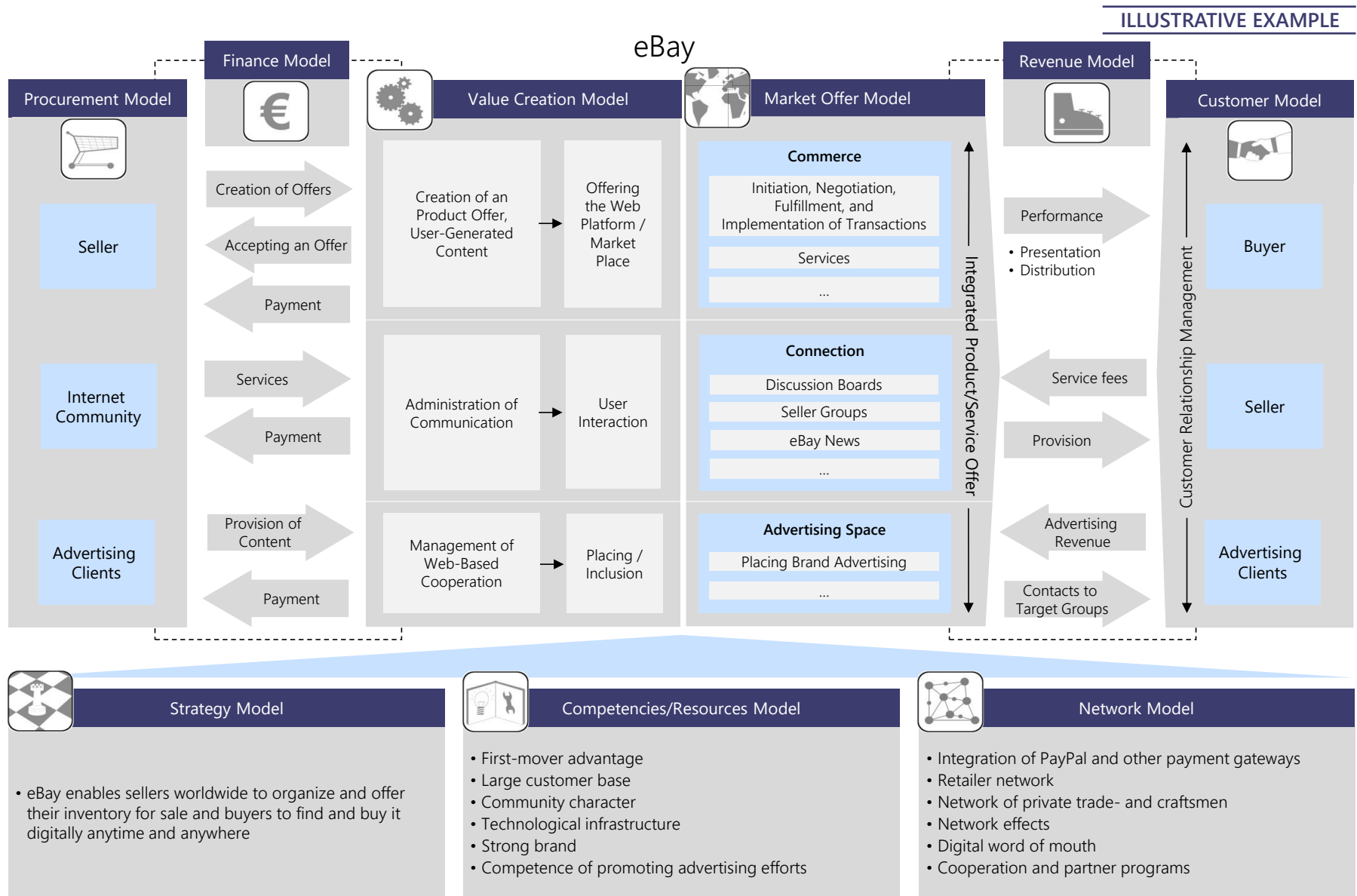
Source: Google (2023), Wirtz (2024)

Fig. 13.19 Types of auctions

		Seller	
		One	Multiple
Buyer	One	Not Applicable	Reverse Auction
	Multiple	Forward Auction (English or Dutch Auction)	Double Auction

Source: Wirtz (2010, 2021b, 2024)

Fig. 13.20 Business model of eBay



Source: Wirtz (2010, 2021b, 2024) and own analysis and estimations

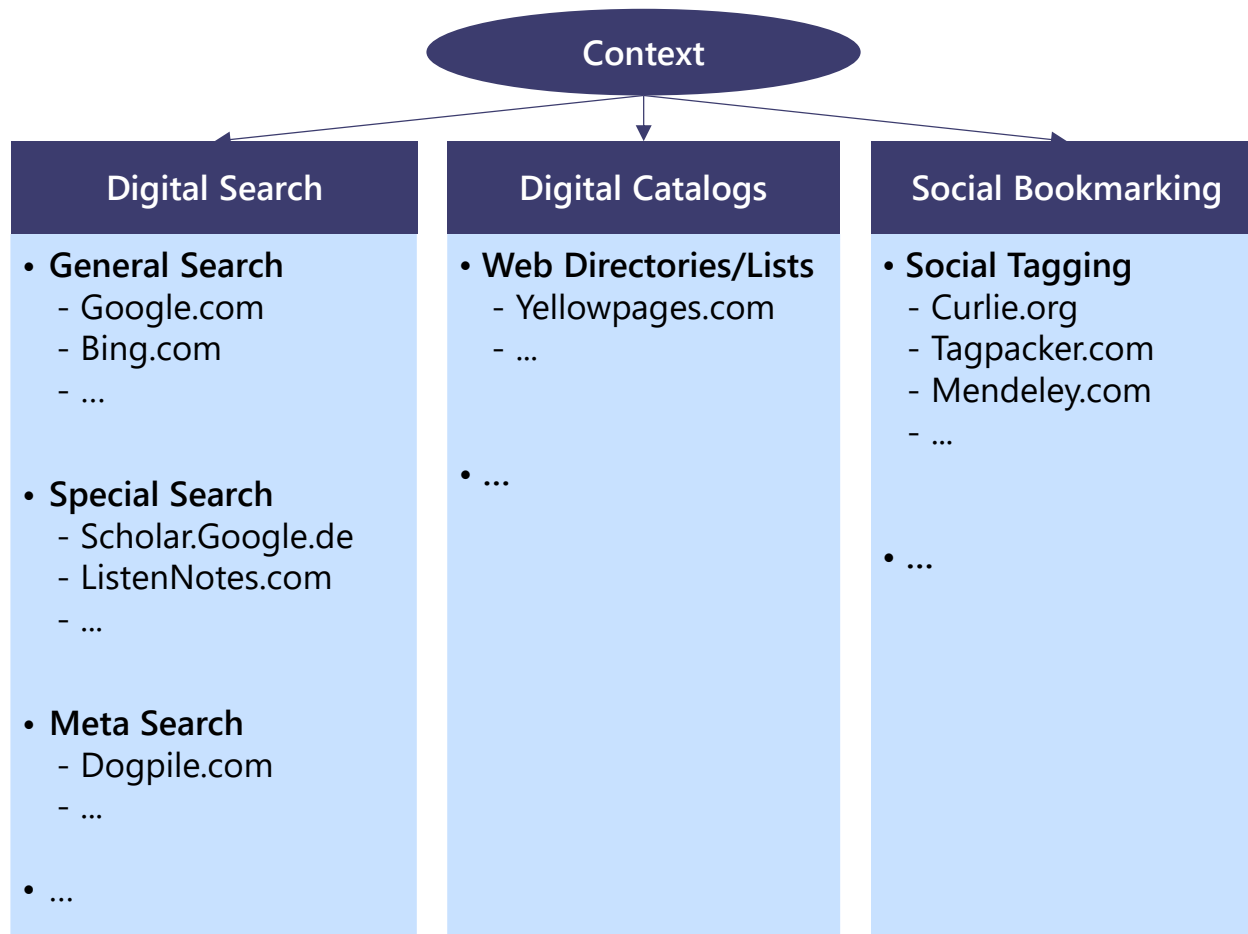
Fig. 13.21 Strategic orientation of eBay

	Aspects
Strategy	<ul style="list-style-type: none">• Provision of online auction platform and market place• Further services related to the negotiation/bargaining as well as the processing of transactions through the Internet• Market leader of online auctioning
Business Model	<ul style="list-style-type: none">• Commerce aspect: initiation, negotiation, and processing of business transactions• Business model types: digital bargaining/digital negotiation
Service Offer	<ul style="list-style-type: none">• Provision of an online platform to present and offer products, as well as an optional auction-based pricing tool• Extended services to increase visibility, market products, as well as the integration of different payment options• Community features
Success Factors	<ul style="list-style-type: none">• First-mover advantage, well-known brand• Large customer base, high number of users• Community aspect• Global presence and economies of scale

Source: Wirtz (2010, 2021b, 2024)

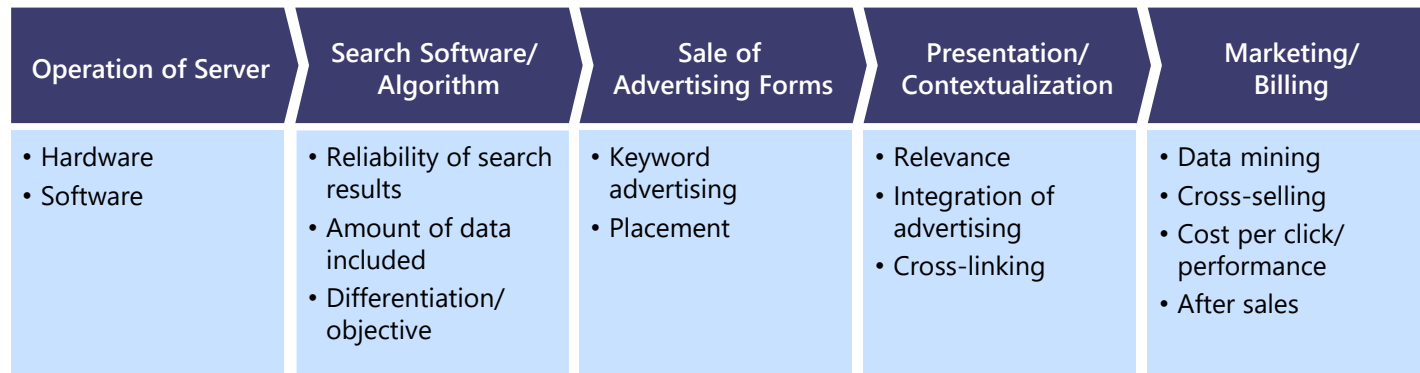
Fig. 13.22 The Context Business Model

- Classification and
- Systematization of information available on the Internet



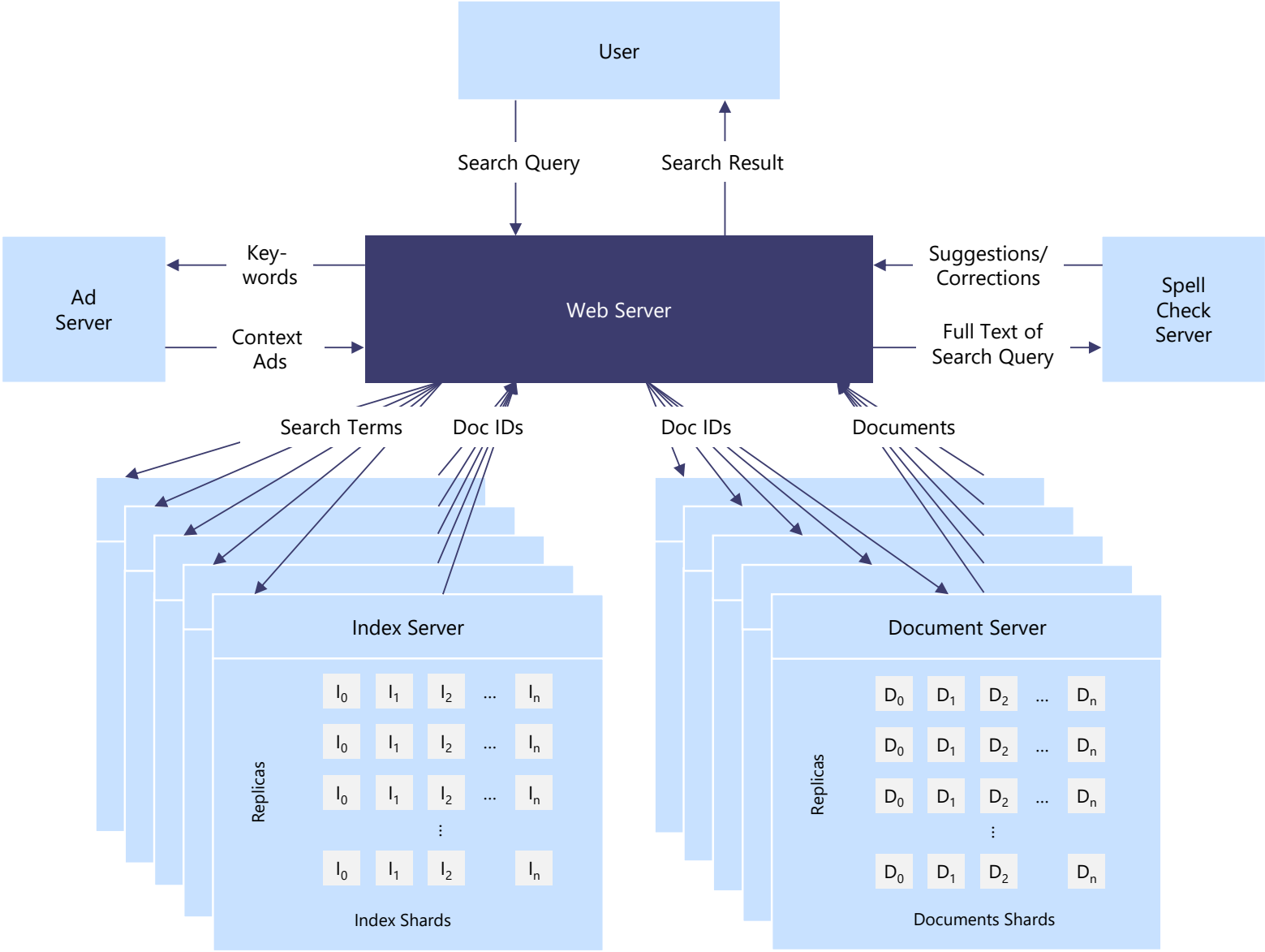
Source: Wirtz (2001a, 2021b, 2024)

Fig. 13.23 Aggregated value chain of the Context Business Model



Source: Wirtz (2010, 2021b, 2024)

Fig. 13.24 Server structure and interaction for the search query



Source: Wirtz (2010, 2021b, 2024)

Fig. 13.25 Integrated search results of the search engine

Change Settings, Filters, and Tools

Reverse Image Search Search Type Selection

Google mini cooper

Images For sale Reviews Specs Price Lifespan Shopping News Photo

About 433,000,000 results (0.44 seconds)

Results for **United States** · Choose area

Sponsored

MINI USA
<https://www.miniusa.com>

MINI Cooper® Official Site - Trust Your Inner MINI-Logue
 Find Your Perfect Electric **MINI** And Learn What The #1 Ownership Experience Feels Like. Trust Your Inner **MINI**-Logue And Schedule A Test Drive With **MINI** Electric Today. Unrivaled Customization. World Famous Handling. Superior Engineering. Over 60 Years of Motoring.

Build Your Own MINI
 Create & Price Your MINI Online. Find the Right MINI for You.

Locate a MINI Dealer
 Visit Your Local MINI Dealer to Find & Test Drive the MINI for You.

MINI Anywhere
 Purchase Your Dream MINI Completely Online. Find A Dealer Now.

MINI USA
<https://www.miniusa.com>

MINI USA: For The Drive | Small Cars, 2 Door and 4 Door
 Meet your MINI · **MINI Cooper SE** · Clubman · Convertible · Hardtop 4 Door · Hardtop 2 Door · Countryman ...

2024 MINI Models & Prices
 All MINI Models · Electric Hardtop · hardtop 2 door · hardtop 4 door ...

Build Your Own
 With over 10M combinations, design a MINI to match your ...

Current Inventory
 Ready to Hit The Road? Just Enter Your Zip Code and Browse the ...

2024 MINI Hardtop 2 Door
 JOHN COOPER WORKS. For adrenaline-fueled excursions ...
[More results from miniusa.com](#)

People also ask

- Is A Mini Cooper a reliable car?
- Is a Mini Cooper a high end car?
- Is the Mini Cooper car made by BMW?
- Which Mini is best to buy?

Feedback

Overview

MINI

Automotive marque

Mini is a British automotive marque founded in 1969, owned by German automotive company BMW since 2000, and used by them for a range of small cars assembled in the United Kingdom, Austria and the Netherlands. [Wikipedia](#)

Owner: BMW
Introduced: As a car model 1959; 64 years ago; As a standalone marque 1969; 54 years ago
Related brands: John Cooper Works
Parent company: Bayerische Motoren Werke AG

Latest models

2024 MINI Cooper	2024 MINI Cooper Clubman	2024 MINI SE Hardtop	2023 MINI SE Countryman...

People also search for View 2+ more

Jeep	Mercedes Benz	Mercedes...	BMW

Feedback

Fig. 13.26 Google Ads Information Website

The image shows a screenshot of the Google Ads Information Website with several annotations. At the top, a blue banner contains the text: "To help you get started with Google Ads, we'll give you \$500 in free ad credit when you spend \$500. [Learn more](#)". Below this is the Google Ads logo on the left and a navigation bar on the right containing a phone number "1-855-287-5177*", a "Sign in" button, and a "Start now" button. The main content area is divided into two sections. The first section, titled "Summary of Customer Goals", is enclosed in a dashed box and contains three columns. The first column is titled "DRIVE WEBSITE VISITS" and features an icon of a cursor clicking on a screen; the text below reads: "Grow online sales, bookings, or mailing list signups with online ads that direct people to your website." The second column is titled "GET MORE PHONE CALLS" and features a green phone icon; the text below reads: "Increase customer calls with ads that feature your phone number and a click-to-call button." The third column is titled "INCREASE STORE VISITS" and features a yellow building icon; the text below reads: "Get more customers in the door with business ads that help people find your company on the map." The second section, titled "Information on Budget Functions", is also enclosed in a dashed box and features the heading "Set a budget that works for your business". Below the heading is a slider control for the "Monthly budget cap" with the text "Adjust anytime". The slider has a blue knob and is flanked by "\$" and "\$\$\$" symbols. Below the slider, the text reads: "Google ads give you control over your advertising budget. Set a monthly budget cap, and never go over it. Plus, you can pause or adjust your spend anytime." On the right side of the page, there is a "Support via Phone or Expert Chat" section. It includes a dashed box around the phone number and "Sign in" button, and another dashed box around a chat bubble that says "Chat with a Google Ads Expert for a one-on-one consultation." and a chat icon in the bottom right corner.

To help you get started with Google Ads, we'll give you \$500 in free ad credit when you spend \$500. [Learn more](#)

Google Ads

1-855-287-5177* Sign in Start now

Summary of Customer Goals

DRIVE WEBSITE VISITS

Grow online sales, bookings, or mailing list signups with online ads that direct people to your website.

GET MORE PHONE CALLS

Increase customer calls with ads that feature your phone number and a click-to-call button.

INCREASE STORE VISITS

Get more customers in the door with business ads that help people find your company on the map.

Information on Budget Functions

Set a budget that works for your business

Monthly budget cap
Adjust anytime

\$ \$\$\$

Google ads give you control over your advertising budget. Set a monthly budget cap, and never go over it. Plus, you can pause or adjust your spend anytime.

Support via Phone or Expert Chat

Chat with a Google Ads Expert for a one-on-one consultation.

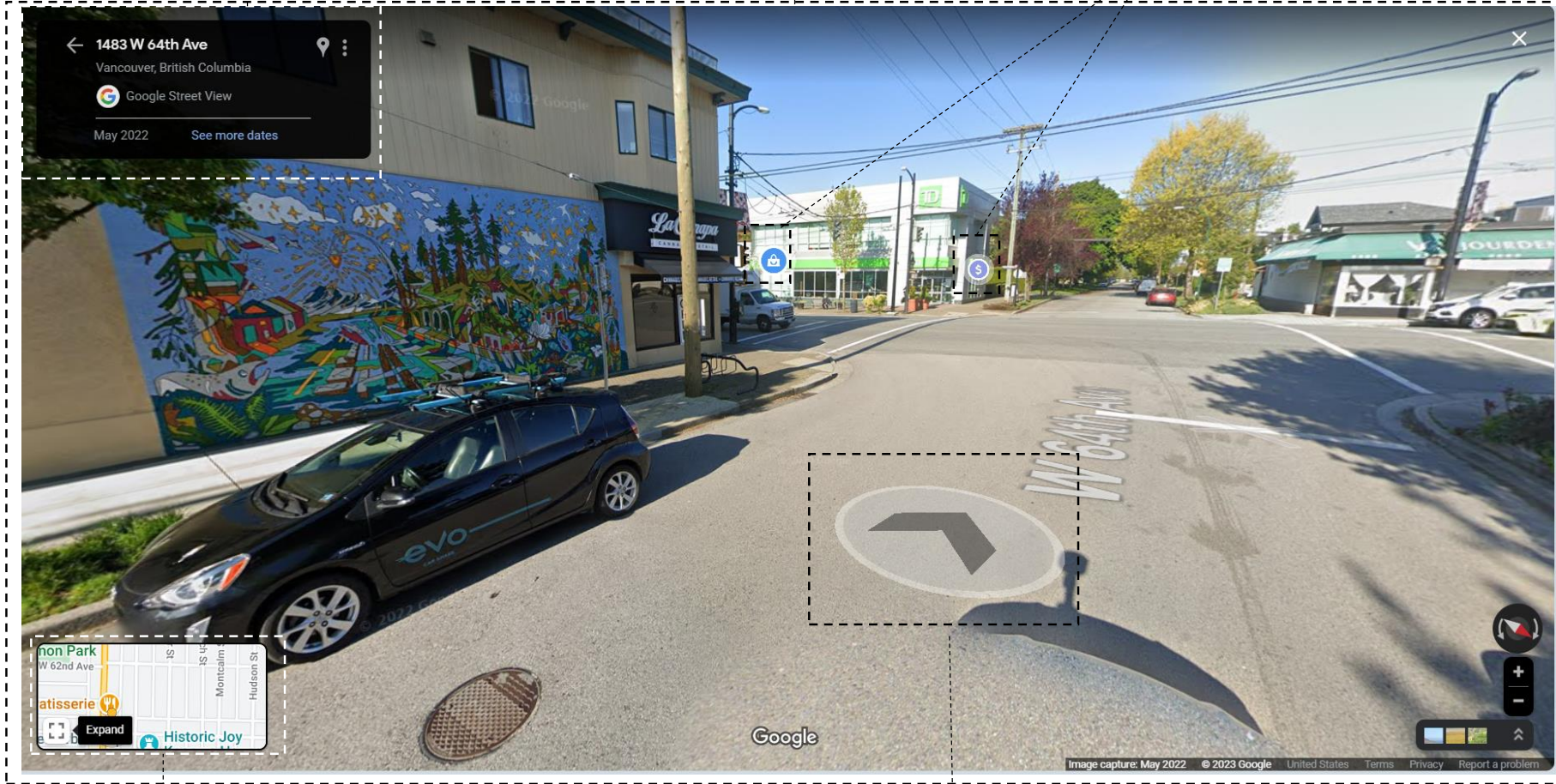
Source: Google (2023j), Wirtz (2023)

Fig. 13.27 Google Street View

Street View

Location Description

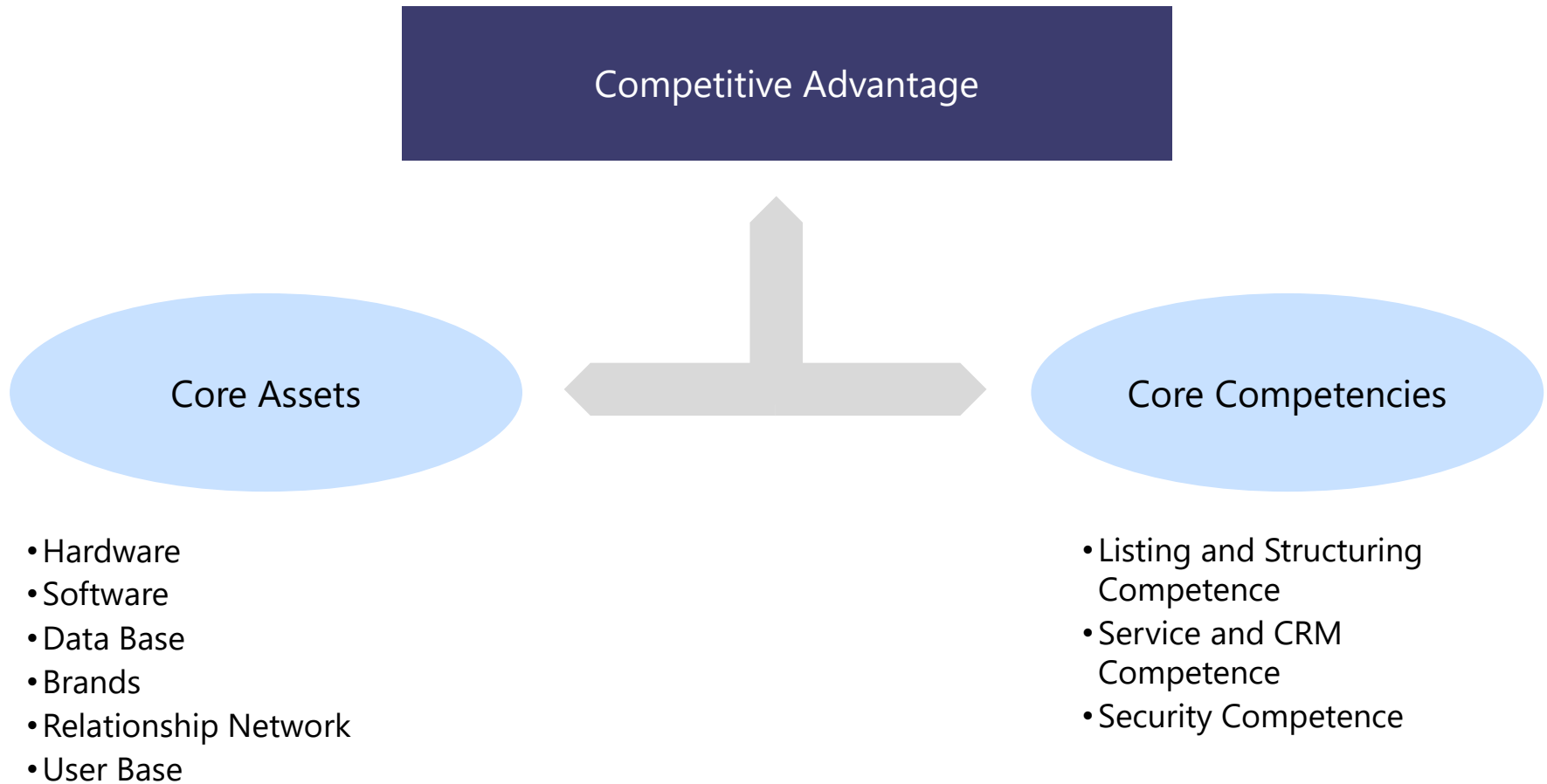
Google Places with Symbols



Google Maps Detail

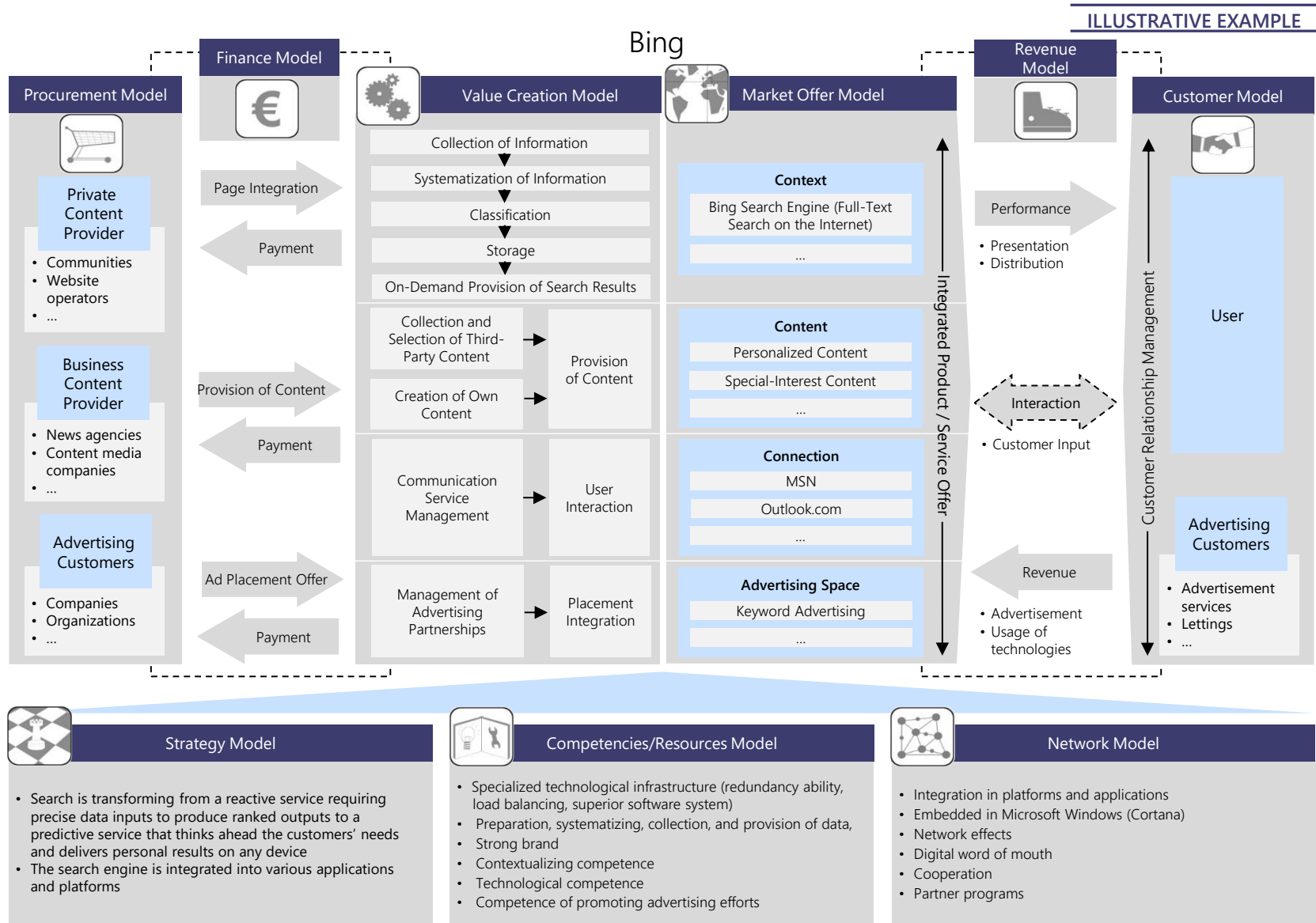
Navigation Function

Fig. 13.28 Core assets and competencies of the Context Business Model



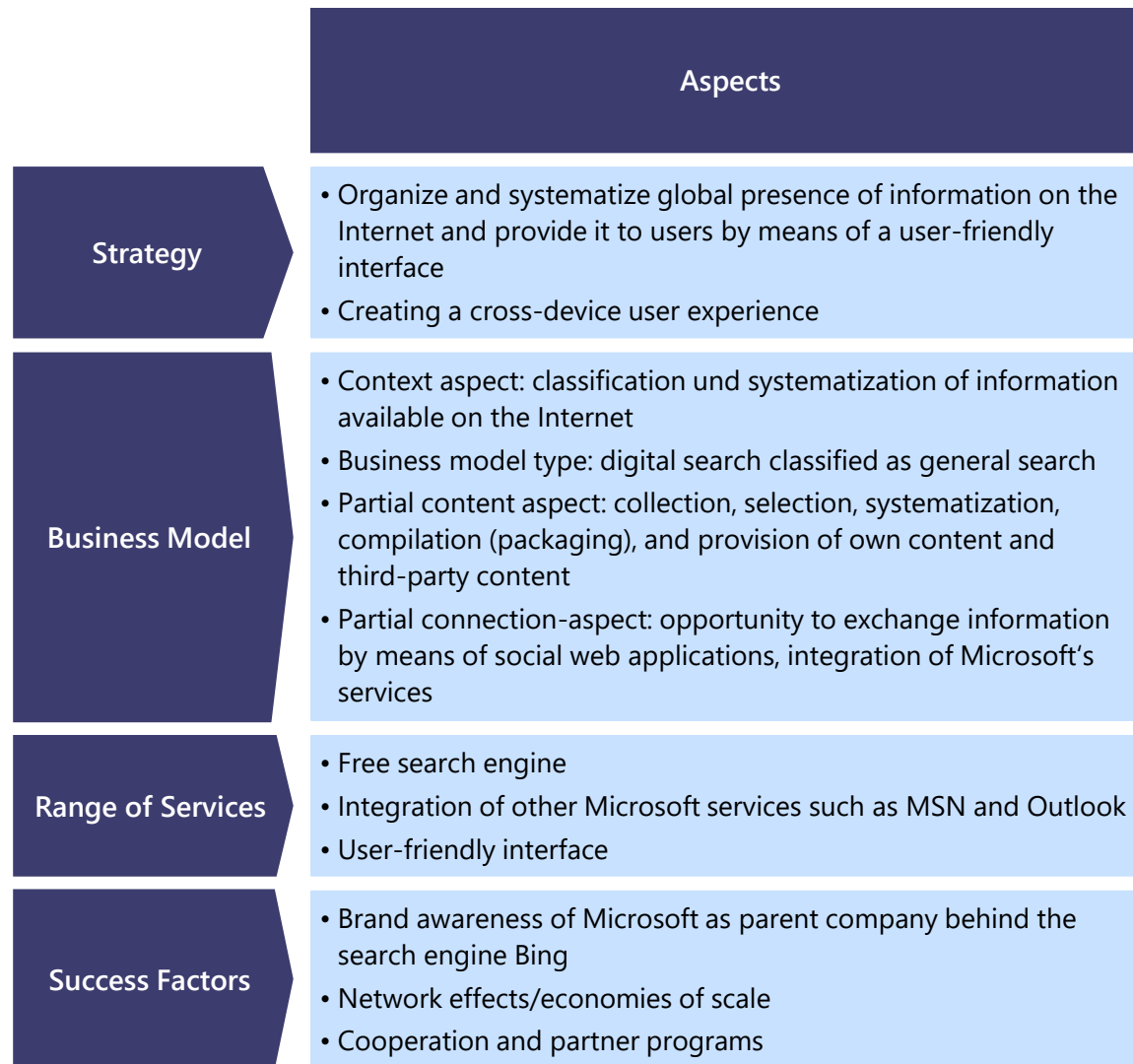
Source: Wirtz (2024)

Fig. 13.29 Business Model of Bing



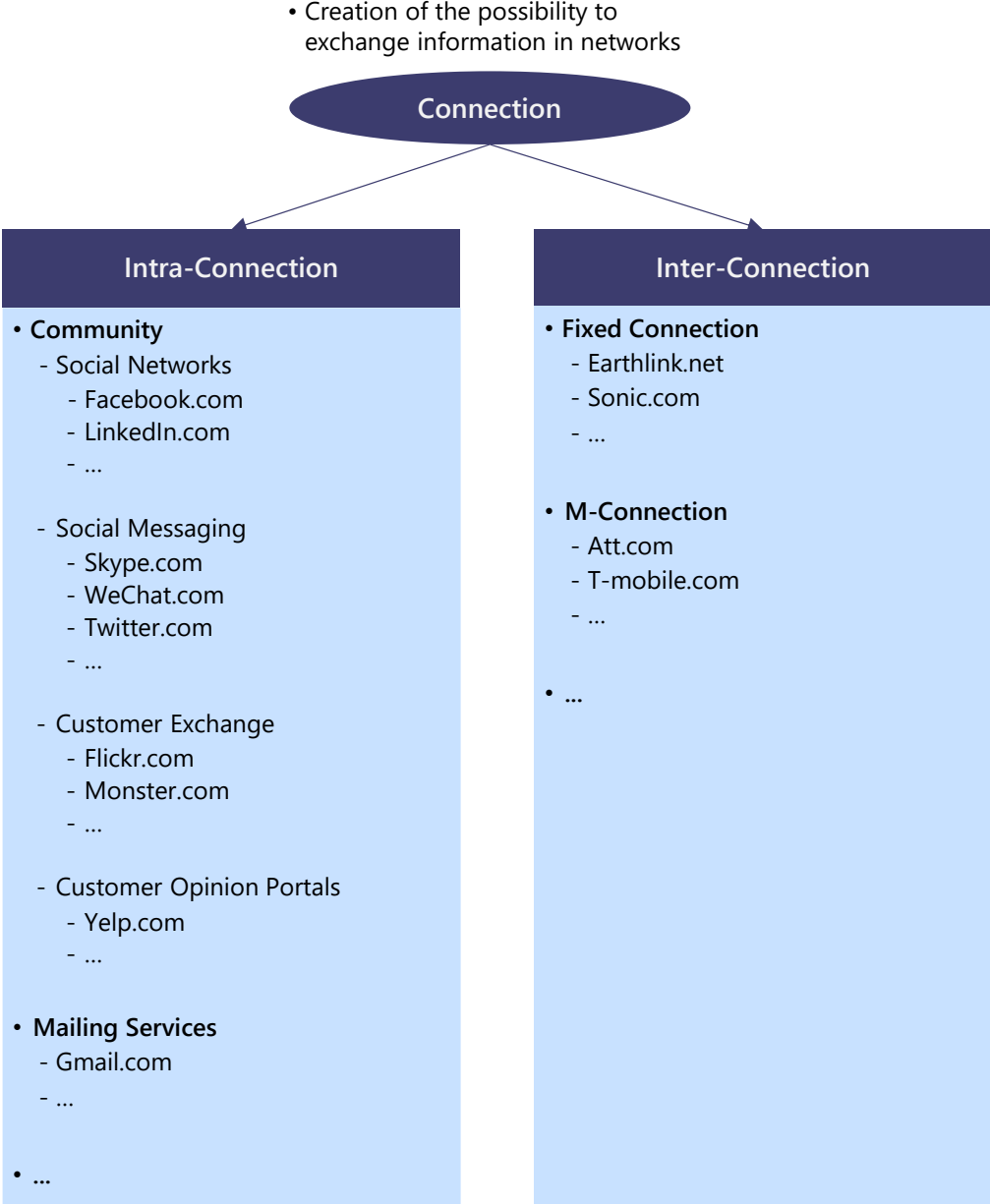
Source: based on Wirtz (2010, 2021b, 2024) and own analysis and estimations

Fig. 13.30 Strategic orientation of Bing



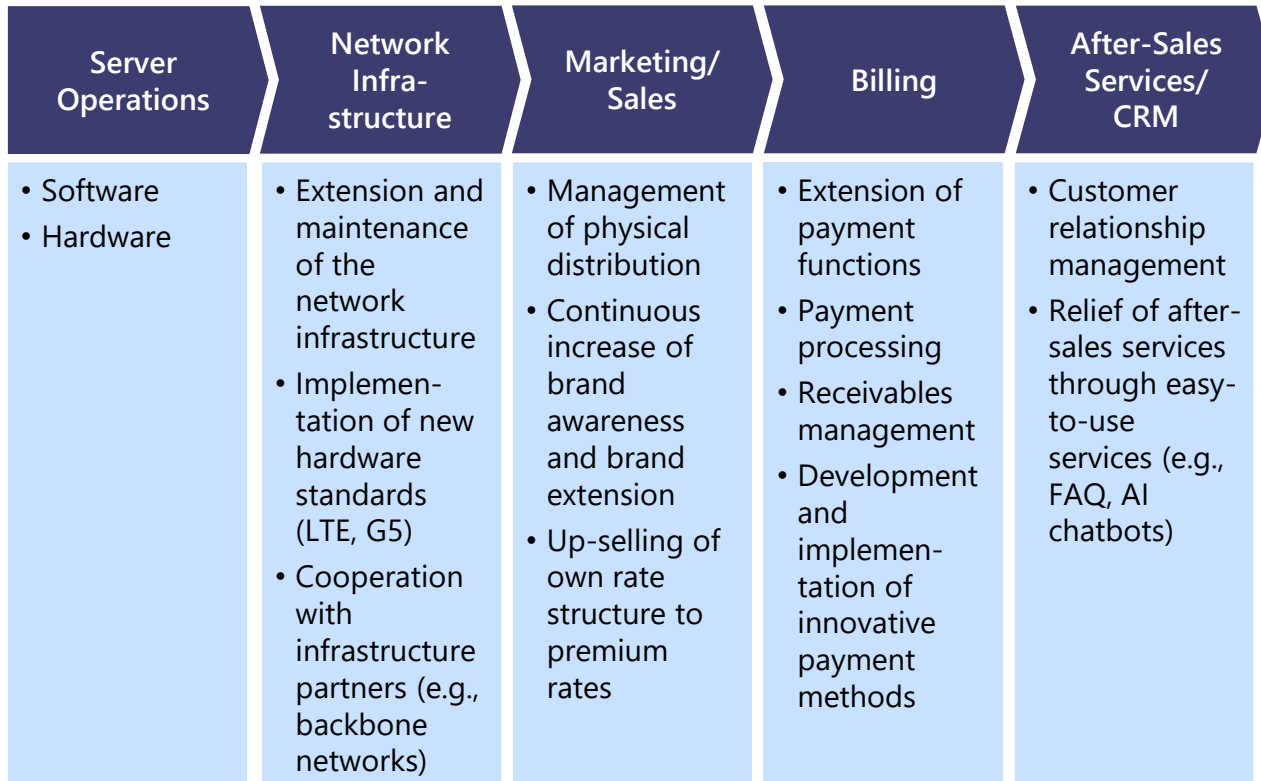
Source: Wirtz (2010, 2021b, 2024)

Fig. 13.31 The Connection Business Model



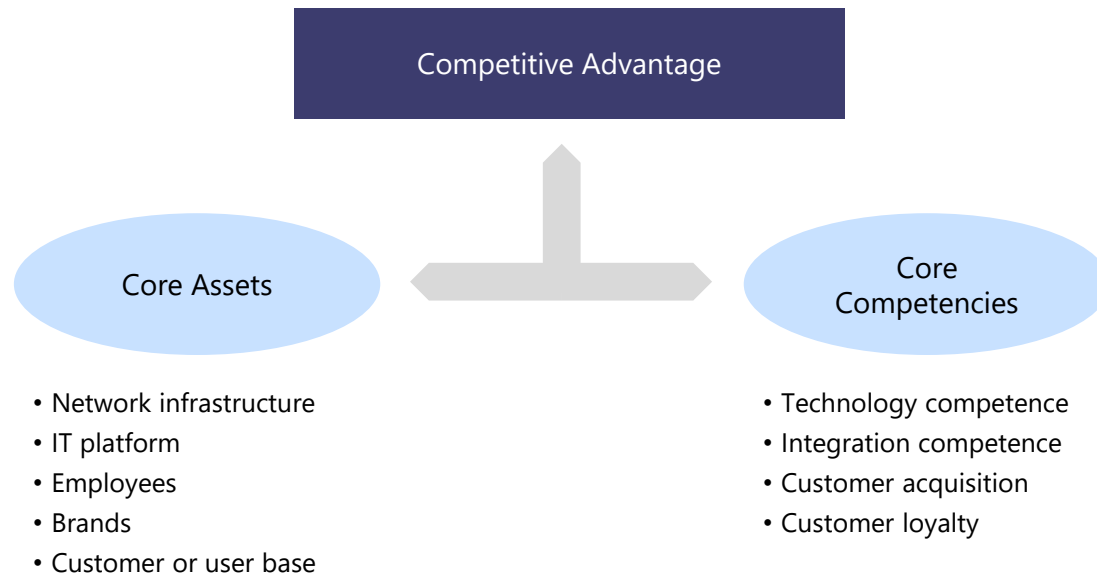
Source: Wirtz (2001a, 2021b, 2024)

Fig. 13.32 Aggregated value chain of the Connection Business Model



Source: Wirtz (2010, 2021b, 2024)

Fig. 13.33 Core assets and competencies of a connection provider



Source: Wirtz (2010, 2021b, 2024)

Fig. 13.34 Free vs. paid subscription packages

Choose a plan that works for you

Starting at 100 GB. All Google Accounts include 15 GB of storage.

By subscribing to a Google One plan, you agree to the [Google One Terms of Service](#). Note: The [Google Privacy Policy](#) describes how data is handled in this service.

Monthly Annual Save up to 16%

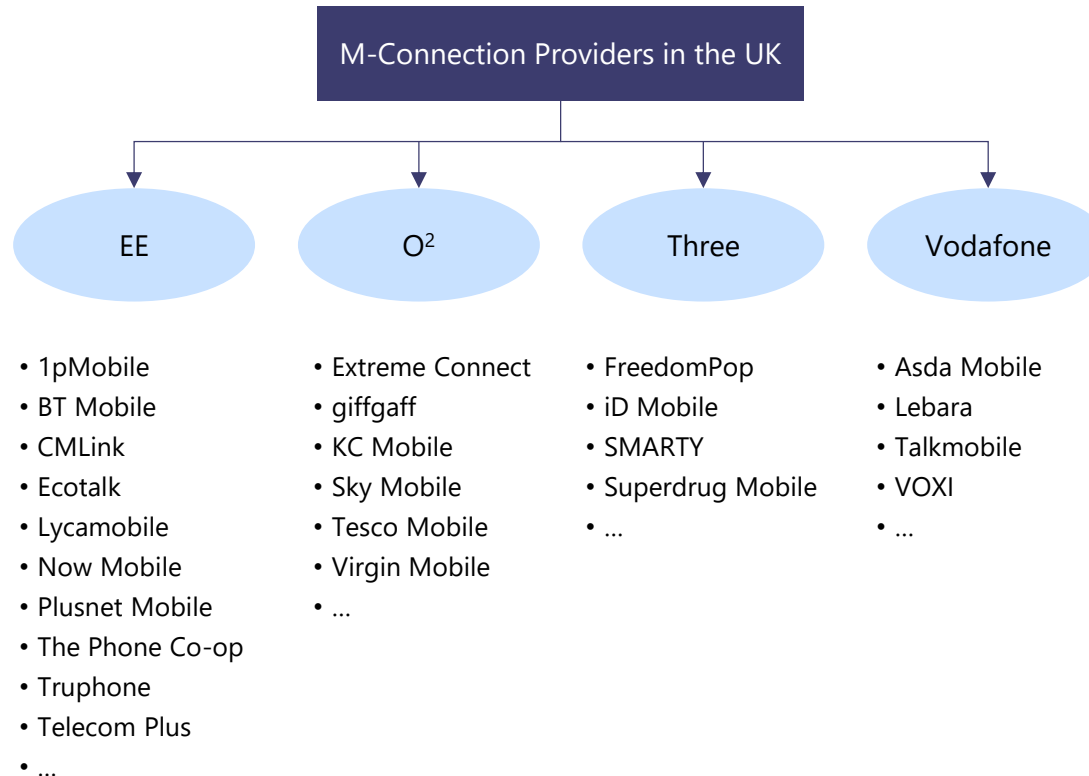
Plan	Storage	Price	Frequency	Get started
Basic	15 GB	Free	Up to 15 GB	Get started
Basic	100 GB	\$1.99 / month	Billed monthly	Get started
Standard	200 GB	\$2.99 / month	Billed monthly	Get started
Premium	2 TB	\$9.99 / month	Billed monthly	Get started

Free basic model up to 15 GB

Cost structure of the subscription packages

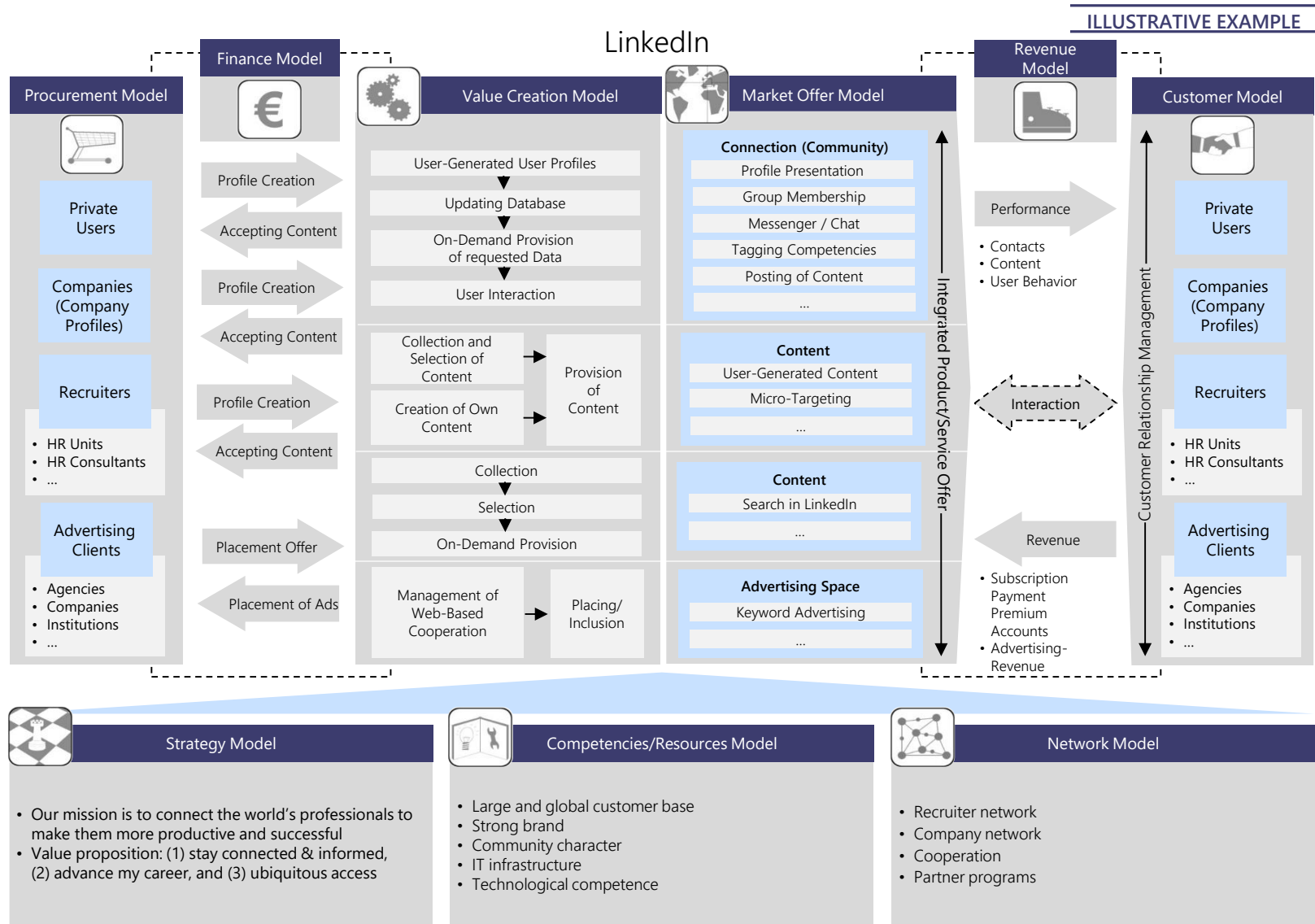
- 15 GB:** Includes 15 GB storage.
- Basic (100 GB):** Google One includes 100 GB of storage, Access to Google experts, Share with up to 5 others, More Google Photos, Extra member benefits, VPN for multiple devices, Monitor the dark web.
- Standard (200 GB):** Google One includes 200 GB of storage, Access to Google experts, Share with up to 5 others, More Google Photos editing, Extra member benefits, 3% back in the Google Store, VPN for multiple devices, Monitor the dark web.
- Premium (2 TB):** Google One includes 2 TB of storage, Access to Google experts, Share with up to 5 others, More Google Photos editing, Extra member benefits, 10% back in the Google Store, Google Workspace premium features, VPN for multiple devices, Monitor the dark web.

Fig. 13.35 M-connection providers in the UK



Source: Wirtz (2019, 2021b, 2024) and own research and estimations

Fig. 13.36 Business model of LinkedIn



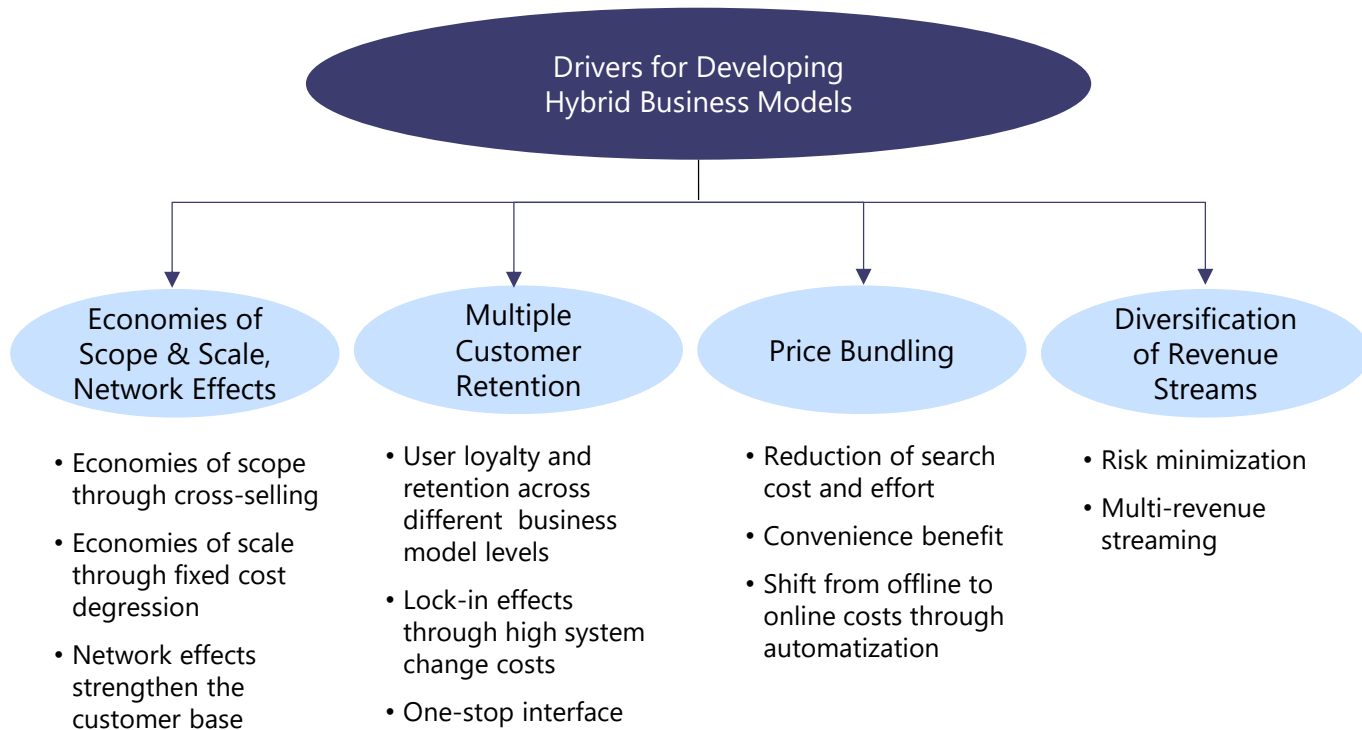
Source: Wirtz (2010, 2021b, 2024) and own research and estimations

Fig. 13.37 Strategic orientation of LinkedIn

	Aspects
Strategy	<ul style="list-style-type: none">• LinkedIn's mission is to connect the world's professionals to make them more productive and successful
Business Model	<ul style="list-style-type: none">• Focus on intra-connection, offering online commercial, and communicative services. LinkedIn is a community-platform and can be assigned to social networks within this context• Partly a content-approach by providing user-generated content in customer and company profiles. Here, the collection and selection of content is particularly relevant• Partly a commerce approach through the sale of services to business customers and the provision of initiation / negotiation functions
Service Offer	<ul style="list-style-type: none">• Provision of professional and company profiles and placement of contacts• Provision of personalized advertising• Provision of analysis services
Success Factors	<ul style="list-style-type: none">• Brand awareness of the company and high number of users• Global presence and pronounced scale and network effects• Comprehensive and differentiated recruiting services

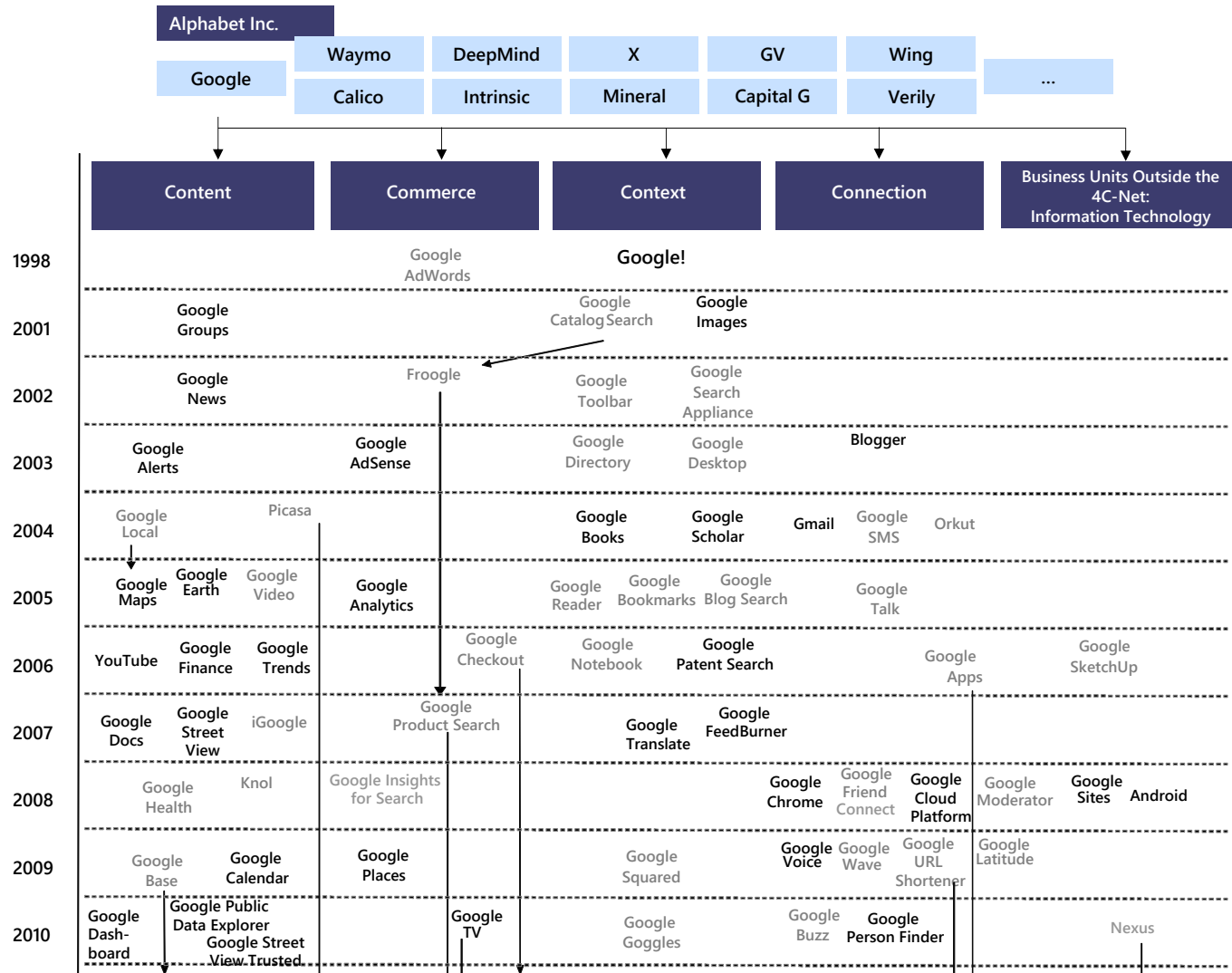
Source: Wirtz (2010, 2021b, 2024)

Fig. 13.38 Reasons of the development of hybrid business models



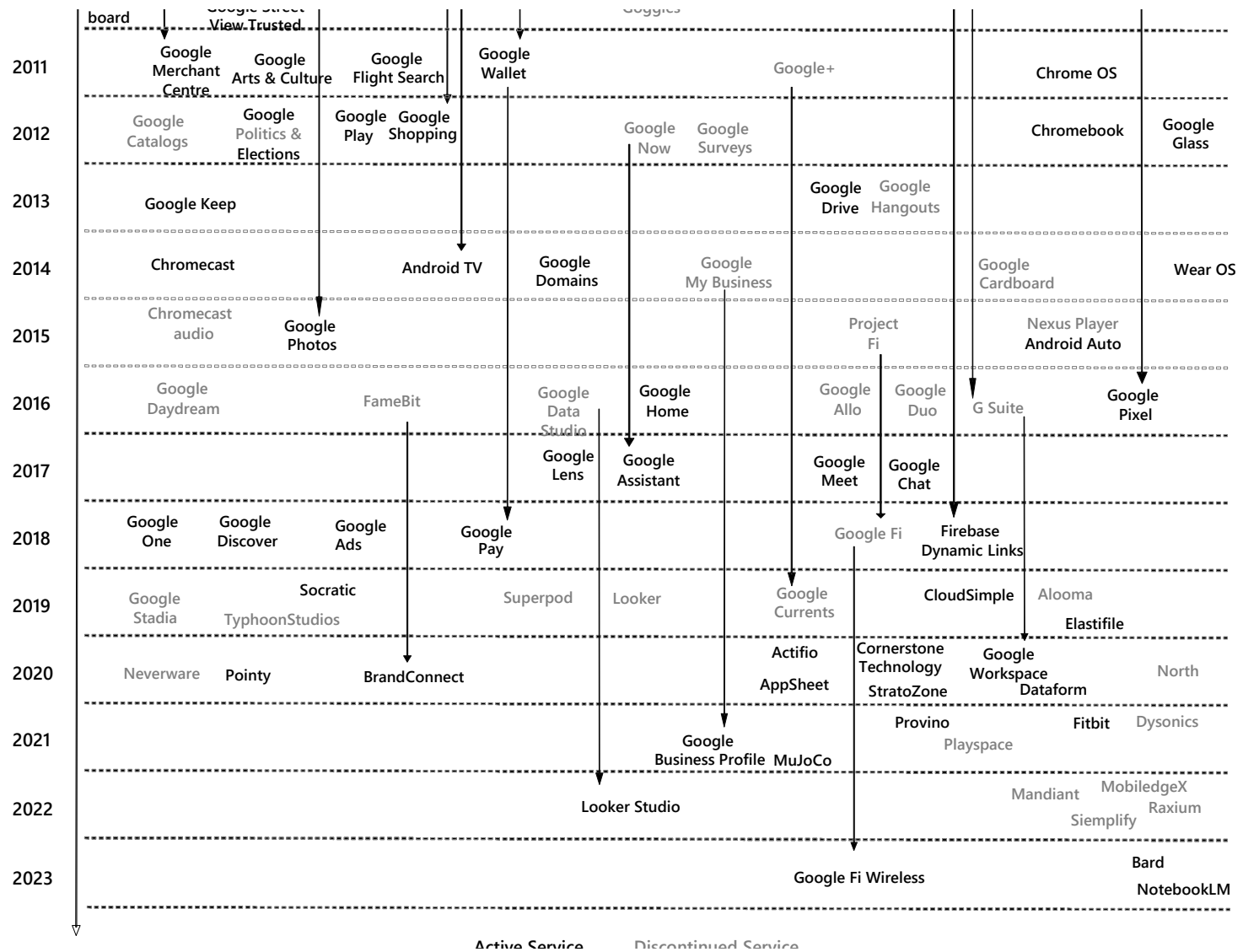
Source: Wirtz (2001a, 2021b, 2024)

Fig. 13.39 Development of Google's hybrid business model (1)



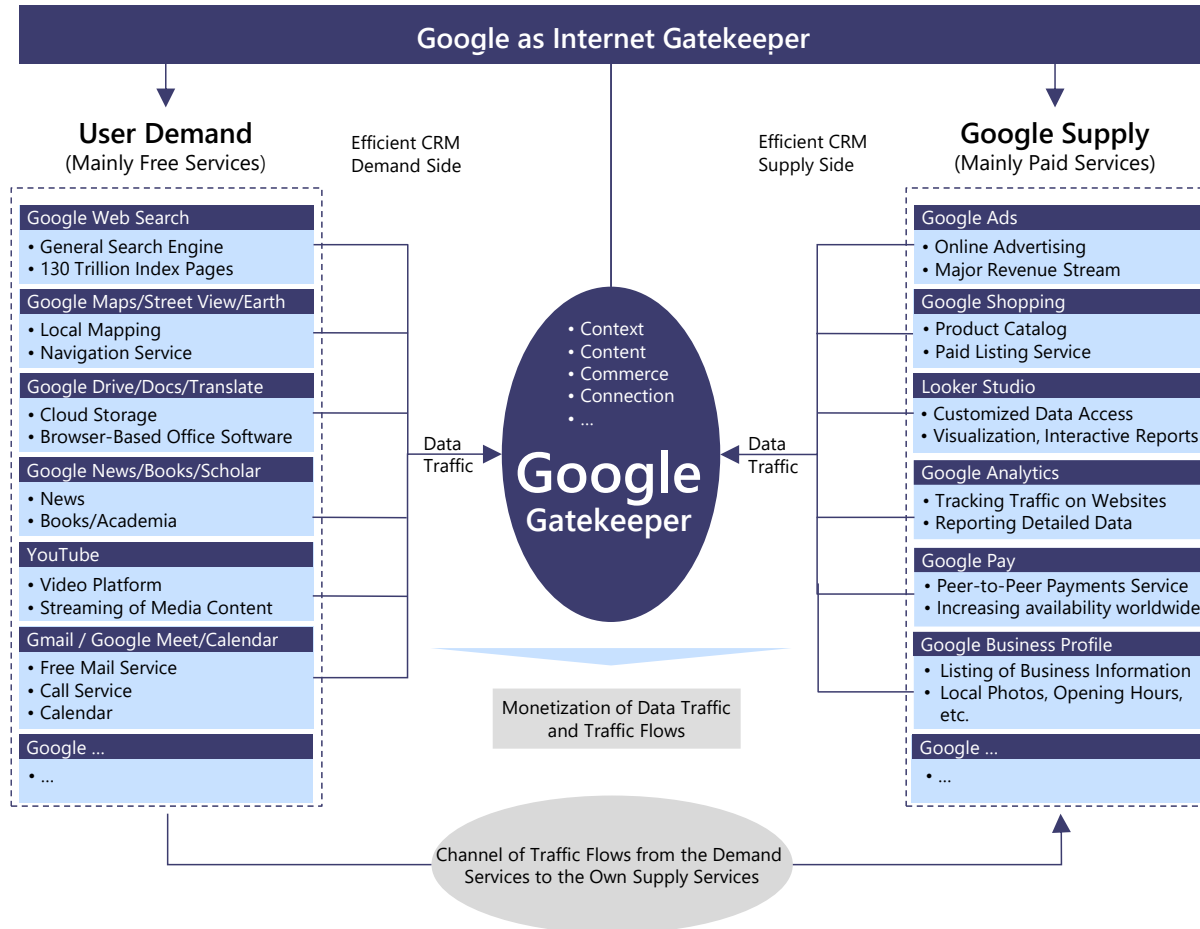
Source: based on Wirtz (2010, 2021b, 2024) and own analysis, estimations, and updates

Fig. 13.39 Development of Google's hybrid business model (2)



Source: based on Wirtz (2010, 2021b, 2023) and own analysis, estimations, and updates

Fig. 13.40 Google as Internet gatekeeper of information



Source: Wirtz (2010, 2021b, 2024) and updates

Chapter 13 Questions and topics for discussion

Chapter 13 Questions and topics for discussion



Review questions

1. Which partial models make up business models in digital business?
2. Present the revenue model system of digital business schematically and briefly discuss the different relevance of the individual forms of revenue.
3. Present the different basic business model types of the 4C-Net Business Model.
4. Describe the components of the value chain of the Commerce Business Model.
5. Give examples of hybrid business models. What are the advantages for customers and companies in digital business?



Topics for discussion

1. Discuss the advantages and disadvantages of specialized business models (1C). Are integrated models (2C, 3C, or 4C) perhaps more reasonable for the free market economy and customer benefit? (one-stop shopping)
2. Discuss the future of the Content Business Model - will digital media lead to the complete dissolution of traditional media (newspapers, magazines, television, ...)?
3. Discuss the advantages and disadvantages of the Context Business Model. To what extent does Google's dominant position in the search engine market entail risks for our society and the free market economy?

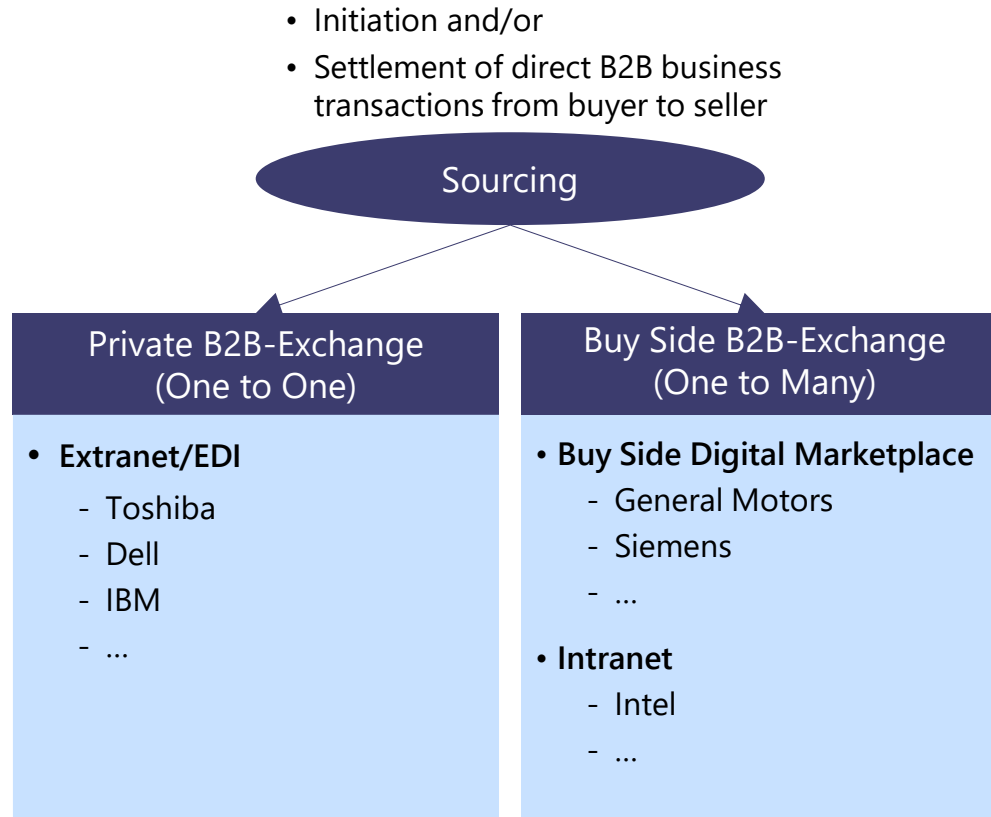
Chapter 14: Digital B2B Business Models

Fig. 14.1 4S-Net Business Model

Sourcing	Sales
<ul style="list-style-type: none">• Initiation and/or• Settlement of direct B2B business transactions from buyer to seller	<ul style="list-style-type: none">• Initiation and/or• Settlement of business transactions from seller to buyer
Supportive Collaboration	Service Broker
<ul style="list-style-type: none">• Supporting collaborative value generation• Collaborative research and development• Collaborative production• Collaborative sale	<ul style="list-style-type: none">• Support of B2B business transactions• Providing information and marketplaces of third parties

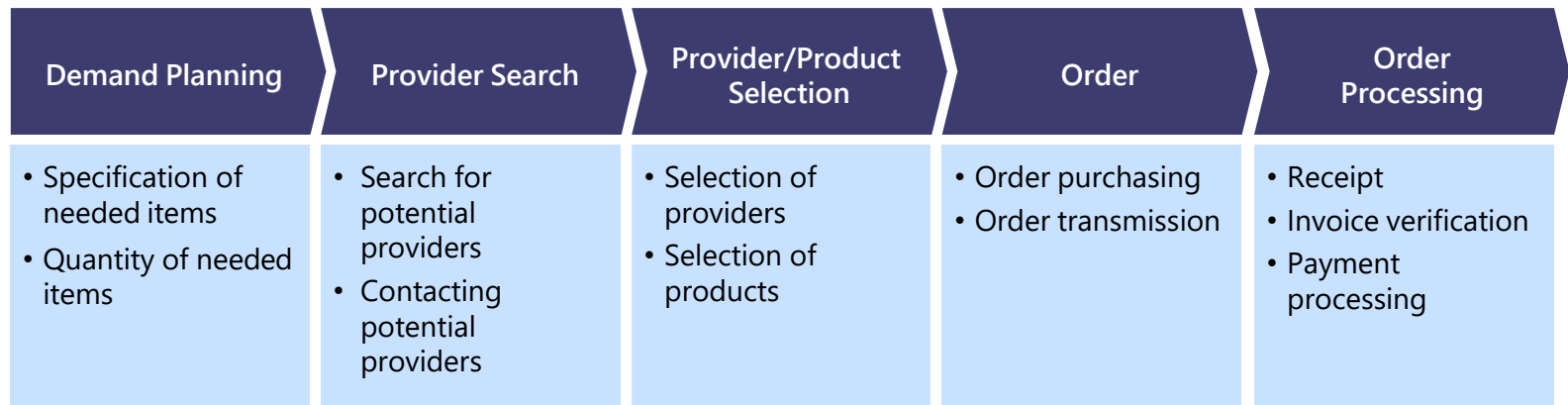
Source: Wirtz (2010b, 2021, 2024)

Fig. 14.2 B2B Sourcing Business Model



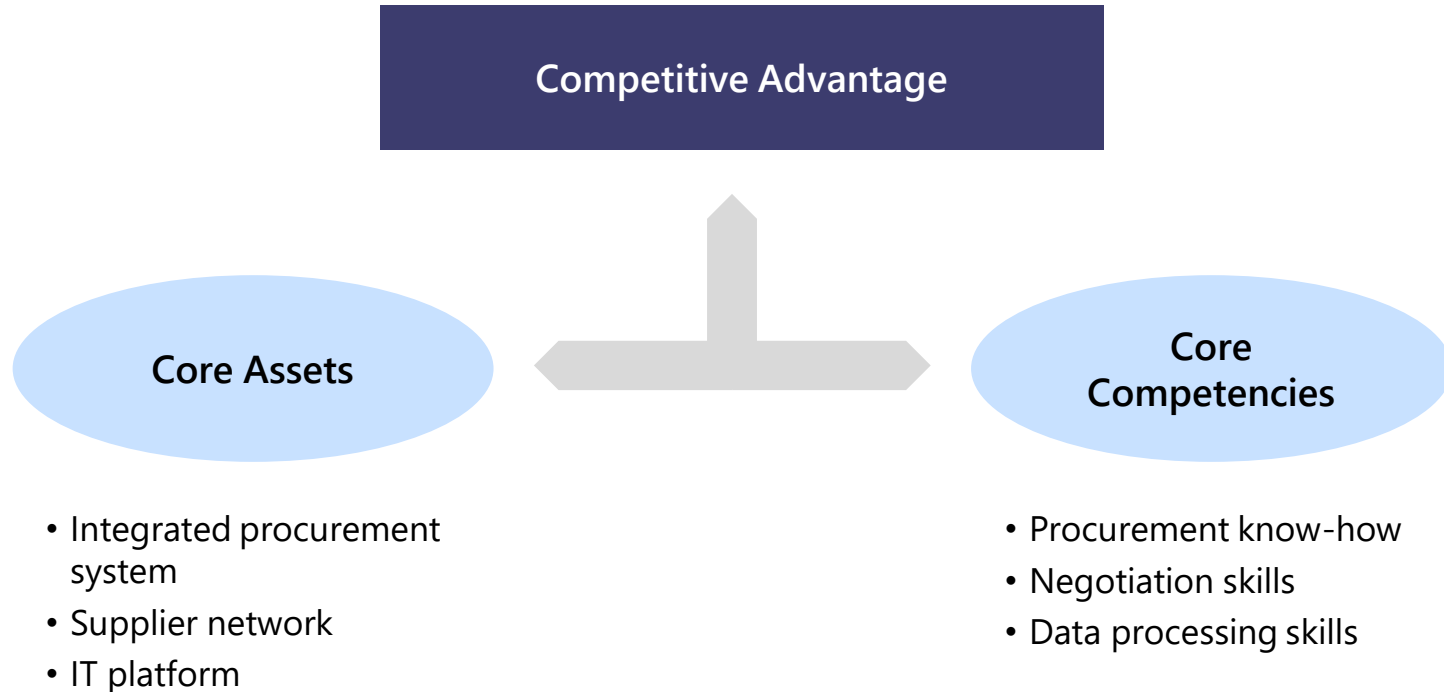
Source: Wirtz (2010b, 2021, 2024)

Fig. 14.3 Aggregated value chain of the Sourcing Business Model



Source: Wirtz (2010b, 2021, 2024)

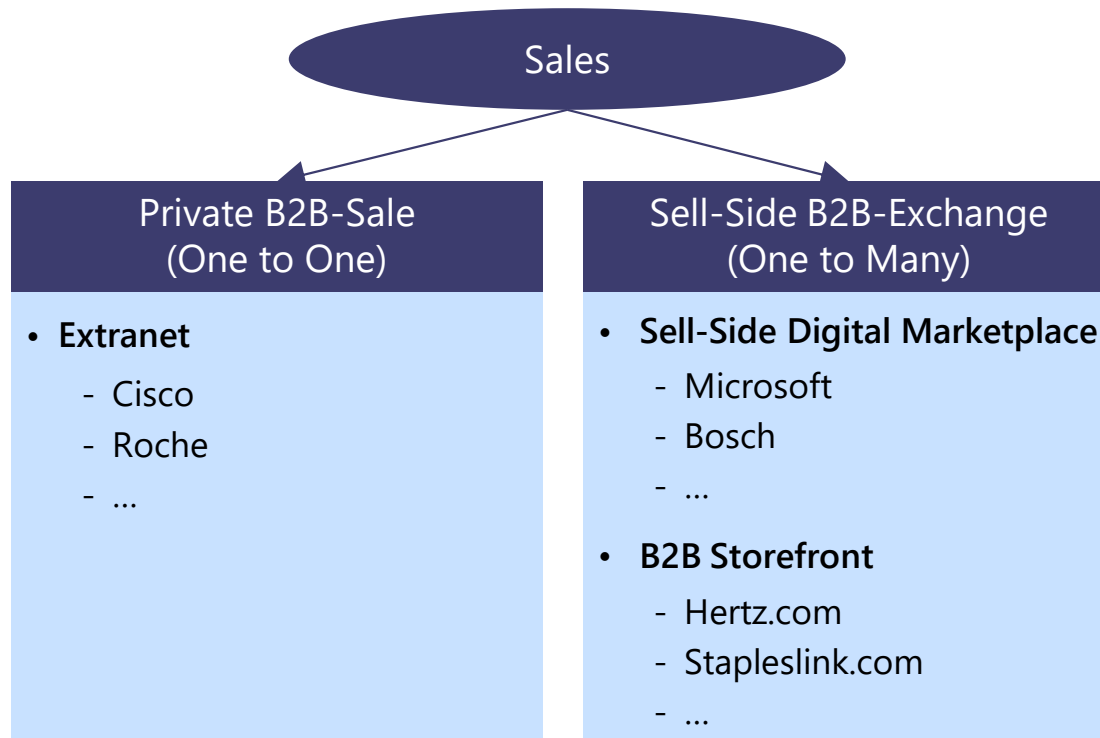
Fig. 14.4 Core assets and core competencies of the Sourcing Business Model



Source: Wirtz (2010b, 2021, 2024)

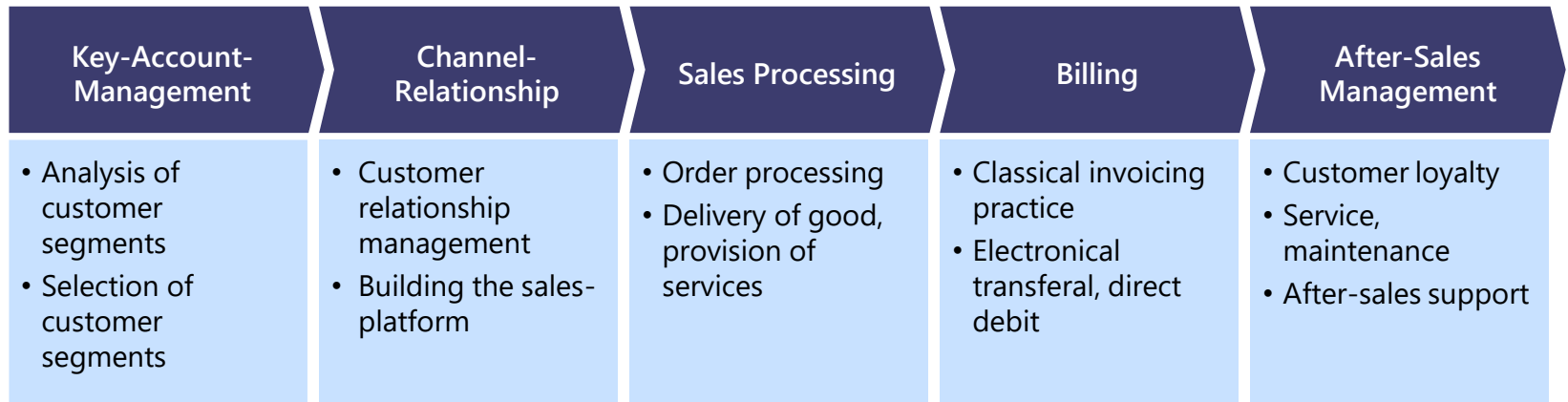
Fig. 14.5 B2B Sales Business Model

- Initiation and/or
- Settlement of direct B2B business transactions from seller to buyer



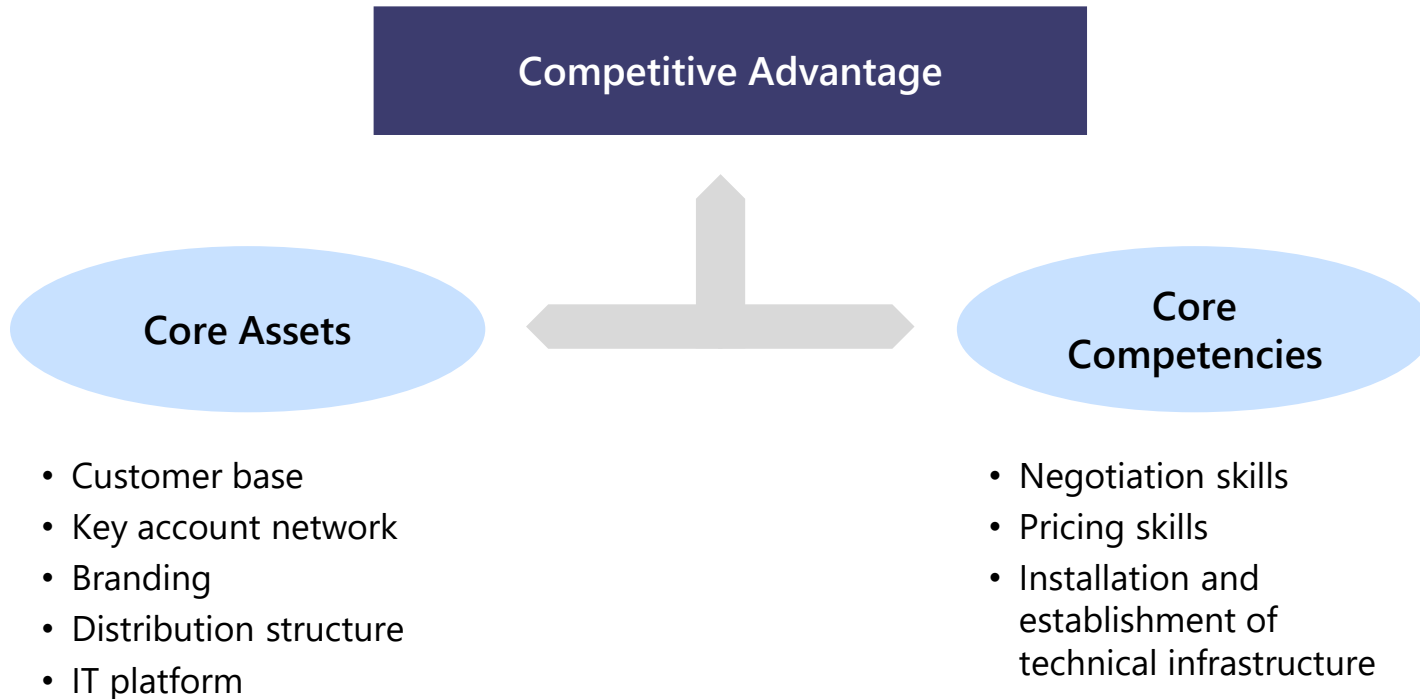
Source: Wirtz (2010b, 2021, 2024)

Fig. 14.6 Aggregated value chain of the Sales Business Model



Source: Wirtz (2010b, 2021, 2024)

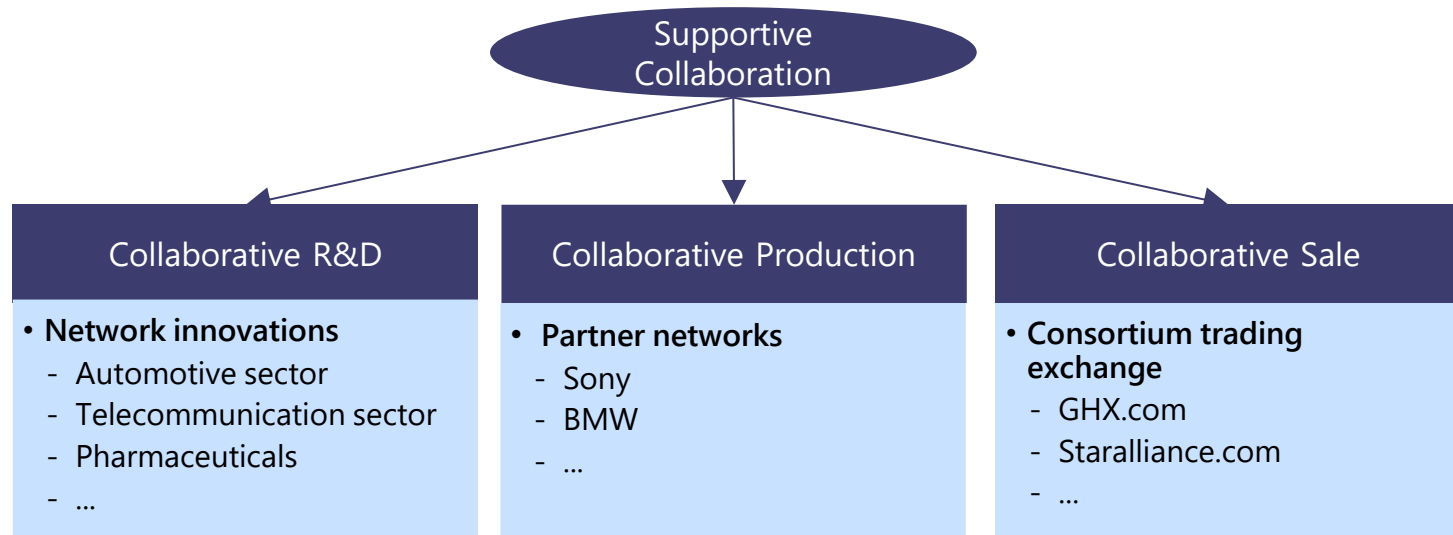
Fig. 14.7 Core assets and core competencies of the Sales Business Model



Source: Wirtz (2010b, 2021, 2024)

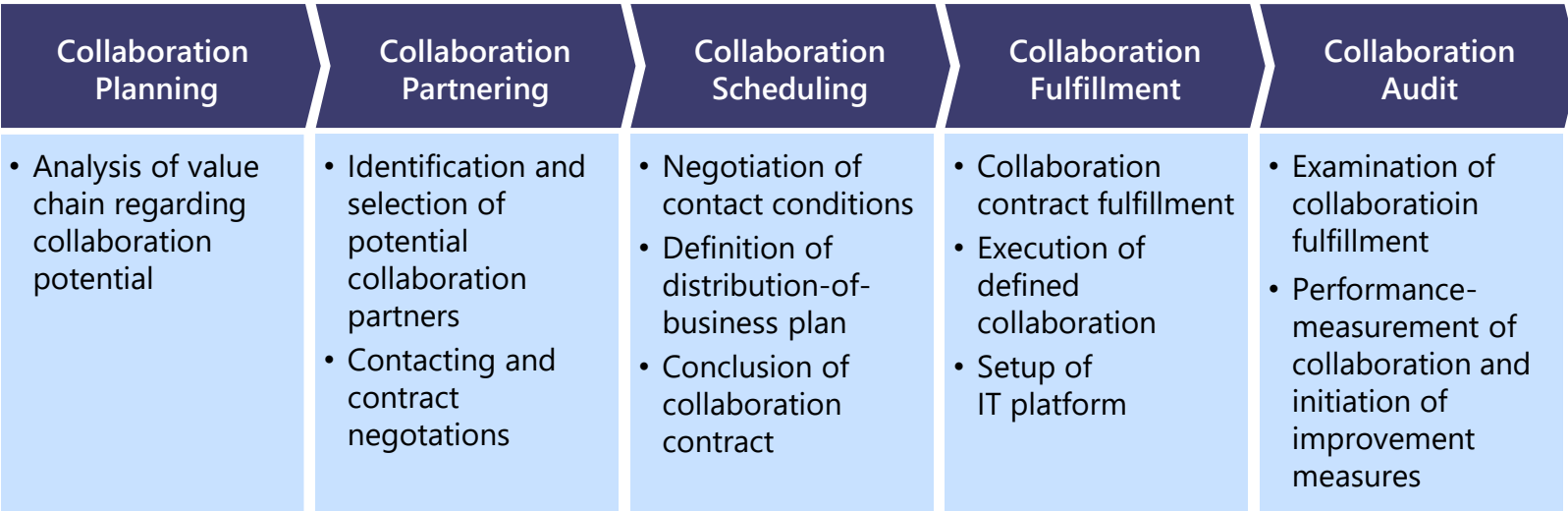
Fig. 14.8 B2B Supportive Collaboration Business Model

- Support of collaborative value generation
- Collaborative R&D
- Collaborative production
- Collaborative sale



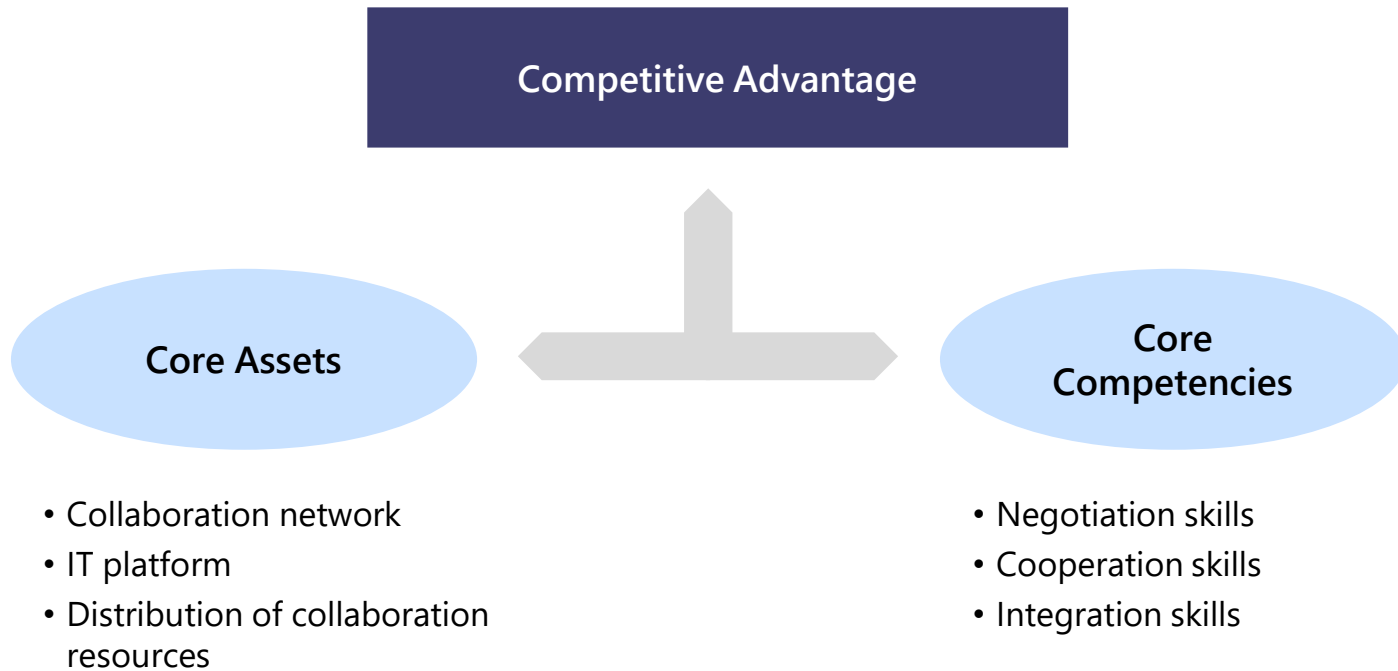
Source: Wirtz (2010b, 2021, 2024)

Fig. 14.9 Aggregated value chain of the Supportive Collaboration Business Model



Source: Wirtz (2010b, 2021, 2024)

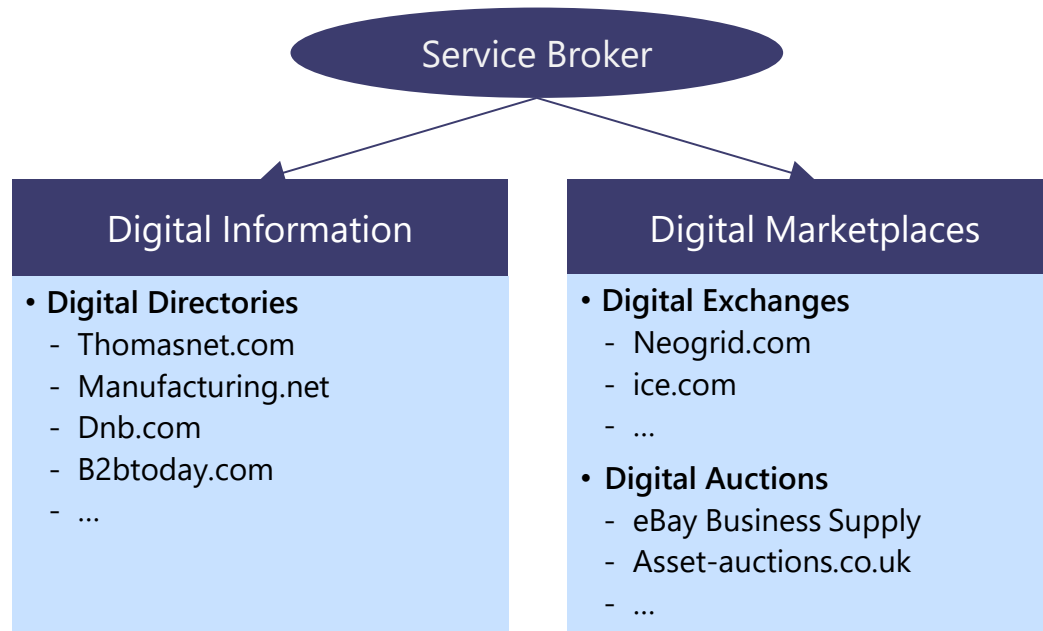
Fig. 14.10 Core assets and core competencies of the Supportive Collaboration Business Model



Source: Wirtz (2010b, 2021, 2024)

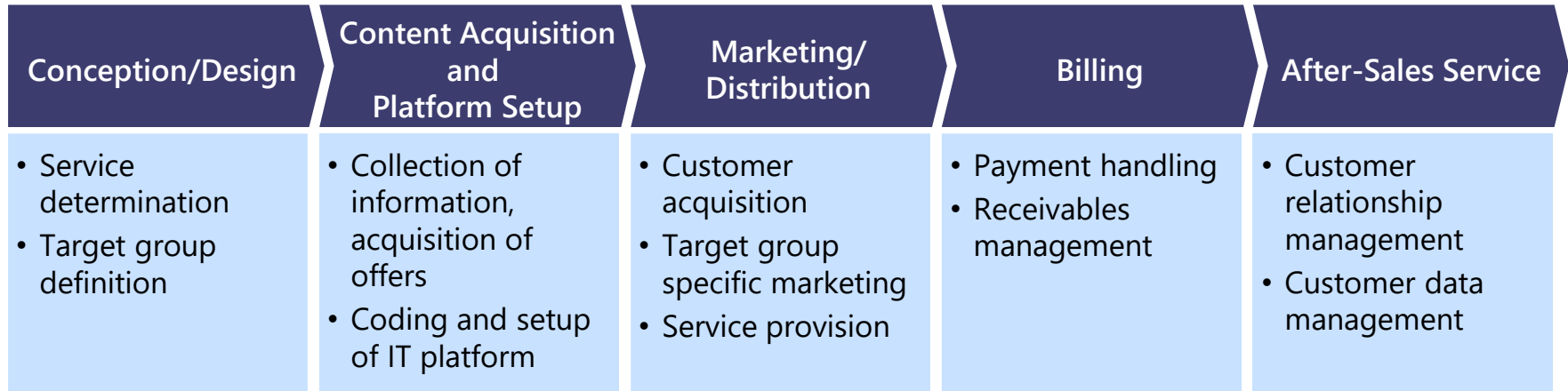
Fig. 14.11 B2B Service Broker Business Model

- Support of B2B business transactions through
- Provision of information and marketplaces of third parties



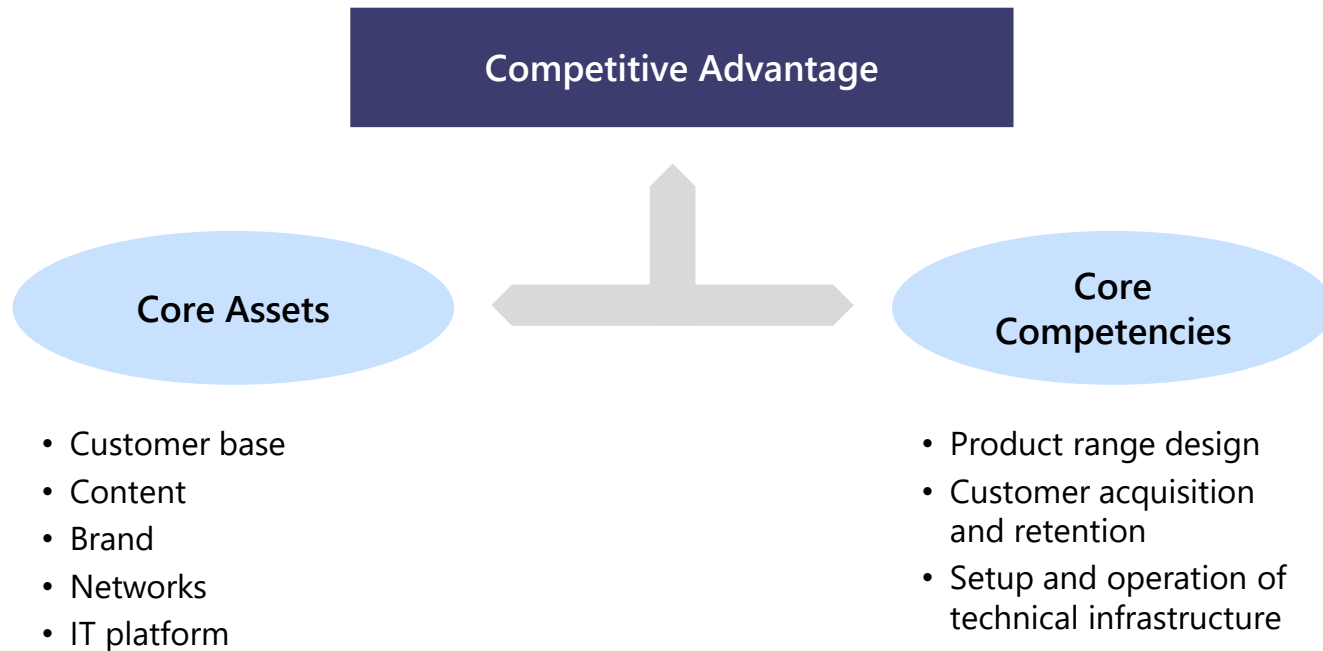
Source: Wirtz (2010b, 2021, 2024)

Fig. 14.12 Aggregated value chain of the Service Broker Business Model



Source: Wirtz (2010b, 2021, 2024)

Fig. 14.13 Core assets and core competencies of the Service Broker Business Model



Source: Wirtz (2010b, 2021, 2024)

Chapter 14 Questions and topics for discussion

Chapter 14 Questions and topics for discussion



Review questions

1. Describe the 4S-Net Business Model in the B2B sector.
2. Explain the four aggregated value chains of the respective digital B2B business models.
3. Summarize the core assets of each of the four digital B2B business models.
4. Describe the core competencies of all four digital B2B business models.
5. Name significant company examples for the four basic models of the 4S-Net Business Model and assign these examples suitably.

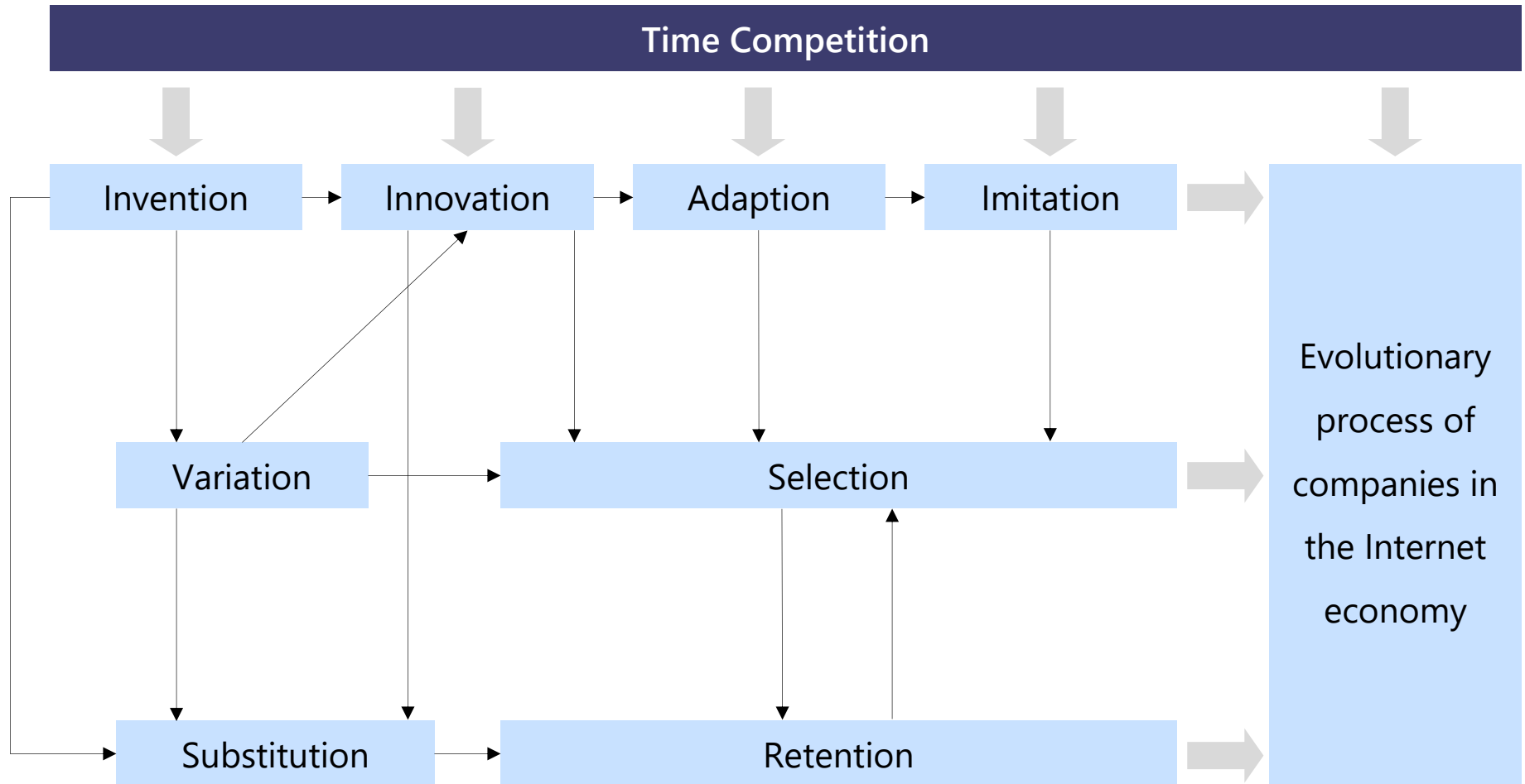


Topics for discussion

1. Discuss the relevance of digital business models in the B2B sector, especially with regard to the digital transformation of the economy in view of the shift from offline to online business.
2. Discuss the main differences between the 4C- and 4S-Net Business Model. Explain where the B2B and B2C relationships differ within the digital context.
3. Discuss to what extent the B2B examples from the digital world with which you are familiar are covered by the 4S-Net Business Model or name examples of companies that comprise several of the basic 4S-Net Business Models.

Chapter 15: Digital Business Strategy

Fig. 15.1 Scheme of evolution and change processes in the Internet economy



Source: Wirtz (2000c, 2021, 2024)

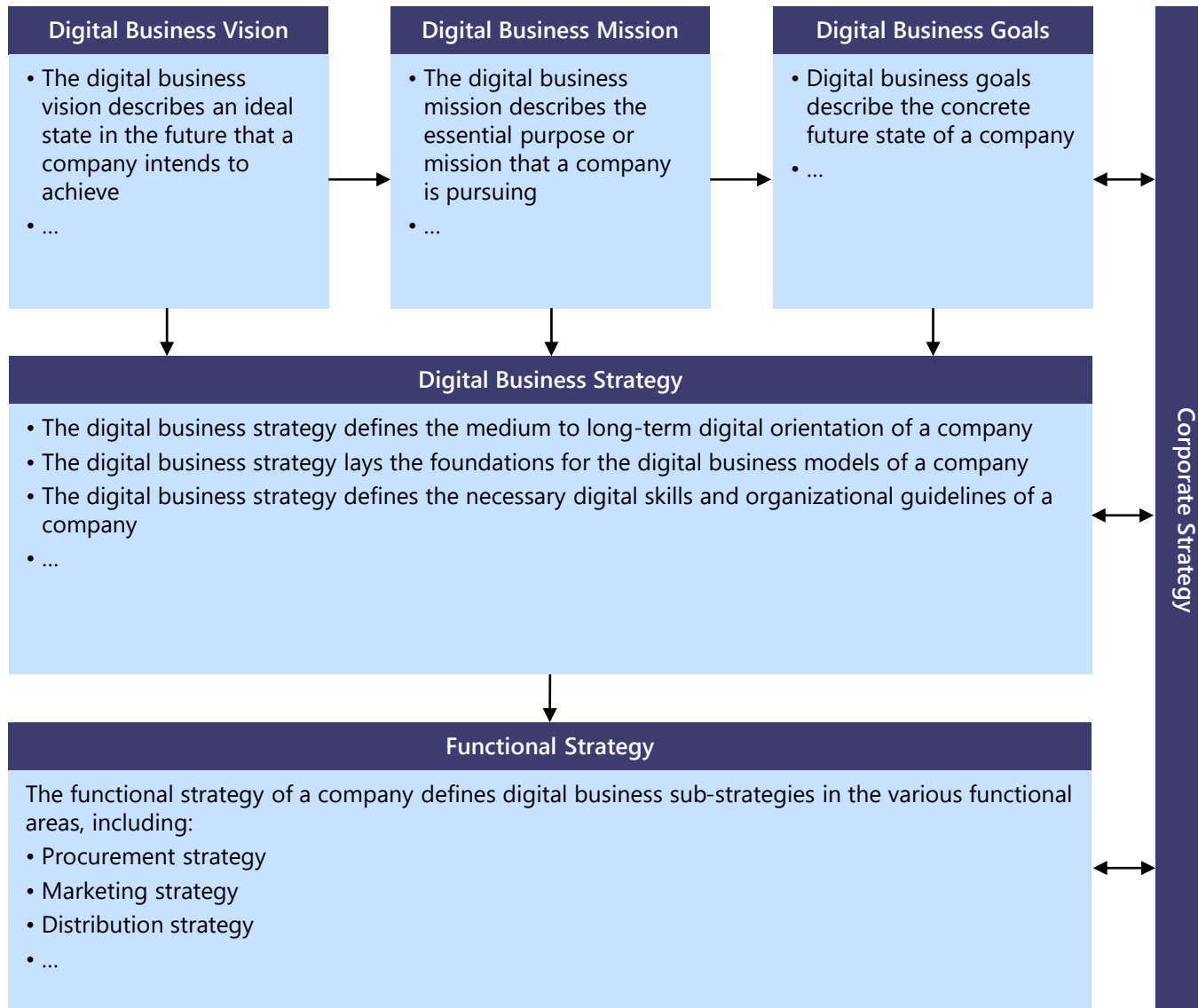
Definition of Digital Business Strategy

Definition of Digital Business Strategy (Wirtz 2001a,2021,2023)

Against the background of substantial evolutionary dynamics, digital business strategy can be defined as a mostly medium-term direction of corporate behavior that takes into account external market and competitive conditions, resource dispositions as well as core competencies, ultimately serving to achieve sustainable competitive advantage.

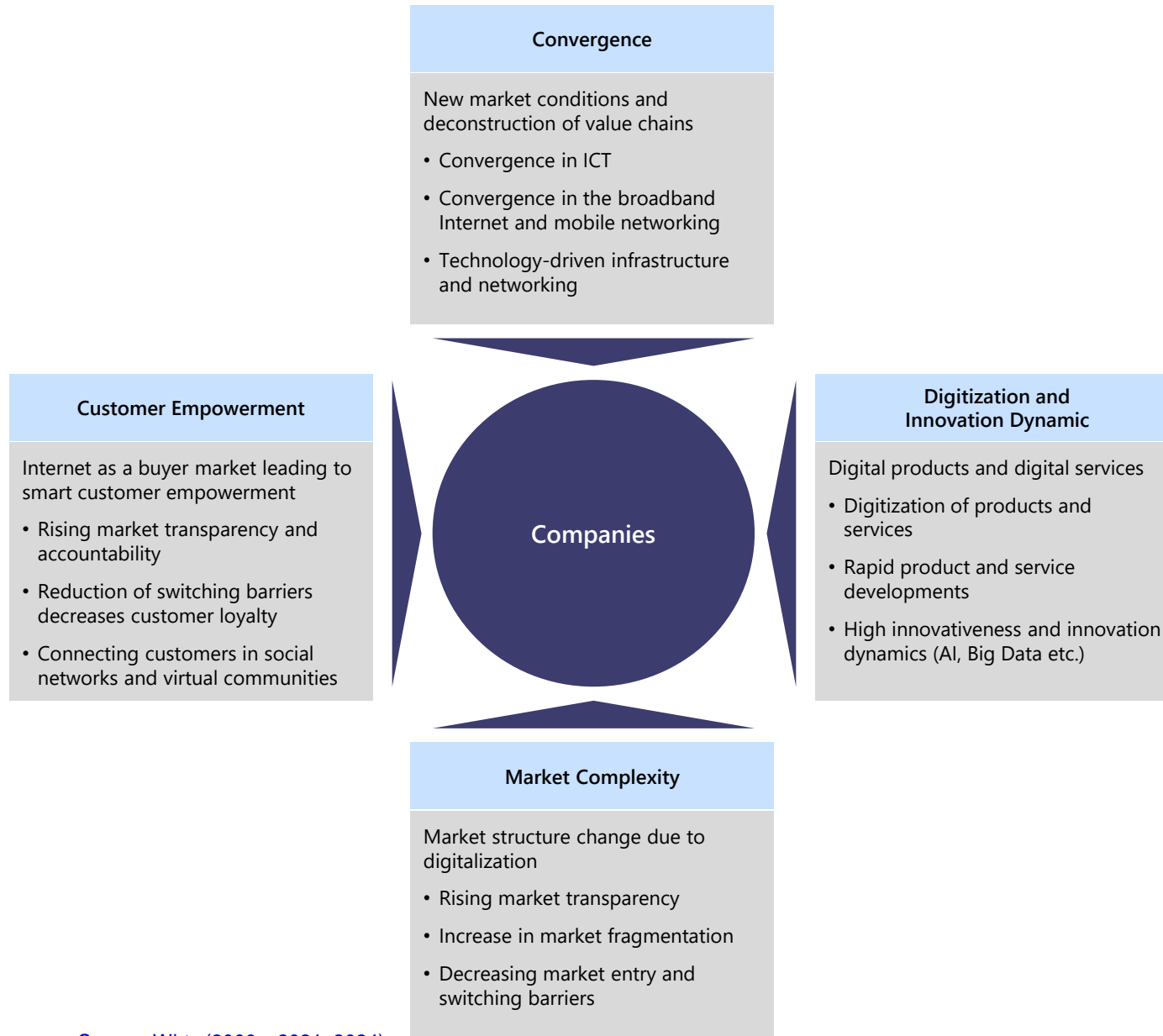
Source: [Wirtz \(2001a,2021,2024\)](#)

Fig. 15.2 Classification of the digital business strategy in the corporate context



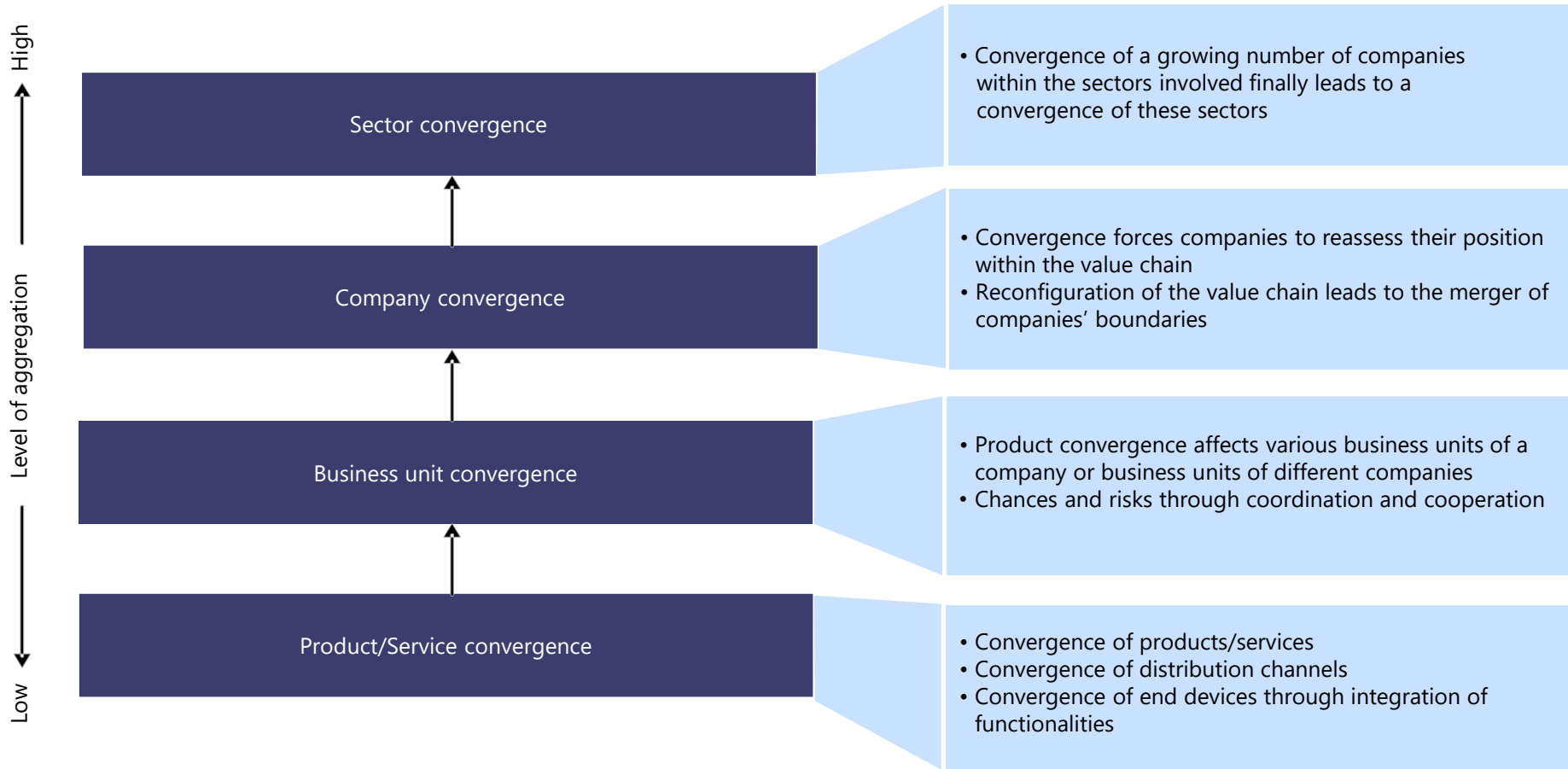
Source: Wirtz (2020a, 2021, 2023)

Fig. 15.3 4-Forces Model of Digital Business



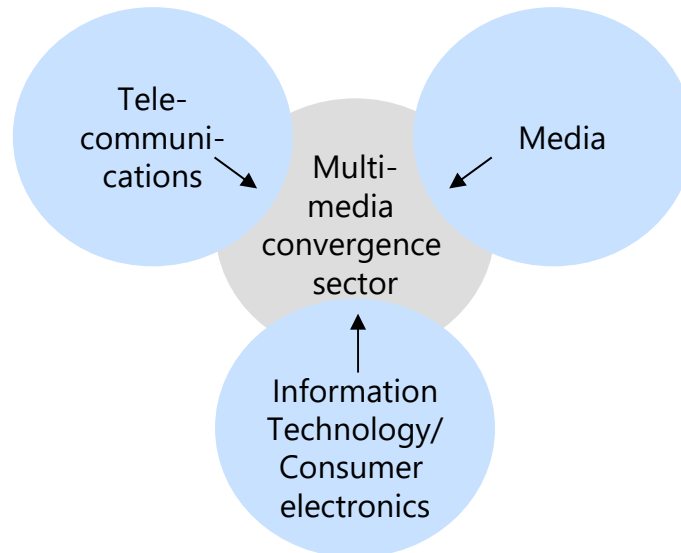
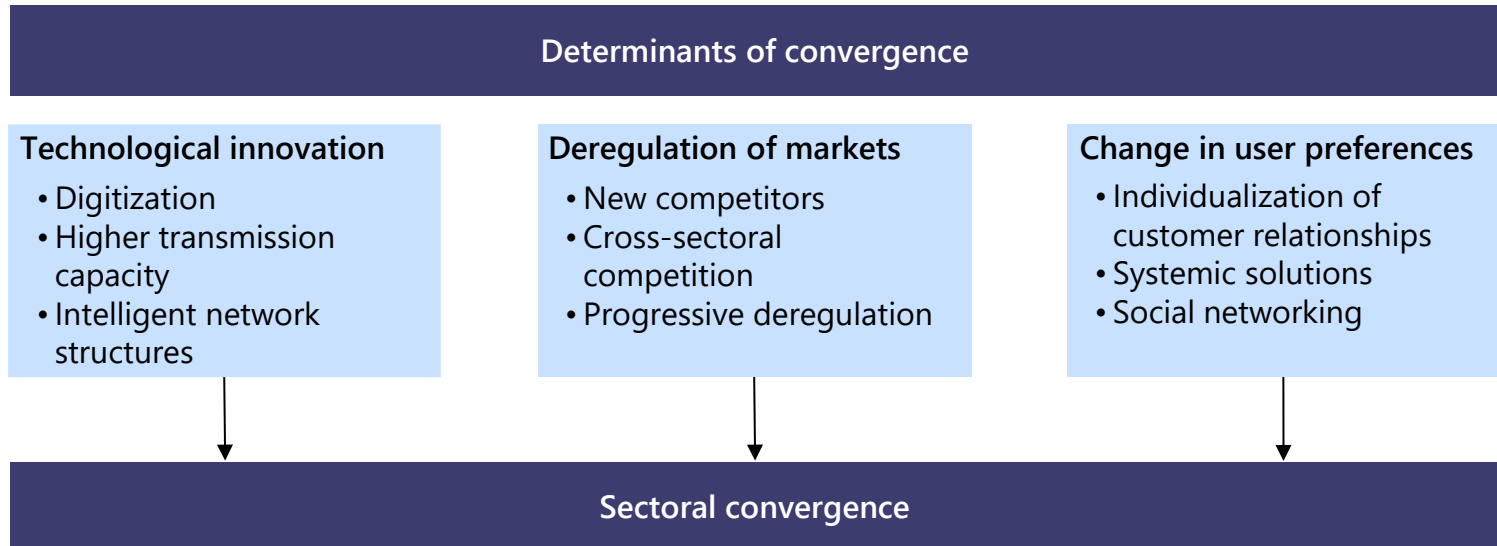
Source: Wirtz (2000c, 2021, 2024)

Fig. 15.4 4-Level Convergence Model



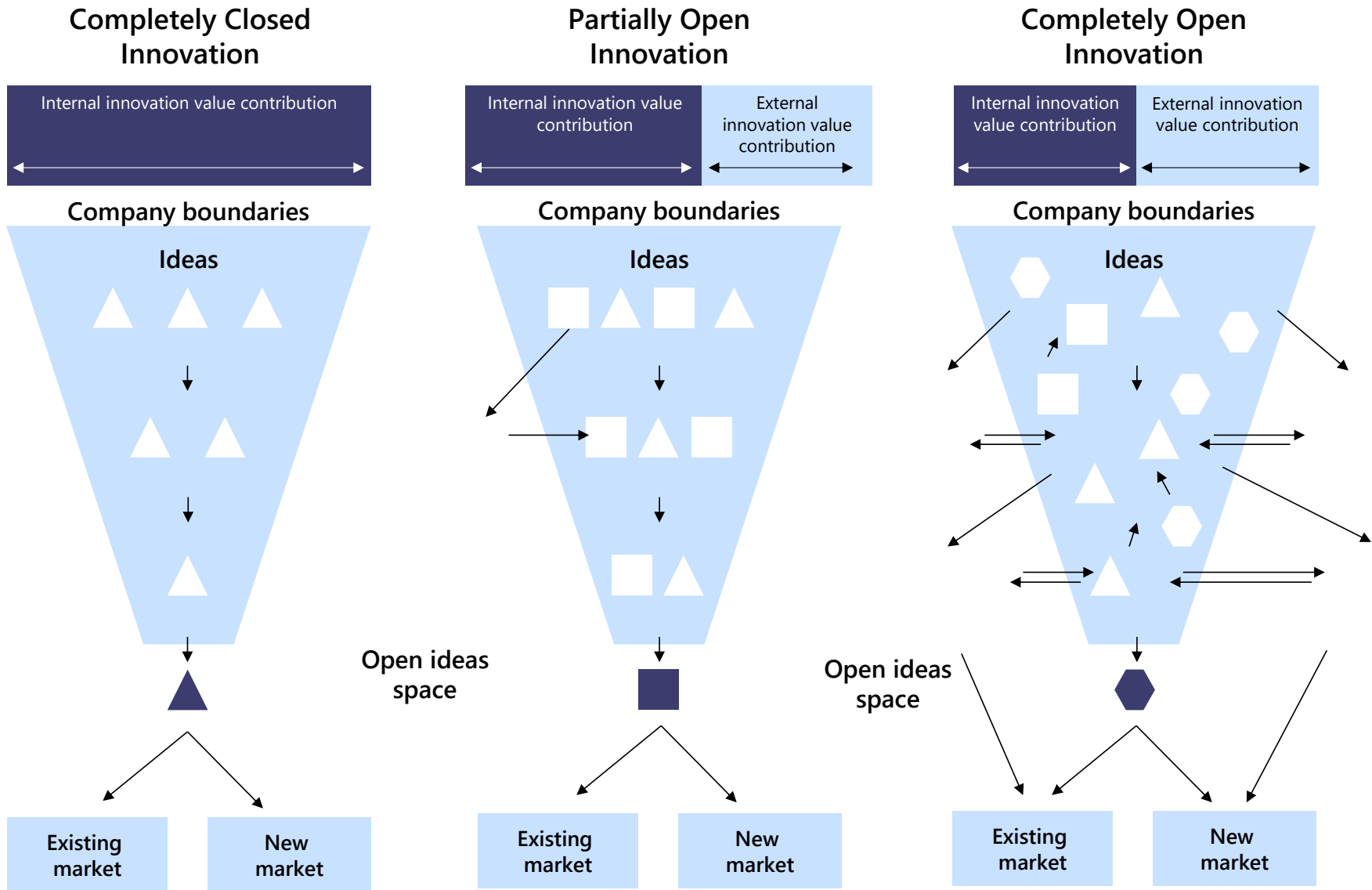
Source: Wirtz (2006, 2020b, 2021, 2024)

Fig 15.5 Determinants of convergence



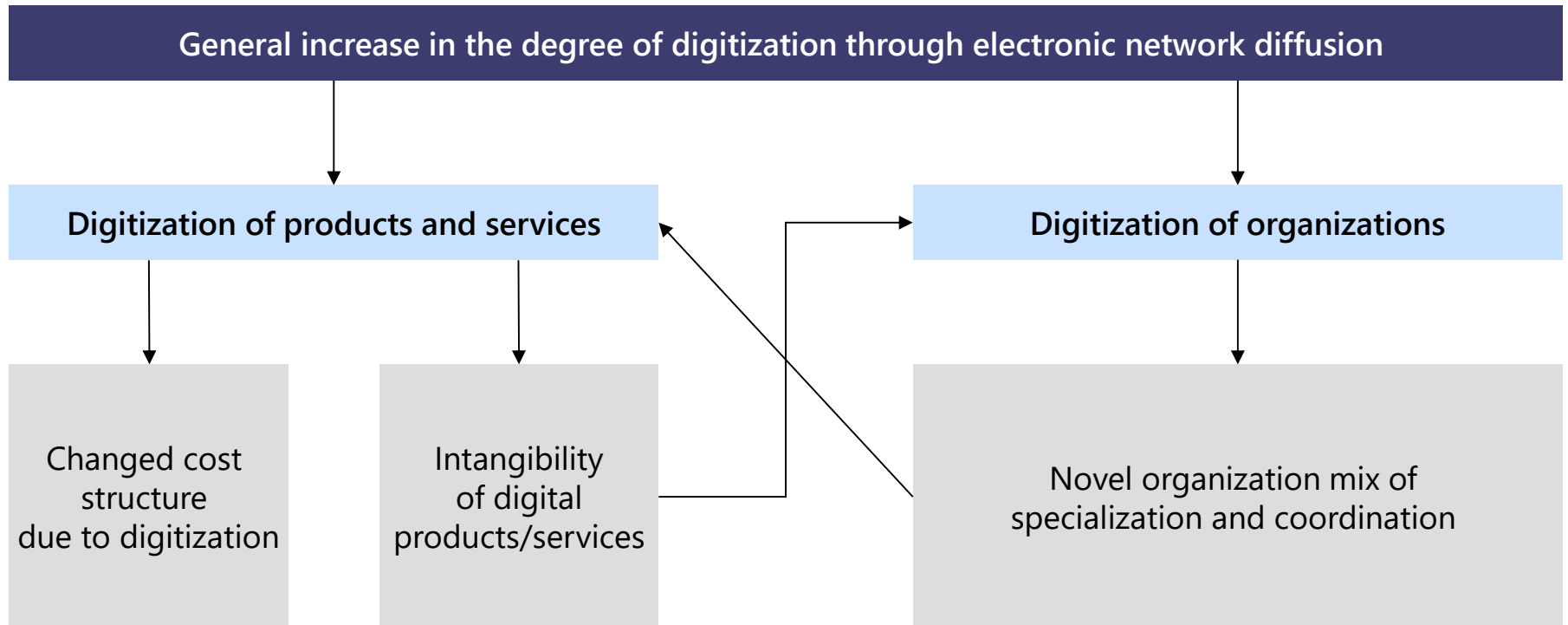
Source: Wirtz (2000e, 2020a, 2021, 2024)

Fig. 15.7 Forms of open innovation



Source: Wirtz (2020a, 2021, 2024)

Fig. 15.8 Effects of digitization



Source: Wirtz (2000c, 2021, 2024)

Fig. 15.9 Decrease of the average copy costs with increasing output quantity

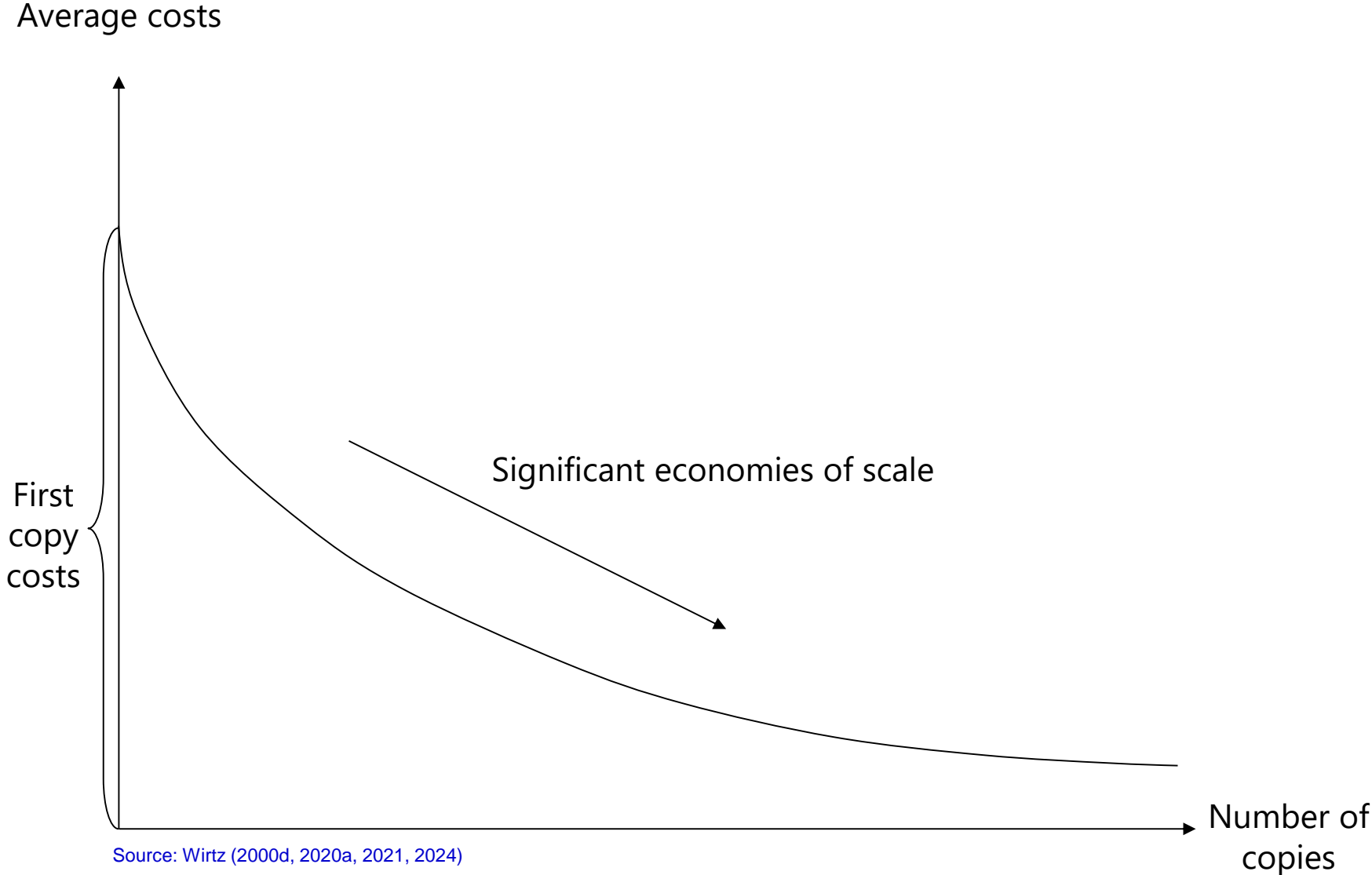
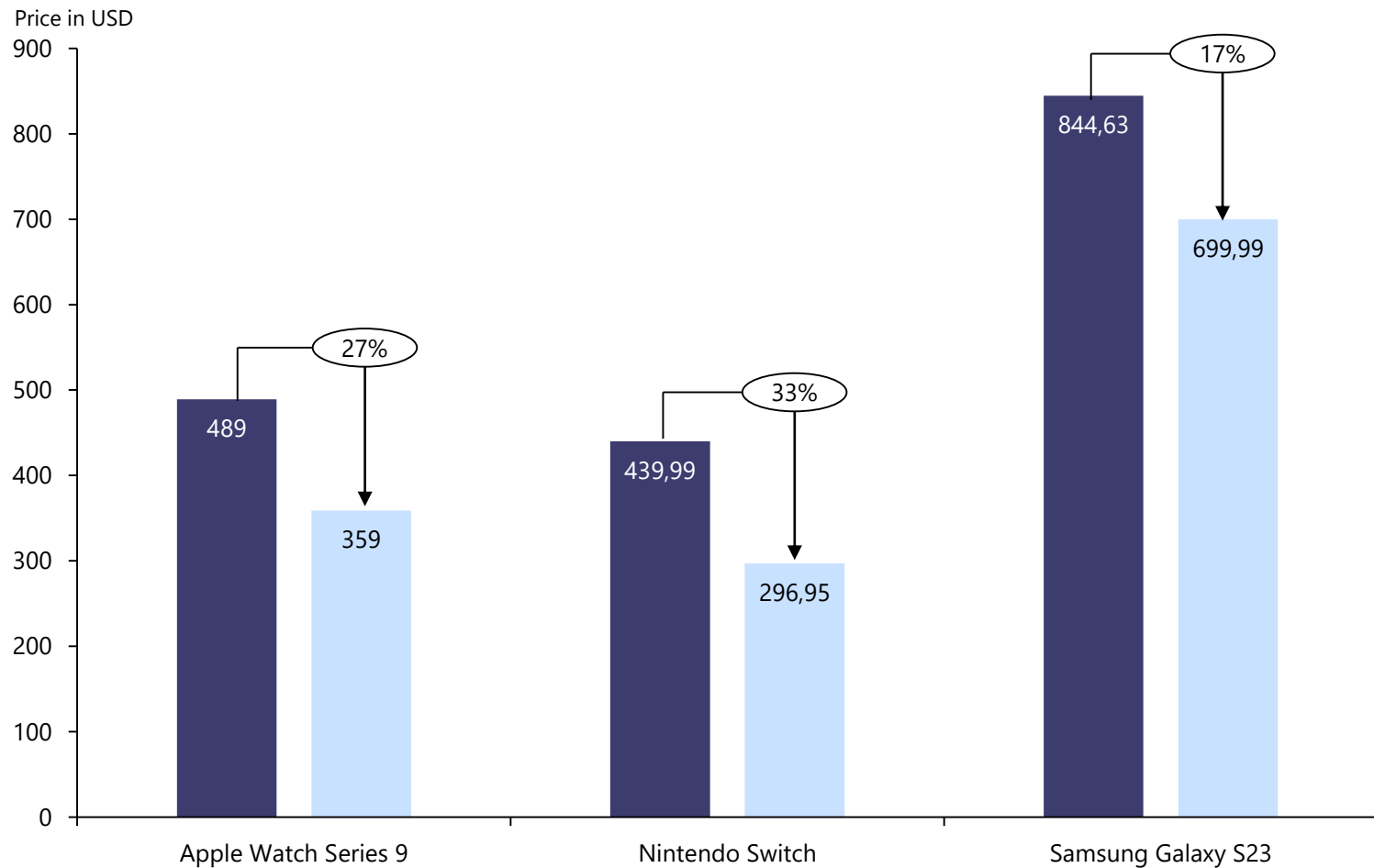
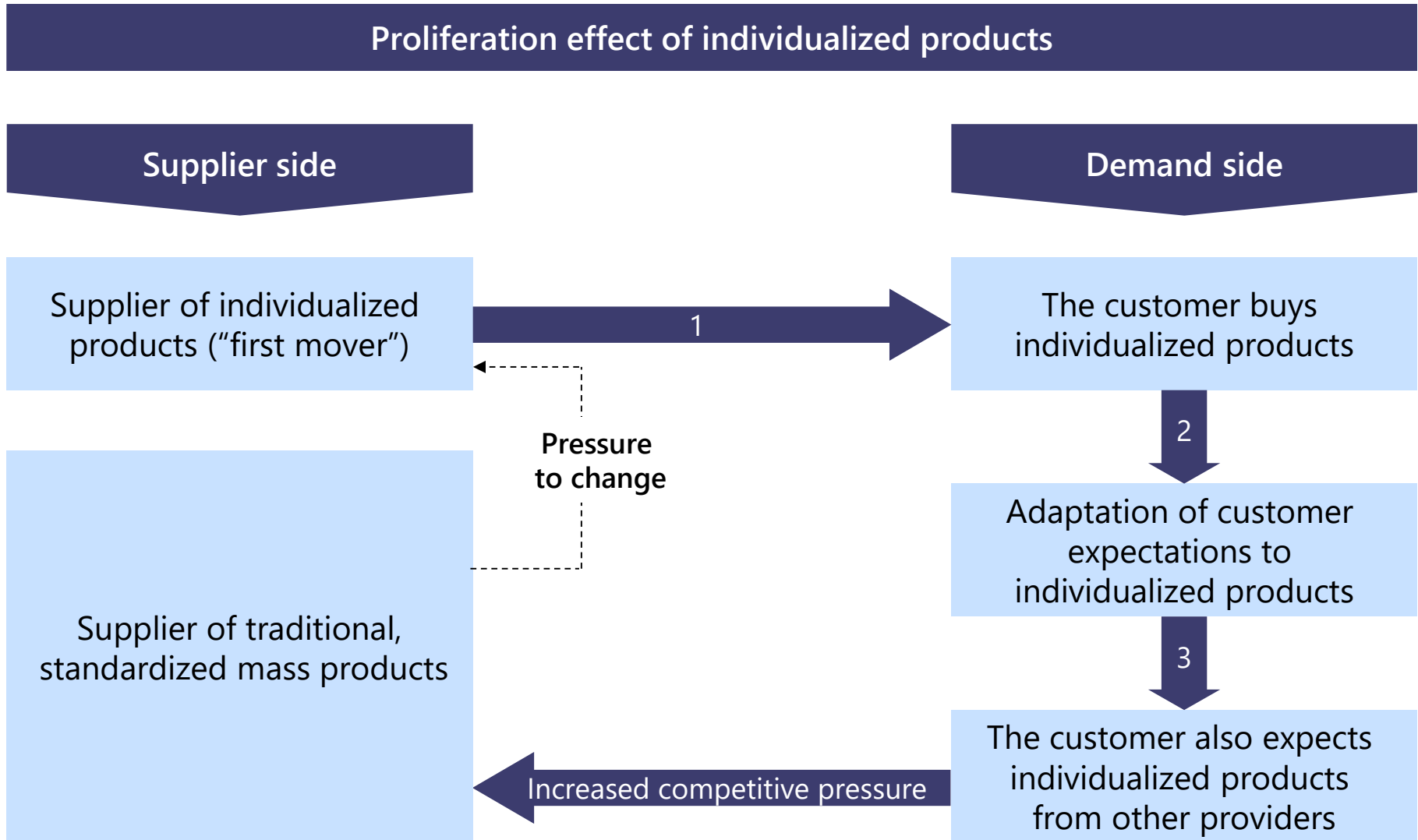


Fig. 15.10 Exemplary illustration of the price differences among different providers by shopsavvy.com



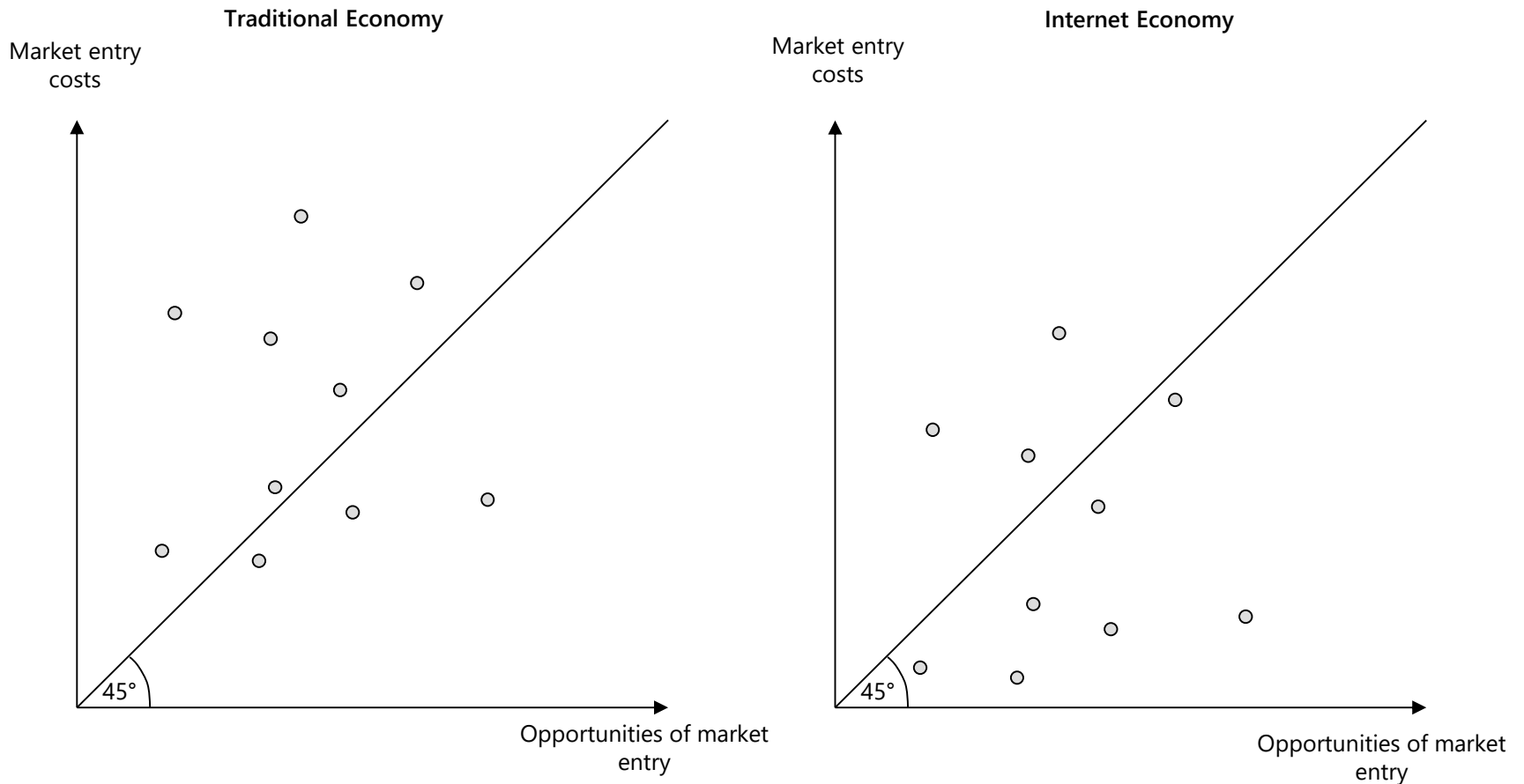
Source: shopping.com (2020), Wirtz (2024)

Fig. 15.11 The proliferation effect of individualized products



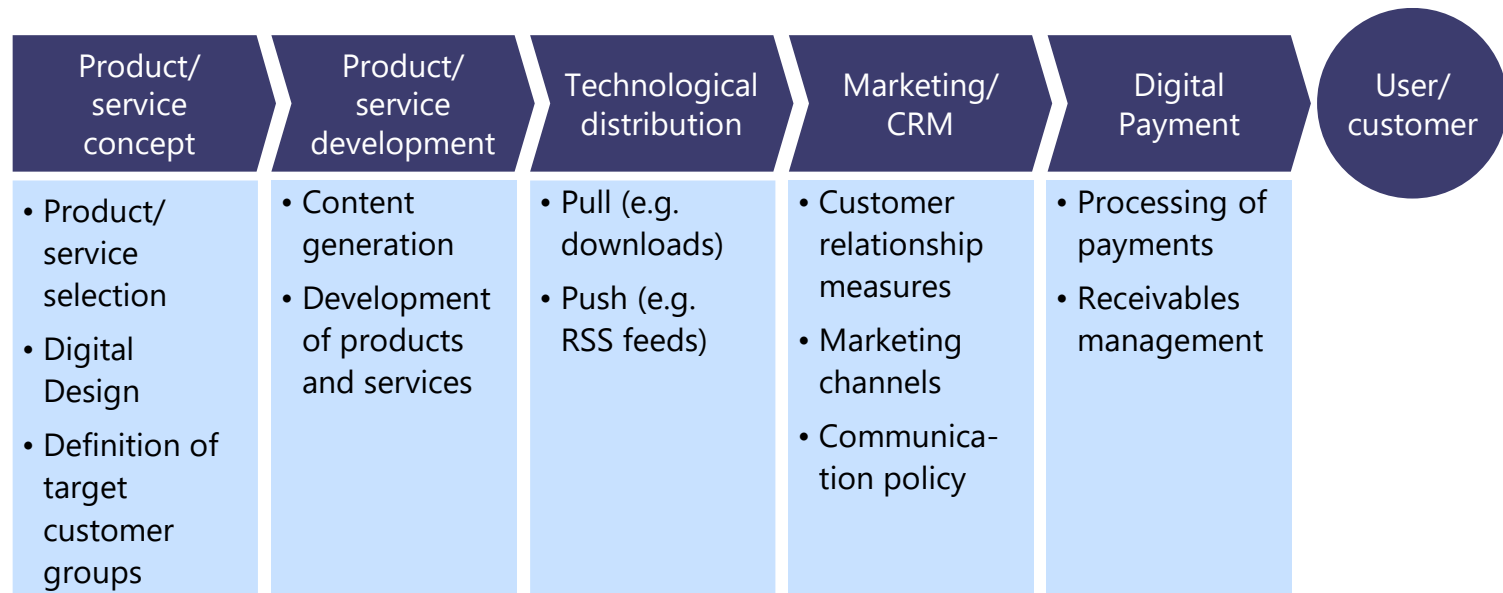
Source: Wirtz (2000c, 2021, 2024)

Fig. 15.12 Changed cost/opportunity ratio of market entry



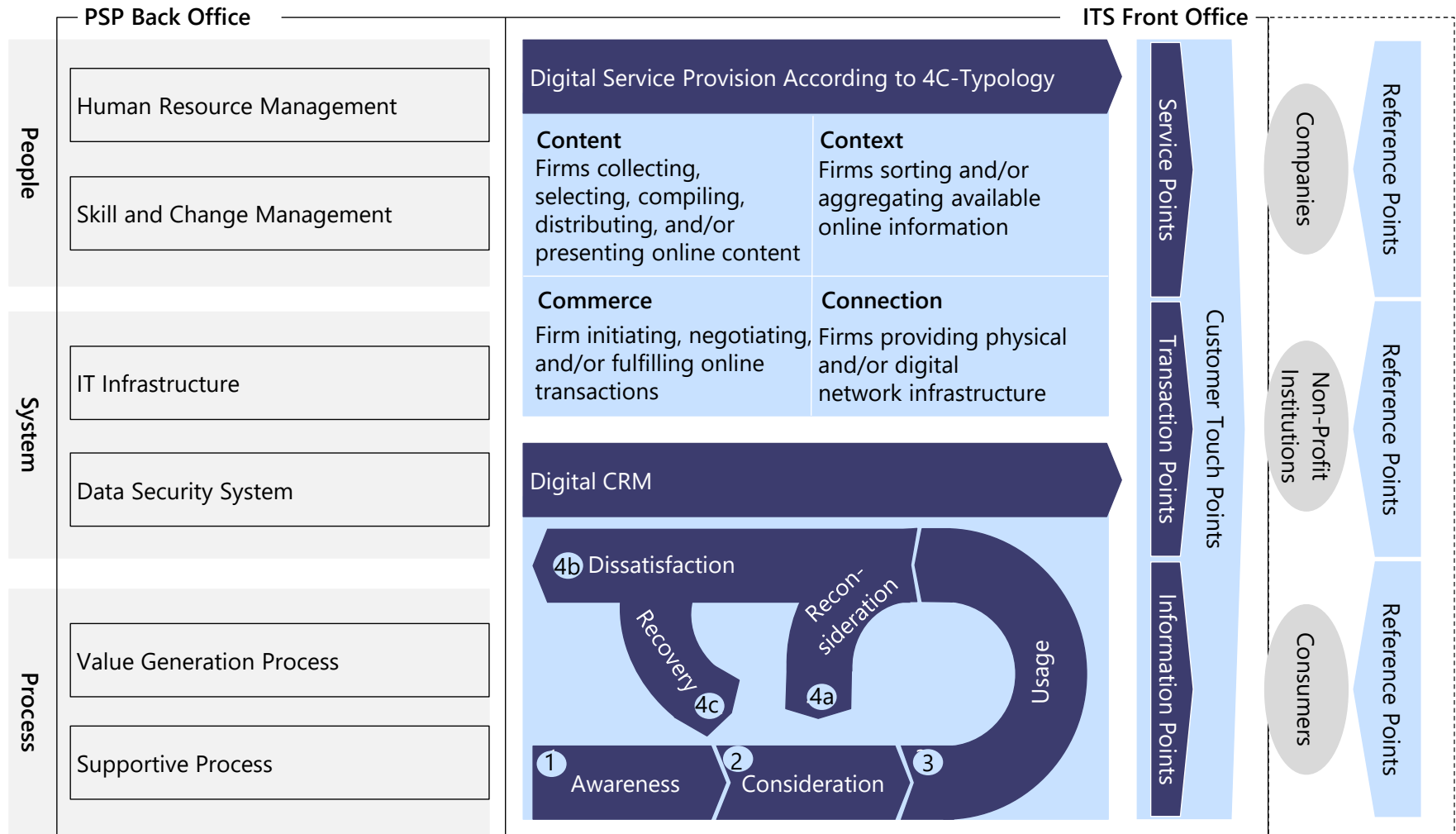
Source: Wirtz (2000c, 2021, 2024)

Fig. 15.13 Digital business value chain



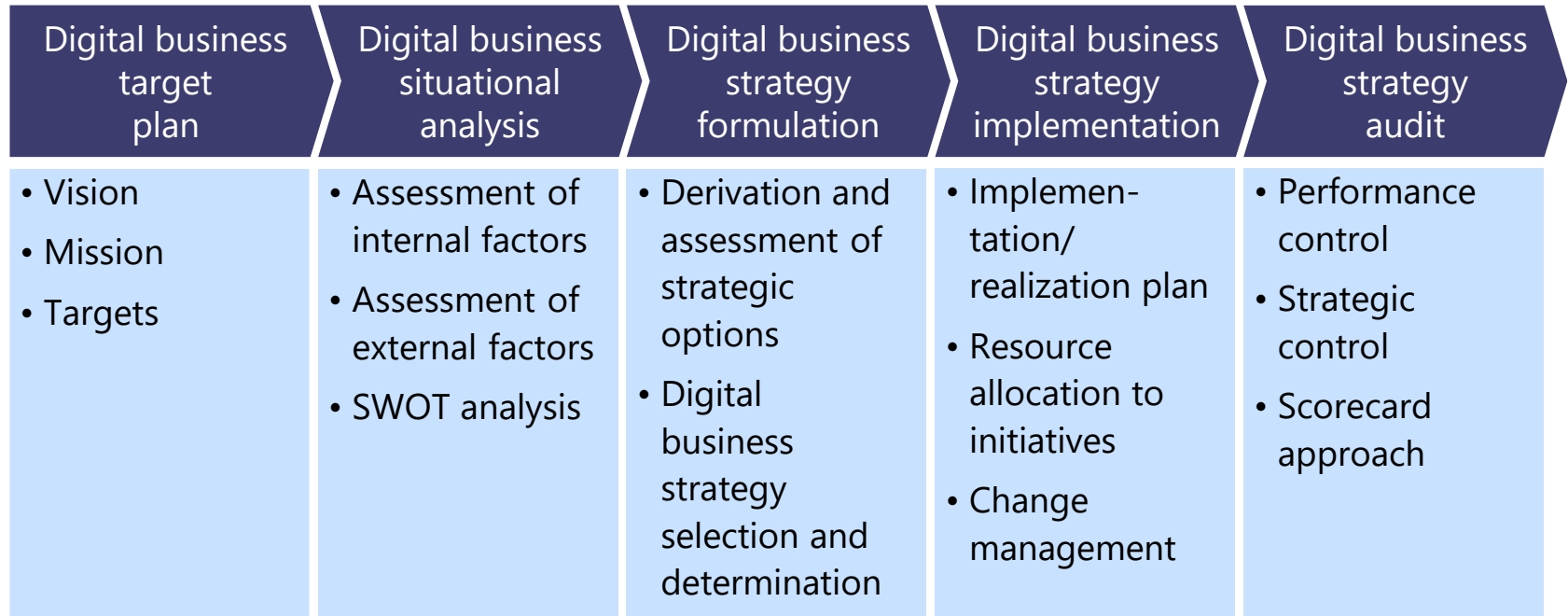
Source: Wirtz (2000c, 2020a, 2021, 2024)

Fig. 15.14 Model of Digital Business Value Activity System (dVAS)



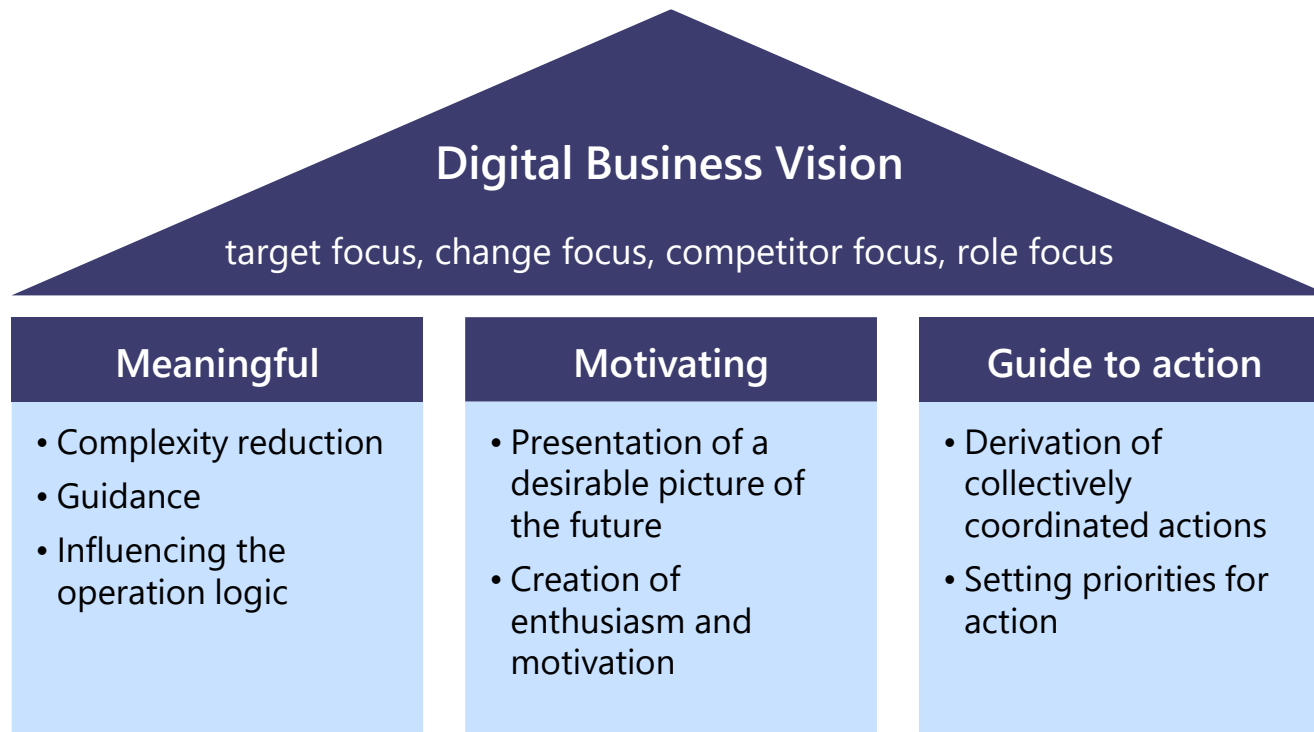
Source: Wirtz (2021, 2024)

Fig. 15.15 Taxonomy of digital business strategy development



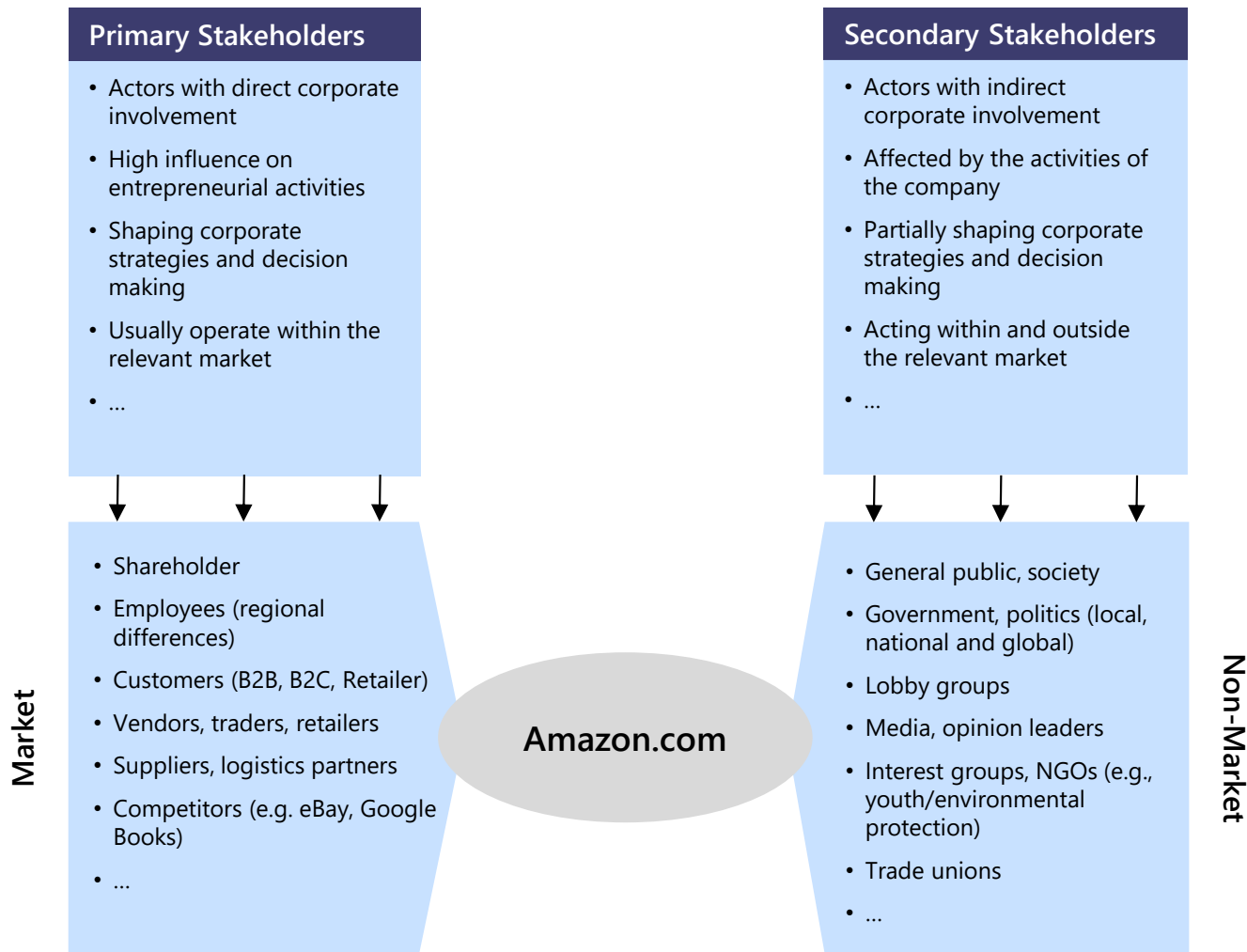
Source: Wirtz (2001a, 2021, 2024)

Fig. 15.16 Digital business vision



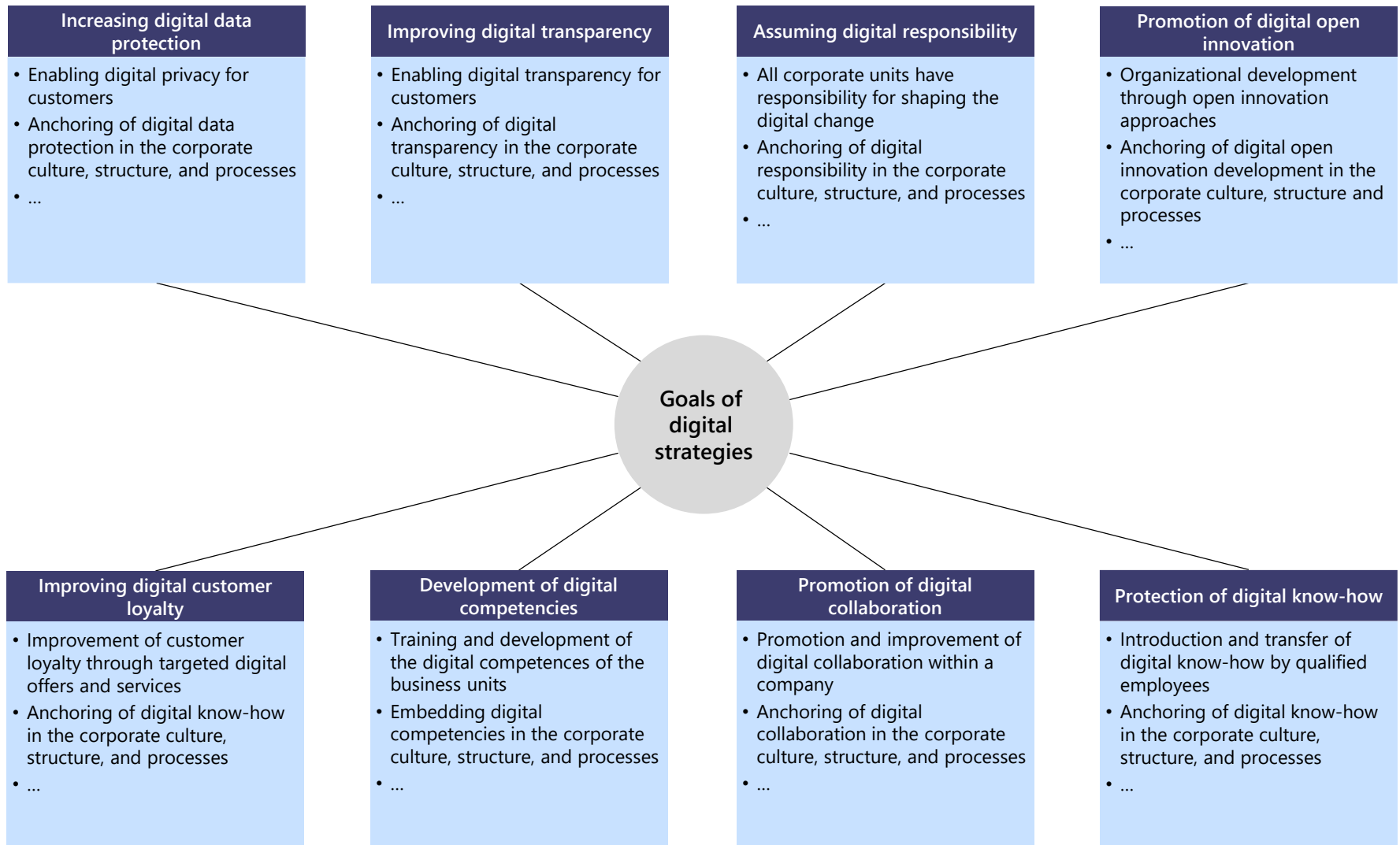
Source: Wirtz (2010b, 2021, 2024)

Fig. 15.17 Primary and secondary stakeholders of Amazon



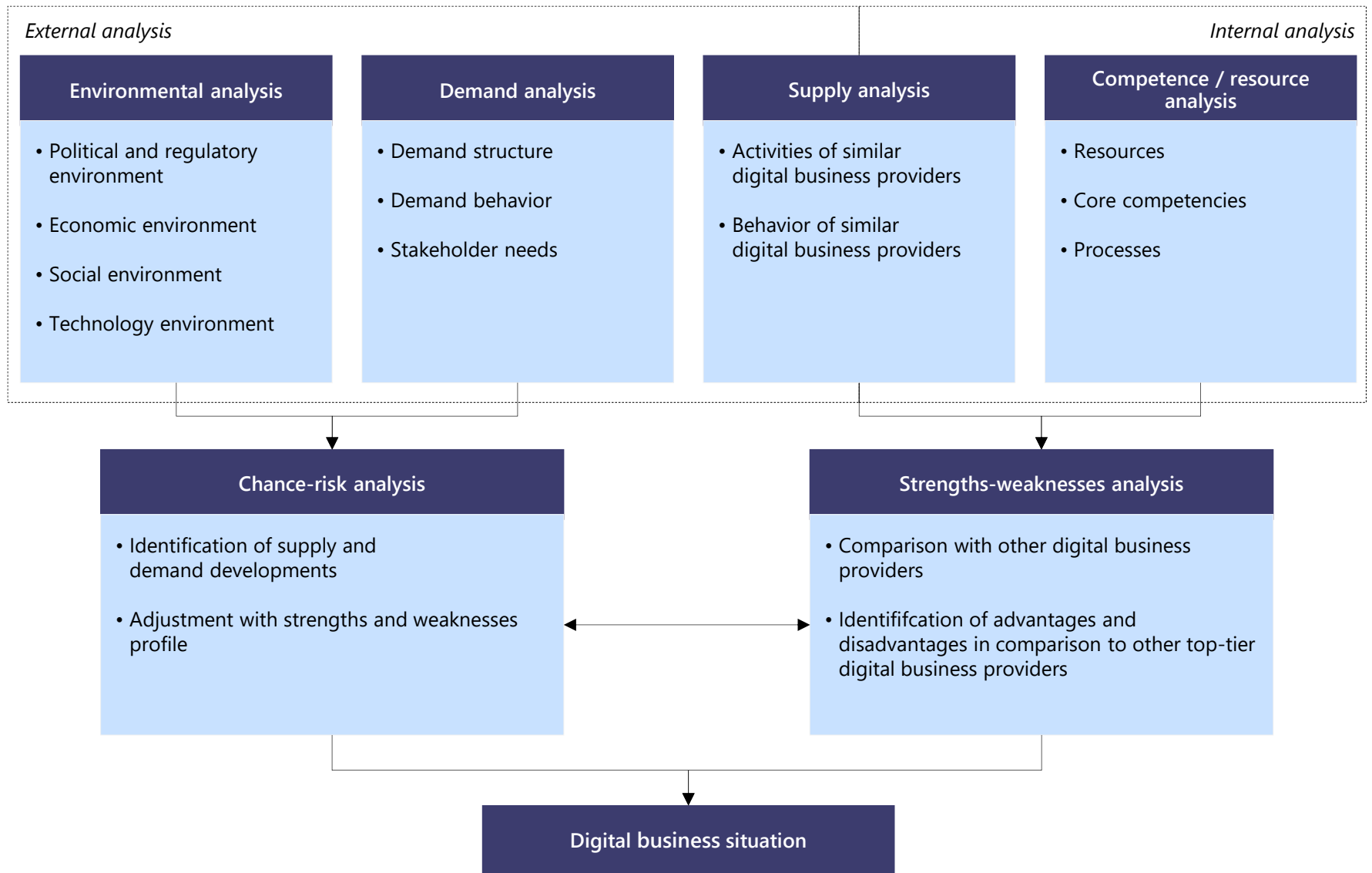
Source: Wirtz (2020a, 2021, 2024)

Fig. 15.18 Goals of digital strategies



Source: Wirtz (2020a, 2021, 2024)

Fig. 15.19 Elements of the situational digital business analysis



Source: Wirtz (2001a, 2021, 2024)

Table 15.1 Criteria for customer segmentation (1)

Type of criterion	Differentiation criteria for the digital business consumer goods market
Socio-demographic criteria	<ul style="list-style-type: none">• Gender• Age• Family status• Profession• Education• Income• Household size / number of children• Lifestyle• Religion• Nationality• ...
Psychographic criteria	<ul style="list-style-type: none">• Personal characteristics• Attitude• Behavior• Expected benefits• Usage rate• Usage status• Risk appetite• ...

Source: Wirtz (2020a, 2021, 2024)

Table 15.1 Criteria for customer segmentation (2)

Behavior-based criteria	<ul style="list-style-type: none">• Usage rate• Usage status• Price behavior• Media behavior• Brand loyalty• ...
Geographic criteria	<ul style="list-style-type: none">• State• Federal state• Place of residence• Administrative district• Purchasing power district• Function room• Catchment area• ...

Source: Wirtz (2020a, 2021, 2024)

Fig. 15.20 Competitive forces in the digital business

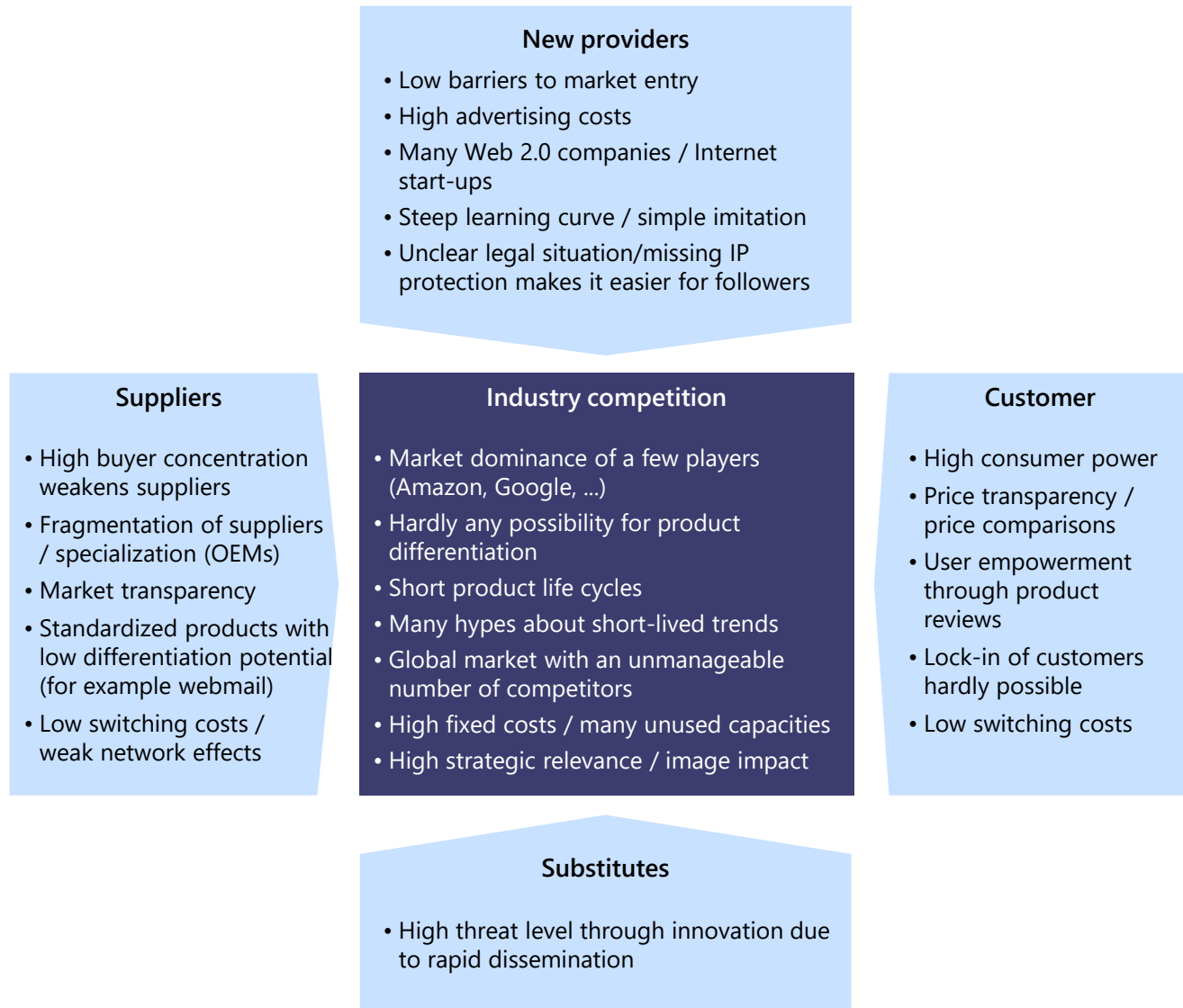


Fig. 15.21 SWOT analysis for Amazon

Strengths <ul style="list-style-type: none">• Profitable company• Excellent customer relationship management• Reliable IT infrastructure• Global brand	Weaknesses <ul style="list-style-type: none">• Risk of brand dilution due to broad product range• Pure mail order business causes high shipping costs• Dependence on supply services
Opportunities <ul style="list-style-type: none">• Potential for cooperation (for example with Toys "R" Us)• Market opportunities in Asia and Eastern Europe	Threats <ul style="list-style-type: none">• Many competitors• Threat from Google Books, Google Shopping, etc.

Source: Wirtz (2010b, 2021, 2024)

Table 15.2 Competitive strategies in digital business (1)

Strategy	Key aspects	Revenue generation	Success factors	Examples
Service leader	<ul style="list-style-type: none"> • Very high customer focus / customer orientation • Reliable service provision • Service orientation as a core competence • User-oriented breadth and depth of the offer • ... 	<ul style="list-style-type: none"> • Direct revenues through value-added services • Pay-for-performance • User fees • Setup fees • Basic fees • ... 	<ul style="list-style-type: none"> • Service reliability • Service expertise • Understanding of the service provider • Service responsiveness • ... 	<ul style="list-style-type: none"> • Share-now.com • Deliveroo.com • ...
Quality leader	<ul style="list-style-type: none"> • Focus on the value of the range of services • Focus on the range of services • Brand image premium quality • Focus on process, product, and service quality • Breadth and depth of qualitative offers • ... 	<ul style="list-style-type: none"> • Transaction revenues • Connection fees • User fees • Setup fees • Basic fees • Ad Sales • Big Data / data mining-revenues • ... 	<ul style="list-style-type: none"> • Realization of premium prices through performance advantages • Customer-oriented quality development and –planning • Continuous quality improvement • Quality-oriented organizational practices • ... 	<ul style="list-style-type: none"> • Google.com • Sap.com • ...
Price leader	<ul style="list-style-type: none"> • Scale and alliance-oriented business model • Differentiation via the lowest / best price • Coincidence with cost leadership • Focus on cost reduction • No-frills concepts • ... 	<ul style="list-style-type: none"> • Transaction revenues • Connection fees • User fees • Setup fees • Basic fees • ... 	<ul style="list-style-type: none"> • Consistent exploitation of cost reduction • High market shares • Efficient use of cost depression effects due to large quantities • ... 	<ul style="list-style-type: none"> • Mintmobile.com • Xfinity.com • ...

Source: Wirtz (2020a, 2021, 2024)

Table 15.2 Competitive strategies in digital business (2)

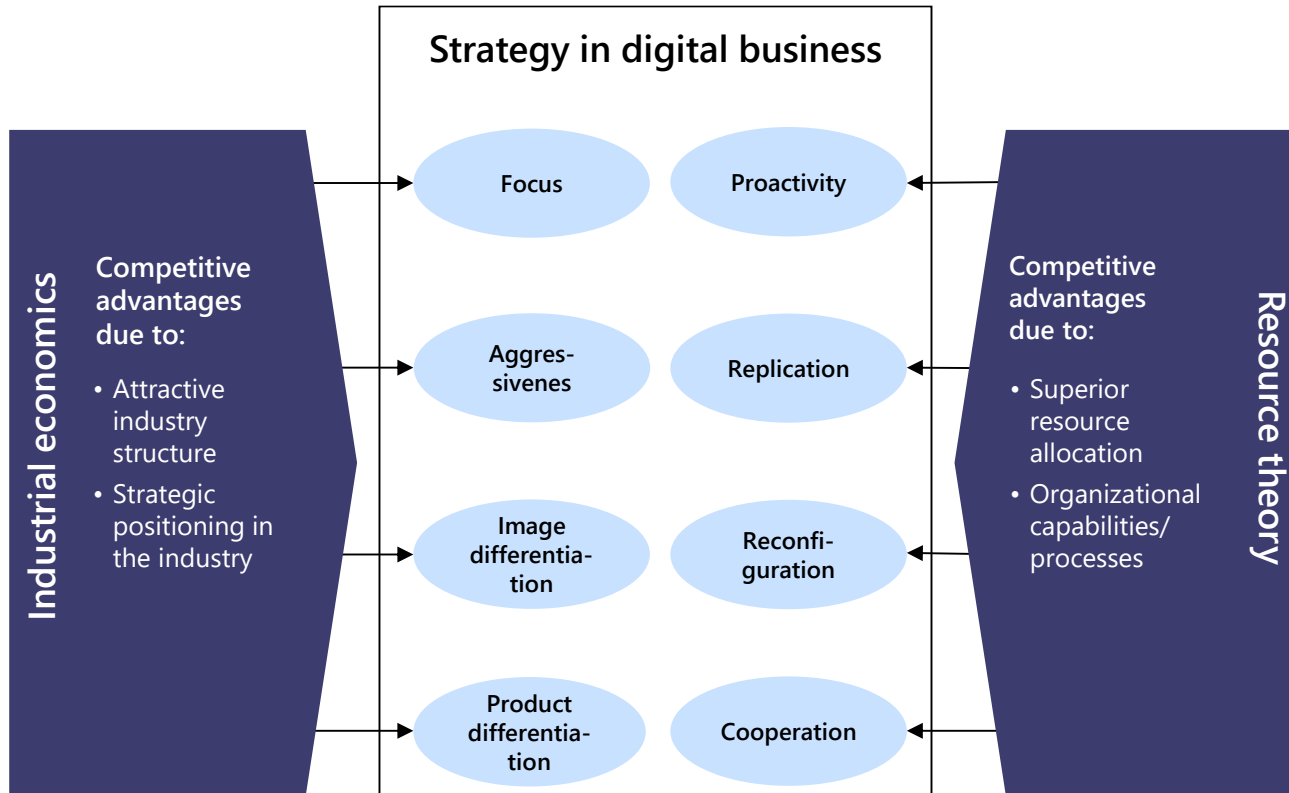
Assortment leader	<ul style="list-style-type: none"> • Focus on the most diversified range of products and services in order to address a large number of different target groups • „Long tail“ effect • ... 	<ul style="list-style-type: none"> • Transaction revenues • User fees • Basic fees • Ad sales • ... 	<ul style="list-style-type: none"> • Broad and deep product range • Consideration of the needs of different (also smaller) target groups / customer segments • Variable and multi-faceted customer approach • ... 	<ul style="list-style-type: none"> • Amazon.com • Spotify.com • Netflix.com • ...
Personalization leader	<ul style="list-style-type: none"> • Distinguished by a high degree of user-defined and customizable offers • Individual customer approach and orientation • Individual / group data mining • ... 	<ul style="list-style-type: none"> • Transaction revenues (individual prices) • ... 	<ul style="list-style-type: none"> • Provision of customer-oriented product / service configurators • Effective exploitation of technological opportunities in the configuration of products and services • ... 	<ul style="list-style-type: none"> • Mymuesli.com • Nike.com/nike-by-you • ...
Information leader	<ul style="list-style-type: none"> • Dominant position regarding the completeness, relevance and credibility of the information provided • Focus on accessibility, security and usability of information • ... 	<ul style="list-style-type: none"> • User fees (in the form of pay-per-use) • Basic fees (in the form of subscriptions) • Ad Sales • ... 	<ul style="list-style-type: none"> • Effective and efficient provision of informative content • Customer-centered/ personalized information offer • Use of different distribution media (multichannel) • ... 	<ul style="list-style-type: none"> • Reuters.com • Dpa.com • ...
Communication leader	<ul style="list-style-type: none"> • Focus on the communication with customer/stakeholder groups • Communication touchpoints • Customer/user interface forms • ... 	<ul style="list-style-type: none"> • Ad Sales • Big data / data mining-revenues • ... 	<ul style="list-style-type: none"> • User-oriented design of the graphical user interface • Multiple communication • Guarantee of data security • High communication responsiveness • ... 	<ul style="list-style-type: none"> • Twitter.com • YouTube.com • ...

Source: Wirtz (2020a, 2021, 2024)

Table 15.2 Competitive strategies in digital business (3)

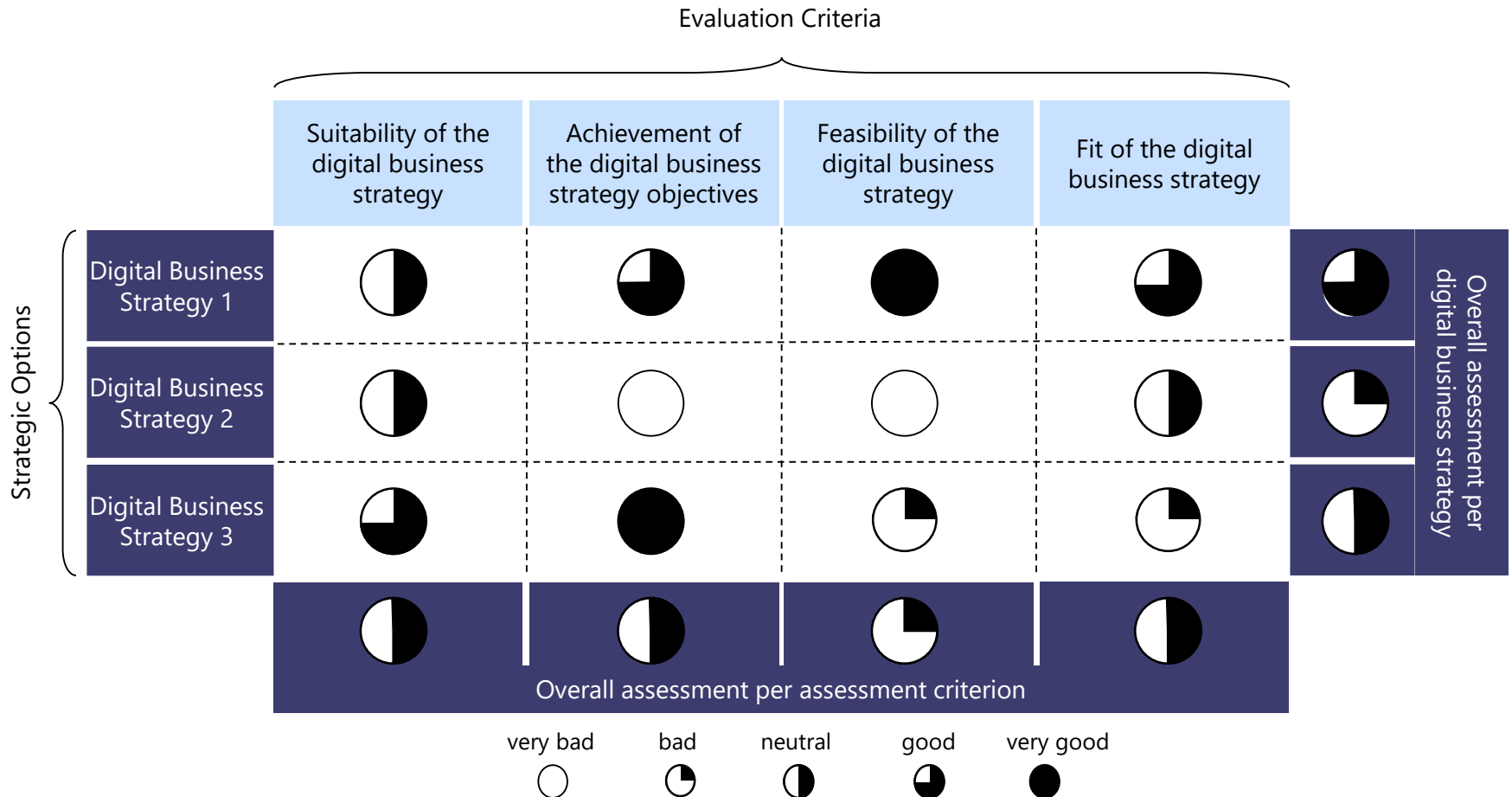
Interaction leader	<ul style="list-style-type: none"> • Focus on interactive customer needs • Manage the interactions of third-party vendors and multiple customers • Traditional providers are forced to buy information from the interaction leader • ... 	<ul style="list-style-type: none"> • Commissions • ... 	<ul style="list-style-type: none"> • Effective and efficient handling of the service relationship between third-party providers and their customers • Provision and development of interaction-oriented interfaces • Achieving high market shares • ... 	<ul style="list-style-type: none"> • Uber.com • Airbnb.com • ...
Cooperation/network leader	<ul style="list-style-type: none"> • Control and mediation competence in cooperative networks • Focus on interorganizational relationships • Creating the opportunity of informational exchange in cross-organizational networks • ... 	<ul style="list-style-type: none"> • Ad Sales • Big Data / data mining revenues • Basic fees (for premium users/professional users) • ... 	<ul style="list-style-type: none"> • Demand-oriented provision and development of effective and efficient cooperation platforms • Design of the cooperation interfaces • Ensuring the accessibility and security of the network • ... 	<ul style="list-style-type: none"> • Dropbox.com • Google.com/drive • ...
Scale leader	<ul style="list-style-type: none"> • Mass market focus • High degree of automation in services and production • High economies of scale and scope • Production volume increases faster than production costs • ... 	<ul style="list-style-type: none"> • Transaction revenues • Basic fees • License fees • ... 	<ul style="list-style-type: none"> • Consistent exploitation of cost reduction potentials • High market shares • Efficient use of cost depression effects due to large quantities • Broad and deep product range • ... 	<ul style="list-style-type: none"> • Microsoft.com/en-us/windows/ • Sap.com/products/crm/service-cloud/ • ...
Innovation leader	<ul style="list-style-type: none"> • High degree of creativity and innovative power • Innovation advantages • First-to-market strategy • First-mover advantage • ... 	<ul style="list-style-type: none"> • Transaction revenues • User fees • Patent / licence fees • ... 	<ul style="list-style-type: none"> • Innovation-oriented organizational practices • Customer-oriented innovations • Promotion of innovation • High R&D share • Innovation cooperations • ... 	<ul style="list-style-type: none"> • Apple.com • Tesla.com • ...

Fig. 15.22 Strategy in digital business



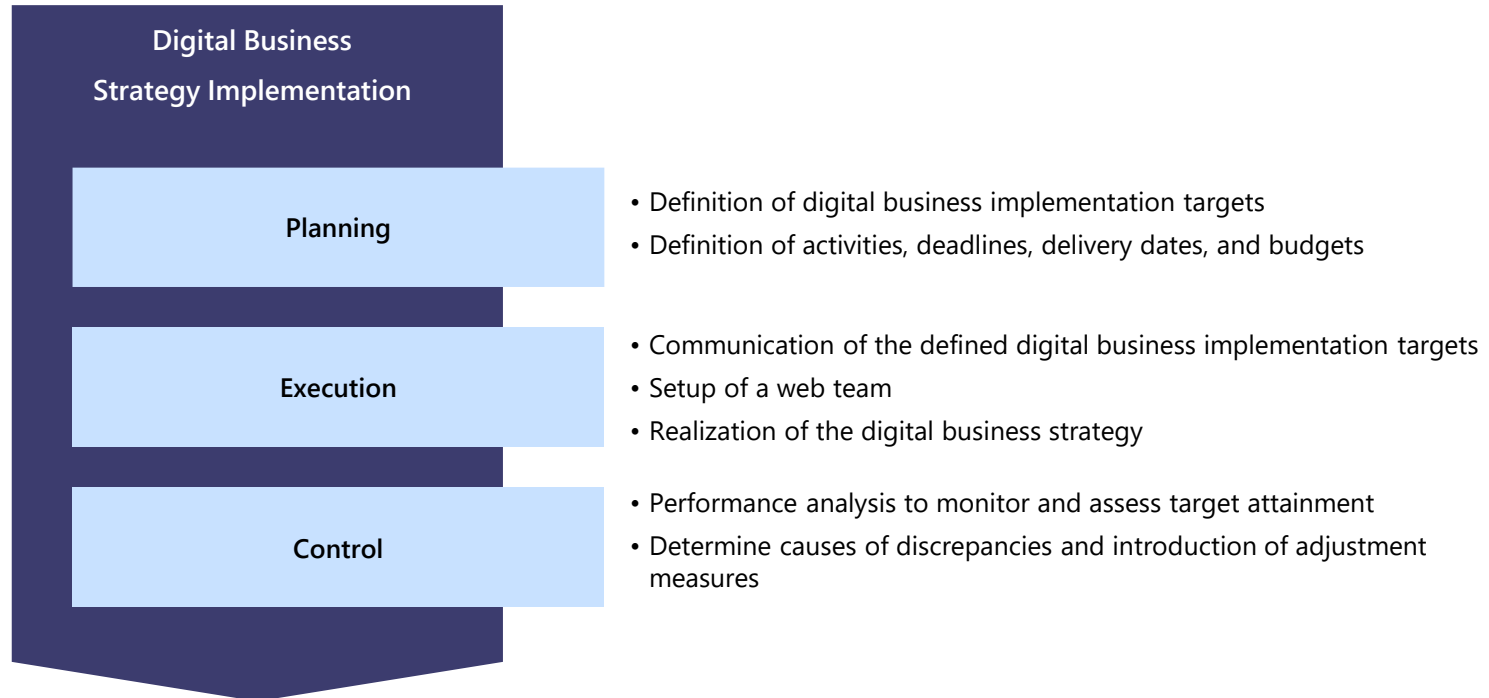
Source: Wirtz (2020a, 2021, 2024)

Fig. 15.23 Digital business strategy evaluation matrix



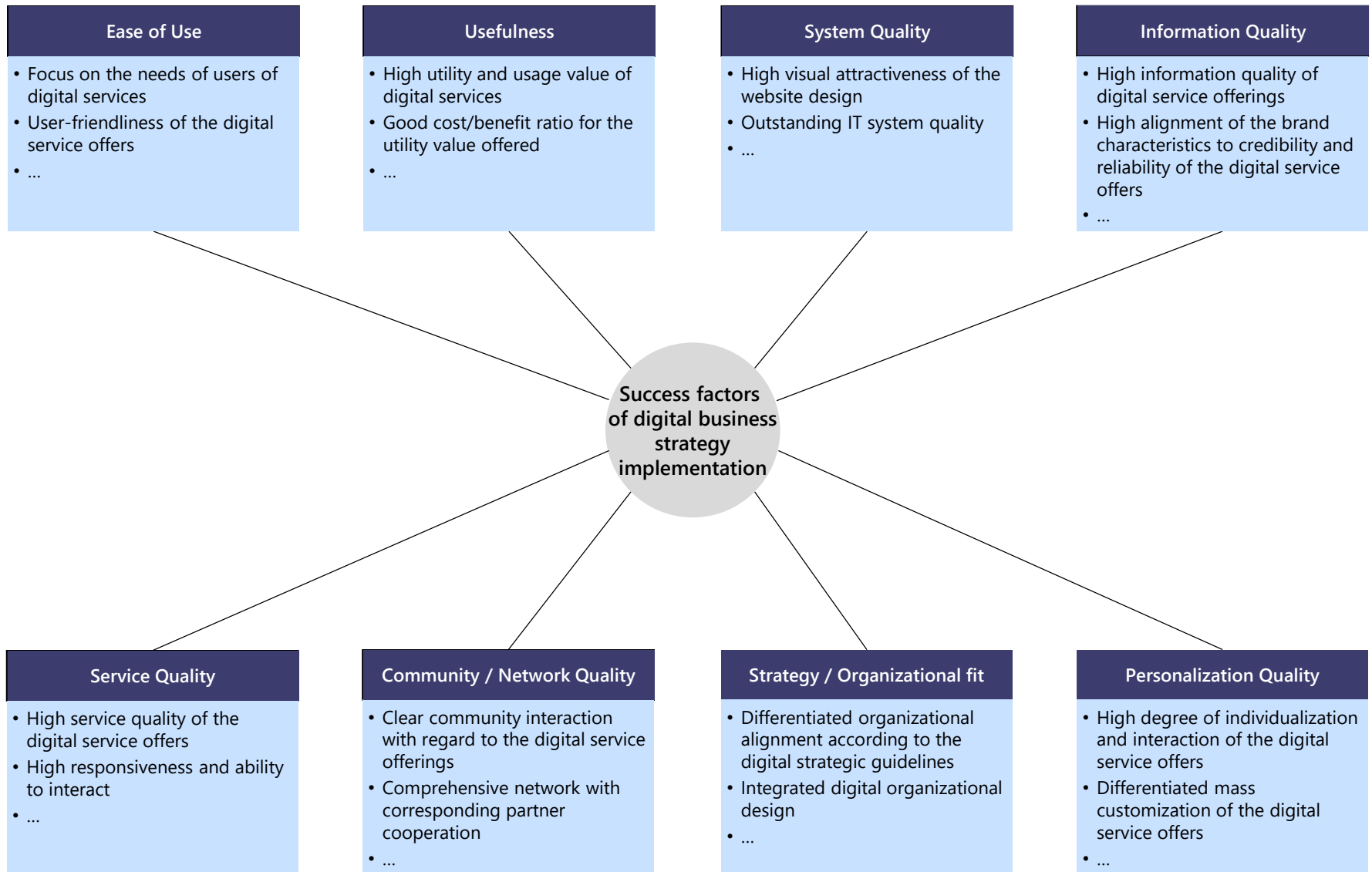
Source: Wirtz (2010b, 2021, 2024)

Fig. 15.24 Digital business implementation phases



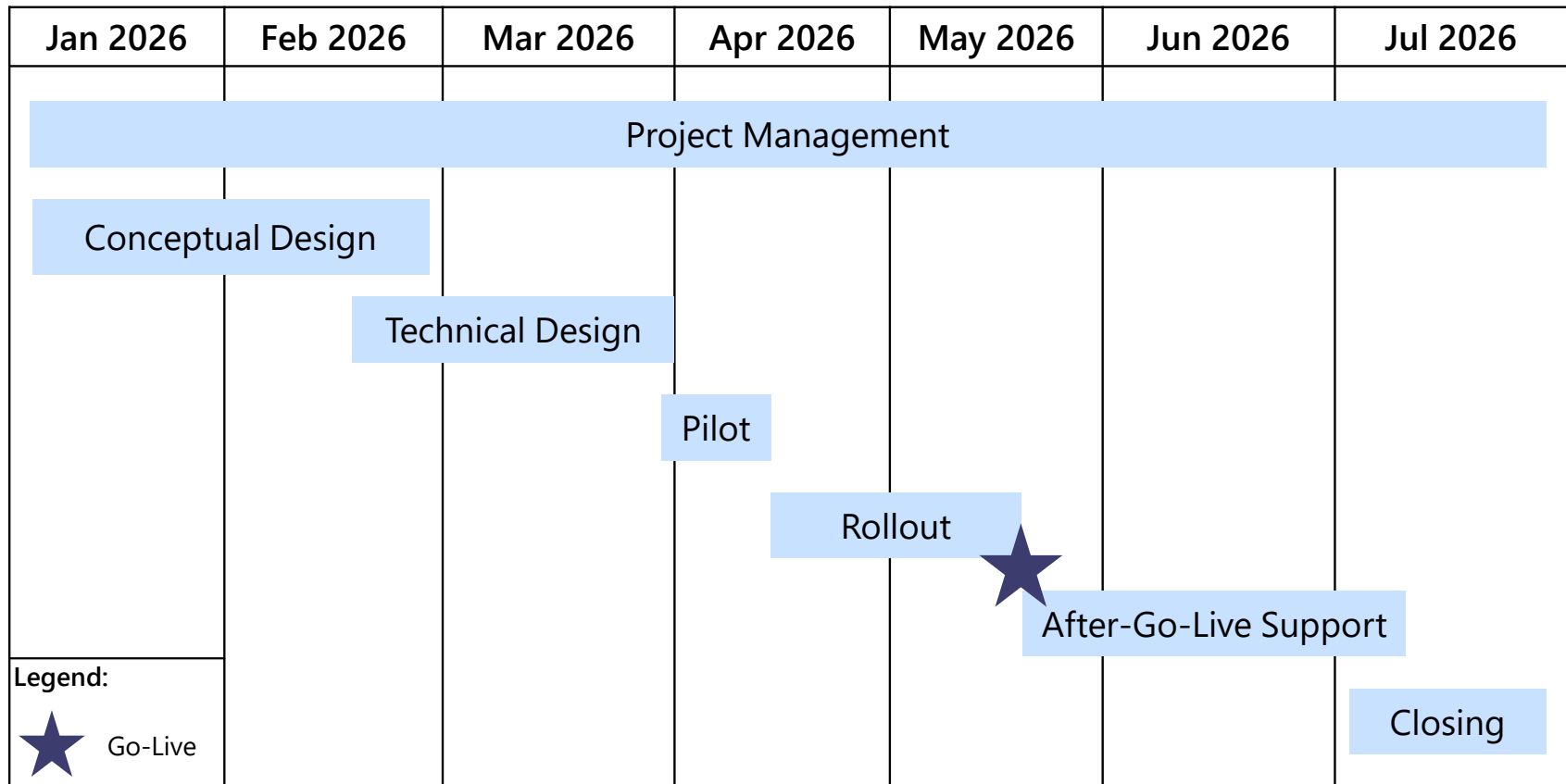
Source: Wirtz (2010b, 2021, 2024)

Fig. 15.25 Success factors of digital business strategy implementation



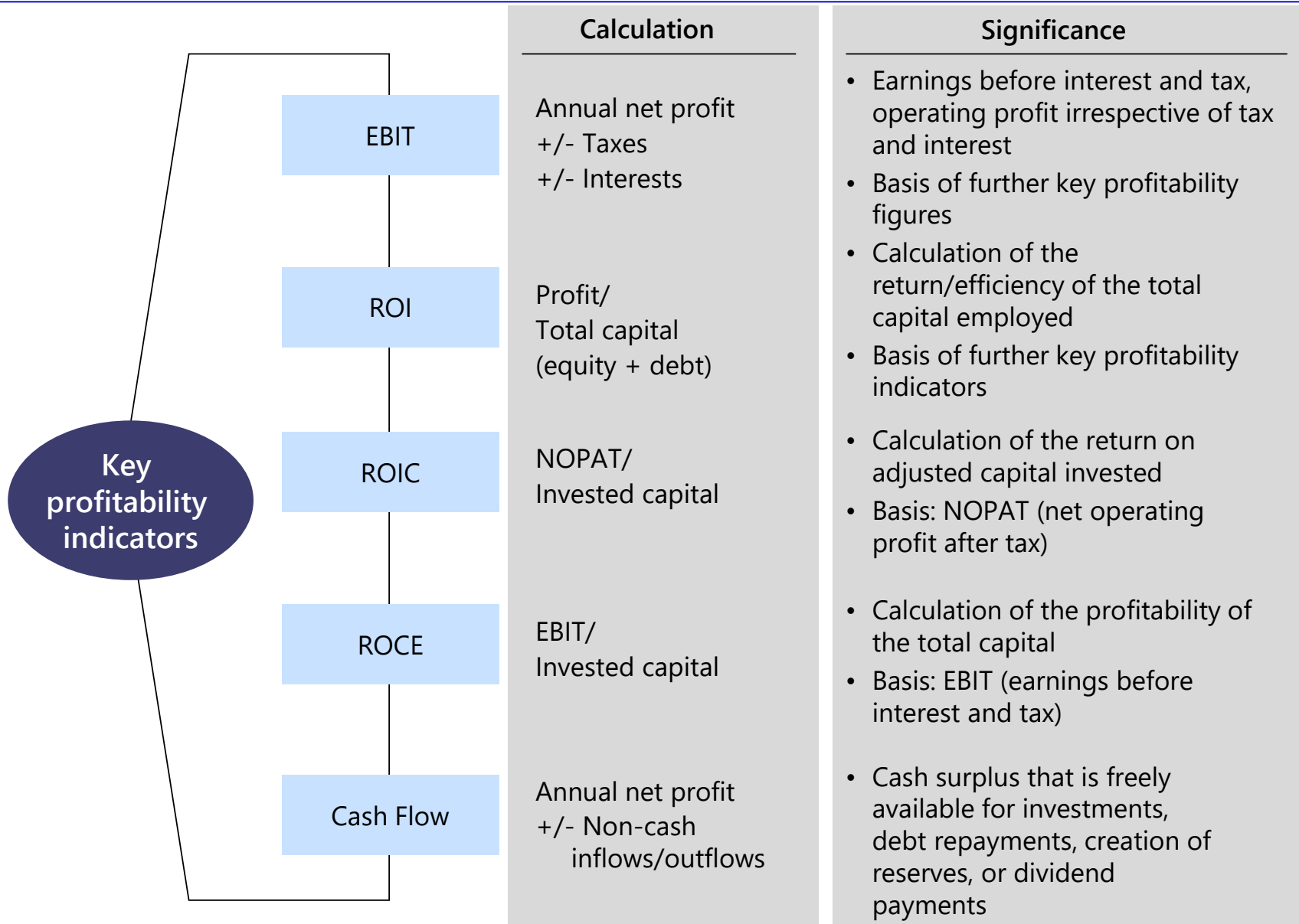
Source: Wirtz (2000a, 2021, 2024)

Fig. 15.26 Ideal digital business strategy implementation plan



Source: Wirtz (2010b, 2021, 2024)

Fig. 15.27 Digital business key profitability indicators



Source: Wirtz (2010a, 2021, 2024)

Chapter 15 Questions and topics for discussion

Chapter 15 Questions and topics for discussion



Review questions

1. Describe the four forces of digital business.
2. Explain the determinants and levels of convergence development.
3. Describe the forms of open innovation.
4. Present the different competitive strategies in digital business.
5. Describe the different phases of digital business strategy development.

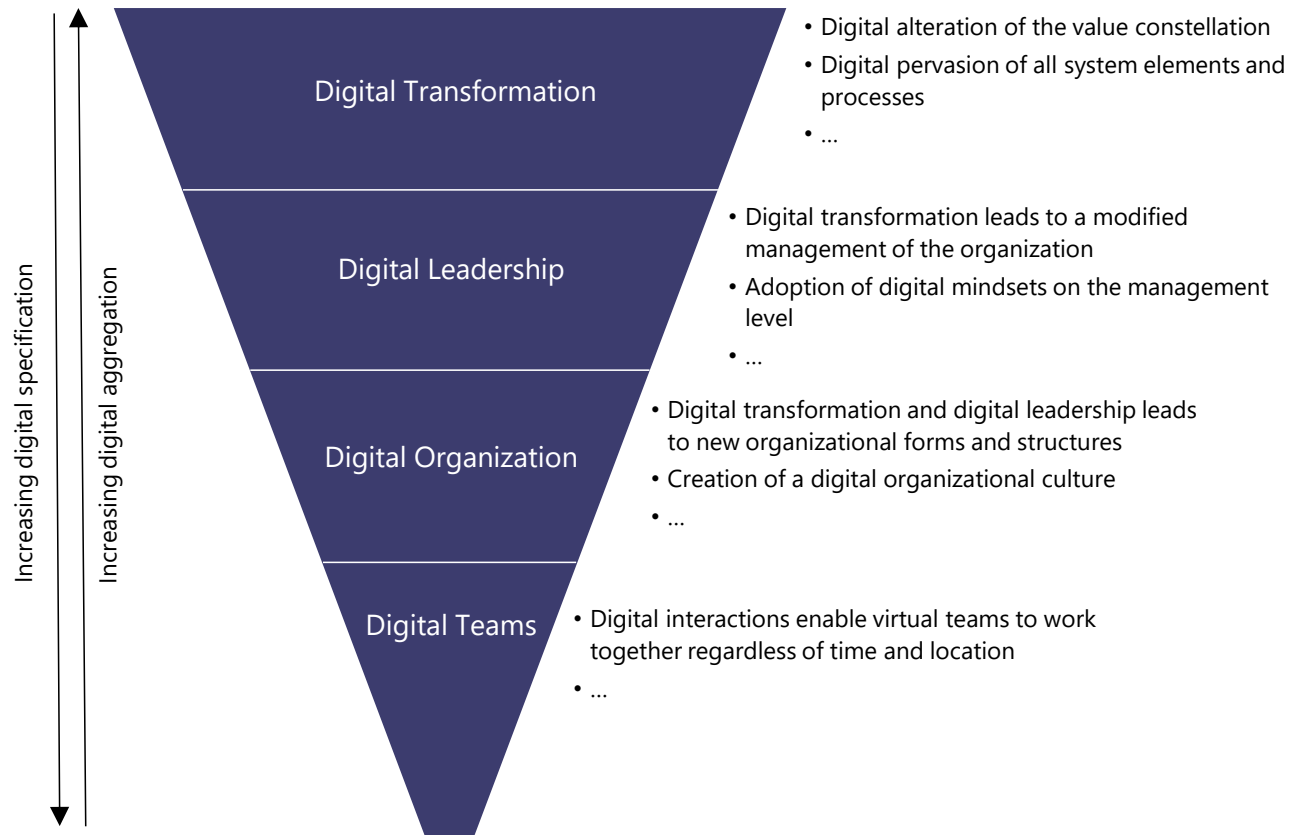


Topics for discussion

1. Discuss on the basis of the four forces which force is the most important one.
2. Discuss whether the fast-moving digital market even requires a long-term strategy. Is a short-term adaptation not the more effective approach?
3. Debate whether the innovation strategy is the most important competitive strategy and which advantages and disadvantages a systematic innovation strategy has.

Chapter 16: Digital Transformation and Digital Organization

Fig. 16.1 Digital transformation pyramid



Source: Wirtz (2020, 2021, 2022, 2024)

Table 16.1 Selected definitions of digital transformation

Author(s)	Definition
Capgemini Consulting (2011)	"Digital transformation (DT) – the use of technology to radically improve performance or reach of enterprises – is becoming a hot topic for companies across the globe. Executives in all industries are using digital advances such as analytics, mobility, social media and smart embedded devices – and improving their use of traditional technologies such as ERP – to change customer relationships, internal processes, and value propositions."
Bouée and Schaible (2015)	We understand digital transformation as the consistent interconnectedness of all industrial sectors and the adaptation of the actors to the new conditions of the digital economy. Decisions in interconnected systems include the data exchange and analysis, the calculation and evaluation of options as well as the initiation of actions and consequences.*
Berghaus and Back (2016)	"Digital transformation is a technology-induced change on many levels in the organization that includes both the exploitation of digital technologies to improve existing processes, and the exploration of digital innovation, which can potentially transform the business model."
Schwertner (2017)	"Digital Business Transformation is the application of technology to build new business models, processes, software and systems that results in more profitable revenue, greater competitive advantage, and higher efficiency. Businesses achieve this by transforming processes and business models, empowering workforce efficiency and innovation, and personalizing customer/citizen experiences."
Kofler (2018)	From a societal perspective, the digital transformation is omnipresent and affects every individual - it is irrevocable. We are all affected and actively drive this continuous change in different roles (for instance as customers, developers, employees, scientists) without any foreseeable end.*

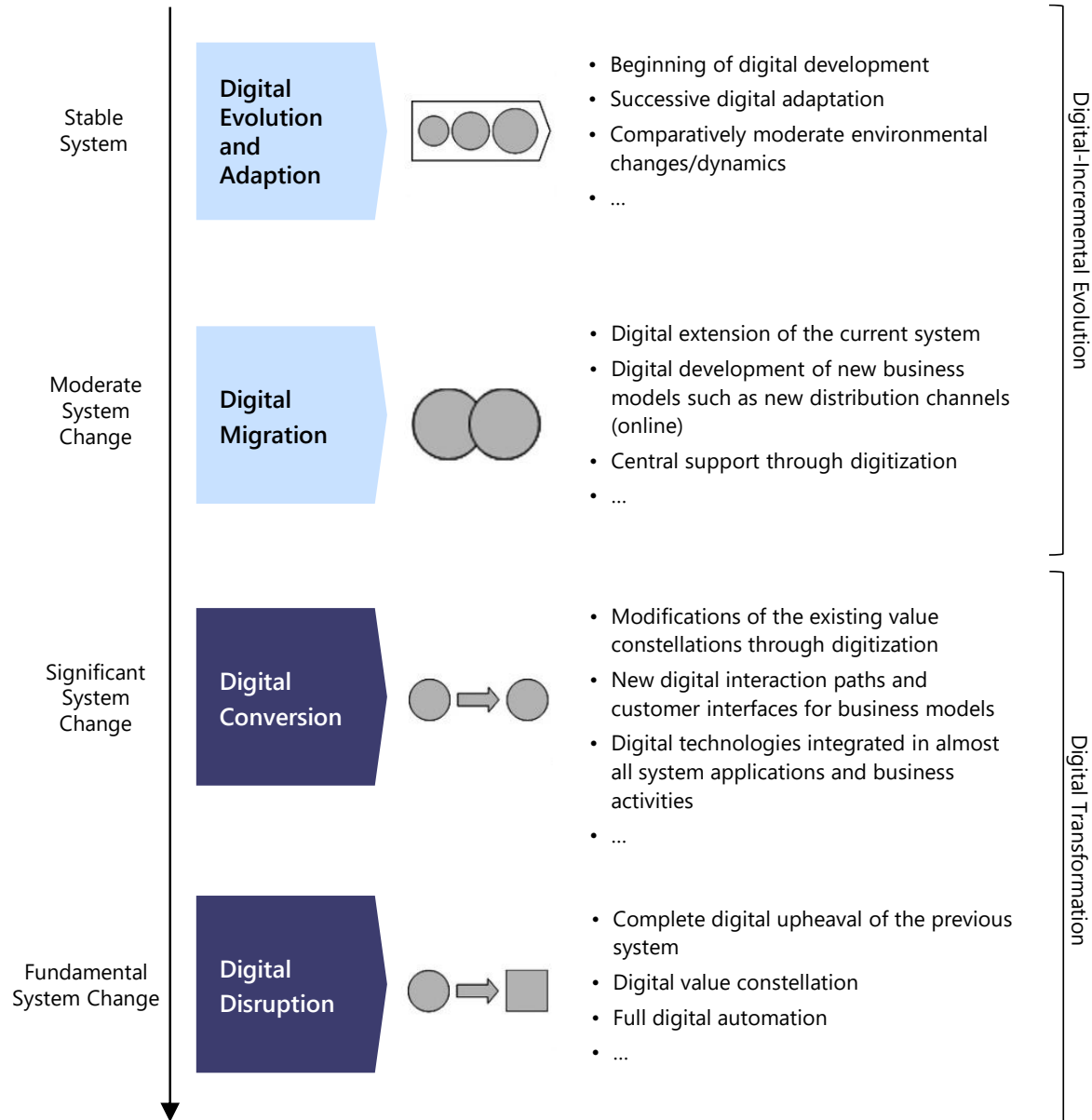
Definition of Digital Transformation

Definition of Digital Transformation (Wirtz 2020,2021,2022,2024)

Digital transformation represents the fundamental change and transformation of economy and society towards a digital-based economic and social system. In this process, all economic and social structures and processes are significantly supported and shaped by digital technologies with the aim of improving their efficiency and effectiveness at a higher level of welfare.

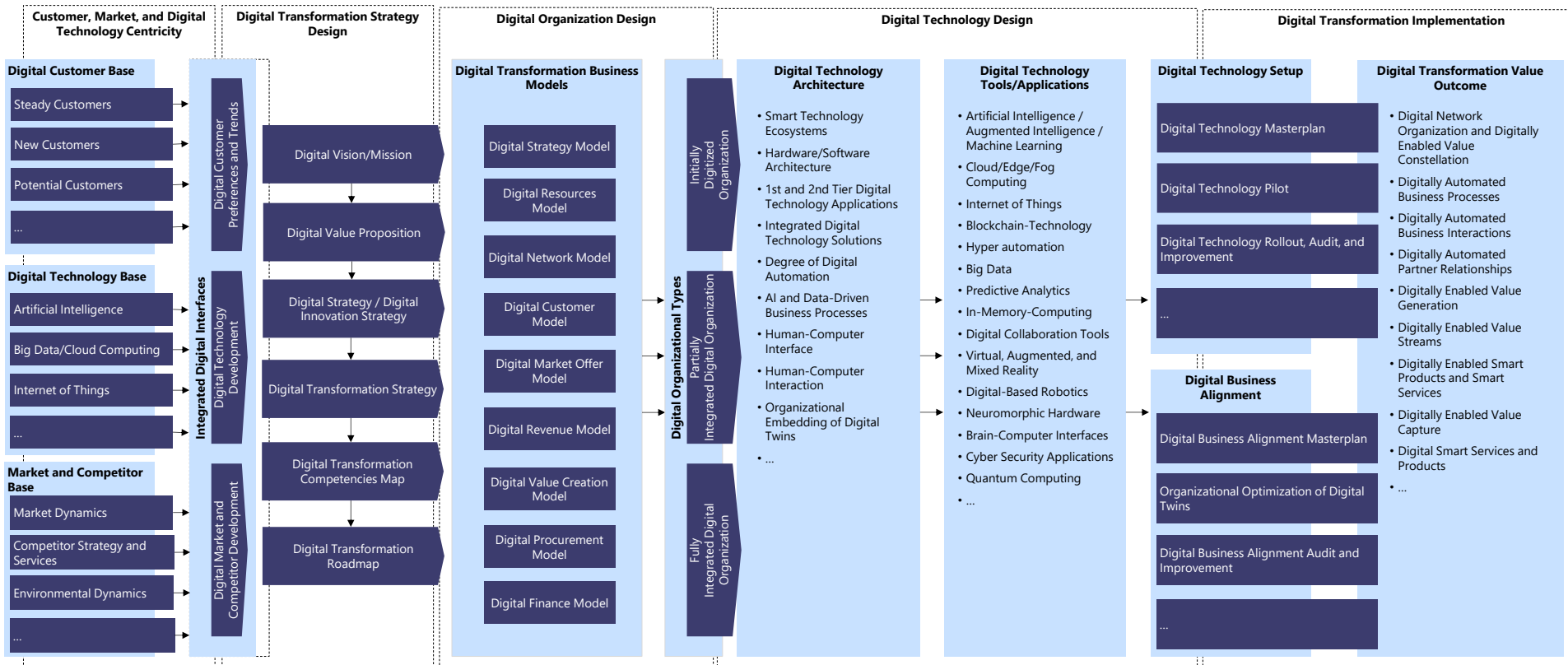
Source: [Wirtz \(2020, 2021, 2022, 2024\)](#)

Fig. 16.2 Phases of digital development and transformation



Source: Wirtz (2020, 2021, 2022, 2024)

Fig. 16.3 5-Component Model of Digital Transformation



Source: Wirtz (2024)

Table 16.2 Definitions of digital leadership

Author(s)	Definition
Buhse (2012)	Digital Leadership as a form of management that not only masters the old management basics, but is also able to abstract old leadership concepts and recipes for success, compare them with the new values and success models from the digital world and then use them (two-handed leadership). In addition to their traditional role, digital leaders are also required to act as moderators, bridge builders and organizers of networks.*
El Sawy et al. (2016)	"We define digital leadership as doing the right things for the strategic success of digitalization for the enterprise and its business ecosystem."
Petry (2018)	"The five characteristics of network, openness, participation, agility plus trust form the so called NOPA+ model of digital leadership."
Hensellek (2019)	Digital leadership is a reciprocal concept that is not only tied to top management positions in the sense of a top-down approach, but also refers to the active involvement of employees at lower hierarchical levels.*
Doyé (2018)	Digital leadership means using the collective intelligence of employees and peers (swarm intelligence) with decentralized leadership.*

* Translated

Source: Wirtz (2020, 2021, 2022, 2024)

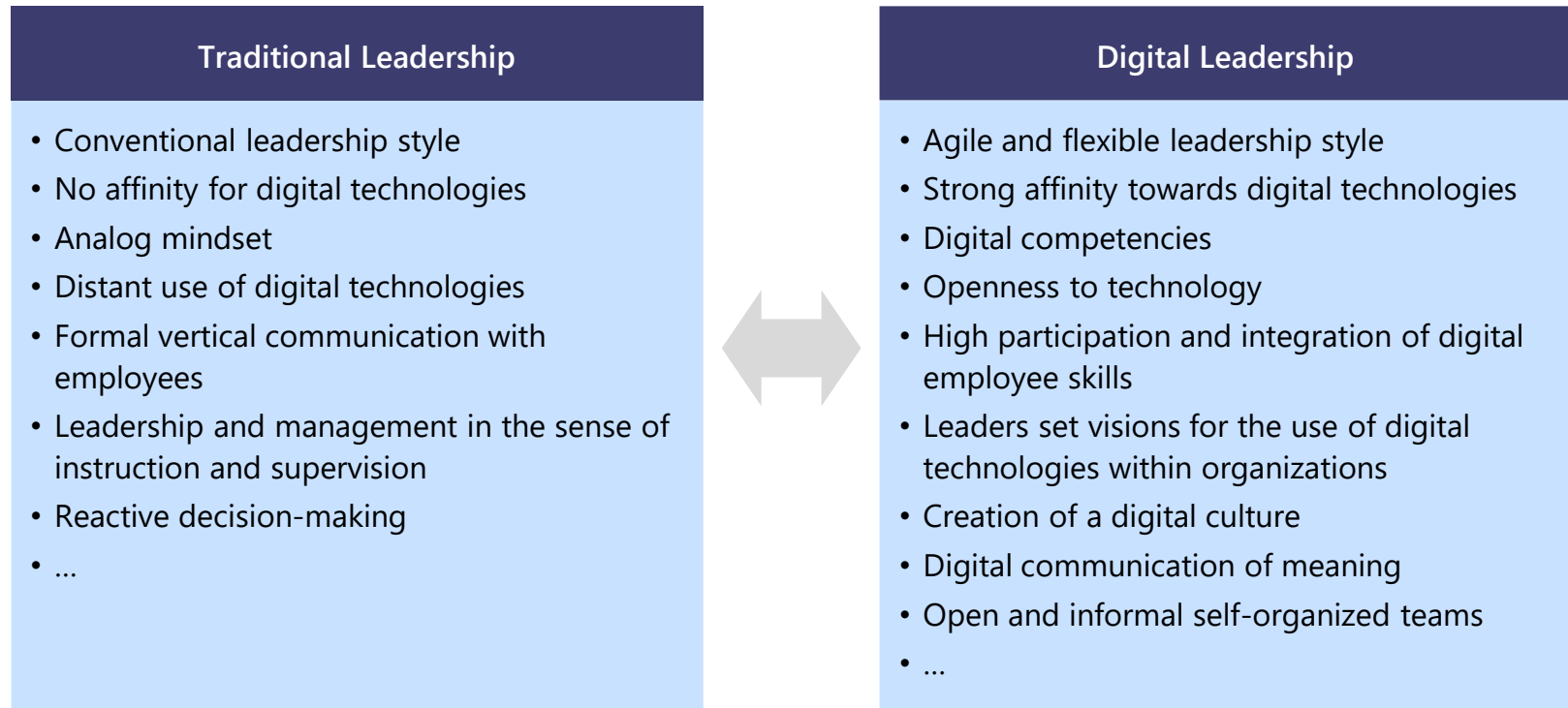
Definition of Digital Leadership

Definition of Digital Leadership (Wirtz 2020,2021,2022,2024)

Digital leadership characterizes the leadership of organizational systems and actors based on the comprehensive application of digital technologies. Specific features of digital leadership are high agility, networking, participation, flexibility and responsiveness to external environmental and internal organizational changes. The objective of digital leadership is to achieve greater effectiveness and efficiency in business activities.

Source: [Wirtz \(2020, 2021, 2022, 2024\)](#)

Fig. 16.4 Traditional leadership vs. digital leadership



Source: Wirtz (2020, 2021, 2022, 2024)

Table 16.3 Selected definitions of digital/virtual organization

Author(s)	Definition
Wirtz (1995)	A virtual organization can be understood as a temporary network of independent companies (suppliers, co-producers, distributors, but also customers or competitors), which is linked via modern information and communication technologies in order to transfer knowledge (know-how), supplement skills and share costs to open up new product areas and markets.*
Mertens and Faisst (1996)	A virtual company is based on a network of companies that quickly join forces (dynamic configuration and reconfiguration) to take advantage of a competitive opportunity.*
Picot et al. (1998)	The virtual enterprise presents itself as a dynamic network. [...] Virtual enterprises are created through the networking of location-distributed organizational units that are involved in a coordinated value-added process based on the division of labor.*
Rouse (2011)	"A digital enterprise is an organization that uses technology as a competitive advantage in its internal and external operations."
Accenture Consulting (2017)	"A digital enterprise is connected and dynamic, flexible enough to embrace continuous change. It uses connected platforms, analytic insights, collaboration and modular operating models to increase productivity, speed and responsiveness while putting customers at the center of whatever it does."
Snow et al. (2017)	"A fully digital enterprise is a powerful combination of people, technology, and organizing ability that is well suited to today's economic and social environment."

* Translated

Source: Wirtz (2020, 2021, 2022, 2024)

Definition of Digital Organization

Definition of Digital Organization (Wirtz 2020,2021,2022,2024)

The digital organization is an organization that is supported by digital information technologies in all essential areas of business activities and digitizes all core business processes. It thus has a digital-organizational end-to-end structure (value-added organization from the supplier interface to the customer interface). The digital organization uses digital technologies to achieve a sustainable, technology-based competitive advantage.

Source: [Wirtz \(2020, 2021, 2022, 2024\)](#)

Fig. 16.5 Development stages of digital organizations

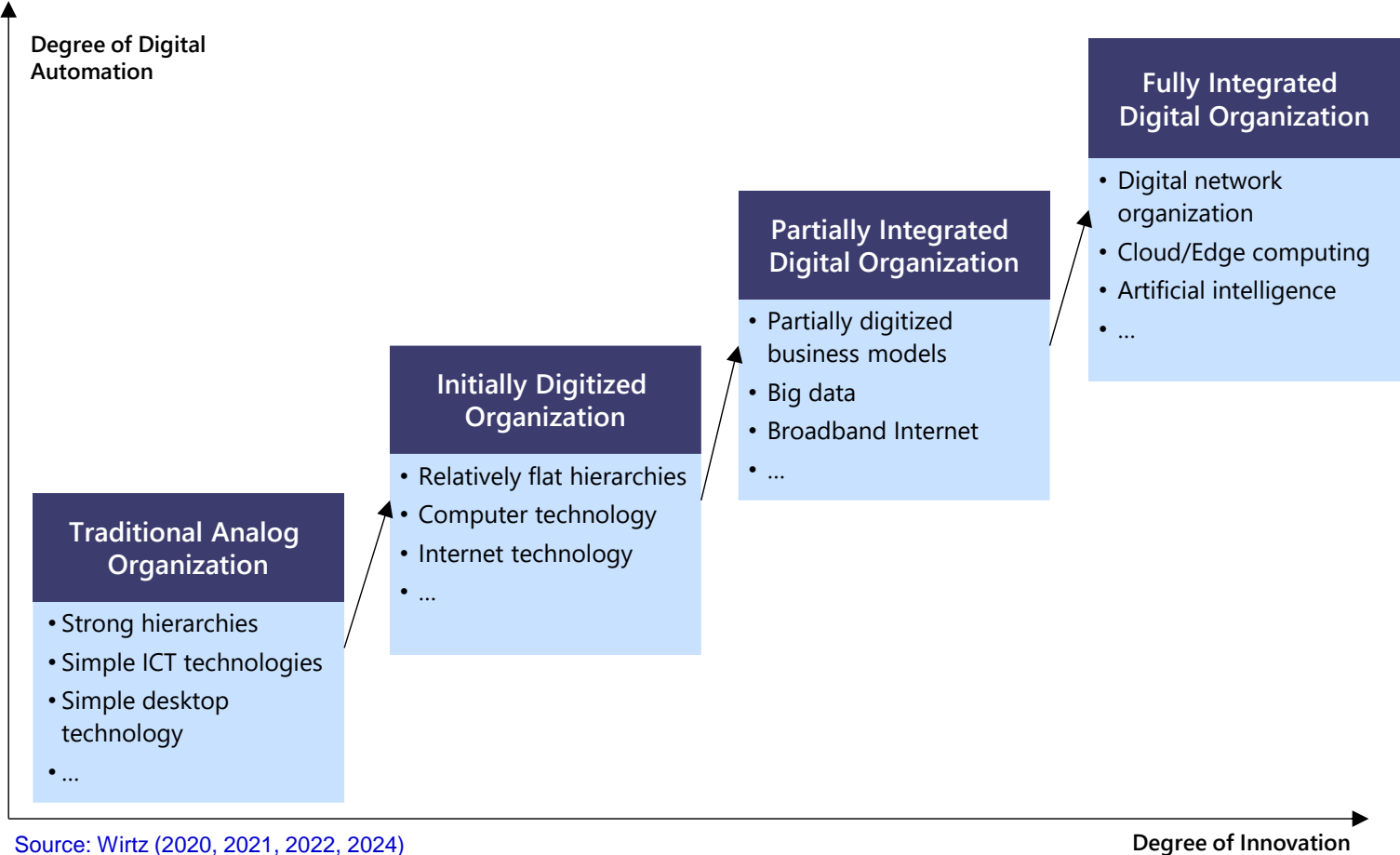


Fig. 16.6 Organizational and technological characteristics of the different development stages of digital organizations (1)


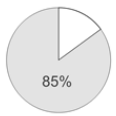

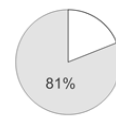

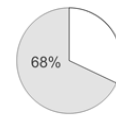

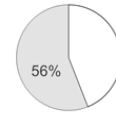
	Traditional Analog Organization	Initially Digitized Organization	Partially Integrated Digital Organization	Fully Integrated Digital Organization
Organizational Characteristics	<ul style="list-style-type: none"> • Primary organization • Single-line or multi-line system • Strong hierarchy • Analog mindset • Analog business model • Central responsibility • Process orientation • Low integration or participation of users/customers • Concentration of specialists • Silo thinking • Formal vertical communication • Superior as sole directional control • Leadership and management in the sense of instruction and supervision • Reactive culture • ... 	<ul style="list-style-type: none"> • Secondary organization that completes/ transcends hierarchies • Line-and-staff system • Focus on process standardization • Development culture • Establishment of intensive feedback loops • Relatively flat hierarchies • Focus on organizational stability • Low digital action, reaction and interaction capability • Responsible employees • Short and frequent communication cycles • Culture of cooperation • Manager as moderator between analogue and digital technologies • ... 	<ul style="list-style-type: none"> • Flat organizational structure • Flat hierarchies • Partially digitized business model • Digital integration and participation of users/customers • Focus on process optimization • Data based decision making • Moderate digital action, reaction, and interaction ability • Electronic/digital collaboration • Decentralized responsibility • Supervisor as digital conveyor and enabler • Proactive organizational culture • Open informal and self-organized teams • ... 	<ul style="list-style-type: none"> • Digital network organization • Digital mindset / digital organizational culture • Digital business model/digital twin • Big data-based business activities and processes • Digital value chains • Digital interfaces • Digital cross-functional connections • High digital action, reaction, and interaction capability • Digital transparency • Digitally based user/customer orientation • Focus on digital process automation • Digital collaboration • Use of agile methods • Digital flexibility and agility • Self-learning organization • Autonomous digital teams • ...

Fig. 16.6 Organizational and technological characteristics of the different development stages of digital organizations (2)

Technological Characteristics	<ul style="list-style-type: none">• Analog data• Simple ICT technologies• Analog signal transmission• Simple desktop technology• Fax• Telephone• Printer• Floppy disks• CDs• ...	<ul style="list-style-type: none">• Electronic data processing• Data centers• Computer• Internet• Email• LAN• ...	<ul style="list-style-type: none">• Big data• Predictive analytics• Computer-computer connection / cross communication (peer-to-peer-architecture)• In-memory-computing• Electronic collaboration Tools (Cisco Webex)• Videotelephony• Broadband Internet• ...	<ul style="list-style-type: none">• Cloud/edge computing• Machine learning• Internet of things• Blockchain technology• Virtual, augmented, and mixed reality• Artificial intelligence/ augmented intelligence• Hyper automation• Robotics• Neuromorphic hardware• Brain-computer interfaces• Cyber security applications• Quantum computing• Digital Twins/Industrial Metaverse• ...
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Source: Wirtz (2020, 2021, 2022, 2024)

Table 16.4 Digital technologies, instruments, and methods in digital organizations (1)

Digital Technologies, Instruments and Methods	Description	Percentage of Use in Successful Digital Organizations
 Conventional Web Technologies	<ul style="list-style-type: none"> • Active use of websites or online applications • Provision of websites and online applications • HTML • JavaScript • ... 	
 Cloud-based Services	<ul style="list-style-type: none"> • Use of external storage capacities • Use of external computing power • Use of external software • Flexible and location-independent access to data, software, and computing power • ... 	
 Mobile Internet Technologies	<ul style="list-style-type: none"> • Location-independent access to nearly all contents of the Internet • High data transfer rates through 5G technology (10 gigabit per second) • ... 	
 Big Data and Big Data Architecture	<ul style="list-style-type: none"> • Effective and efficient analysis and processing of large, complex, and partly unstructured data sets • Data-based decision making • ... 	





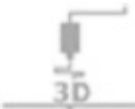

Source: Wirtz (2020, 2021, 2022, 2024)

Table 16.4 Digital technologies, instruments, and methods in digital organizations (2)

 <p>Internet of Things</p>	<ul style="list-style-type: none"> • Interconnectedness of different physical and virtual objects via the Internet • The objects can communicate and interact autonomously via the Internet • ... 	
 <p>Design Thinking</p>	<ul style="list-style-type: none"> • Method for solving complex problems • Application of creative techniques and technological tools • ... 	
 <p>AI Applications</p>	<ul style="list-style-type: none"> • Automation of intelligence • Based on a variety of inputs the system learns to find the expected solutions to problems • E.g., in the form of language translation • ... 	
 <p>Robotics</p>	<ul style="list-style-type: none"> • Use of information technology, mechanical elements, and electrical engineering to create a physical connection between a technical unit and the real environment • Interaction between electronics and mechanics • ... 	

Source: Wirtz (2020, 2021, 2022, 2024)

Table 16.4 Digital technologies, instruments, and methods in digital organizations (3)

 <p>Advanced Neural Machine Learning (Deep Learning)</p>	<ul style="list-style-type: none"> • Artificial neural networks as information-technological replication of the human brain • Machine learning is the artificial generation of knowledge by machines • Subfield of artificial intelligence • ... 	
 <p>Augmented Reality</p>	<ul style="list-style-type: none"> • Virtual extension of human perception • Fictional extension of the environment through digital information and symbols • ... 	
 <p>Additive Manufacturing (3D Printing)</p>	<ul style="list-style-type: none"> • Computer-controlled successive generation of three-dimensional products • E.g., 3D printing • ... 	

Source: Wirtz (2020, 2021, 2022, 2024)

Table 16.5 Selected definitions of digital/virtual teams

Author(s)	Definition
Jarvenpaa and Leidner (1999)	"A virtual team is an evolutionary form of a network organization (Miles and Snow 1986) enabled by advances in information and communication technology."
Zaccaro and Bader (2003)	"The "virtual" team is another phrase that has recently entered prominently into our leadership lexicon. The term "virtual" is misleading because it suggests a degree of unreality, as if such teams exist only in the nether world of electrons. These are real teams having all of the characteristics, demands, and challenges of more traditional organizational teams. The differences reside in two key features. First, members of these new forms of organizational teams either work in geographically separated work places, or they may work in the same space but at different times. Still other teams have members working in different spaces and time zones, as is the case with many multinational teams. The second feature is that most, if not all, of the interactions among team members occur through electronic communication channels."
Hertel et al. (2004)	"[...] virtual teams consist of two or more persons who collaborate to achieve common goals, while (at least) some of the team members work at different locations (or times) so that communication and coordination is predominantly based on electronic communication media (email, fax, phone, videoc conference, etc.)."
Malhotra et al. (2007)	"Virtual teams are teams whose members are geographically distributed, requiring them to work together through electronic means with minimal face-to-face interaction."
Hewitt (2013)	"Digital teams are responsible for developing, testing, and implementing a strategy to reach and engage target audiences through digital channels like web, mobile, and social."

Source: Wirtz (2020, 2021, 2022, 2024)

Definition of Digital Teams

Definition of Digital Teams (Wirtz 2020,2021,2022,2024)

A digital team is a working group of employees supported by digital information technologies in all essential areas of work and business activity, and in which all essential business work processes are digitized. At the core of the digital team are digital working environments and platforms that enable agile and flexible collaboration regardless of time, location or people. Employees can work together interactively, simultaneously and in real time to complete tasks by means of digital technologies. Digital teams aim at achieving sustainable technology-based efficiency and effectiveness at the work level.

Source: [Wirtz \(2020, 2021, 2022, 2024\)](#)

Fig. 16.7 Development stages of digital teams

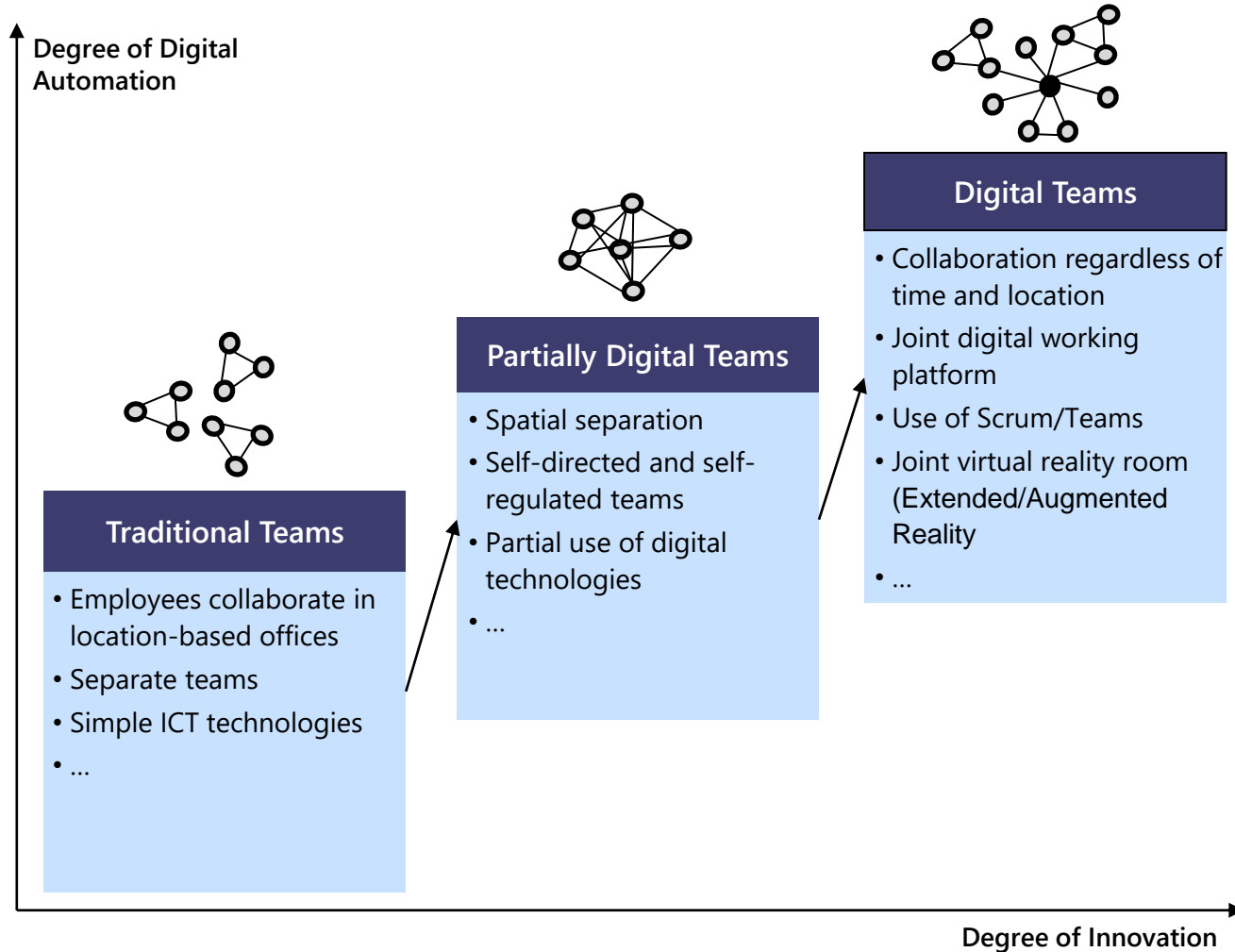


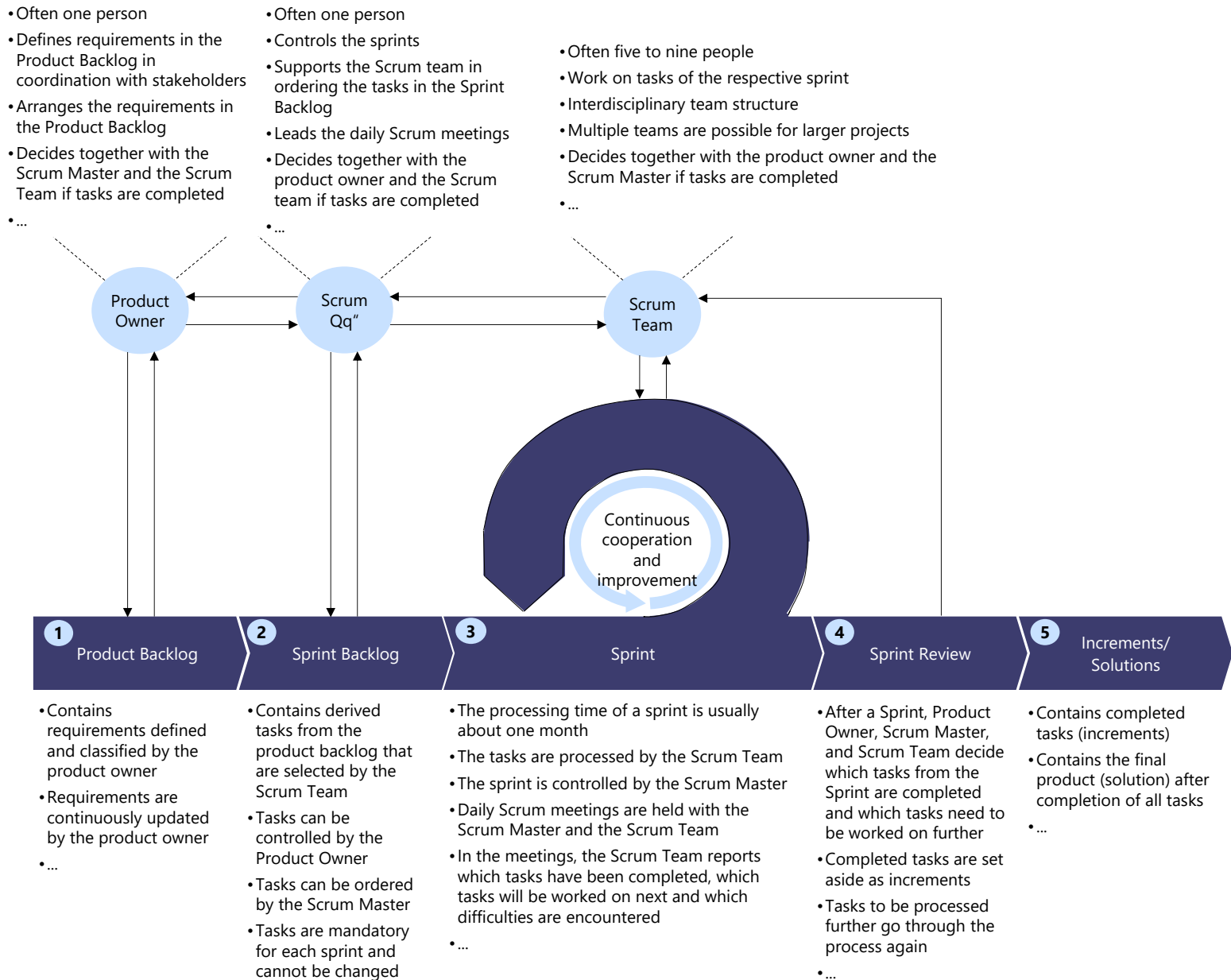
Table 16.6 Selected agile methods for digital teams (1)

Method	Concept	Main Aspects
Design Thinking	Design thinking is based on the assumption that problems can be solved better by interdisciplinary teams. The design thinking process can be divided into six phases, which are worked on in an interdisciplinary way and mostly in digital teams: Understand, Observe, Define, Idea generation, Prototype, Test. These phases can be worked through linearly or iteratively. Visualization usually takes place in digital form and enables work in digital teams.	<ul style="list-style-type: none"> • Interdisciplinary approach • Fostering collaborative creativity • User/customer centricity • Digital visualization of phases • Digital collaboration of the team • ...
Scrum	Scrum is an iterative method of product development. Within fixed periods of time (sprints), a team develops solutions to requirements that are specified by a product owner with the support of a Scrum master. At the end of the sprint, the team, product owner, and Scrum master evaluate which solutions are mature and which solutions need further development. The next sprint then begins. Scrum is often used in the digital context.	<ul style="list-style-type: none"> • Iterative method of product development • Within a defined period (sprint), a team develops solutions to requirements of the product owner • After evaluation of the result, the next sprint starts • Scrum enables digital planning and the use of digital teams • ...
Kanban	Kanban is based on the assumption that tasks should be broken down into manageable subtasks. These subtasks are processed according to a defined schedule. Often, the number of subtasks that can be processed simultaneously is limited. This planning process is often visualized in digital formats and enables working in virtual teams.	<ul style="list-style-type: none"> • Breakdown of tasks into subtasks • Limitation of tasks that can be processed simultaneously • Digital visualization of the subtasks • Digital collaboration of the team • ...

Table 16.6 Selected agile methods for digital teams (2)

Business Model Canvas	<p>The basic idea of the Business Model Canvas is that a business model can be efficiently developed based on nine fields: Customer Segments, Value Propositions, Channels, Customer Relationships, Revenue Streams, Key Resources, Key Activities, Key Partners, and Cost Structure. The most important aspects are assigned to these fields in bullet points. This approach makes it easy to compare different variants and identify overlaps. Ideas can be visualized, discussed, developed, and evaluated in digital teams using this approach.</p>	<ul style="list-style-type: none"> • Breakdown of the key aspects of a business idea into nine areas • Representation of the aspects within the nine fields • Evaluation and further development of ideas based on visualization • Digital visualization • Digital collaboration • ...
Rapid Prototyping	<p>As part of the rapid prototyping process, a minimum viable product, i.e. the first minimally functional iteration of a product, is first developed. This minimum viable product is made available to selected customers. The feedback received flows directly into further product development. The advantage of this method is faster product development. Rapid prototyping is used in particular in the digital context.</p>	<ul style="list-style-type: none"> • Development of a minimal viable product • Use of feedback for further development • Reduced development time • ...
Hackathons	<p>Rapid development of a prototype (usually within a period of a few days). This method is used especially in the field of information and communication technologies. Meetings often take place in digital form.</p>	<ul style="list-style-type: none"> • Development of a prototype within a short time • Use of information and communication technologies for digital collaboration • ...

Fig. 16.8 Structure and process of the Scrum method



Chapter 16 Question and topics for discussion

Chapter 16 Questions and topics for discussion



Review questions

1. Describe the digital transformation pyramid.
2. Describe the 5-Component Model of Digital Transformation.
3. Explain the differences between digital leadership and traditional leadership.
4. Describe the development stages of digital organizations and name the technological and organizational characteristics of each stage.
5. Define and explain the Scrum process.



Topics for discussion

1. Discuss the socio-economic effects of digital transformation for your city.
2. Discuss the advantages and disadvantages of digital leadership against the background of traditional leadership.
3. Will the development towards digital organizations fundamentally change our understanding with regard to social systems and structures? Will digital development lead to the dissolution of traditional forms of organization?

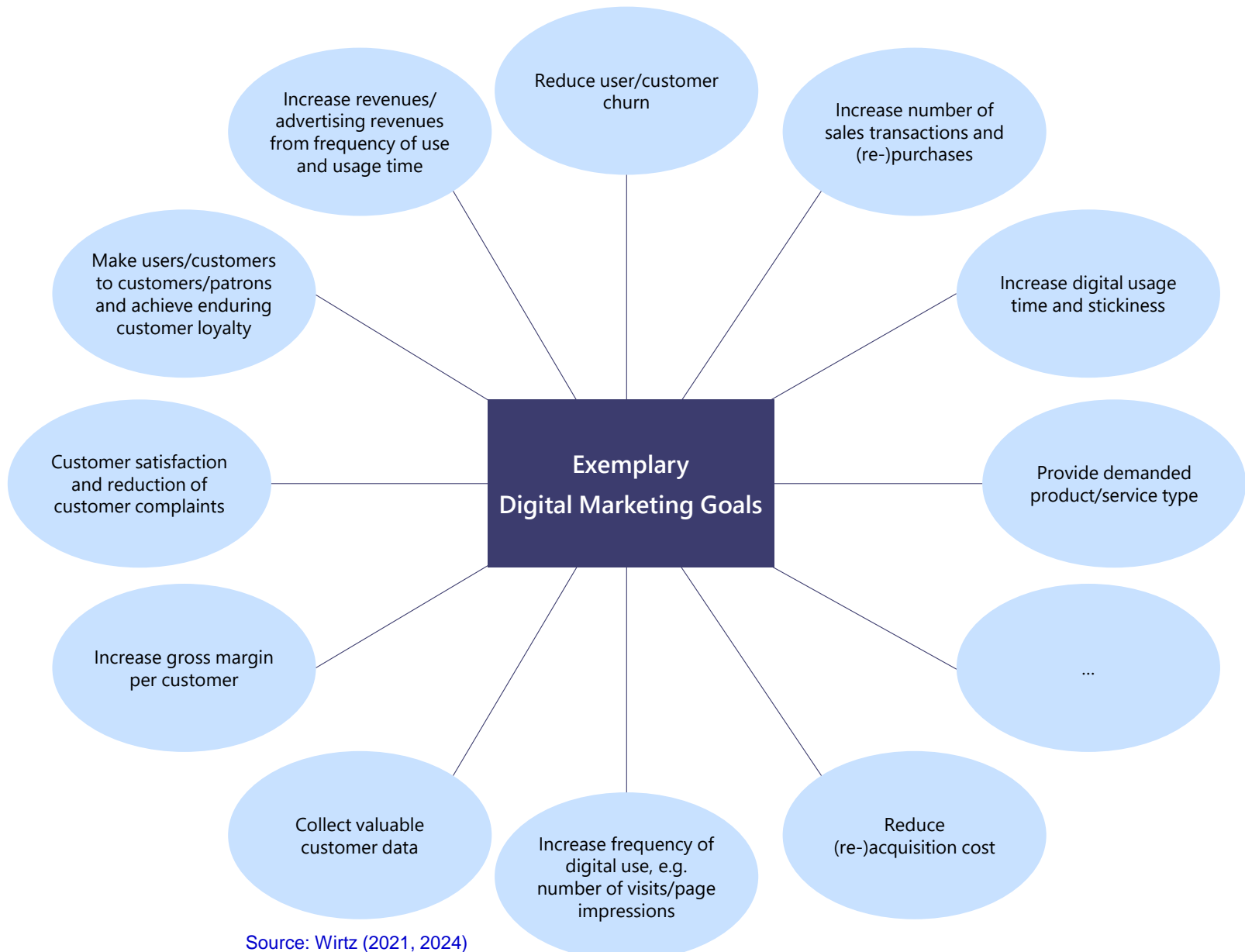
Chapter 17: Digital Marketing and Electronic Commerce

Fig. 17.1 Core aspects of digital marketing strategy development



Source: Wirtz (2021, 2024)

Fig. 17.2 Exemplary digital marketing goals



Source: Wirtz (2021, 2024)

Fig. 17.3 Customer Model of Determinants of Customer Value

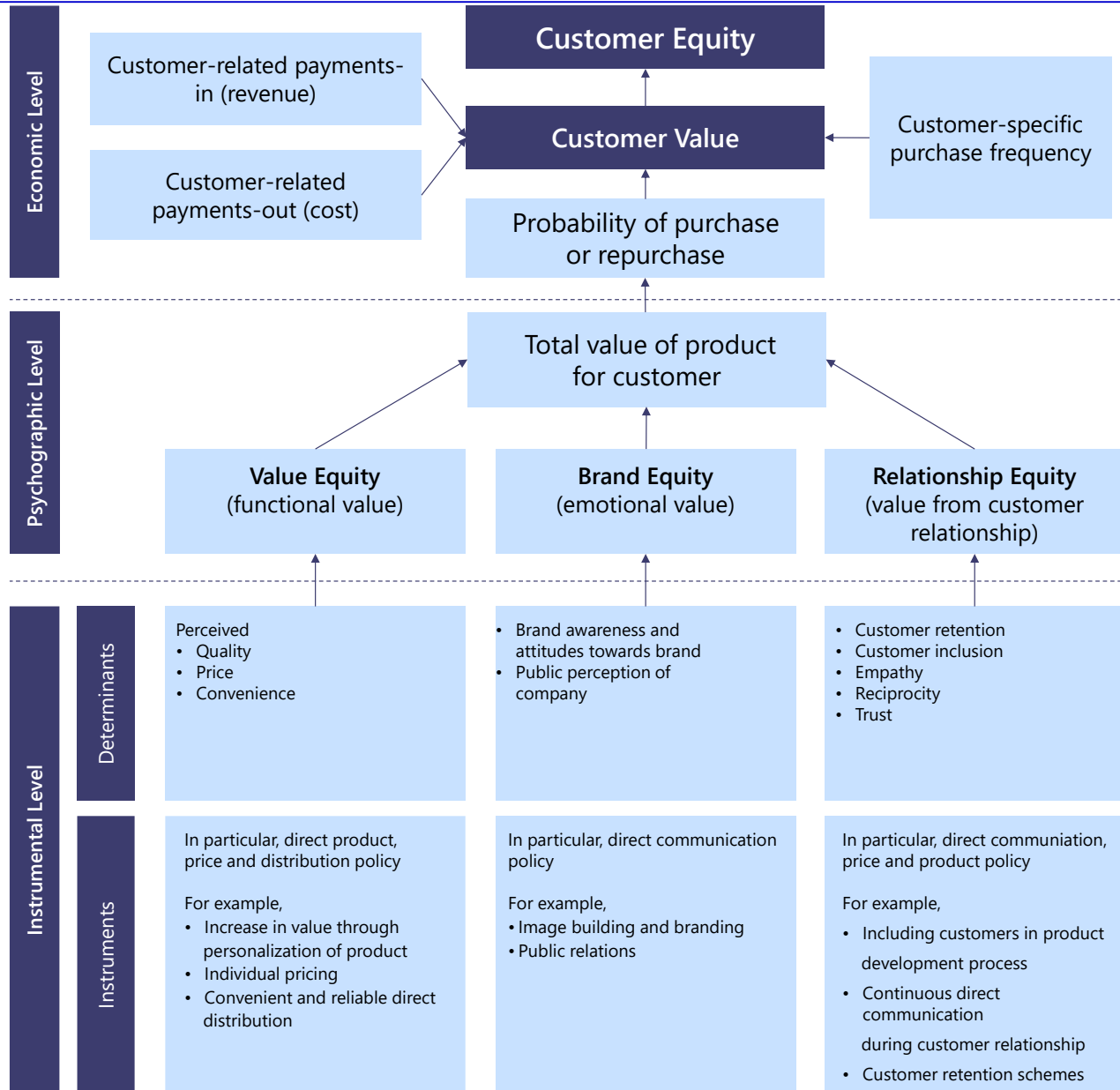
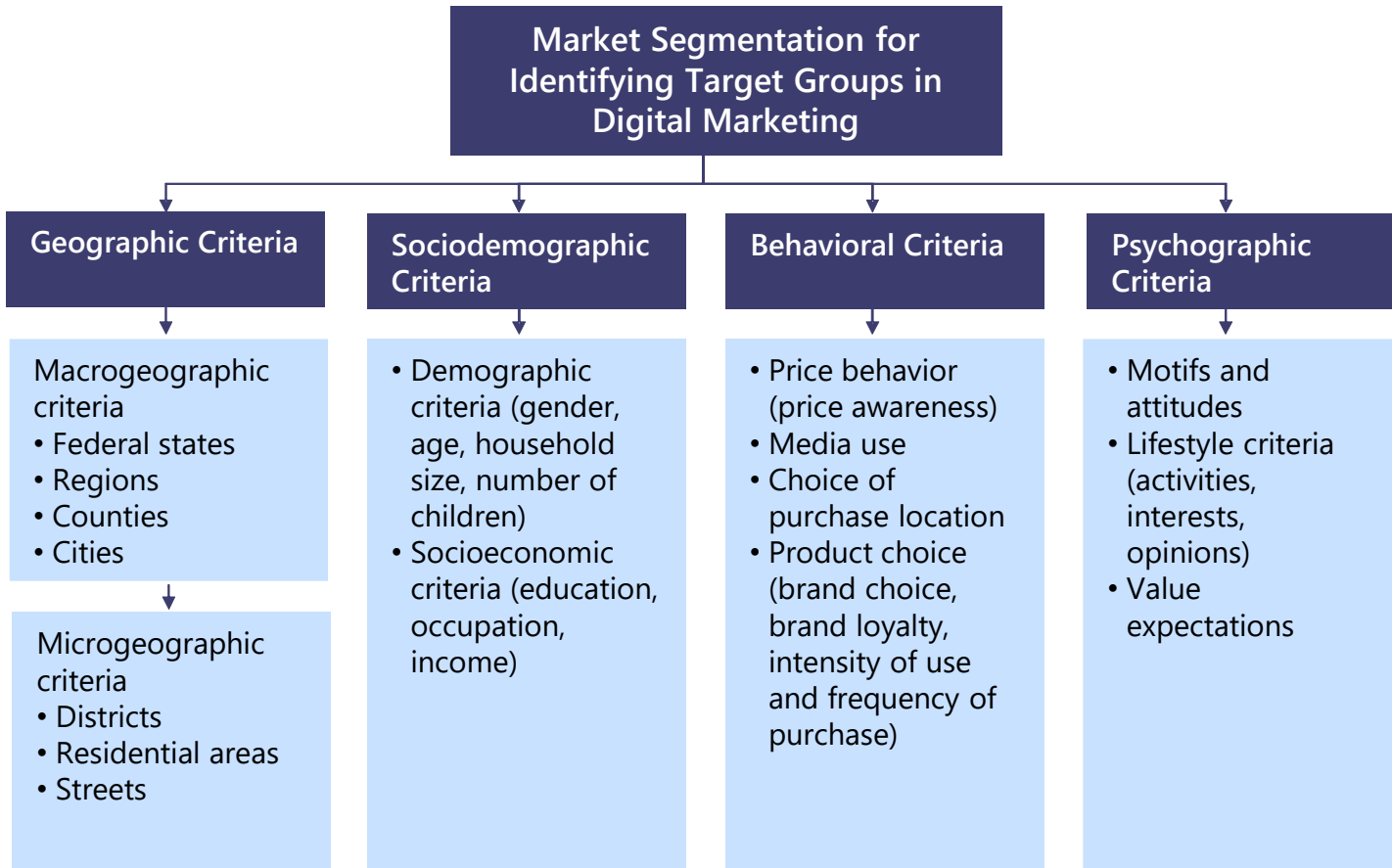
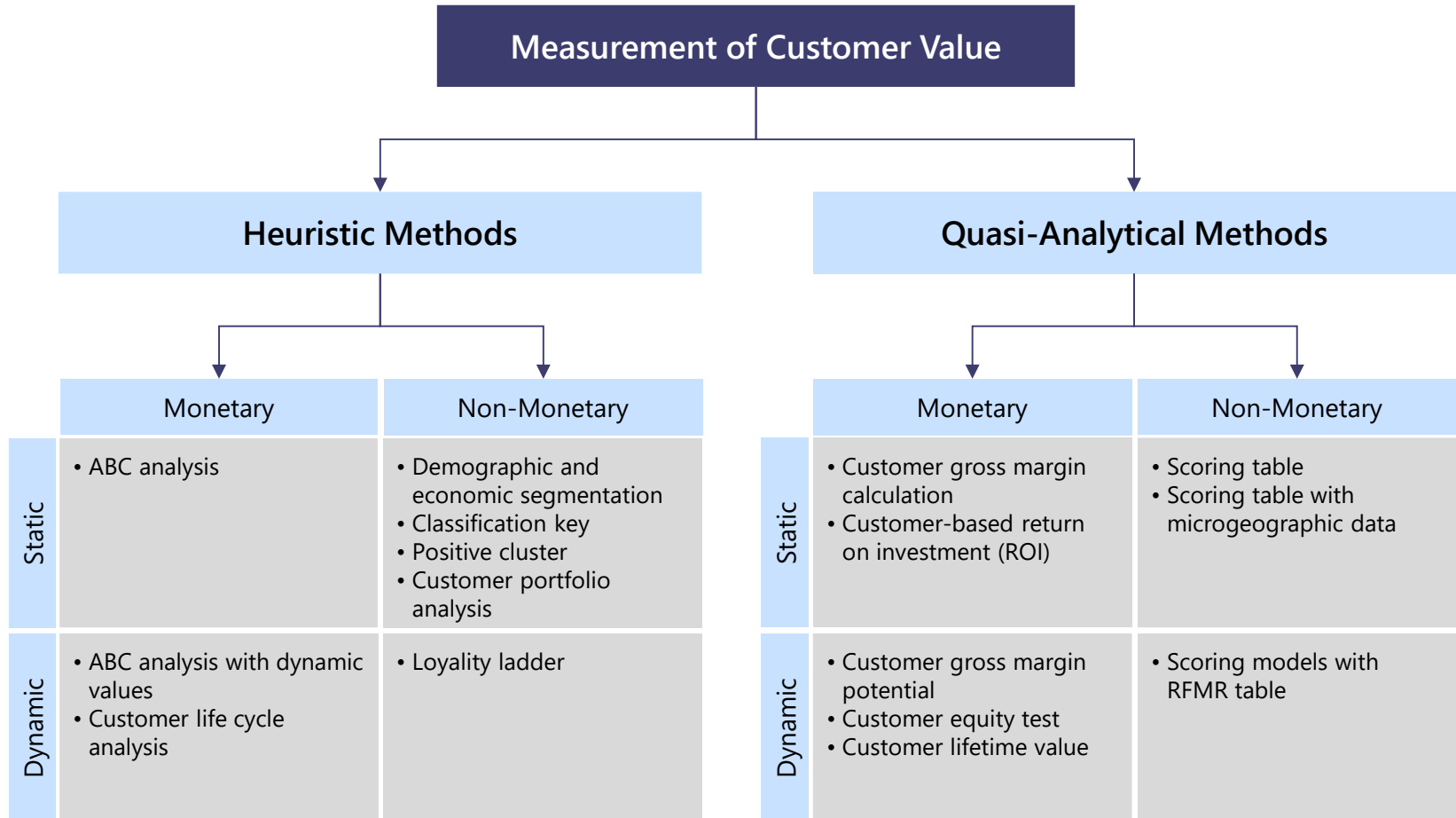


Fig. 17.4 Potential market segmentation criteria



Source: Wirtz (2005b, 2021, 2024)

Fig. 17.5 Measurement of customer value



Source: Wirtz (2005b, 2021, 2024)

Fig. 17.6 Digital marketing strategies



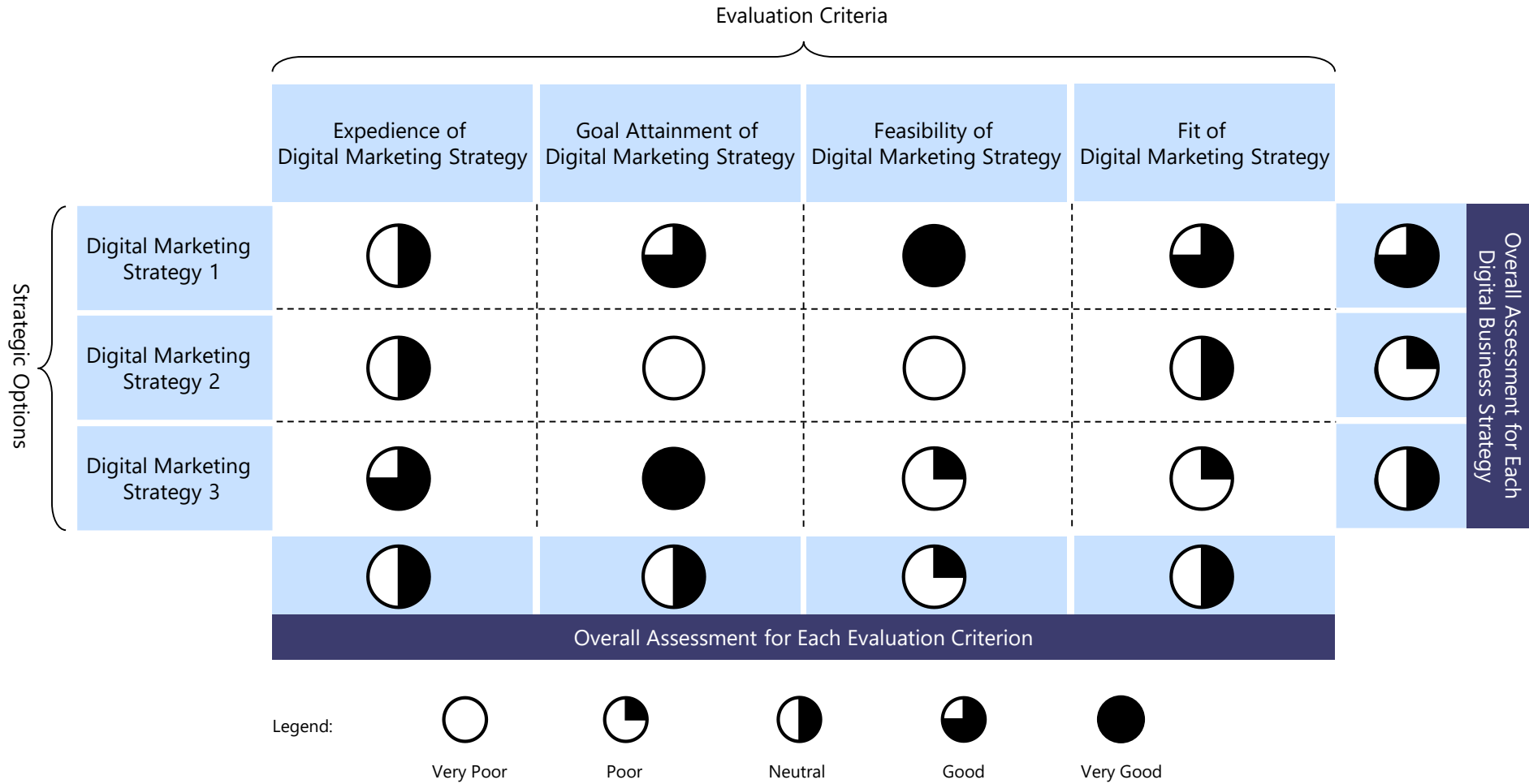
Source: Wirtz (2008, 2021, 2024)

Fig. 17.7 Different types of market development

Level of Differentiation Market Coverage	Undifferentiated	Differentiated
Complete	Undifferentiated market development (e.g. Facebook)	Differentiated market development on total market (e.g. PayPal)
Partial	Concentrated market development (e.g. Baidu)	Differentiated market development on submarket (e.g. Walmart online)

Source: Wirtz (2008, 2012, 2024)

Fig. 17.8 Digital marketing evaluation matrix



Source: Wirtz (2013a, 2021, 2024)

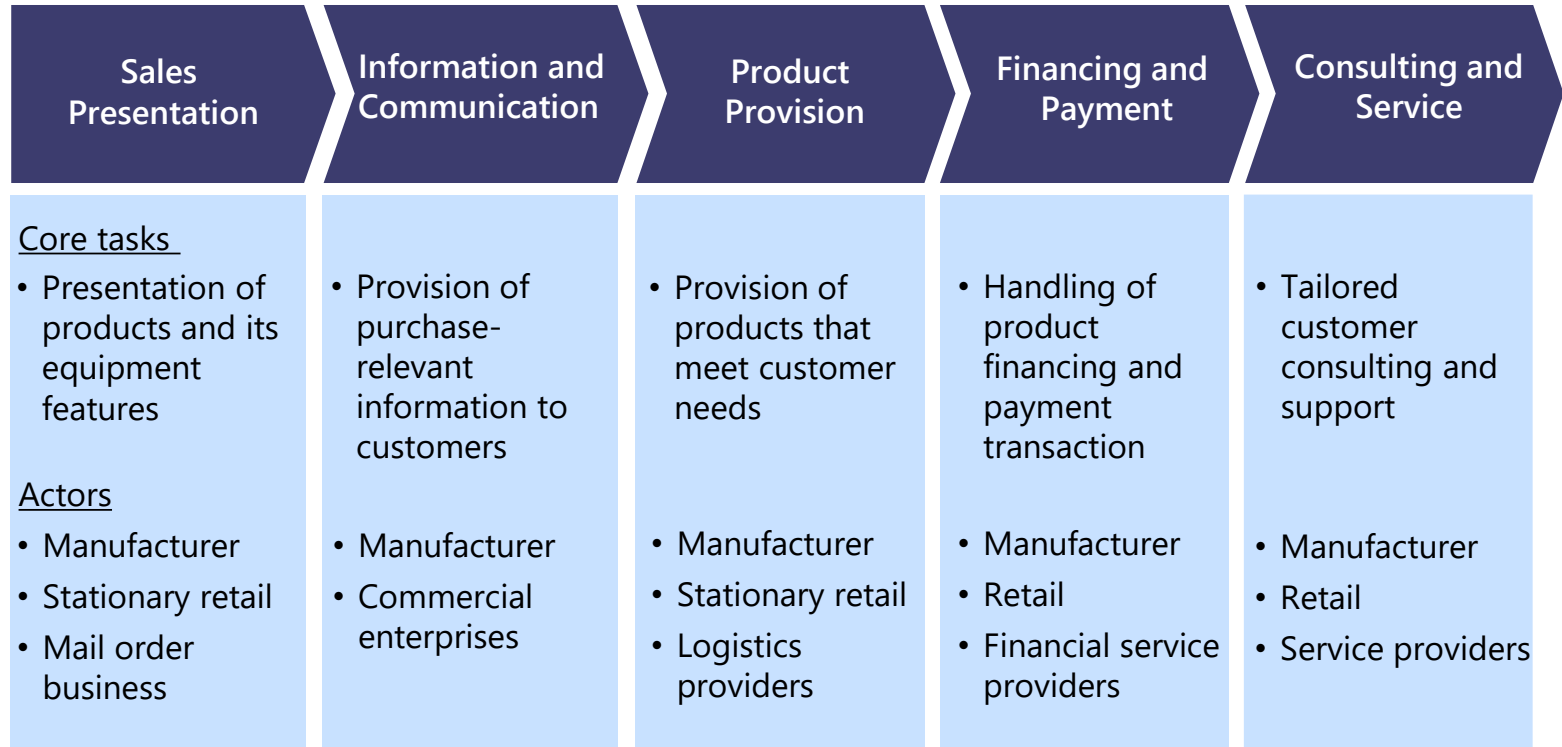
Definition of Distribution Management

Definition of Distribution Management (Wirtz 2001a, 2024)

The term distribution management refers to the totality of all measures that serve to provide the products and services of a company in such a way that these meet the needs of the demanders in spatial, temporal, quantitative and qualitative terms.

Source: [Wirtz \(2001a, 2024\)](#)

Fig. 17.9 Traditional value chain of distribution



Source: Wirtz (2020b, 2021, 2024)

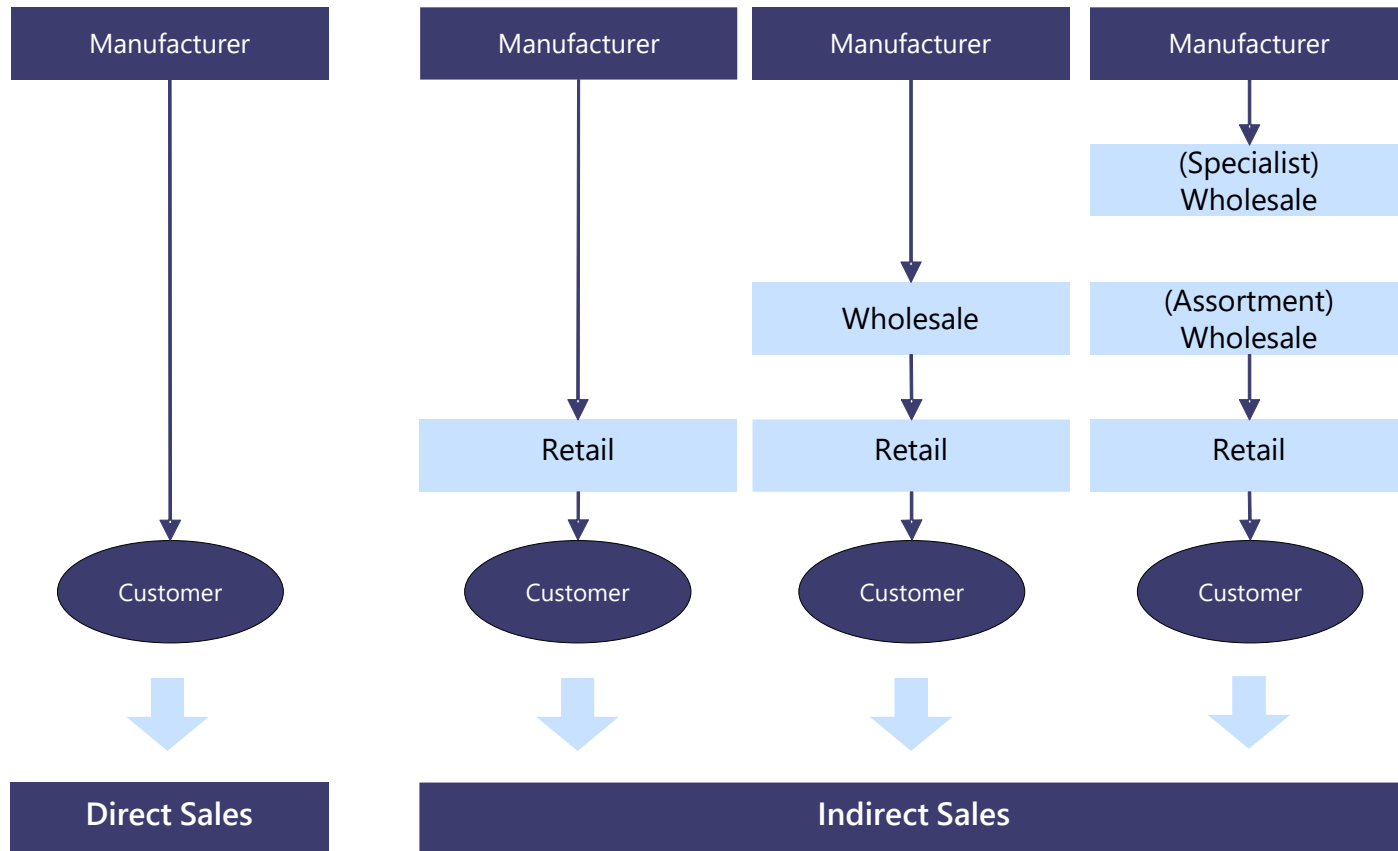
Definition of Digital Distribution

Definition of Digital Distribution (Wirtz 2001a, 2021, 2024)

Digital distribution refers to the exercise of value-adding activities in the distribution value chain in a digital distribution channel. While digital distribution in the strict sense describes the digital provision or transfer of a good to the customer, digital distribution in a broader sense pertains to a situation in which the exchange of information and ordering takes place digitally, but the provision of the goods occurs by physical means.

Source: [Wirtz \(2001a, 2021, 2024\)](#)

Fig. 17.10 Direct and indirect sales



Source: Wirtz (2020b, 2021, 2024)

Fig. 17.11 Multichannel strategy IKEA

Webshop Functionalities

The screenshot shows the top navigation bar of the IKEA website. On the left is a menu icon. In the center is the IKEA logo and a search bar with the placeholder text "What are you looking for?". To the right of the search bar are icons for account management ("Hej! Log in or sign up"), a shopping cart, and a heart icon. Below the search bar is a horizontal navigation menu with categories: Products, Marketplace, Rooms, Ideas & Inspiration, Design, and Deals. On the far right of this menu, it indicates the current store location as "Atlanta" with a pin icon, and shows the store's hours as "Open until 9:00pm" and the delivery zip code as "67346".

Store Location Finder

This section is titled "Find an IKEA location near you" and features a dropdown menu currently set to "Atlanta, GA (My store)". Below the dropdown, there are three columns of information for the selected store:

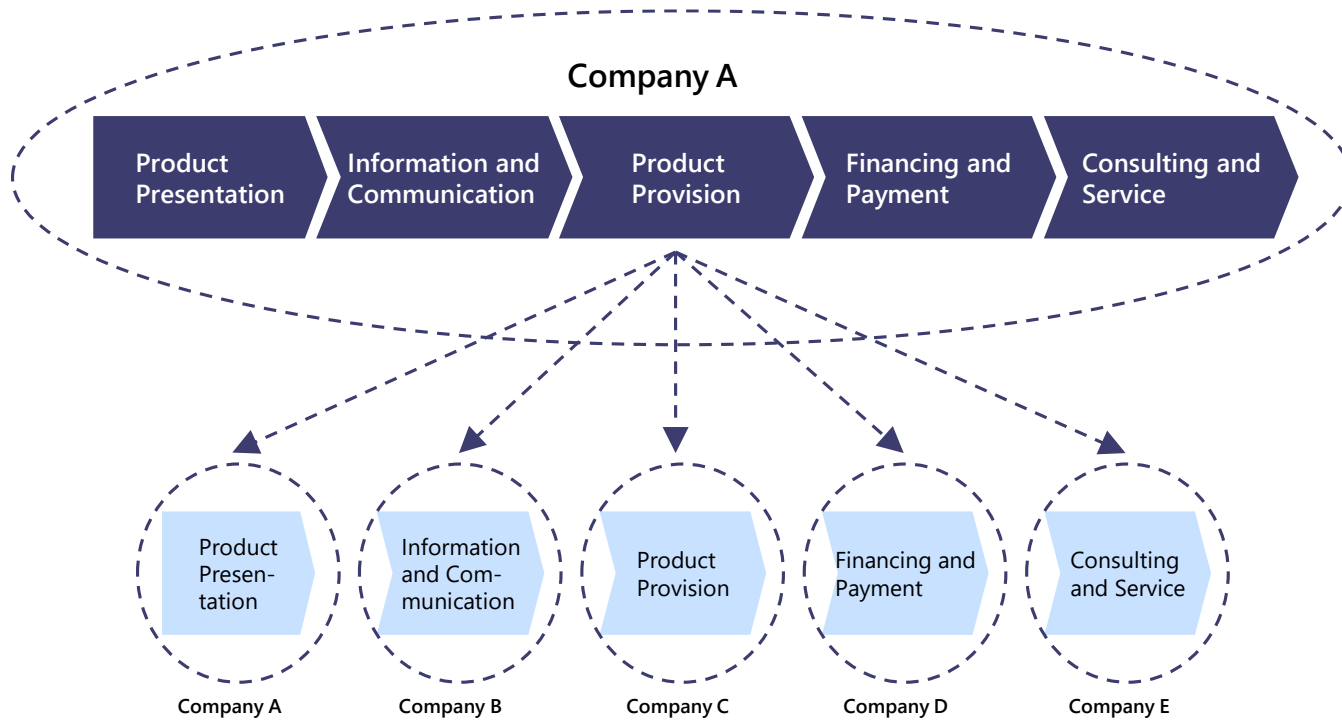
- Atlanta, GA**
Store
Address:
441 16th Street, Atlanta, GA 30363
- Store hours:**
Today: Open until 9:00pm
**Hours may vary based on holidays and store events.*
- Contact us:**
For more information and FAQs
visit: www.ikea-usa.com/contactus

On the right side of this section, there are two buttons: "Visit store page" and "My store".

The map shows the United States with numerous blue location pins indicating store locations. A pop-up window for the Atlanta, GA store is visible, showing the address "441 16th Street, Atlanta, GA 30363" and a "Get Directions" button. The map interface includes a "Karte" (Map) and "Satellit" (Satellite) toggle, a search bar, and zoom controls. A legend at the bottom identifies the pin types: blue for "Store", red for "Planning studio", and green for "Pick-up location".

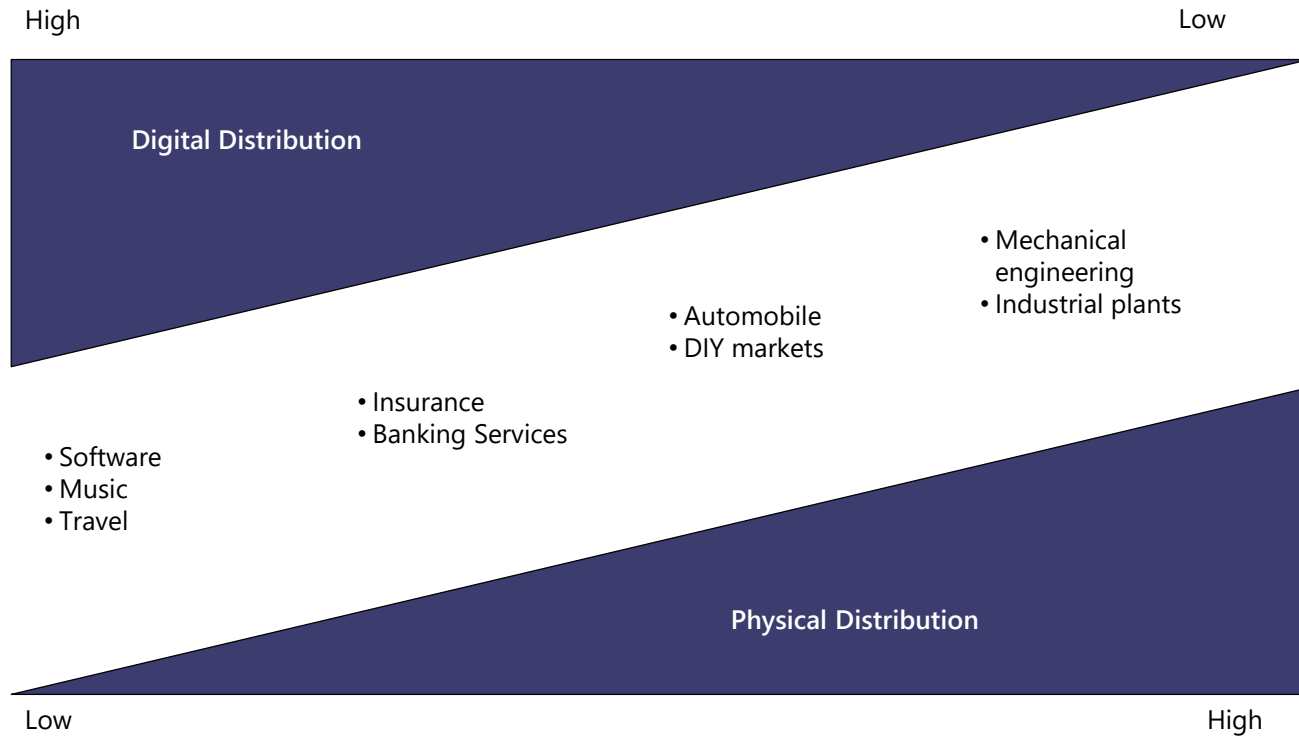
Source: IKEA (2023), Wirtz (2024)

Fig. 17.12 Development trend of intermediation



Source: Wirtz (2020a, 2021, 2024)

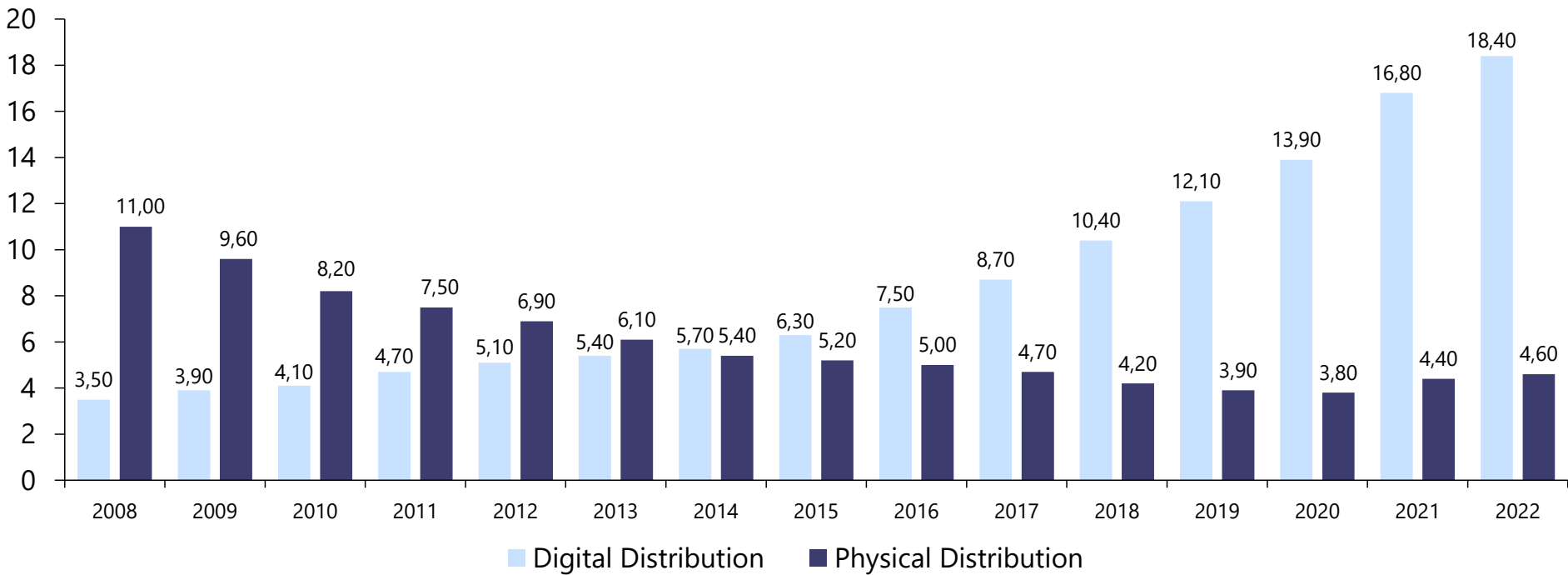
Fig. 17.13 Substitution relationship between physical and digital distribution



Source: Wirtz (2020b, 2021, 2024)









Fig. 17.14 Development of physical vs. digital distribution in the global recorded music industry

In billion USD



Source: IFPI (2023), Wirtz (2024)

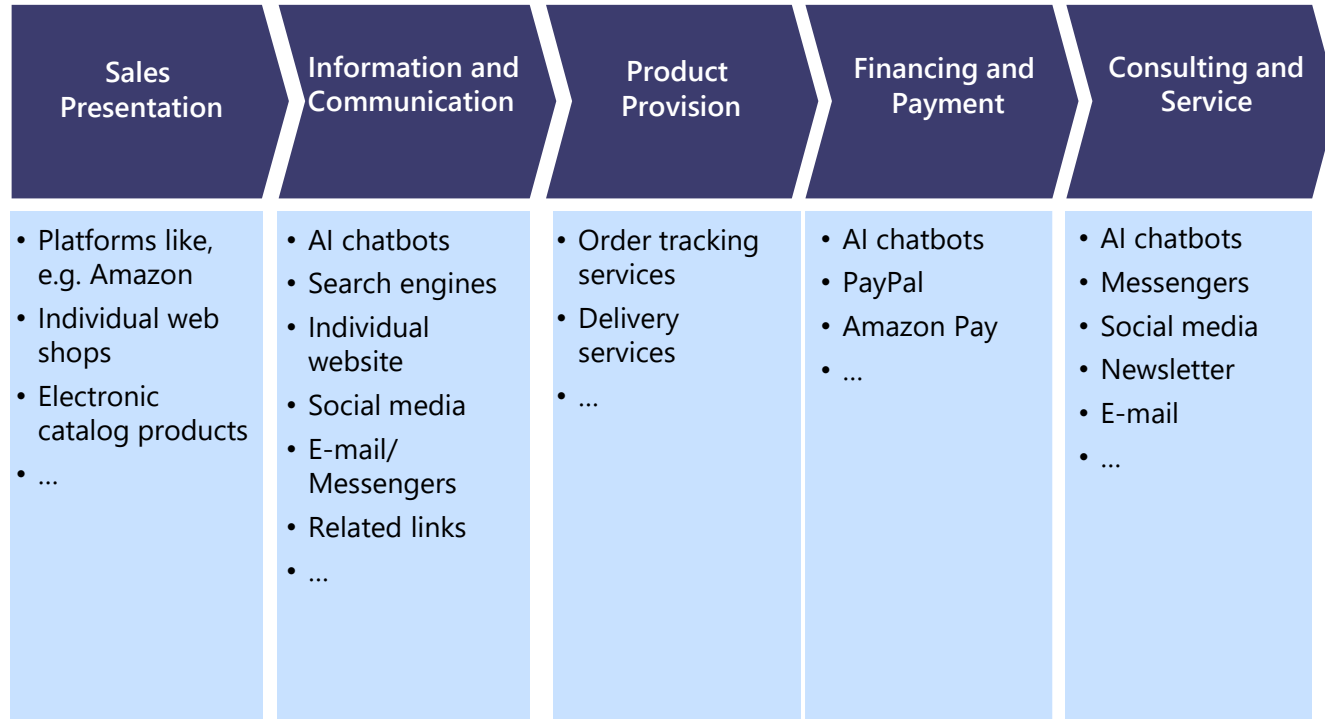
Fig. 17.15 Business actors of digital distribution

Business Actors	Functions	Importance	Tendency	Company Examples
<ul style="list-style-type: none"> Producers 	<ul style="list-style-type: none"> Development and production as well as potential online direct distribution 		+  -	<ul style="list-style-type: none"> McAfee Tesla ...
<ul style="list-style-type: none"> Traditional retail companies 	<ul style="list-style-type: none"> Stationary retail mail order/ traditional home delivery systems 		+  -	<ul style="list-style-type: none"> Walmart Sears ...
<ul style="list-style-type: none"> Digital coordinators/ distributors 	<ul style="list-style-type: none"> Development of digital business models without physical traditional distribution 		+  -	<ul style="list-style-type: none"> Amazon Spotify ...
<ul style="list-style-type: none"> Physical on-demand distributors 	<ul style="list-style-type: none"> Realization of digital logistics/ physical distribution 		+  -	<ul style="list-style-type: none"> FedEx UPS ...

Potential: ○ Very low ◐ Low ◑ Medium ◒ High ● Very high

Source: Wirtz (2020b, 2021, 2024)

Fig. 17.16 Value-added chain of digital distribution



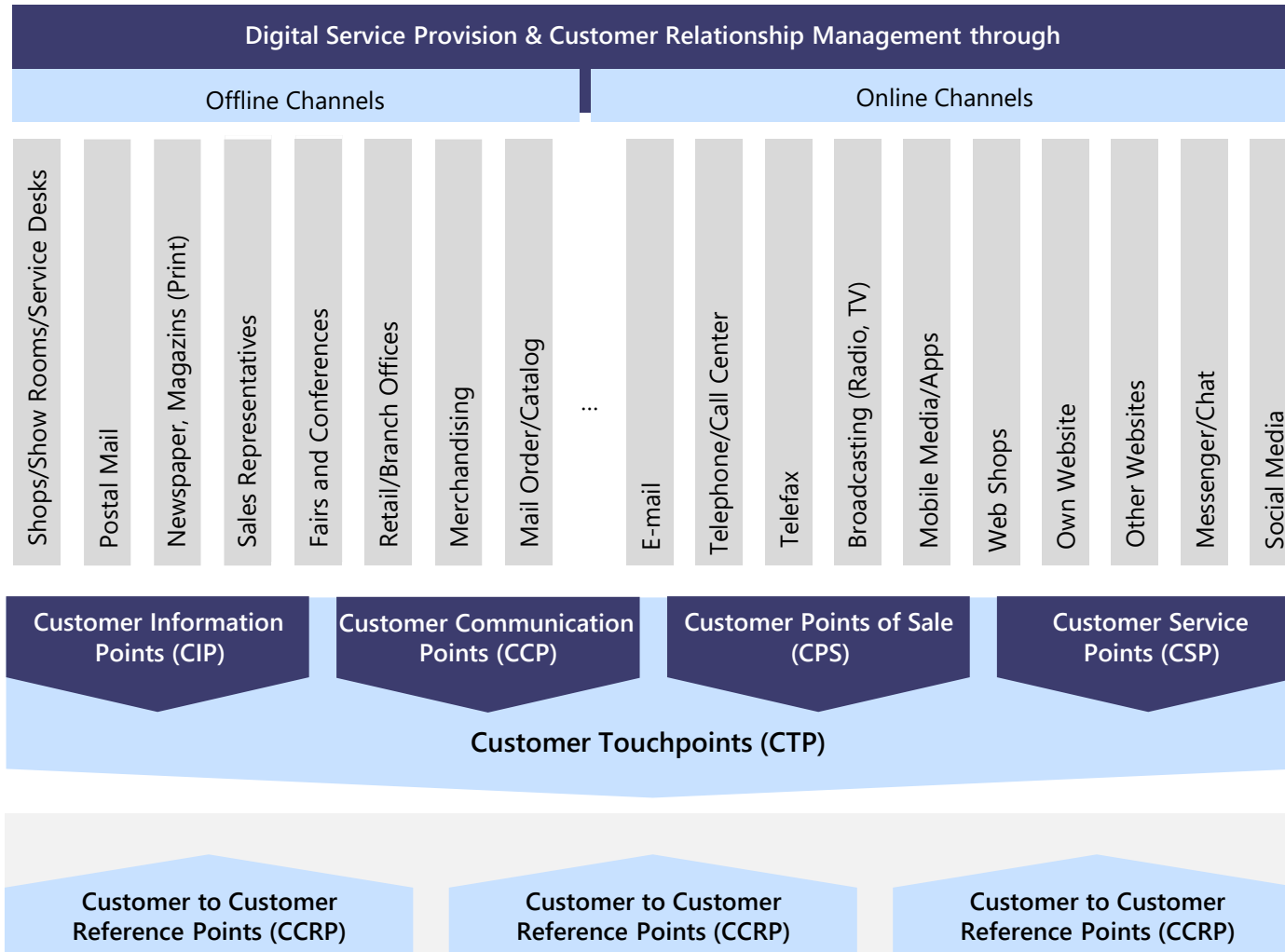
Source: Wirtz (2001a, 2024)

Fig. 17.17 Service-channel diversification model (SCD model)

		Channel widening/expansion		
		Same	Similar	New
Service expansion/channel deepening	Same	<p>I Single-channel service penetration</p> <ul style="list-style-type: none"> • Application of one or similar services through one or similar channels • Example: mail.com offering email service based on desktop browser 	<p>III Lateral-channel service penetration</p> <ul style="list-style-type: none"> • Application of one or similar services through different channels • Example: mail.com offering email service based on desktop browser, mobile browser, and mobile app 	
	Similar	<p>II Single-channel service diversification</p> <ul style="list-style-type: none"> • Application of different services through one or similar channels • Example: mail.com offering email, news, weather, etc. based on desktop browser 	<p>IV Multilateral cross-service channel expansion</p> <ul style="list-style-type: none"> • Application of various services through multiple channels • Example: mail.com offering email, news, weather, etc. based on desktop browser, mobile browser and mobile app 	
	New			

Source: Wirtz (2013a, 2021, 2024)

Fig. 17.18 Customer touchpoints management



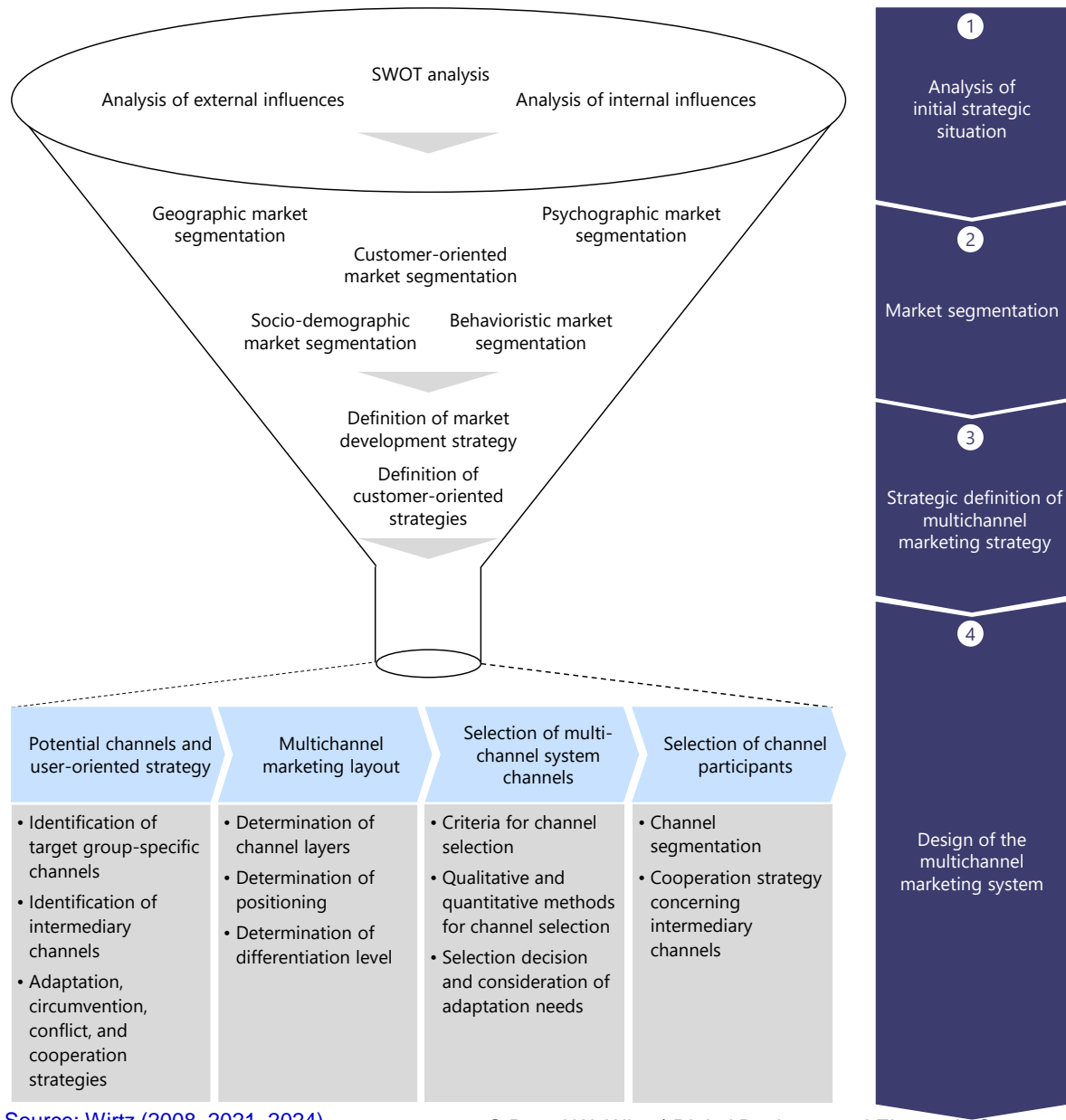
Source: Wirtz (2005b, 2021, 2024)

Fig. 17.19 Digital business multichannel strategy framework

<div style="text-align: right;">Approach</div> <div style="text-align: left;">Aspects</div>	Isolated Channel Strategy	Combined Channel Strategy	Integrated Channel Strategy
Coordination	<ul style="list-style-type: none"> • Uncoordinated channels/channel-inherent management • Closed channel structure • Channel competition 	<ul style="list-style-type: none"> • Partially coordinated channels/channel-inherent management • Loosely linked channel structure • Channel competition 	<ul style="list-style-type: none"> • Completely coordinated channels/comprehensive channel management • Interdependent channel structure • No competition between channels
Formation	<ul style="list-style-type: none"> • Lead channel structure • Channel-specific management 	<ul style="list-style-type: none"> • Mostly lead channel structure • Comprehensive channel management 	<ul style="list-style-type: none"> • Multichannel structure • Centralized overall channel management
Organization	<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <ul style="list-style-type: none"> • High individual responsibility • Low coordination • High decentralization </div> <div style="width: 45%;"> <ul style="list-style-type: none"> • High interdependence • High coordination • High centralization </div> </div>		

Source: Wirtz (2013a, 2021, 2024)

Fig. 17.20 Strategic multichannel marketing process



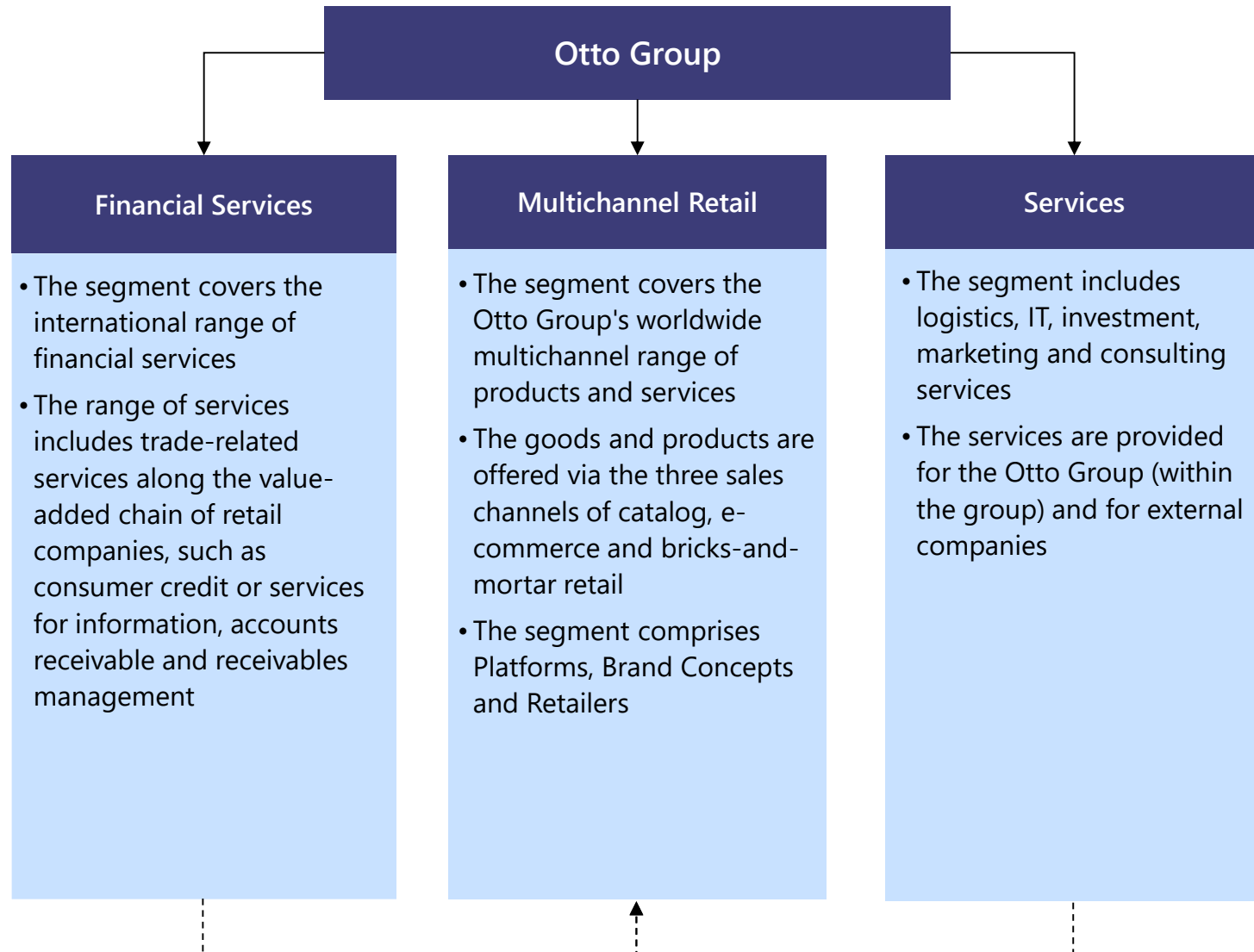
Source: Wirtz (2008, 2021, 2024)

Fig. 17.21 Historical development of shopping opportunities in the Otto Group

1950: Catalog	Orders by postcard on account
1963: Phone	Orders from the catalog by phone
1991: Teleshopping	Presentation of goods on TV, orders by phone
1994: CD-ROM	Presentation of goods offline, various ordering methods
1995: Internet	Goods offer and order online
2000: M-commerce	Selection from assortment and ordering via mobile phone
2003: T-commerce	Selection and ordering via interactive television
2007: E-shopping 2.0	Interactive and dialog-enabled online product-offering
2010: Apps	Selection from assortment and ordering via smartphone
2013: Apps 2.0	Personalized shopping via smartphone
2018: E-focus	Focus on digital sales channels

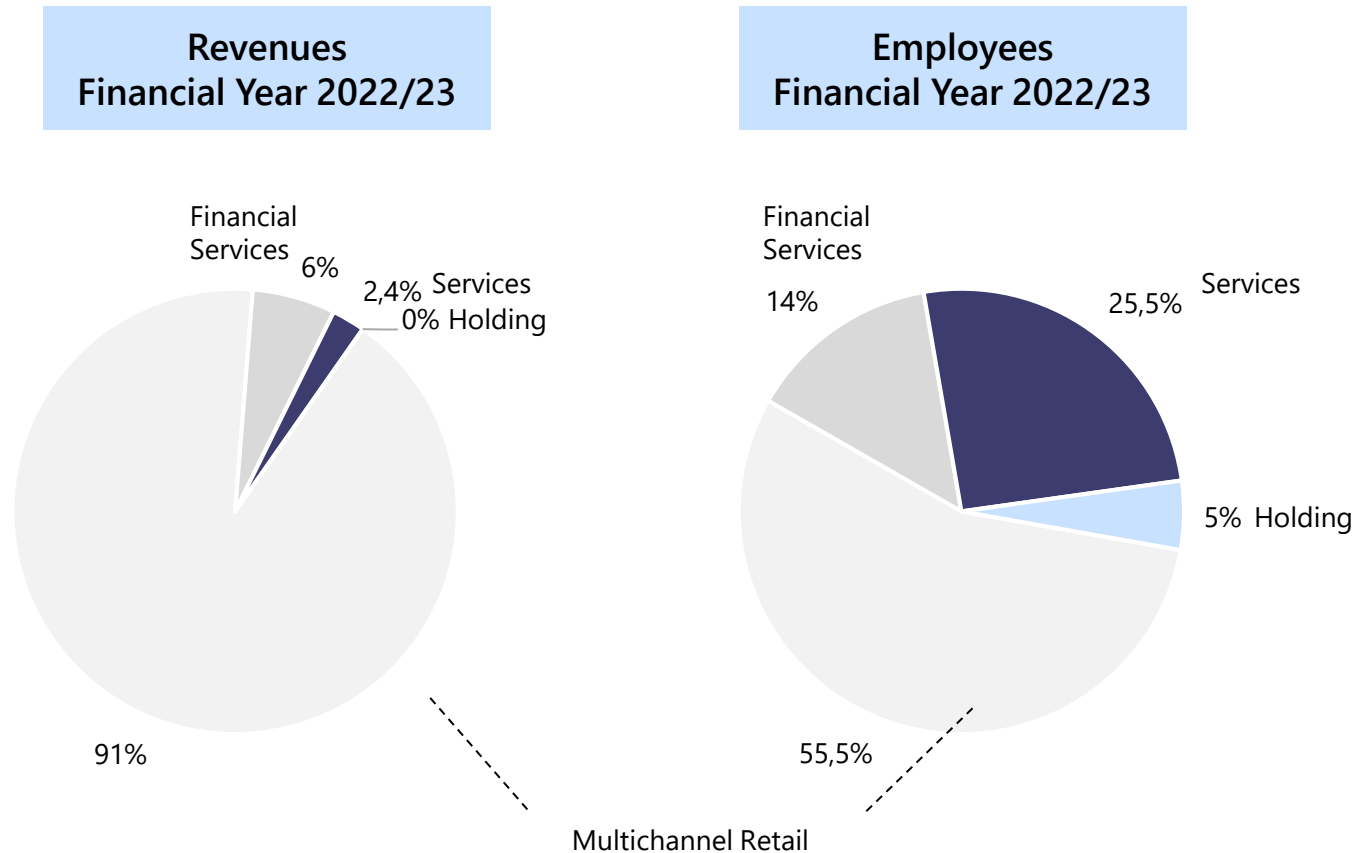
Source: Wirtz (2010, 2022b, 2024)

Fig. 17.22 Otto Group's segments



Source: Wirtz (2010, 2022b, 2024)

Fig. 17.23 Revenue and employee structure of the Otto Group



Source: Otto Group (2023a), Wirtz (2024)

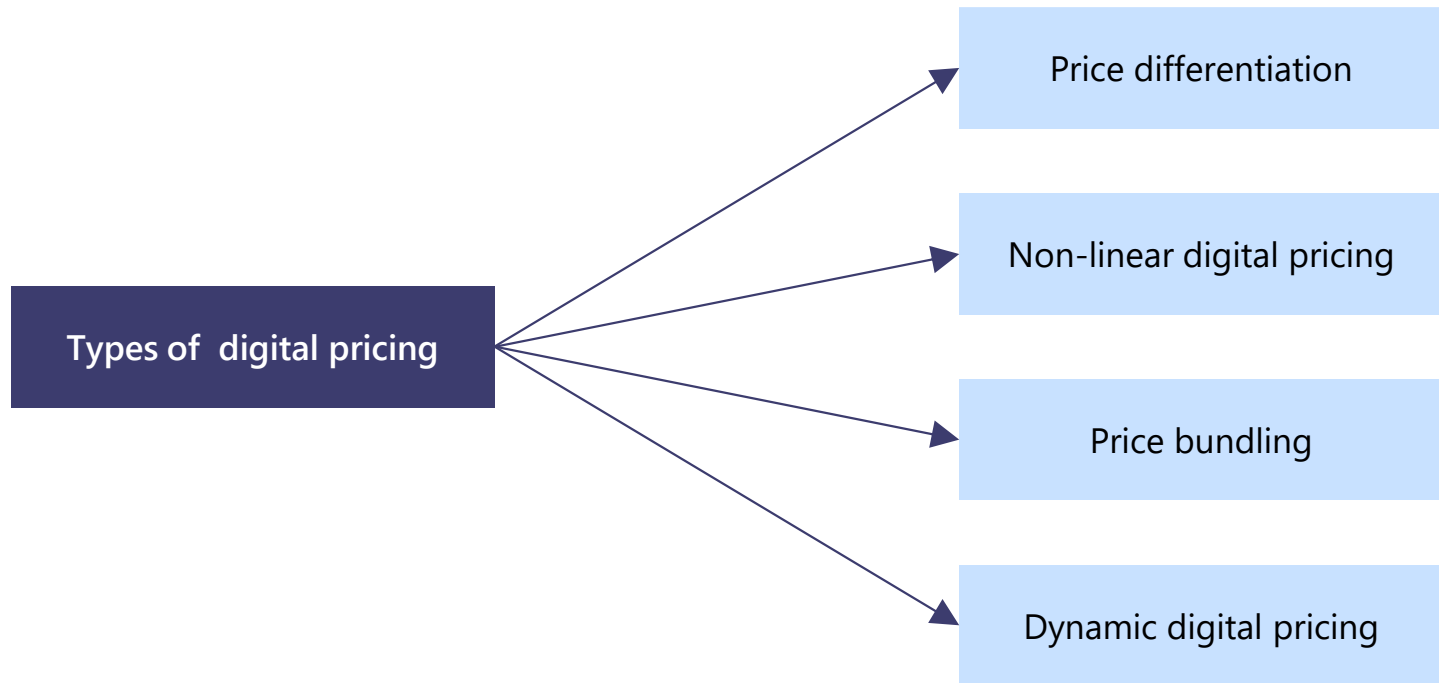
Definition of Digital Pricing Wirtz

Definition of Digital Pricing Wirtz (Wirtz 2010, 2021, 2024)

Digital pricing refers to the deliberate setting and continuous management of prices within digital markets.

Source: Wirtz (2010, 2021, 2024)

Fig. 17.24 Types of digital pricing



Source: Wirtz (2021, 2024)

Fig. 17.25 Performance-based price differentiation in digital business

The image shows the Google Cloud pricing page. At the top, there is a navigation bar with links for Overview, Solutions, Products, Pricing, Resources, and Contact Us. A search icon, Docs, and Support are also present. On the right, there is a language selector set to English and buttons for Sign in and Start free. The main heading is "Google Cloud pricing", followed by a sub-heading: "Save money with Google Cloud's transparent and innovative approach to pricing. Contact us today to get a quote for your organization." Below this are two buttons: "Request a quote" (blue) and "Get started for free" (white with blue border). The main content area is titled "Start running workloads for free" and contains text about new customers getting \$300 in free credits and all customers getting 20+ products for free. Two dashed boxes with dotted lines point to these offers: one for "\$300 in free credits" and another for "20+ free products".

Google Cloud pricing

Save money with Google Cloud's transparent and innovative approach to pricing. Contact us today to get a quote for your organization.

[Request a quote](#) [Get started for free](#)

Start running workloads for free

Create an account to evaluate how Google Cloud products perform in real-world scenarios. New customers get [\\$300 in free credits](#) to run, test, and deploy workloads. All customers can use [20+ products for free](#), up to monthly usage limits.

\$300
in free credits

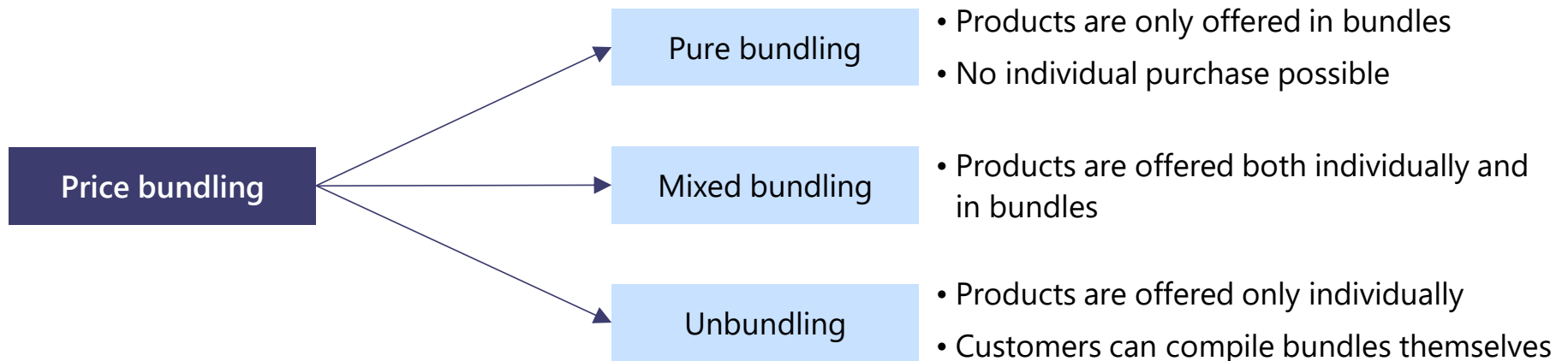
20+
free products

Starting credit to get to know products of choice

Free basic products

Source: Cloud (2023), Wirtz (2024)

Fig. 17.26 Types of price building



Source: Wirtz and Olderoog (2001), Wirtz (2024)

Fig. 17.27 Bundling of services in digital business

Google Workspace Solutions Products Industries Pricing Resources Admin console Contact sales Get started

Choose your edition. Try it at no charge for 14 days.

Every plan includes

Gmail Drive Meet Calendar Chat Jamboard Docs Sheets Slides Keep Sites Forms

MOST POPULAR			
Business Starter	Business Standard	Business Plus	Enterprise
5.75 € per user / month, 1 year commitment	11.50 € per user / month, 1 year commitment	17.25 € per user / month, 1 year commitment	Contact sales for pricing
Get started	Get started	Get started	Contact sales
<ul style="list-style-type: none"> ✓ Custom and secure business email ✓ 100 participant video meetings ✓ 30 GB pooled storage per user* ✓ Security and management controls ✓ Standard Support 	<ul style="list-style-type: none"> ✓ Custom and secure business email ✓ 150 participant video meetings + recording ✓ 2 TB pooled storage per user* ✓ Security and management controls ✓ Standard Support (paid upgrade to Enhanced Support) 	<ul style="list-style-type: none"> ✓ Custom and secure business email + eDiscovery, retention ✓ 500 participant video meetings + recording, attendance tracking ✓ 5 TB pooled storage per user* ✓ Enhanced security and management controls, including Vault and advanced endpoint management ✓ Standard Support (paid upgrade to Enhanced Support) 	<ul style="list-style-type: none"> ✓ Custom and secure business email + eDiscovery, retention, S/MIME encryption ✓ 1000 participant video meetings + recording, attendance tracking, noise cancellation, in-domain live streaming ✓ 5 TB pooled storage per user, with ability to request more* ✓ Advanced security, management, and compliance controls, including Vault, DLP, data regions, and enterprise endpoint management ✓ Enhanced Support (paid upgrade to Premium Support)

Bundle name

Price information

Bundle features

Source: Google Workspace (2023), Wirtz (2024)

Table 17.1 Functions of auctions

Coordination function	Auctions determine market clearing prices that coordinate supply and demand so that all products are sold.
Pricing function	Auctions can also determine prices for goods that are rarely traded, such as antiques, without relying on estimates.
Allocation function	Auctions can serve as an allocation mechanism for products that are difficult to market, such as remaining seats on a scheduled flight.
Distribution function	Auctions are suitable for attracting a large number of bidders and thus represent a separate distribution channel, which in some cases reaches new customer groups.

Source: Wirtz (2000c, 2024)

Definition of Product and Program Policy

Definition of Product and Program Policy (Wirtz 2001a, 2024)

Product and program policy is the entirety of all decision-making activities relating to the market-oriented design of the services offered in the sales market, both at the product and at the program level.

Source: Wirtz (2001a, 2024)

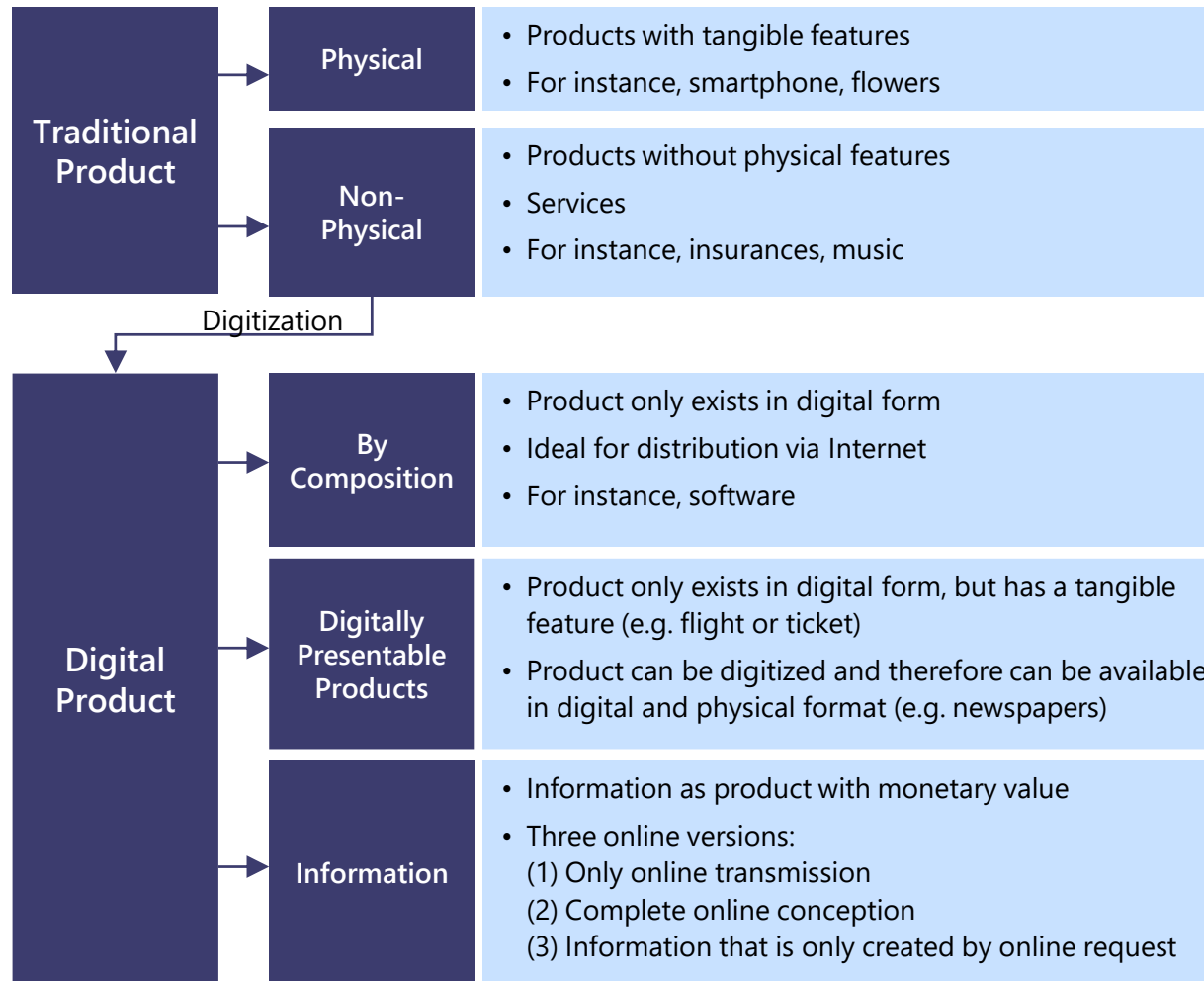
Definition of Digital Product and Program Policy

Definition of Digital Product and Program Policy (Wirtz 2001a, 2021, 2024)

Digital product and program policy involves the use of modern information and communication technologies, in particular the Internet, in all phases of the product and program policy.

Source: Wirtz (2001a, 2021, 2024)

Fig. 17.28 Categorization of products and services in digital business



Source: Wirtz (2010, 2021, 2024)

Fig. 17.29 Value-added services

<p>No Variable Costs</p>	<ul style="list-style-type: none"> • Stock price information and business news of online broker (e.g. Merrill Edge, WellsTrade) • FAQs • Trouble-shooting guides • Standardized newsletters • ... 	<ul style="list-style-type: none"> • Search engines (e.g. Google, Bing) • Financial information (e.g. Bloomberg, MarketWatch) • Price comparisons (e.g. PriceGrabber) • ...
<p>Variable Costs</p>	<ul style="list-style-type: none"> • Individual product trainings • ... 	<ul style="list-style-type: none"> • Insurance comparisons (e.g. The Zebra, GasBuddy) • Product-independent individual training offers • ...
<p>Value-Added Services</p>		<p>Stand-Alone Services</p>

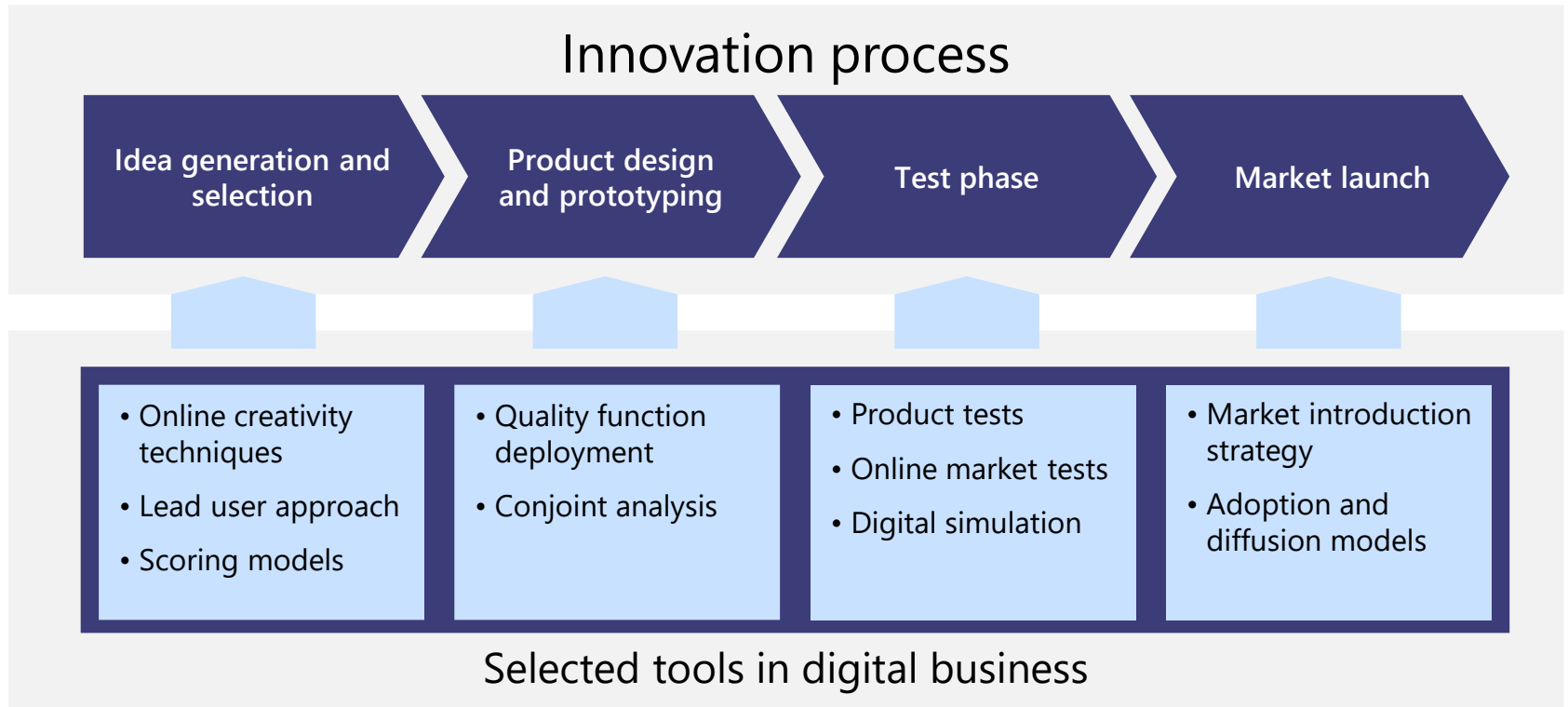
Source: Wirtz (2020b, 2021, 2024)

Fig. 17.30 Action parameters of the product and program policy

Product Innovation	Product Variation	Product Differentiation	Product Elimination
<ul style="list-style-type: none"> • Development of new products • Market innovation: General new problem solution • Business innovation: First-time use of a technical innovation that is already available in the market • Process of product innovation undergoes several subsequent stages 	<ul style="list-style-type: none"> • Preservation of product in its basic conception • Substitution of previous product by modified product • Adaptation of products to changing consumer needs 	<ul style="list-style-type: none"> • Preservation of product in its basic conception • Supplementation of product line with modified products • Adaptation of products to specific demands of different target groups 	<ul style="list-style-type: none"> • Removal of products from product line • Allocation of scarce resources to successful products

Source: Wirtz (2010, 2021, 2024)

Fig. 17.31 Phases of the innovation process



Source: Wirtz (2010, 2024)

Fig. 17.32 Creativity techniques in digital business

Unleash Your Creativity

MindMeister: The Features.

Whether you're a first-time mapper or an experienced enthusiast, MindMeister can teach you how to mind map and empower you to create intuitive resources for organizing, informing and inspiring your team. MindMeister's extensive feature set fuels your creativity every step of the way.

Features

Example

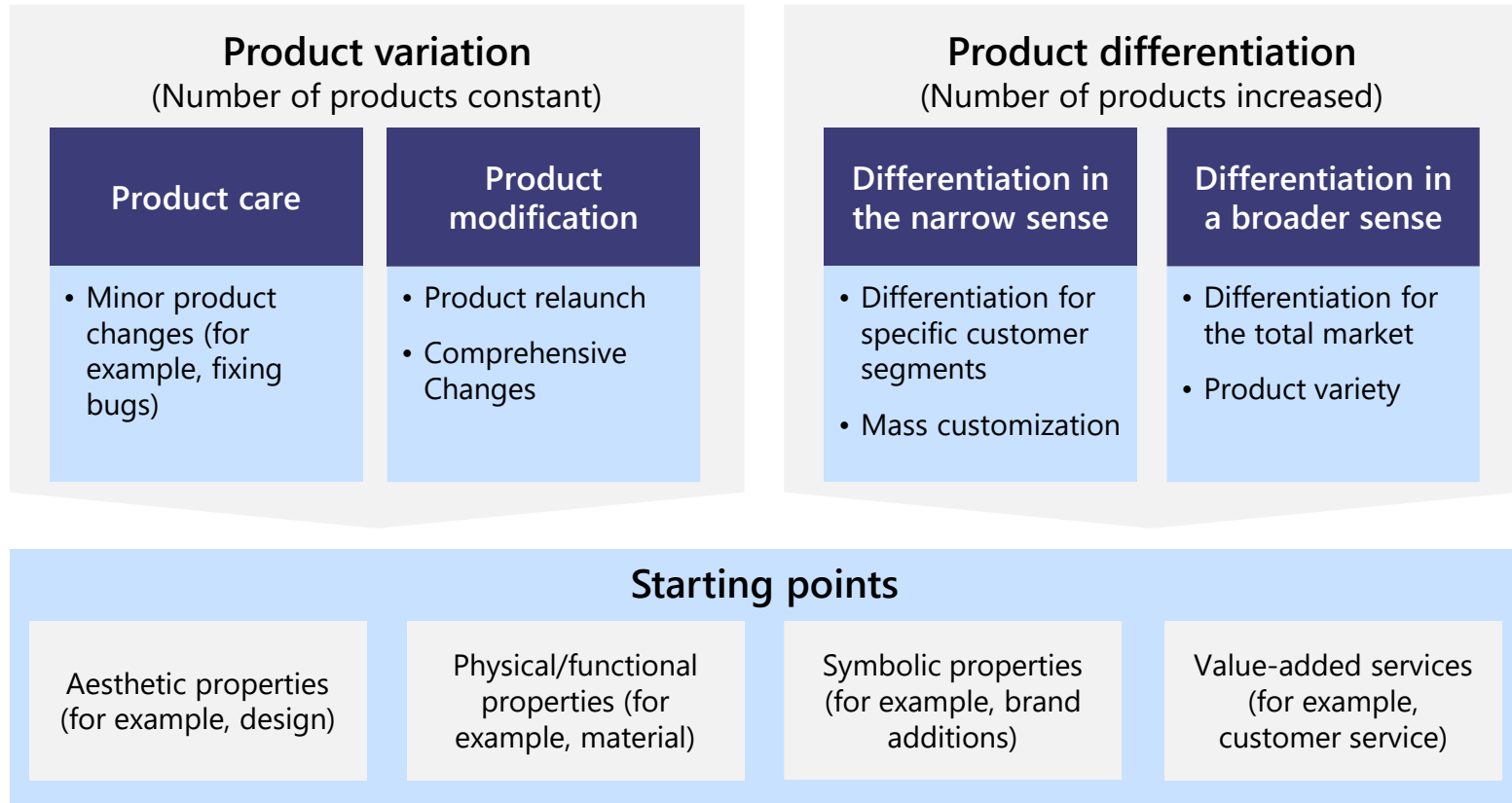
The image is a composite graphic. On the left, a dashed box contains a list of four features, each with an icon and a short description. On the right, a larger dashed box contains a screenshot of the MindMeister interface. The screenshot shows a central mind map node with several branches. A 'Themes' overlay is visible, displaying a grid of different theme options. A blue callout box is positioned over the screenshot, providing more details about the themes feature.

- Themes**
Make it shine.
- Map Layouts**
Clarity through structure.
- Notes, Attachments & Comments**
Map better, together.
- Export and Share**
Show it to the world.

Themes
Explore MindMeister's expertly-designed themes to add color and style to your mind maps: improving readability and comprehension.

Source: Mindmeister (2023), Wirtz (2024)

Fig. 17.33 Starting points for product variation and product differentiation



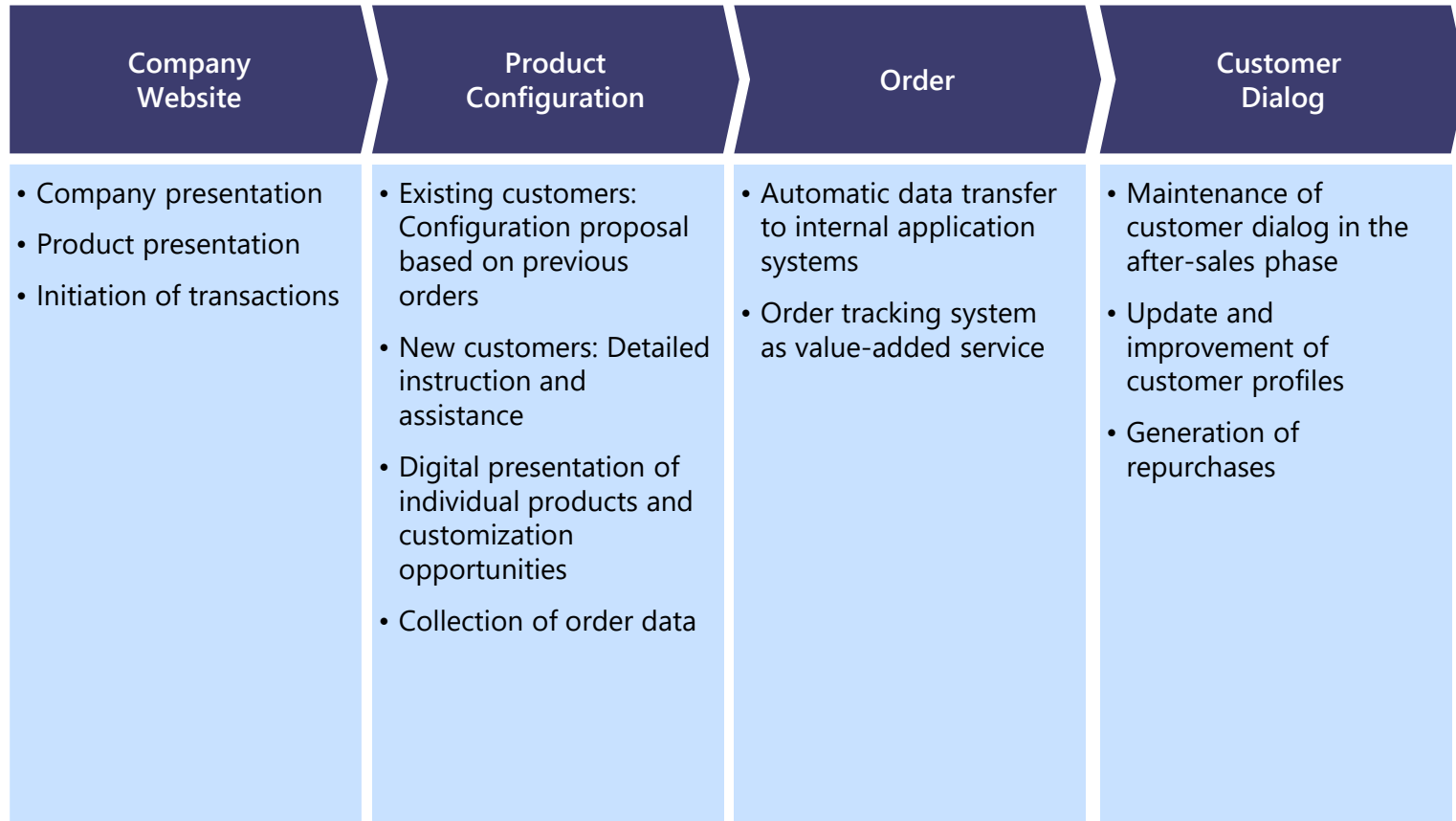
Source: Wirtz (2010, 2024)

Fig. 17.34 Selected versioning possibilities of digital products

Features	<ul style="list-style-type: none">• Differing product scope (e.g. Microsoft Windows and Windows Pro)
User Interface	<ul style="list-style-type: none">• Different interfaces for different user groups (e.g. Adobe Premiere Elements and Premiere Pro)
Delay	<ul style="list-style-type: none">• Same information is presented to different user groups time-delayed (e.g. stock change information)
Manipulation	<ul style="list-style-type: none">• Provides user groups with different rights for processing information (e.g. Adobe Acrobat Reader and Acrobat Sign)
Convenience	<ul style="list-style-type: none">• Certain user groups receive more convenient/privileged terms of use (e.g. Availability at peak times)
Support	<ul style="list-style-type: none">• Improved support for certain user groups (e.g. improved support for subscribers)

Source: Wirtz (2010, 2021, 2024)

Fig. 17.35 Internet-based mass customization



Source: Wirtz (2001a, 2021, 2024)

Fig. 17.36 Example of a mashup in digital business

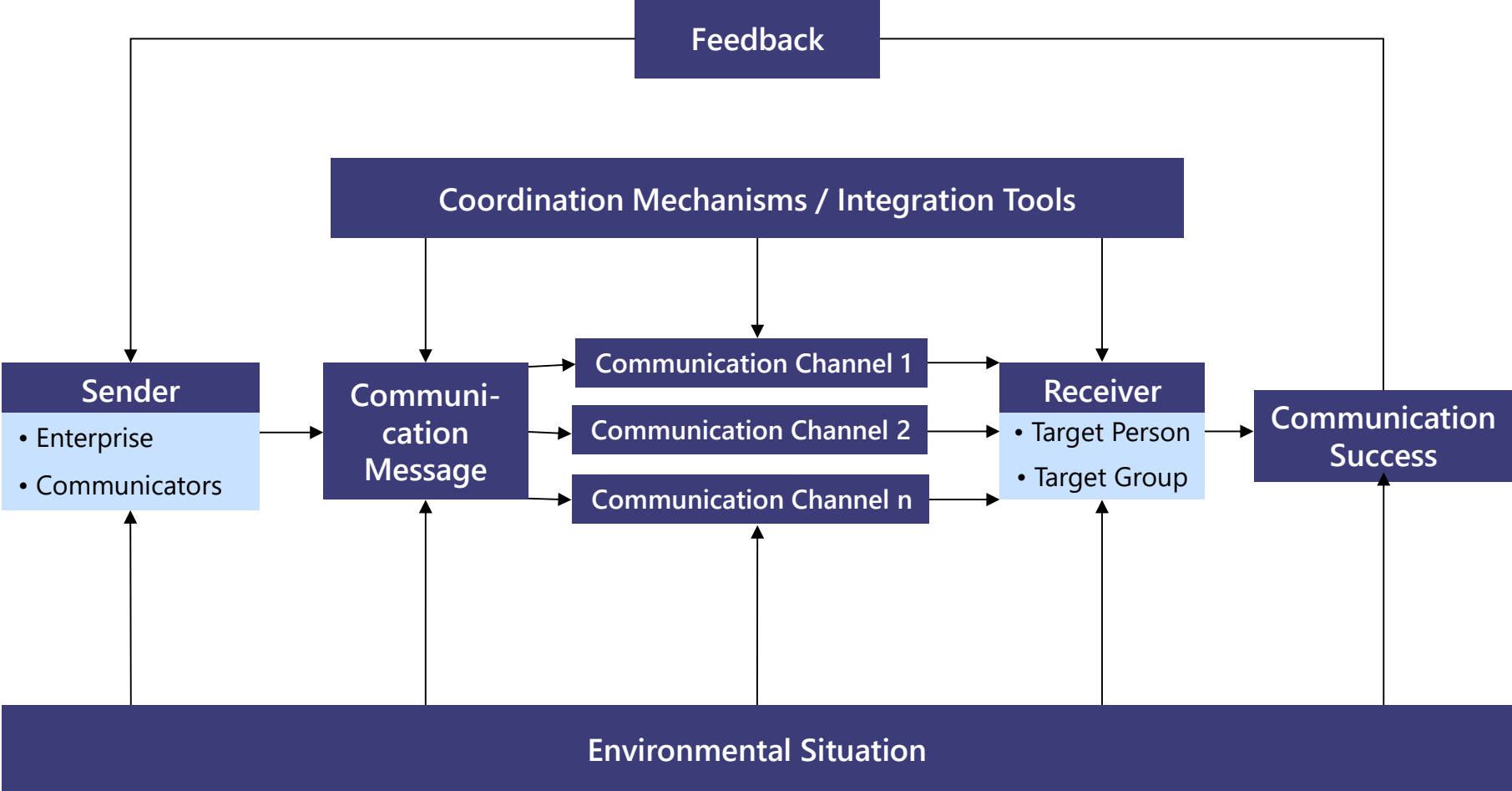
The screenshot shows the Speyer Tourism website interface. At the top, there is a navigation bar with a 'Menu' icon, a search bar, and a 'Tourism' button. The 'SPEYER' logo is in the top right corner. Below the navigation bar, a breadcrumb trail reads: Home > Tourism > Planning and booking > Accommodations > **Online Reservation**. The main heading is 'Online Reservation'. A text block below the heading says: 'You are looking for accommodation in Speyer? Here you can easily book online. If you have any questions, please feel free to contact the Tourist Information team.' A dashed-line box highlights a 'booking&more' widget. The widget has a logo on the left and navigation options on the right: 'English', 'EUR', and 'Login / Register'. The main content of the widget is a grid of accommodation categories with images and counts: 'All (51)', 'hotel (12)', 'inn (2)', 'pension (1)', 'Holiday home (3)', 'holiday apartment (35)', 'hotel B&B (5)', and 'private rooms (1)'. A 'SHOW MORE' button is centered below the grid.

Accommodation Type	Count
All	51
hotel	12
inn	2
pension	1
Holiday home	3
holiday apartment	35
hotel B&B	5
private rooms	1

Source: Stadt Speyer (2023), Wirtz (2024)

accommodation booking option integrated into own website via booking&more

Fig. 17.37 Representation of the Communication Model



Source: Wirtz (2001a, 2024)

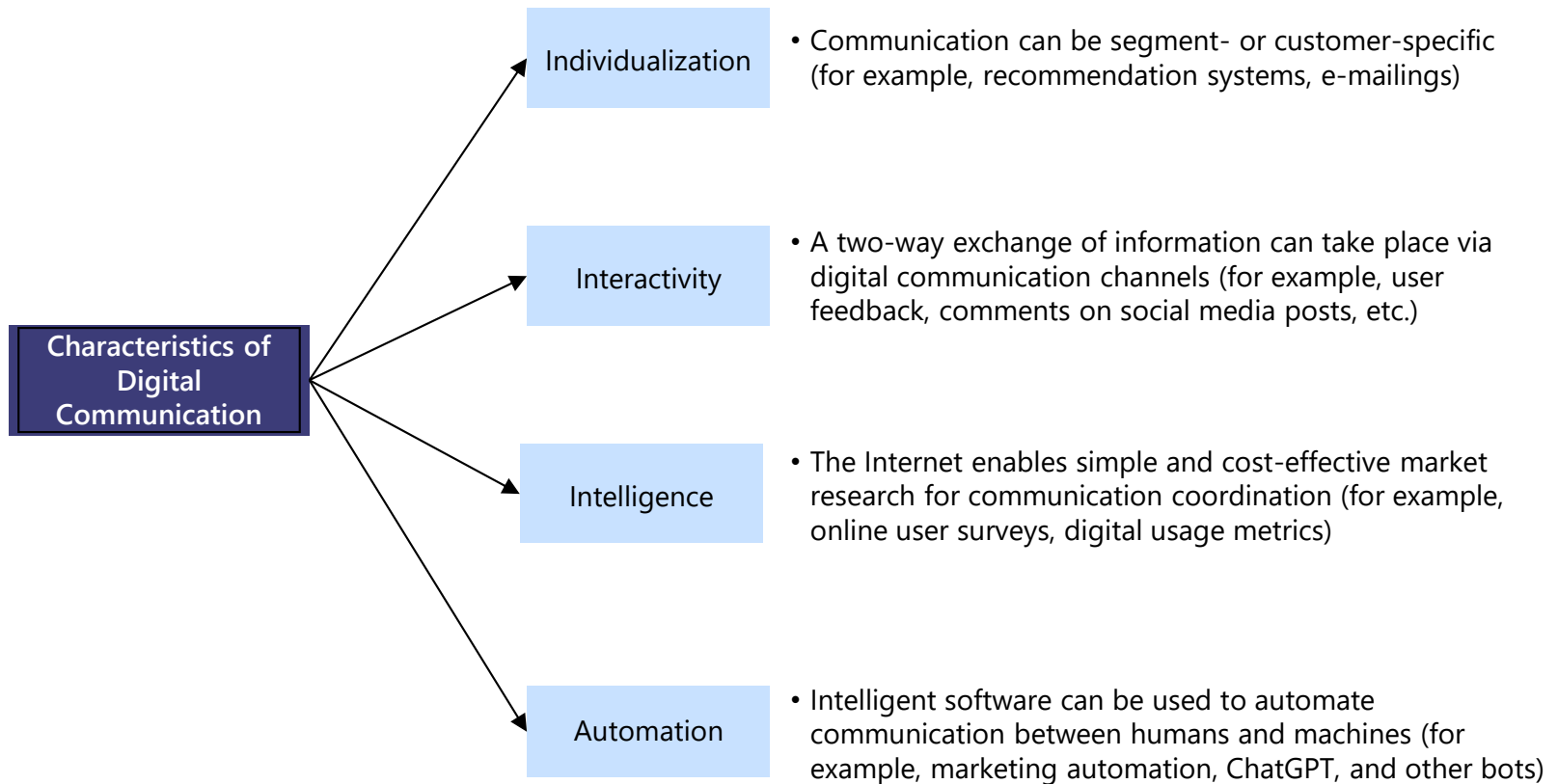
Definition of Digital Communication in the Marketing Mix

Definition of Digital Communication in the Marketing Mix (Wirtz 2001a, 2021, 2024)

Digital communication includes interactive, multifunctional communication using network-based and electronic communication platforms.

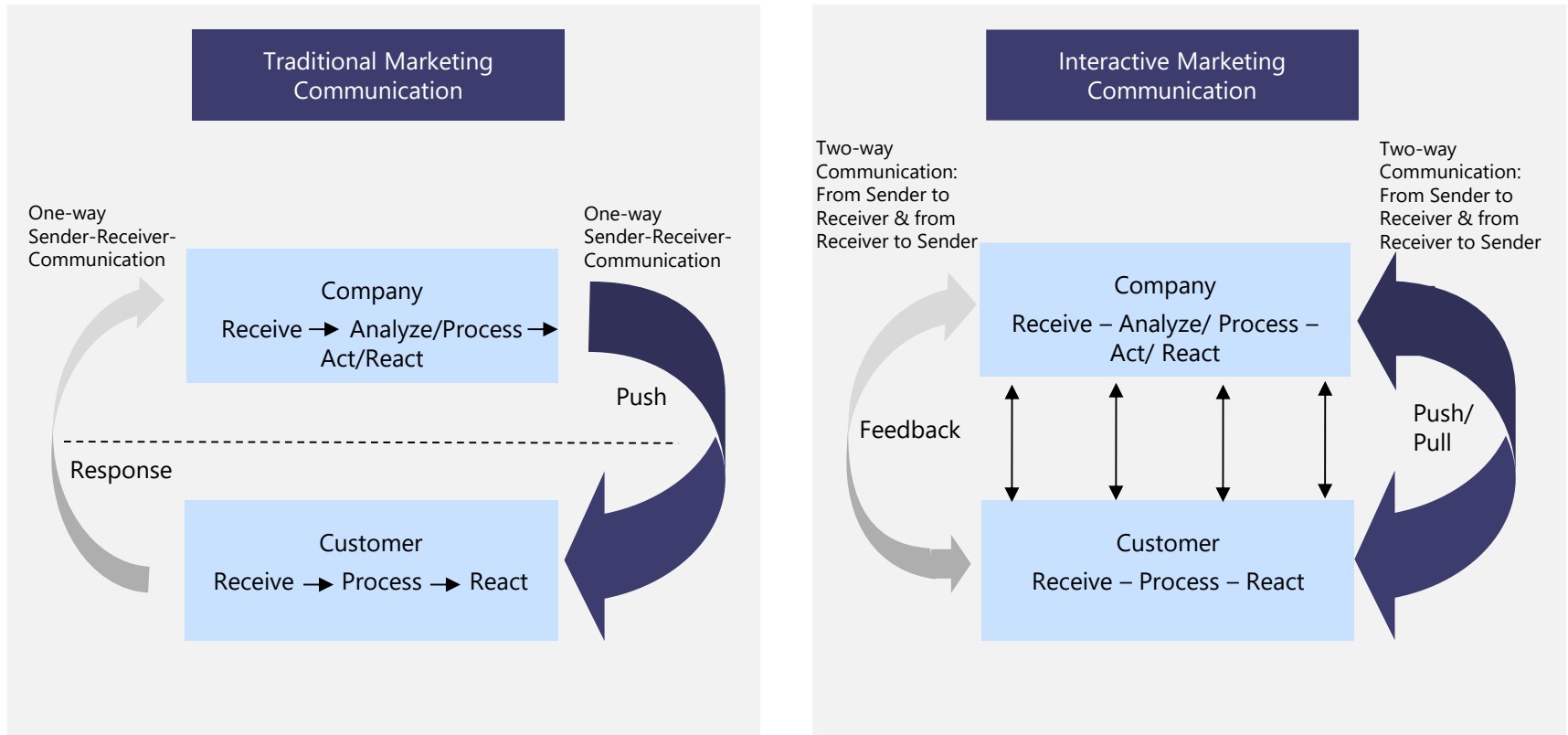
Source: Wirtz (2001a, 2021, 2024)

Fig. 17.38 Characteristics of digital communication



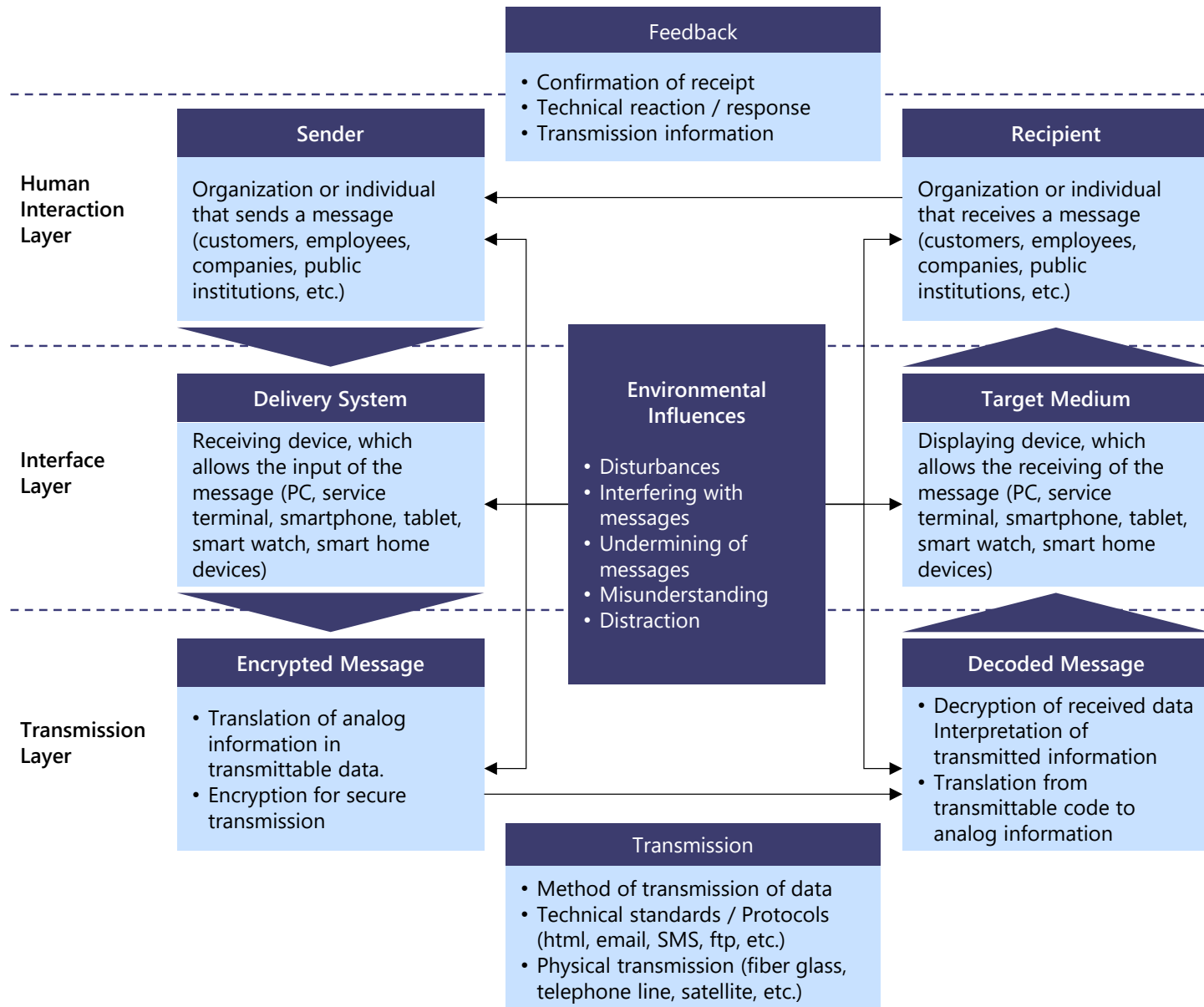
Source: Wirtz (2010, 2021, 2024)

Fig. 17.39 Comparison of traditional and interactive communication



Source: Wirtz (2013a, 2021, 2024)

Fig. 17.40 Communication process in digital communication



Source: Wirtz (2013a, 2021, 2024)

Fig. 17.41 Instruments of digital communication

Instruments of Digital Communication					
Advertising	Sales Promotion	Public Relations	Sponsoring	Event Marketing	Direct Communication
<ul style="list-style-type: none"> • Banner / Display Advertising • Ad Breaks / In-Stream Ads • New Window Ads / Pop-Ups • Search Engine Advertising (SEA) • Social Media Advertising • Influencer Marketing • Email • ... 	<ul style="list-style-type: none"> • Promotions • Intranet • Extranet • Alliances / Affiliates / Partner Programs • Digital Communities • ... 	<ul style="list-style-type: none"> • Publication of information • Social Media Presence • Search Engine Optimization (SEO: onpage and offpage optimization) • Email (direct mailings / newsletter) 	<ul style="list-style-type: none"> • Site Sponsoring • Digital Communities • Digital Product Placement • Online Sweepstakes • ... 	<ul style="list-style-type: none"> • Digital Events • Digital Product Placement • ... 	<ul style="list-style-type: none"> • Direct Mailings • Newsletter • Website Individualization • AI chatbots • ...

Source: Wirtz (2001a, 2021, 2024)

Fig. 17.42 Search results with advertising via Google

Google X

Images Packages Shopping News On a budget Meaning Videos Near me For couples


About 811,000,000 results (0.55 seconds)

Contextual and variable advertising in search results: Google Ads

Sponsored

Booking.com
<http://www.booking.com> › short-breaks

Booking.com: Short Breaks - Best Price Guarantee.
Book your **Short** Break now. Quick, Easy Booking. No Reservation Costs. Motels. Villas. Flight + Hotel. Special Offers. Get Instant Confirmation. Airport Taxi...
Book Your Holiday · Book for Tomorrow · Find the Perfect Flight · Book for Tonight



Regular search results

U.S. News & World Report
<https://travel.usnews.com> › rankings › best-weekend-g...

15 Best Weekend Getaways for 2023

Montreal Asheville, NC New York City Charleston, SC
San Diego New Orleans Washington, D.C
Romantic Getaways · Montreal Travel Guide · Midwest

<https://travel.usnews.com> › Advice

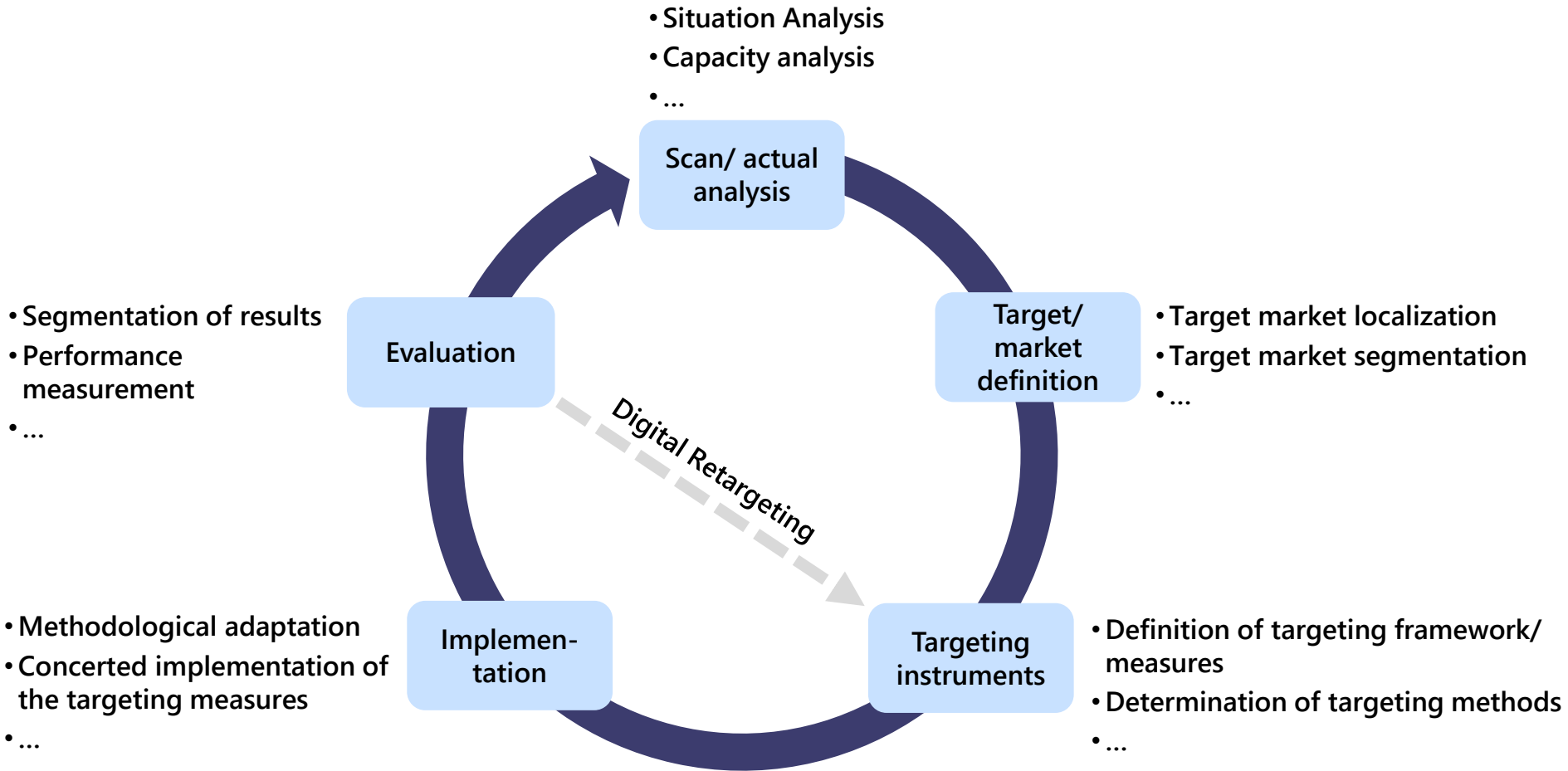
32 Top Cheap Weekend Getaways in the U.S.
Sep 15, 2022 – From beach destinations to amusement parks, these **vacation** ideas are ... in a weekend, but you can still enjoy a **short** and cheap **trip** here.

People also ask

- What is a short vacation?
- Are short vacations worth it?
- Is 3 days a good vacation?
- Are short or long vacations better?

[Feedback](#)

Fig. 17.43 Targeting process



Source: Wirtz (2020b, 2021, 2024)

Fig. 17.44 Targeting methods

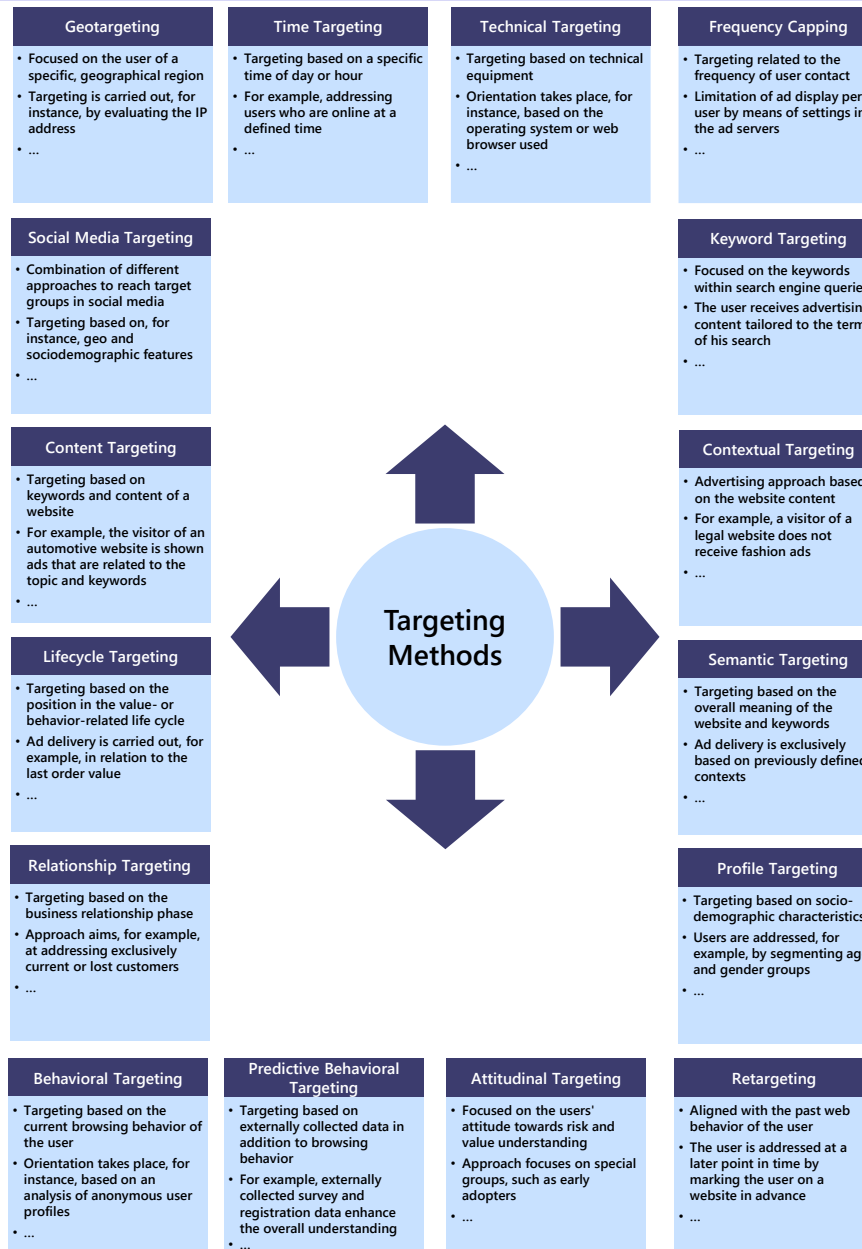
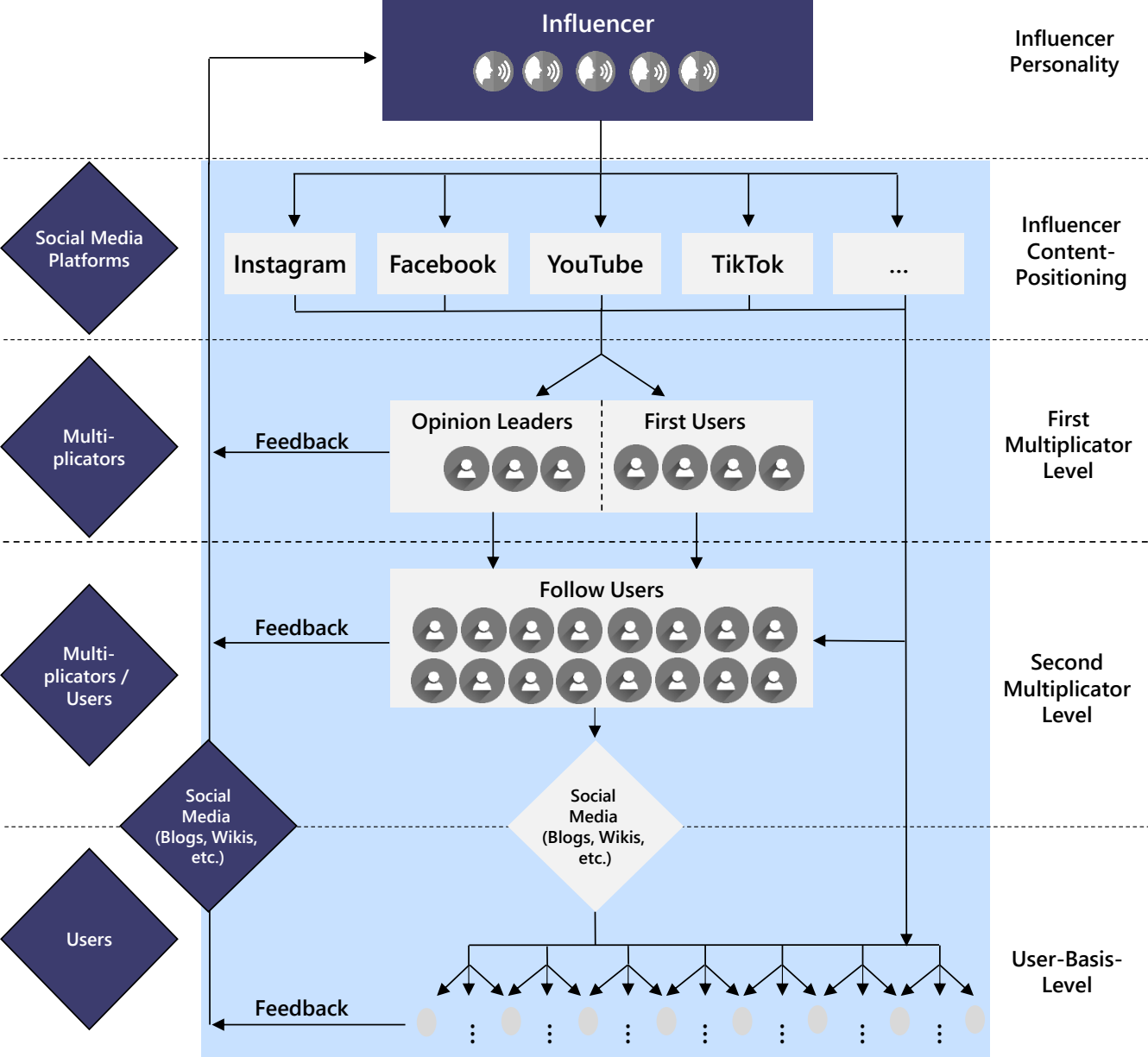


Fig. 17.45 Influencer-Communication-Follower (ICF)



Source: Wirtz (2020fb, 2021, 2024)

Fig. 17.46 PCRI Model of Influencer Marketing

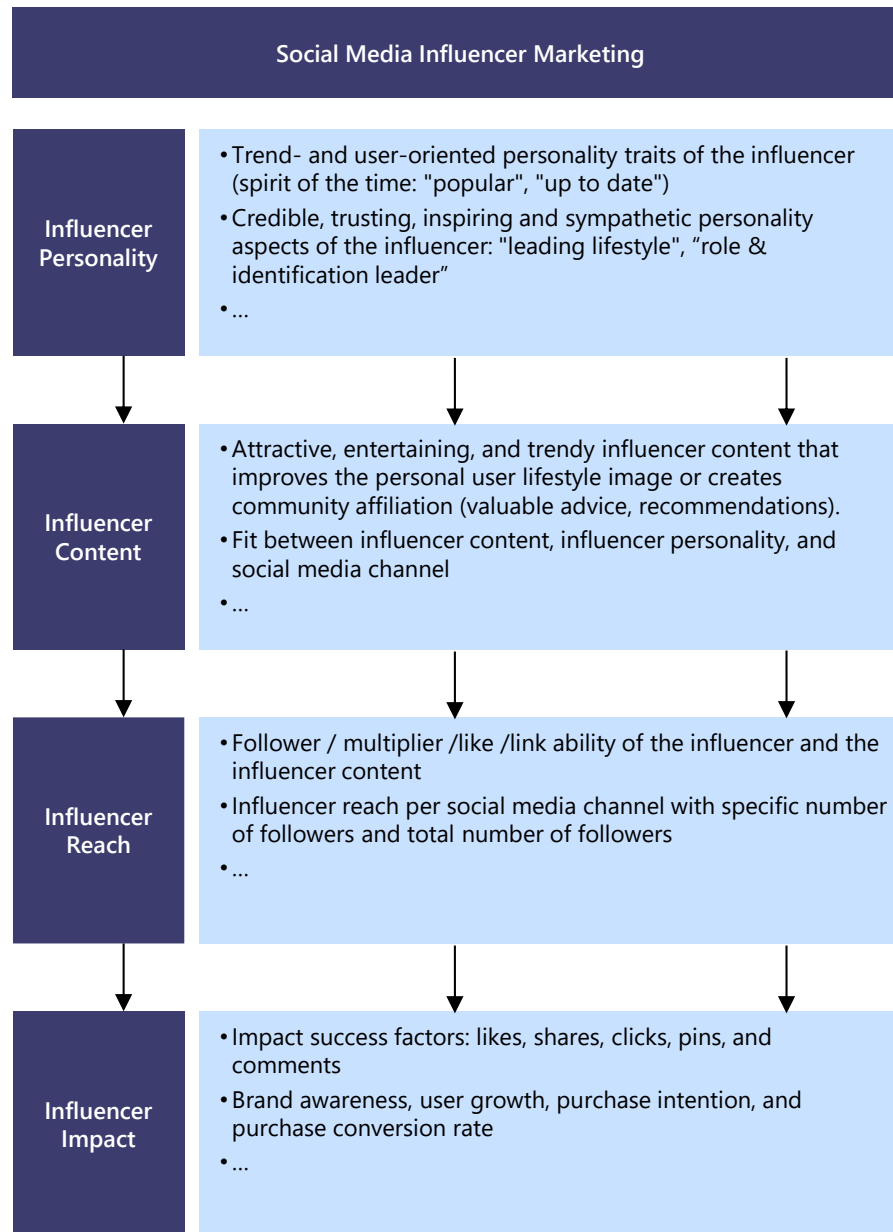


Table 17.2 Types of online advertising (1)

	Advertising forms	Differentiation through interactivity and use of multimedia
Advertising integrated directly into the content site	<ul style="list-style-type: none"> • Skyscraper banner • Billboard ad • Medium rectangle • ... 	<ul style="list-style-type: none"> • Static • Animated • Transactive • Rich media • Streaming video ads • ...
Ad breaks / In-stream ads	<ul style="list-style-type: none"> • Skippable in-stream ads • Non-skippable in-stream ads (bumper ads) • Preceding (pre-roll ads) • Interruptive (mid-roll ads) • Successive (post-roll ads) • ... 	<ul style="list-style-type: none"> • Call-to-action buttons • Sitelink assets • Product feeds • ...
New window ads	<ul style="list-style-type: none"> • Pop-under • Shaped pop-ups • Microsites • Interstitials • Superstitials • ... 	<ul style="list-style-type: none"> • Static • Animated • Transactive • Rich media • Streaming spots • ...

Source: Wirtz (2010, 2024)

Table 17.2 Types of online advertising (2)

Layer ads	<ul style="list-style-type: none"> • Floating ads • DHTML banner • Flash layer • Dynamites • Mouse over banner • Shutter • Sticky ads • ... 	<ul style="list-style-type: none"> • Static • Animated • Transactive • Rich media • Streaming layer ads • ...
Search engine advertising	<ul style="list-style-type: none"> • Text-based • Product listing ad (PLA) / shopping ad • Video (for example on YouTube) • ... 	<ul style="list-style-type: none"> • Static • Animated • Call-to-action buttons • Drop-down menus (for example opening hours) • Google Maps link • ...
Social media advertising	<ul style="list-style-type: none"> • Text-based • Images • Videos • ... 	<ul style="list-style-type: none"> • Like button • Share button • Comments • Call-to-action buttons • ...
Influencer marketing	<ul style="list-style-type: none"> • Product launch • Product test • Event hosting • Live shopping • ... 	<ul style="list-style-type: none"> • Like button • Share button • Comments • Call-to-action button • Messages • ...

Source: Wirtz (2010, 2023)

Table 17.2 Types of online advertising (3)

Advergaming	<ul style="list-style-type: none">• Download games• Plug-in games• In-game advertising• ...	<ul style="list-style-type: none">• Video game is always interactive multimedia experience, yet very different quality of implementation• Complexity of the digital experience• Game complexity• ...
Email	<ul style="list-style-type: none">• Bulk email• Personalized email• Newsletter• ...	<ul style="list-style-type: none">• Static• Animated• Rich media mail• ...

Source: Wirtz (2010, 2023)

Definition of Digital Branding

Definition of Digital Branding (Wirtz 2020b, 2024)

Digital branding comprises the creation, development / expansion and management of brands on the basis of modern information and communication technologies.

Source: Wirtz (2020b, 2024)

Fig. 17.47 Central brand management strategies in digital business

Frame of Reference for Branding Strategies in Digital Business				
Basic Conditions	<div style="display: flex; justify-content: space-around; text-align: center;"> <div style="border: 1px solid black; border-radius: 50%; padding: 5px;">Increased competition</div> <div style="border: 1px solid black; border-radius: 50%; padding: 5px;">Increasing digitization</div> <div style="border: 1px solid black; border-radius: 50%; padding: 5px;">Increasing complexity</div> <div style="border: 1px solid black; border-radius: 50%; padding: 5px;">Dynamic customer behavior</div> </div>			
Initial Situation	No existing brand	Existing brand in the offline world		Existence of various independent brands
Type of Strategy	Ⓐ Online strategy for new brands	Ⓑ Offline/online brand adaptation strategy	Ⓒ Offline/online transfer of regular brand	Ⓓ Online brand alliance
Characteristics	<ul style="list-style-type: none"> Distinct, independent digital business-specific brand 	<ul style="list-style-type: none"> Adaptation/combination of existing elements of traditional offline brand Supplementation by new Internet-affine components 	<ul style="list-style-type: none"> Complete transfer of traditional offline brand to the Internet 	<ul style="list-style-type: none"> New brand emerging from brand alliance Partial transfer of regular brand of cooperating brands
Examples	<ul style="list-style-type: none"> eBay Spotify Airbnb 	<ul style="list-style-type: none"> Nationwide Greyhound New York Times 	<ul style="list-style-type: none"> Washington Post Walmart 	<ul style="list-style-type: none"> Verizon

Source: Wirtz (2020b, 2021, 2024)

Fig. 17.48 Customer loyalty through digital branding



Source: Wirtz (2001a, 2024)

Fig. 17.49 Forms of integration in communication policy

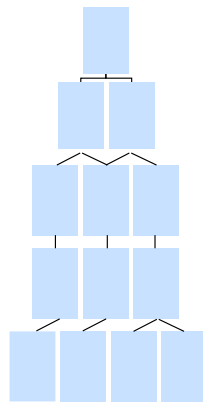
Forms		Goals	Instruments	Digital Business Specifics
Content-related Integration	instrumental	Consistency, independence	Consistent messages, arguments, images	Focus on instrumental and functional integration, customer (segment) specific alignment
	horizontal			
	vertical			
	functional			
Formal Integration		Conciseness, clarity	Consistent use of logos, signs, slogans	Even in digital business, unconditional adherence to formal design principles, possibly overall adaptation
Temporal Integration		Consistency, continuity	Event scheduling (timing)	High importance of topicality due to fast pace of life

Source: Wirtz (2010, 2024)

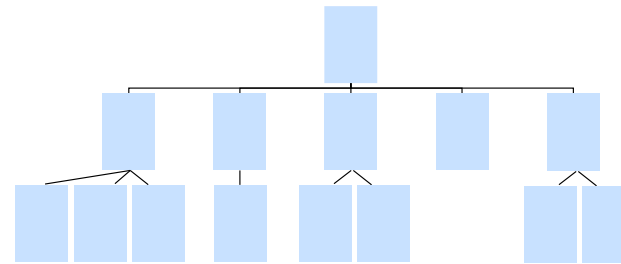
Fig. 17.50 Navigation and interaction structures of websites

Website Navigation Structure

Deep Website Structure



Shallow Website Structure

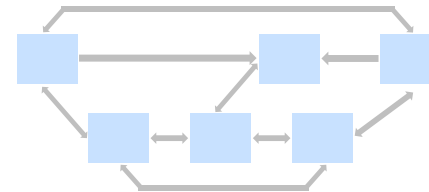


Interaction within the Website Structure

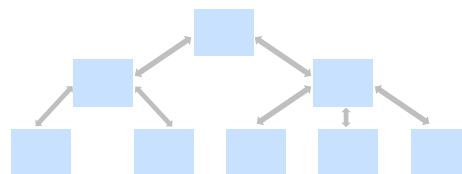
linear



non-linear



hierarchical



integrated

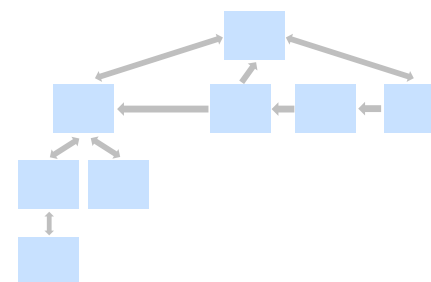
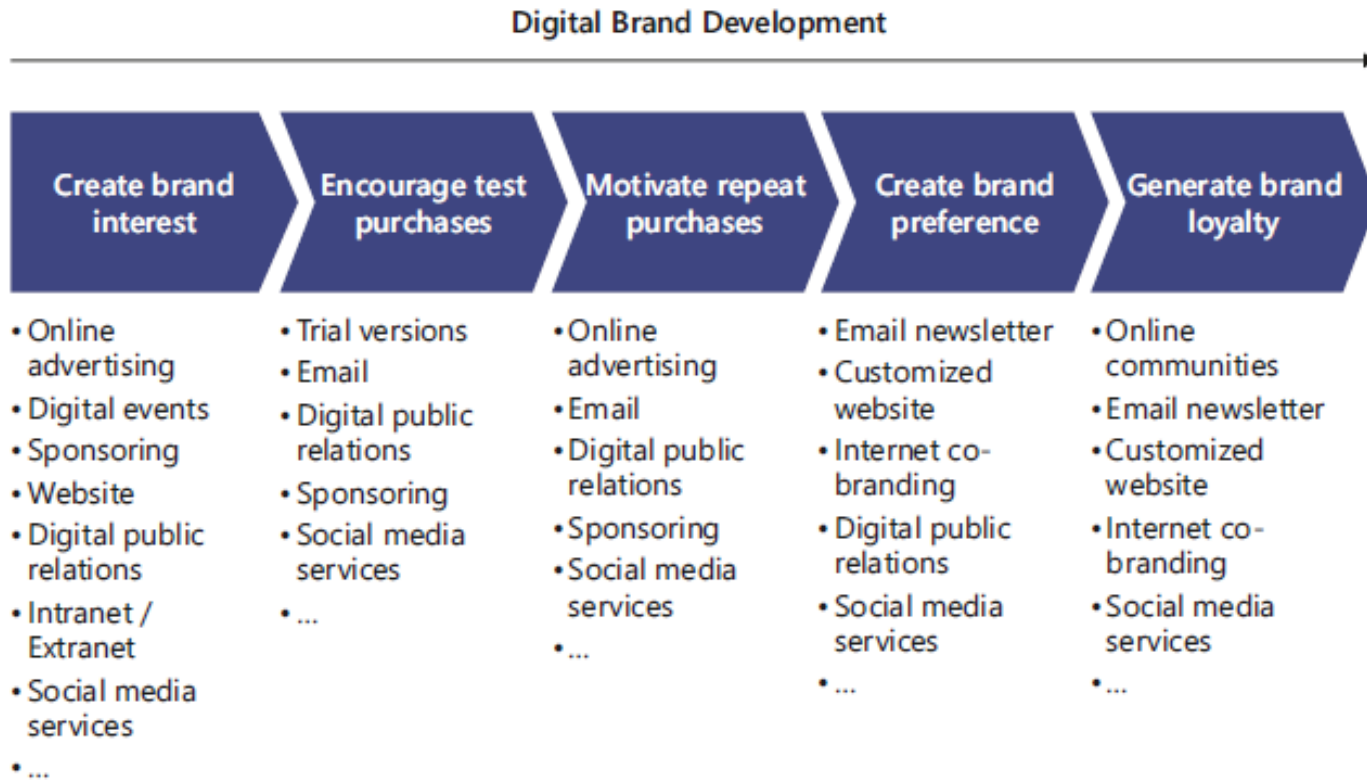


Fig. 17.51 Digital brand development process



Source: Wirtz (2001a, 2024)

Table 17.3 Definitions of customer relationship management

Author(s)	Definition	Core Aspects
Copulsky and Wolf (1990)	Relationship marketing combines elements of general advertising, sales promotion, public relations and direct marketing to create more effective and more efficient ways of reaching customers. It centers on developing a continuous relationship with customers across a family of related products and services	Combination of marketing instruments in order to improve customer contact and relationship across products / services
Morgan and Hunt (1994)	Relationship marketing refers to all marketing activities directed toward establishing, developing and maintaining successful relational exchanges	Initiating, developing, and maintaining relationships
Sheth and Parvatiyar (1995)	Relationship marketing attempts to involve and integrate customers, suppliers and other infrastructural partners into a firm's developmental and marketing activities	Involving and integrating relationship partners in a company's activities
Heller Baird and Parasnis (2011)	Customer relationship management strategy, enabled by processes and technologies, is designed to manage customer relationships as a means for extracting the greatest value from customers over the lifetime of the relationship. These strategies typically concentrate on the operational responses required to manage the customer	Increasing customer value and managing the customer

Source: Wirtz (2000c, 2021, 2024)

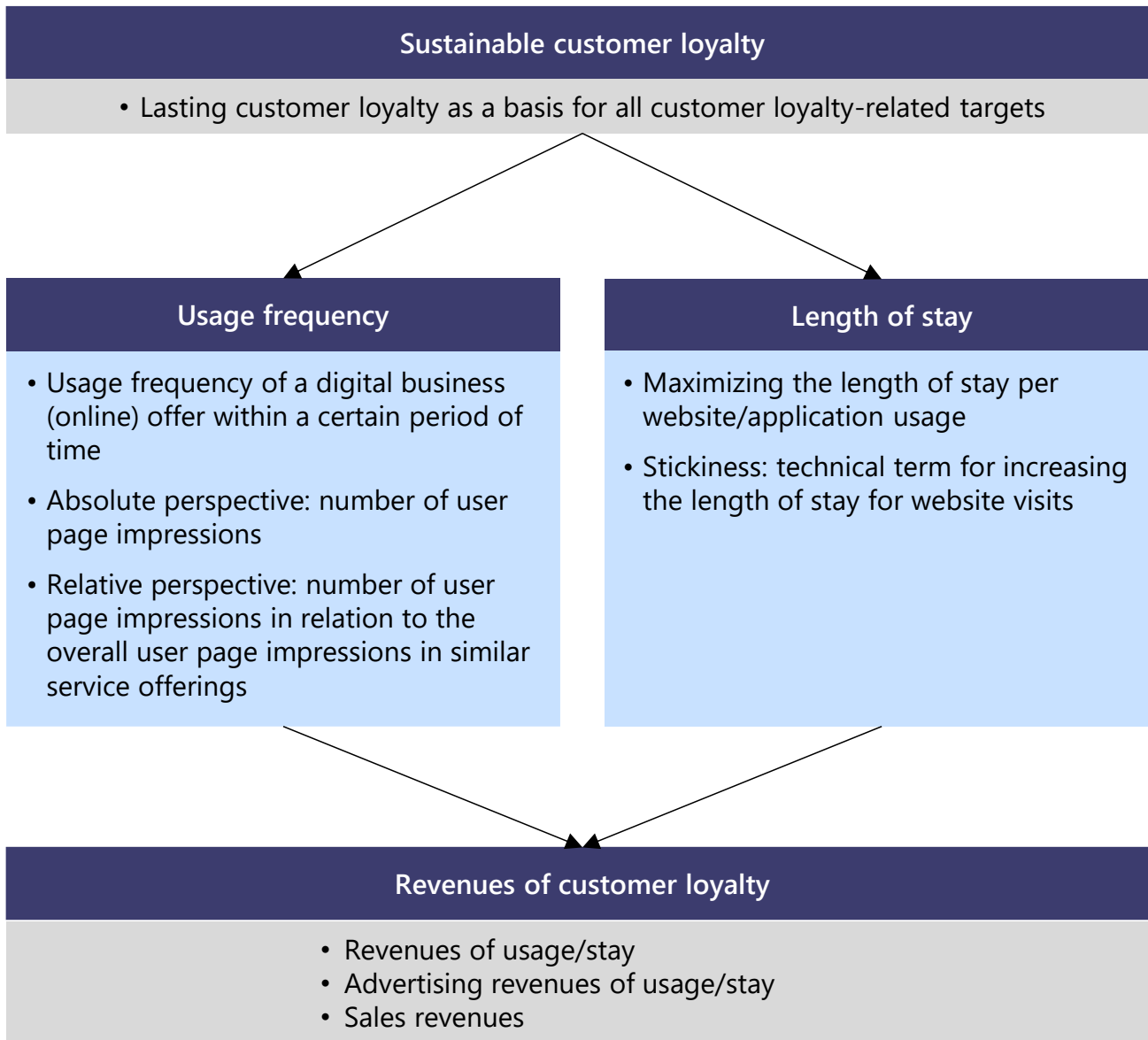
Definition of Digital Relationship Management

Definition of Digital Relationship Management (Wirtz 2010, 2021, 2024)

Digital business customer relationship management includes the analysis, planning, steering and controlling of customer relationships based on information and communication technology, with the aim to successfully generate value for the customer and the respective company.

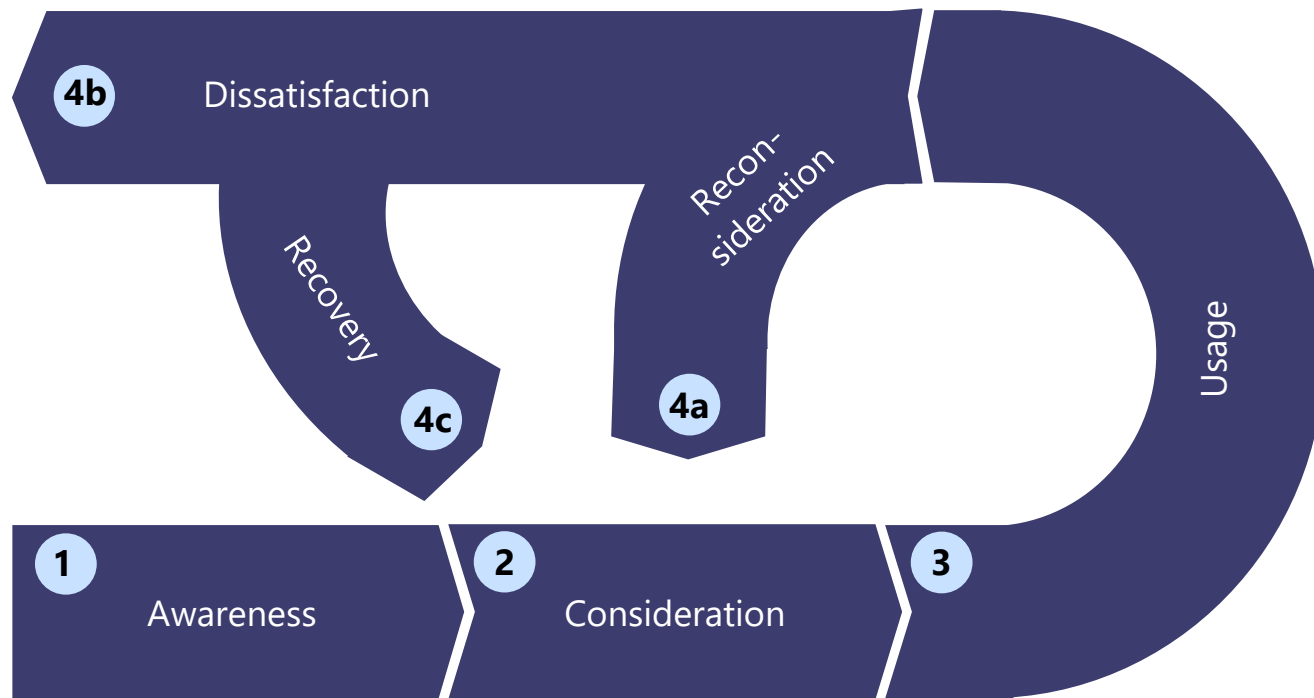
Source: Wirtz (2010,2021, 2024)

Fig. 17.52 Target dimensions of customer/user loyalty



Source: Wirtz (2003, 2021, 2024)

Fig. 17.53 Digital business customer relationship management process



Source: Wirtz (2003, 2021, 2024)

Fig. 17.54 Integrated digital business customer relationship management

Business Model-Related Customer Demand	Access/Connection	Communication	Content	Search/Context	Community	Commerce
Facebook/Meta	<ul style="list-style-type: none"> • Free Basics/Internet.org 	<ul style="list-style-type: none"> • Facebook Messenger • WhatsApp 	<ul style="list-style-type: none"> • Instagram • Facebook Feed 	<ul style="list-style-type: none"> • Facebook Search 	<ul style="list-style-type: none"> • Facebook Fan Pages • Facebook Groups • Instagram • WhatsApp 	<ul style="list-style-type: none"> • Facebook Iframe Shopping • Meta Pay
Microsoft	<ul style="list-style-type: none"> • OneDrive • Office 365 	<ul style="list-style-type: none"> • Windows Live • Microsoft Outlook • Skype 	<ul style="list-style-type: none"> • MSN • Xbox • Groove Music • Bing Maps 	<ul style="list-style-type: none"> • Bing • Microsoft Start 	<ul style="list-style-type: none"> • Skype • Microsoft Communities 	<ul style="list-style-type: none"> • Microsoft Store
Google/Alphabet	<ul style="list-style-type: none"> • Google Drive 	<ul style="list-style-type: none"> • Google Hangouts • Gmail • Blogger / Blogspot 	<ul style="list-style-type: none"> • Google Play • YouTube • YouTube Music • Google Books • Google Maps 	<ul style="list-style-type: none"> • Google Search • Google Shopping • Google News • Google Images 	<ul style="list-style-type: none"> • Google Hangouts • Google Groups 	<ul style="list-style-type: none"> • Google Shopping • Google Pay • Google Play

Source: Wirtz (2010, 2021, 2024)

Fig. 17.55 Measures and instruments of DCRM

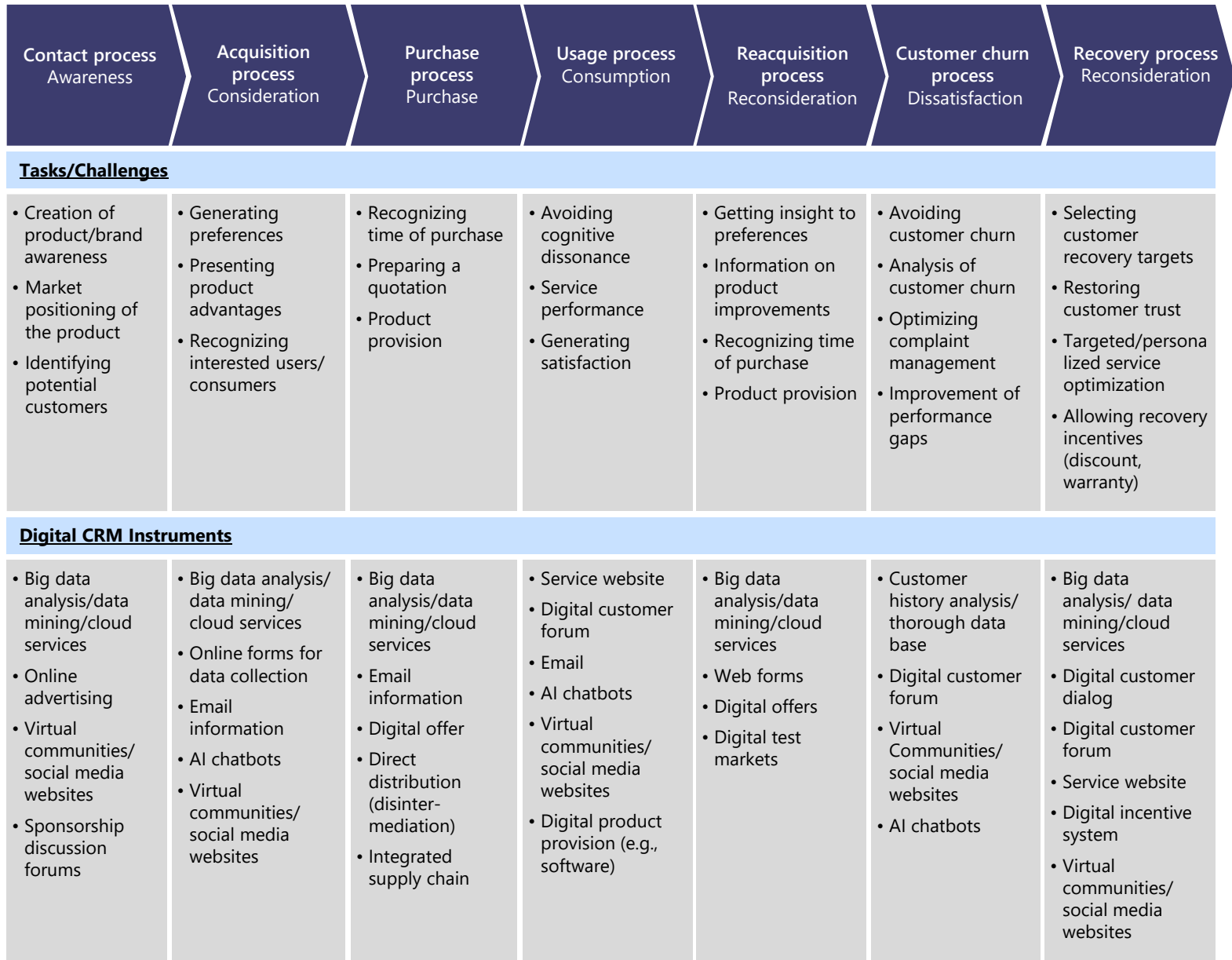
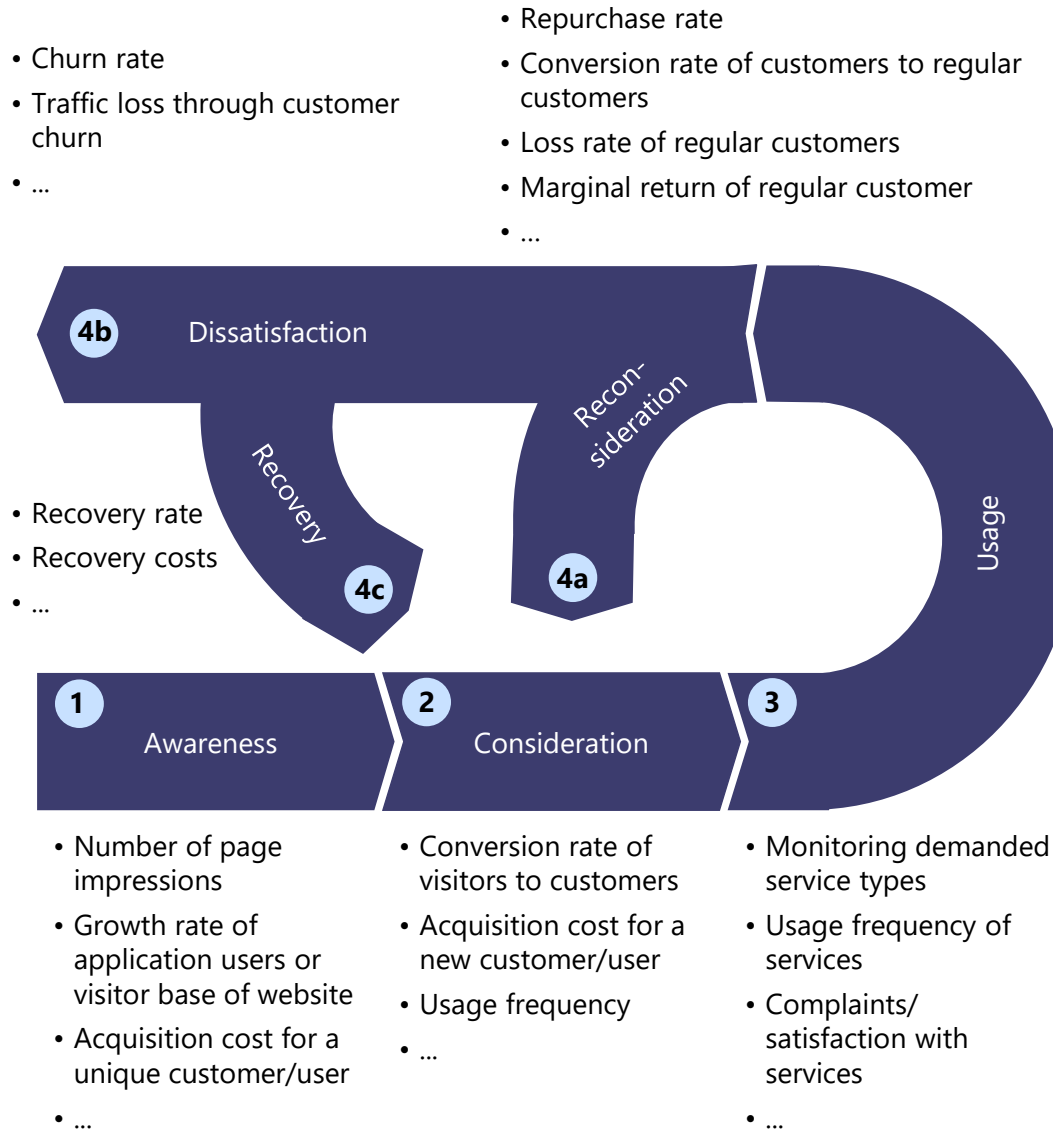
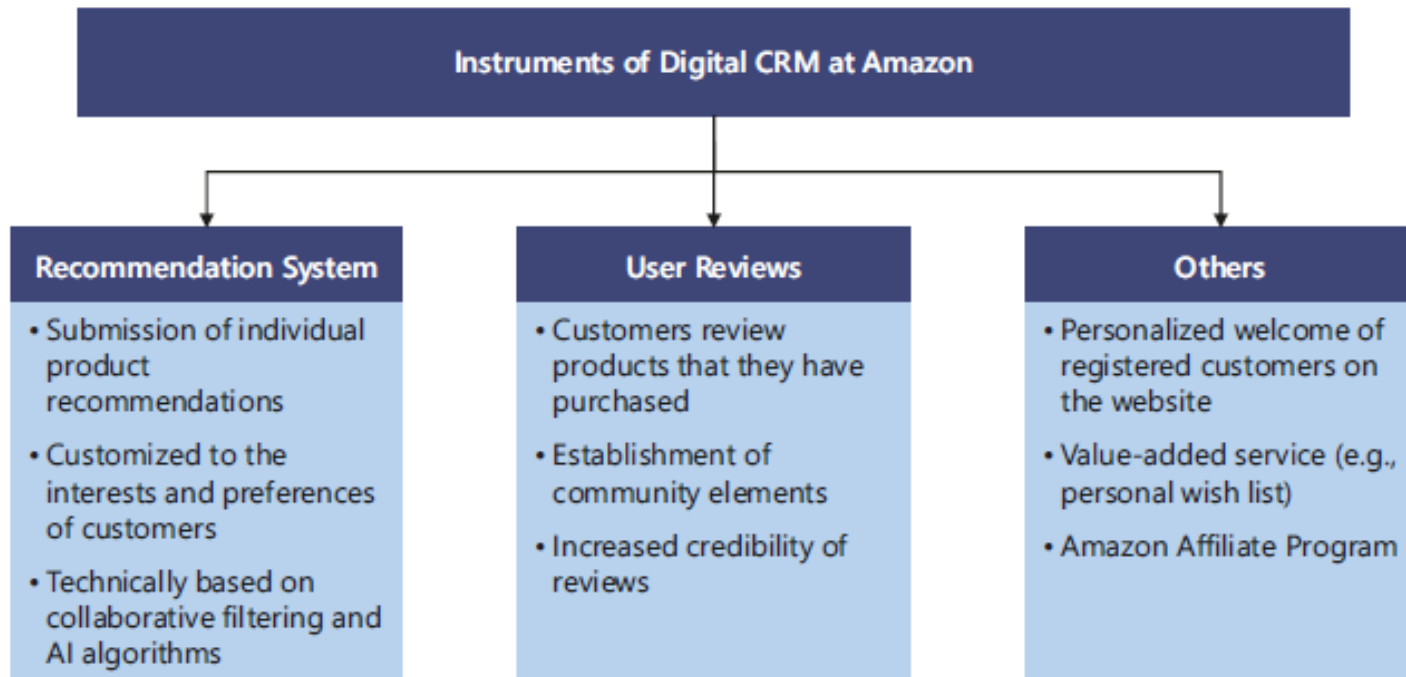


Fig. 17.56 Performance and control variables of the digital customer relationship management process



Source: Wirtz (2003, 2021, 2024)

Fig. 17.57 Digital Customer Relationship Management at Amazon



Source: Wirtz (2010, 2024)

Chapter 17 Questions and topics for discussion

Chapter 17 Questions and topics for discussion



Review questions

1. Describe the main objectives of digital marketing.
2. Outline the digital value chain of distribution.
3. Describe both the ICF model and the PCRI model.
4. Describe the strategic multichannel marketing process.
5. Describe the digital CRM process and the respective tasks and challenges.

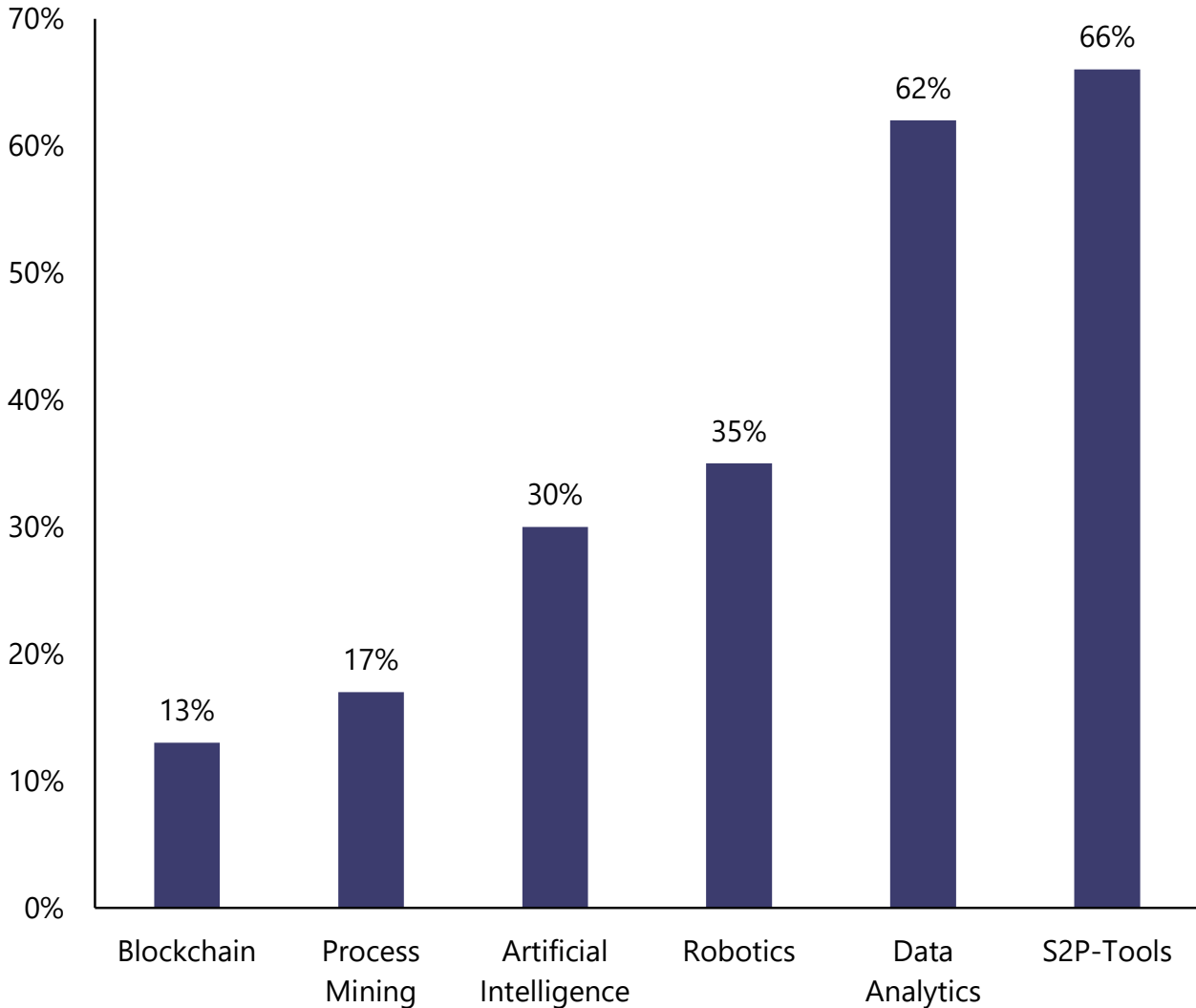


Topics for discussion

1. Discuss the advantages and disadvantages of digital marketing with regard to the identification and use of your personal data based on the different targeting methods. Which socially critical and legally problematic aspects are of particular relevance here?
2. Discuss the importance of influencer marketing within social media. Discuss to what extent influencer marketing is critical and whether influencer marketing is a new method of surreptitious advertising.
3. The combination of offline and online channel marketing leads to a multitude of information, transaction, and service points. Customers are almost completely captured and addressed by customer touch points. Discuss the advantages and disadvantages of this complete "customer processing" for the individual consumer (transparent human, 24/7- accessible) and to what extent this is individually and socially desirable from the point of view of "commercialization".

Chapter 18: Digital Procurement

Fig. 18.1 Share of companies planning to use digital tools in procurement by 2025



Source: PricewaterhouseCoopers (2022), Wirtz (2024)

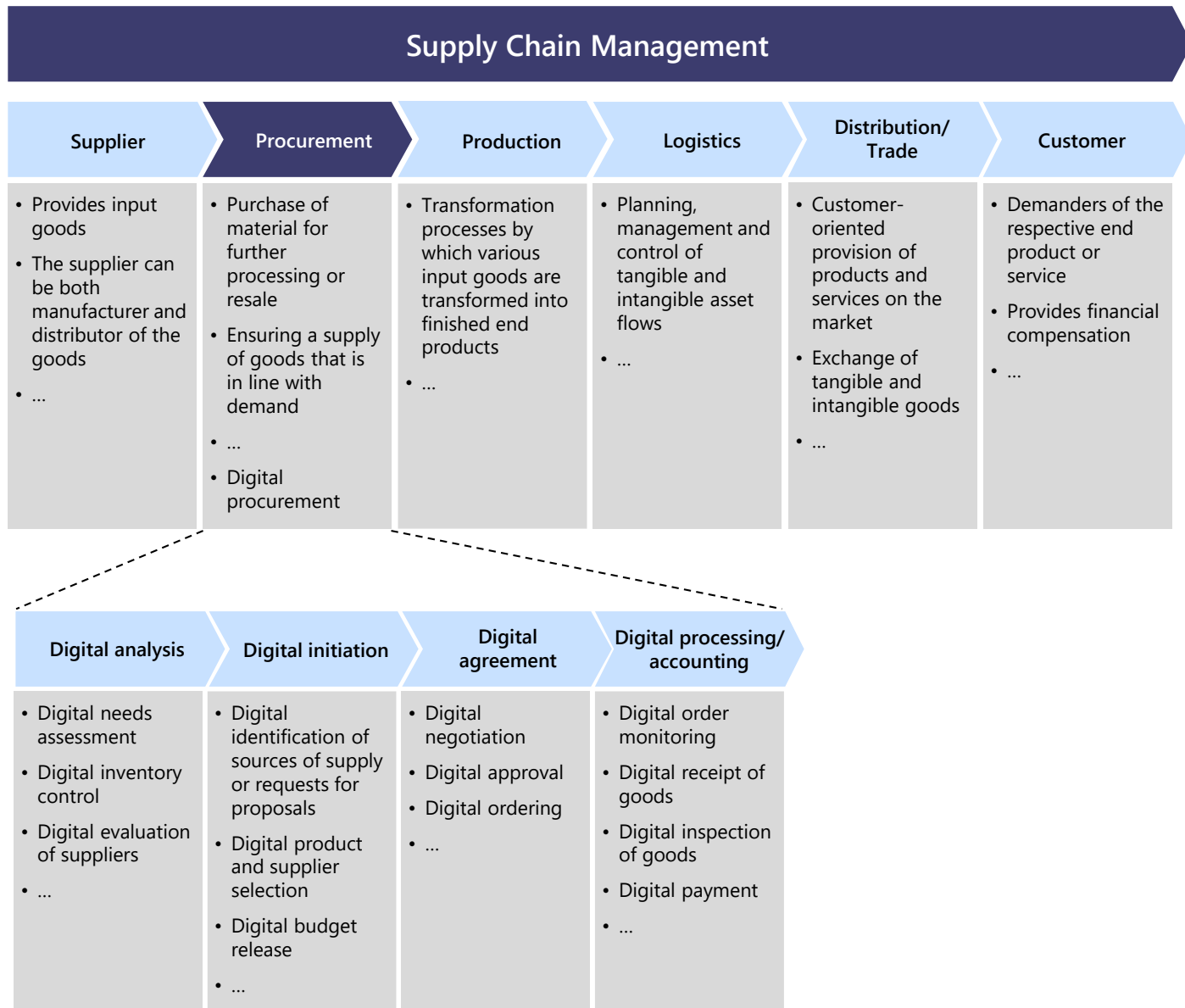
Definition of Procurement

Definition of Procurement (Wirtz 2010, 2021, 2024)

Procurement involves all activities and processes necessary to supply a demanding entity with input factors that the buying company (recipient) does not create itself.

Source: [Wirtz \(2010,2021, 2024\)](#)

Fig. 18.2 Intertwining and differentiation of digital procurement and SCM



Source: Wirtz (2020, 2021, 2024)

Table 18.1 Definitions of digital procurement

Author(s)	Definition
Bogaschewsky (1999)	Electronic procurement (EP) ultimately represents a collective term for electronically supported procurement, without being able to clearly define what is meant by this. There is only agreement that the use of Internet-related technologies - TCP/IP, HTML, XML - and Internet services such as e-mail, FTP, Telnet, newsgroups and the WWW are core elements of EP concepts.*
Wirtz and Eckert (2001)	In this paper, electronic procurement is understood as Internet-based procurement.*
Schubert (2002)	Electronic Procurement supports a company's relationships and processes with its suppliers using electronic media.*
Wirtz and Kleineicken (2005)	Electronic procurement (short e-procurement) is defined as the support of organizational procurement activities through the Internet in order to increase procurement success.*
Papazoglou and Ribbers (2006)	"Electronic Procurement is characterized by the purchase of supplies and services over the internet."
Meier and Stormer (2012)	E-Procurement refers to all relationship processes between companies and suppliers using electronic communication networks. E-Procurement includes strategic, tactical and operational elements of the procurement process.*
Turban et al. (2015)	"E-procurement (electronic procurement) is the online purchase of supplies, materials, energy, work and services."
Chaffey et al. (2019)	"The electronic integration and management of all procurement activities, including purchase request, authorization, ordering, delivery and payment, between a purchaser and a supplier."

*Translated

Source: Wirtz (2001, 2021, 2024)

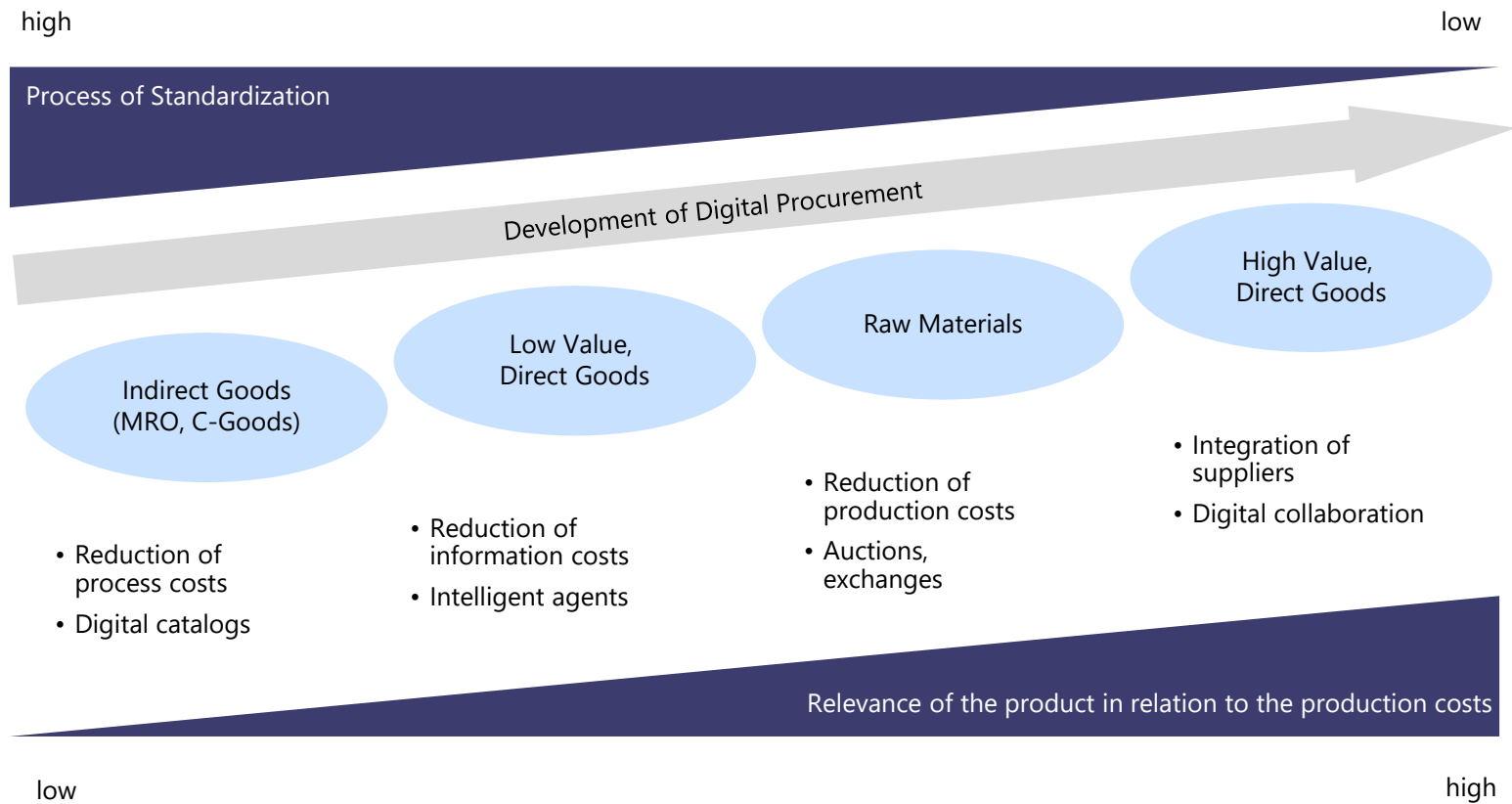
Definition of Digital Procurement

Definition of Digital Procurement (Wirtz 2001, 2021, 2024)

Digital procurement is the integration of network-based information and communication technology to support operational activities and strategic tasks in the procurement department of a company. Digital procurement is intended to improve the effectiveness and efficiency of business activities.

Source: Wirtz (2001,2021, 2024)

Fig. 18.3 Development of digital procurement



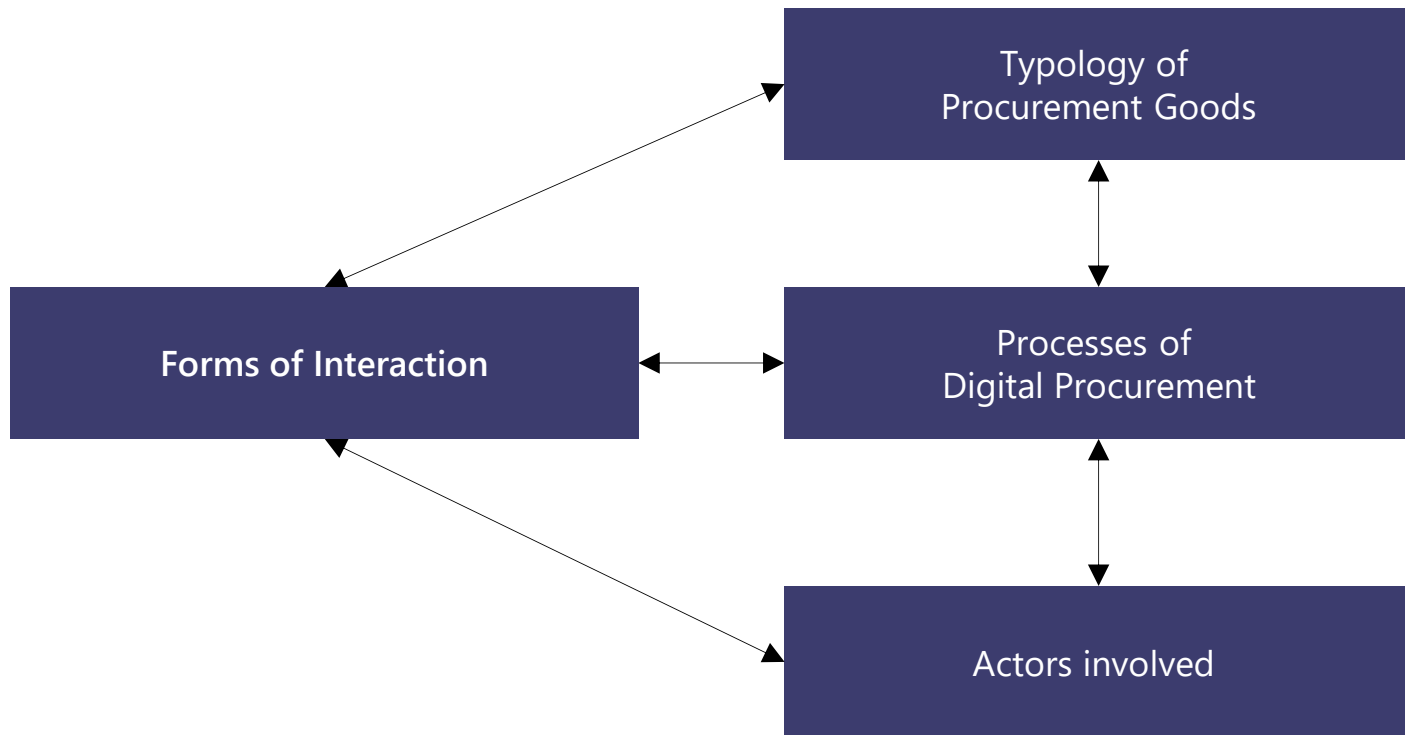
Digital Procurement Potential



Legend: ○ Very low ◐ Low ◑ Medium ◒ High ● Very High

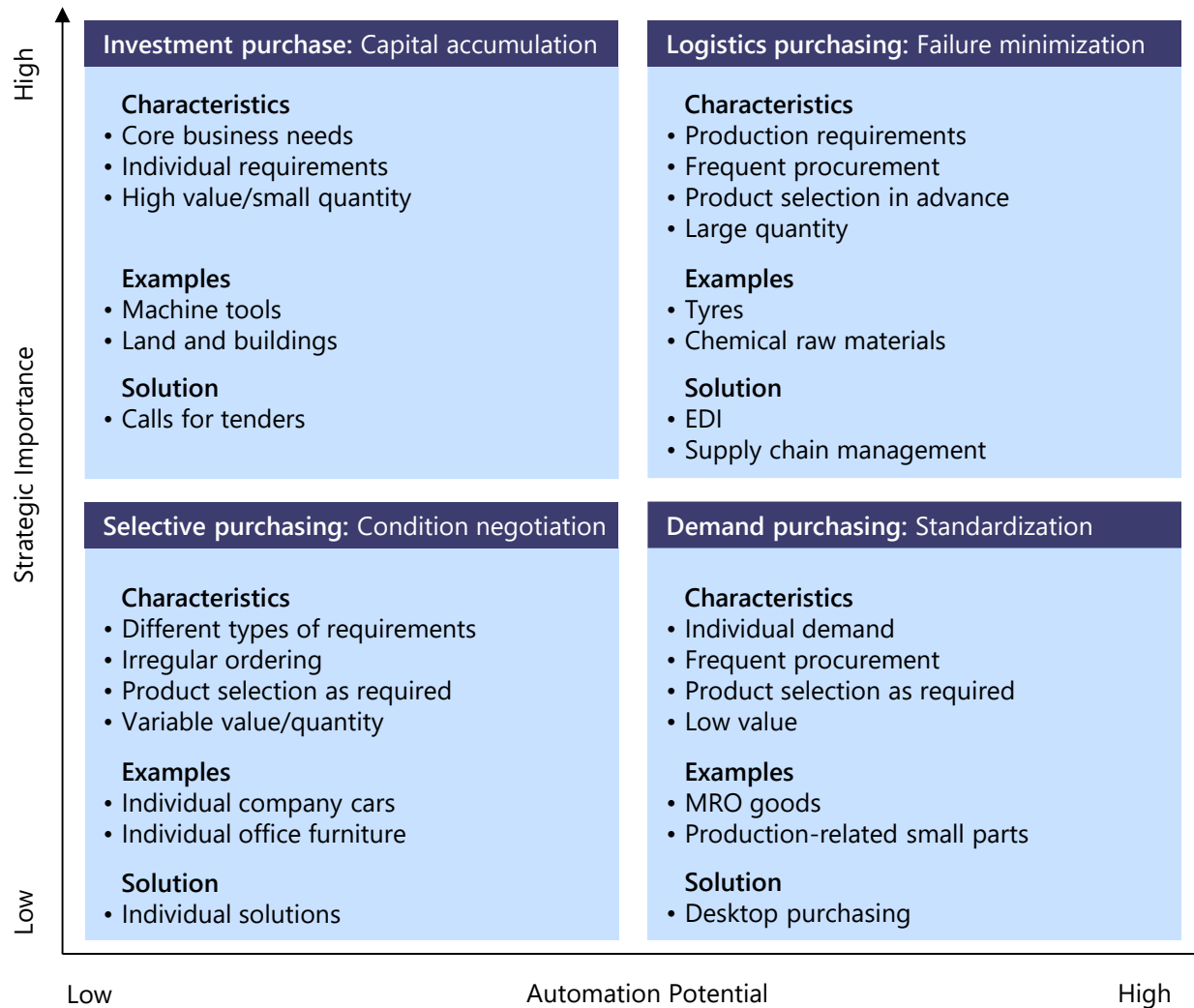
Source: Wirtz (2001, 2021, 2024)

Fig. 18.4 Structural framework of digital procurement



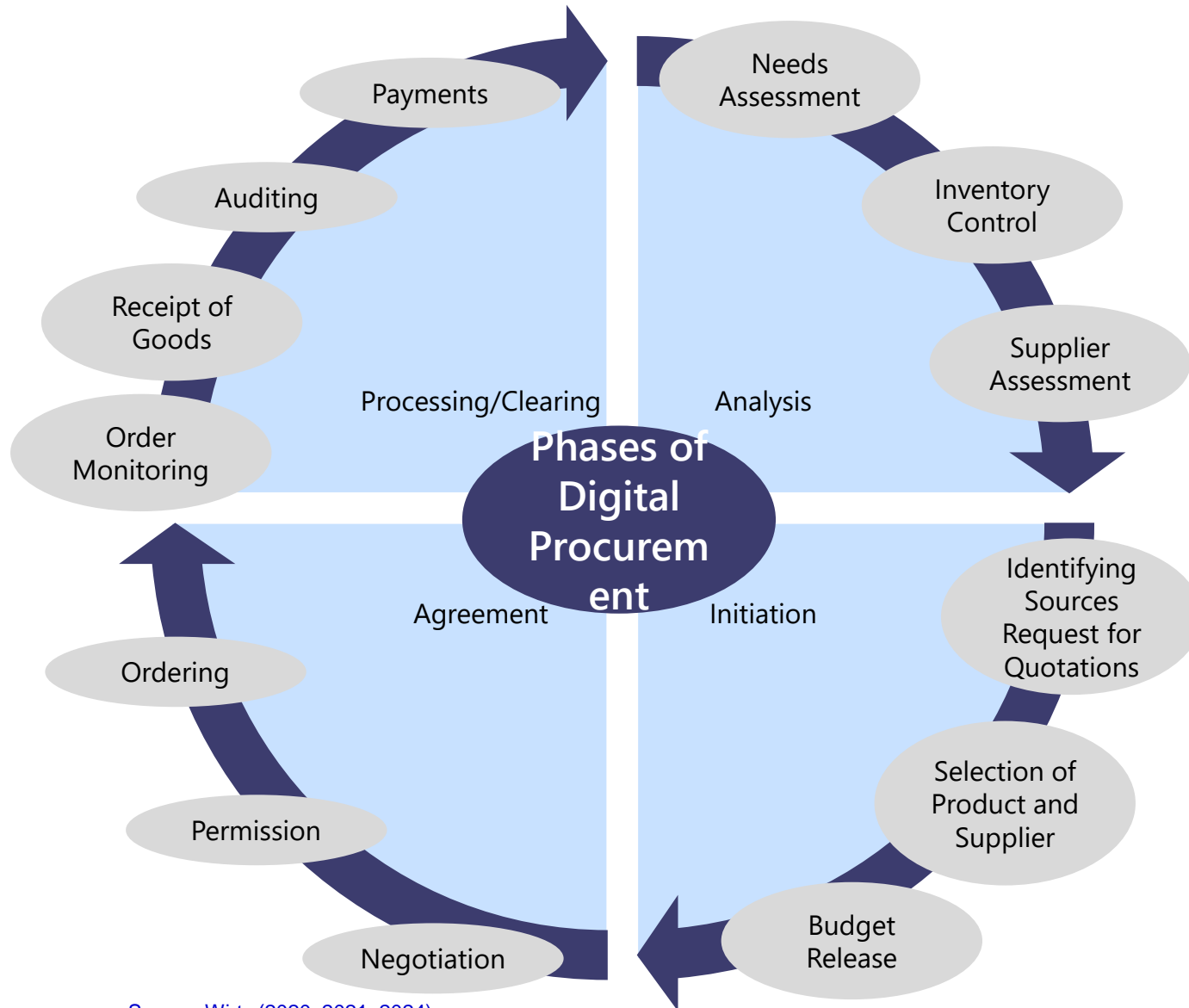
Source: Wirtz (2001, 2021, 2024)

Fig. 18.5 Strategy/automation potential matrix



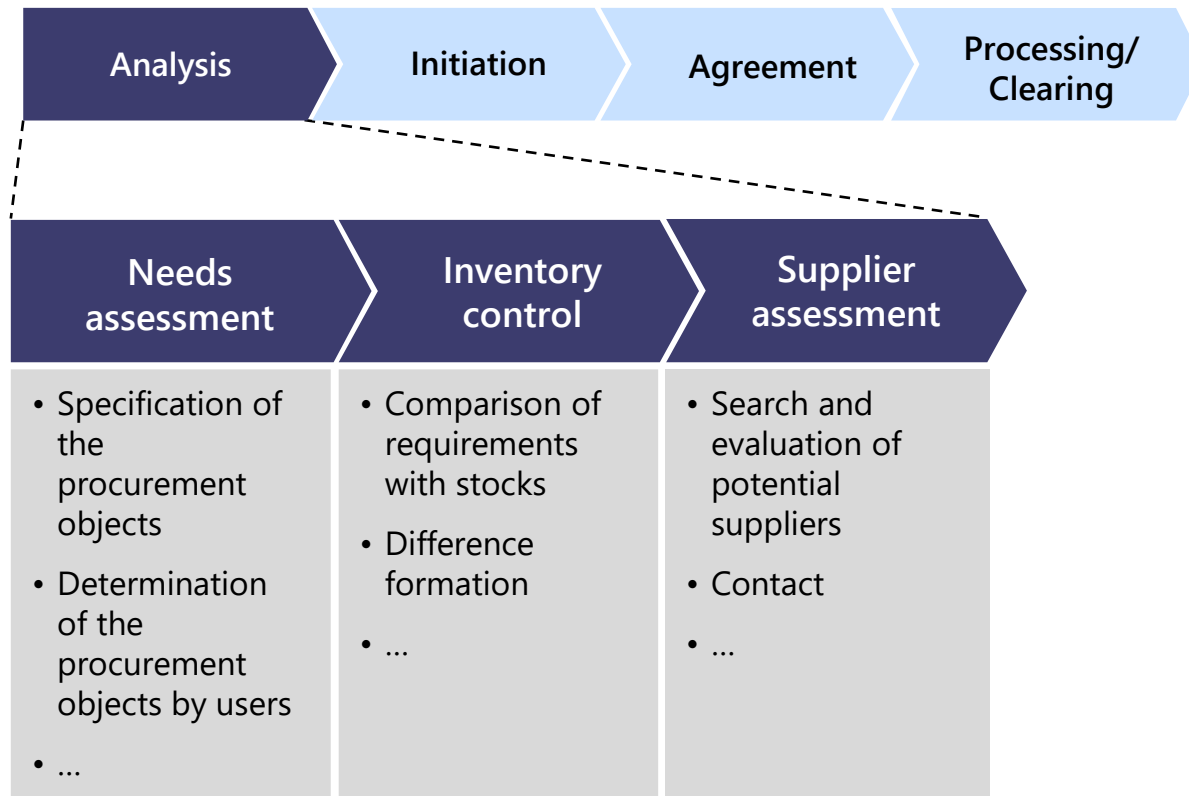
Source: Wirtz (2021, 2024)

Fig. 18.6 Phases of digital procurement



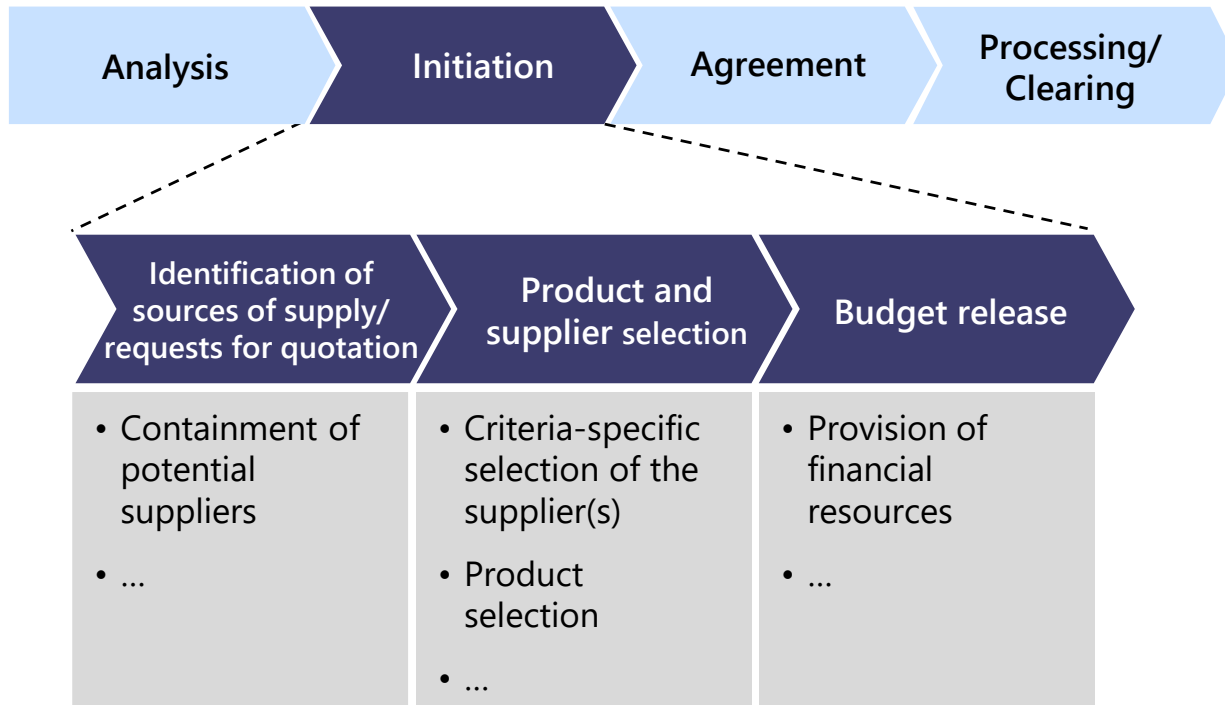
Source: Wirtz (2020, 2021, 2024)

Fig. 18.7 Analysis phase of procurement



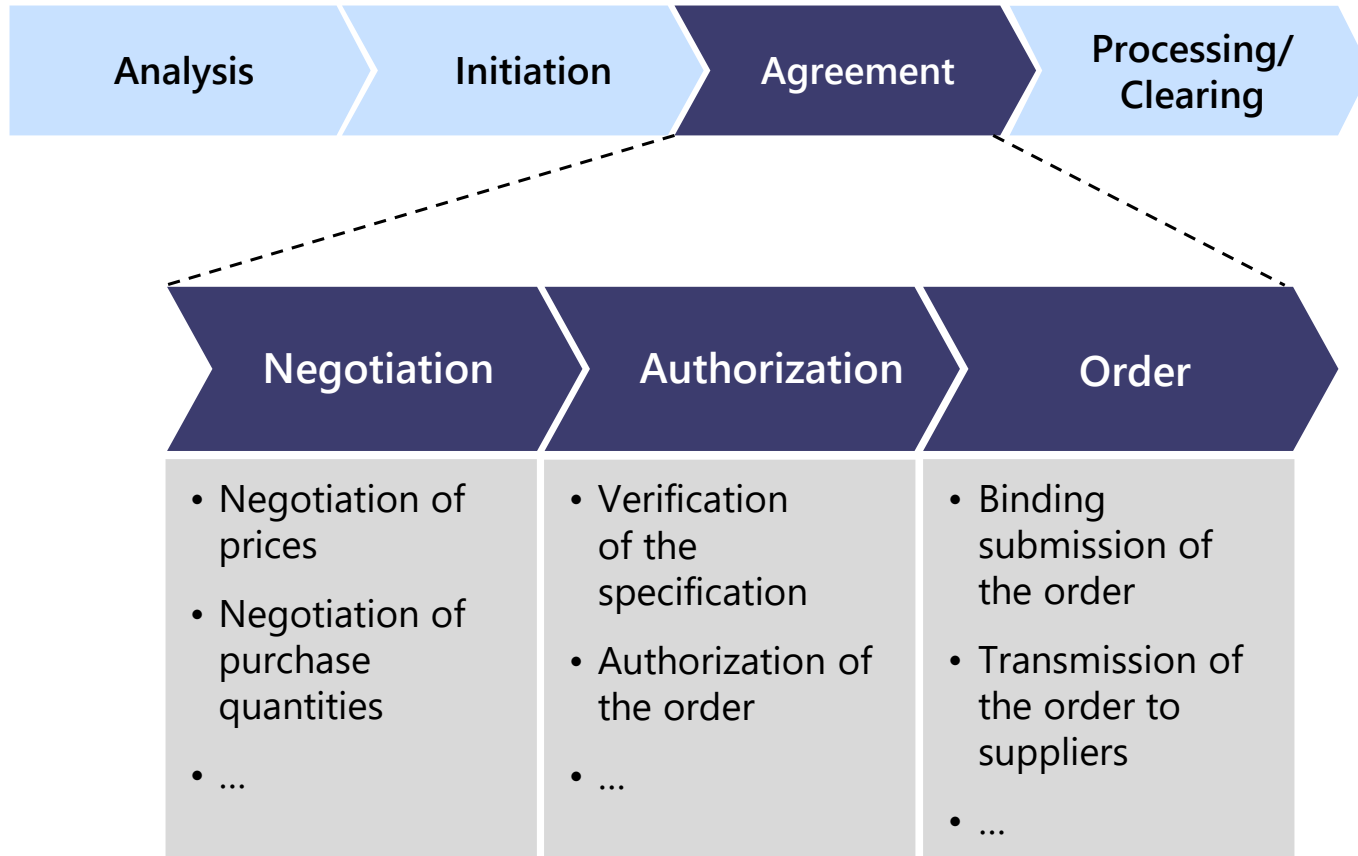
Source: Wirtz (2001, 2021, 2024)

Fig. 18.8 Initiation phase of procurement



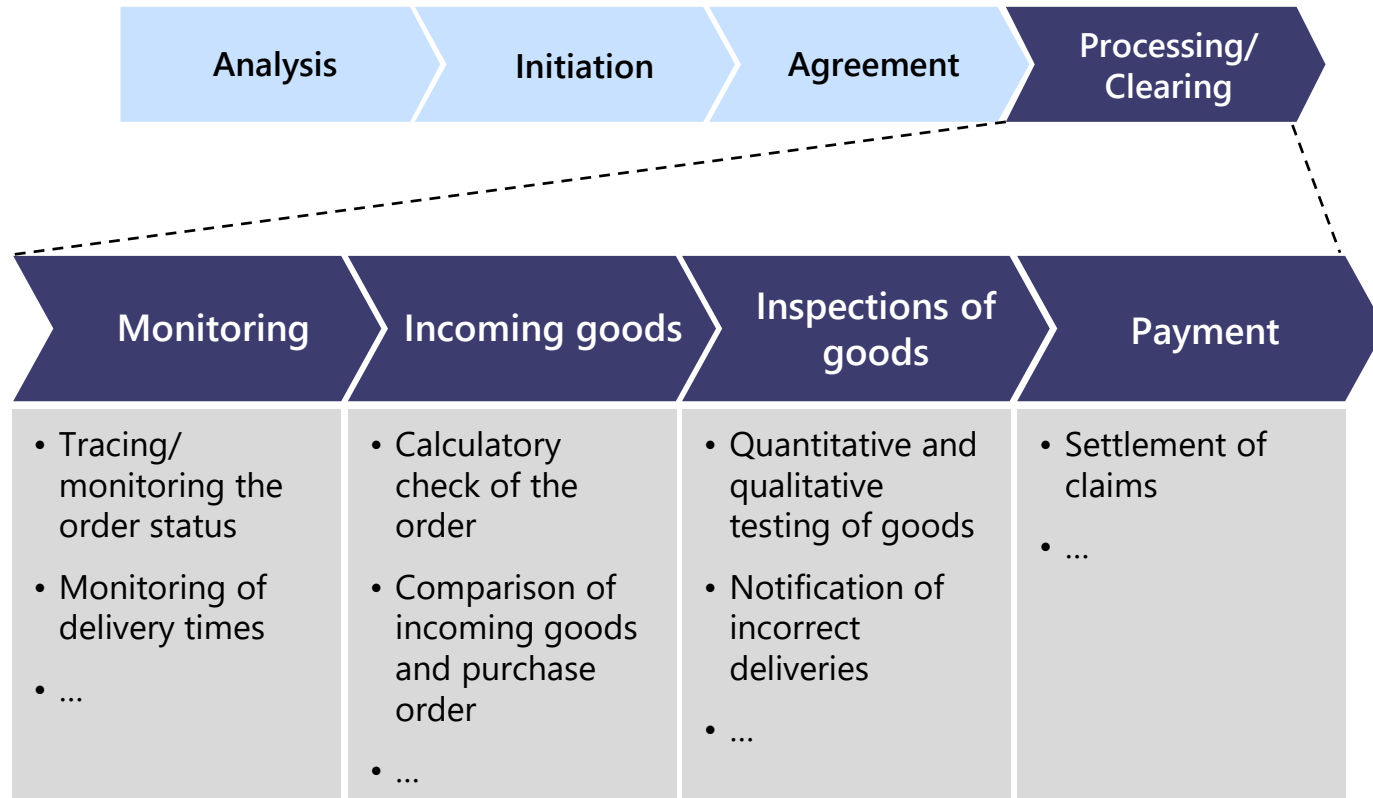
Source: Wirtz (2001, 2021, 2024)

Fig. 18.9 Agreement phase of procurement



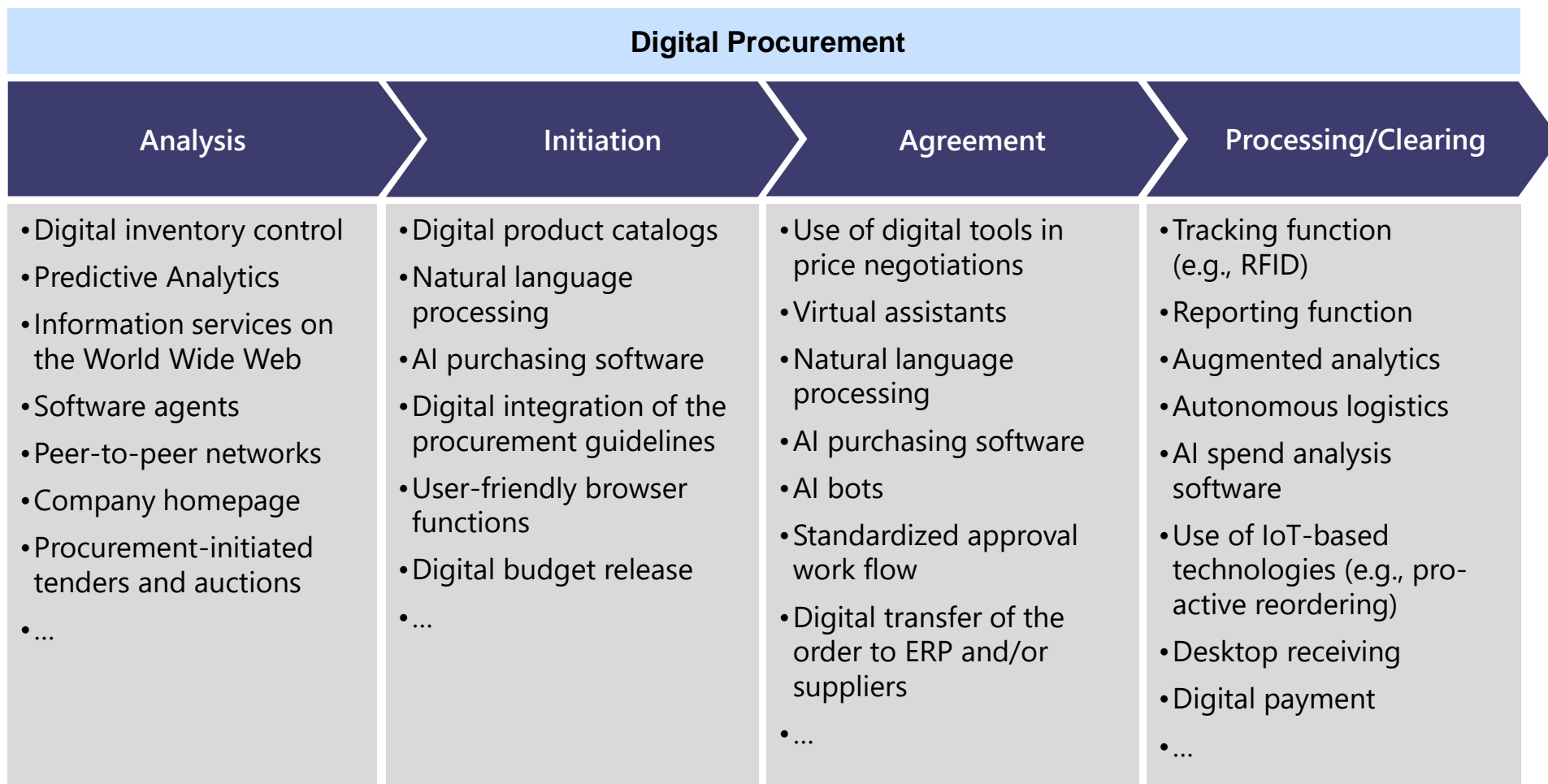
Source: Wirtz (2001, 2021, 2024)

Fig. 18.10 Processing and clearing phase of procurement



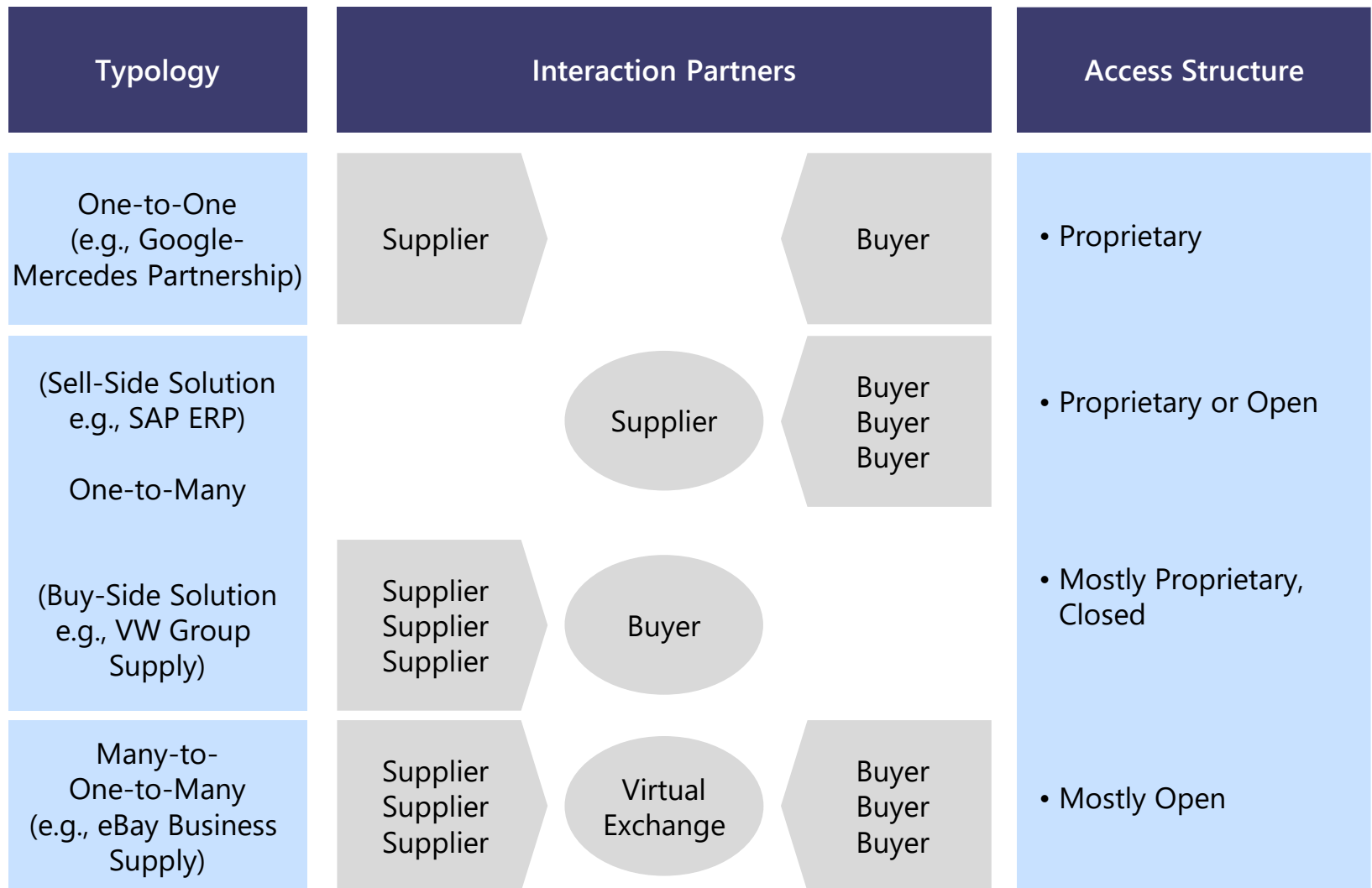
Source: Wirtz (2001, 2021, 2024)

Fig. 18.11 Digital procurement applications and supportive information and communication technology



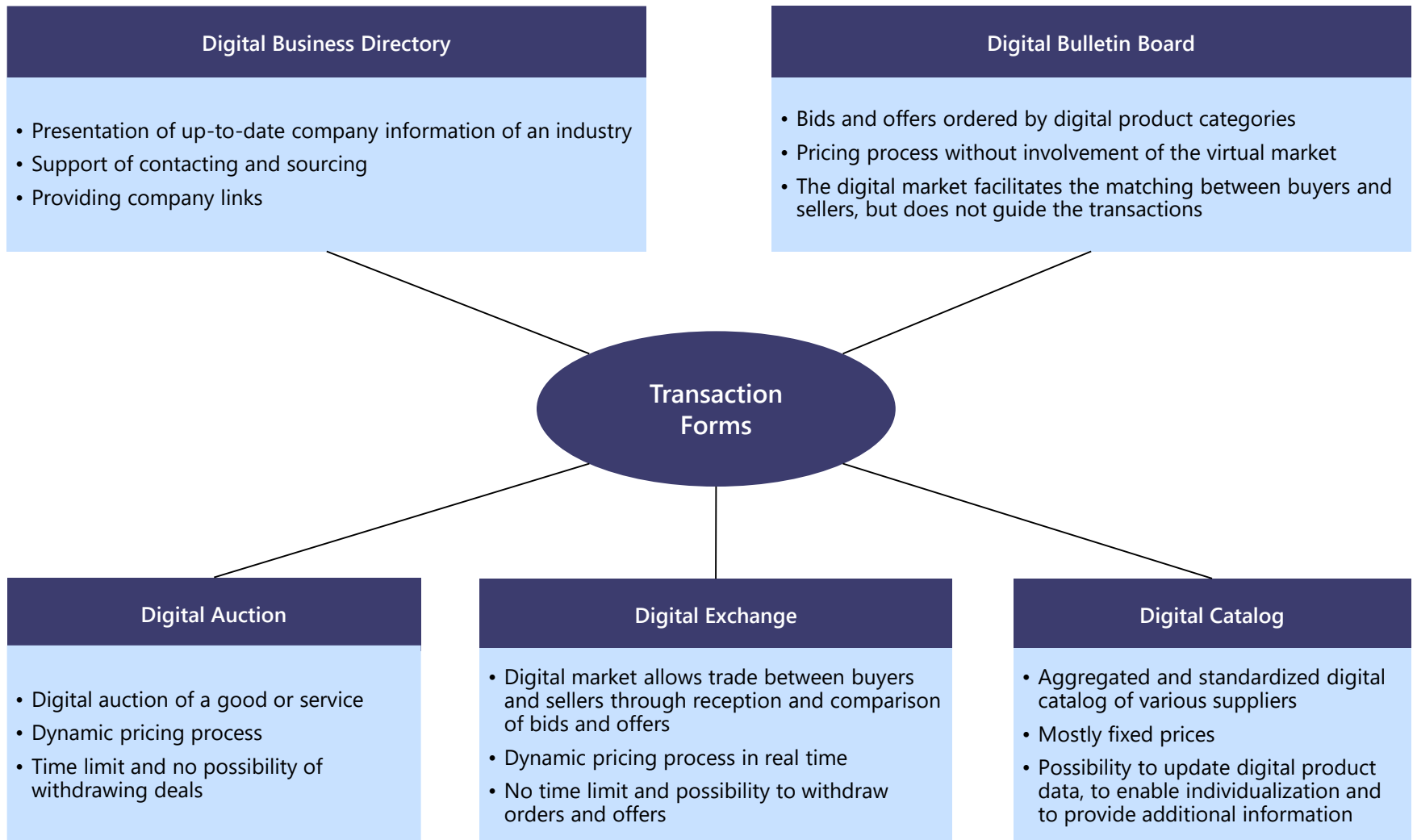
Source: Wirtz (2001, 2021, 2024)

Fig. 18.12 Interaction typology of digital procurement



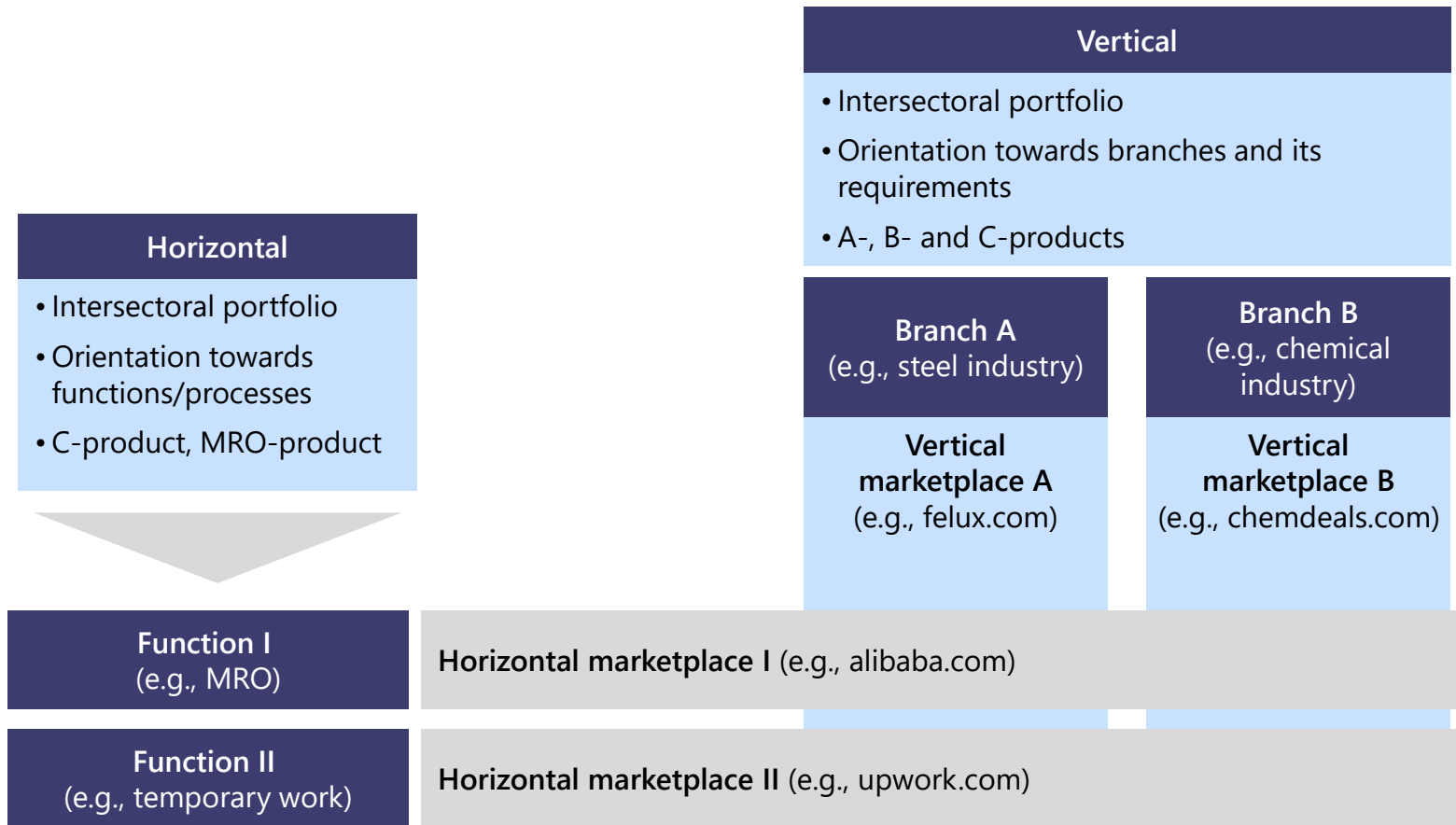
Source: Wirtz (2001, 2021, 2024)

Fig. 18.13 Transaction forms of digital marketplaces



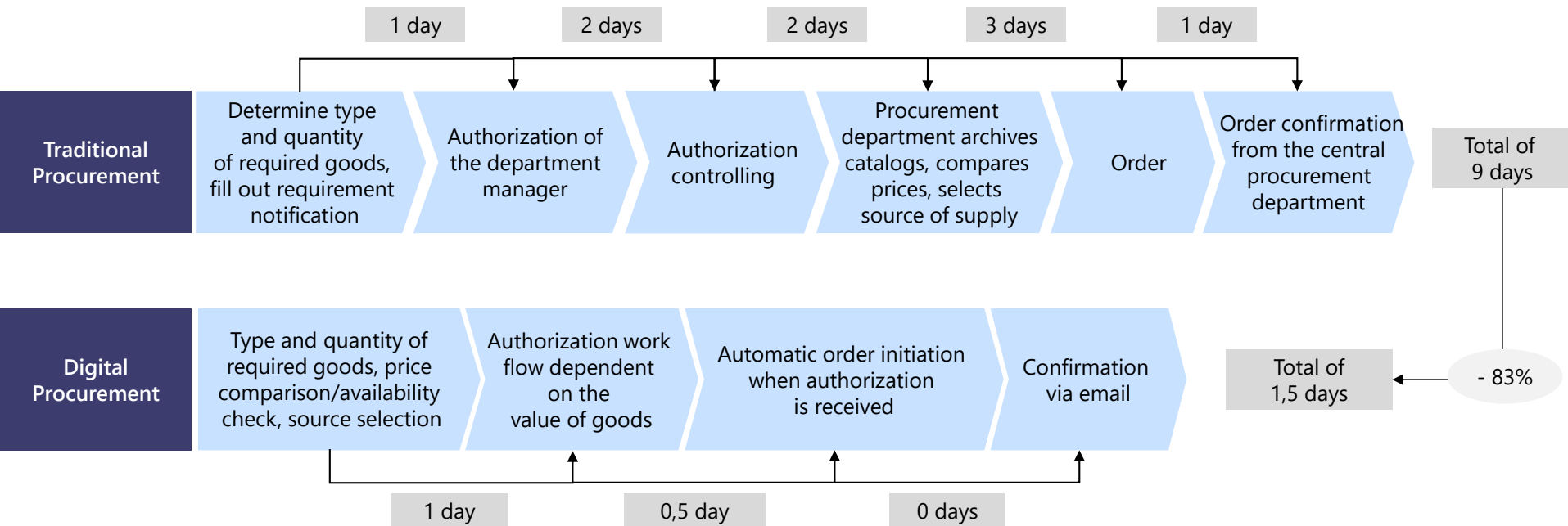
Source: Wirtz (2001, 2021, 2024)

Fig. 18.14 Orientation of digital marketplaces



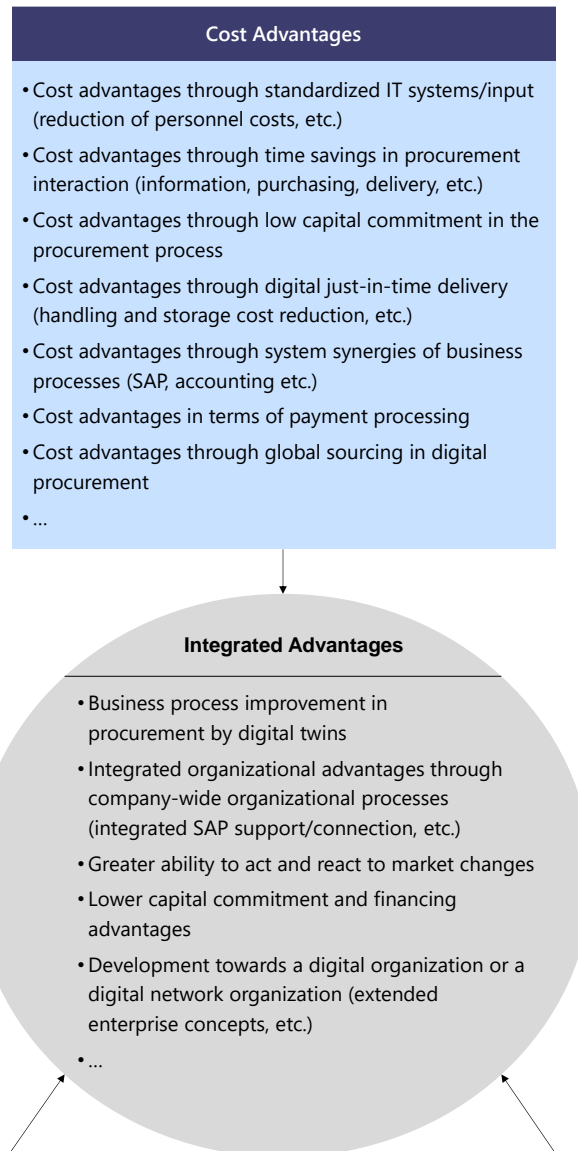
Source: Wirtz (2001, 2021, 2024)

Fig. 18.15 Procurement process optimization through digital procurement



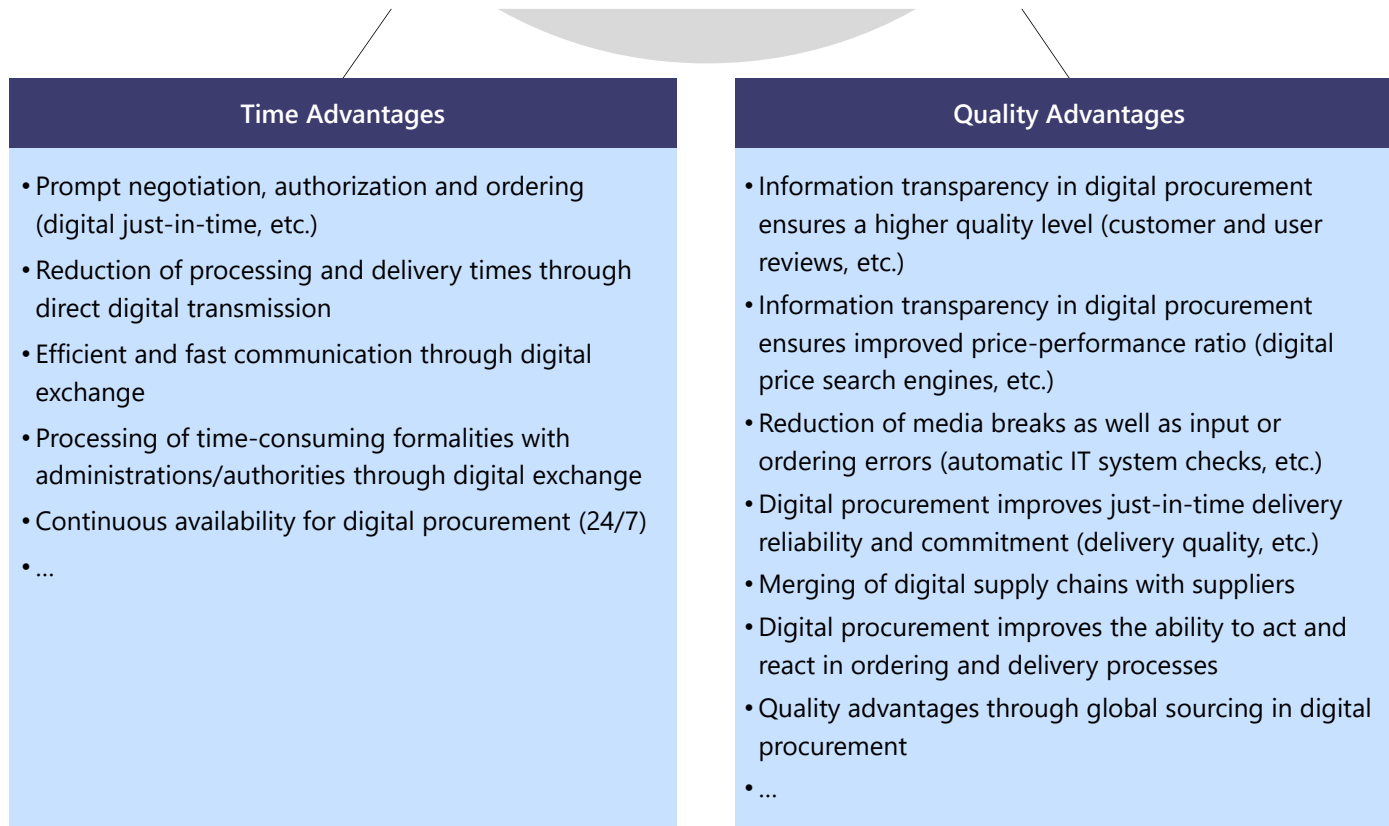
Source: Wirtz (2001, 2021, 2024)

Fig. 18.16 Advantages of digital procurement (1)



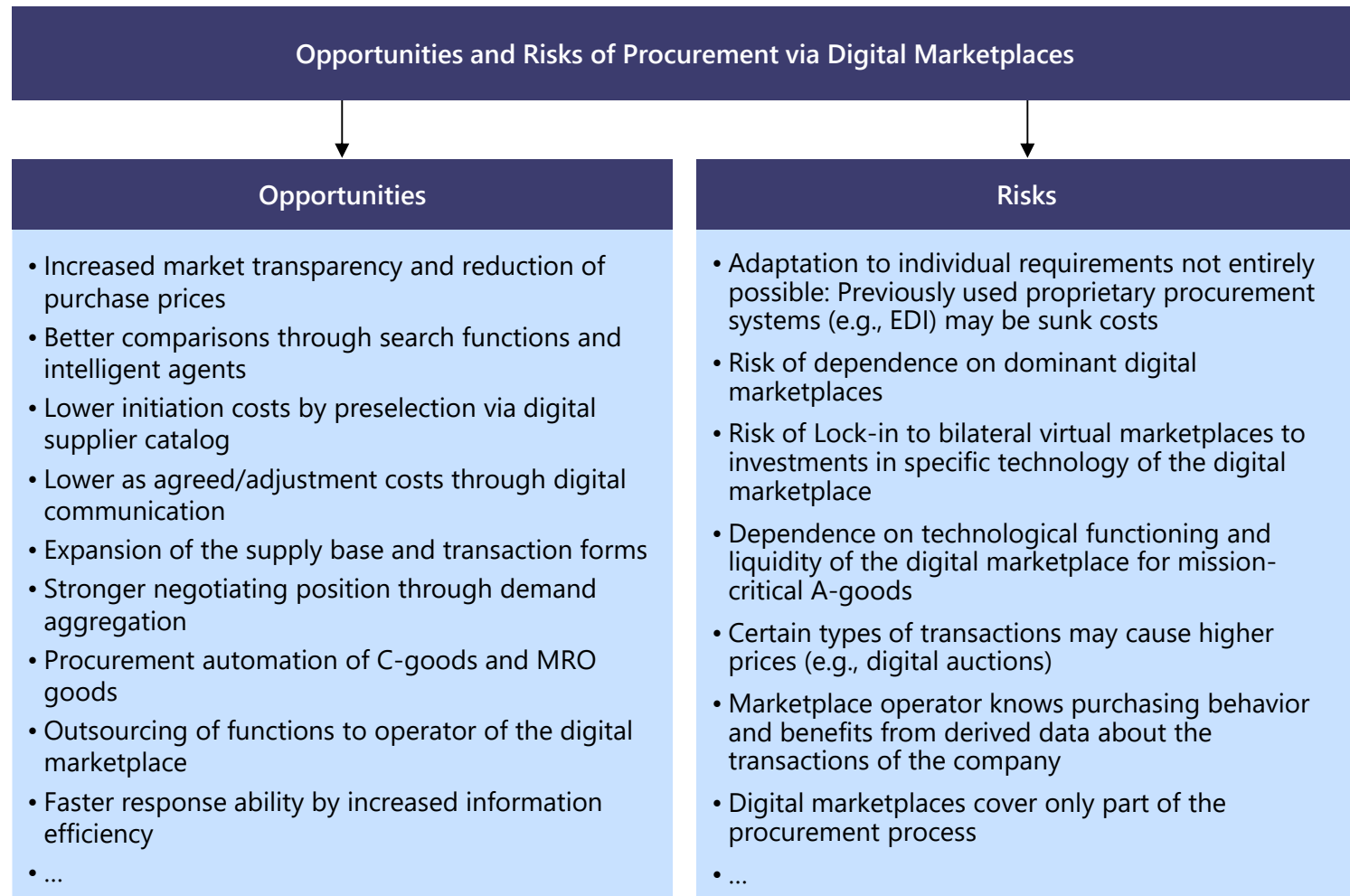
Source: Wirtz (2020, 2021, 2024)

Fig. 18.16 Advantages of digital procurement (2)



Source: Wirtz (2020, 2021, 2024)

Fig. 18.17 Opportunities and risks of procurement via digital marketplaces



Source: Wirtz (2001, 2021, 2024)

Fig. 18.18 Evaluation scheme for digital marketplaces

Evaluation Scheme for Digital Marketplaces		
	Description/Content	Significance
Liquidity	<ul style="list-style-type: none"> • Number of active participants • Type and quantity of traded goods and services 	●
Software Performance	<ul style="list-style-type: none"> • Functionality, scalability, reliability, security, integration, accessibility, usability 	●
Services	<ul style="list-style-type: none"> • Industry news, expert opinions, search engines, price comparisons • Support payments, logistics, ERP system 	◐
Expertise of Operator	<ul style="list-style-type: none"> • General expertise of management • Industry know-how on the structure, relationships, and specific problems 	◑
Anonymity/Neutrality	<ul style="list-style-type: none"> • Executing the transaction without the knowledge of partners • No influence of the transaction 	◒

Legend: ○ Very low ◐ Low ◑ Medium ◒ High ● Very High

Source: Wirtz (2001, 2021, 2024)

Fig. 18.19 Scheme of digital procurement implementation

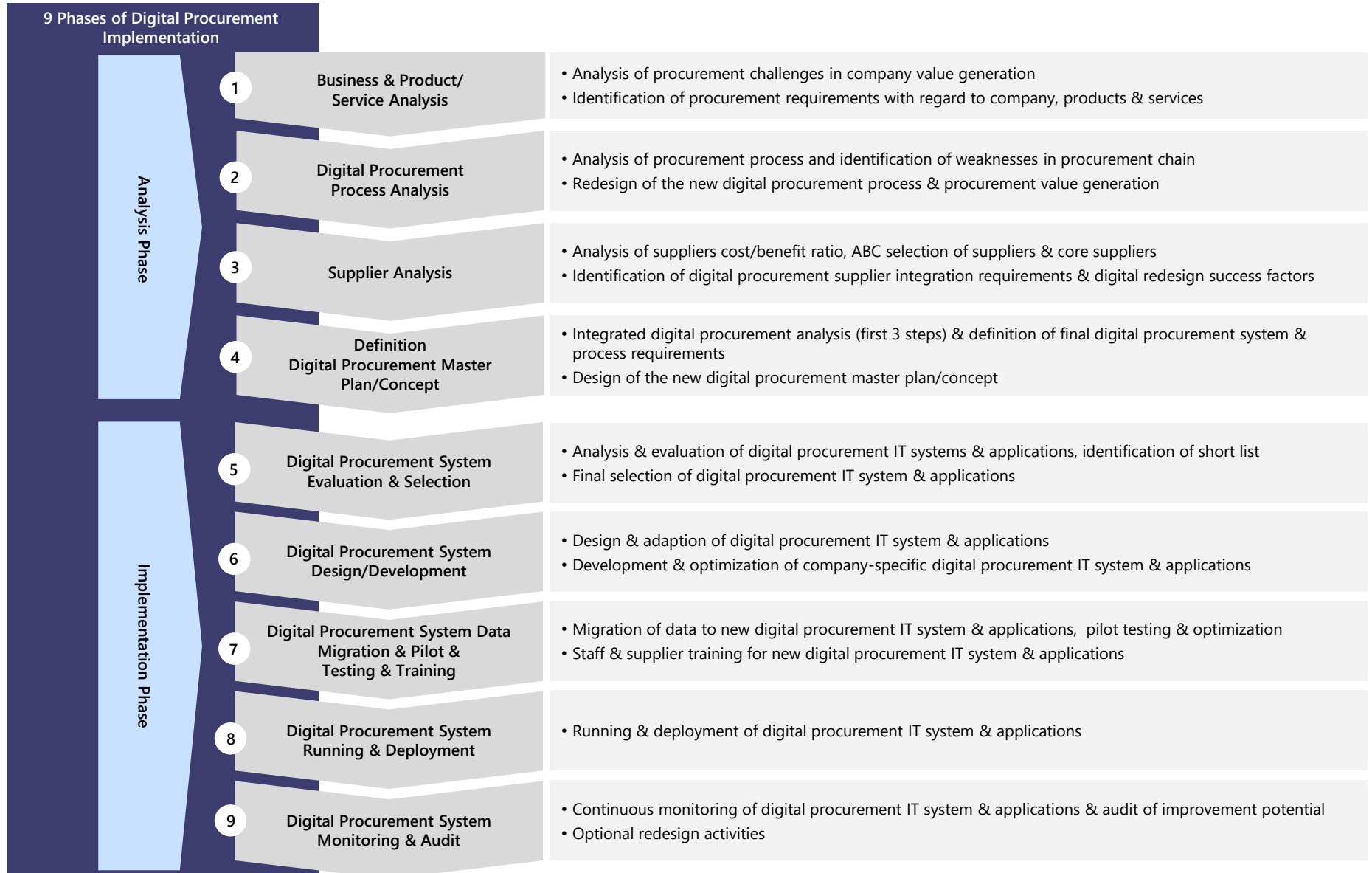


Fig. 18.20 Analysis phases of digital procurement

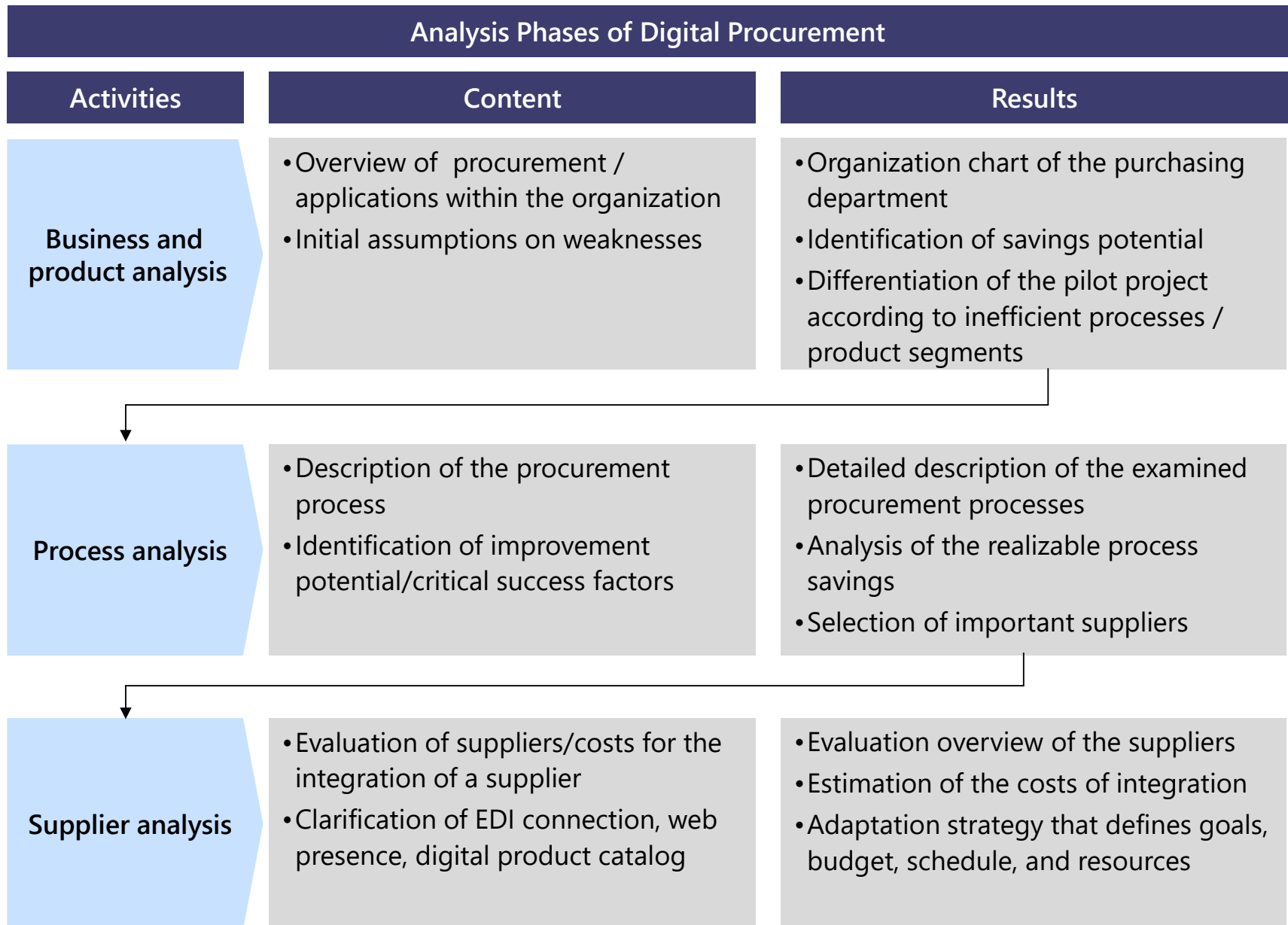
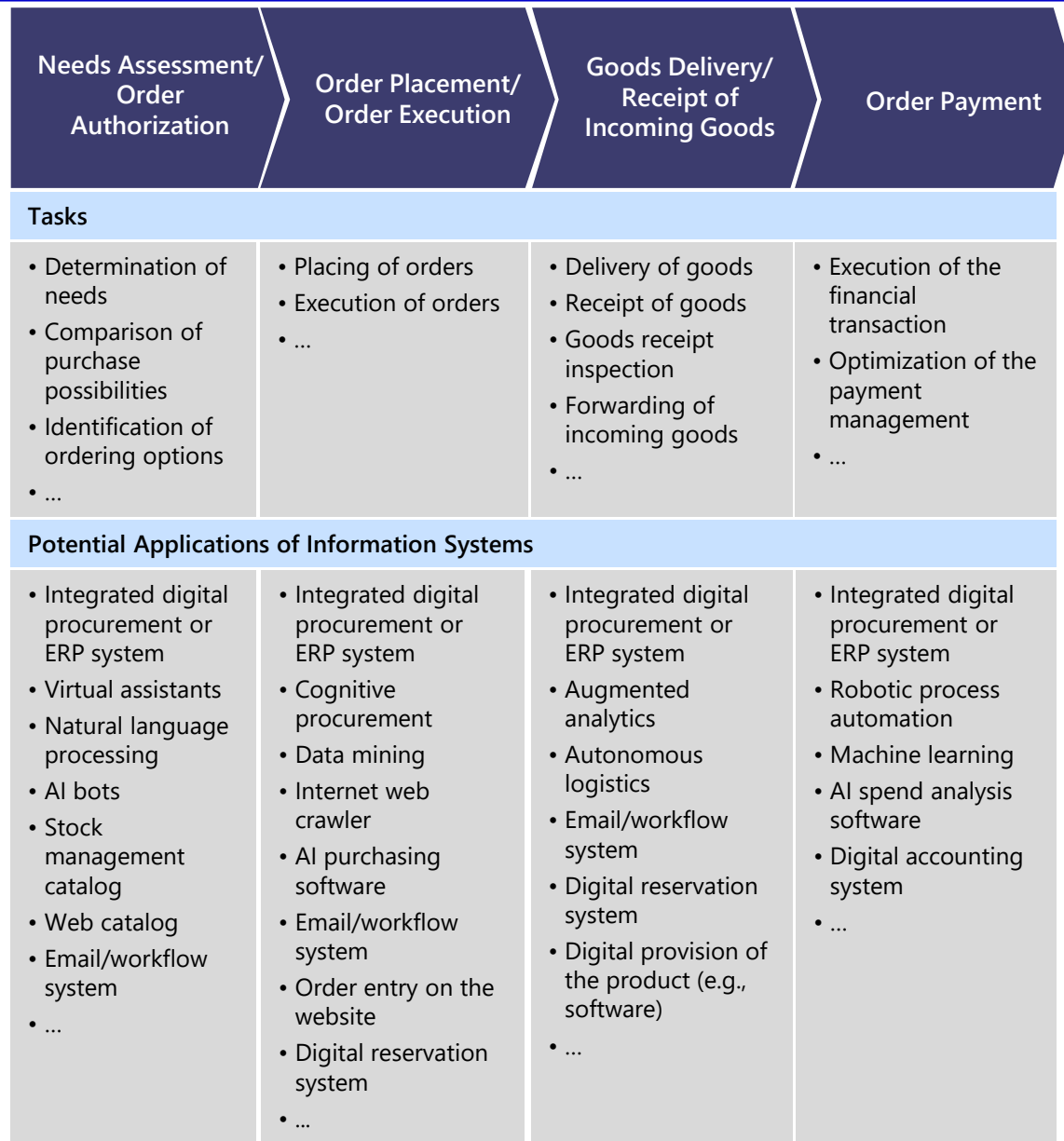


Fig. 18.21 Digital support systems for procurement process



Source: Wirtz (2020, 2021, 2024)

Chapter 18 Questions and topics for discussion

Chapter 18 Questions and topics for discussion



Review questions

1. Define digital supply chain management and digital procurement
2. Describe the development of digital procurement and evaluate its suitability.
3. Identify the actors and illustrate the different forms of interaction within digital procurement.
4. Describe the different phases of the digital procurement process and identify the potentials of digital procurement along this process.
5. Outline the implementation process of digital procurement.

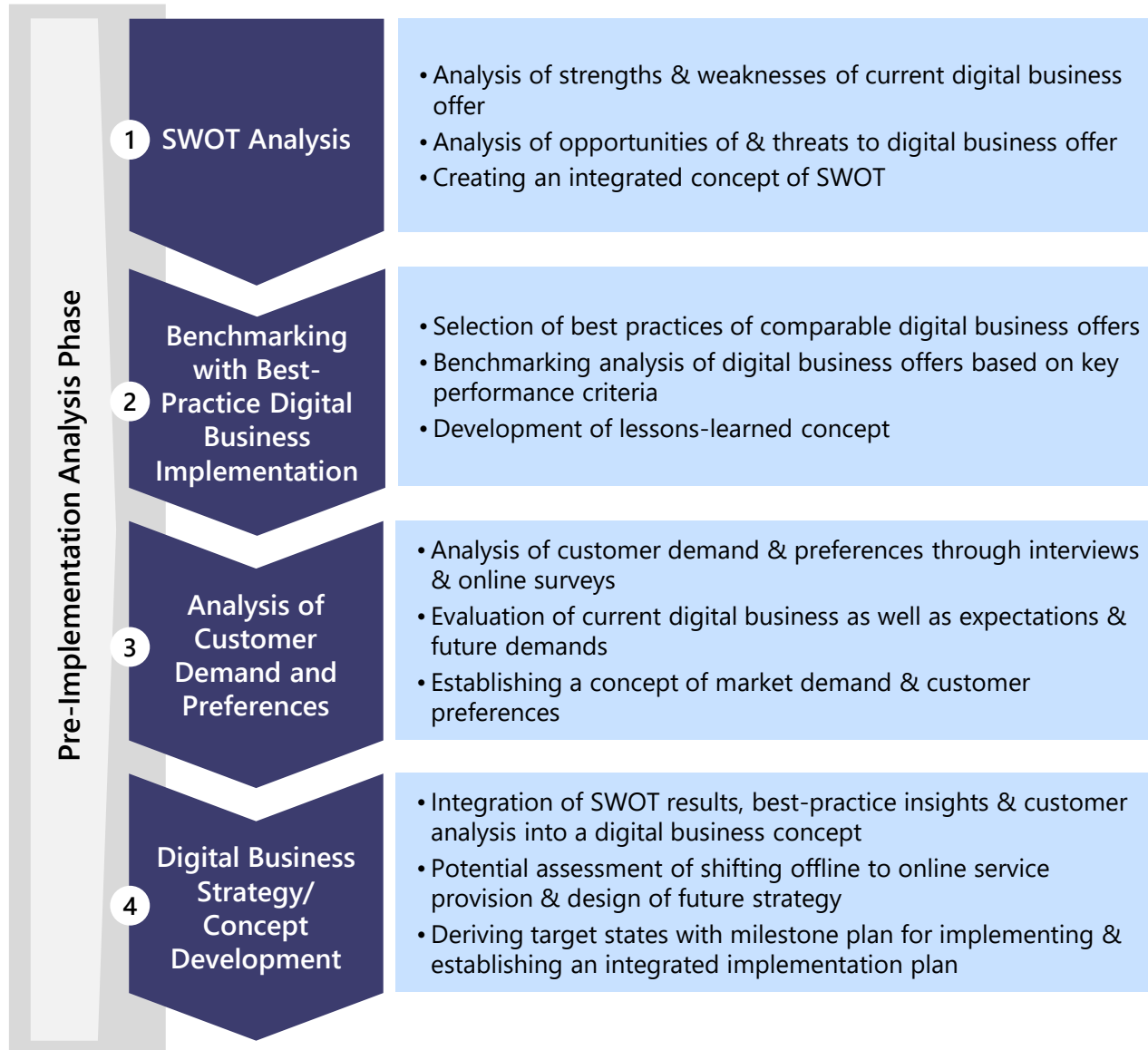


Topics for discussion

1. Discuss whether digital procurement is suitable for every company or whether there are differences in terms of industry affiliation.
2. Debate whether digital procurement leads to a fundamental change of the supply chain. What are the effects of digital procurement on affiliated companies?
3. Discuss whether digital procurement is associated with significant process improvements compared to traditional procurement and whether this will lead to a reduction in personnel. In this context, also analyze the general impact of procurement automation on the job market.

Chapter 19: Digital Business Implementation

Fig. 19.1 Pre-implementation analysis phase



Source: Wirtz (2015, 2021, 2024)

Fig. 19.2 Implementation phase

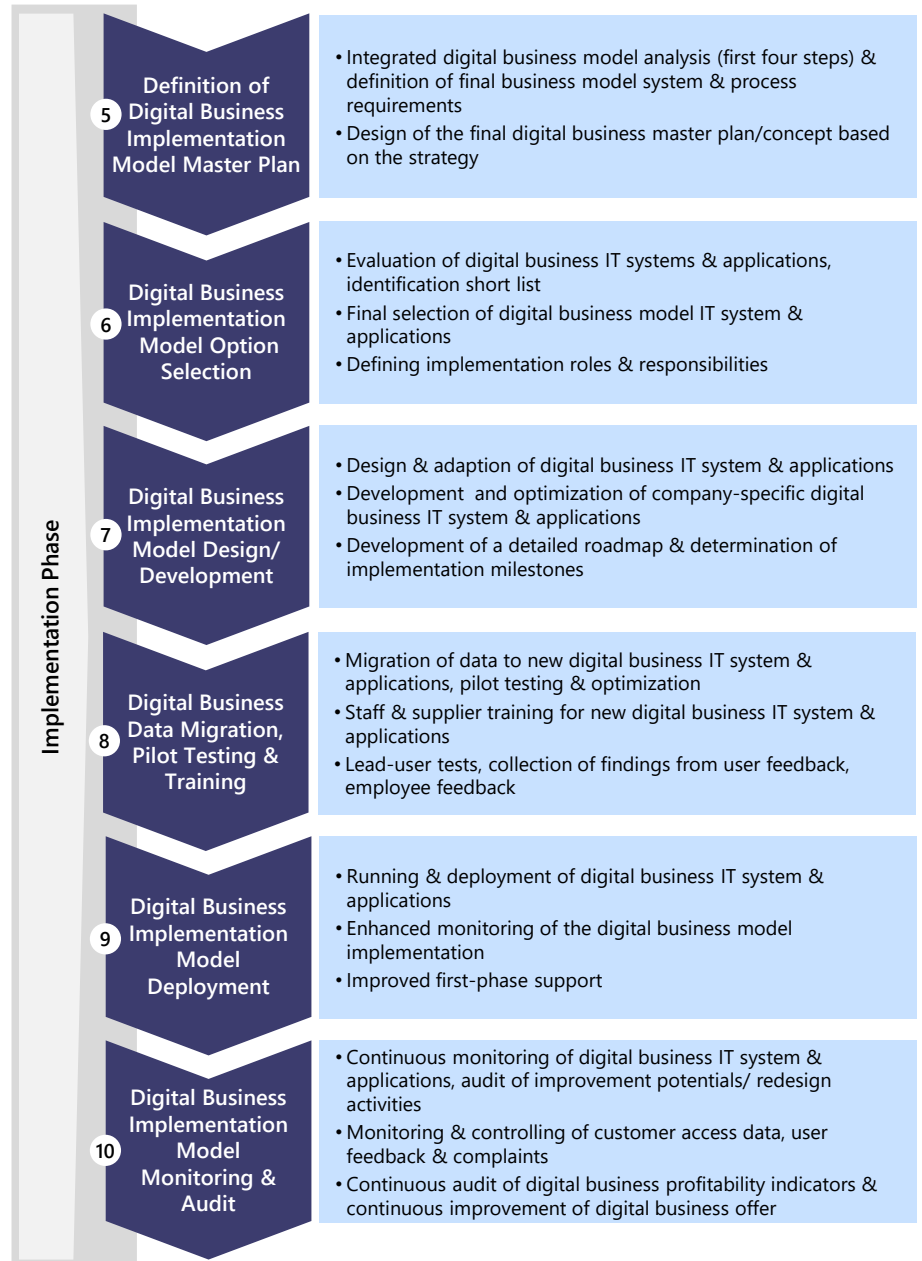
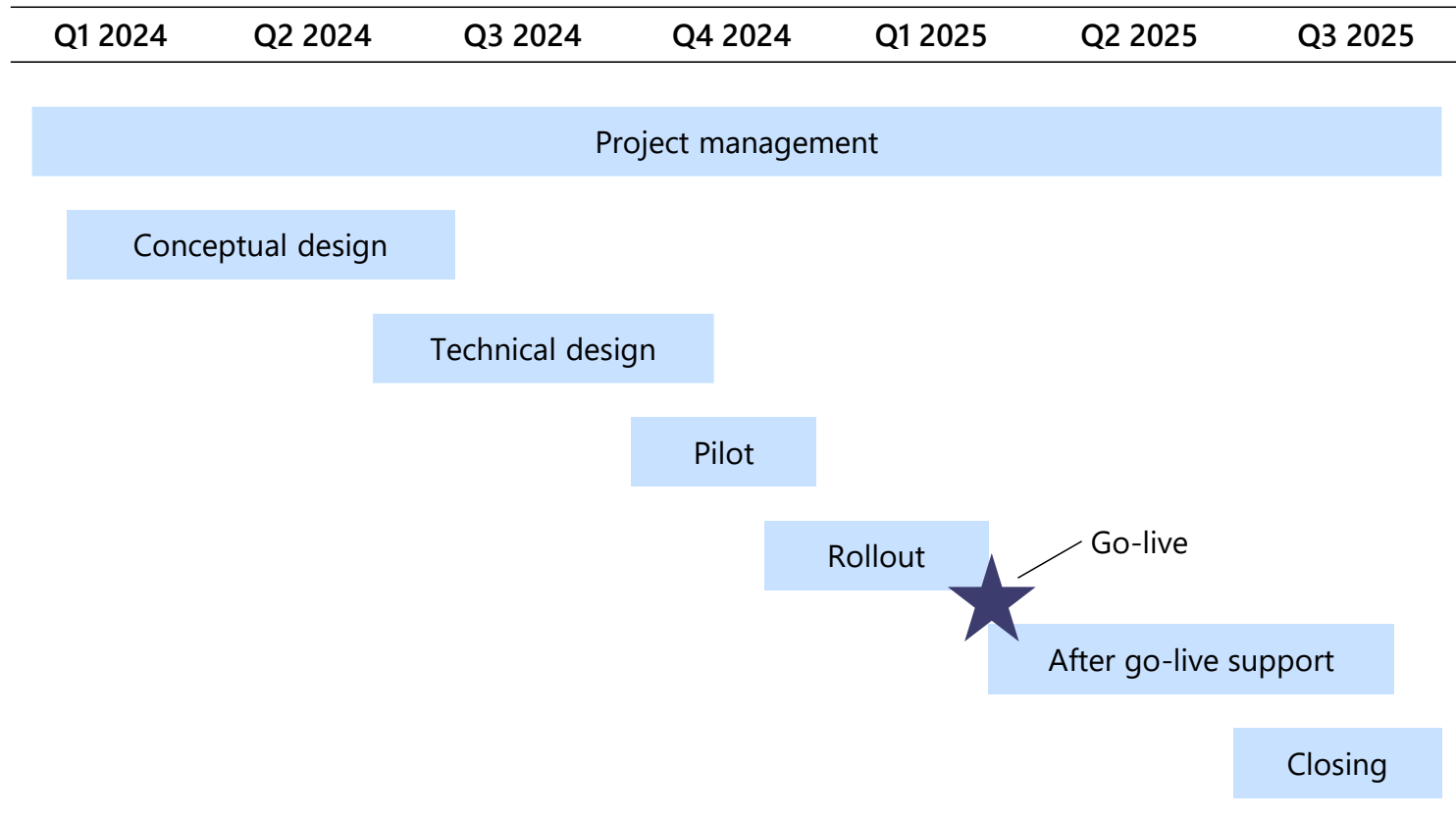


Fig. 19.3 Exemplary digital business implementation plan

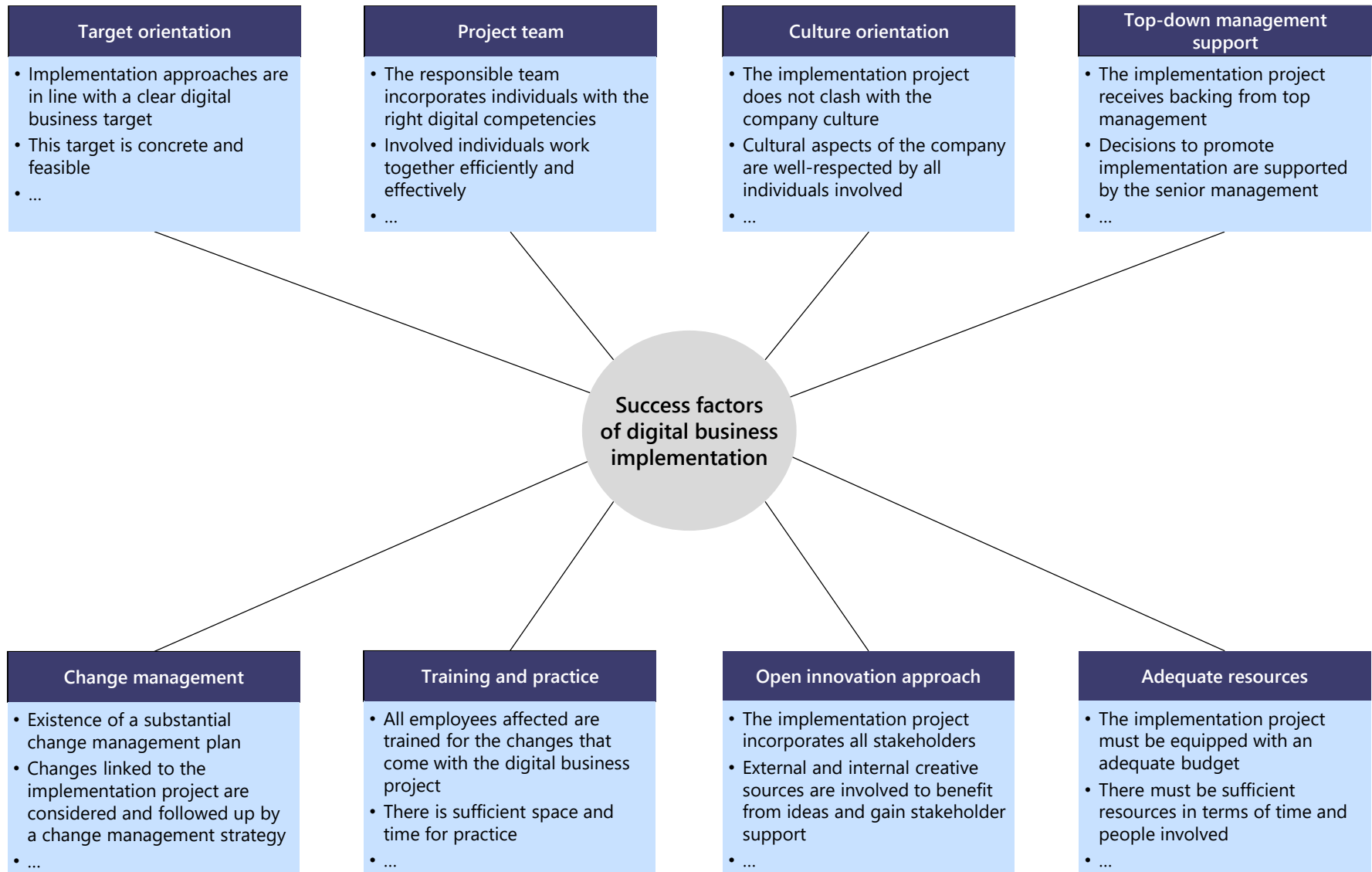


Source: Wirtz (2010, 2021, 2022, 2024)

Fig. 19.4 10-steps of the digital business implementation roadmap

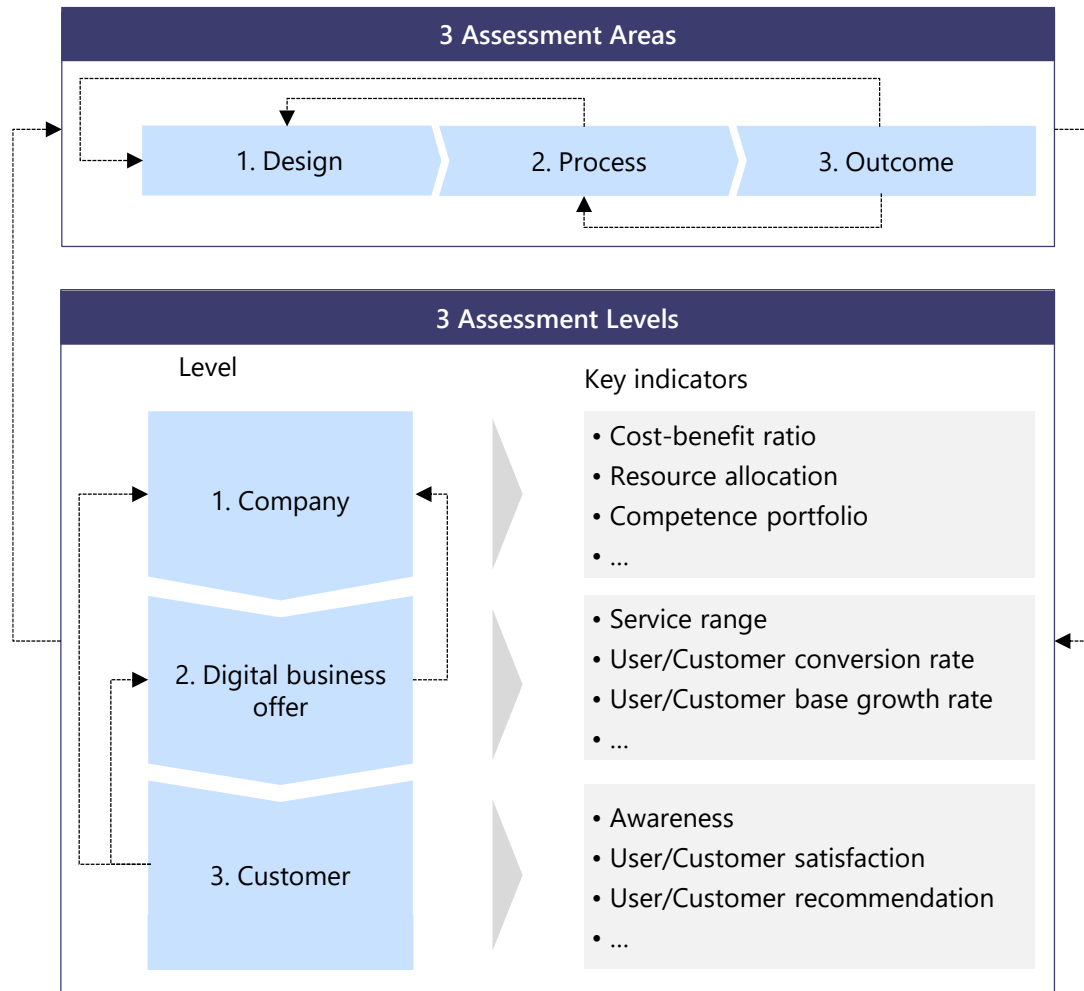


Fig. 19.5 Targets of digital business implementation



Source: Wirtz (2021, 2022, 2024)

Fig. 19.6 Digital Business 3+3 Audit and Evaluation System



-----> Feedback circuit

Source: Wirtz and Daiser (2015), Wirtz (2015, 2021, 2022, 2024)

Chapter 19 Questions and topics for discussion

Chapter 19 Questions and topics for discussion



Review questions

1. Explain all four phases of the pre-implementation analysis phase.
2. Describe all of the six implementation phases.
3. Name some key targets of a successful digital business implementation.
4. Describe the three assessment areas and associated feedback loops of the Digital Business 3+3 Audit and Evaluation System.
5. Explain the three levels of assessment of the Digital Business 3+3 Audit and Evaluation System and list relevant key indicators.

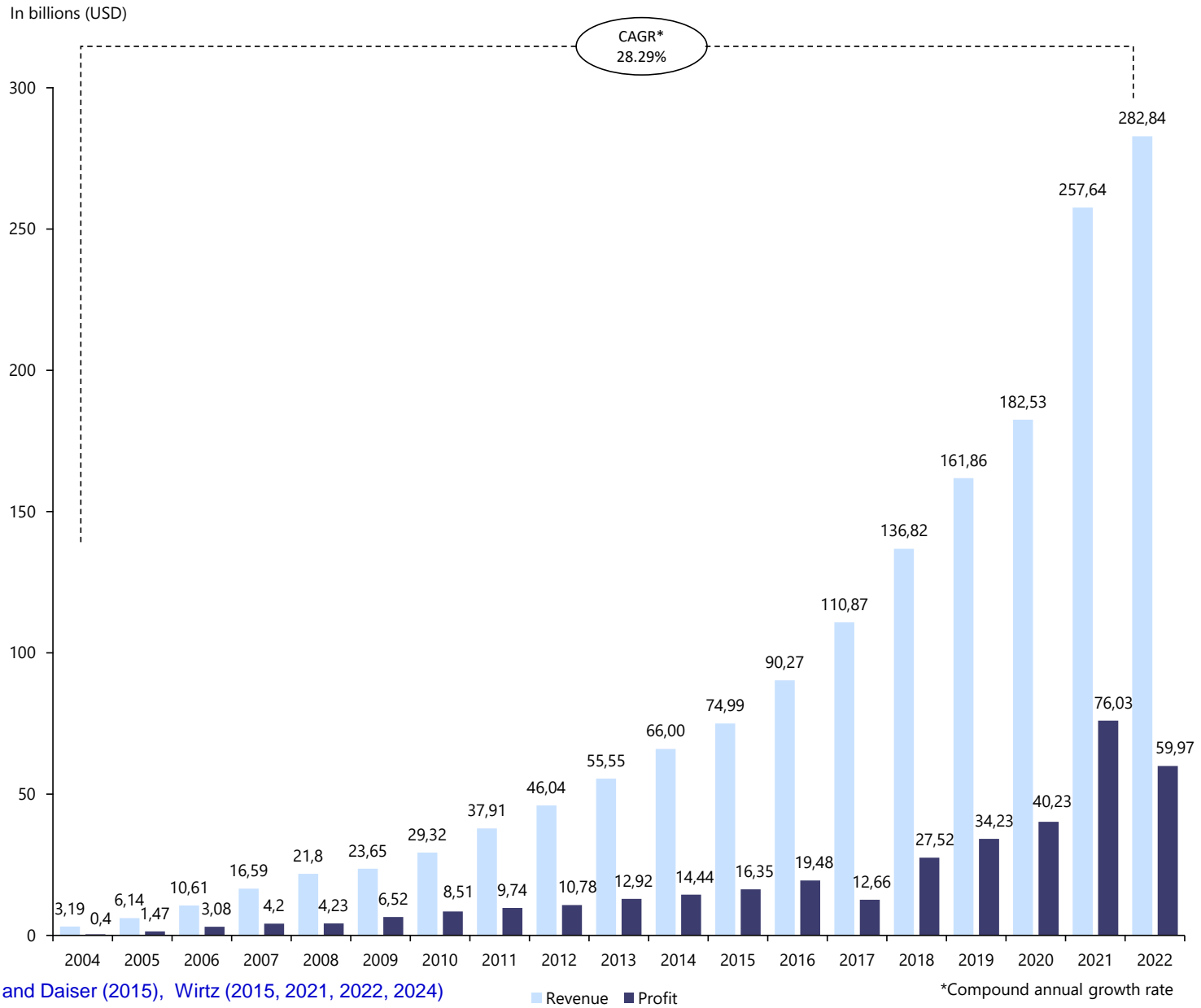


Topics for discussion

1. Discuss whether an implementation phase always requires a pre-implementation analysis phase. What are the advantages and disadvantages of a pre-implementation analysis phase for successful implementation?
2. Discuss whether the six steps of implementation must necessarily be carried out in the described manner and which are particularly important for ensuring implementation success.
3. Discuss to what extent the Digital Business 3+3 Audit and Evaluation System covers all relevant monitoring and audit areas that are important for implementation and whether, in your opinion, relevant ones are missing.

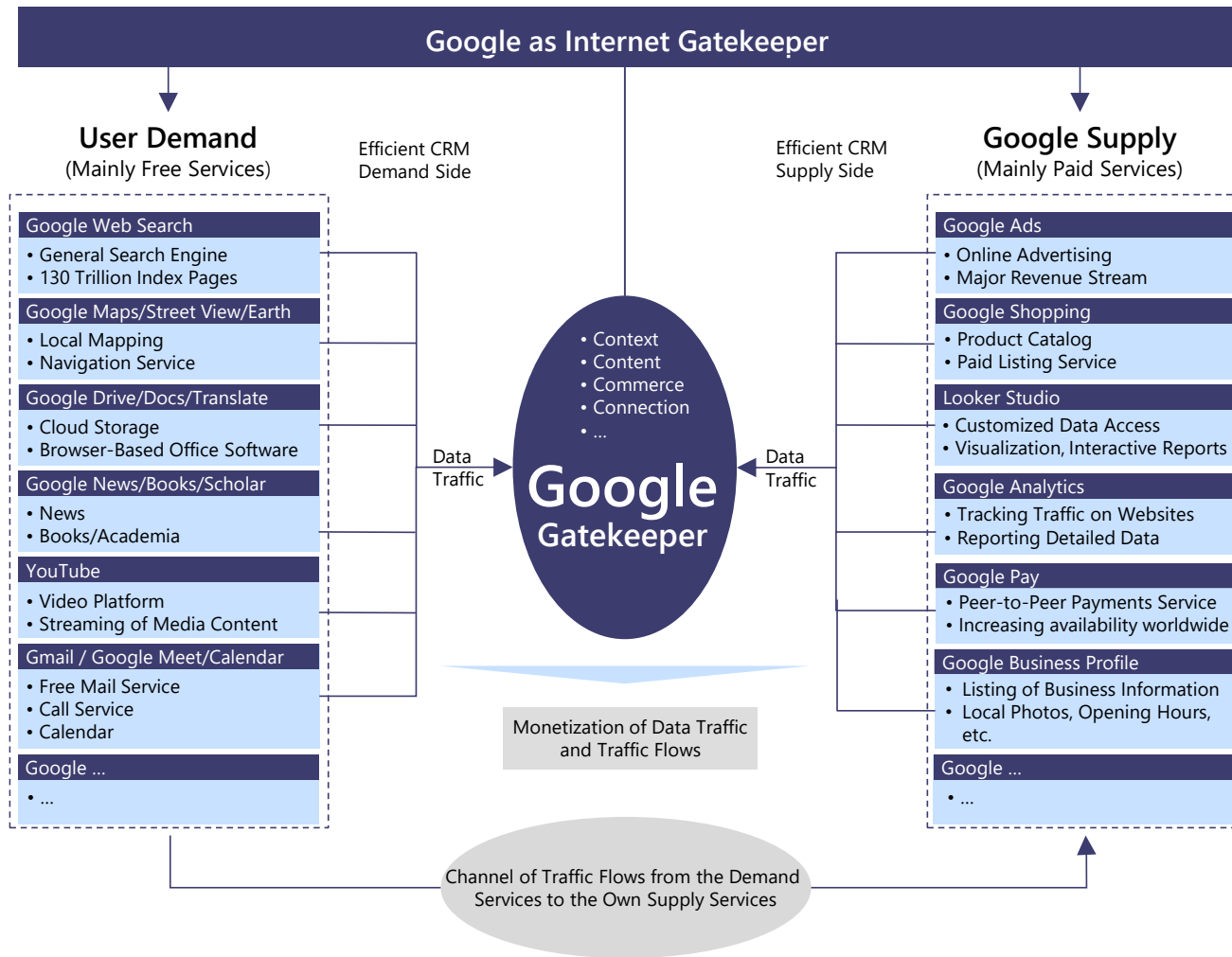
Chapter 20: Google/Alphabet Case Study

Fig. 20.1 Development of Google/Alphabet's revenue from 2004 to 2022



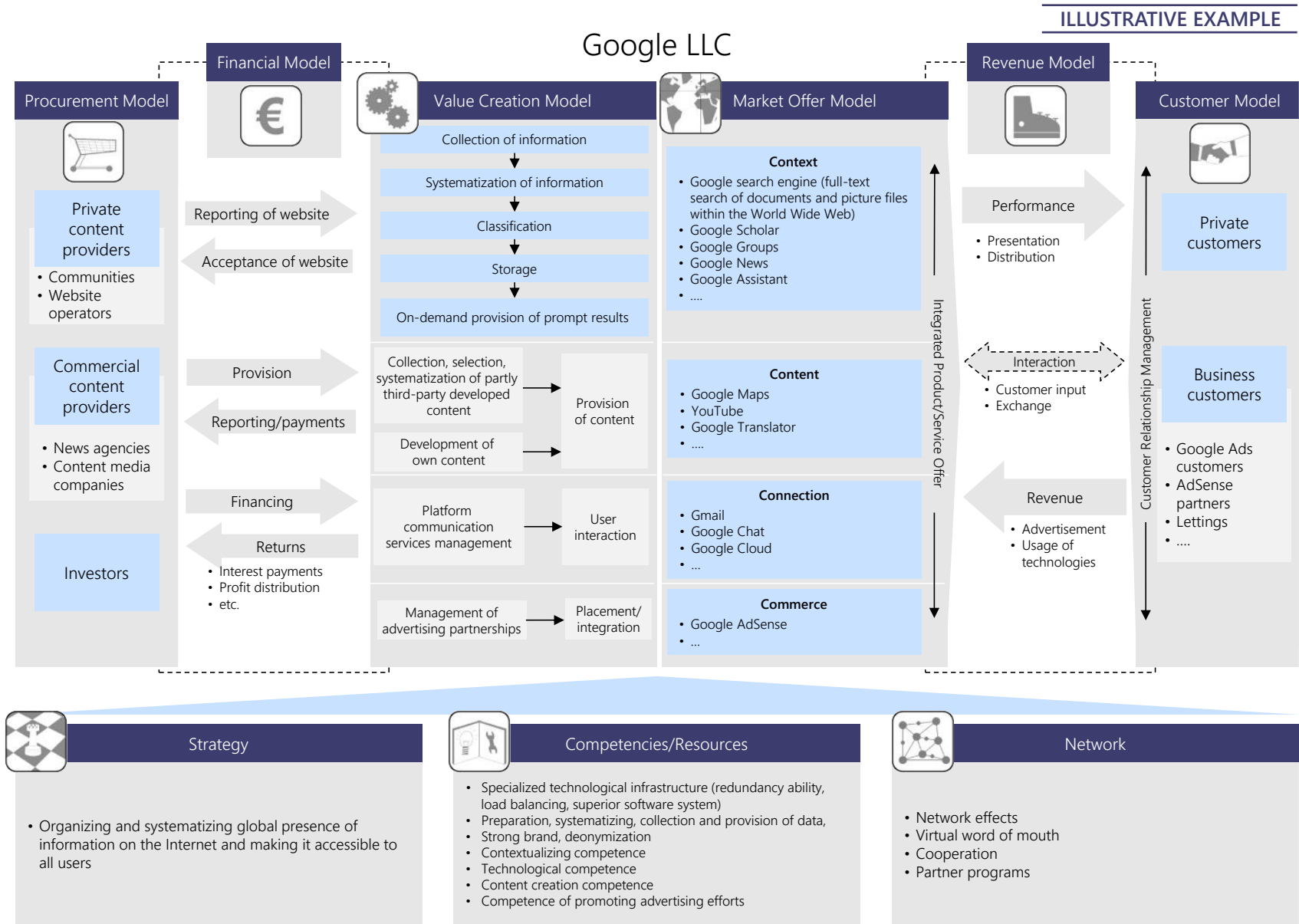
Source: Wirtz and Daiser (2015), Wirtz (2015, 2021, 2022, 2024)

Fig. 20.2 Google as Internet gatekeeper of information



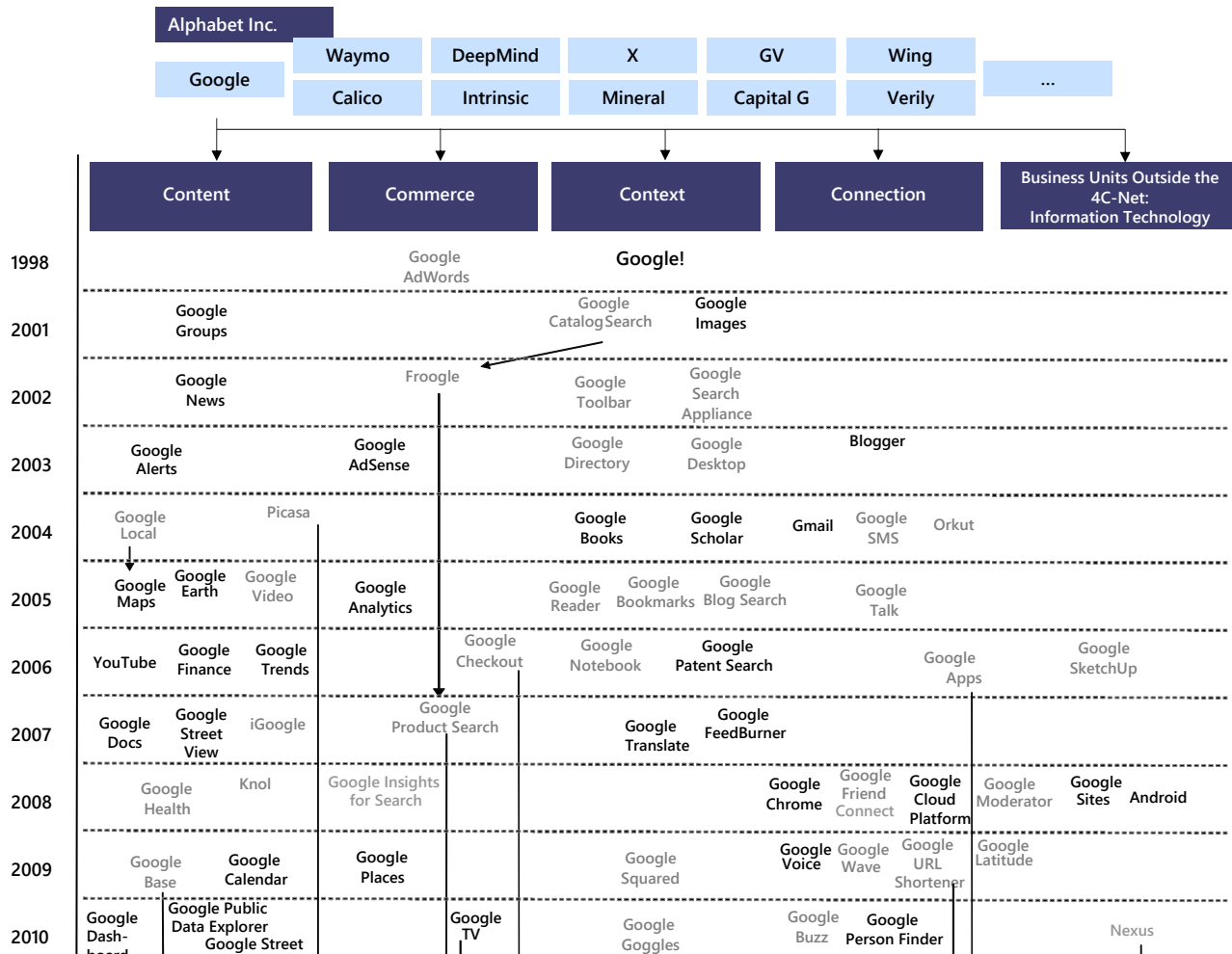
Source: based on Wirtz (2010, 2021, 2024) and own analysis, estimations, and updates

Fig. 20.3 Google's business model



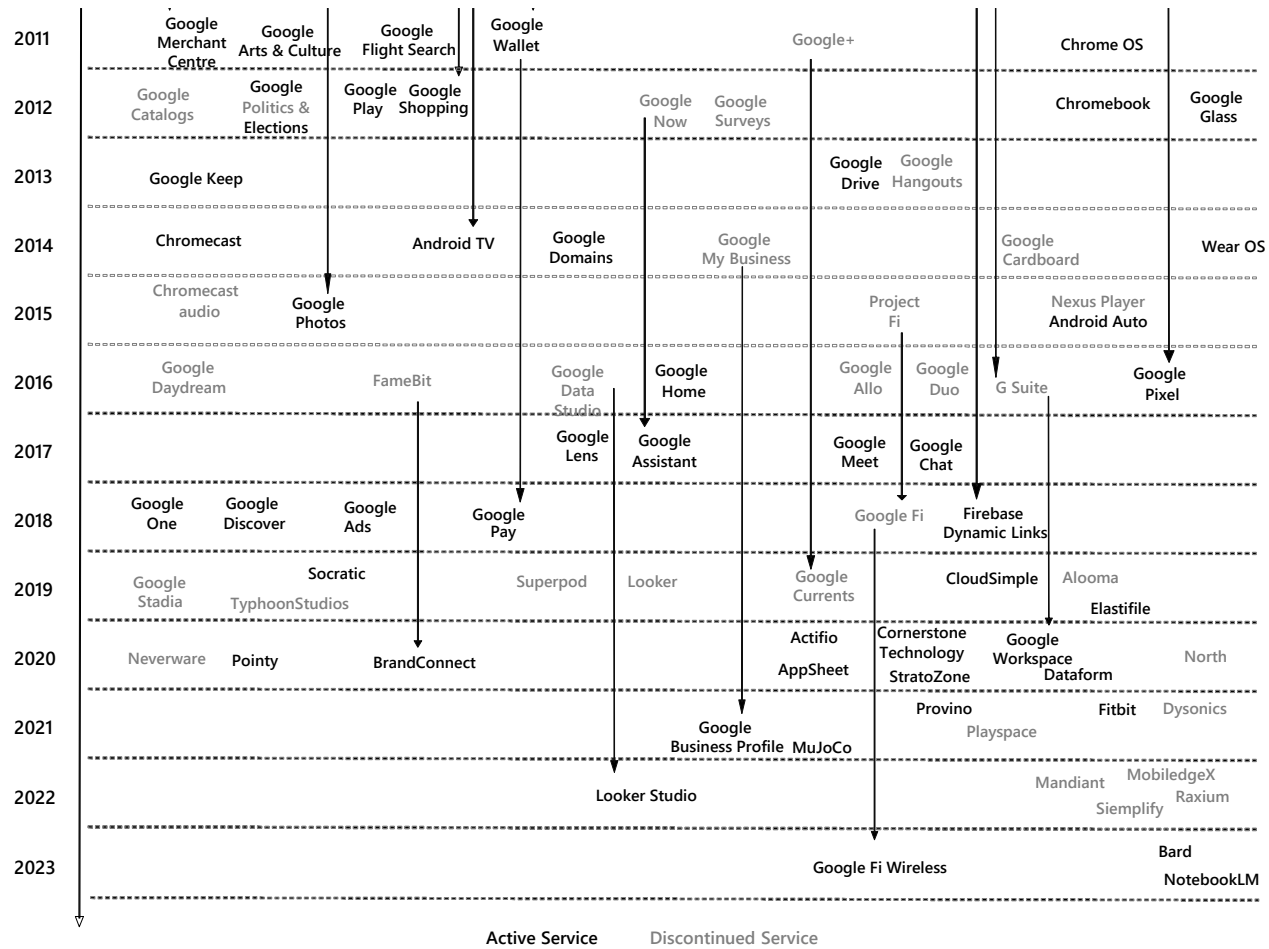
Source: based on Wirtz (2013a, 2021, 2024) and own analysis, estimations, and updates

Fig. 20.4 Development of Google's hybrid business model (1)



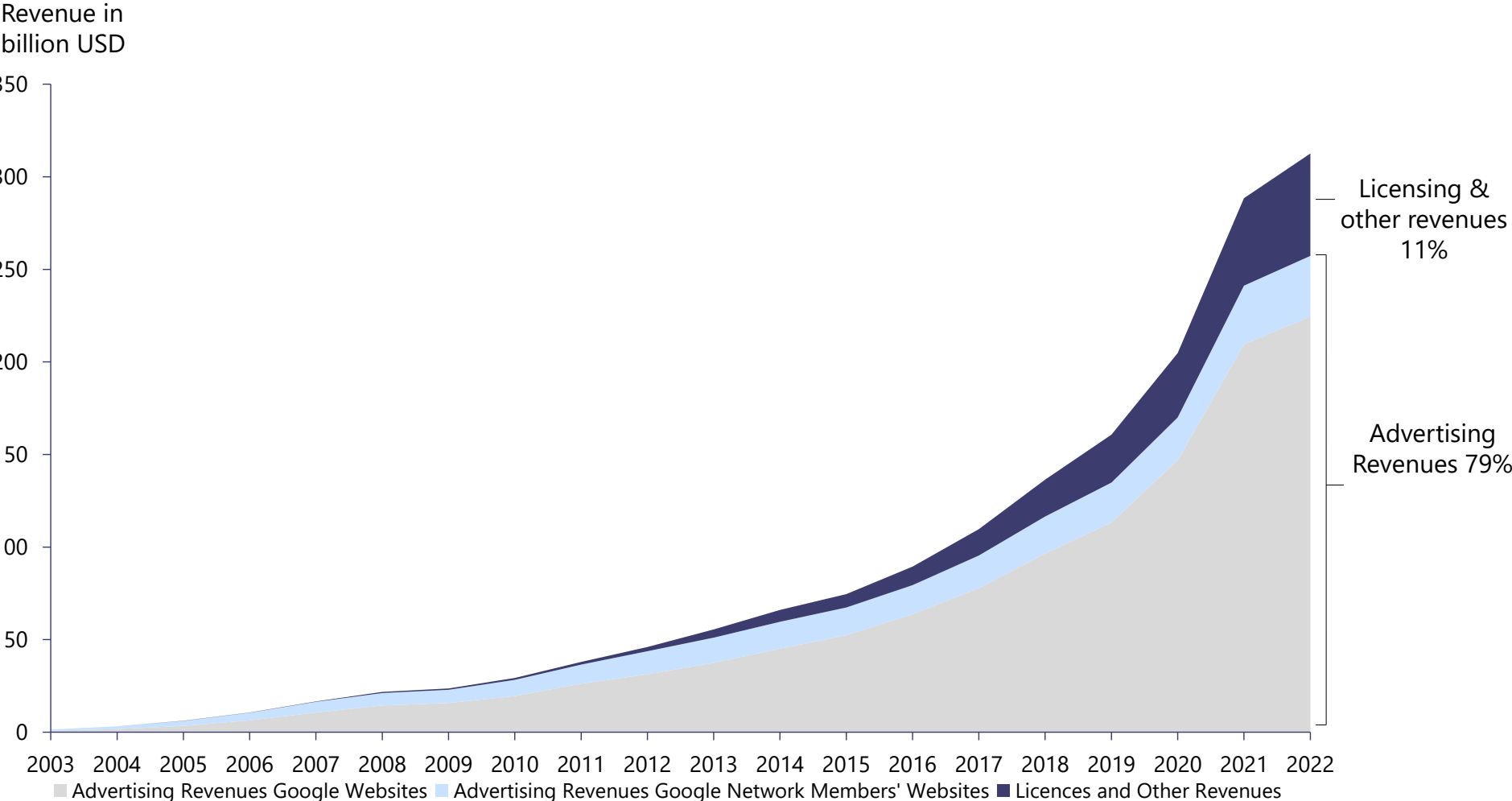
Source: based on Wirtz (2010, 2021, 2024) and own analysis, estimations, and updates

Fig. 20.4 Development of Google's hybrid business model (2)



Source: based on Wirtz (2010, 2021, 2024) and own analysis, estimations, and updates

Fig. 20.5 Development of Google/Alphabet's revenue



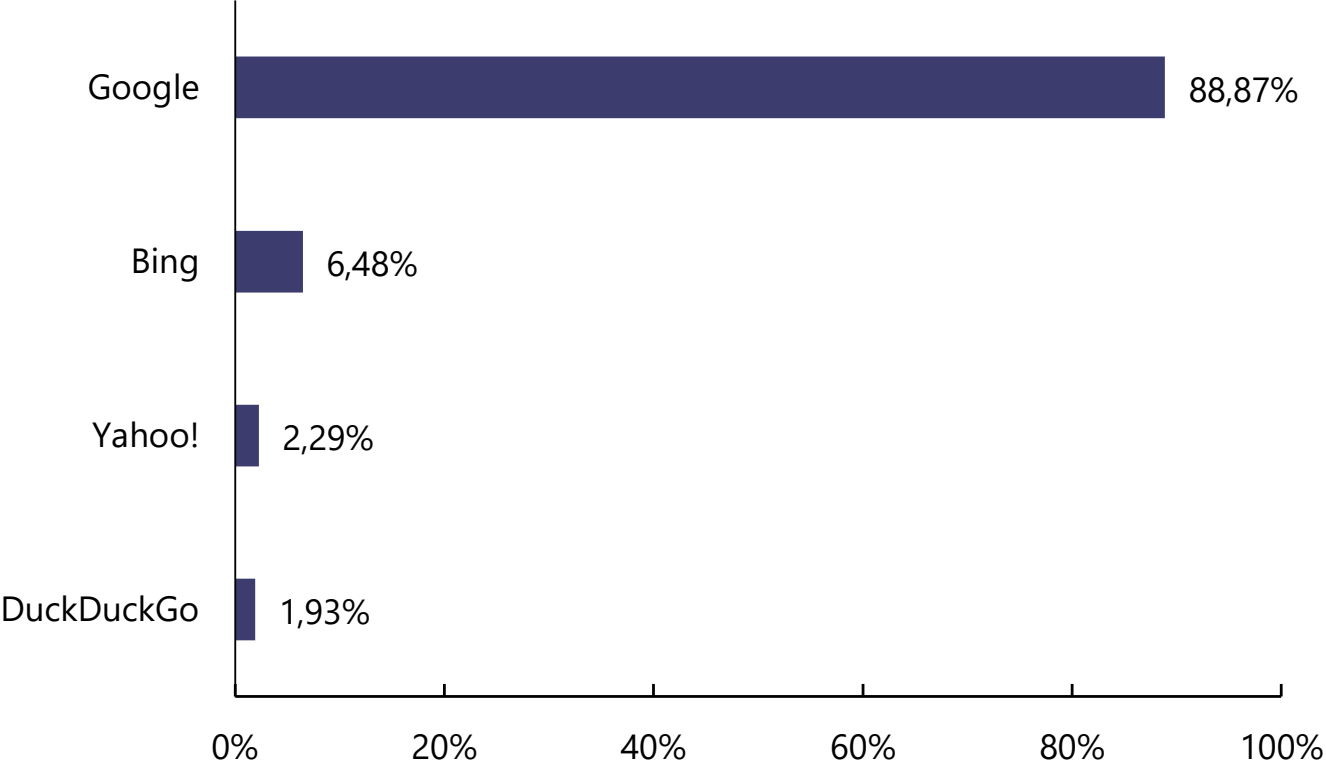
Source: Alphabet (2023) and previous data sets, Wirtz (2024)

Fig. 20.6 Google's revenue structure

	Direct Revenue Generation	Indirect Revenue Generation
Transaction-Dependent	<ul style="list-style-type: none">• Hardware sales• Transaction charges on the Android App Market: PlayStore	<ul style="list-style-type: none">• Cost per click<ul style="list-style-type: none">– Keyword advertising• Cost per view<ul style="list-style-type: none">– YouTube video ads
Transaction-Independent	<ul style="list-style-type: none">• Royalties, for example, fees for using extended program packages• AdWords activation fees	<ul style="list-style-type: none">• YouTube custom brand channel

Source: Wirtz (2013c, 2021, 2024)

Fig. 20.7 Market share of search engines in the US in July 2020



Source: StatCounter (2023c), Wirtz (2024)

Fig. 20.8 Solution method of case studies

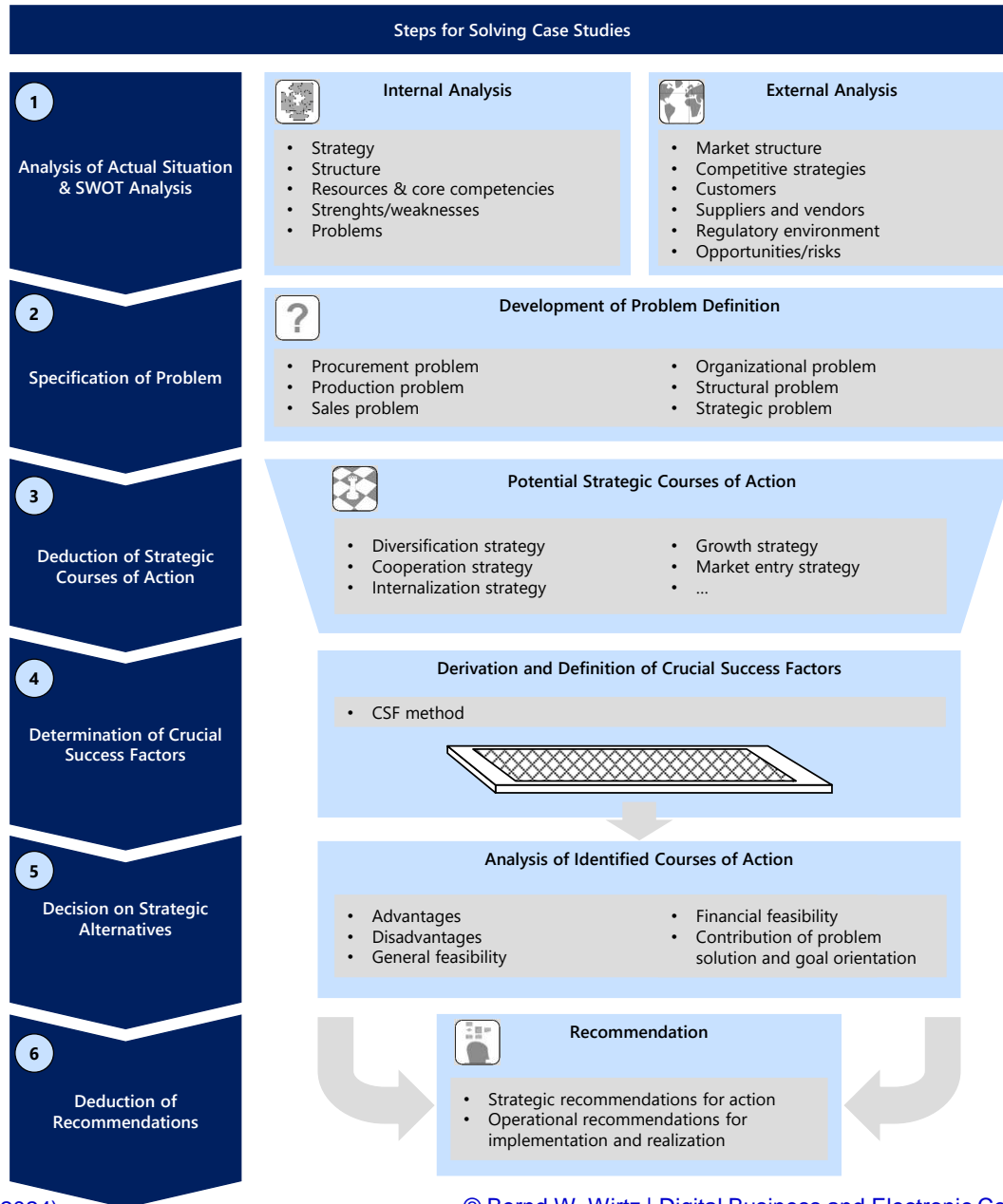


Fig. 20.9 Key aspects, tasks and hints for solution in the Google case study

Steps	Key Aspects	Tasks	Hints for Solution
Current Situation	<ul style="list-style-type: none"> Google is a successful company that offers a broad range of services The main part of Google's revenue is based on advertising (especially search engine advertising) 	<ul style="list-style-type: none"> TASK: SWOT analysis focusing on the present revenue situation 	<ul style="list-style-type: none"> Focus on market offer model and revenue model Consideration of current market situation
Specification of Problem Statement	<ul style="list-style-type: none"> The low diversification of revenue streams is a central problem 	<ul style="list-style-type: none"> TASK: Which alternative revenue streams can be further exploited? 	
Deduction of Strategic Alternatives for Action	<ul style="list-style-type: none"> Google already uses multiple sources and forms of revenue Besides advertising, Google generates only low revenue The broad range of services offers various opportunities for action 	<ul style="list-style-type: none"> TASK: Identification of strategic alternatives of action 	<ul style="list-style-type: none"> Analysis of different revenue forms and sources Awareness of most important competitors
Illustration of Critical Success Factors	<ul style="list-style-type: none"> Google has numerous core competencies that are suitable for revenue differentiation Google's core business must not be influenced 	<ul style="list-style-type: none"> TASK: Identification of essential success factors 	<ul style="list-style-type: none"> Inclusion of strategy model and resource model
Decision about Strategic Alternatives	<ul style="list-style-type: none"> Google remains unchallenged in its core business but has to diversify its revenue streams in order to diminish potential risks 	<ul style="list-style-type: none"> TASK: Development and explanation of diverse diversification strategies 	<ul style="list-style-type: none"> Analysis of market and competitive situation Market-based differentiation
Deduction of Recommendations for Action	<ul style="list-style-type: none"> Google is already active in distinct future markets Revenue generation needs to be optimized 	<ul style="list-style-type: none"> TASK: Recommendations for action and their justification 	

Source: Wirtz (2013c, 2021, 2024)

Fig. 20.10 Analysis of Google's strengths, weaknesses, opportunities, and threats



Source: based on Wirtz (2013c, 2021, 2024) and own analysis, estimations, and updates

Fig. 20.11 Strategic options for Google based on a SWOT analysis

<p>External Dimensions</p> <p>Internal Dimensions</p>	<p>Opportunities</p>	<p>Threats</p>
<p>Strengths</p>	<p>Taking advantage of existing opportunities through own strengths</p> <ul style="list-style-type: none"> • Leveraging existing service offerings such as Google Maps, YouTube, and the Google Cloud Platform • Differentiating revenue as well as establishing new revenue streams • Due to the technological competencies of the subsidiary DeepMind, Google is in a position to integrate artificial intelligence as a universal tool into the entire range of services 	<p>Using own strengths to avert existing threats</p> <ul style="list-style-type: none"> • Enhancement and extension of the current service spectrum • Utilization of dominant position in the search engine market and of technological leadership to outperform competitors • Focus on core markets to safeguard sustainable market positions
<p>Weaknesses</p>	<p>Eliminating own weaknesses to take advantage of opportunities</p> <ul style="list-style-type: none"> • Exploitation of existing revenue potential through streamlining the range of services • Monetization of services with no or low revenue • Extension of market leadership in online marketing through market expansion 	<p>Eliminating own weaknesses to be able to face threats</p> <ul style="list-style-type: none"> • Abandonment of services with no or low revenue and refocus on market offer model • Definition of revenue purposes of all services to extend revenue basis • Expansion of online marketing even in weak markets to at least maintain market positions

Source: based on Wirtz (2013c, 2021, 2024) and own analysis, estimations, and updates

Fig. 20.12 Opportunities for differentiation with regard to revenue generation (1)

	Measures for Revenue Generation	Revenue Potential	Risk	Rating
Direct Transaction-Dependent	Software sales	Low potential because a lot of products are based on open source and therefore difficult to realize with the current structure of service offers	High risk due to reduced coverage and negative impact on core business (advertising market)	○
	Hardware offers for the mobile sector (smartphones, tablets, etc.)	Very high potential (see Apple)	High risk of losing important network partners, risks with regard to competition law	◐
	Extension of the hardware offers in the server segment	Low to medium potential due to highly competitive market and its special distribution structures	Medium risk due to high technology competence	◑
	Extension of the payment service range	High potential, especially in the mobile sector	Low due to existing infrastructure, but strong competition with other providers (e.g., PayPal)	●
	Extension of hardware and software offers in the field of Internet of Things, automation, artificial intelligence, and machine learning	High potential, especially with regard to smart home appliances and artificial intelligence	Medium to high risk due to competition (e.g., OpenAI with its chatbot ChatGPT integrated in the search engine Bing from Microsoft)	◐
	Extension of hardware offers in the field of augmented or virtual reality (e.g., wearables)	Low to medium potential	Medium risk due to moderate to high competition	◑

Source: based on Wirtz (2013c, 2021, 2024) and own analysis, estimations, and updates

Fig. 20.12 Opportunities for differentiation with regard to revenue generation (2)

Indirect Transaction-Dependent	Commission fees as e-commerce intermediary (e.g., through Google Merchant Center and Google Shopping)	High potential due to Google's role as gatekeeper in online shopping	Medium to high risk due to competition with current customers	●
Direct Transaction-Independent	Price differentiation for licenses (premium products)	Low to medium potential because only few services are suitable for this model	Relatively low risk as long as there is a recognizable added benefit, approved instrument, high risk of user churn in view of formerly free functions	●
	Price differentiation for licenses (charged for business customers)	Medium potential because the model is quite established, but not suitable for all services	Medium risk because it is an established model in online business	●
	License fees	High potential due to high number of users	Very high risk of end user churn, risk of brand erosion, medium risk in the business sector because here it is already partially established (Google Maps API)	●
	Letting of server capacities (cloud computing)	Very high potential because necessary structures are already established in the emerging market	Medium to high risk in the private customer segment, low risk in the business customer segment	●
Indirect Transaction-Independent	Extension of revenues from data mining and big data (sale of user data)	High potential due to Google's broad portfolio of diverse user data	High risk due to problems of acceptance among users, resulting in user churn (impact on core business) and legal risks	●

Legend: ○ Not suitable ● Less suitable ● Moderately suitable ● High suitable ● Very high suitable

Source: based on Wirtz (2013c, 2021, 2024) and own analysis, estimations, and updates

Chapter 20 Topics for discussion

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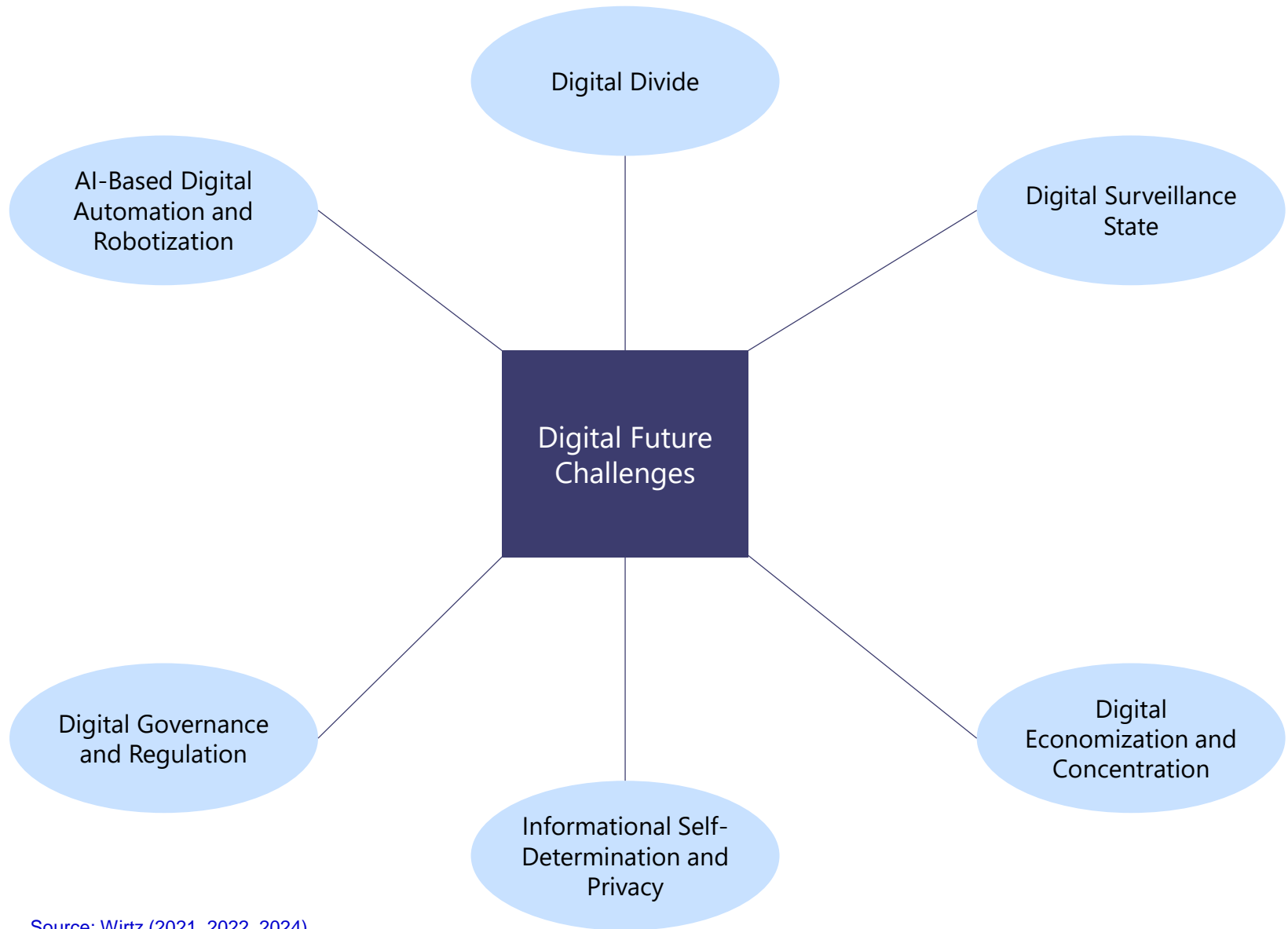


Topics for discussion

1. Google's goal is to make all information available worldwide, while generating revenue from personalized targeted advertising. Discuss this tension between Google's vision and Google's revenue model.
2. Google is the central gatekeeper in the Internet and has billions of personalized and non-personalized data of people worldwide. Discuss to what extent this central gatekeeper function of Google is desirable against the background of future scientific, social, and democratic developments.
3. Google has a monopoly-like market position worldwide. Against this background, a break-up of Google is under discussion. Discuss the advantages and disadvantages of breaking up Google from a social and economic point of view, in particular against the background of Google's considerable profit position.

Chapter 21: The Digital Future: A Brief Outlook

Fig. 21.1 Digital future challenges



Source: Wirtz (2021, 2022, 2024)