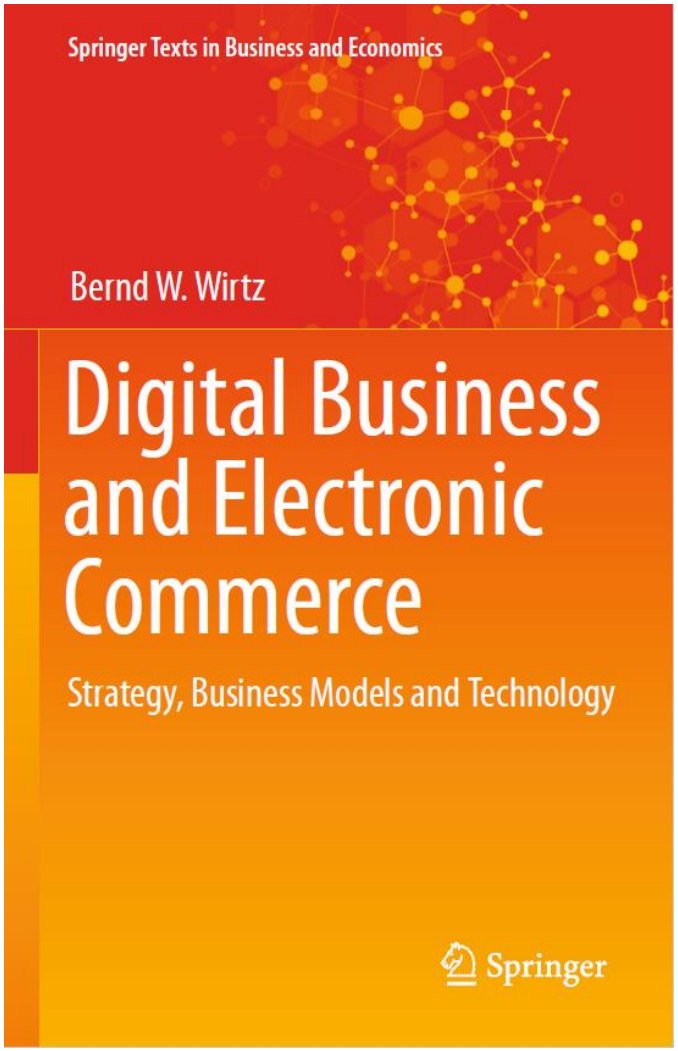


Digital Business and Electronic Commerce

Strategy, Business Models and Technology

Lecture Material

Prof. Dr. Bernd W. Wirtz

Chair for Information & Communication Management
German University of Administrative Sciences Speyer
Freiherr-vom-Stein-Straße 2
DE - 67346 Speyer- Email: ls-wirtz@uni-speyer.de

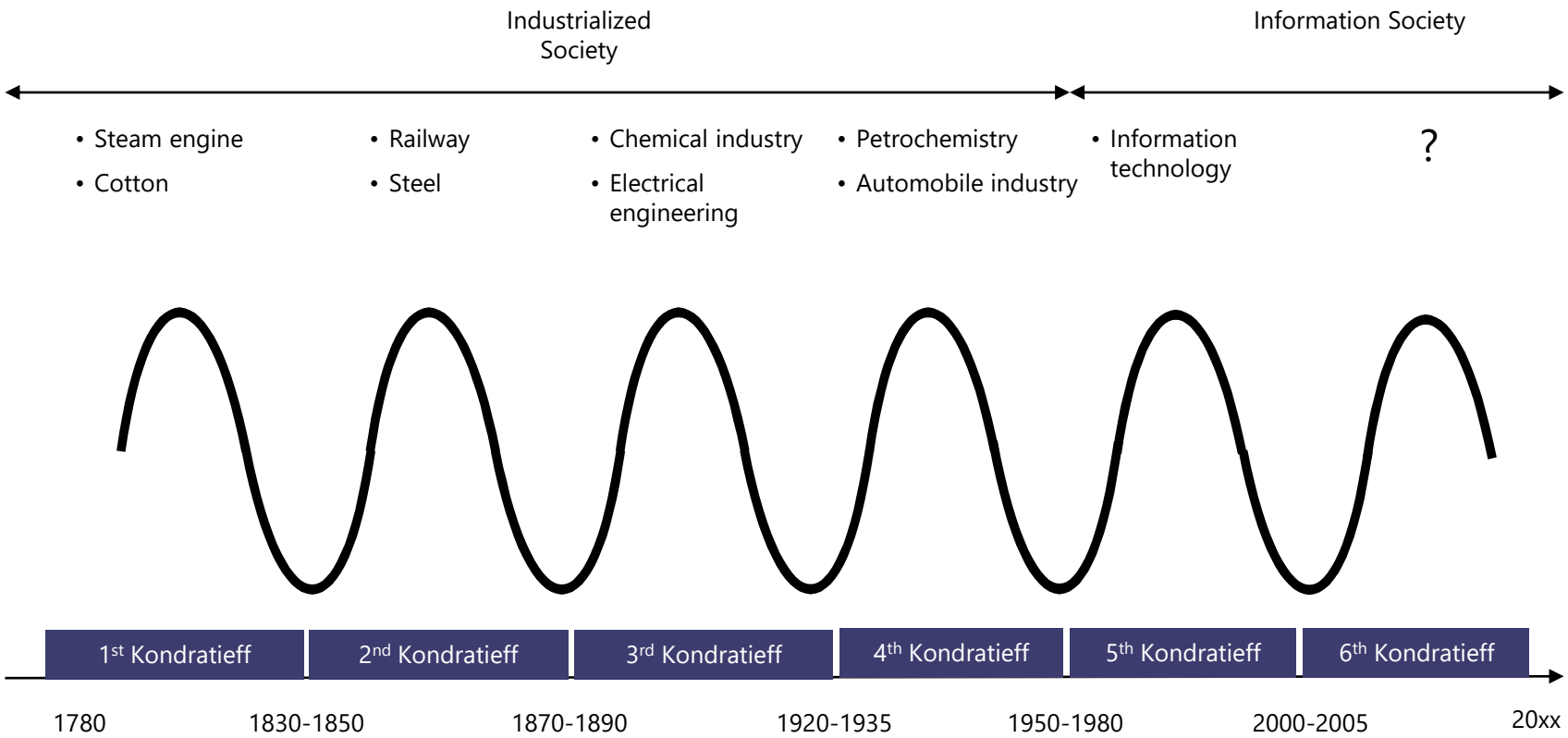
Table of Contents I

Table of Contents II

Part I - Introduction

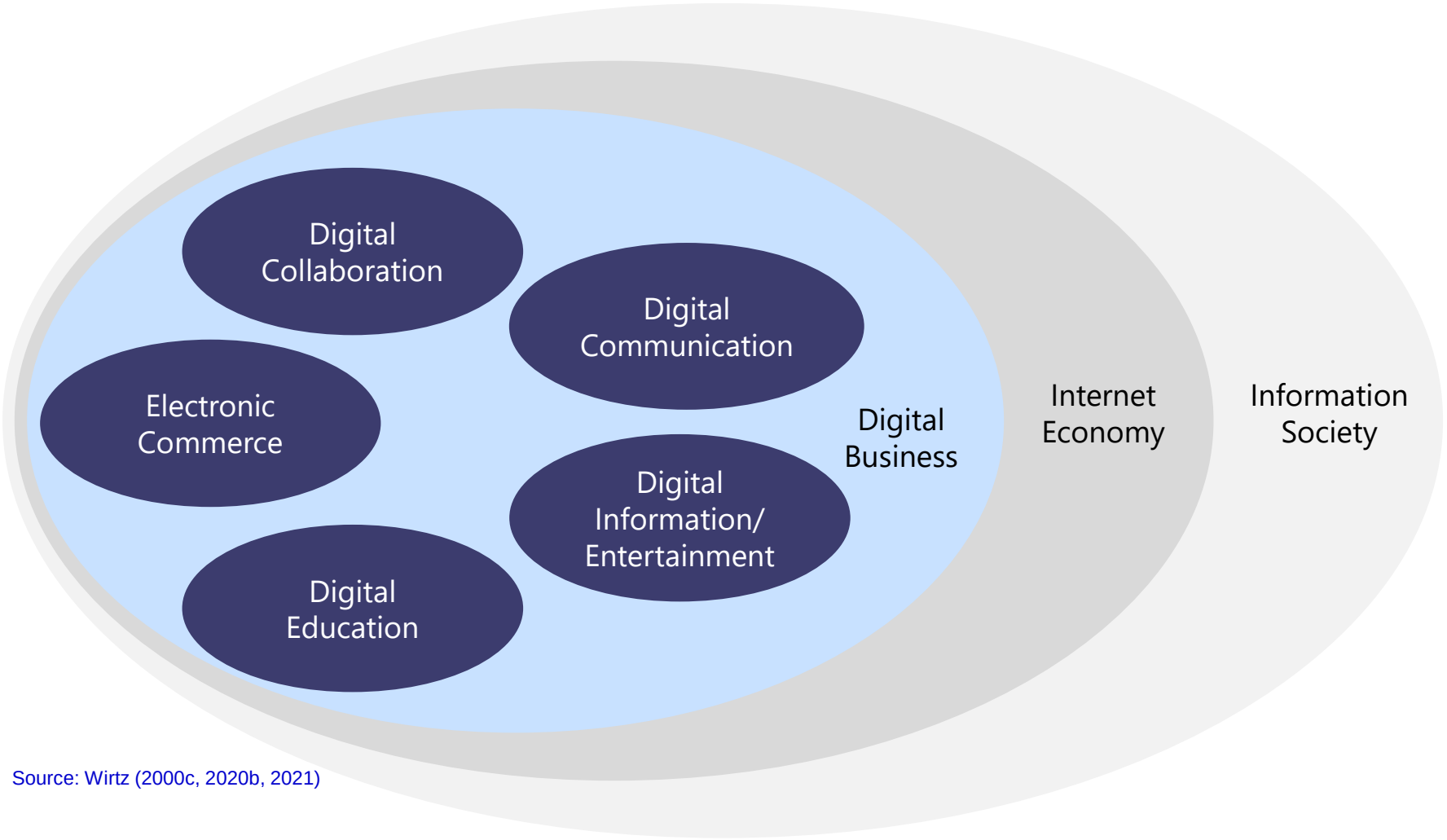
Chapter 1: Foundations of Digital Business

Fig. 1.1 Kondratieff cycle



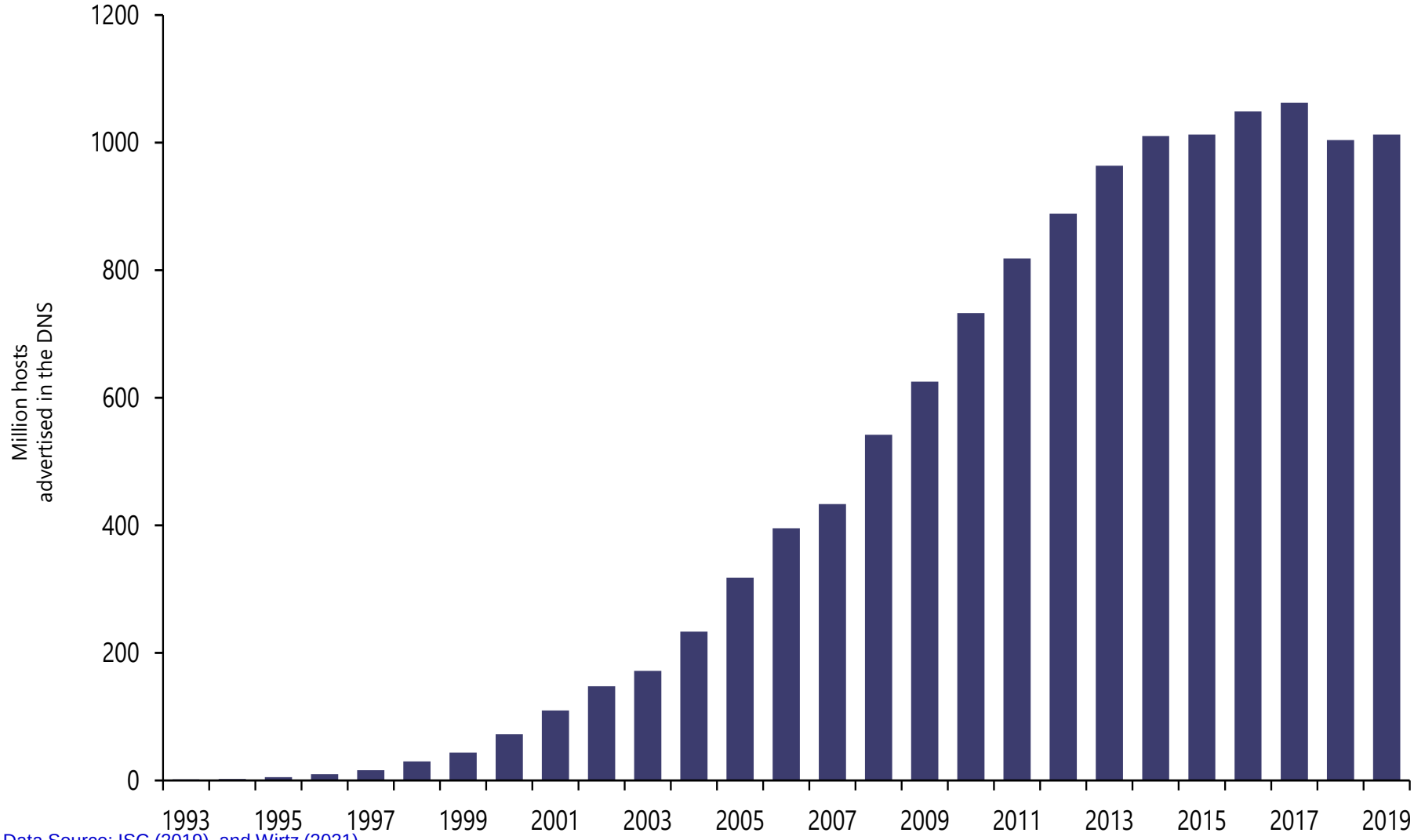
Source: Nefiodow and Nefiodow (2014), and Wirtz (2021)

Fig. 1.2 Dimensions of the information society



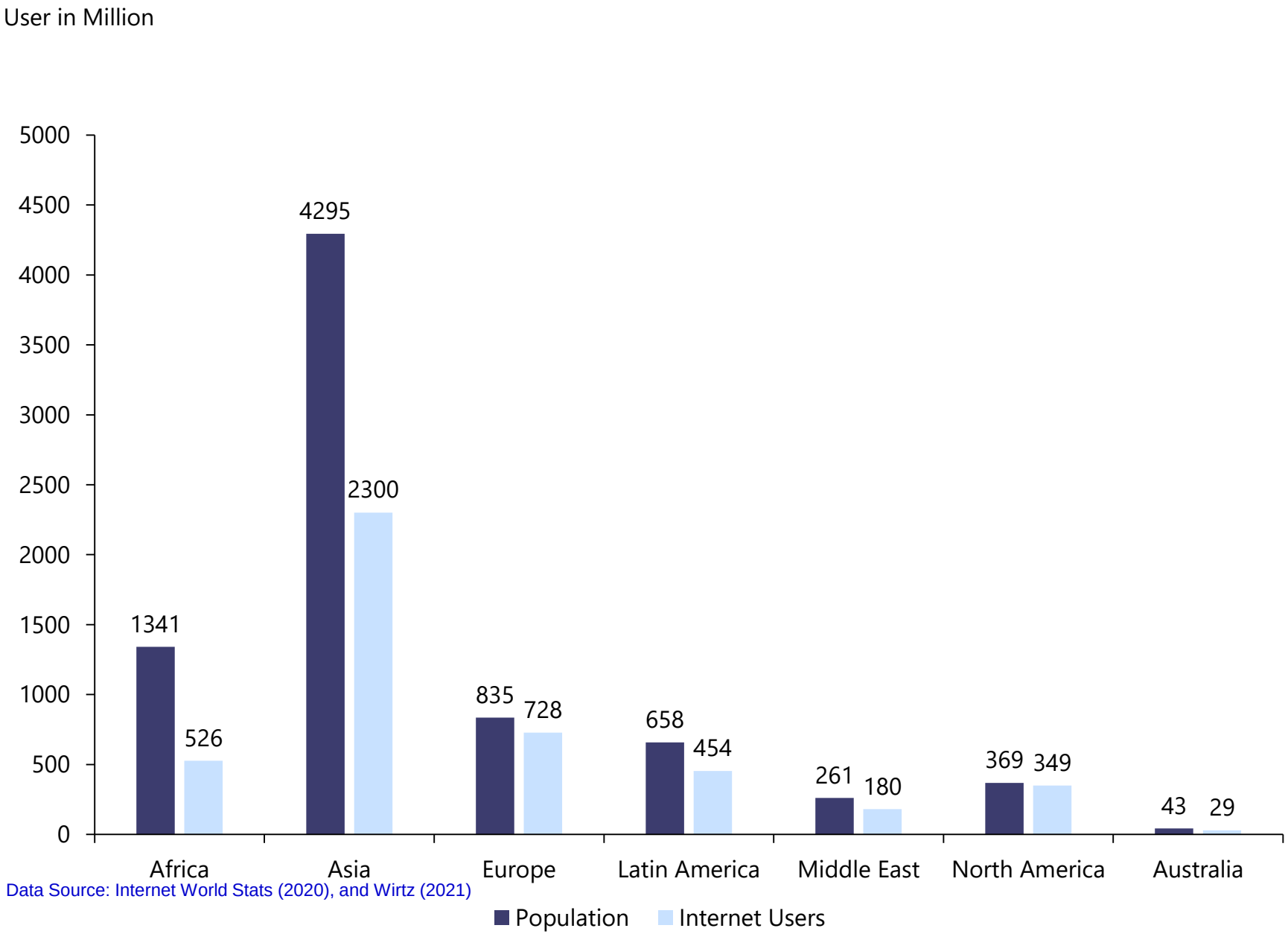
Source: Wirtz (2000c, 2020b, 2021)

Fig. 1.3 Development of the number of Internet hosts since 1993



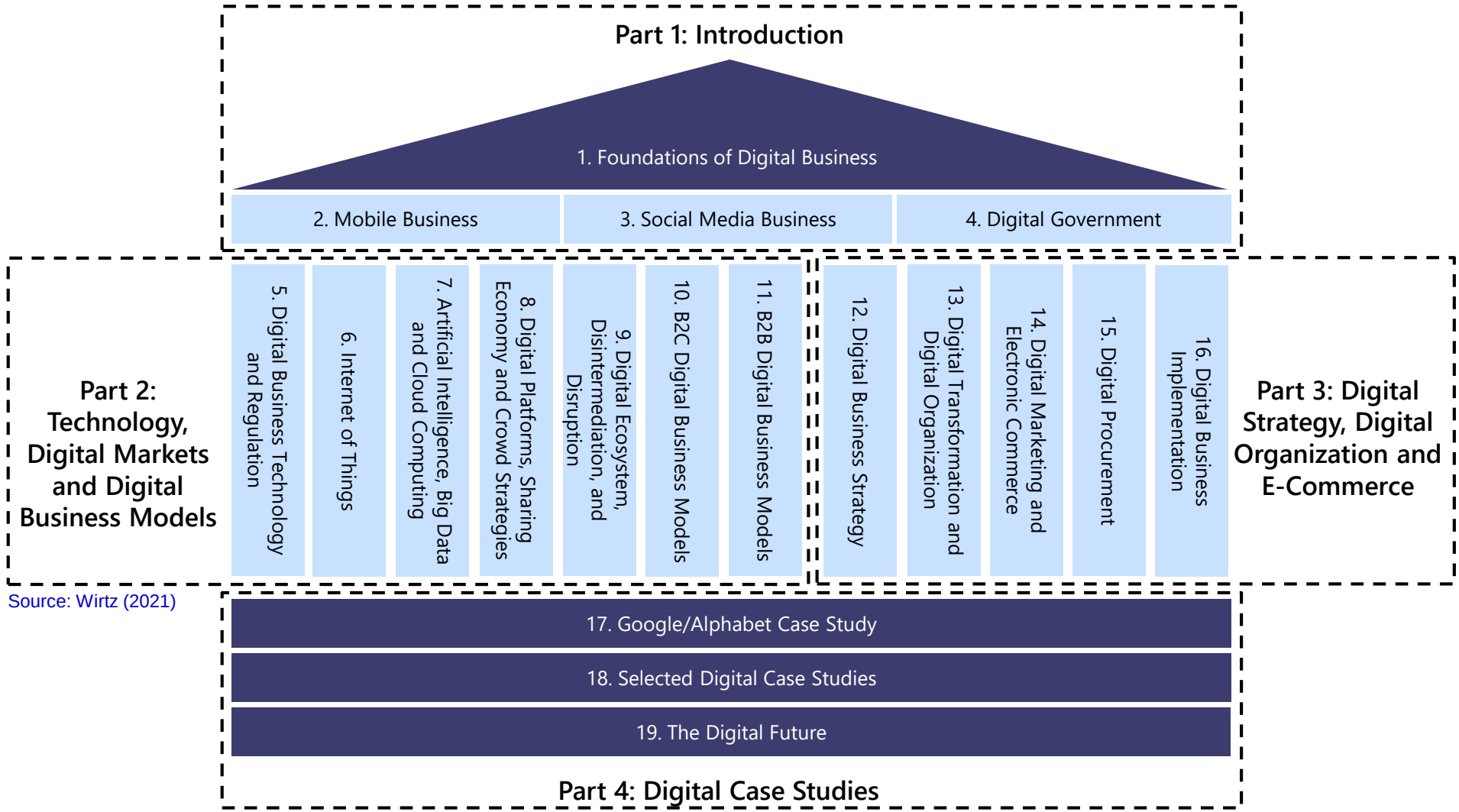
Data Source: ISC (2019), and Wirtz (2021)

Fig. 1.4 Worldwide Internet usage and population statistics



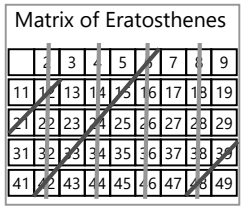
Data Source: Internet World Stats (2020), and Wirtz (2021)

Fig. 1.5 Structure of the textbook

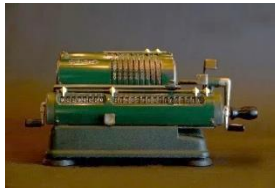


Source: Wirtz (2021)

Fig. 1.6 Development of information and communication applications (250 B.C. until 1956)

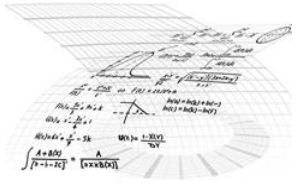


250 B.C. Eratosthenes develops an algorithm for determining prime numbers



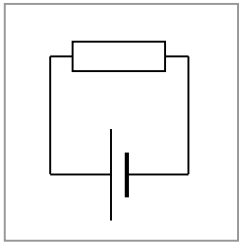
1623 Wilhelm Schickard constructs the first 4-function calculator

1672 Gottfried Leibnitz constructs the first mechanical calculating machine that is capable of the four standard calculation methods

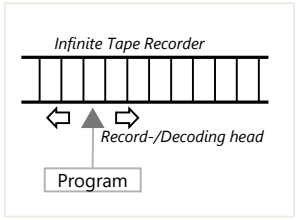


1854 George Boole publishes the Boolean algebra

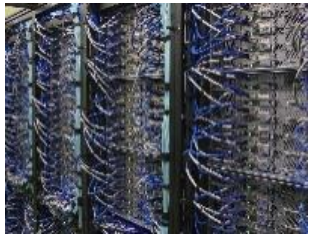
1867 Alexander Graham Bell puts the first telephone into operation



1903 Nikola Tesla patents the electrical circuits

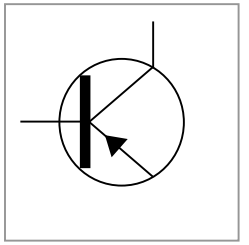


1936 With the Turing machine, Alan M. Turing develops a basic foundation of theoretical informatics



1941 Konrad Zuse builds the first fully automated, program-controlled and freely programmable Computer

1946 Implementation of the first mobile network worldwide in the U.S.



1948 William Bradford Shockley patents the transistor

1953 Introduction of color television in the U.S.

1956 IBM introduces the magnetic hard drive (IBM 350)

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

Fig. 1.7 Development of information and communication applications (1966 until 1994)

1966: Disk Operating System/360 (DOS) is introduced as operating system for IBM mainframes

1971: Intel launches the first microprocessor 4004

1981: Motorola introduces the first cell phone worldwide (Dynatac 8000x)

1985: Steve Case founds the Internet service Quantum Computer Services (renamed to AOL 3 years later)

1993: SAP releases the ERP-Software SAP R/3

1966 | 1969 | 1971 | 1981 | 1983 | 1985 | 1989 | 1993 | 1994

1969: Paul Baran und Donald Watts Davies create the first decentral network ARPANET

1981: Introduction of IBM „Personal Computer“

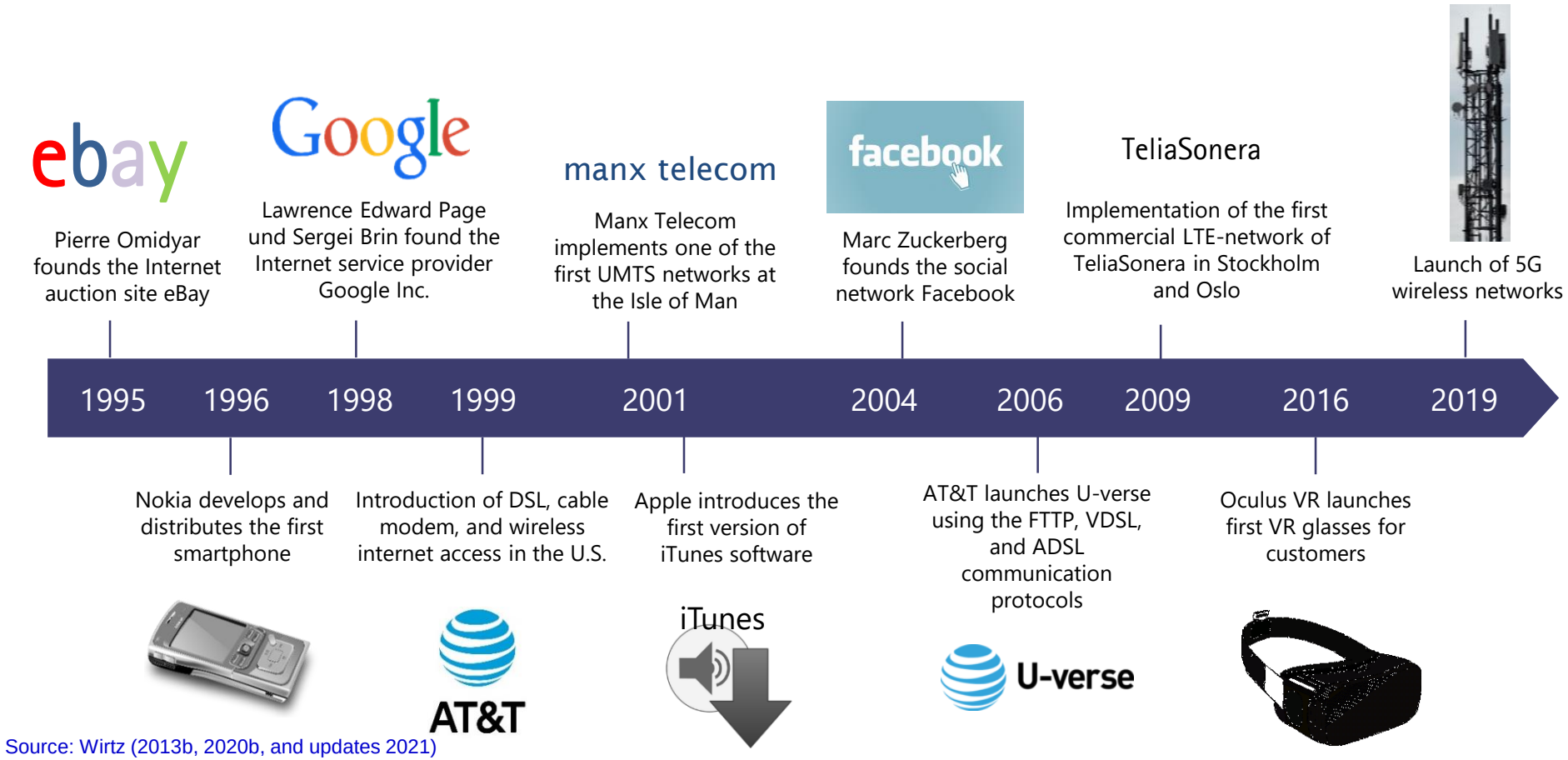
1985: Microsoft releases Windows 1.0

1989: Start of the World Wide Web

1994: Jeff Bezos founds the internet mail order business Amazon

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

Fig. 1.8 Development of information and communication applications (1995 until 2019)



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

Table 1.1 Selected definitions of digital business

Author	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.
Pricewaterhouse Coopers (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 (2000e)	Digital 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 electronically based intra- or interorganizational 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 ecommerce 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-toend.
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 (2020b, 2021)

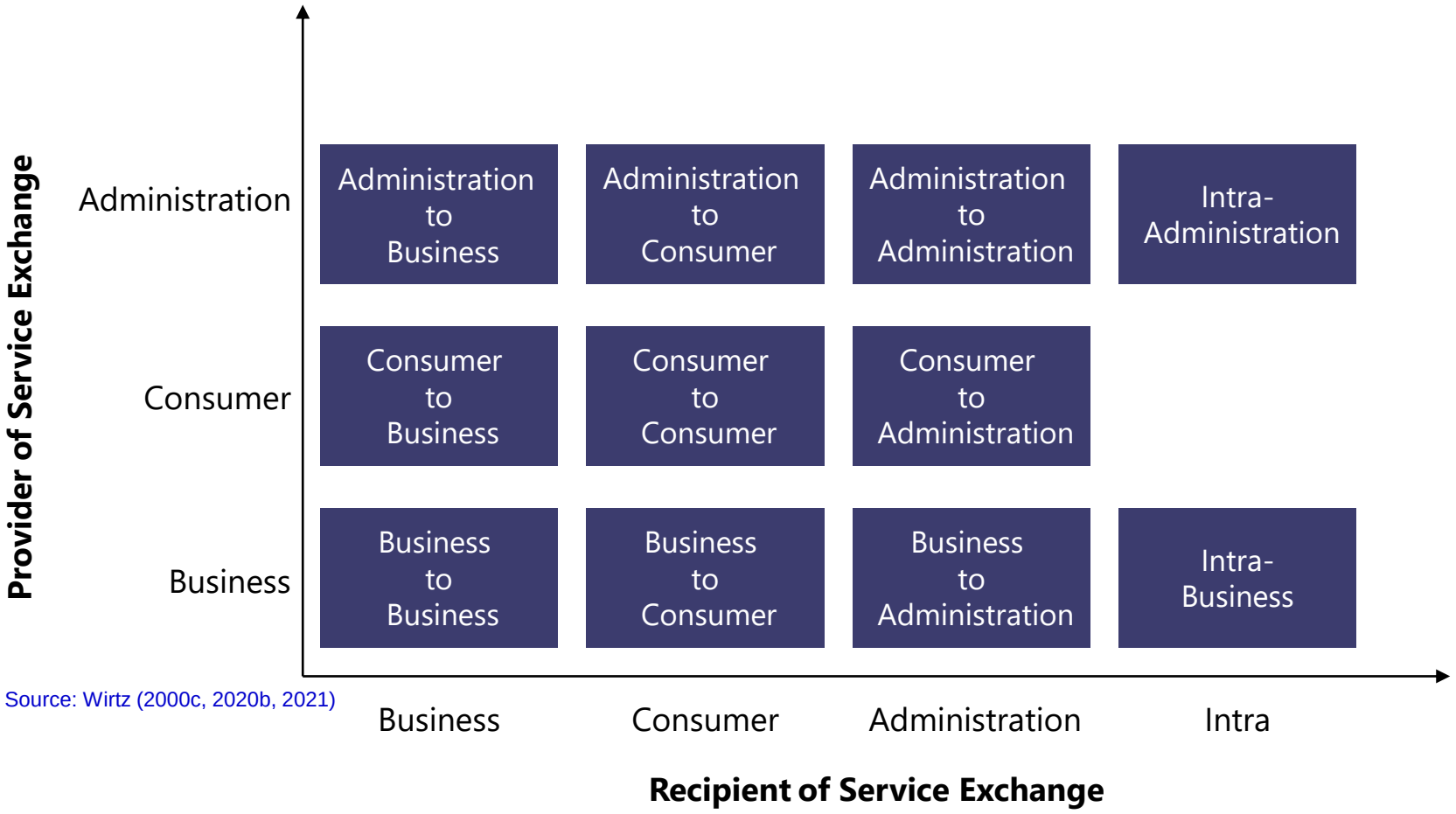
Definition of Digital Business

Definition of Digital Business (Wirtz 2000c, 2020b)

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).

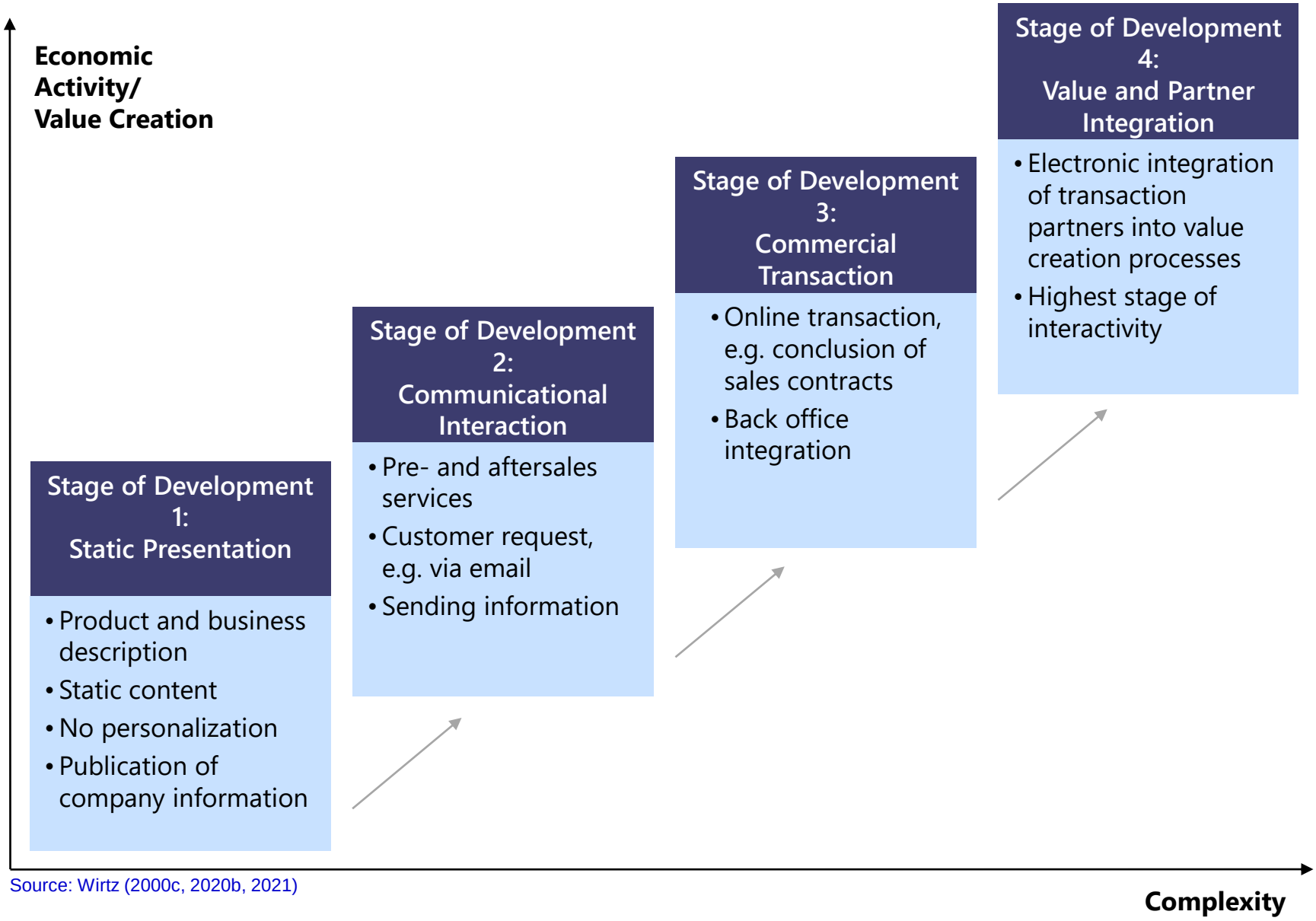
Source: Wirtz (2000c, 2020b, 2021)

Fig 1.9 Matrix of interaction patterns in digital business



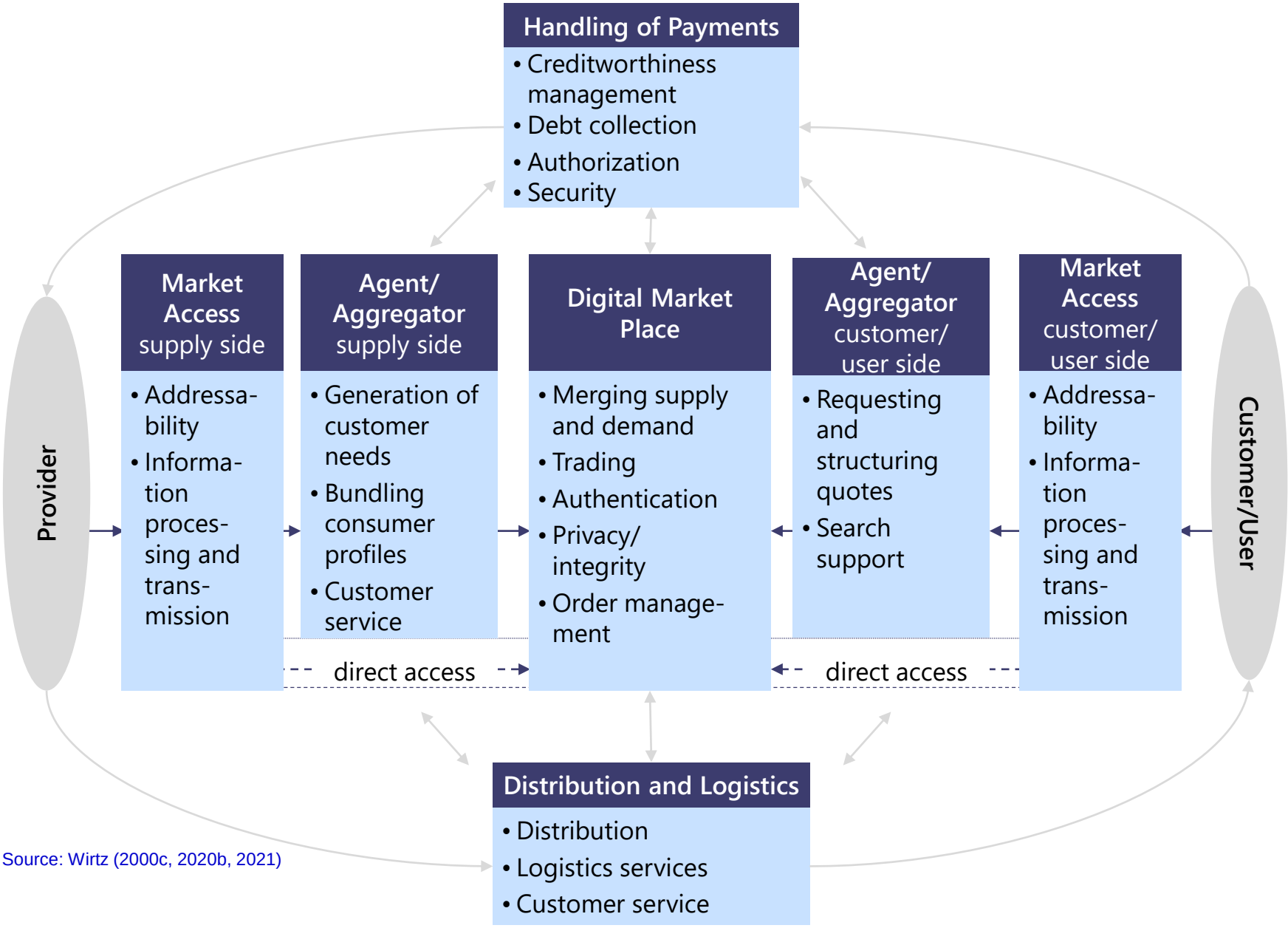
Source: Wirtz (2000c, 2020b, 2021)

Fig 1.10 Stages of digital business development



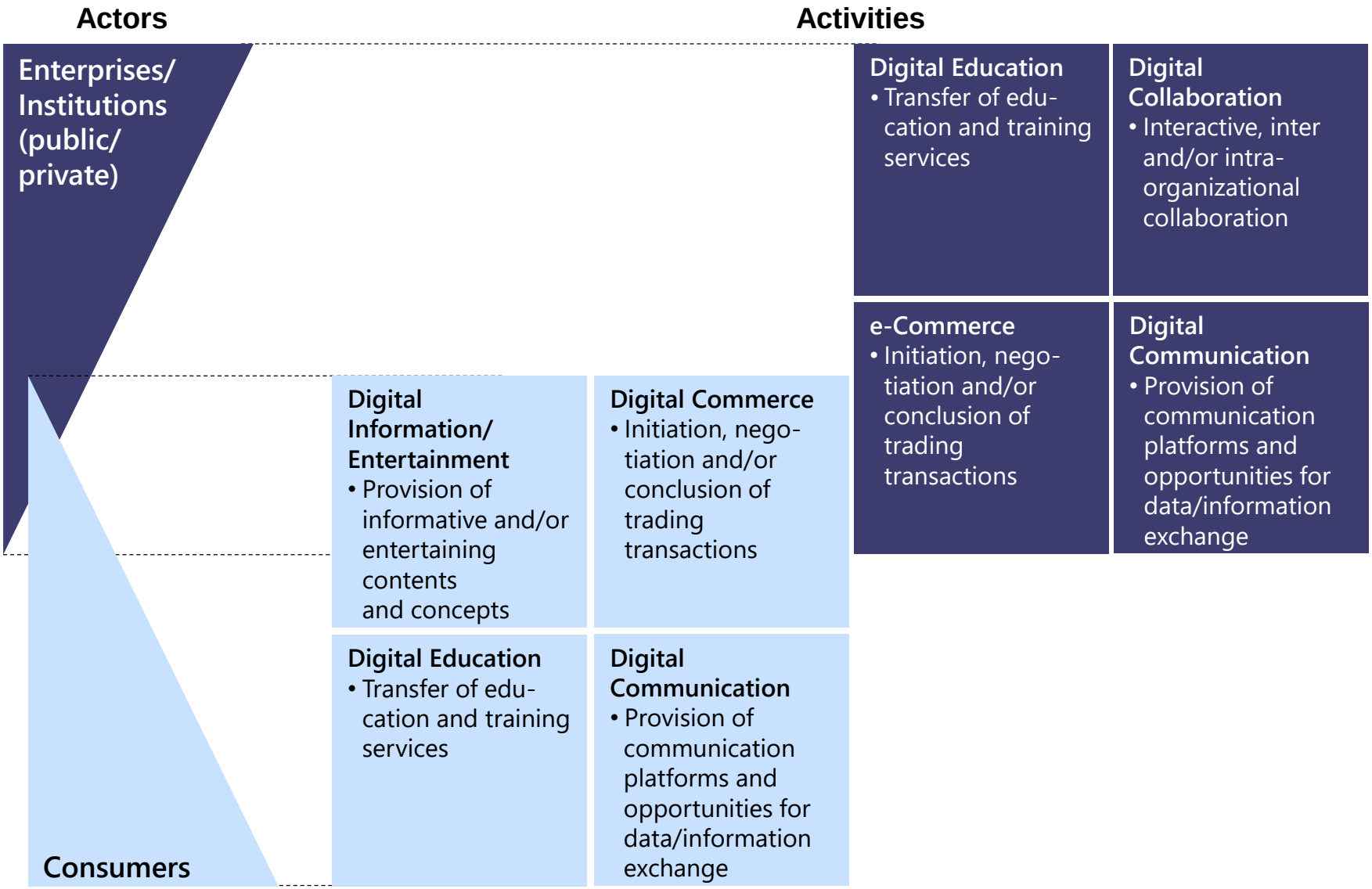
Source: Wirtz (2000c, 2020b, 2021)

Fig 1.11 Digital market model of Internet economy



Source: Wirtz (2000c, 2020b, 2021)

Fig 1.12 Actors and activities of digital business



Source: Wirtz (2000c, 2020b, 2021)

Definition of E-Commerce (Wirtz 2000c, 2020b)

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

Source: Wirtz (2000c, 2020b, 2021)

Definition of Digital Communication

Definition of Digital Collaboration (Wirtz 2000c, 2020b)

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

Source: Wirtz (2000c, 2020b, 2021)

Definition of Digital Communication

Definition of Digital Communication (Wirtz 2000c, 2020b)

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

Source: Wirtz (2000c, 2020b, 2021)

Definition of Digital Education

Definition of Digital Education (Wirtz 2000c, 2020b)

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

Source: Wirtz (2000c, 2020b, 2021)

Definition of Digital Information/Entertainment

Definition of Digital Information/Entertainment (Wirtz 2000c, 2020b)

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 (2000c, 2020b, 2021)

Table 1.2 Demographic classification of Internet users in the United States

	2010	2012	2015	2018	2019
Internet users	72%	79%	88%	89%	90%
Male	77%	83%	85%	89%	90%
Female	76%	82%	84%	88%	91%
14-17	87%	91%	94%	N/A	N/A
18-29	92%	96%	96%	98%	100%
30-49	85%	91%	93%	97%	97%
50-64	74%	79%	81%	87%	88%
65 or older	43%	54%	58%	66%	73%
College+	93%	96%	95%	97%	98%
Some college	87%	91%	90%	93%	95%
High school	68%	75%	76%	84%	84%
Less than high school	41%	55%	66%	65%	71%

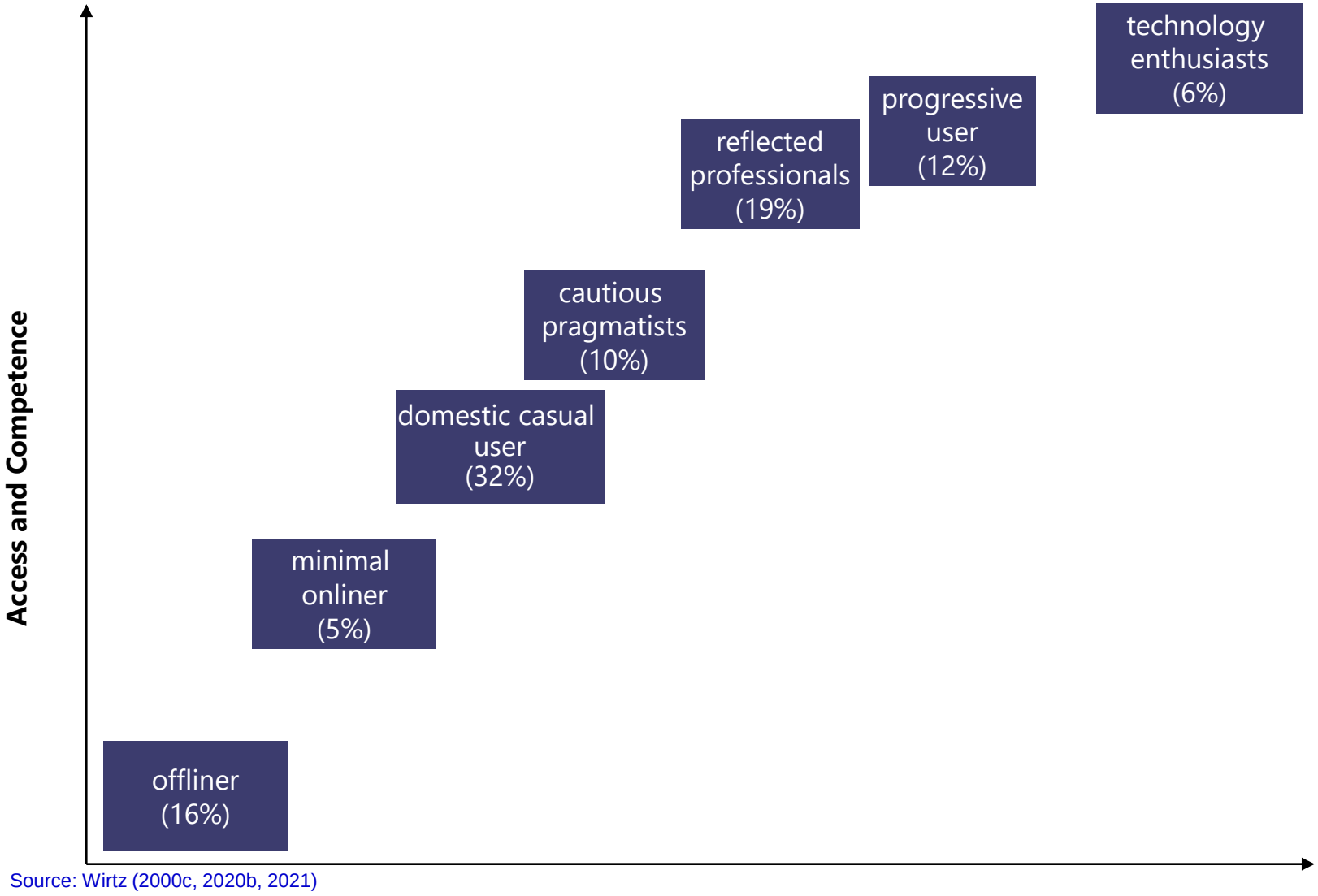
Data Source: Pew Research Center (2019a), and Wirtz (2021)

Table 1.3 Most popular online activities of adult Internet users in the United States

	Total US Users	15-24	25-44	45-64	65+
Uses email	90.8%	91.0%	93.4%	90.5%	85.8%
Shops, makes travel reservations, or uses other customer online services	68.5%	62.9%	74.2%	69.4%	60.2%
Watches videos	69.5%	86.4%	81.7%	61.2%	40.2%
Uses online social networks	74.4%	88.2%	83.8%	67.5%	52.0%
Uses text messaging or instant messaging	90.2%	95.7%	96.4%	89.7%	70.8%
Searches health information online	48.0%	34.5%	52.0%	51.1%	48.7%
Searches for job online	20.8%	34.5%	26.6%	15.1%	4.4%
Uses financial services like banking, investing, paying bills	65.9%	53.2%	76.5%	66.6%	54.6%

Data Source: NTIA (2018), and Wirtz (2021)

Fig. 1.13 Overview of the user structure in the digital society



Source: Wirtz (2000c, 2020b, 2021)

Fig. 1.14 Success factors of digital business

Digital Innovation Capability	Strategic and Organizational Flexibility
•Market analysis/customer needs •Evaluation of risks and opportunities of an innovation •Physical vs. virtual goods	•Dynamic environment of the Internet economy •Focusing on customer relationship •Capability of adapting to market structure at different company levels
Capability for Networking and Integrating	**Ease of Use**
•Digital combination and processing of information •Resources and time advantage through electronic networking without media disruption •Network effects and lock-in effects	•Efficiency of and access to business interfaces •Transfer of offline basics to e-Business •Focus on customer/user needs

Source: Wirtz (2000c, 2020b, 2021)

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 digital business.
3. Identify both the providers and recipients of service exchange in digital business and provide examples of their interactions.
4. Explain the Digital Market Model of the Internet Economy.
5. Name the four success factors of digital business and describe them.

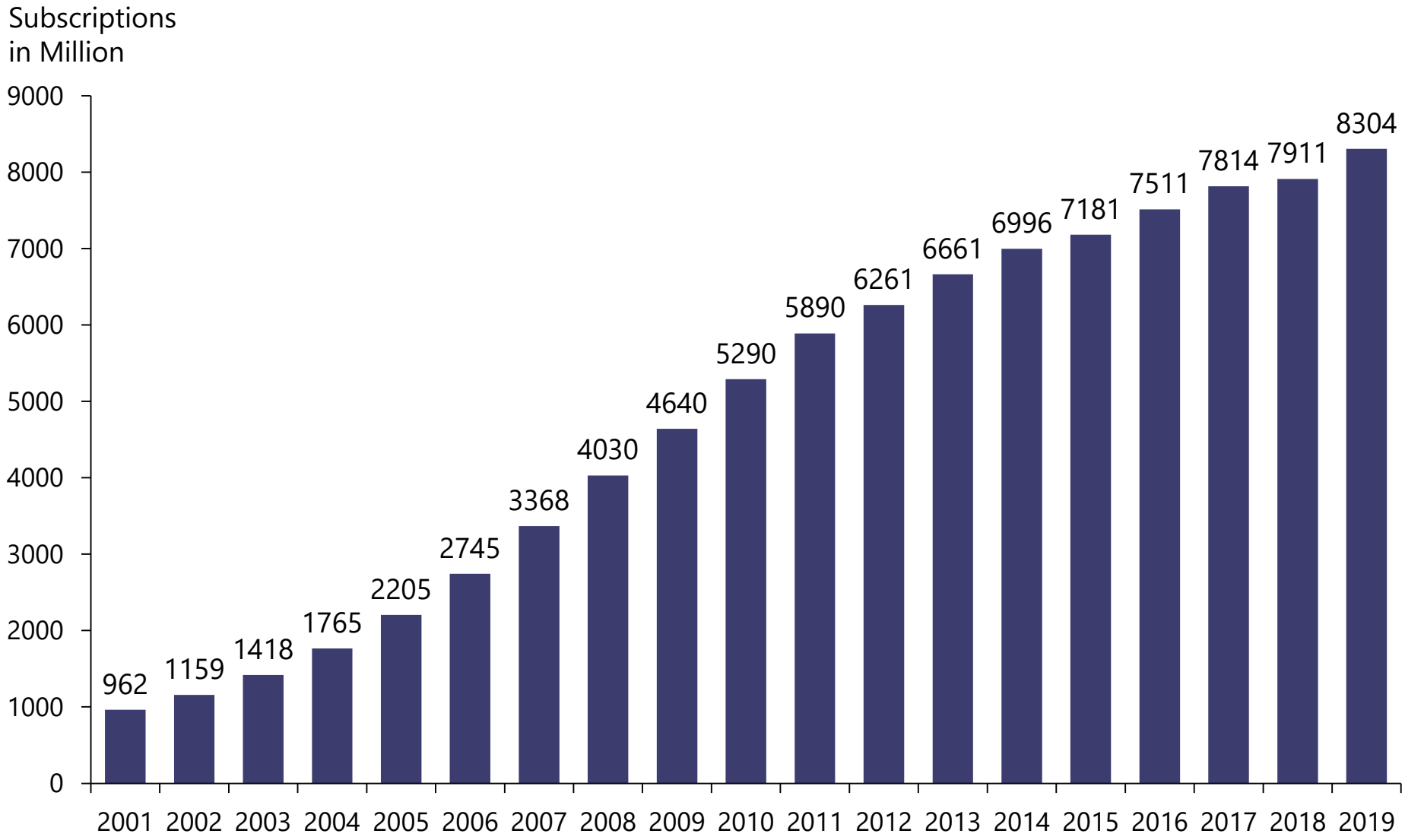
Topics for classroom discussion and team debates

1. Discuss the changes that the Kondratieff-cycle of digitalization causes?
2. Discuss the perspectives of an information society against the background of data security as well as personal and privacy rights.
3. Discuss how the digital market model will change in the future. Who will economically and socially benefit and who will not?

Source: Wirtz (2021)

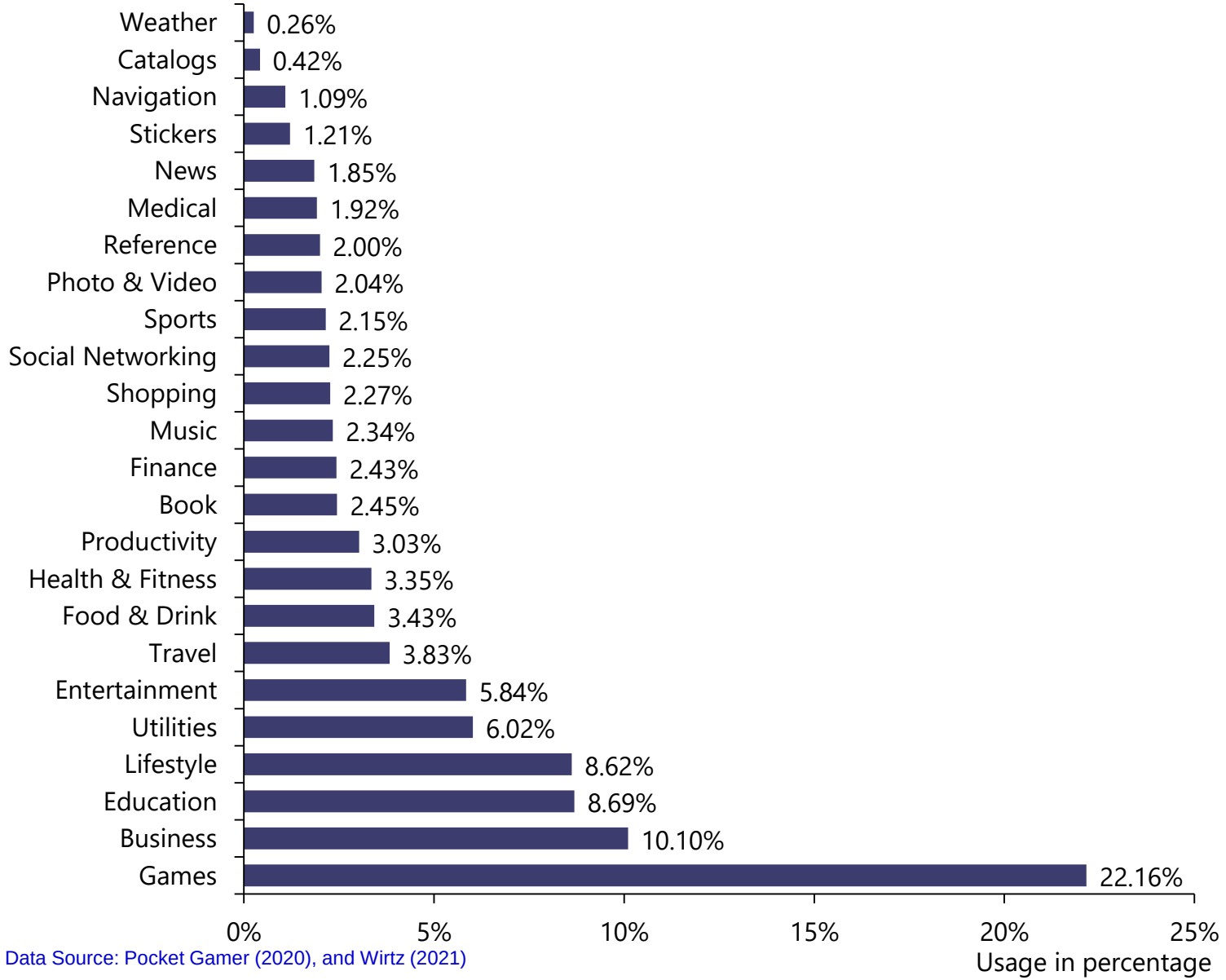
Chapter 2: Mobile Business

Fig. 2.1 Development of mobile phone subscriptions worldwide



Data Source: ITU (2019a), and Wirtz (2021)

Fig. 2.2 Regular use of mobile services in 2019



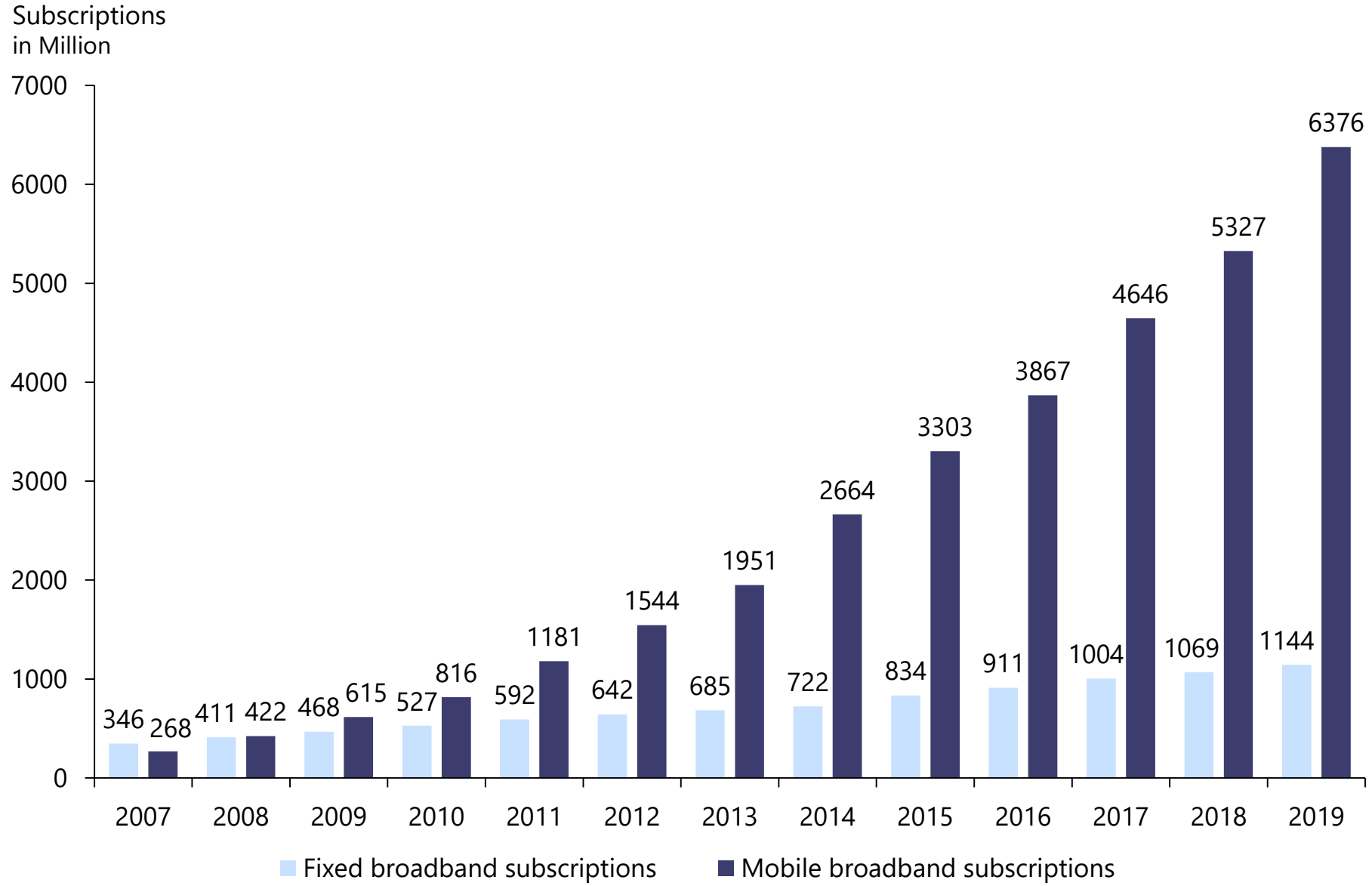
Data Source: Pocket Gamer (2020), and Wirtz (2021)

Table 2.1 Volume of the US mobile commercial market

	Smartphone sales (billion USD)	Tablet sales (billion USD)	Total (billion USD)
2015	26.5	15.1	41.6
2016	46.0	17.6	63.6
2017	75.6	21.2	96.8
2018	95.8	24.6	120.4
2019*	128.4	28.5	156.9
2020*	170.3	34.7	205.0
2021*	221.2	41.8	263.0
2022*	276.1	48.1	324.2
2023*	344.5	56.7	401.2
2024*	418.9	69.1	488.0

Data Source: Meola (2019), and Wirtz (2021)

Fig. 2.3 Development of mobile and stationary broadband subscriptions



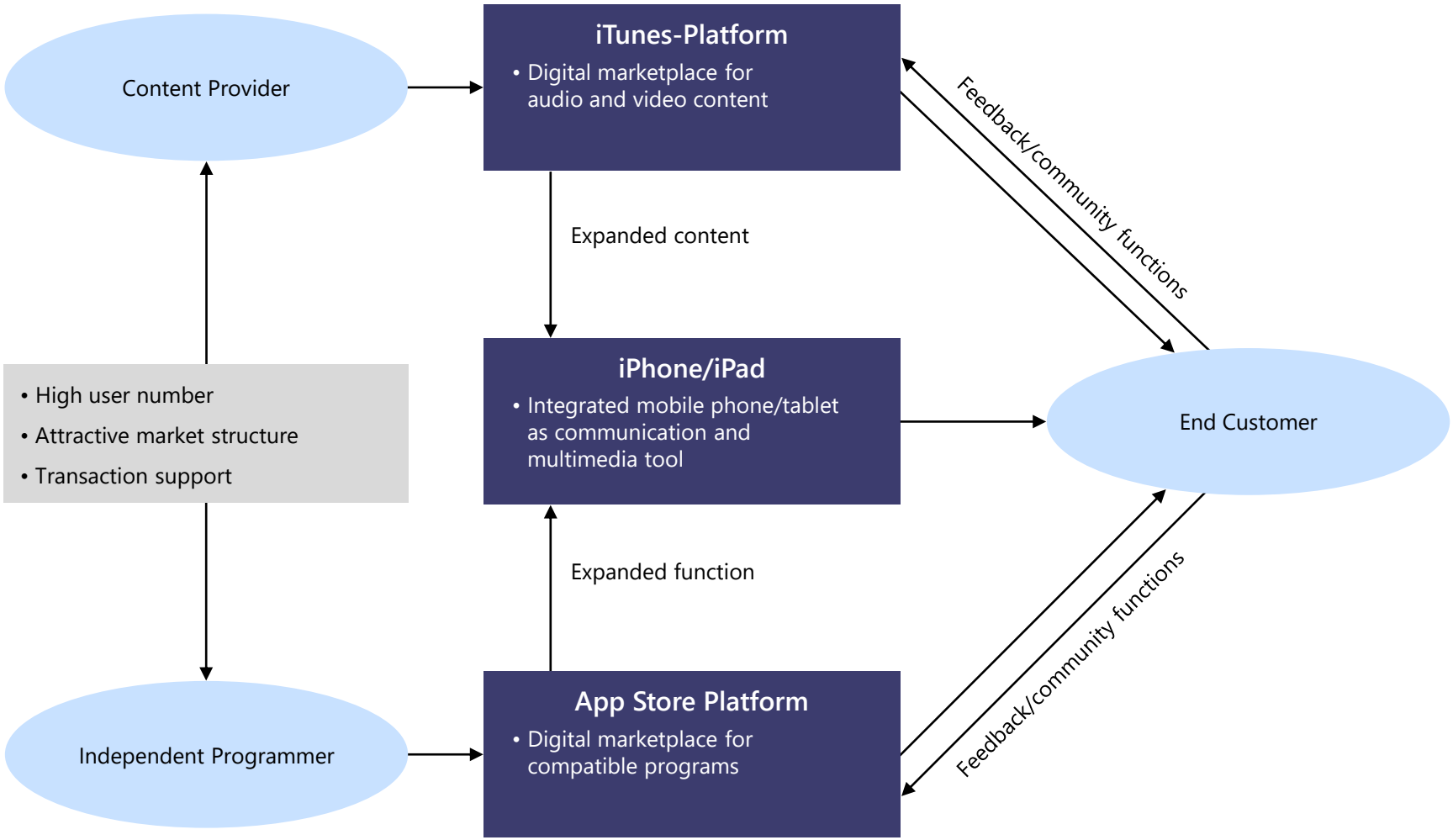
Data Source: ITU (2018,2019b), and Wirtz (2021)

Fig. 2.4 Corporate positions in the mobile internet market

	Strengths	Weaknesses	Objectives
Apple	• Interface design • Successful content platform iTunes • High degree of control due to closed system	• Premium price image/cost-benefit ratio • Missing compatibility with Android	• Enlargement of proprietary platforms by new applications and user groups
Microsoft	• Recourses and competencies by means of developing operation systems	• Late adoption of mobile strategy • License model under threat	• Networking between stationary and mobile Internet through cloud services
Google	• Successful online search and online services • Possibility of cross-platform usage	• No contract bond to end consumers	• Developing and expanding supremacy in the field of mobile online search
Facebook	• Successful mobile Facebook App • WhatsApp as a mobile instant messenger • Instagram as mobile social media	• No contract bond • Increasing negative image due to monopoly position and acquisitions	• Developing and expanding supremacy in the field of mobile social media

Source: Wirtz (2010c, 2020b, 2021, and own analysis and estimations)

Fig. 2.5 Integrated mobile business strategy of Apple



Source: Wirtz (2010c, 2020b, 2021, and 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, handheld 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.

Source: Wirtz (2020b, 2021)

Definition of M-Business

Definition of M-Business (Wirtz 2010c, 2020b)

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)

Fig. 2.6 Mobile transmission standards and devices

Devices Mobile Business/Mobile Internet			
Simple Internet Mobile Phones	**Smartphones**	**E-Reader/Tablets**	**Netbooks**
• Nokia 216 • LG Xpression 2 • ZTE Z233 • …	• Apple iPhone XR/XS • Samsung Galaxy S 9 • Nokia Lumia 950 • …	• Amazon Kindle Paperwhite • Apple iPad Pro 12.9 • Samsung Galaxy Tab S5e • …	• Apple MacBook Pro • Asus ZenBook Pro • Lenovo ThinkPad X1 • …

Transmission Standard Mobile Internet				
UMTS	**HDSPA**	**HSUPA**	**LTE**	**5G**
• Mobile network 3rd generation • Max. transmission rate 384 kbit/s • 2014 about 300 million user worldwide	• Downlink expansion of UMTS • Max. transmission rate 7.2 Mbit/s • Enables data-intensive services such as streaming	• Uplink expansion of UMTS • Max. transmission rate 5.8 Mbit/s • Enables interactive services such as GoogleDocs	• Mobile network 4th generation • Max. transmission rate 300 Mbit/s download and 75 Mbit/s upload	• Mobile network and 5th generation • Max. transmission rate 10.000 Mbit/s • Enables shorter response times

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

Table 2.3 Overview of mobile applications I

	Fields of Application			
	Mobile Search	**Mobile Information**	**Mobile Communication**	**Mobile Advertising**
Brief Description	• Mobile use of search engines • Pull mechanism: Information request • Location-based applications and services for mobile search	• Mobile news • Mobile knowledge management • Location-based applications and services for mobile information	• 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	• Mobile push advertising • Mobile pull advertising • Permission-based marketing • Location-based applications and services for mobile advertising
Benefit/Advantage Mobile Business	• Benefit-demand side: Access to information • Advantage-supply side: Direct marketing through targeted information provision adapted to search behavior	• Benefit-demand side: Direct mobile information and knowledge relation • Advantage-supply side: Transmission of personalized product and service information	• Benefit-demand side: Direct communication channel • Advantage-supply side: Possibility of direct response and interaction	• 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	• Mobile search engine: e.g. Bing Mobile, Google Mobile, Baidoo Mobile • Mobile Search Engine Marketing: e.g. Google Adwords • ...	• Contextual advertising • Content-targeted inclusion • Portal subscriptions • ...	• Competitions via mobile channels • SMS codes • Bluetooth marketing • ...	• Mobile coupons • Mobile display advertising • In-app advertising • Location-based advertising • Mobile telephone marketing • ...

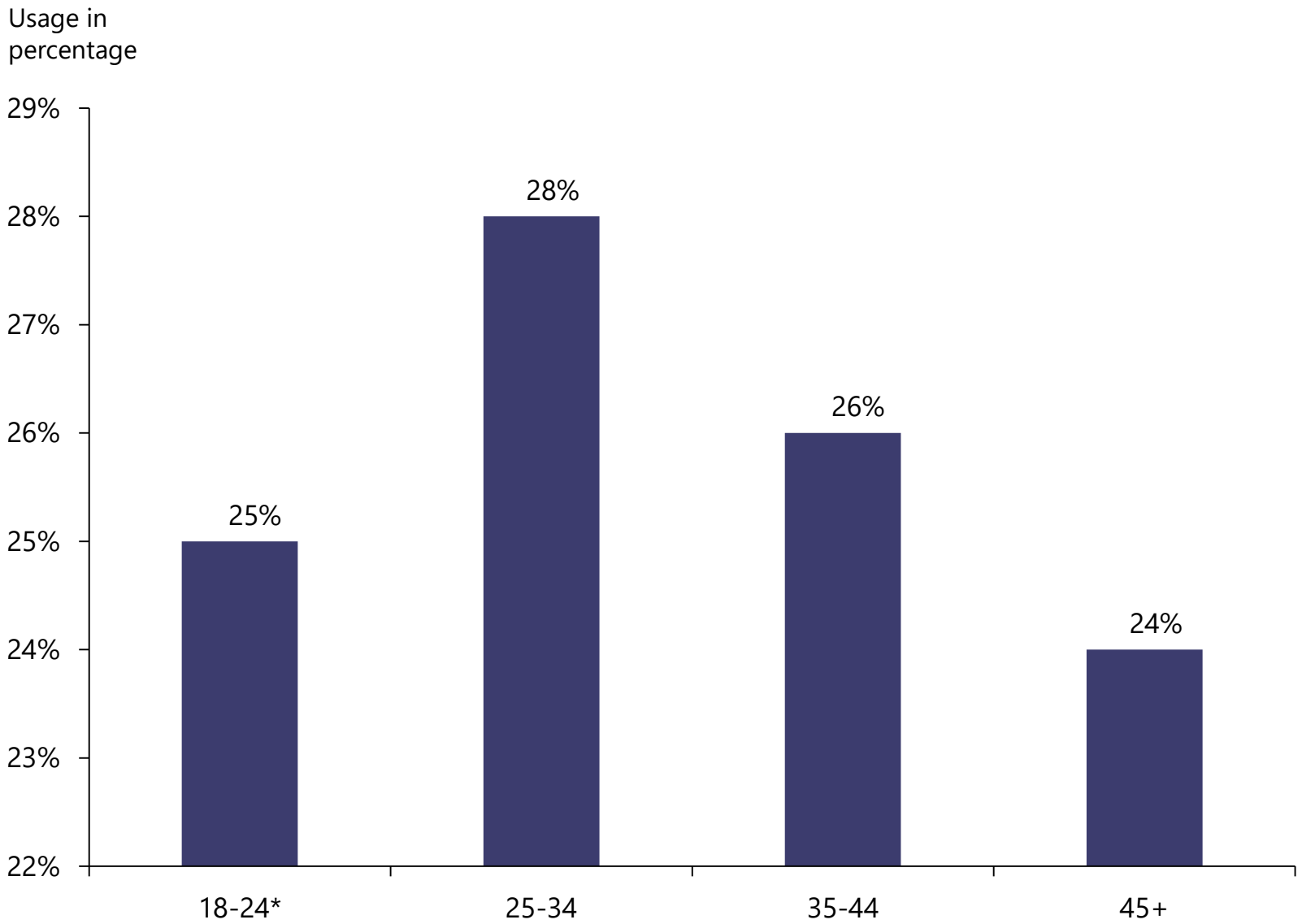
Source: Wirtz (2010c, 2020b, 2021)

Table 2.4 Overview of mobile applications II

	Fields of Application			
	Mobile Commerce	Mobile Payment	Mobile Entertainment	Support-functions
Brief Description	• Mobile shopping: Mobile initiation and handling of shopping transactions • Mobile access to auctions • Location-based applications and services for mobile commerce	• Payment of products or services via mobile devices • Quick payment at point of sale or remote • Location-based applications and services for mobile payment	• 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	• Mobile software • Mobile browsing • Mobile navigation • Mobile telemetry
Benefit/Advantage Mobile Business	• Benefit-demand side: Location-independent online shopping • Advantage-supply side: Additional distribution channel	• Benefit-demand side: Quick, easy, and secure payment • Advantage-supply side: Efficiency of payment processing	• 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	• Realization of respective fields of application and functions • Basis for complex mobile services
Instruments in Mobile Business	• Mobile shopping-platforms, e.g. Amazon Mobile, Expedia Mobile, Newegg Mobile • Mobile auction platforms, e.g. eBay Mobile • Shopping apps • ...	• Mobile payment via near field communication (NFC) • Purchasing products and services mobile and doing direct payment with the same device, e.g. via PayPal • ...	• Sponsoring and pre-/post rolls of mobile entertainment • Mobile games for enhancing brand awareness and for product promotion • Viral direct marketing • ...	• Operation systems for mobile devices, e.g. Google Android, Windows Mobile • Mobile browser: e.g. Opera Mini, Chrome • Complex instruments in telemetric & navigation • ...

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

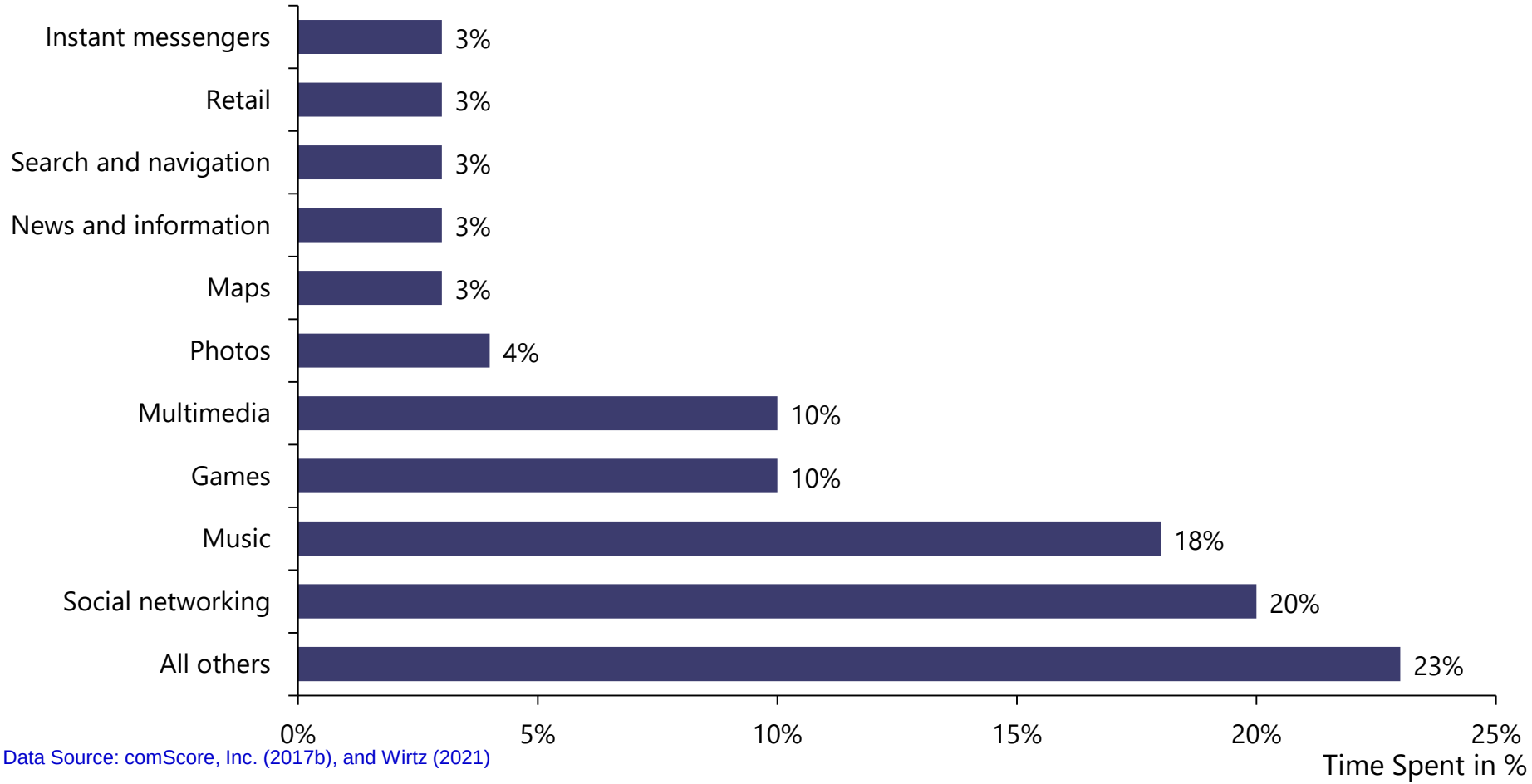
Fig. 2.7 Average usage of mobile-only Internet



* Ages 15-24 in Brazil, China, India, Italy, Malaysia, Spain and UK

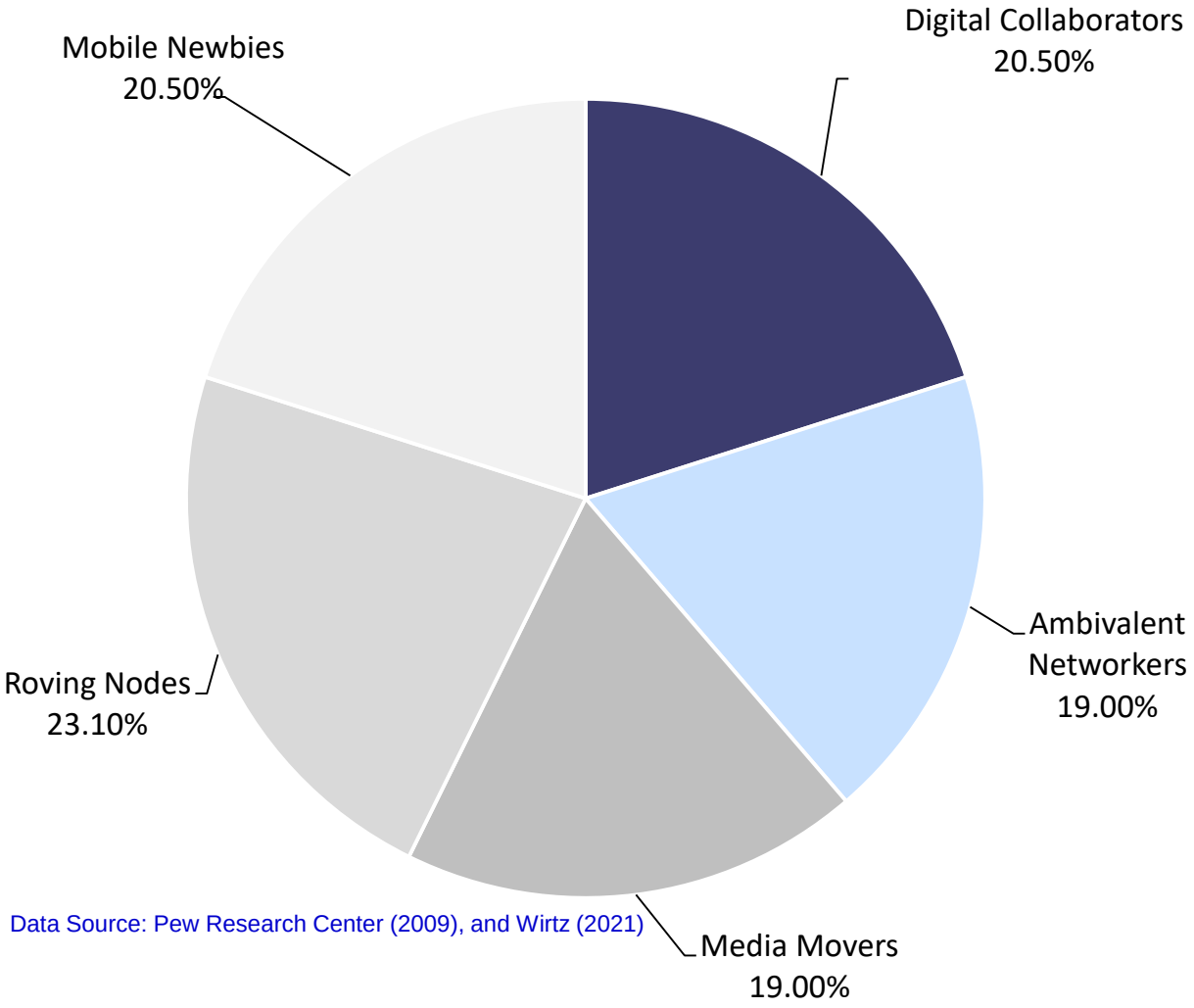
Data Source: comScore, Inc. (2017b), and Wirtz (2021)

Fig. 2.8 Share of time spent according to mobile app category



Data Source: comScore, Inc. (2017b), and Wirtz (2021)

Fig. 2.9 Types of mobile Internet users



Data Source: Pew Research Center (2009), and Wirtz (2021)

Fig. 2.10 Success factors of mobile business

Customization and Mobile Networking	Absence of Media Disruption and Seamless Connection
• 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	• 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
Software Platform and Integration Degree	**Bandwidth**
• Width and depth/customization of app offer/ attractiveness of app service • Interconnected system solutions (e.g., Apple iCloud) • Digital marketplace for software-based extensions	• Stability of connection • Performance of connection (e.g., bit rate) • Area of coverage and range

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

Chapter 2. Questions and topics for discussion

Chapter 2
Questions and topics for discussion

Review questions

1. Define mobile business.
2. Describe integrated mobile applications and illustrate their advantages.
3. Describe the different mobile transition standards and devices.
4. Outline Apple's integrated mobile business strategy.
5. Identify success factors of mobile business.

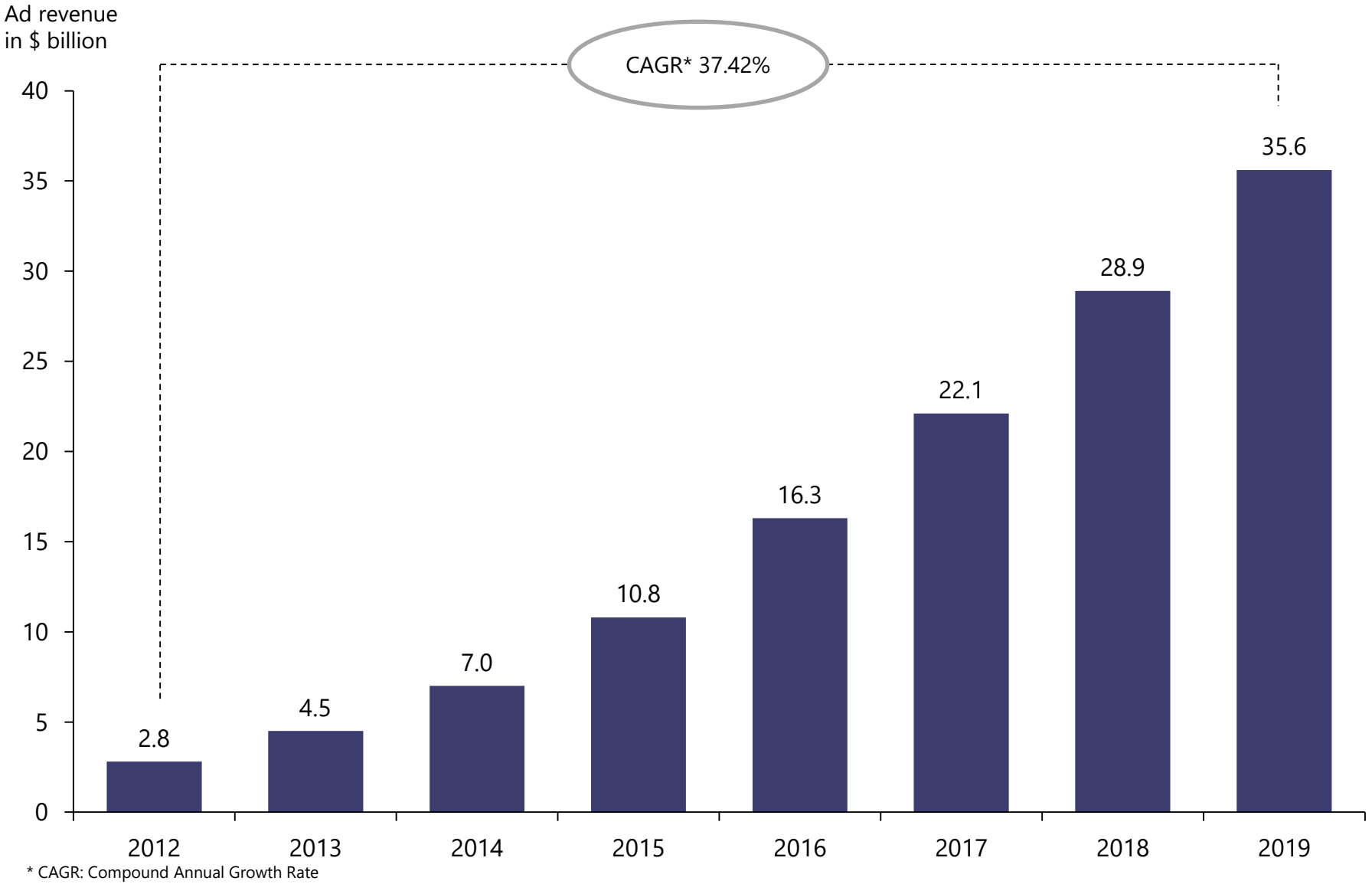
Topics for classroom discussion and team debates

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?

Source: Wirtz (2021)

Chapter 3: Social Media Business

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



* CAGR: Compound Annual Growth Rate

Data Source: IAB/PwC (2020), and Wirtz (2021)

Table 3.1 Most frequently used social media services in the world

Platform	Activity in %
Facebook	17.2
YouTube	13.8
WhatsApp	13.8
FB Messenger	9.0
Weixin / WeChat	8.0
Instagram	6.9
Douyin/TikTok	5.5
QQ	5.0
Qzone	3.6
Sina Weibo	3.6
Reddit	3.0
Kuaishou	2.8
Snapchat	2.7
Twitter	2.7
Pinterest	2.5

Data Source: We are Social (2020), and Wirtz (2021)

Fig. 3.2 Web 2.0 vs. social media

	Web 2.0	Social Media
Characteristics	• 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	• Group of Internet applications based on Web 2.0 • Allows creating and exchanging user-generated content
Examples	• Adobe Flash • RSS (Really Simple Syndication) • AJAX (Asynchronous Java Script)	• Social networking (e.g., Facebook) • Video sharing platforms (e.g., YouTube) • Wikis (e.g., Wikipedia)

Source: Wirtz (2020b, 2021)

Definition social media

Definition of Social Media (Wirtz and Ullrich 2008; Wirtz 2016b,2020b)

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)

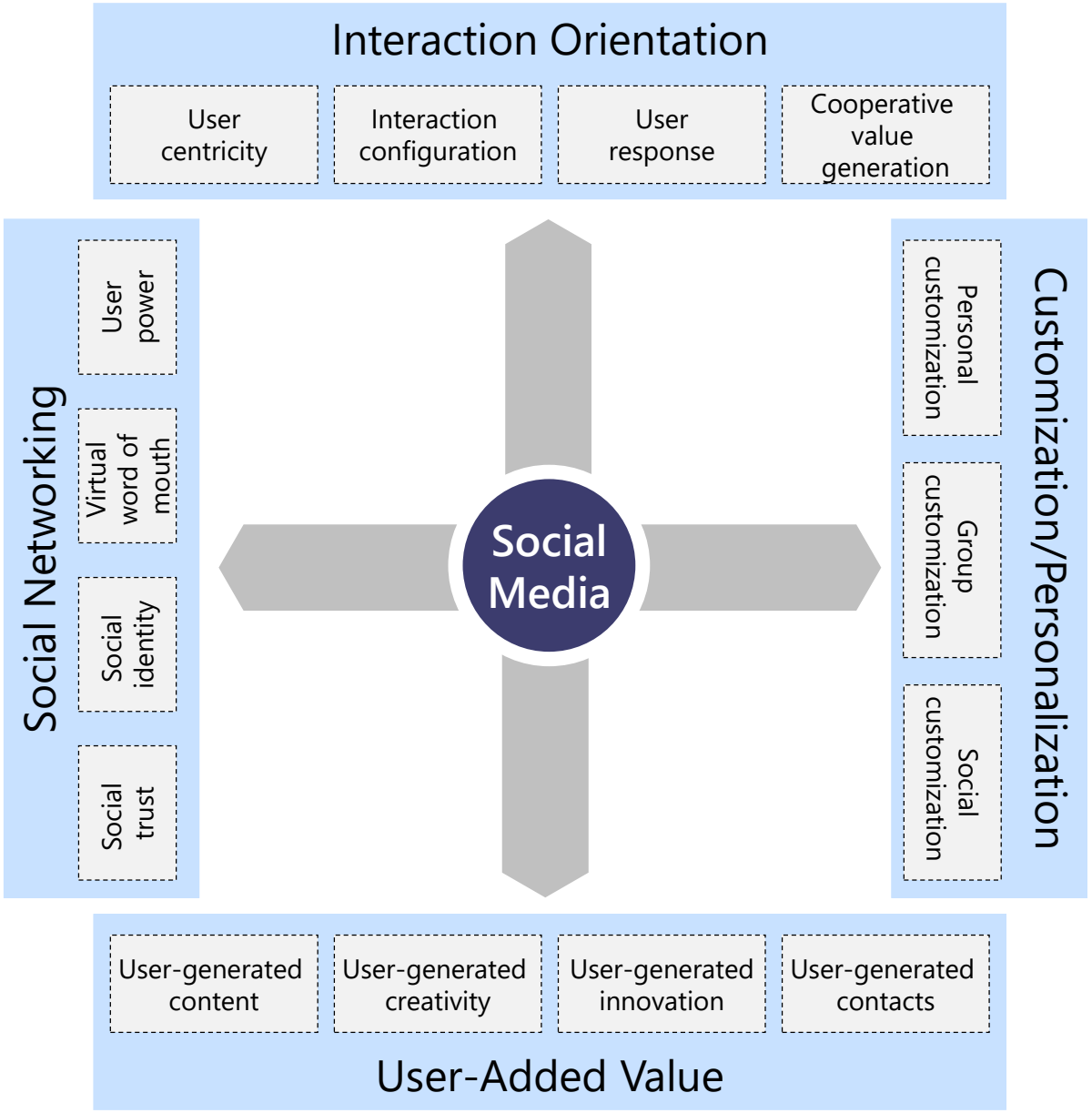
Definition social media business

Definition of Social Media Business (Wirtz 2013a, 2018b)

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)

Fig. 3.3 Social Media Four-Factor Model



Source: Wirtz (2020b, 2021)

Table 3.2 Overview of social media applications I

Application	Business Model	Service Offer	User Value
Social Networking e.g.: facebook.com	- Compilation and provision of user generated content on a single platform - Revenues through ad sales/data mining	- Self-presentation of the user - Networking among users - Connection between users and content	- Mediation of social contacts through digital interaction - High suitability for use in the mobile context (mobile networking)
Bogs & RSS Feeds e.g. blogger.com	- Systematization and compilation of online diaries - Revenues through ad sales/usage or subscription fees/data mining	- Provision of an authoring tool for the creation of blogs - Hosting of blogs - Categorization of blogs	- Unfiltered personal publishing for "everyone" - Visual presentation of content
Microblogs, e.g. twitter.com	- Compilation and provision of user generated content on a single platform - Revenues through ad sales/data mining	- Special type of blogging to quickly publish short messages	- Fast and convenient opportunity to publish - High suitability for use in the mobile context
File Exchange & Sharing, e.g. youtube.com	- Archiving and systematization of user-generated content (e.g., videos) - Revenues through ad sales/data mining	- Provision of online storage - Systematization of content, e.g., through categorization and ratings	- Broadcasting for "everyone" - Access to a large number of users / audiences

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

Table 3.2 Overview of social media applications II

Application	Business Model	Service Offer	User Value
Rating Portals e.g., yelp.com	- Aggregation and systematization of product- and service-related information - Revenues from agency commissions and through ad sales/data mining	- Aggregation of product and service information - User-generated reviews of products and services - Price comparisons with links to online stores	- Independent product/service reviews from users - Simplifying and supporting decision-making and the buying process
Instant Messengers e.g., whatsapp.com	- Exchange of text, audio, and video messages and content - Revenues through subscription fees, cooperation with companies, and data mining	- Instant exchange of push messages - Support of data, audio and video streams	- Fast and convenient exchange of messages - High suitability for use in the mobile context
Podcasts e.g., podcasts.com	- Provision of audio or video content - Revenues through pay-per-use, subscription, and ad sales	- Topic-specific audio and video content - Possibility of subscription	- Location and time-independent use of content
Wikis e.g., wikipedia.com	- Collection, systematization, and further development of information - Revenues from donations	- Tools for creating and editing content by users - Provision of a platform for searching and presenting information/ knowledge	- Aggregation of subject-specific information - Freedom concerning content/authors - Users as a collective editorial

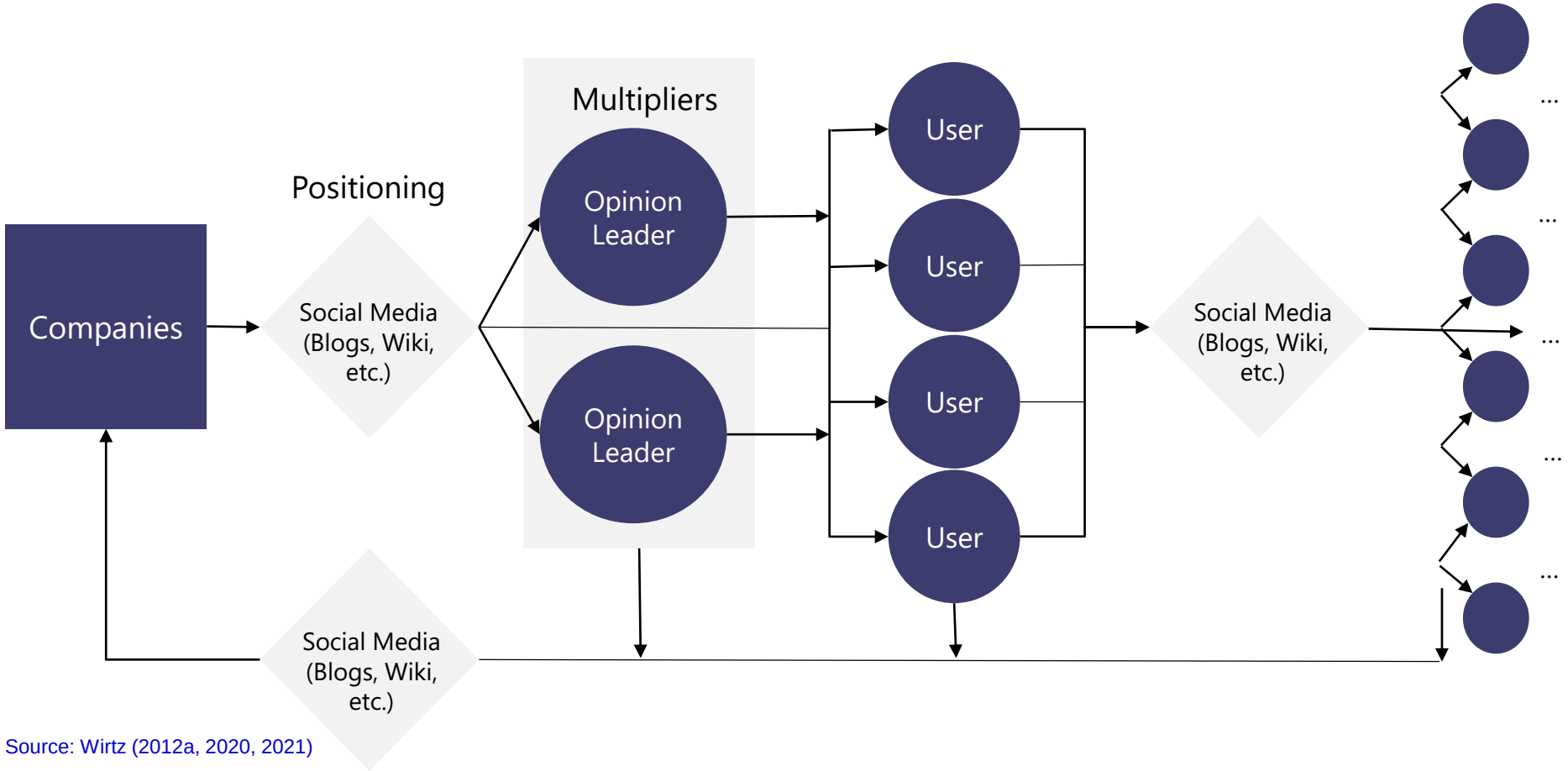
Source: Wirtz (2011b, 2020b, 2021)

Table 3.2 Overview of social media applications III

Application	Business Model	Service Offer	User Value
Tagging/Social Bookmarking e.g., delicious.com	- Classification and systematization of Internet offers - Revenues, e.g., from the sale of click streams for data mining purposes	- Central archiving and ubiquitous availability of bookmarks - Tagging of bookmarks - Access to link collections of other users	- Individual editorial workup of the Internet
Online Forums e.g., topix.com	- Compilation, classification, and provision of user-generated content on a single platform - Revenues through ad sales/data mining	- Exchange and archiving of thoughts, opinions, and experiences	- Increase in knowledge - Problem-solving through community - Structured documentation of topics and opinions
Mashups e.g., parkingcarma.com	- Combination of multiple online software products/API services - Revenues through ad sales and/or membership fees	- Creation of new media content by recombining already existing content	- Exploitation of synergies between different social media applications - Time savings

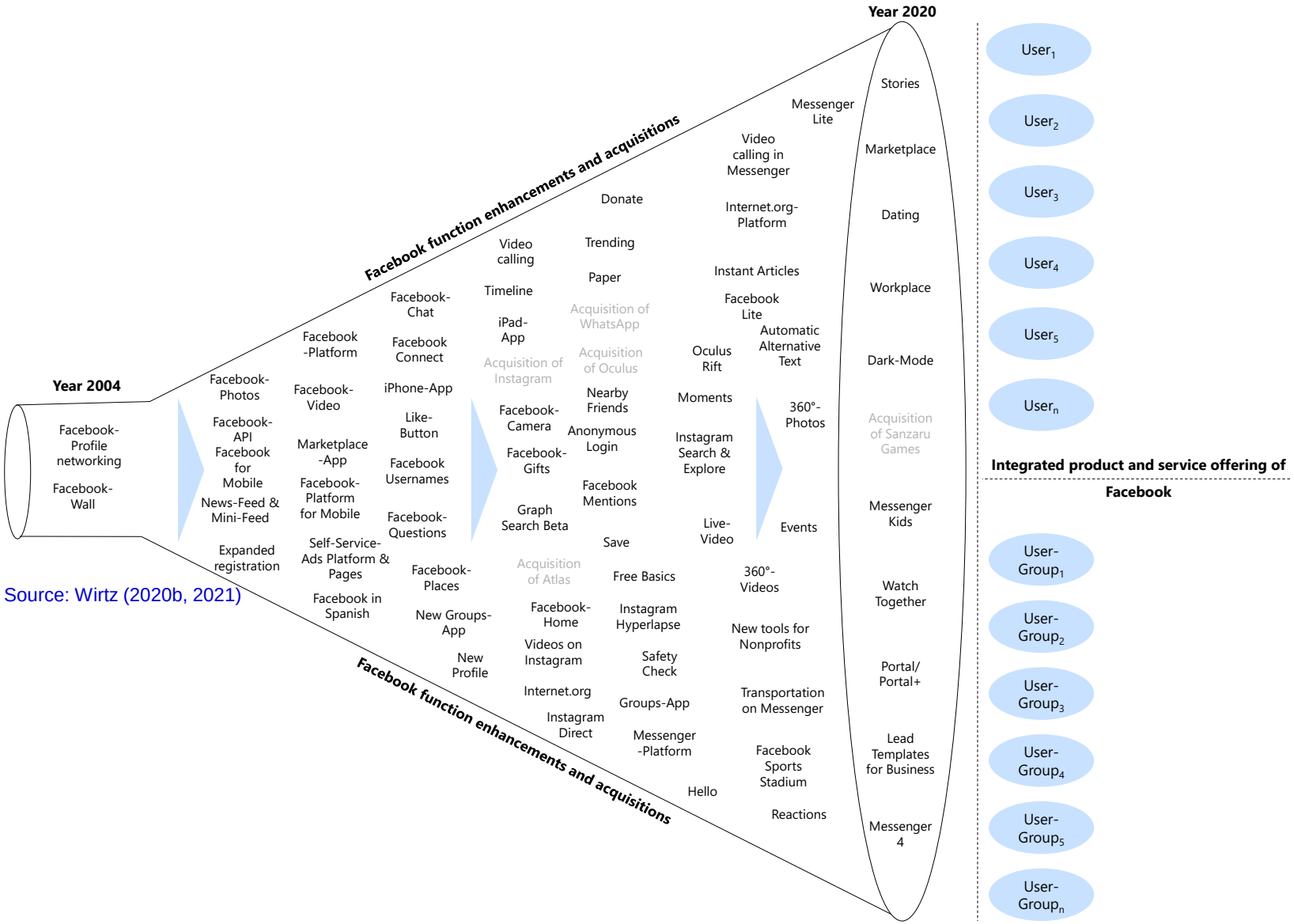
Source: Wirtz (2011b, 2020b, 2021)

Fig. 3.4 Multiplier effect of social media



Source: Wirtz (2012a, 2020, 2021)

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



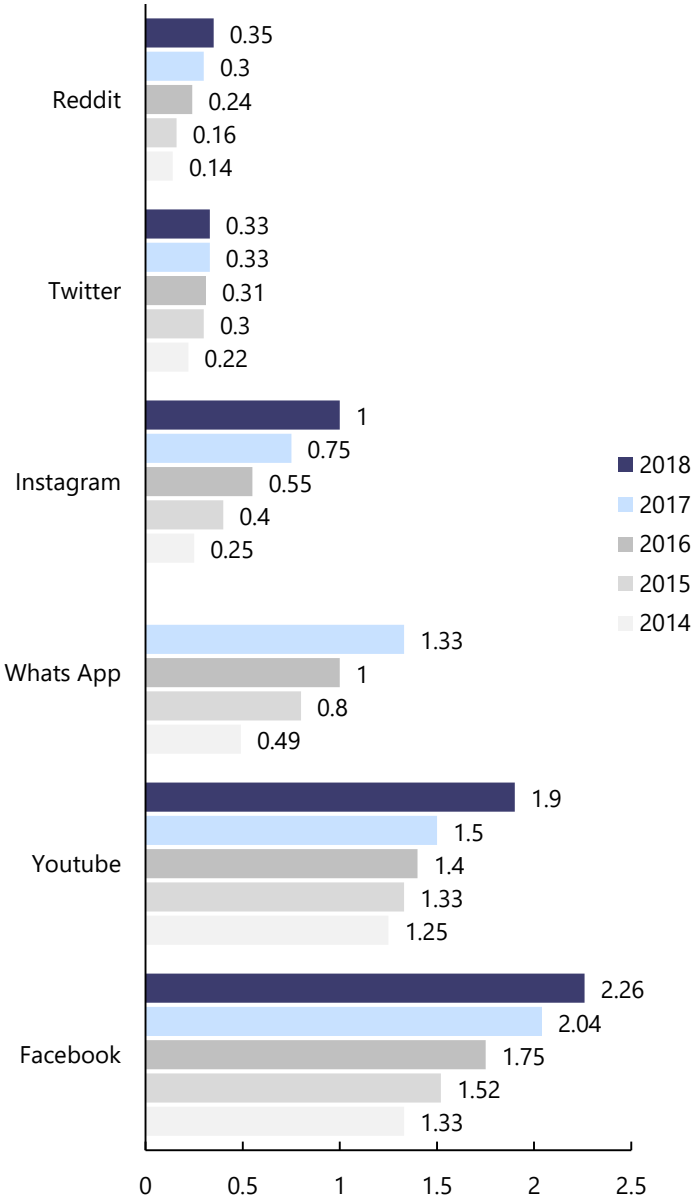
Source: Wirtz (2020b, 2021)

Table 3.3 Social media users and their activities

User groups with different involvement	Social media activities
Inactive users	• No interest in a social media presence • No sign of any activity on social media applications
Spectators	• Consume content on different social media platforms such as product review sites, blogs, streaming platforms • No contribution of own content
Newcomers	• Regular maintenance of the profiles on social media platforms • Open to other social networking sites
Collectors	• Use of RSS feeds • Use of bookmarking services
Critics	• Active participation in product rating portals • Modification of articles on wikis • Commenting on blog posts
Creatives	• Release own publications on blogs and other sites • Customize design of own websites • Upload of videos, music, or other media contents • Publication of own articles

Source: Wirtz (2021)

Fig. 3.6 Development of monthly social media users in billions



Data Source: OurWorldInData (2019), and Wirtz (2021)

Table 3.4 Company's social media use worldwide

	NA (Northern America)	EMEA (Europe/Middle East/Africa)	APAC (Asia Pacific)	Germany
Facebook	96%	93%	97%	93%
Twitter	87%	86%	64%	75%
Instagram	77%	69%	75%	73%
LinkedIn	65%	65%	62%	51%
YouTube	62%	62%	57%	67%
Google+	31%	36%	26%	37%
Messenger (Facebook)	31%	26%	36%	20%
Pinterest	30%	21%	16%	22%
WhatsApp	5%	27%	15%	21%
Snapchat	12%	3%	8%	4%
Wechat	2%	2%	9%	1%
Xing	0%	4%	0%	4%

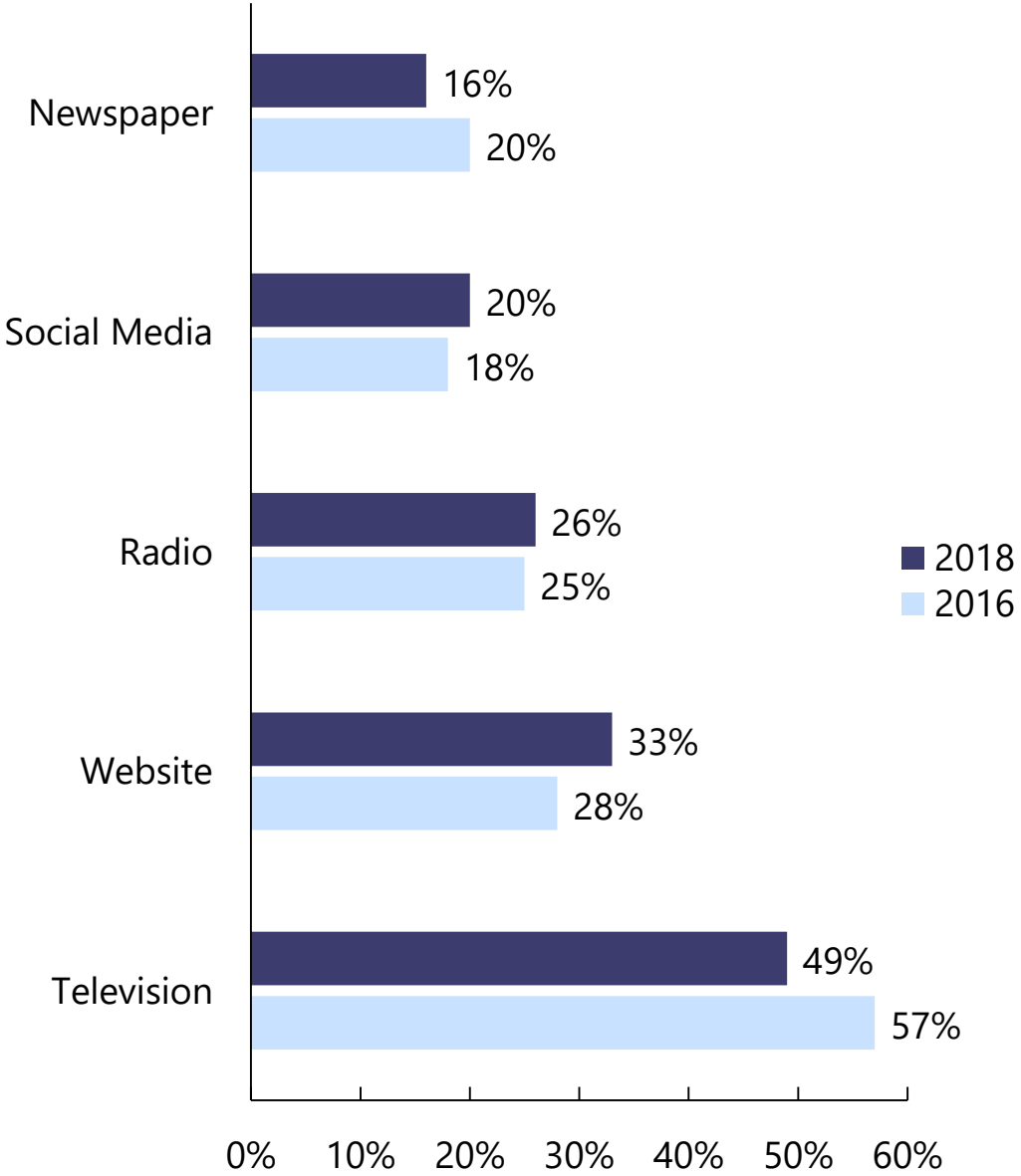
Data Source: Hootsuite (2018), and Wirtz (2021)

Table 3.5 US Facebook user profile

Age	Male	Female
13-17	1.1%	1.3%
18-24	7.0%	7.5%
25-34	13.6%	13.6%
35-44	8.8%	10.1%
45-54	6.6%	7.9%
55-64	4.8%	7.0%
65+	4.1%	6.6%

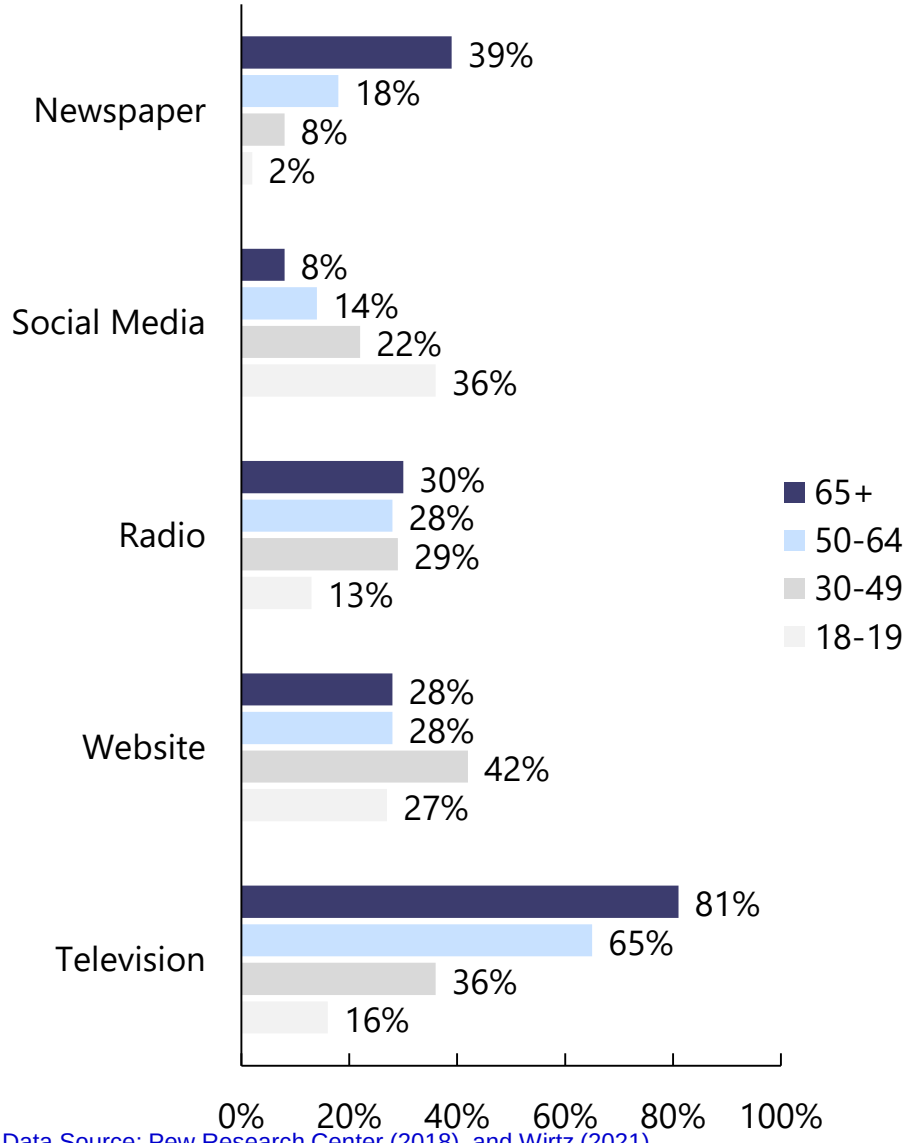
Data Source: NapoleonCat (2020), and Wirtz (2021)

Fig. 3.7 Regularly used new sources in the United States



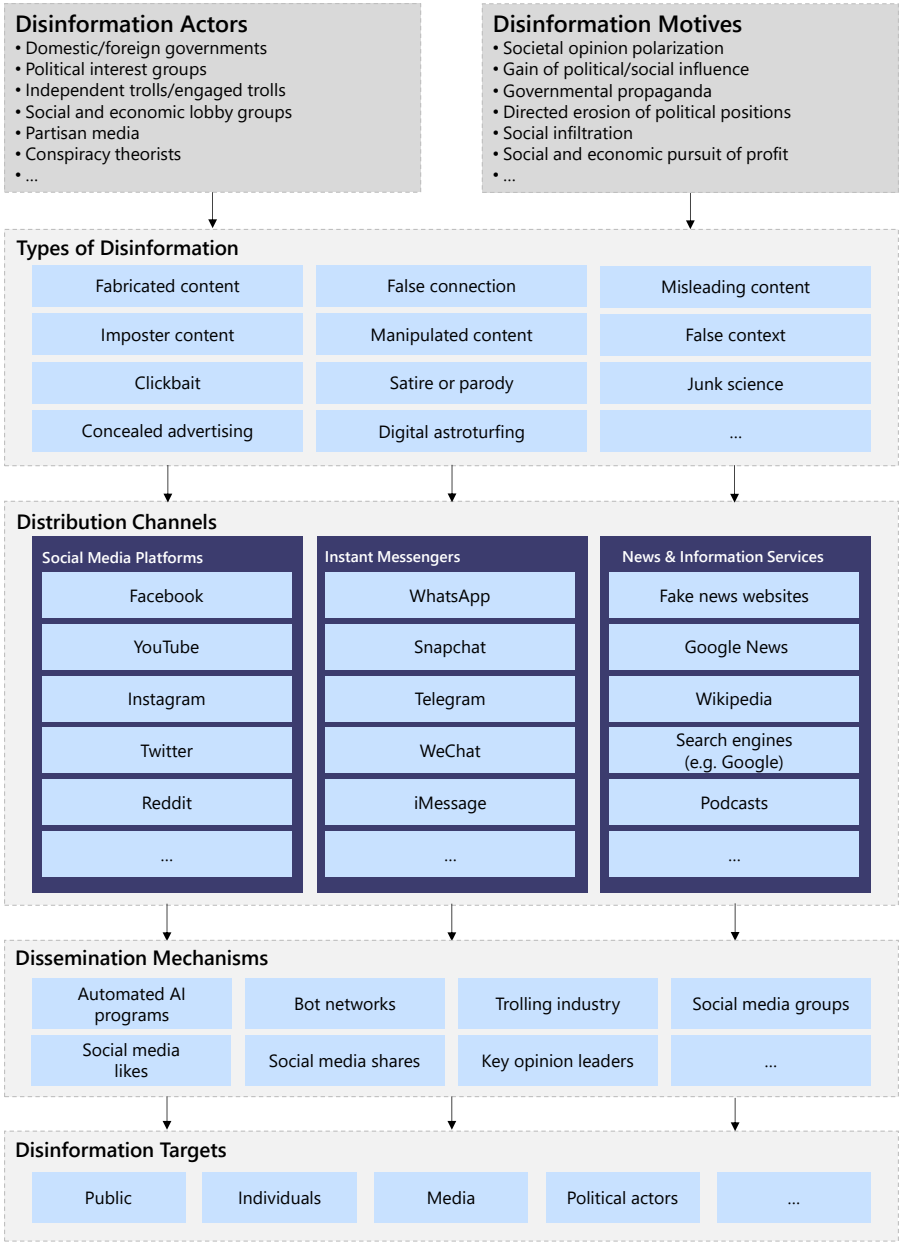
Data Source: Pew Research Center (2018), and Wirtz (2021)

Fig. 3.8 Most often used new sources by age in the United States



Data Source: Pew Research Center (2018), and Wirtz (2021)

Fig. 3.9 Integrated model of digital disinformation



Source: Wirtz (2020b, 2021)

Table 3.6 Governance of digital disinformation

	Social Measures	Organizational & Technological Measures	Public & Legal Measures
Disinformation Actors and Motives	• Monitoring Disinformation	• (Crowd-based) source ratings	• State sanctions
Disinformation Types	• Independent fact-checking organizations and websites	• Human-curated algorithmic fact-checking • (Crowd-based) reporting tools • Inverse image search	• Gatekeeping • Certifications • Indexing
Distribution Channels	Self-regulation: • Standards and Guidelines • Voluntary self-regulation authorities	• Internal standards and guidelines • Digital Disinformation Officer (DDO) • Rethinking business models • Revised technological infrastructure	• Fact-checking requirements • Requirement of verified standards and guidelines
Dissemination Mechanisms	Education: • Source criticism • Media literacy • Media effects	• Social media alerts	• Ban of trolling industry and dissemination bots • Ban of purchased social media interaction
Disinformation Targets	Communication: • Agenda-setting • Corrections • Framing	• Clearing • Fact-checking app • Reactive public relation strategies	• Data protection and data security laws

Source: Wirtz (2021)

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 (2020b, 2021)

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 Factors Model.
3. Explain the applications of social media with their respective service offerings and customer benefits.
4. Describe the Digital Disinformation Model.
5. Present the different governance mechanisms for the integrated Digital Disinformation Model.

Topics for classroom discussion and team debates

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?

Source: Wirtz (2021)

Chapter 4: Open Government and E-Participation

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."

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

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."
Yavwa 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 (2017), and Wirtz (2021)

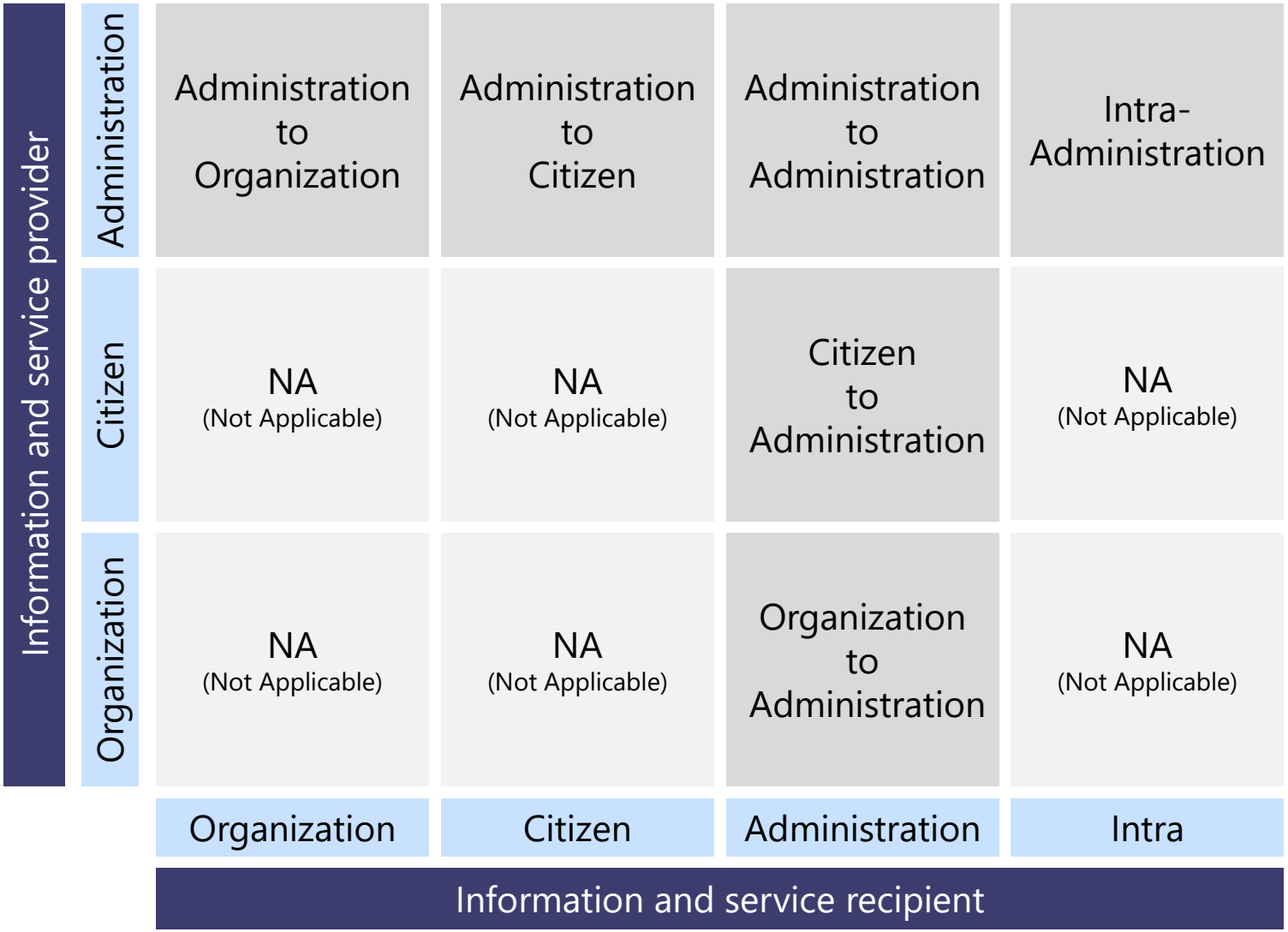
Definition of Digital Government

Definition of Digital Government (Wirtz and Piehler 2010)

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.

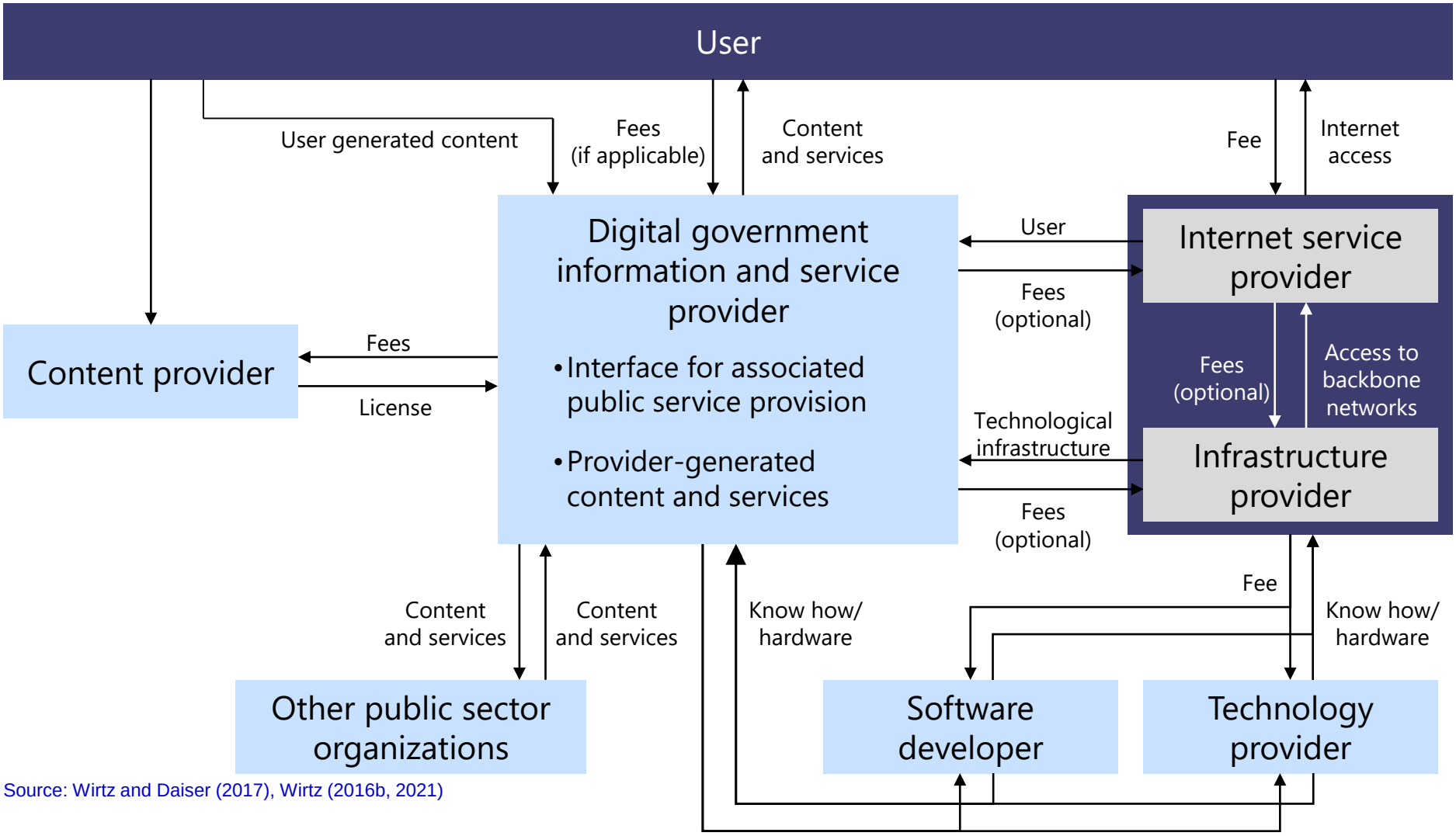
Source: Wirtz and Piehler (2010), and Wirtz (2021)

Fig. 4.1 Digital government interaction matrix



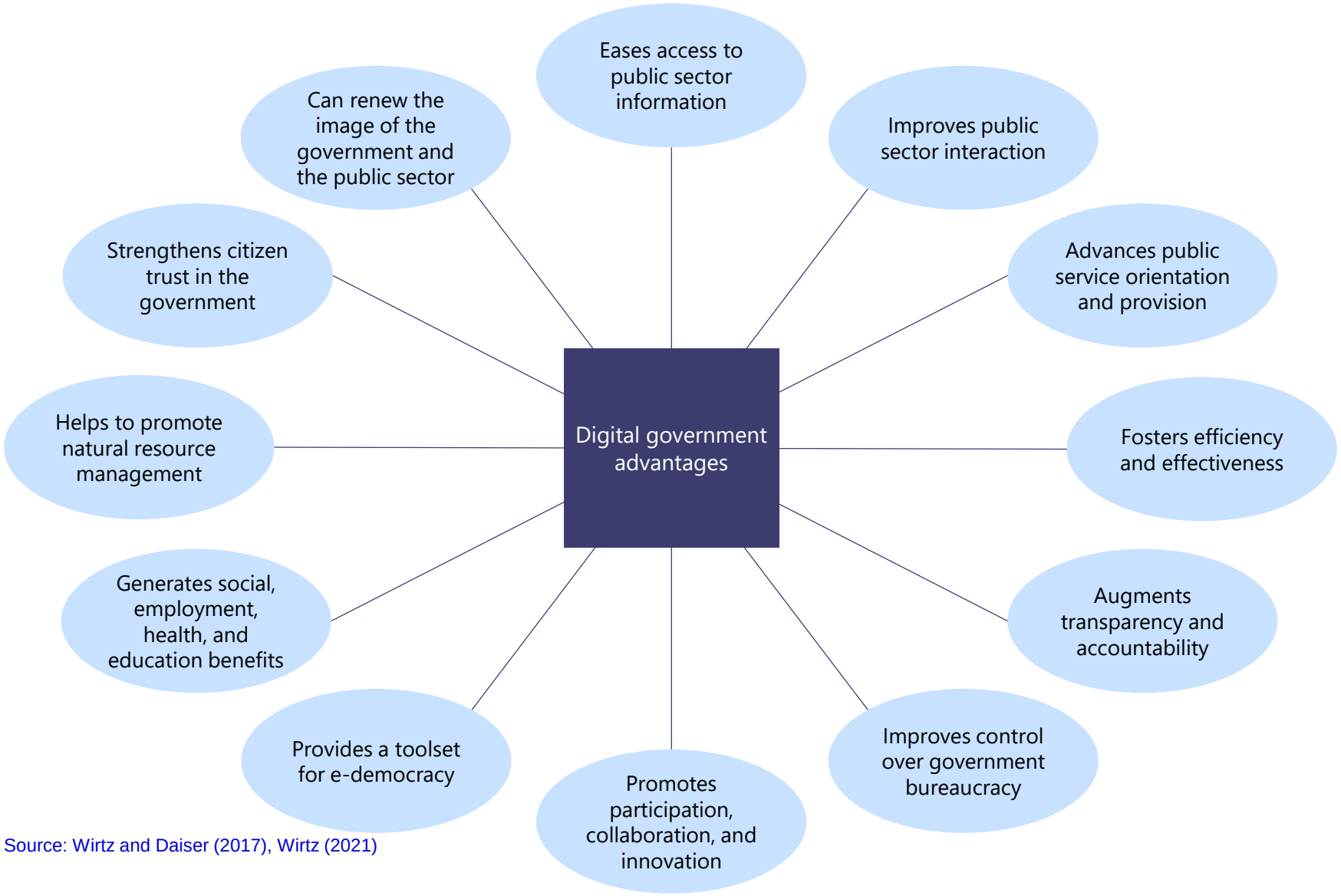
Source: Wirtz and Daiser (2017), Wirtz (2016b, 2021)

Fig. 4.2 Schematic digital government actors and interactions structure



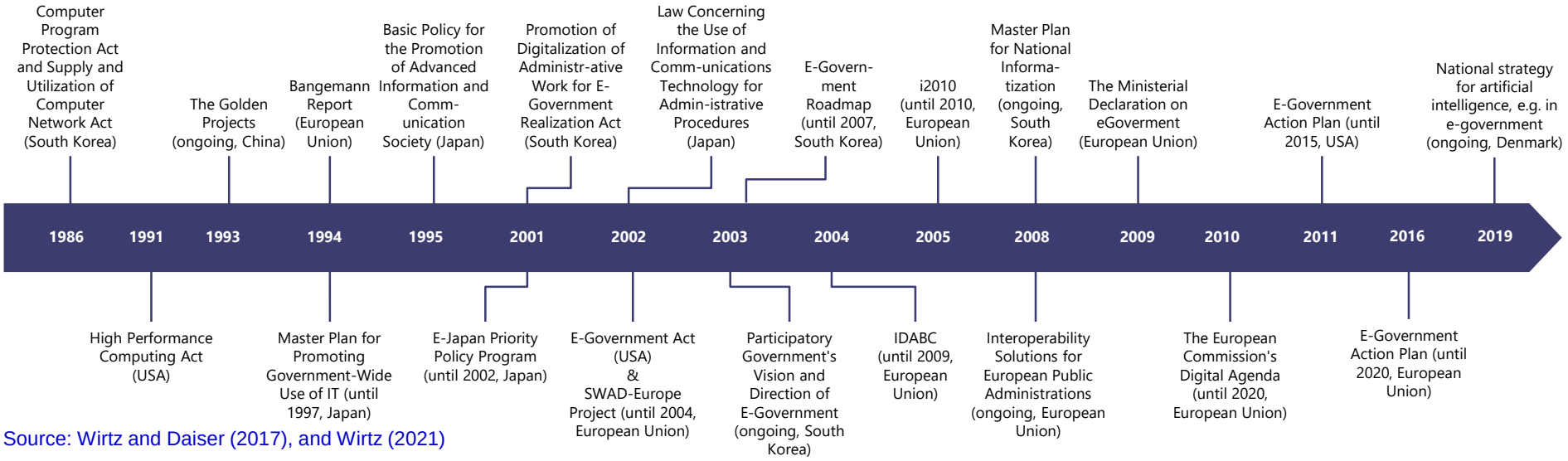
Source: Wirtz and Daiser (2017), Wirtz (2016b, 2021)

Fig. 4.3 Expected advantages of digital government



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

Fig. 4.4 Overview of selected e-government acts and initiatives (1986-2019)



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

Table 4.2 World e-government leaders in 2020

No.	Country	Region	EGDI 2018	Rank 2020	Rank 2018
1	Denmark	Europe	0.9758	1	1
2	Republic of Korea	Asia	0.9560	2	3
3	Estonia	Europe	0.9473	3	16
4	Finland	Europe	0.9452	4	6
5	Australia	Oceania	0.9432	5	2
6	Sweden	Europe	0.9365	6	5
7	United Kingdom	Europe	0.9358	7	4
8	New Zealand	Oceania	0.9339	8	8
9	United States	Americas	0.9297	9	11
10	Netherlands	Europe	0.9228	10	13
11	Singapore	Asia	0.9150	11	7
12	Iceland	Europe	0.9101	12	19
13	Norway	Europe	0.9064	13	14
14	Japan	Aisa	0.8989	14	10

Data Source: United Nations Department of Economic and Social Affairs (2020), and Wirtz (2021)

Definition of Open Government (Wirtz, Daiser and Birkmeyer 2017a)

Definition of Open Government (Wirtz and Birkmeyer 2017a)

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.

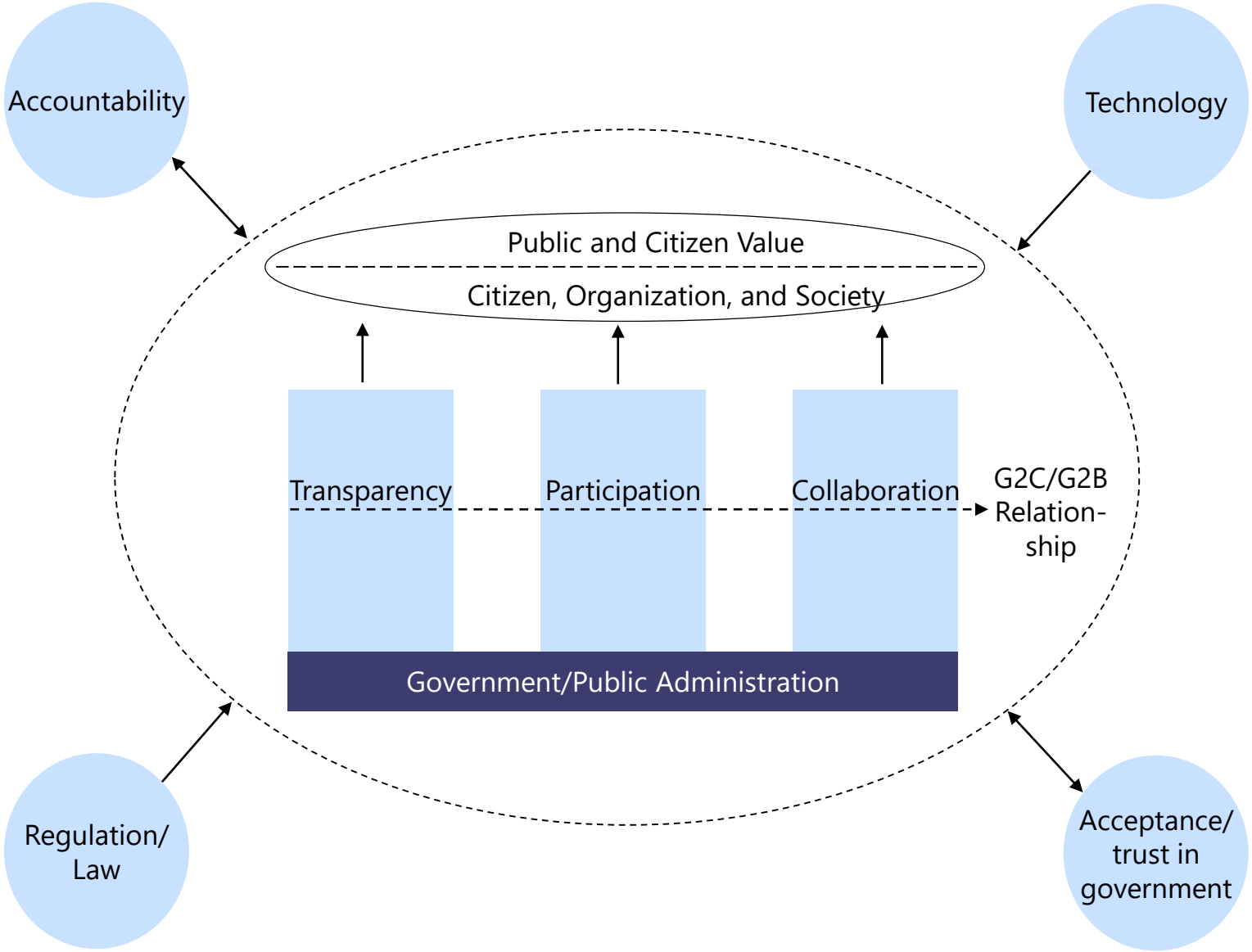
Source: Wirtz (2021)

Table 4.3 Selected definitions of open government

Author(s)	Definition
OECD (2009, p. 113)	"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."
Harrison et al. (2012, p. 84)	"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."
Wirtz and Birkmeyer (2015, p.2)	"Open government is a multilateral, political, and social process, which includes in particular transparent, collaborative, and participatory action by government and administration."

Source: Wirtz (2021)

Fig. 4.5 Open government framework



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

Definition of E-Participation

Definition of E-Participation (Wirtz et al. 2016)

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 policy-making.

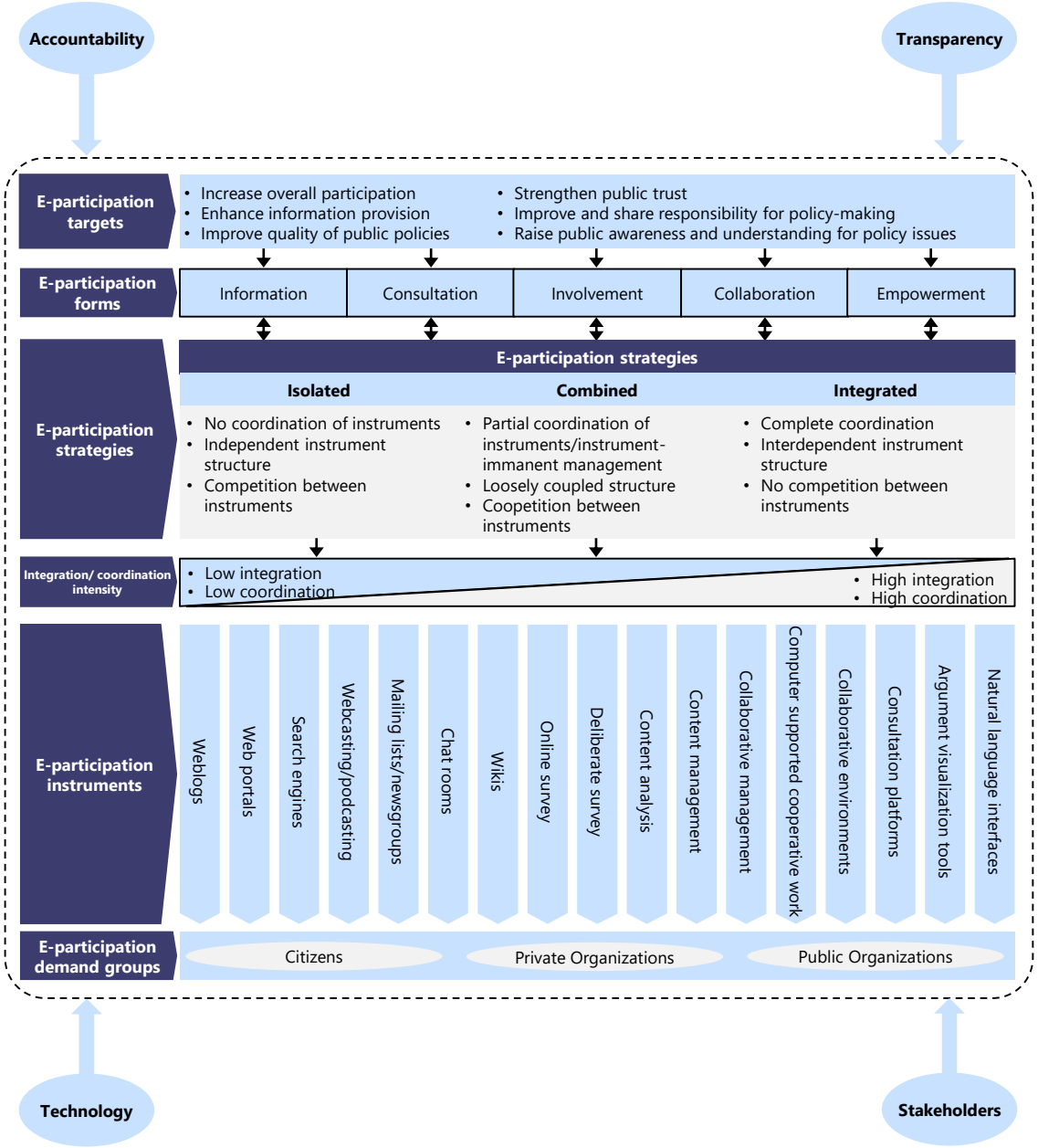
Source: Wirtz (2021)

Table 4.4 Selected definitions of e-participation

Author(s)	Definition
OECD (2003, p.55)	"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, p. 364)	"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, p. 400f.)	"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."

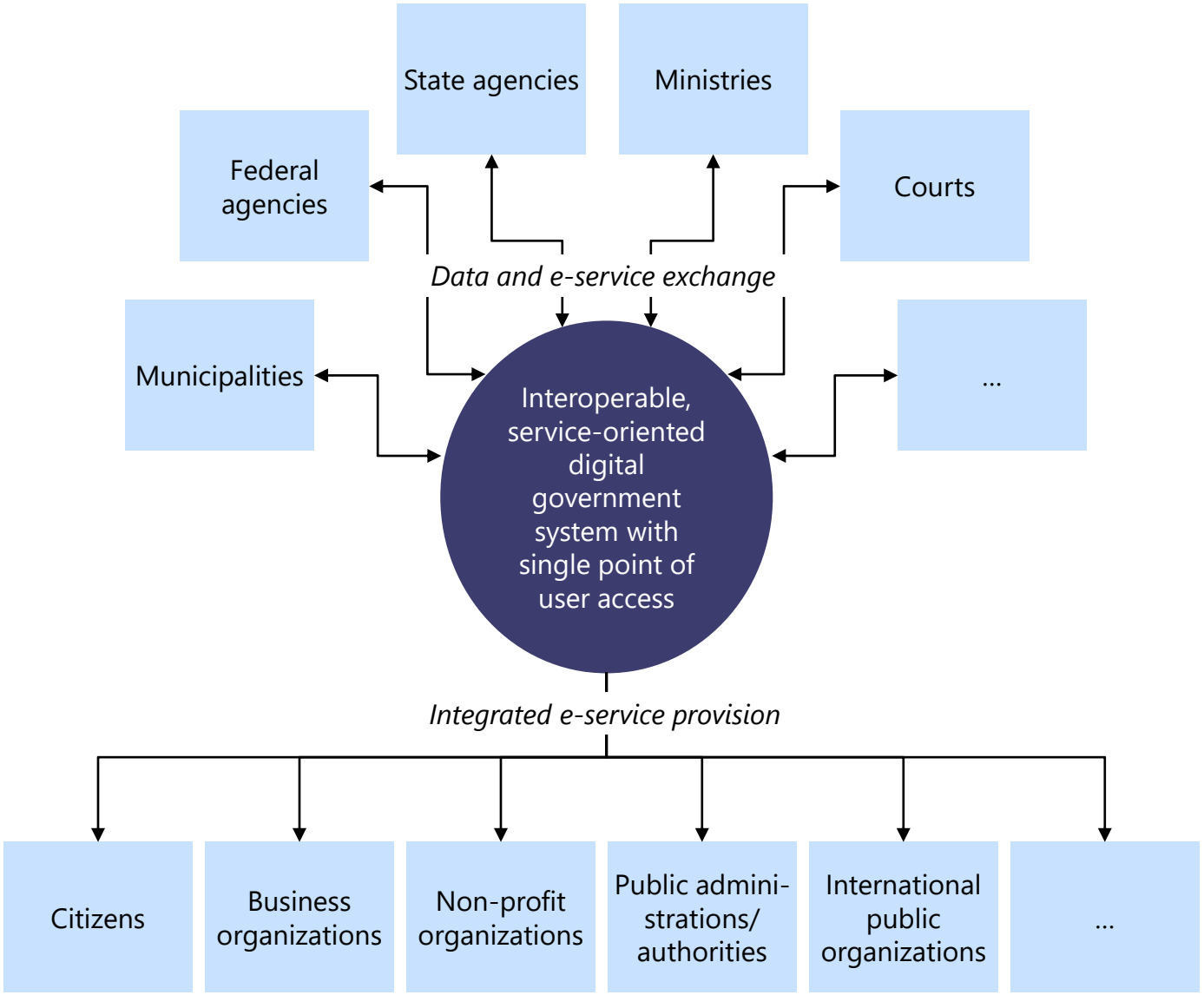
Source: Wirtz (2021)

Fig. 4.6 Integrated strategic e-participation framework



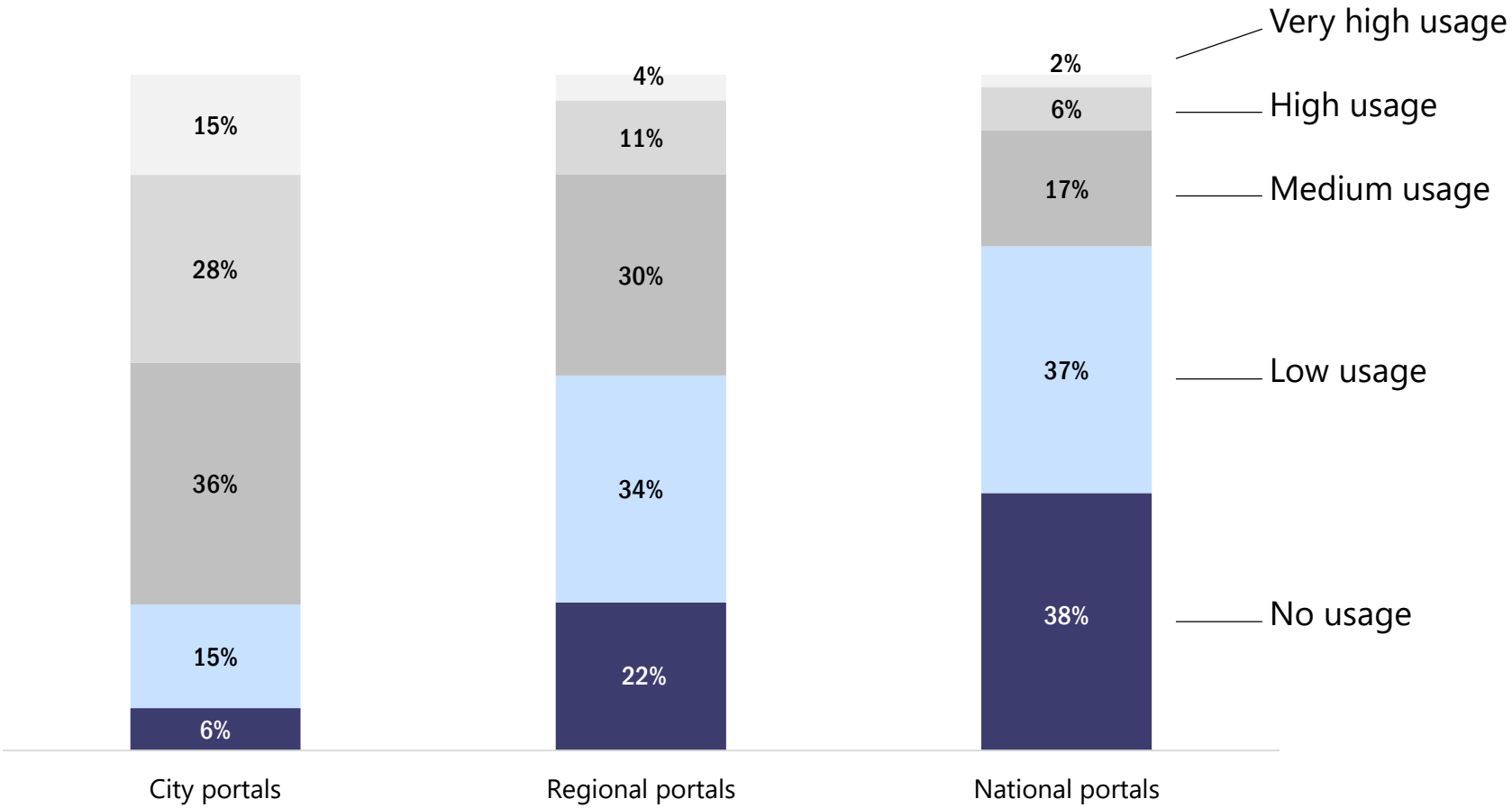
Source: Wirtz and Daiser (2017), and Wirtz (2021)

Fig. 4.7 Schematic digital government portal network



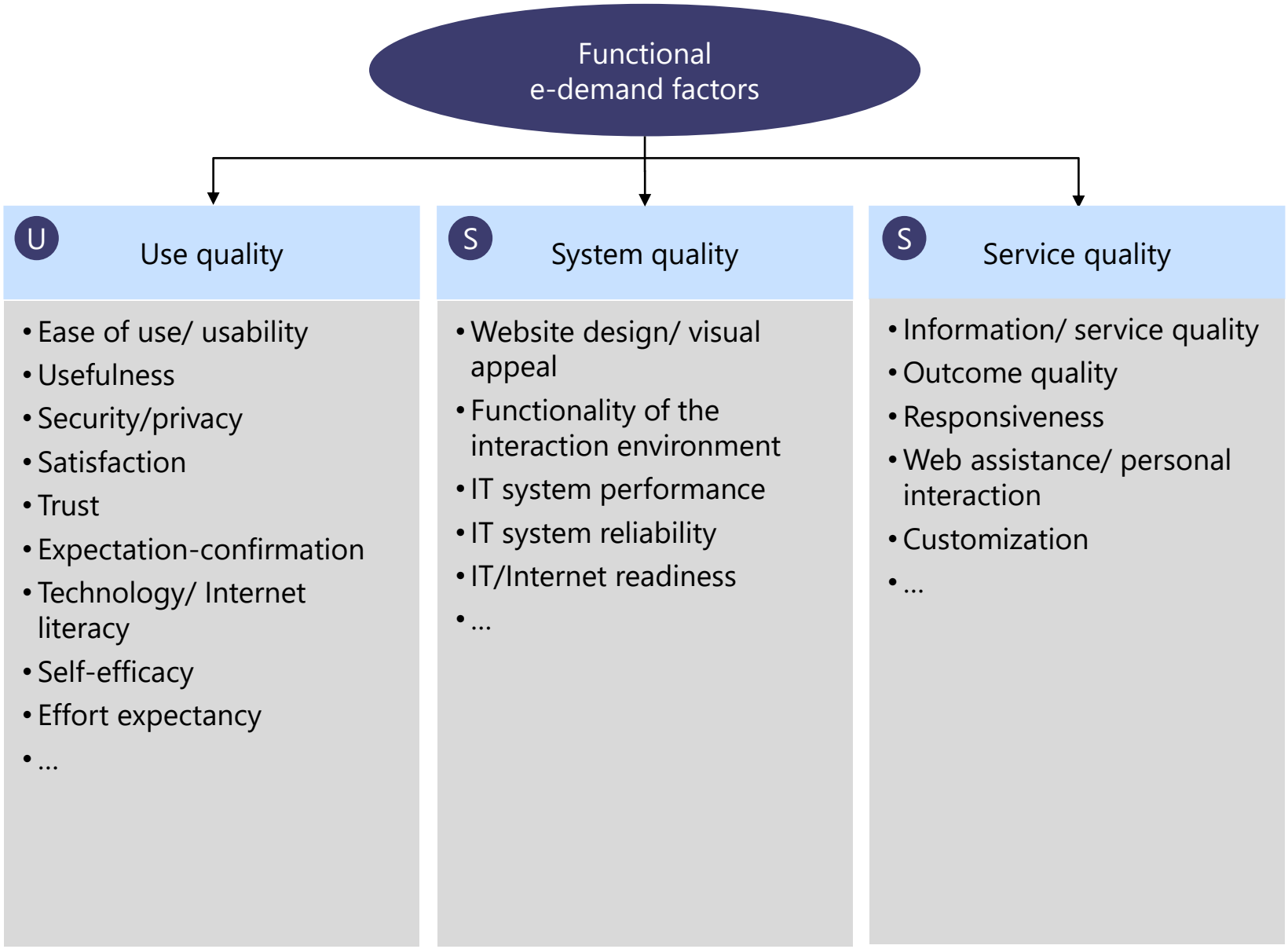
Source: Wirtz and Daiser (2017), and Wirtz (2021)

Fig. 4.8 Digital government portal use (Germany)



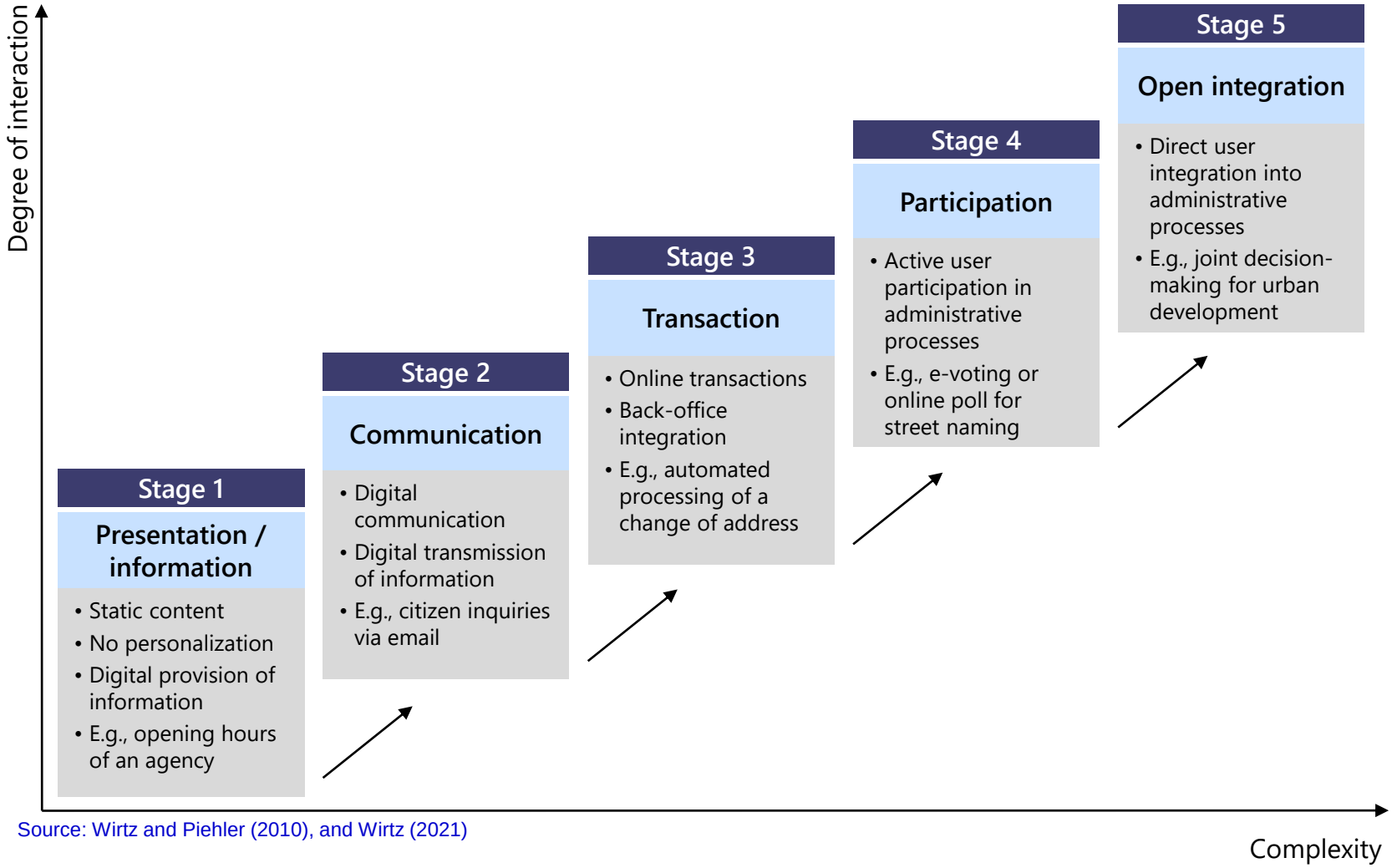
Data Source: Wirtz (2015b, 2021)

Fig. 4.9 USS e-demand factor system



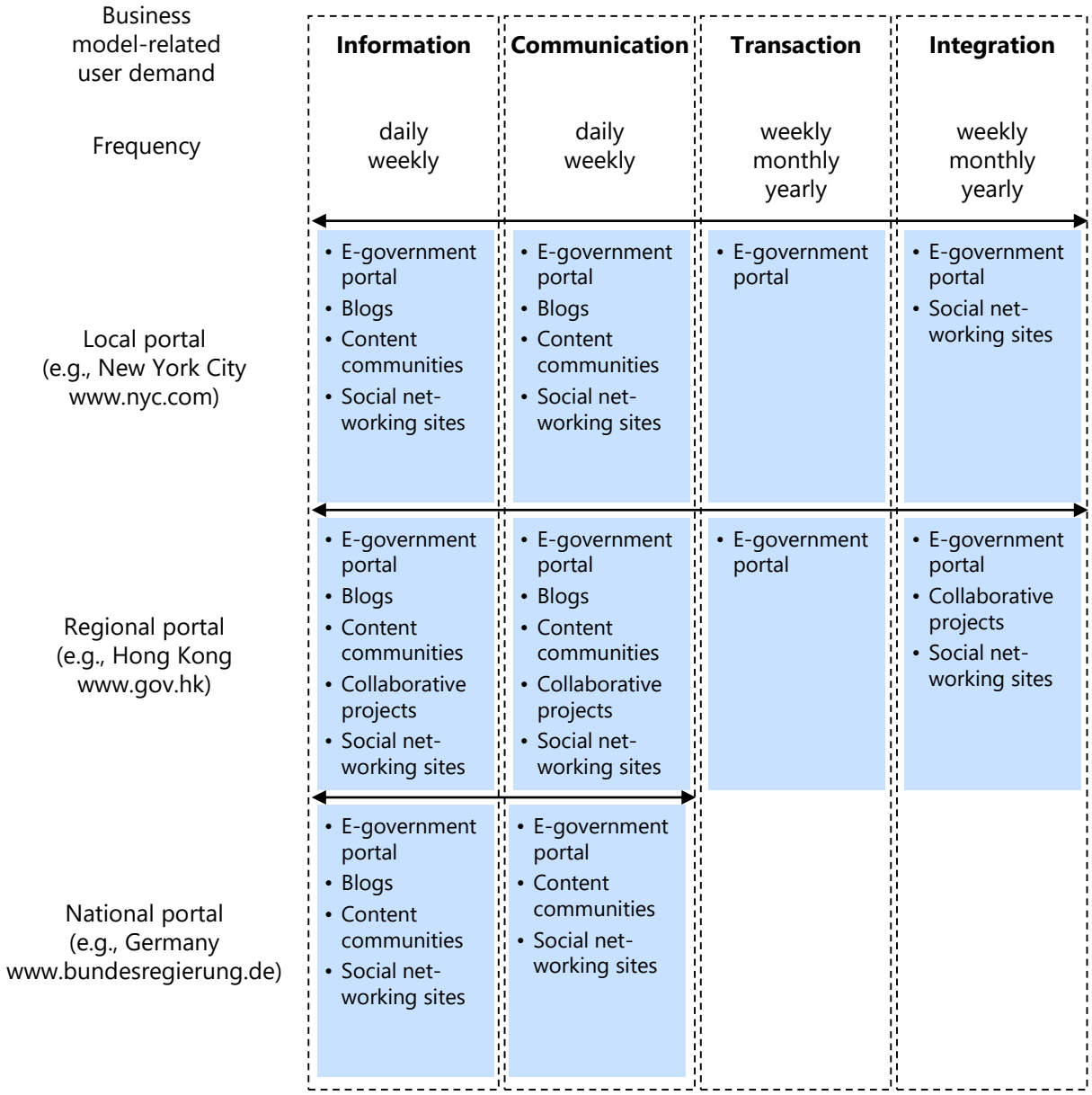
Source: Wirtz and Daiser (2017), and Wirtz (2021)

Fig. 4.10 Digital government development stage model



Source: Wirtz and Piehler (2010), and Wirtz (2021)

Fig. 4.11 Integrated digital government user relationship management



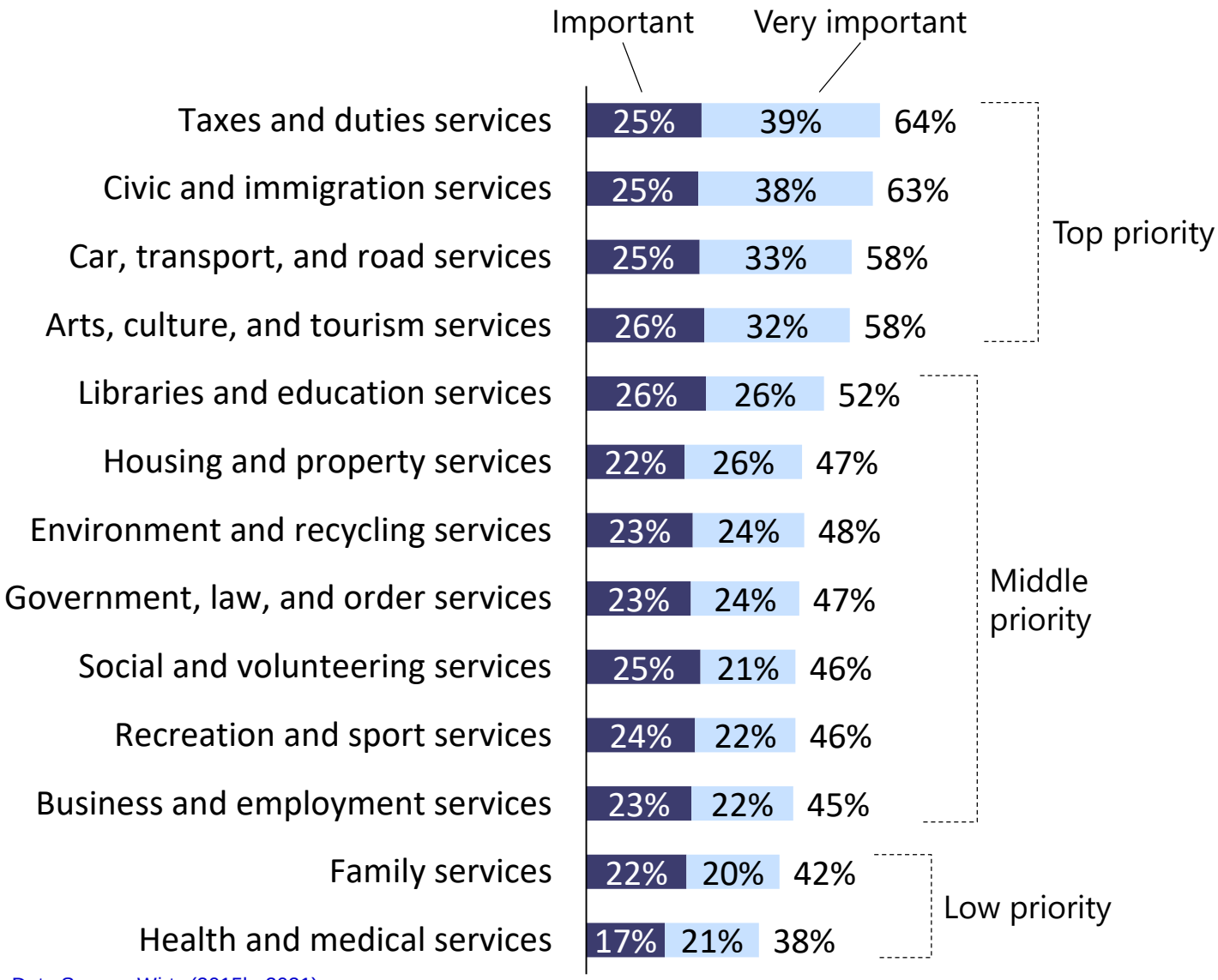
Source: Wirtz (2016b, 2021)

Table 4.5 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

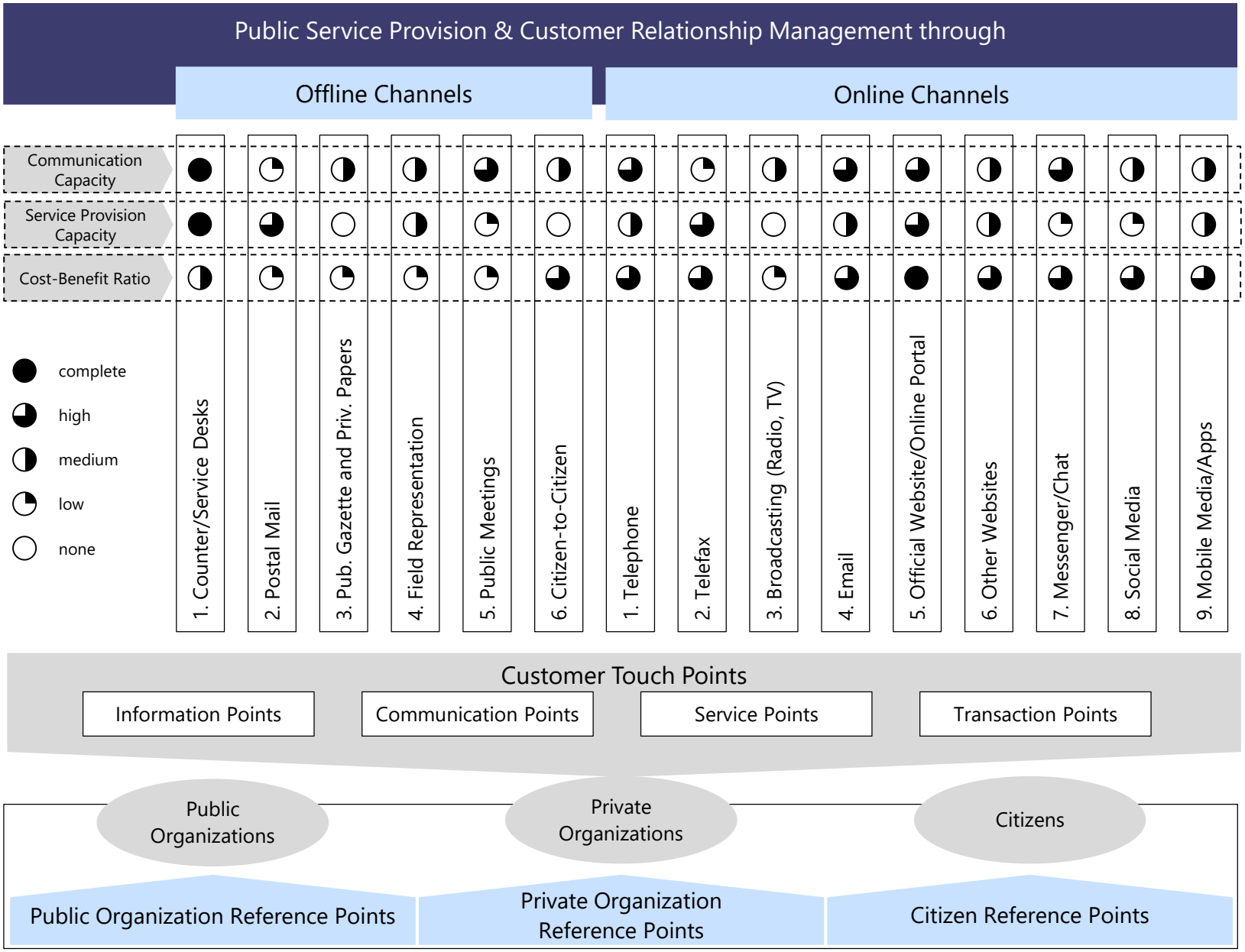
Source: Wirtz (2015b, 2021)

Fig. 4.12 Importance of digital government service preference categories



Data Source: Wirtz (2015b, 2021)

Fig. 4.13 Channel characteristics of public service delivery



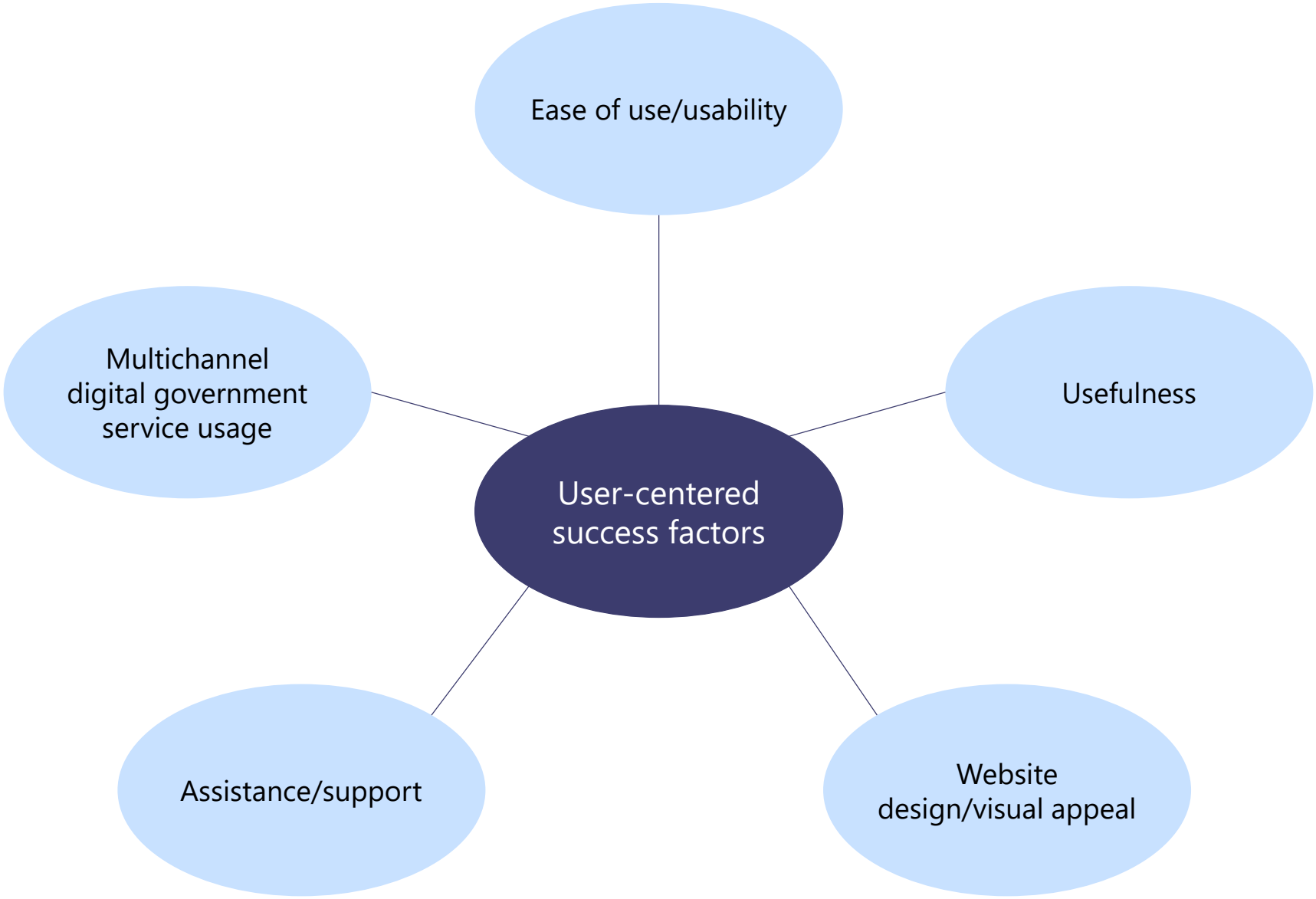
Source: Wirtz and Daiser (2017), and Wirtz (2021)

Fig. 4.14 Public multichannel strategy framework

Aspects \ Approach	Isolated Channel Strategy	Combined Channel Strategy	Integrated Channel Strategy
Coordination	• Uncoordinated channels/ channel-inherent management • Closed channel structure • Channel competition	• Partially coordinated channels/channel-inherent management • Loosely linked channel structure • Channel competition	• Completely coordinated channels/comprehensive channel management • Interdependent channel structure • No competition between channels
Formation	• Lead channel structure • Channel-specific management	• Mostly lead channel Structure • Comprehensive channel management	• Multichannel structure • Centralized overall channel management
Organization	• High individual responsibility • Low coordination • High decentralization		• High interdependence • High coordination • High centralization

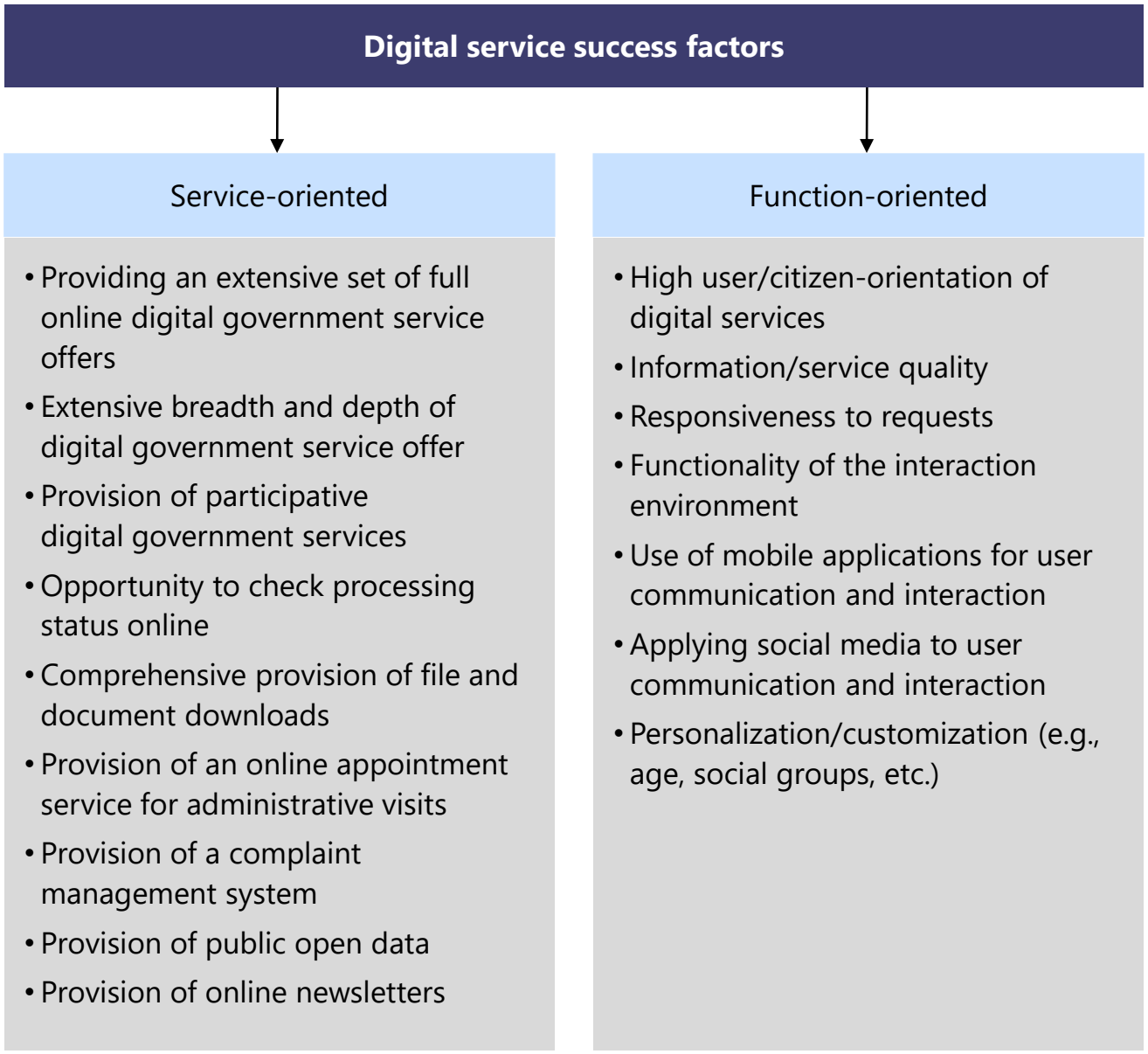
Source: Wirtz and Daiser (2017), and Wirtz (2021)

Fig. 4.15 User-centered success factors



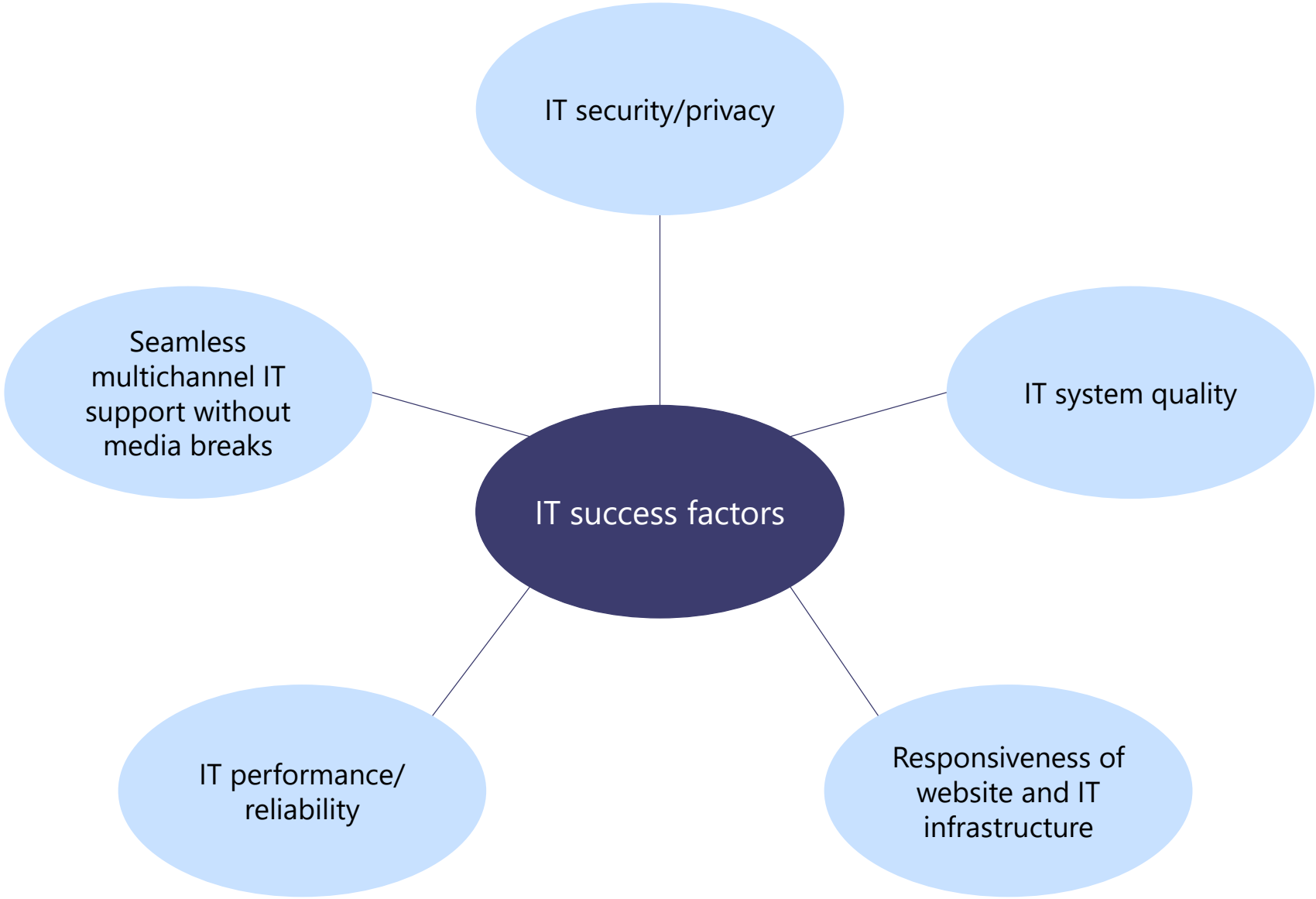
Source: Wirtz and Daiser (2017), and Wirtz (2021)

Fig. 4.16 E-service success factors



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

Fig. 4.17 IT success factors



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

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 benefits of digital government.
3. Define open government and present the open government framework.
4. Describe the stages of the digital government development stage model.
5. Explain the success factors of digital government.

Topics for classroom discussion and team debates

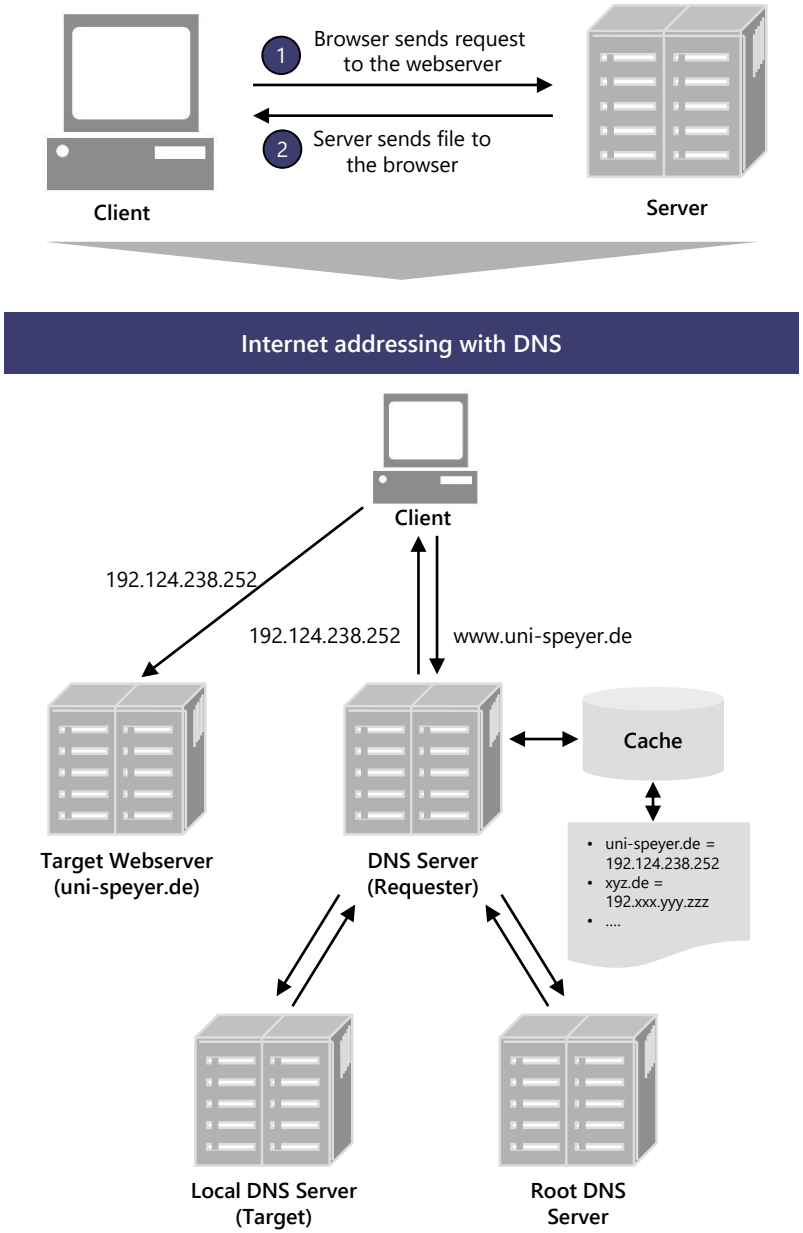
1. In many countries, digital administration lags considerably behind private and business Internet applications. Discuss why the public sector is having greater difficulty in pushing forward with digital governance.
2. Discuss the advantages and disadvantages of digital government, especially with regard to the aspect of a digital surveillance state. Is the transparent citizen sensible and desirable?
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!)

Source: Wirtz (2021)

Part II – Technology, Digital Markets and Digital Business Models

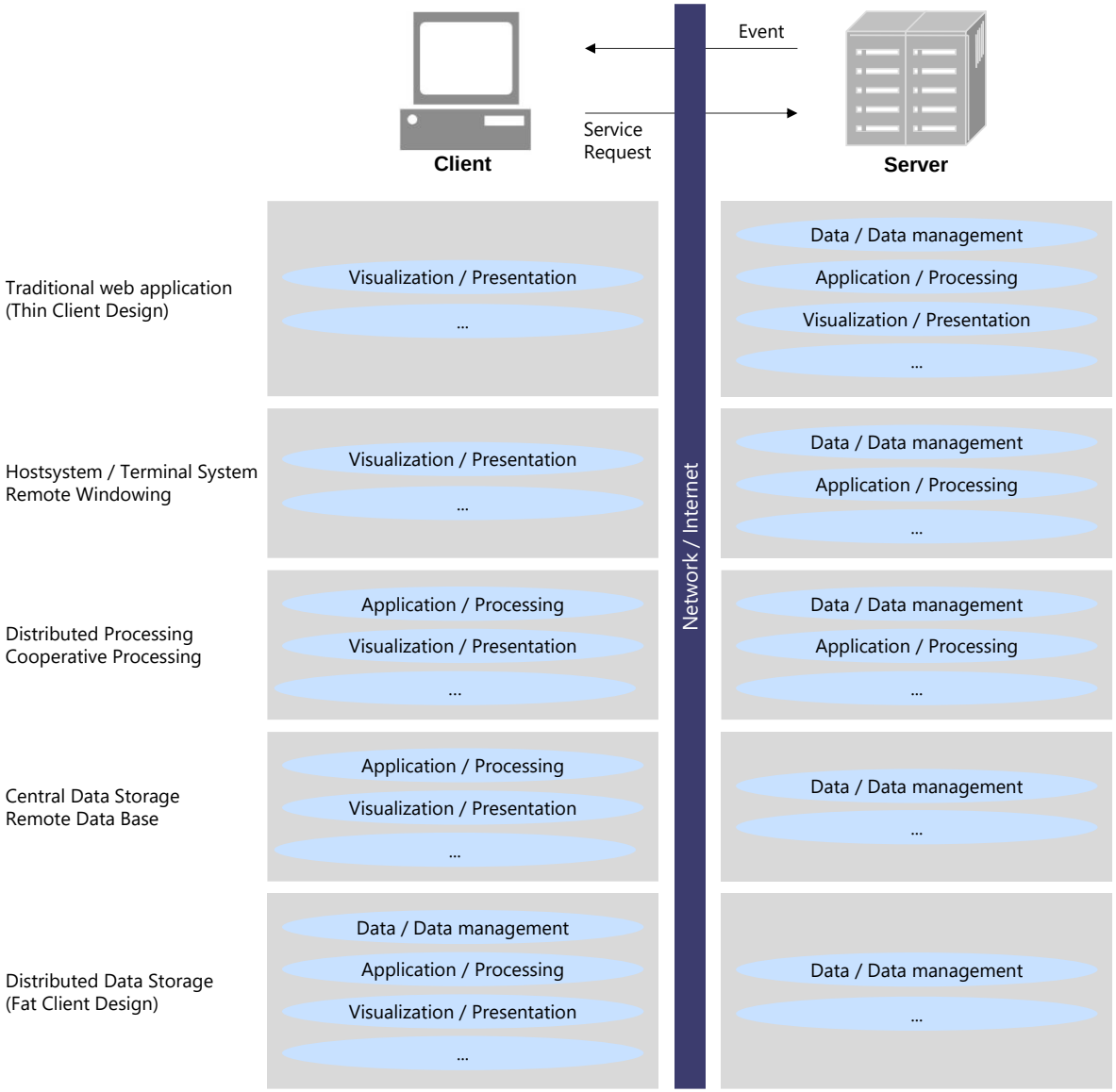
Chapter 5: Digital Business Technology and Regulation

Fig. 5.1 Client-server principle and Internet addressing with DNS



Source: Wirtz (2013a, 2020b, 2021)

Fig. 5.2 Distribution of tasks between client and server



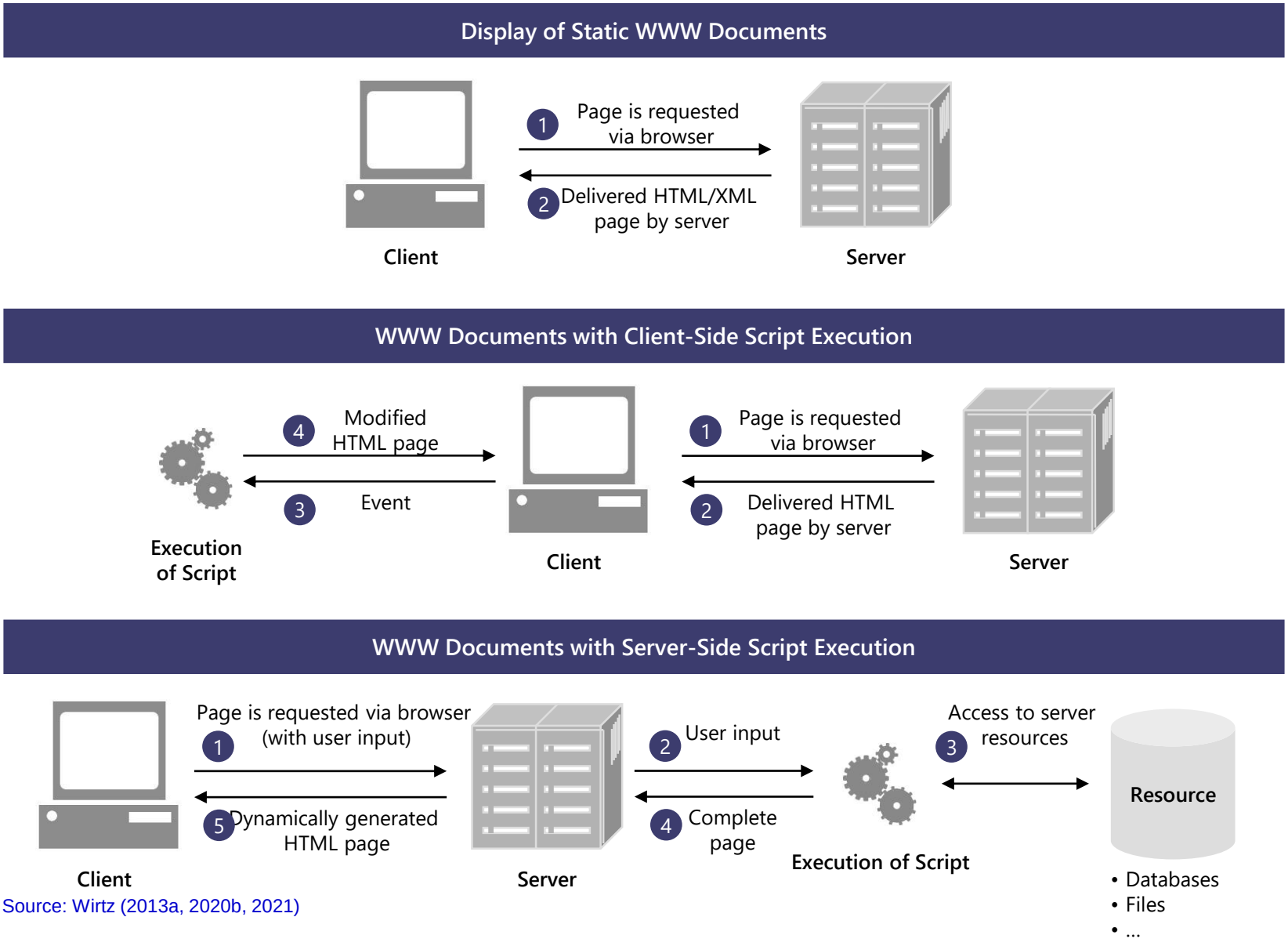
Source: Wirtz (2021)

Table 5.1 Classification of the most important services on the Internet

Services	Protocol	Description	Application
World 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/TSL/SSL/ViPNet/PPTP/PPPD	Secure partial networks with restricted access on the Internet	Different clients (OpenVPN, Cisco VPN, etc.)
Remote Control	Telnet	Use of the 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 in 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, FacebookMessenger, Skype, etc.

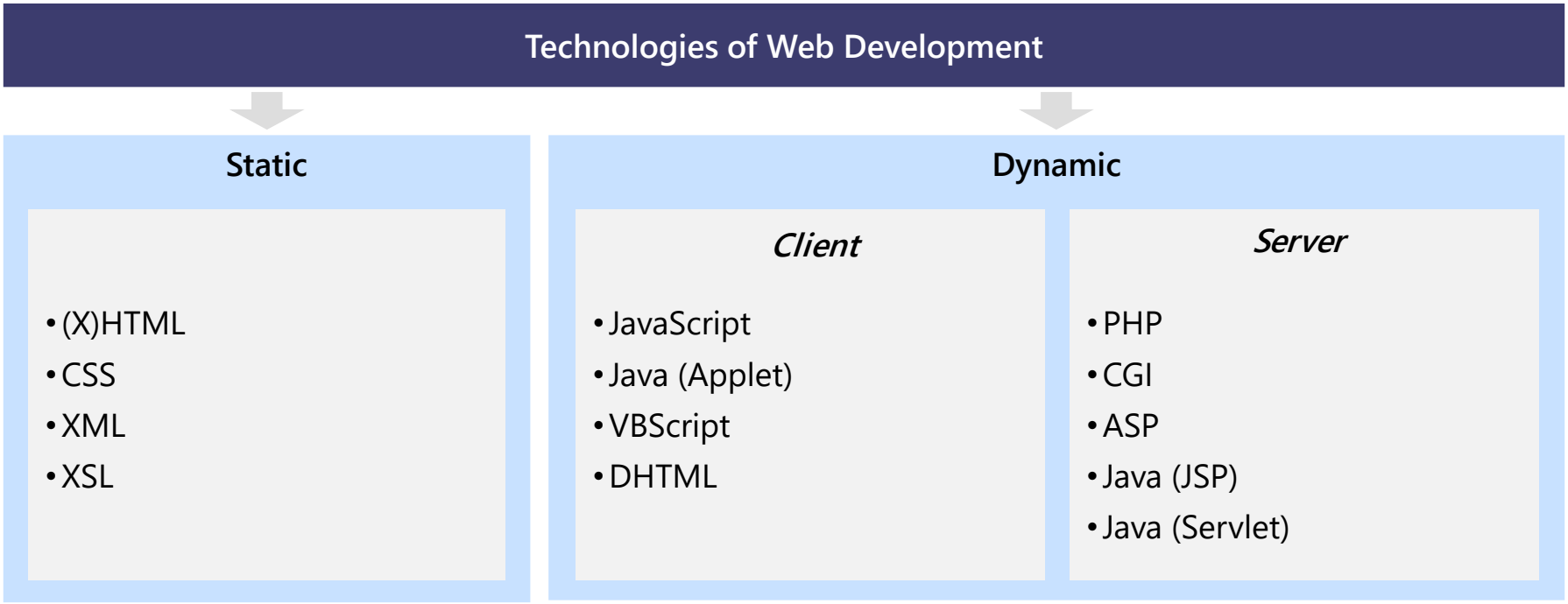
Source: Wirtz (2016b, 2020b, 2021)

Fig. 5.3 Static vs. dynamic WWW documents



Source: Wirtz (2013a, 2020b, 2021)

Fig. 5.4 Static and dynamic languages of web development



Source: Wirtz (2013a, 2020b, 2021)

Fig. 5.5 Structure of syntax of a HTML and XML document

HTML-Document

```
<html>

    <head>
        Title, meta information, style
        information, skript,....
    </head>

    <body>
        Text, links, tables, images,
        form checkboxes, ....
    </body>

</html>
```

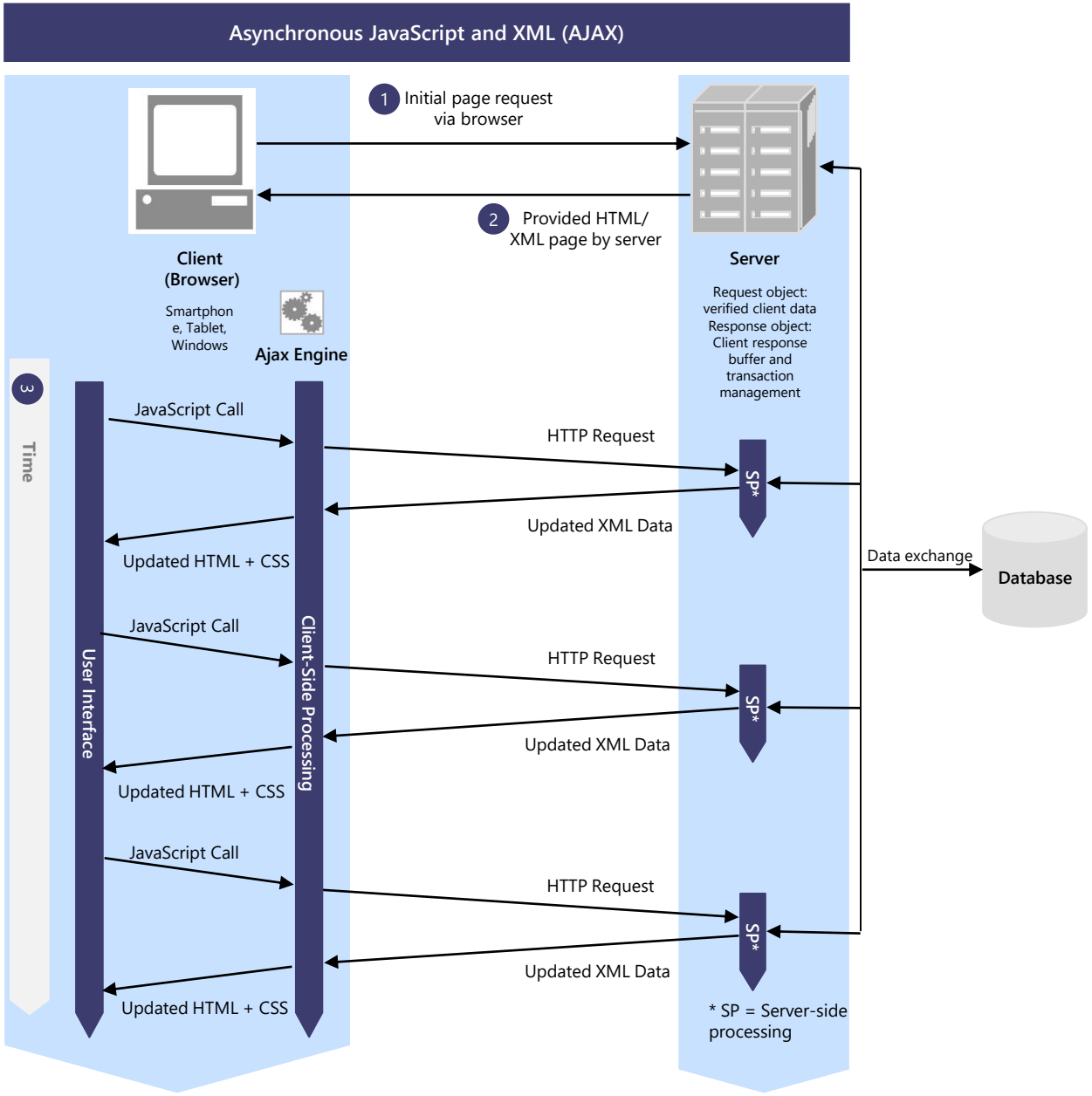
XML-Document

```
<?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>
```

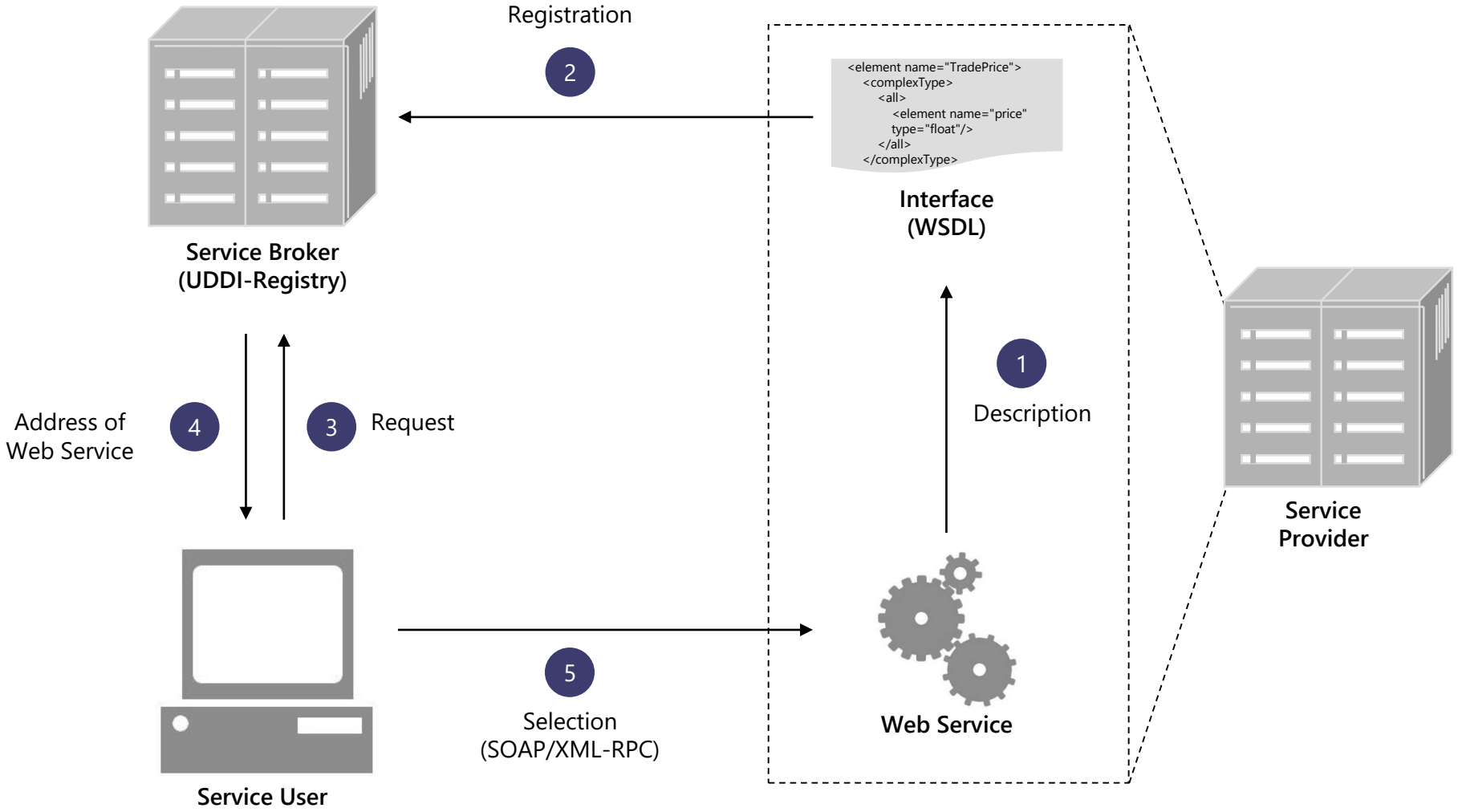
Source: Wirtz (2013a, 2020b, 2021)

Fig. 5.6 Operating principle and schedule of an AJAX application.



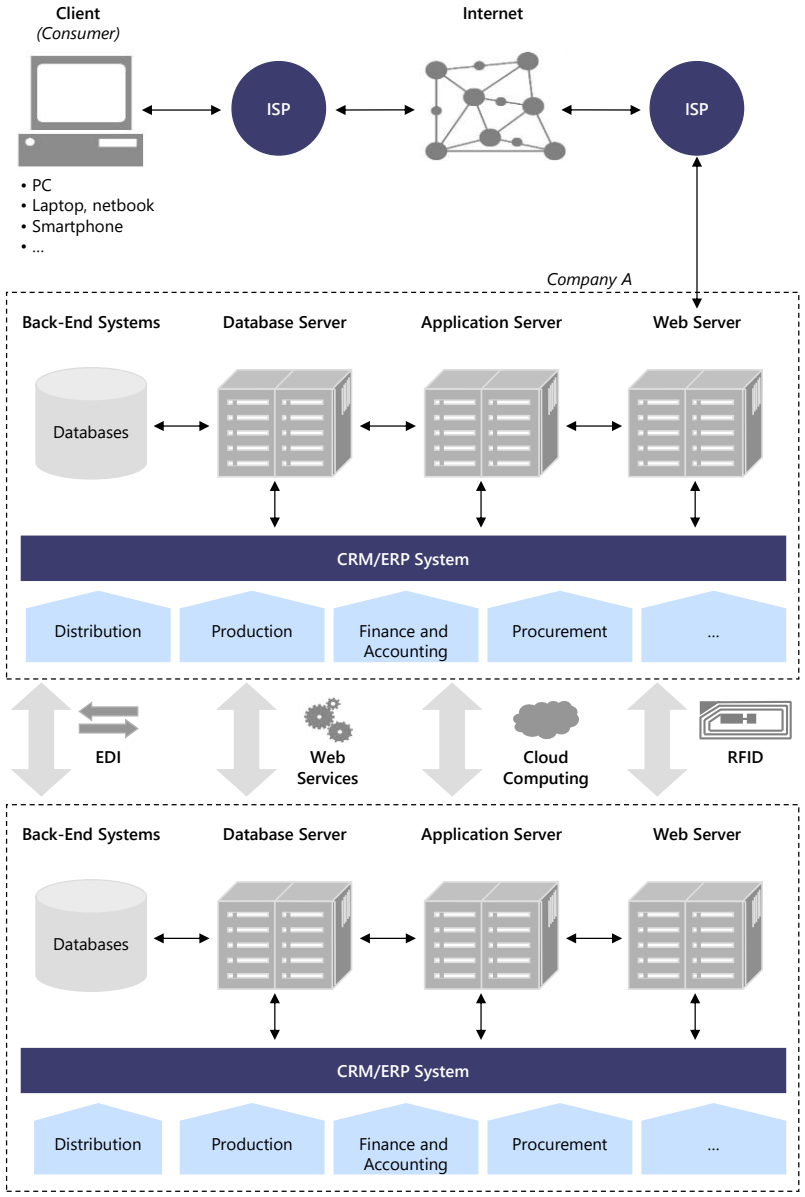
Source: Wirtz (2013a, 2020b, 2021)

Fig. 5.7 Operating principle of a web service



Source: Wirtz (2013a, 2020b, 2021)

Fig. 5.8 Example of a digital business architecture



Source: Wirtz (2013a, 2020b, 2021)

Fig. 5.9 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

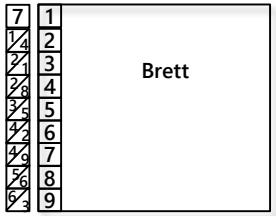
300.000 B.C. | 3.000 B.C. | 800 B.C. | 500 A.C. | 1500 A.C. until 1600 A.C.

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 (2020b, 2021)

Fig. 5.10 Development of the human-machine interface (17th to 19th century).

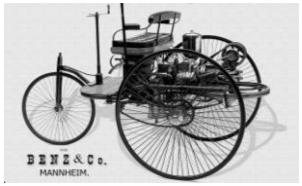


Wilhelm Schickard builds a 4-function calculating machine with Napier's rake

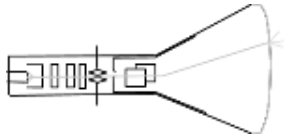
The first mechanical looms with punch card control

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

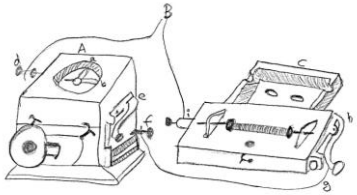
1623 1700 1728 1817 1837 1861 1865 1877 1886 1888 1897

Thomas Newcomen invents the first steam engine

Source: Wirtz (2020b, 2021)

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

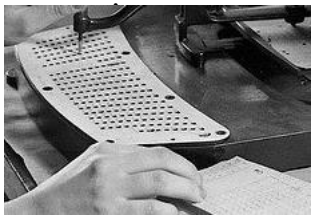
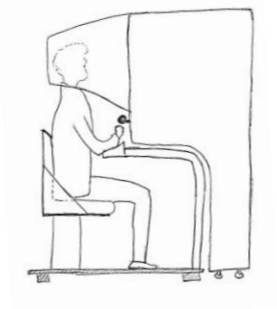


Fig. 5.11 Development of the human-machine interface (1940 to 1970)

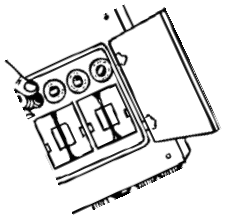
Konrad Zuse invents the fully automatic, program-controlled and freely programmable computer

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

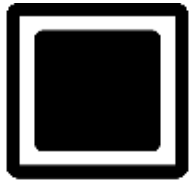


Virtual reality application "Sensorama" is presented by Morton Heilig

Implantation of the first pacemaker in Stockholm



Development of the IBM Shoebox, a digital speech recognition



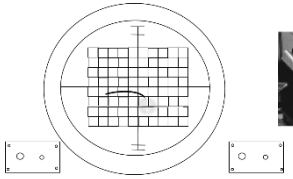
Donald L. Bitzer and H. Gene Slottow design the plasma screen

1941 | 1946 | 1952 | 1955 | 1957 | 1958 | 1960 | 1961 | 1963 | 1964

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

Source: Wirtz (2020b, 2021)

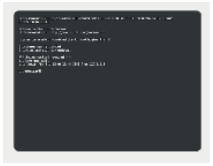
Invention of the light pen at MIT



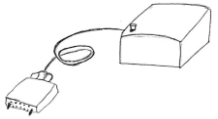
Presentation of the first video game "Tennis for two" by William Higinbotham

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

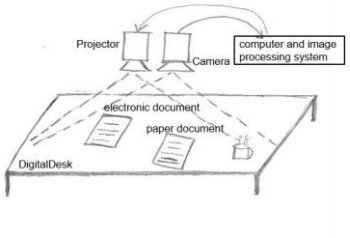
Fig. 5.12 Development of the human-machine interface (1970 to 2000)

1974: The first touch screen is built by Sam Hurst

1977: Construction of the first hearing prosthesis for the deaf (cochlear implant)

1981: Development of the first transparent multitouch screen by Bob Boie

1984: Invention of the touchpad by George Gerpheide



1988: Construction of the "Digital Desk" as one of the first augmented reality systems by Pierre Wellner

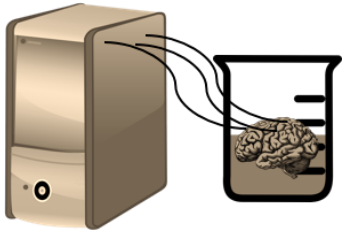
1990: Introduction of electrodes that improve the mototrics of Parkinson's patients

1974 | 1975 | 1977 | 1981 | 1984 | 1988 | 1990 | 1991 | 1998

1975: Introduction of the first graphical user interface with icon icons and pop-up menu

1981: Introduction of the first commercial computer system Xerox Star and the first IBM personal computer

1988: First brain-computer interface is developed by Lawrence Farwell and Emanuel Donchin

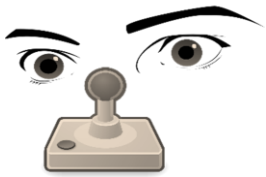


1990: Implementation of the World Wide Web by Tim Berners-Lee and Robert Cailliau

1991: Concept of Ubiquitous Computing by Mark Weiser and development of Personal Digital Assistants (PDA)

Source: Wirtz (2020b, 2021)

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

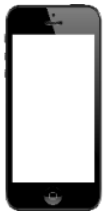


Game control via the eyes by Sony EyeToy

2002

Development of the inner ear on a microchip for the deaf

2003



Apple makes Multi-Touch control widely available by introducing the iPhone

2005

Microsoft develops Kinect, a motion and voice based video game controller for the Xbox 360

2007

Siri by Apple is the first widely used language assistant

2009

The first augmented reality glasses are introduced

2010

Construction of the smart collars Sony Concept N begins

2011

Development of the Conversational Interface (CUI) technology

2012

2015

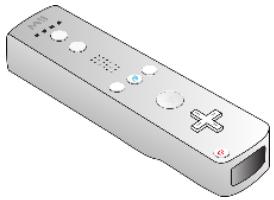
2016

2018

2020

The first RFID chips for humans are constructed

Nintendo builds a remote control for video games, the Wii Remote



Electronically controlled orthoses for paralyzed limbs are developed

Apple produces its first iPad

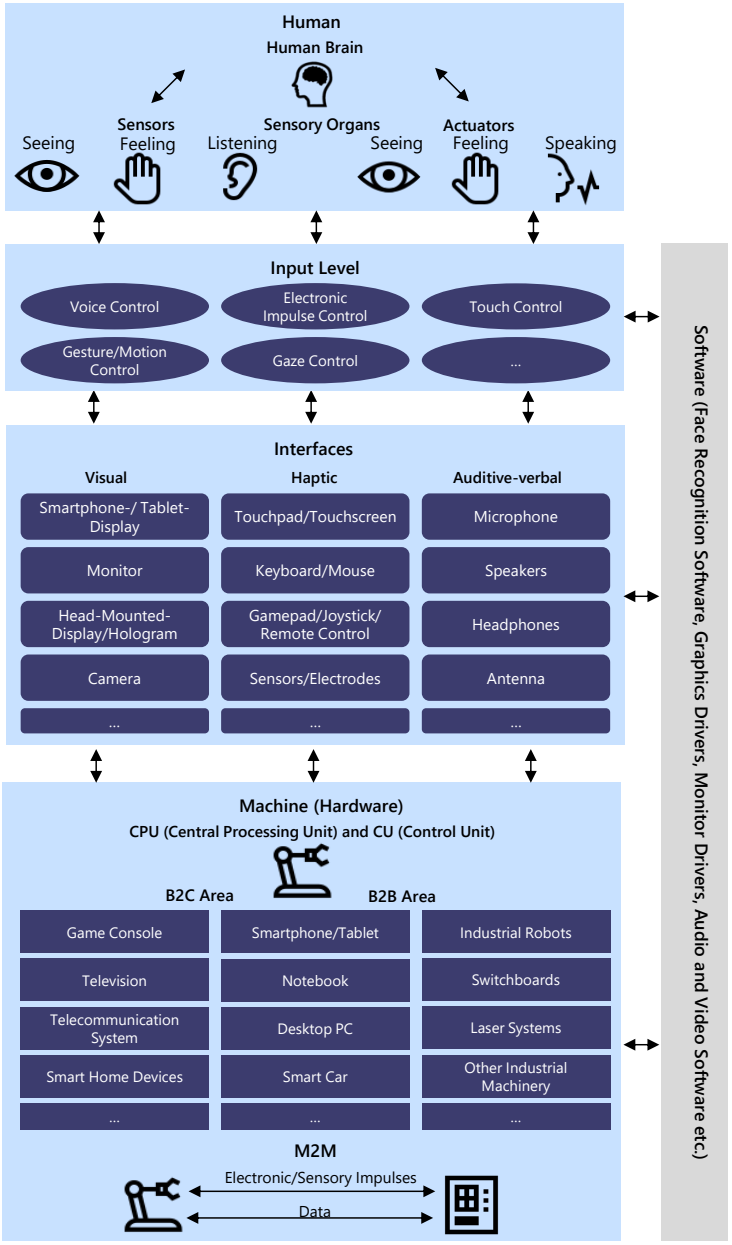
The first electronic visual prosthesis is introduced

In the USA, the first artificial hand capable of feeling is constructed

Diffusion of Virtual and Augmented Reality

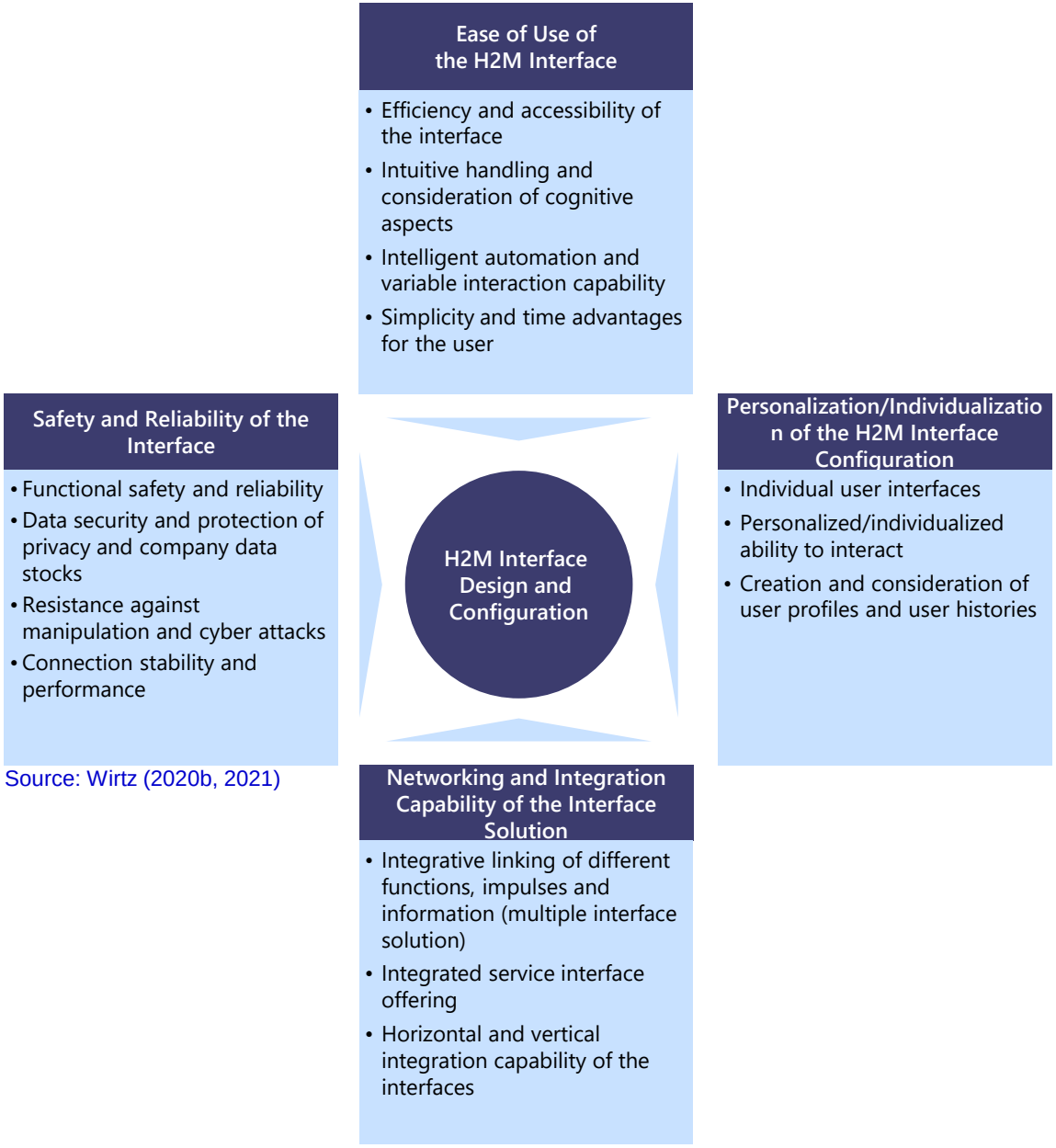
Source: Wirtz (2020b, 2021)

Fig. 5.14 HMI model of human-machine interaction



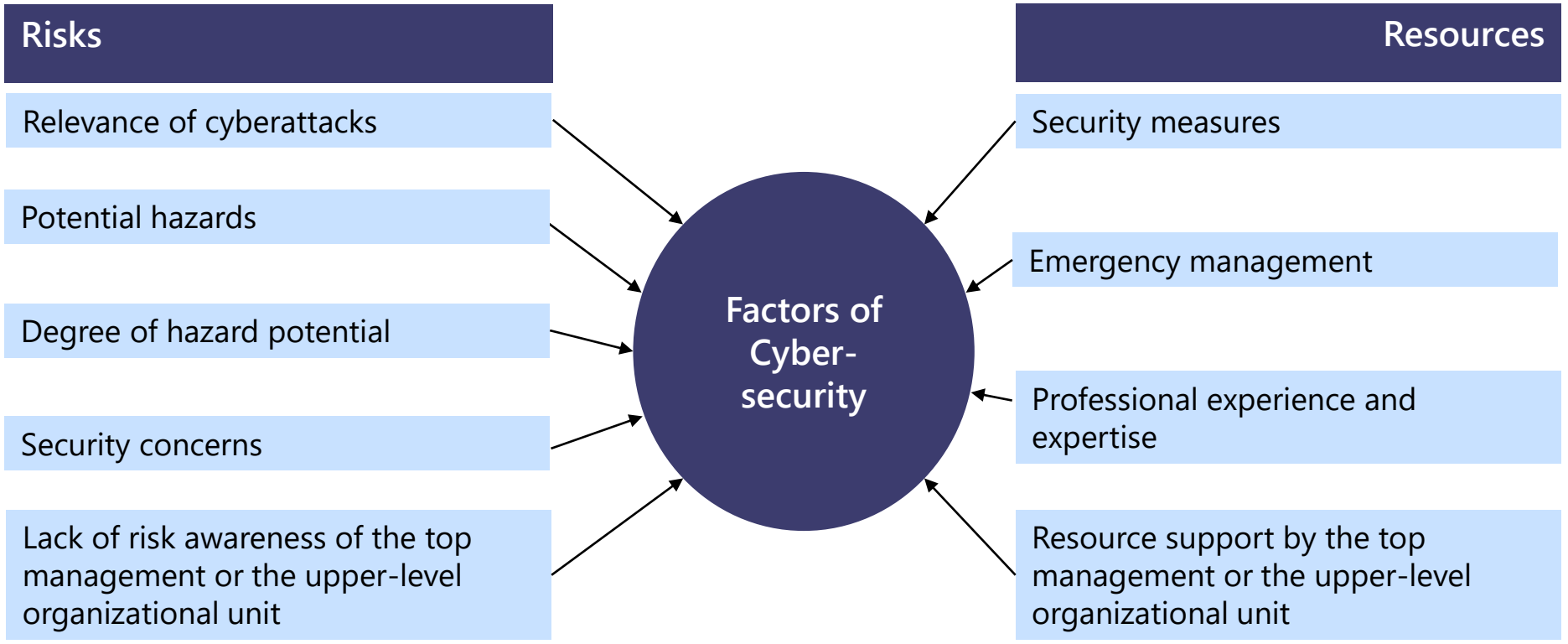
Source: Wirtz (2020b, 2021)

Fig. 5.15 Success factors of H2M interface design and configuration



Source: Wirtz (2020b, 2021)

Fig. 5.16 Risk-resource cybersecurity framework



Source: Wirtz (2020b, 2021)

Table 5.2 Threats in computer networks I

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.
	Trojan	Trojans or Trojan horses are computer programs that give the impression of being useful applications but actually fulfill another or malicious function.

Source: Wirtz (2013a, 2020b, 2021)

Table 5.2 Threats in computer networks II

Type of attack	Threat	Description
Attacks on IT-Infrastructures	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 a 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.
Interception, Reading and Manipulation of Data	Sniffer	A sniffer not only allows to intercept and record data packets in networks but also to analyze them subsequently. Sniffers are applied in the context of network analyses but can also be used for abuse purposes and for unauthorized data reading.
	Keylogger	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.
	Password Cracker	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.
	Man-in-the-Middle-Attack (Snarfing)	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.
	Phishing	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.

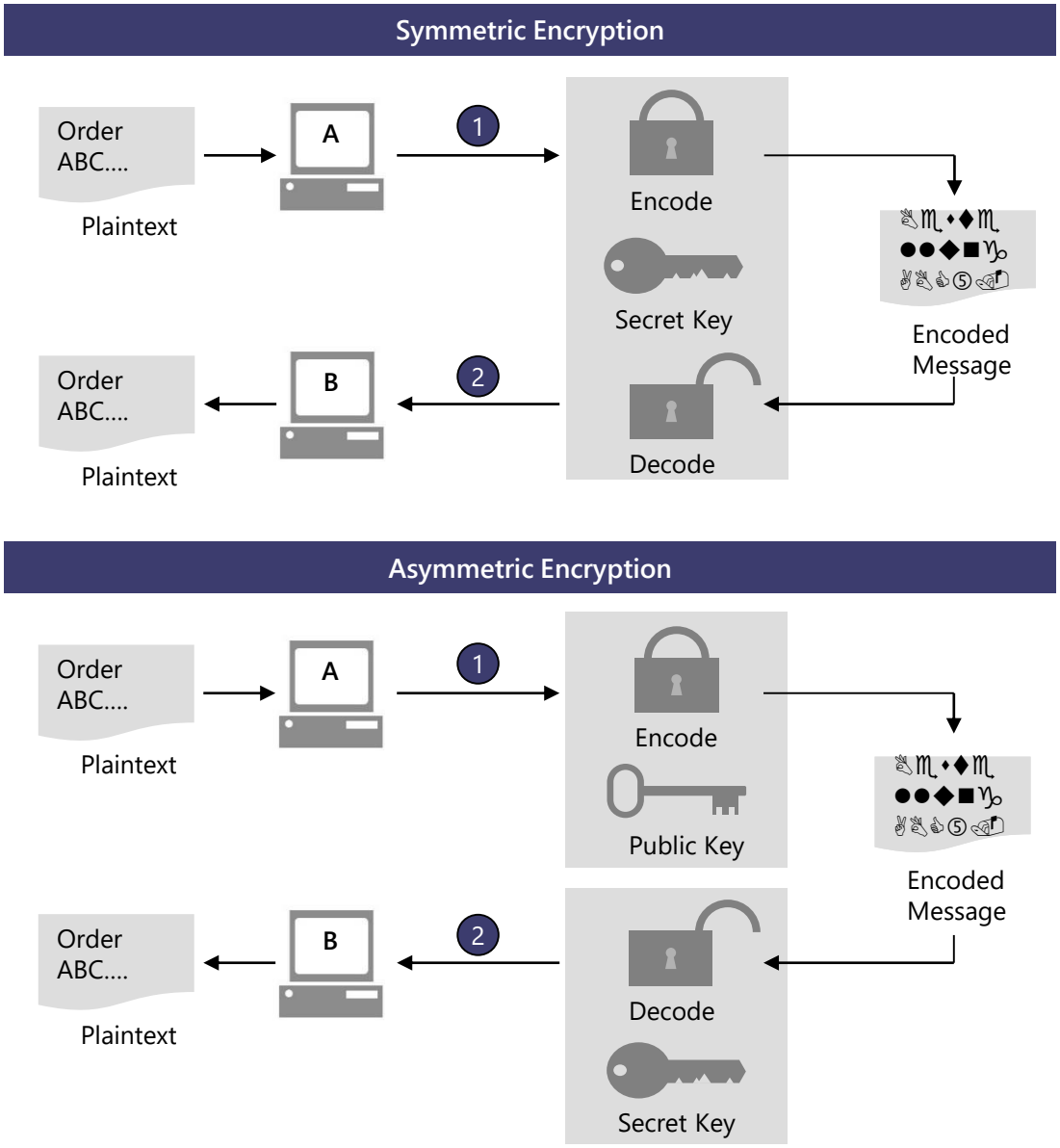
Source: Wirtz (2013a, 2020b, 2021)

Table 5.2 Threats in computer networks III

Type of attack	Threat	Description
Identity Theft/ Deception	Spoofing	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.
	Social Engineering/ Social Hacking	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.

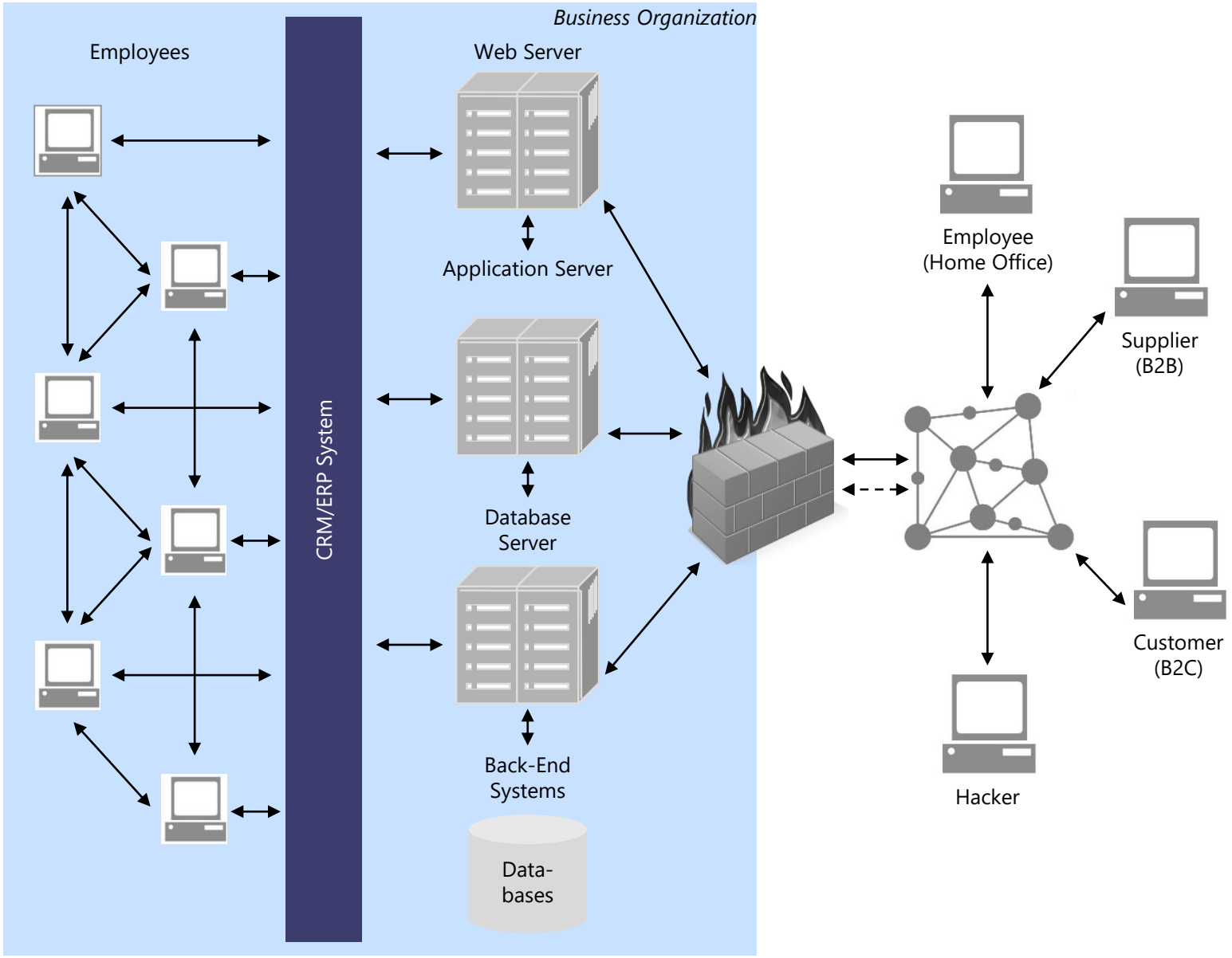
Source: Wirtz (2013a, 2020b, 2021)

Fig. 5.17 Functional principle of symmetric and asymmetric encryption



Source: Wirtz (2013a, 2020b, 2021)

Fig. 5.18 Functions of a firewall



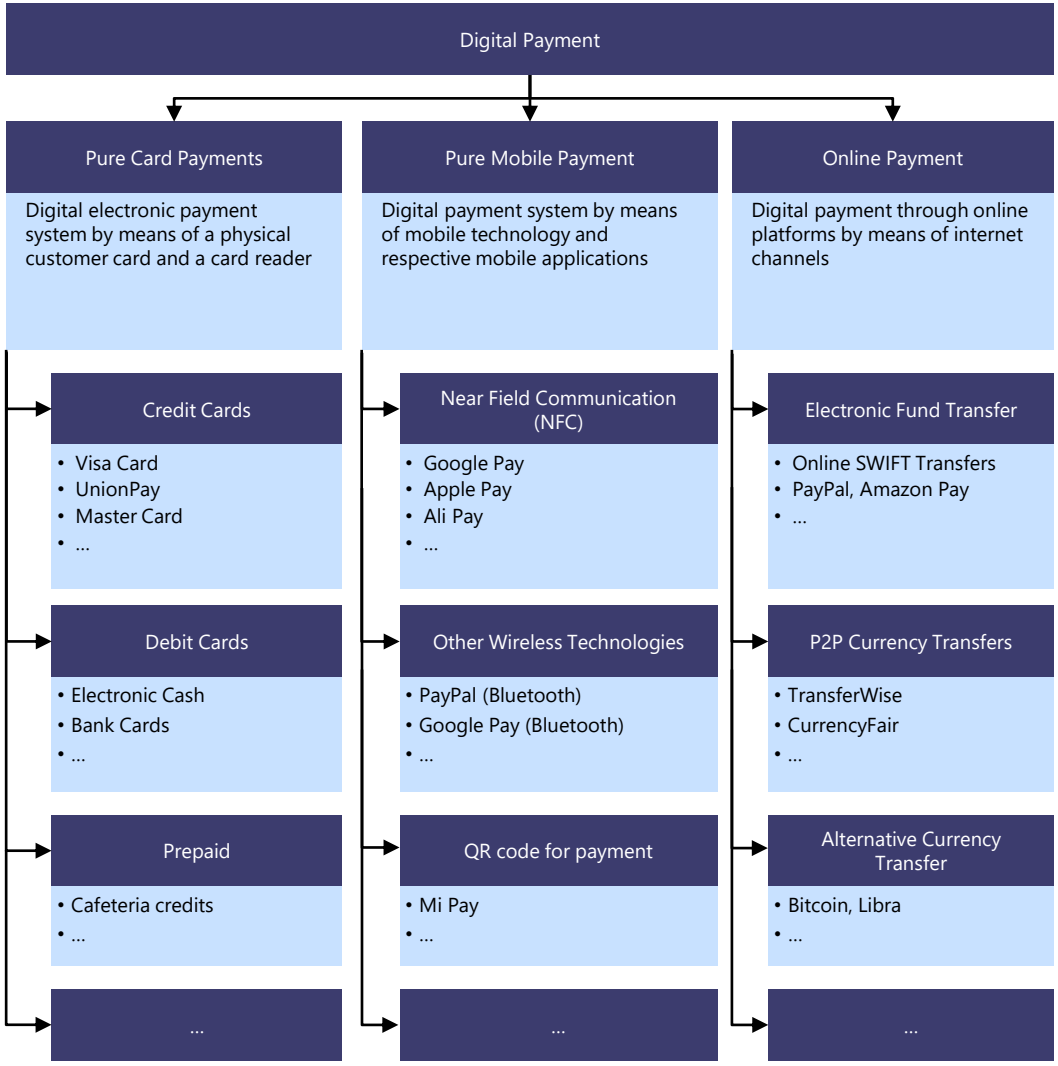
Source: Wirtz (2016b, 2020b, 2021)

Fig 5.19 Transactions in the blockchain

1 Initialization of the transaction	• Initiation of transactions • Verification of transactions • Permanent, transparent documentation of transactions • ...	
2 Representation of the transaction in a block	• Depiction of the transaction in a block • Preparation for block distribution • ...	
3 Distribution of the block to the network	• Distribution of the block to all participants of the network • Visibility of the block by all network participants • ...	
4 Confirmation of the transaction	• Confirmation of the transaction by participants of the network • Preparation of the integration of the transaction into the blockchain • ...	
5 Attaching the block to a blockchain	• Chain-like linking of the confirmed transactions in a blockchain • Interval-type transaction generation by means of the blockchain • ...	
6 Execution of the transaction	• Execution of the interconnected transactions • Confirmation of the interconnected transactions • Completion of the interconnected transactions • ...	

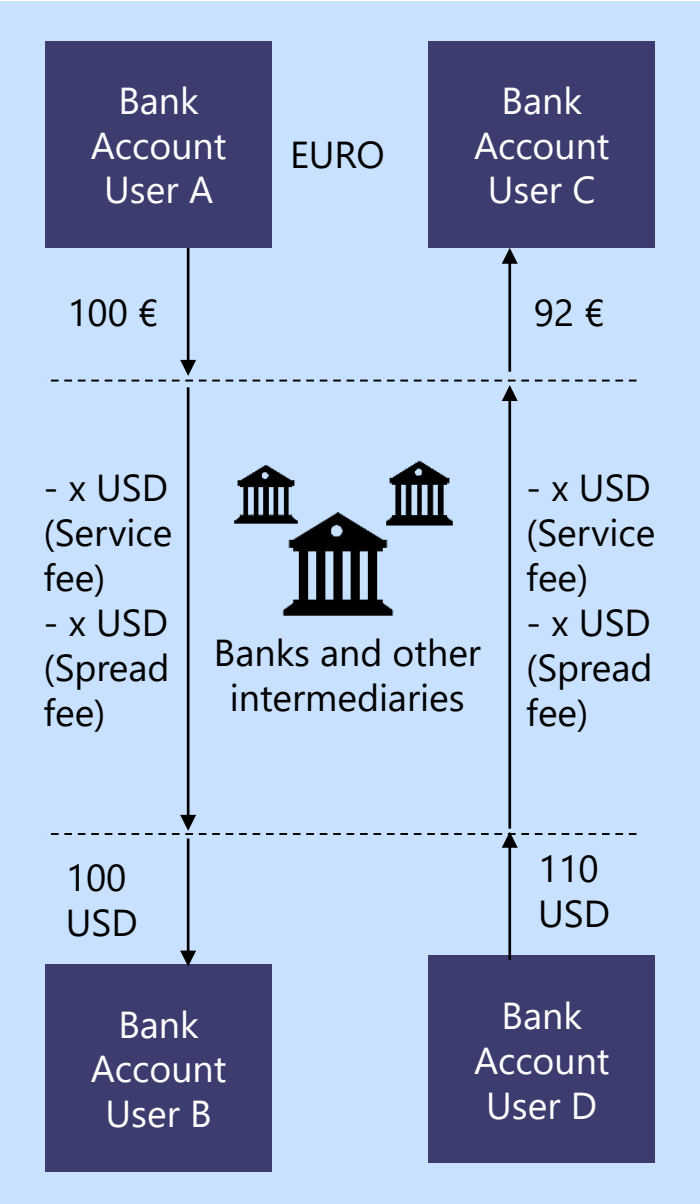
Source: Wirtz (2020b, 2021)

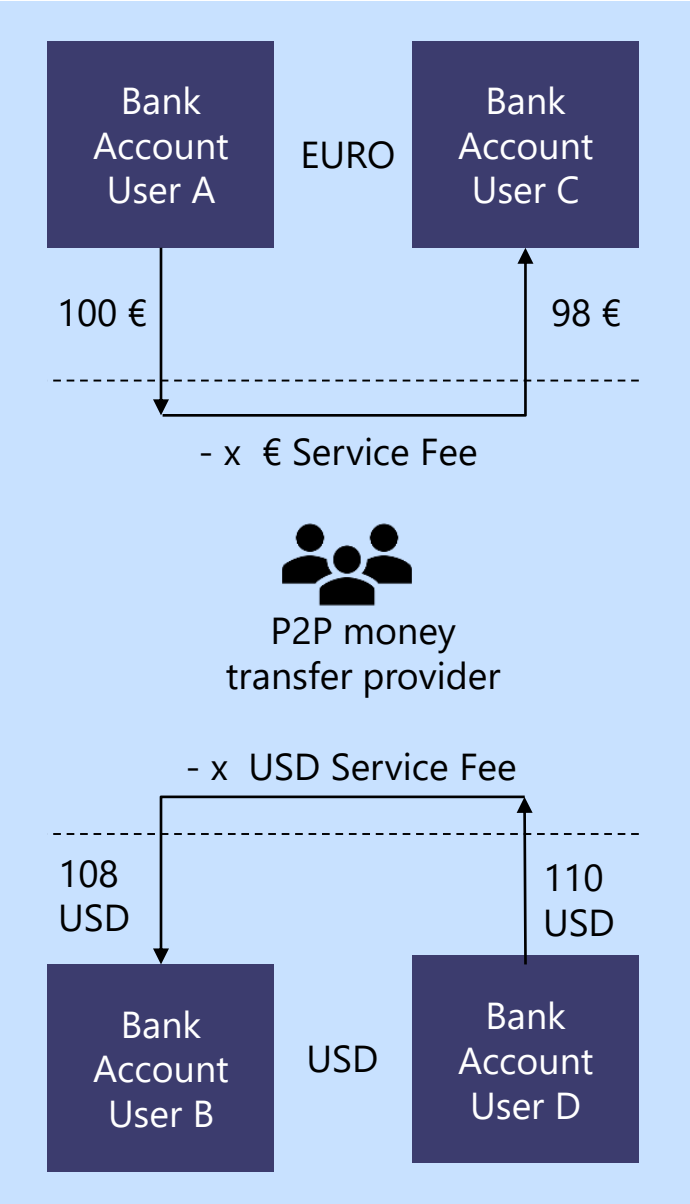
Fig 5.20 Digital payment system



Source: Wirtz (2020b, 2021)

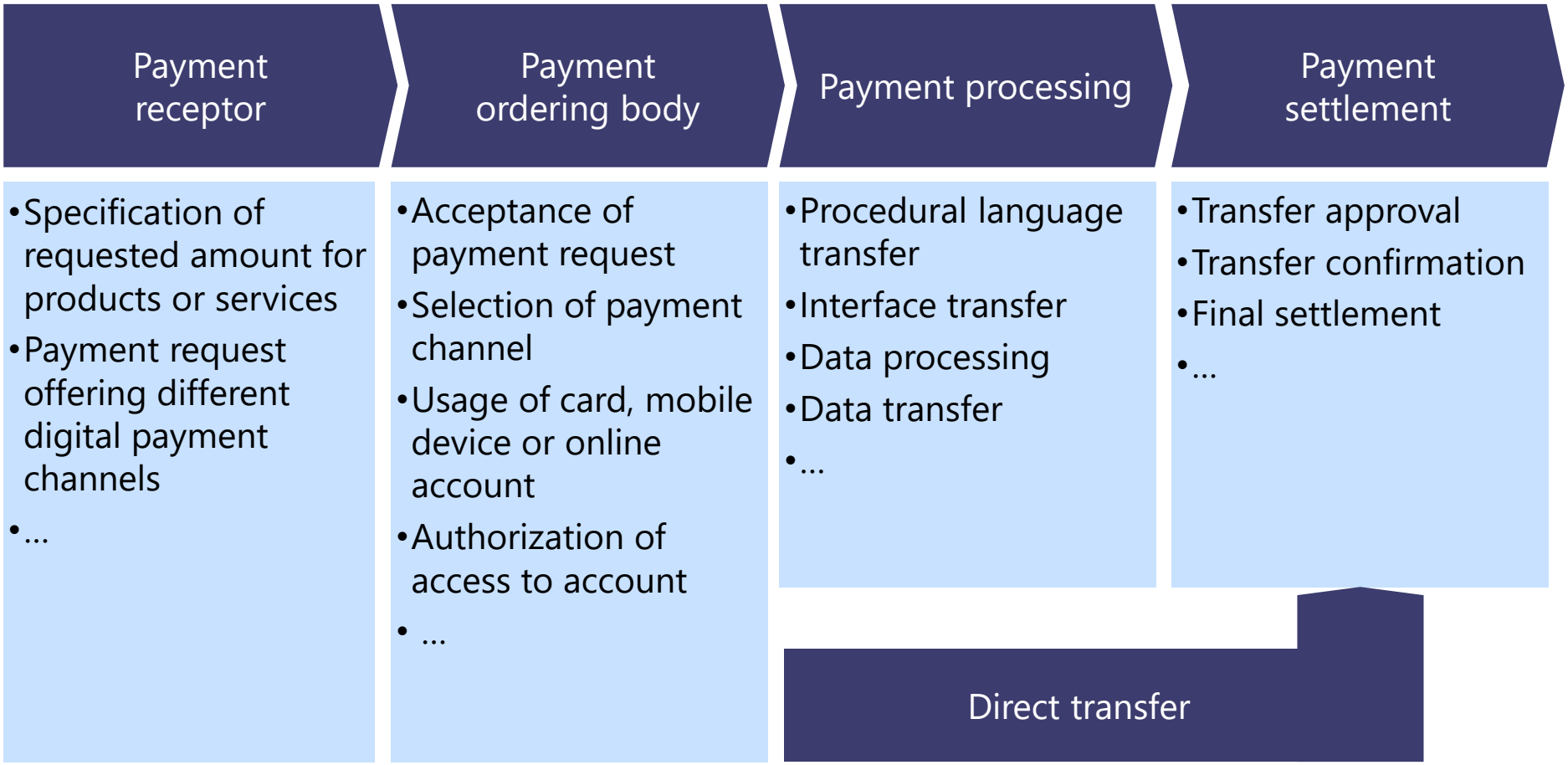
Fig 5.21 Comparison international SWIFT transfer and P2P currency transfer





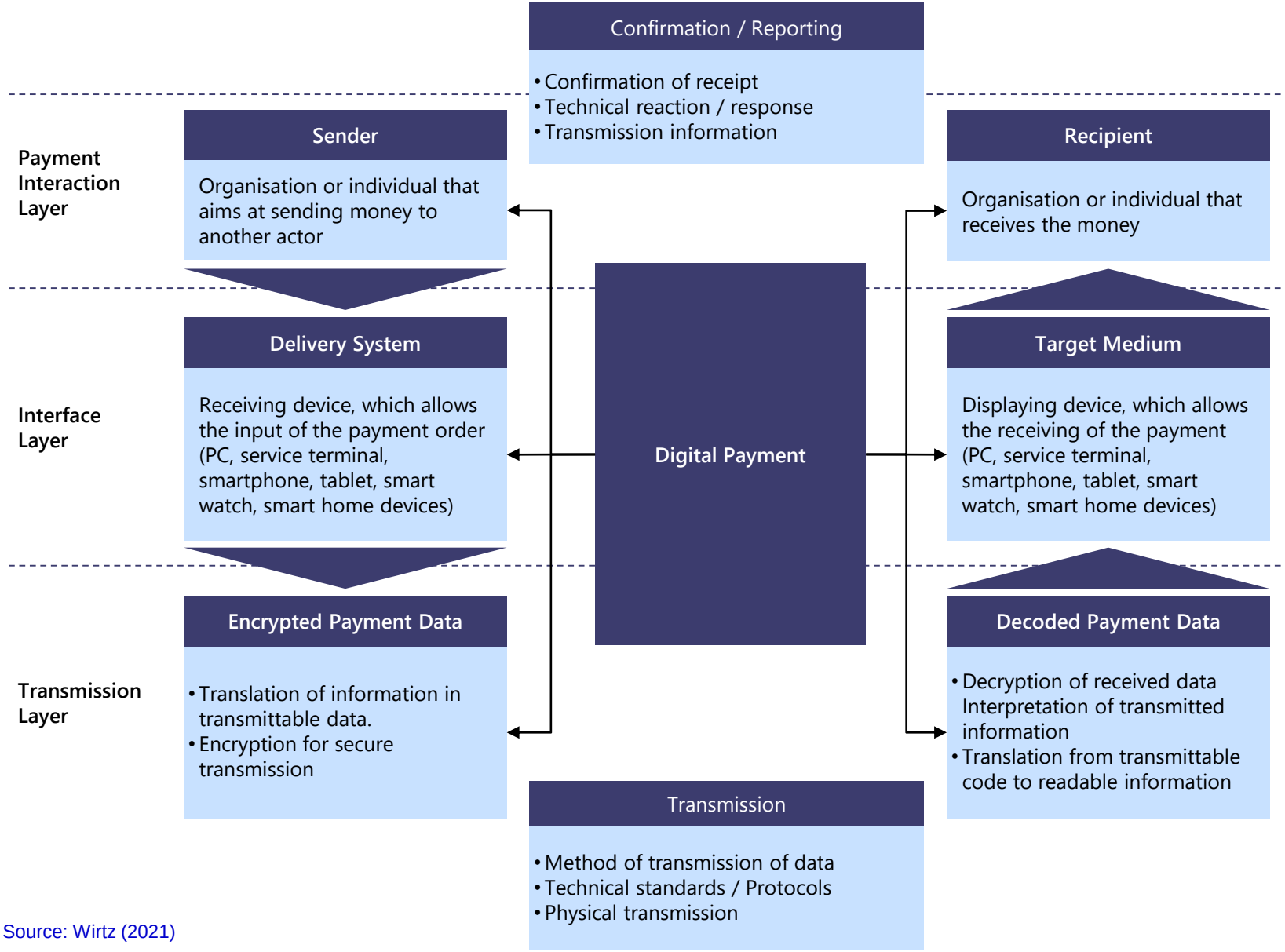
Source: Wirtz (2021)

Fig. 5.22 Digital payment value chain



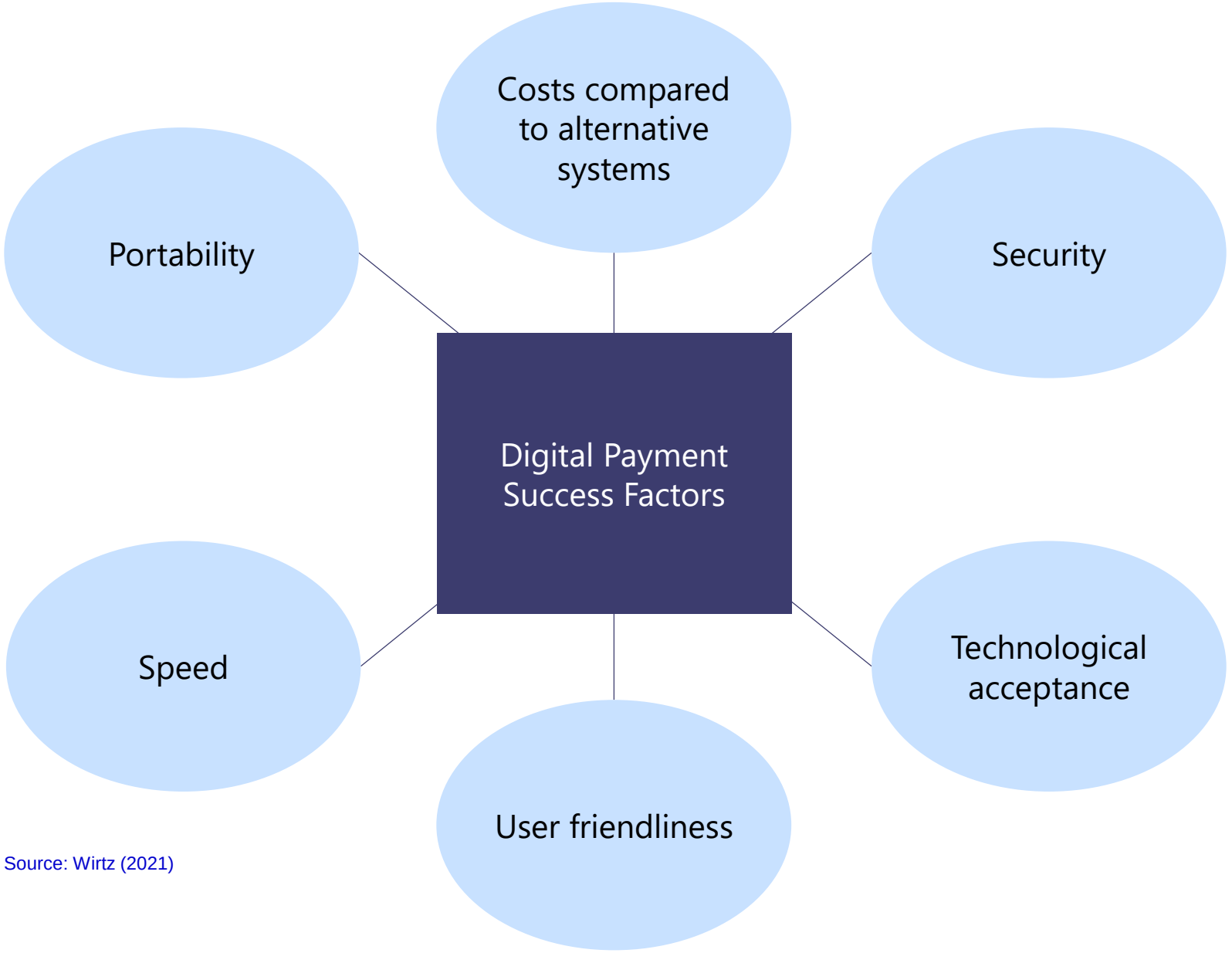
Source: Wirtz (2013a, 2020b, 2021)

Fig. 5.23 Digital payment transaction process



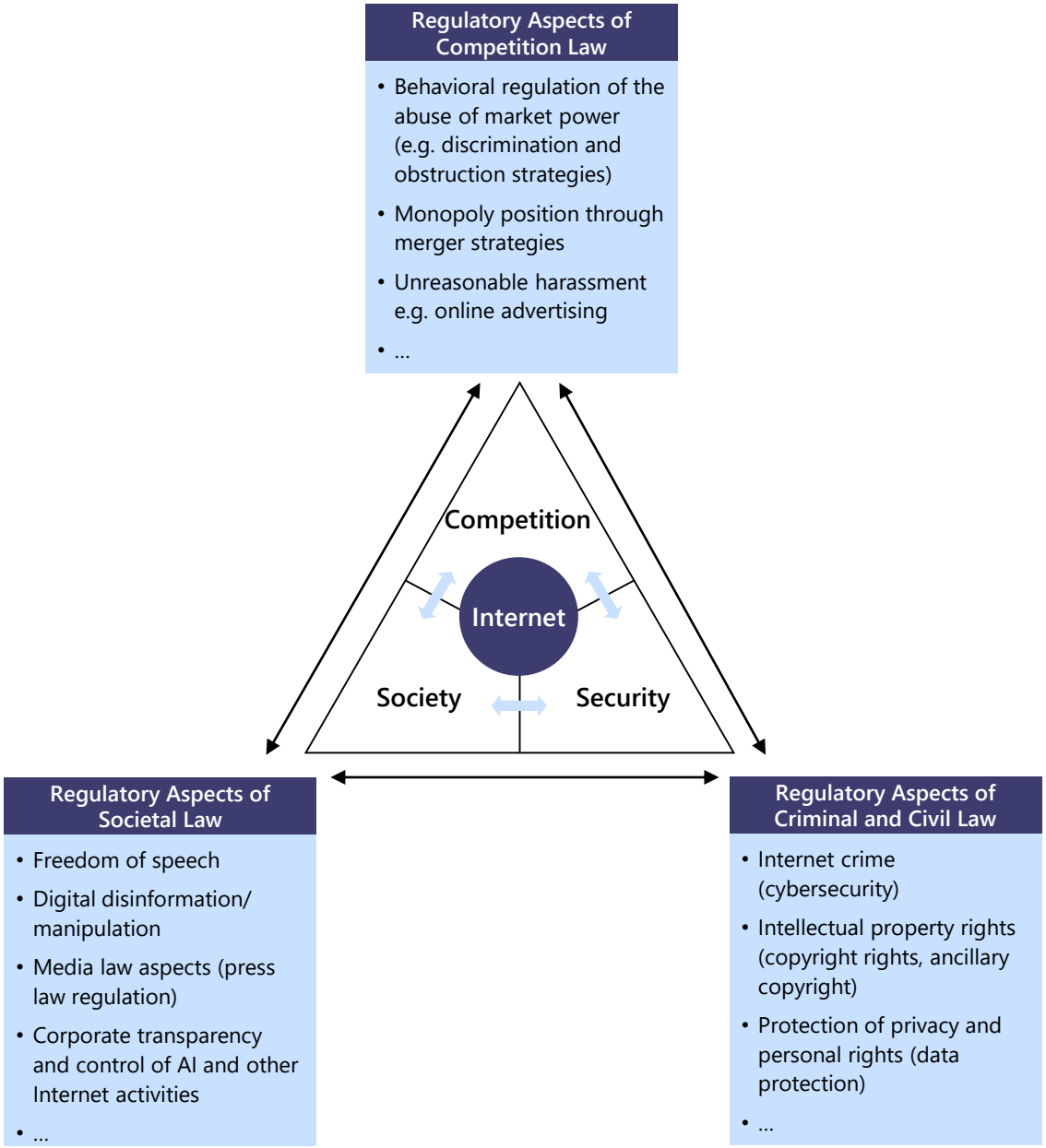
Source: Wirtz (2021)

Fig. 5.24 Digital payment systems success factors



Source: Wirtz (2021)

Fig. 5.25 CSC Internet regulation model



Source: Wirtz (2021)

Table 5.3 Main approaches of Internet regulation

ITU Approach	Internet Governance Approach
• 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 nongovernmental actors • Main criticism: limited effectiveness due to the diversity and power of private sector actors	• Transnational approach • Transnational cooperation of governmental and non-governmental actors • Participatory understanding and multistakeholder 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 nongovernmental actors and power gaps between stakeholders

Source: Wirtz (2020b, 2021)

Chapter 5. Questions and topics for discussion

Chapter 5
Questions and topics for discussion

Review questions

1. Present the client-server principle as well as the Internet addressing in an illustration and explain their interrelation.
2. Describe the HMI model of human-machine interaction.
3. Illustrate the risk-resources cybersecurity framework.
4. What is blockchain? Describe transaction phases and contents of blockchains.
5. Describe the CSC Internet Regulation Model.

Topics for classroom discussion and team debates

1. Discuss the future developments of human-machine interaction 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. Discuss the advantages and disadvantages of comprehensive cybersecurity measures to protect state infrastructure against the background of hacker attacks. Are these protection mechanisms also necessary 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, Amazon or Apple.

Source: Wirtz (2021)

Chapter 6: Internet of Things

Table 6.1 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. (2013, p.1648)	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 (2018b, 2021)

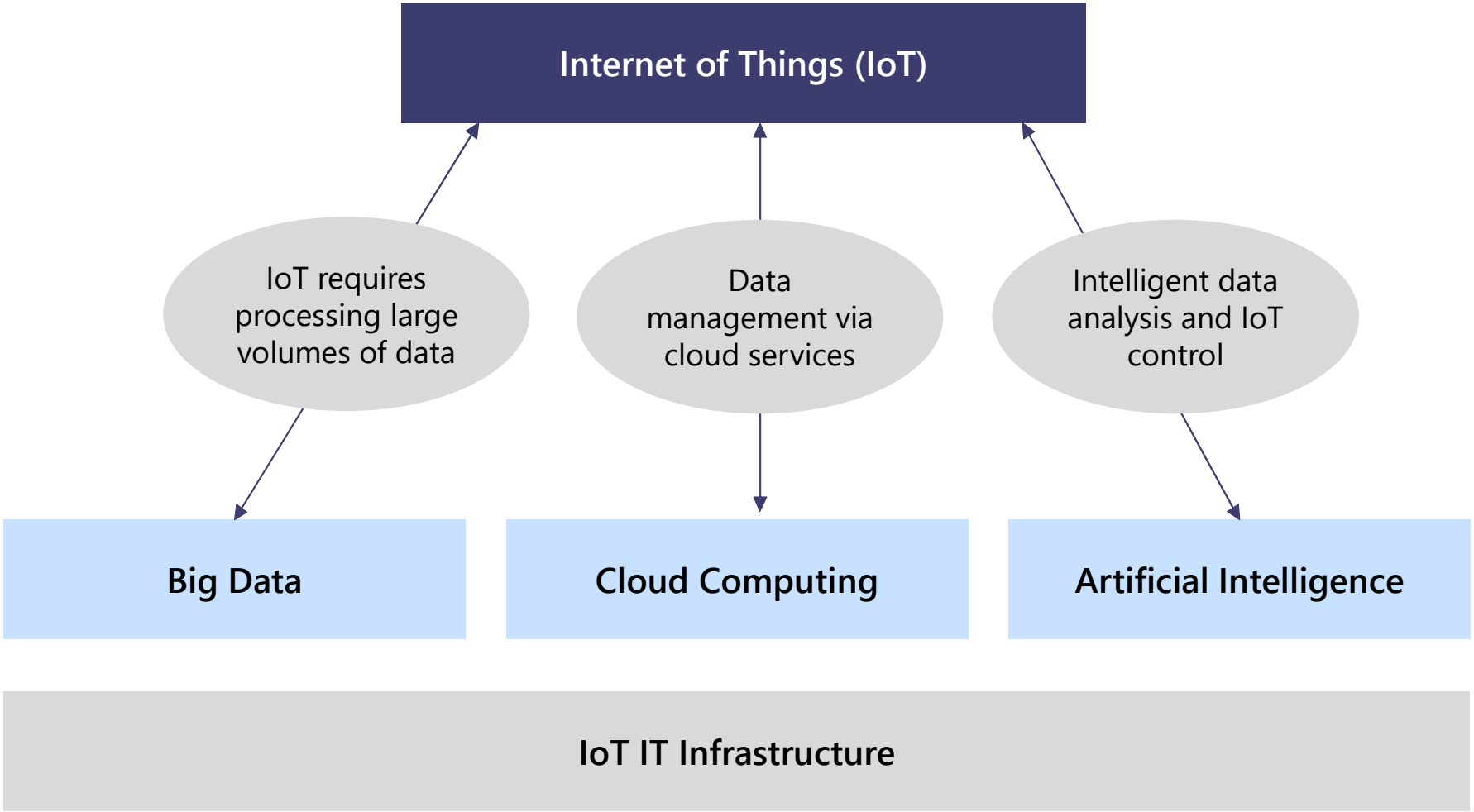
Definition of Internet of Things

Definition of Internet of Things (Wirtz 2018b)

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

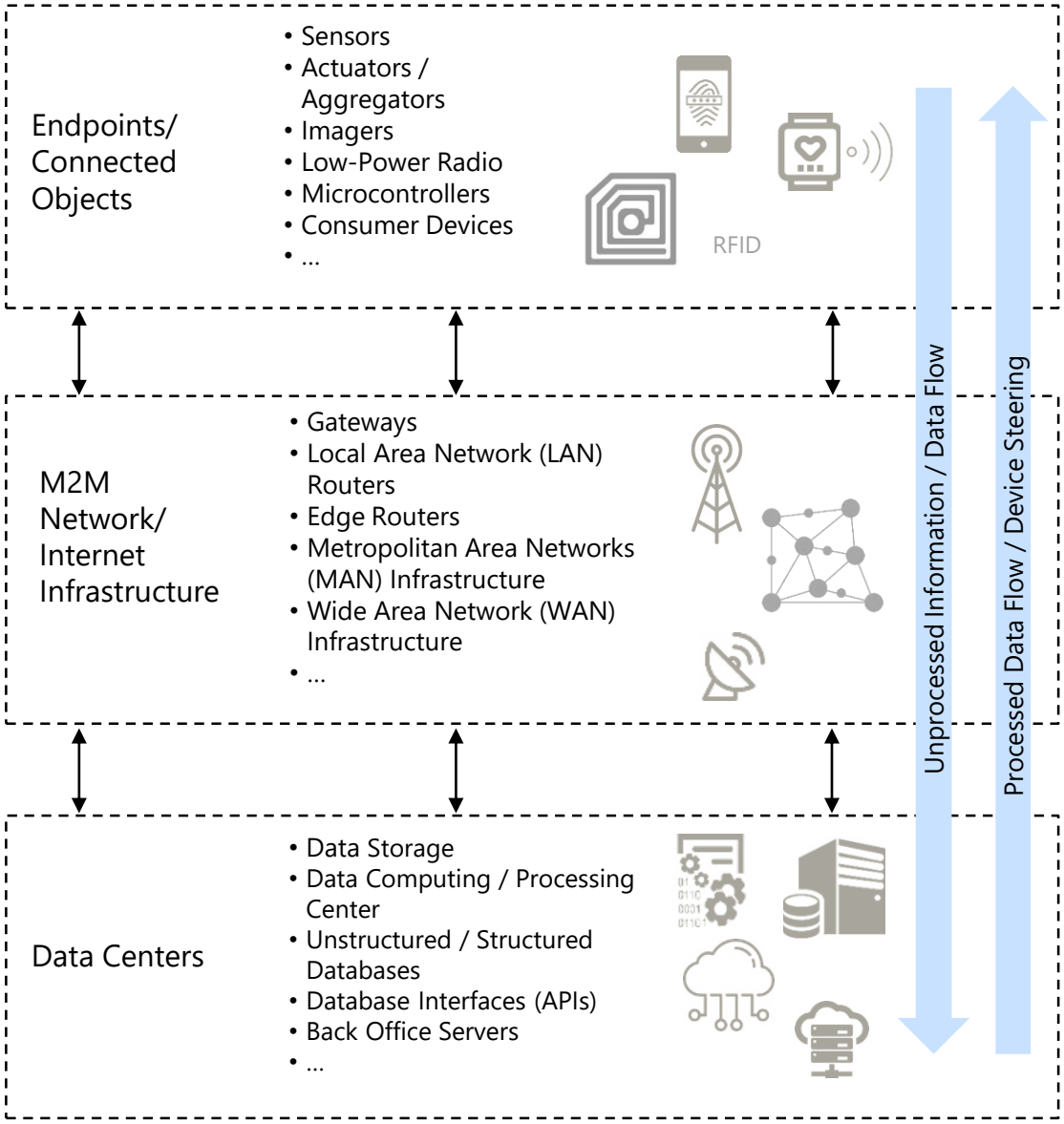
Source: Wirtz (2021)

Fig. 6.1 Basic technological concepts of IoT



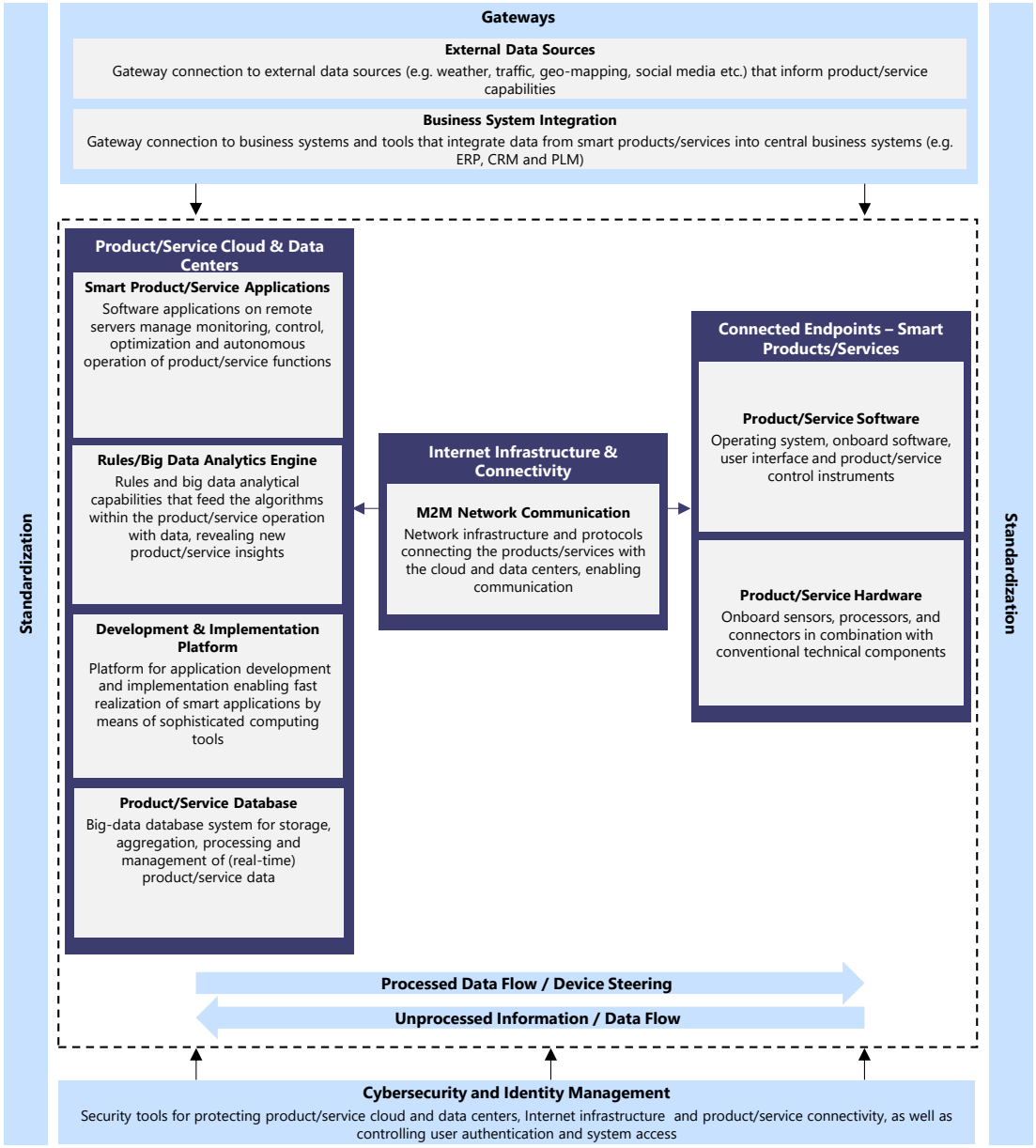
Source: Wirtz (2018b, 2020b, 2021)

Fig. 6.2 IoT IT infrastructure



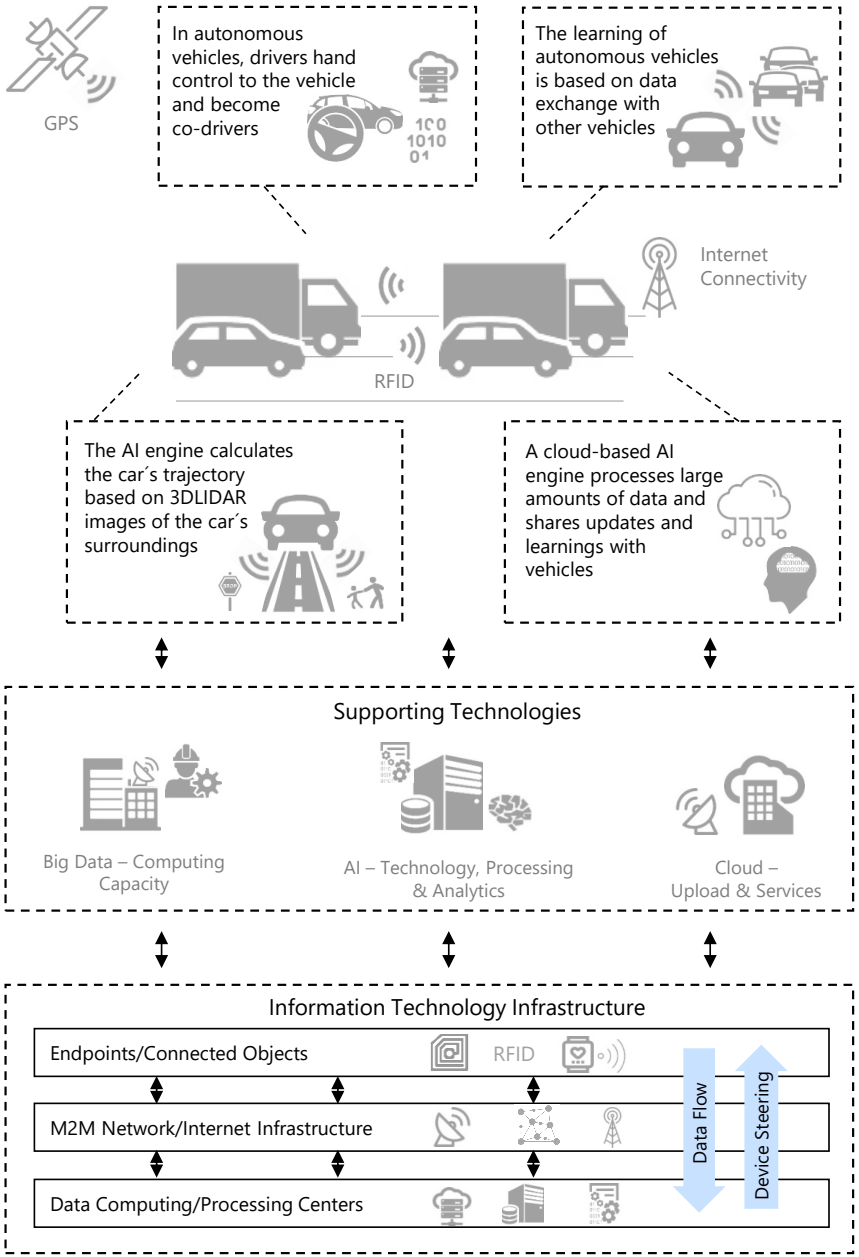
Source: Wirtz (2018b, 2020b, 2021)

Fig. 6.3 Exemplary IoT-specific IT architecture



Source: Wirtz (2020b, 2021)

Fig. 6.4 Illustrative example of IoT with application areas of enabling technologies



Source: Wirtz (2018b, 2020b, 2021)

Fig. 6.5 Application areas of IoT

Setting	Description	Examples	Size in 2025*	
Factories	Standardized production areas	Locations with repetitive workflows, such as farms and hospitals; operational efficiencies, asset utilization optimization and inventory	1,210 - 3,700	●
Cities	Urban areas	Public spaces and infrastructure in urban environments; resource management, environmental monitoring, smart meters, adaptive traffic control system	930 - 1,660	◕
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	170 - 1,590	◕
Retail	Places where consumers engage in commerce	Shops, malls, restaurants, banks, self-service checkout	410 - 1,160	◑
Worksites	Custom production areas	Construction, mining, oil and gas; operating efficiency, safety and health, predictive maintenance	160 - 930	◑
Outside	Outside of urban and other areas	Autonomous vehicles outside of urban environments, railroad tracks, shipment tracking, flight navigation; real-time routing	560 - 850	◑
Vehicles	Inside of vehicles	Cars, trucks, trains, ships, airplanes, helicopters, condition-based maintenance, usage-based design,	210 - 740	◑
Home	Inhabited buildings	Security and home automation control systems	200 - 350	◔
Offices	Places where knowledge workers operate	Security and energy management in office buildings; increased productivity	70 - 150	◔

◯ Low Potential ● High Potential

*Potential economic impact of IoT in 2025 [in billion USD]

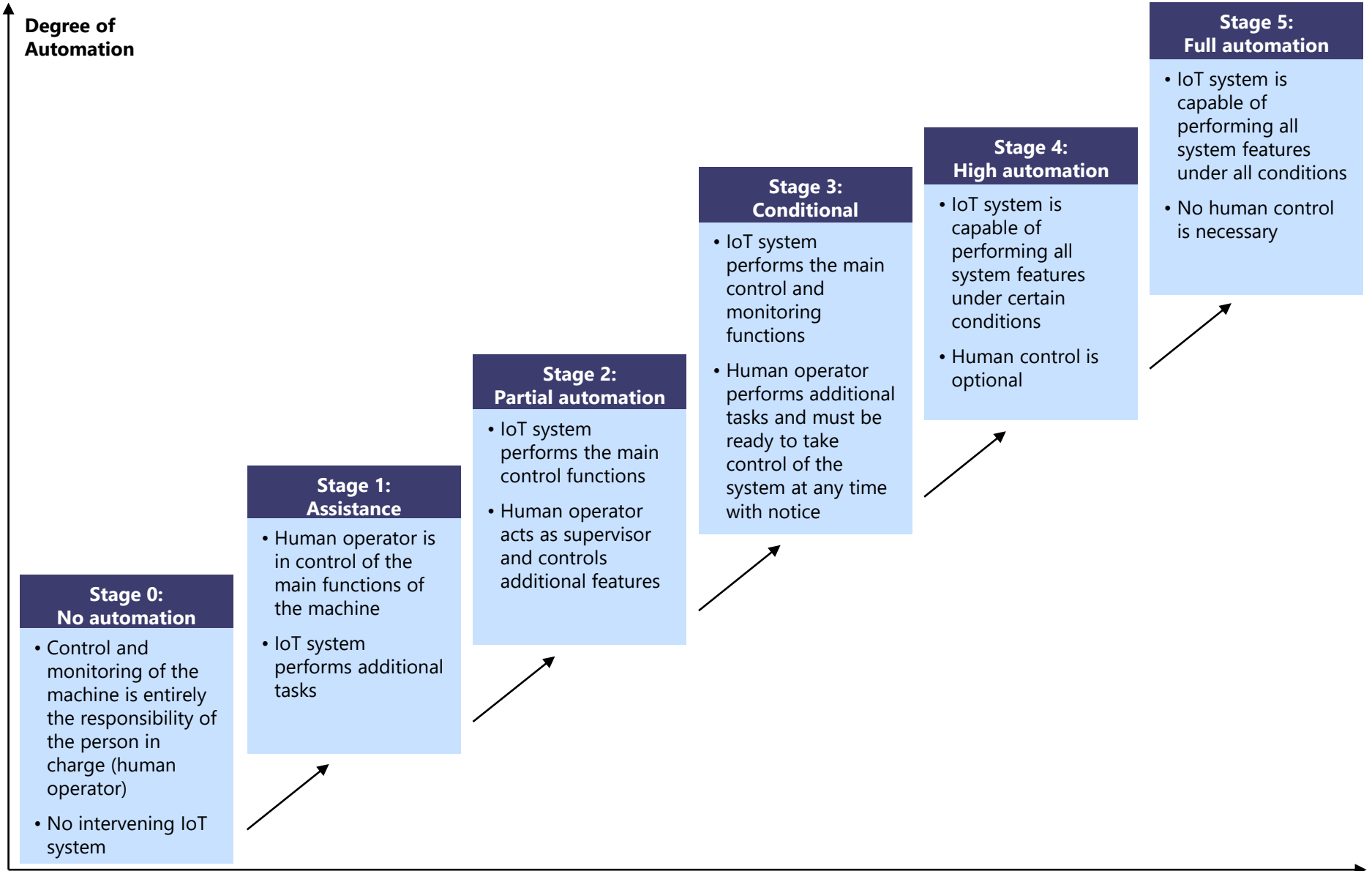
Data Source: McKinsey Global Institute (2015), and Wirtz (2021)

Table 6.2 Key opportunities and challenges of industry 4.0 from a business perspective

IoT Opportunities	IoT Challenges
•Improved planning and controlling •Higher customer satisfaction •Increased flexibility in production •Faster time to market •Improved quality •Individualization of products •…	•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 •…

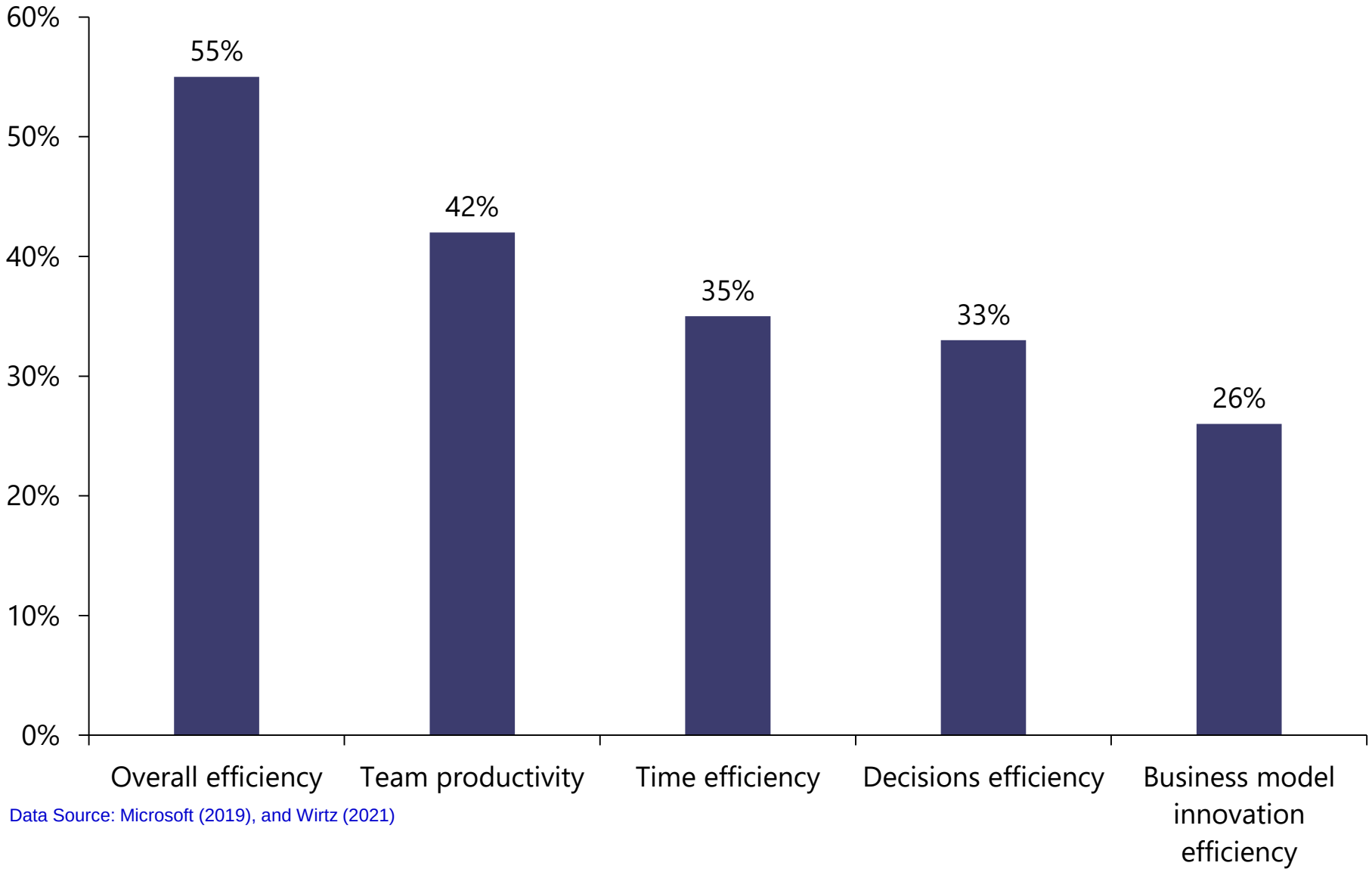
Source: Wirtz (2020b,2021)

Fig. 6.6 Stages of industrial automation



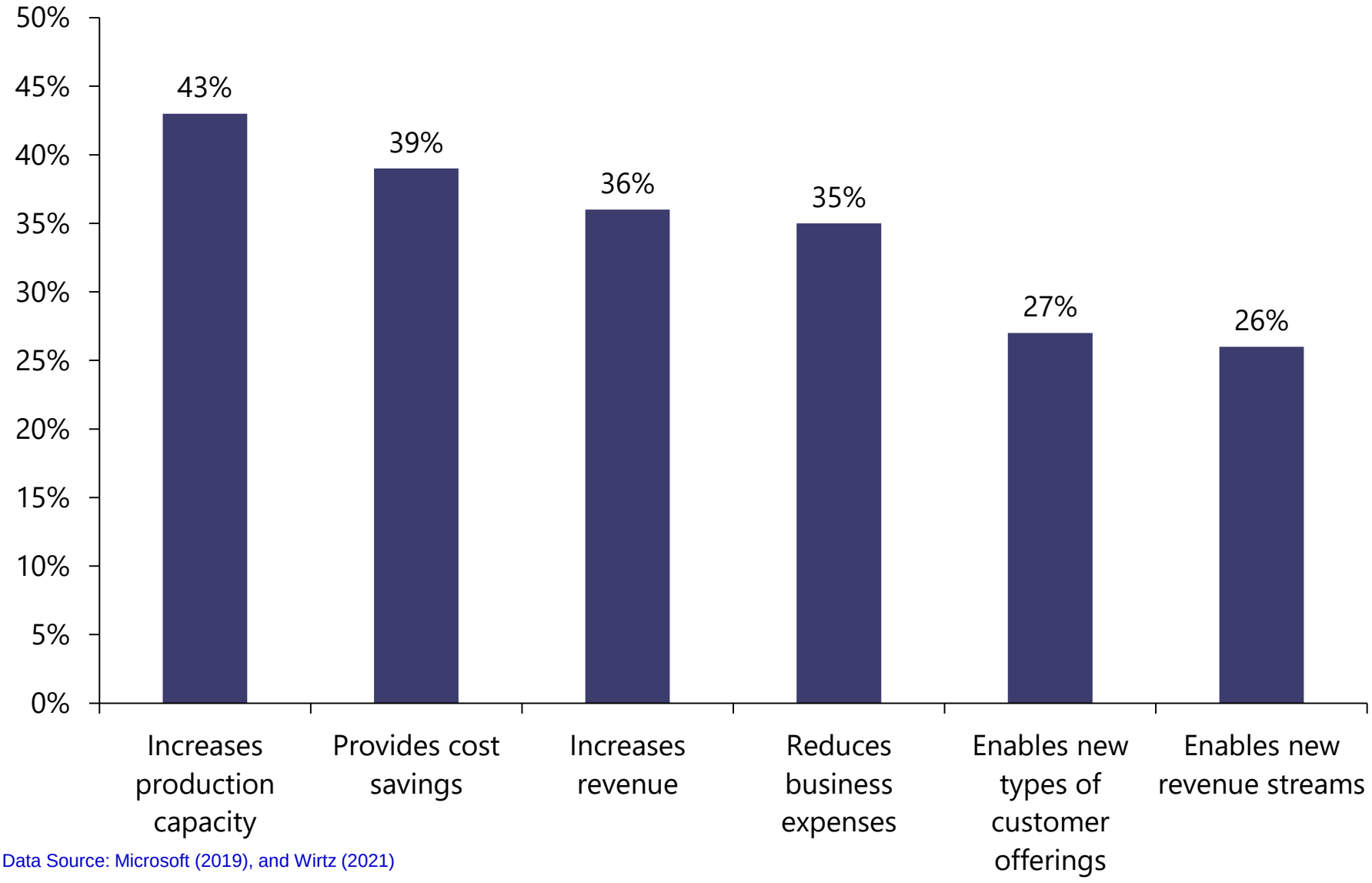
Source: Wirtz (2020b, 2021)

Fig. 6.7 IoT benefit increased efficiency



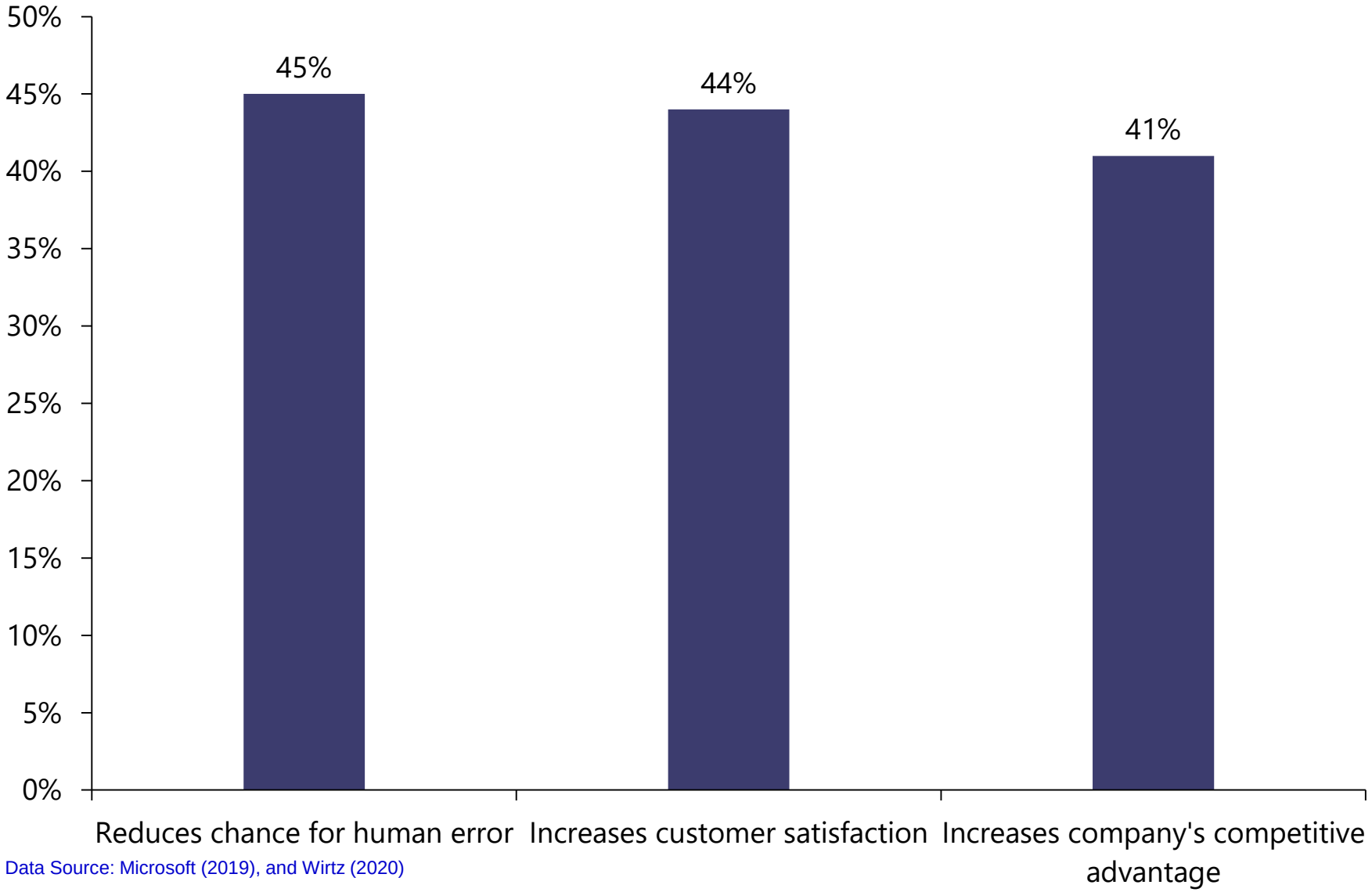
Data Source: Microsoft (2019), and Wirtz (2021)

Fig. 6.8 IoT benefit increased yield



Data Source: Microsoft (2019), and Wirtz (2021)

Fig. 6.9 IoT benefit improved quality



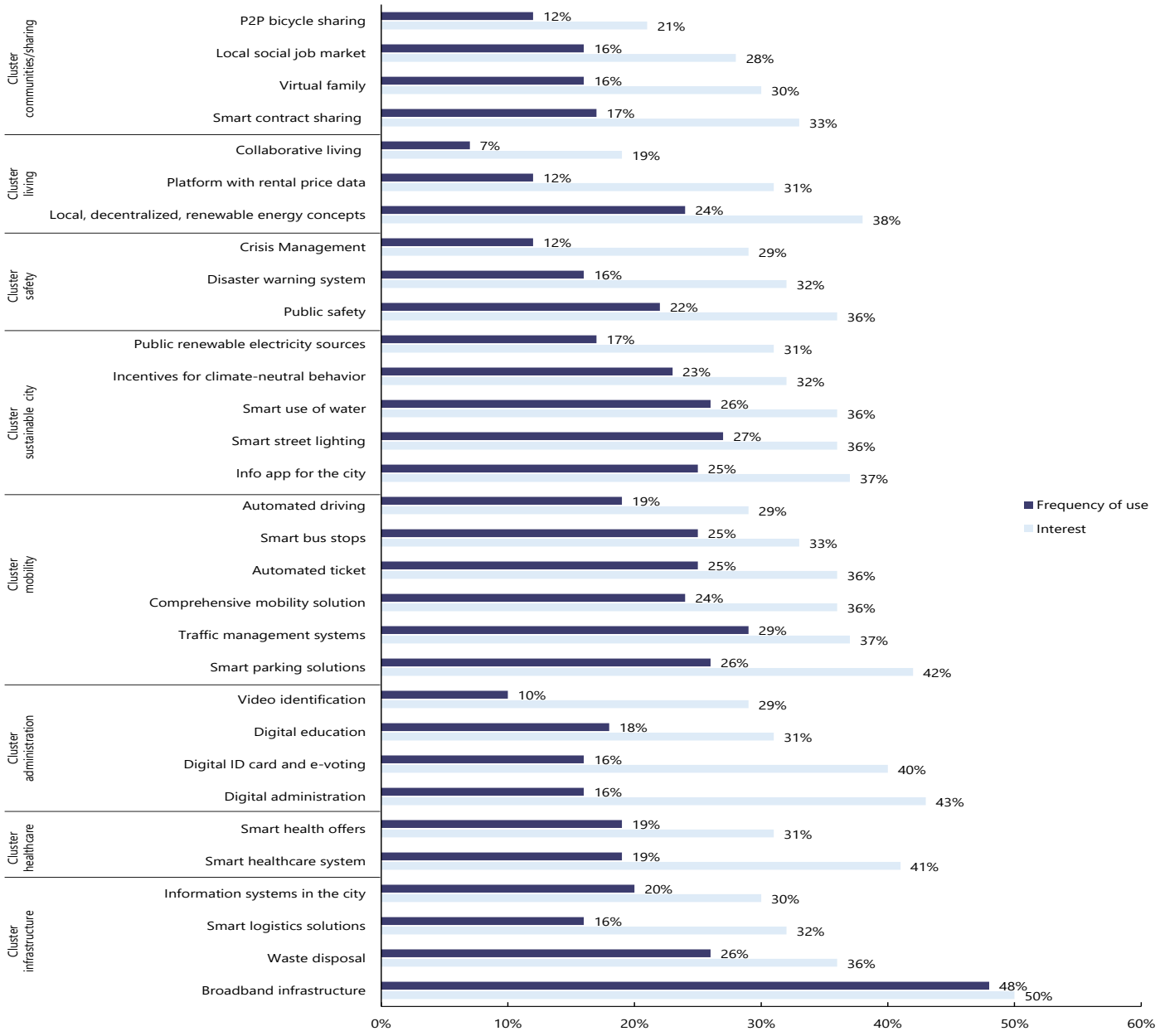
Data Source: Microsoft (2019), and Wirtz (2020)

Table 6.3 Smart home users by age

	Average	18-25	26-35	36-45	46-60	61+
Overall	24%	33%	46%	29%	14%	15%
Smart appliance	16%	18%	33%	18%	6%	6%
Smart thermostat	14%	14%	22%	16%	9%	9%
Smart lights	13%	25%	25%	15%	6%	6%
Other	7%	6%	14%	8%	3%	3%

Data Source: Walker Sands (2017), and Wirtz (2021)

Fig. 6.10 Interest in smart city solutions and frequency of use



Data Source: Wyman (2020), and Wirtz (2021)

Fig. 6.11 Success factors of IoT

Digital Business Model Innovation/ Diversification Competence

- 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

System Technology Competence

- Combinability of software & hardware IoT solutions
- IoT service/platform customization
- Management of IT platform & infrastructure
- Data security

Integration Ability of Complex IoT Services

- Horizontal & vertical integration ability of application levels
- Integrated service offers
- Complexity management

Digital Intelligence Competence

- 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, 2020b, 2021)

Chapter 6
Questions and topics for discussion

Review questions

1. Describe the concept of the Internet of Things.
2. Outline an IoT-specific IT infrastructure model.
3. Describe the different application possibilities of IoT and rank them according to their future market potential.
4. Explain the development stages of industrial automation in the field of IoT.
5. Present the success factors of the Internet of Things.

Topics for classroom discussion and team debates

1. The IoT has a 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.

Source: Wirtz (2021)

Chapter 7: Artificial Intelligence, Big Data, and Cloud Computing

Table 7.1 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.
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.
Adams et al. (2012)	[...] a system that could learn, replicate, and possibly exceed humanlevel 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.
Thierer et al. (2017)	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 (2020b, 2021)

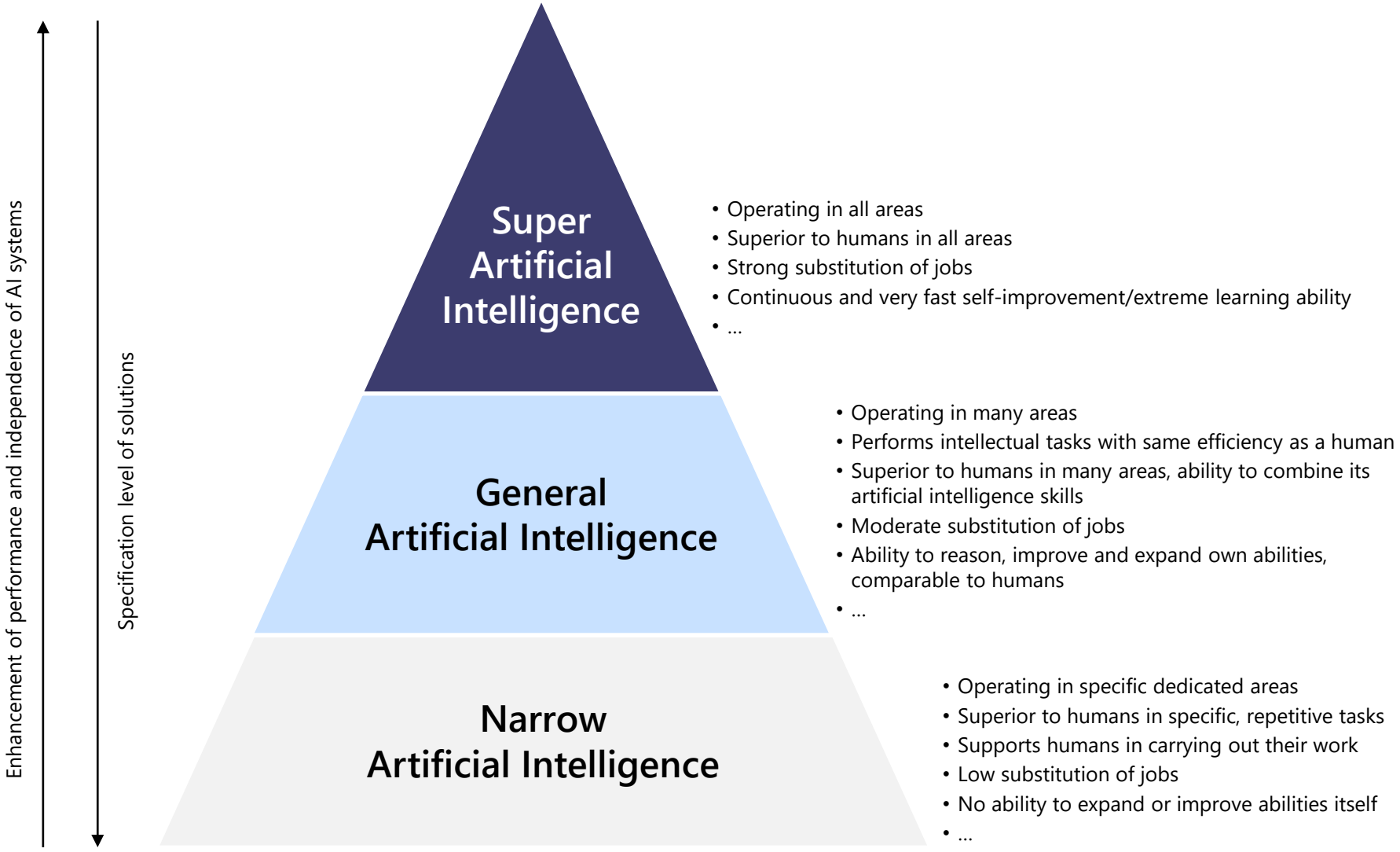
Definition of Artificial Intelligence

Definition of Artificial Intelligence (Wirtz et al. 2019)

AI refers to the capability of a computer system to show human-like 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.

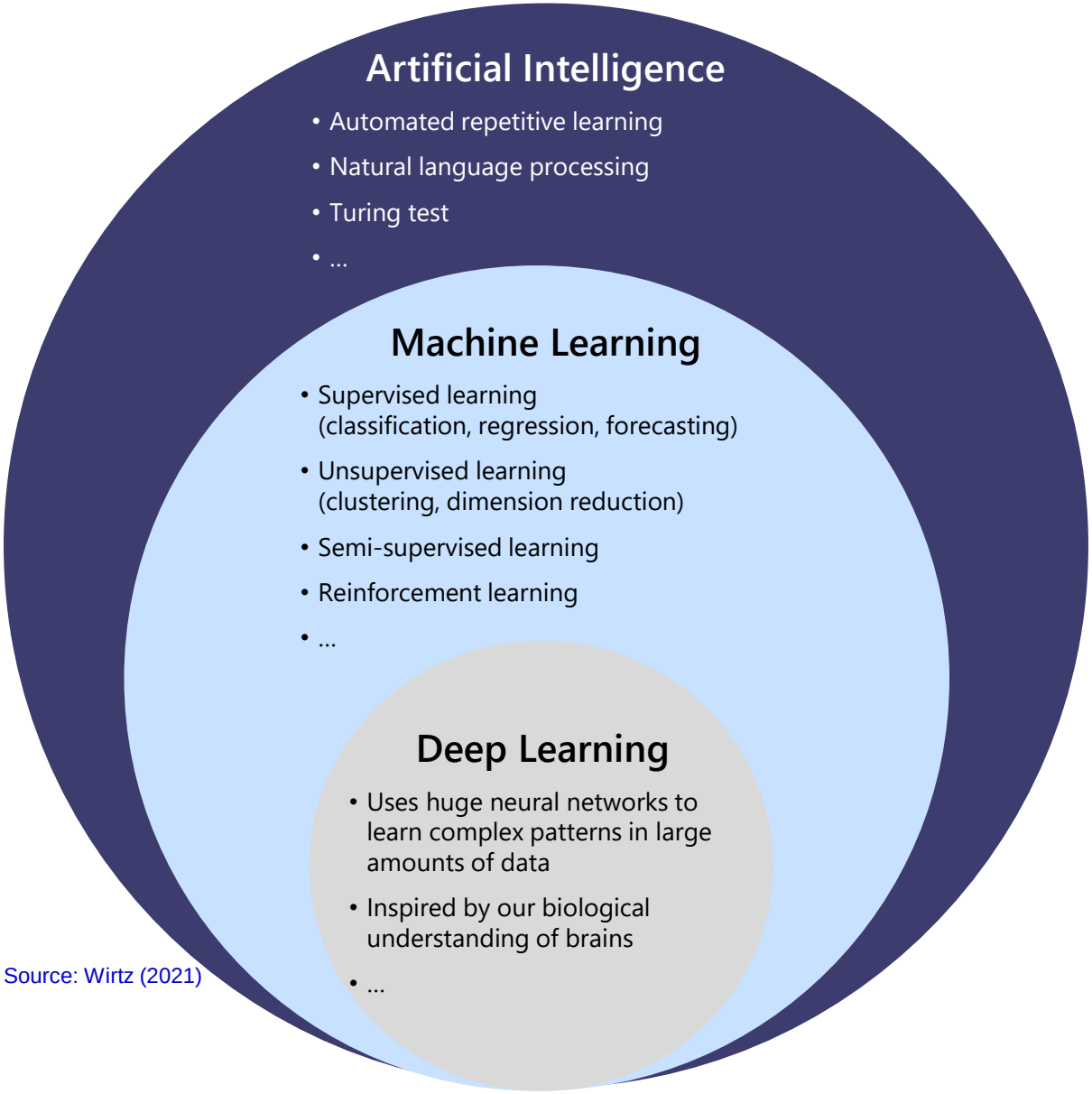
Source: Wirtz (2021)

Fig. 7.1 Development stages of artificial intelligence



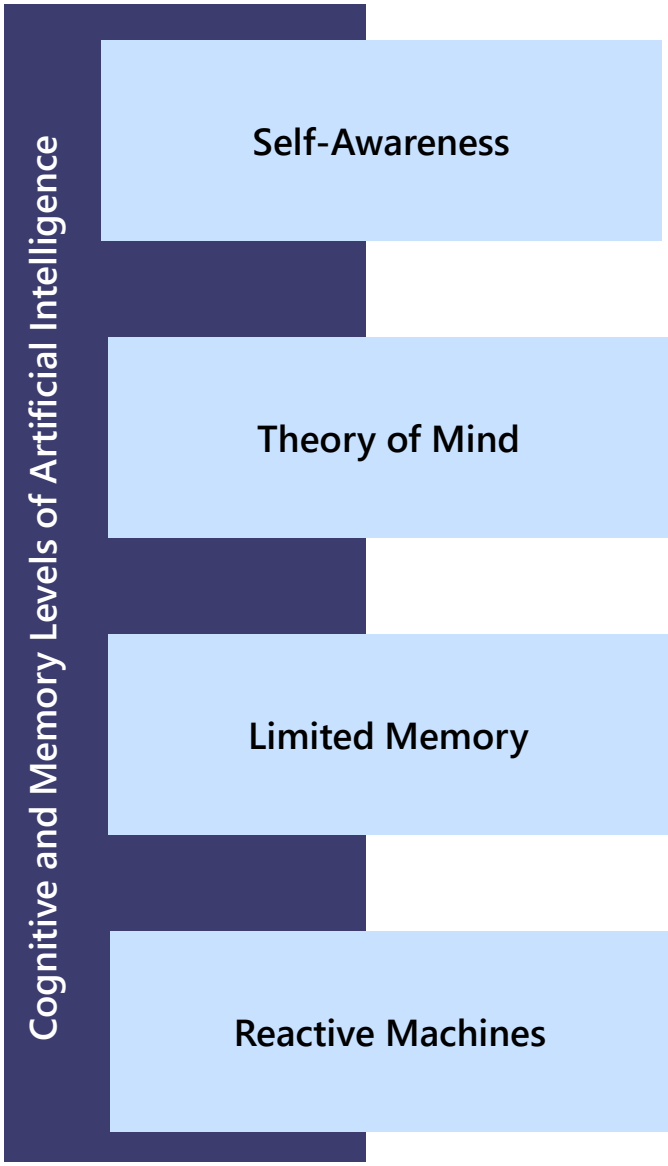
Source: Wirtz (2021)

Fig. 7.2 Methods of artificial intelligence



Source: Wirtz (2021)

Fig. 7.3 Cognitive and memory levels of artificial intelligence



- Artificial Intelligence is self-aware, like a human
- Data storage and processing capability exceeds human intellect
- Abundance of data makes AI smarter than any human mind
- …

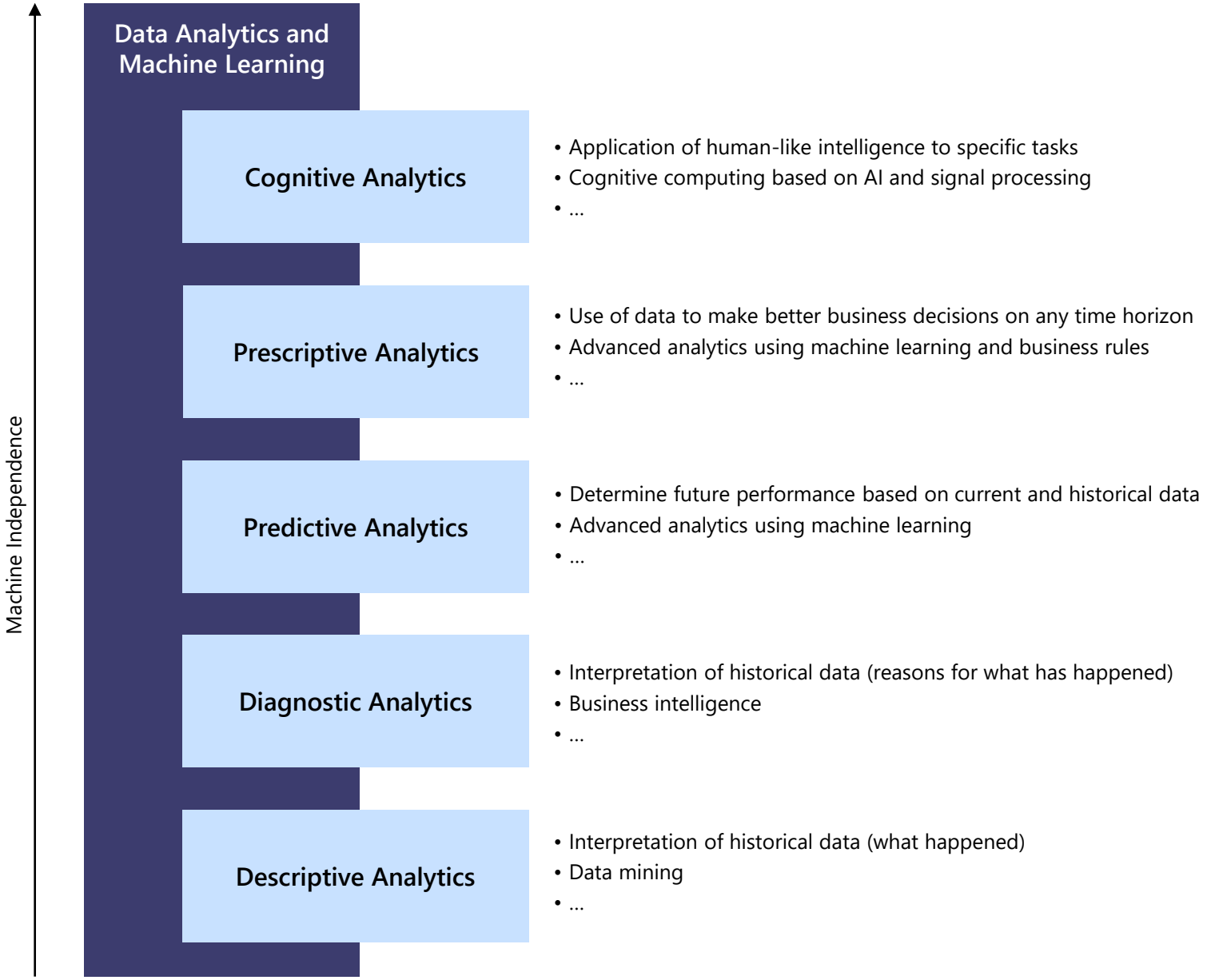
- Perception of the existence and relevance of others
- Available data allow the AI system „human" reactions, like understanding emotions, beliefs, needs of others, and human interaction
- …

- Short-term storage of data for future actions
- Available data allow „smart" reactions, for instance, to traffic conditions
- …

- No storage of memories for future actions
- Focused on current scenarios, giving best possible response
- …

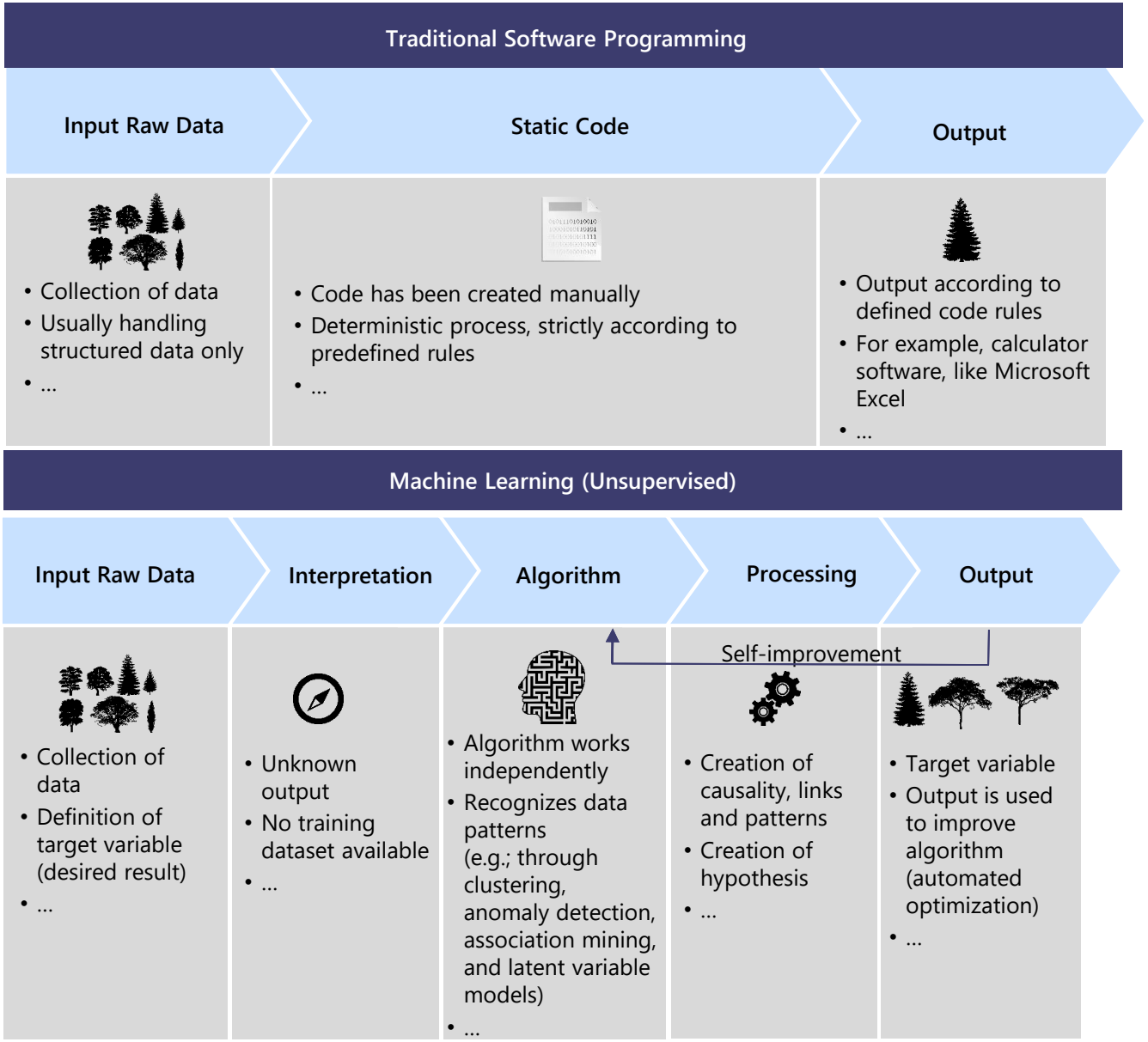
Source: Wirtz (2021)

Fig. 7.4 AI analytics approaches



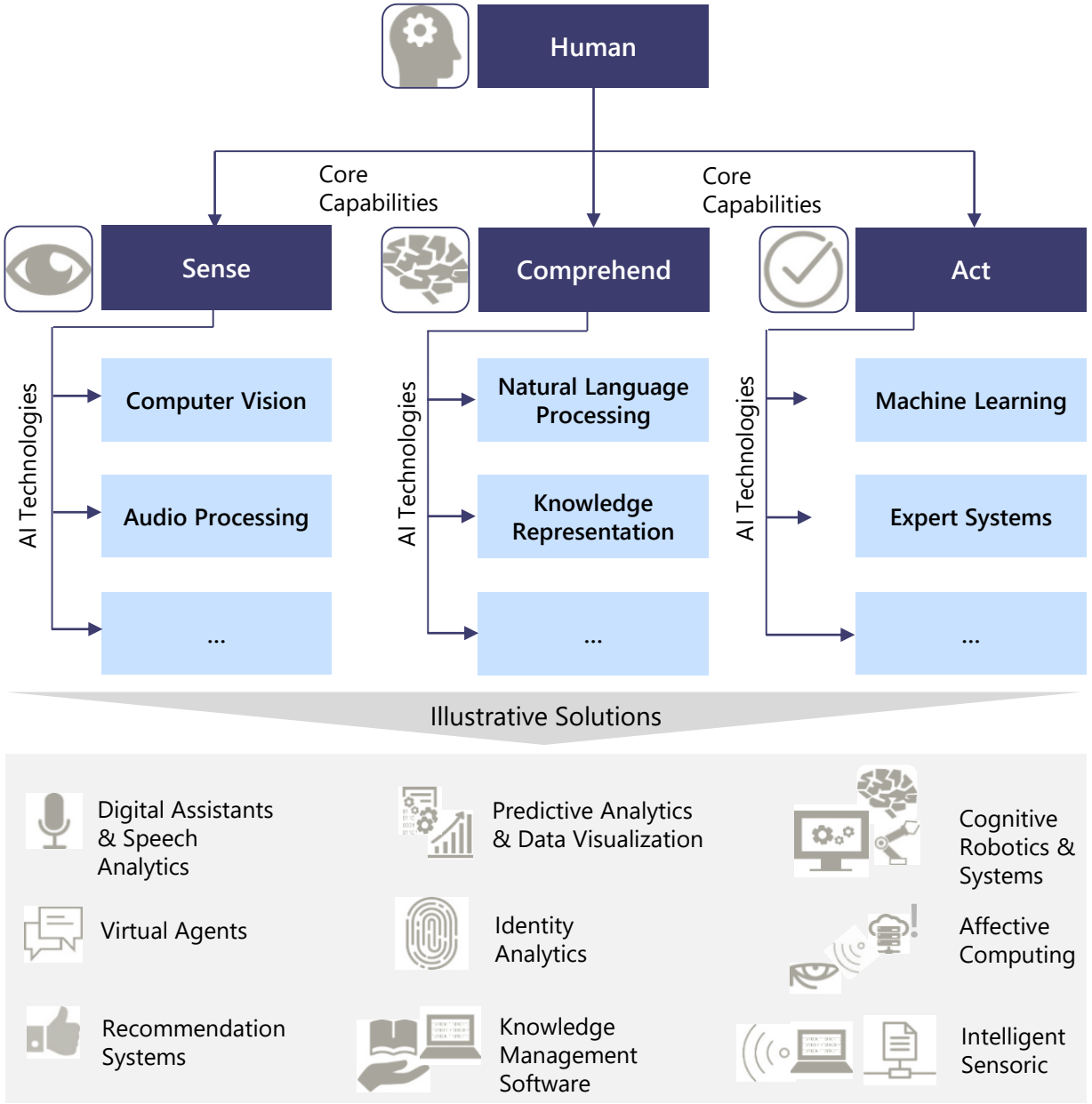
Source: Wirtz (2021)

Fig. 7.5 Machine learning process vs. traditional software programming



Source: Wirtz (2021)

Fig. 7.6 AI framework



Source: Wirtz (2018b, 2020b, 2021)

Table 7.2 Potential AI applications and use cases I

AI Application	AI Value Creation and Functional Proposition	Use Cases
AI-Based Knowledge Management Software	• 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 • ...	• 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	• 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 • ...	• Automated image diagnostics in medicine • Automation and optimization of product development and production • Optimization of environmental plants • ...

Source: Wirtz (2020b, 2021)

Table 7.2 Potential AI applications and use cases II

AI Application	AI Value Creation and Functional Proposition	Use Cases
Virtual Agents	• 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 • …	• Recruiting chatbot • Automated customer correspondence • Purchasing and consulting assistants • …
Predictive Analytics & Data Visualization	• 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 • …	• Medical diagnostics • Predictive maintenance in production • Financial forecasting, price optimization, and sales forecasting • …

Source: Wirtz (2020b, 2021)

Table 7.2 Potential AI applications and use cases III

AI Application	AI Value Creation and Functional Proposition	Use Cases
Identity Analytics	• 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 • …	• Customer recognition in shops • Face recognition for identification of persons • Security robot for monitoring airports • …
Cognitive Robotics & Autonomous Systems	• 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 • …	• Automated driving • Robot-assisted surgery • Care robots • …
Recommendation Systems	• An information filtering system • Software-based systems that screen personalized information to predict preferences of individuals • …	• Personalized marketing • Product recommendations • …

Source: Wirtz (2020b, 2021)

Table 7.2 Potential AI applications and use cases IV

AI Application	AI Value Creation and Functional Proposition	Use Cases
Intelligent Personal Assistants	• 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 • …	• Smart procurement assistants • Driving assistance • Assistants for visually impaired people • …
Speech Analytics	• 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 • …	• 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 & Threat Intelligence	• Additional application for cognitive technologies to analyze security information through natural language processing and machine learning • Interpret and organize information and provide reasoning • …	• Behavior pattern recognition for higher IT security • Monitoring of financial transactions • Sample diagnoses for better fraud detection • …

Source: Wirtz (2020b, 2021)

Table 7.3 Industry-specific potential and effects of AI I

Industry	Automation Potential	Effect on Productivity[1]	Effect on Demand[2]	Use Cases with High Potential Benefit
Production	60%	8.3%	2.2	• Improved monitoring and automatic adjustment of production processes • Optimization of production and supply chain • On-demand production
Transportation & Logistics	60%	7.0%	3.2	• Autonomous deliveries and transportation by trucks • Better traffic control and congestion reduction • Increased road safety
Retail Trade	53%	13.2%	3.0	• Better personalization and customization in design and production • Improved forecasting of product demand • Optimization of inventory and delivery management
Energy & Supply	44%	6.8%	2.2	• Intelligent meters and measuring systems (smart metering) • Higher efficiency of network operation and storage • Predictive maintenance of the infrastructure

[1] *Growth of gross domestic product (GDP) through AI in Germany in percent*
[2] *Values are based on the AI impact index valuation of PwC. The scale ranges from "1" to "5," with "1" being the lowest potential impact of AI on demand and "5" the highest.*

Data source PwC (2017); McKinsey (2017b); PwC (2018a); PwC (2018b); Wirtz and Weyerer (2019c); Wirtz (2020b, 2021)

Table 7.3 Industry-specific potential and effects of AI II

Industry	Automation Potential	Effect on Productivity[1]	Effect on Demand[2]	Use Cases with High Potential Benefit
Finance	43%	8.4%	3.3	• Better personalization of financial planning • Optimizing the prevention and detection of money laundering and fraud • Automated customer business
Technology, Media & Communication	41%	9.9%	3.1	• Improved archiving, search and media recommendations • Generation of custom content • Better personalization and customizing for advertising and marketing
Health & Social Affairs	36%	27.9%	3.7	• Better diagnostic support • Improved early detection of potential pandemics • Improved image diagnosis

[1] *Growth of gross domestic product (GDP) through AI in Germany in percent*
[2] *Values are based on the AI impact index valuation of PwC. The scale ranges from "1" to "5," with "1" being the lowest potential impact of AI on demand and "5" the highest.*

Data source PwC (2017); McKinsey (2017b); PwC (2018a); PwC (2018b); Wirtz and Weyerer (2019c); Wirtz (2020b, 2021)

Table 7.4 Opportunities and risks of AI I

Dimensions	Opportunities	Risks
Social & Ethical	• Increased road safety and time savings for people through selfdriving vehicles based on AI (e.g., Waymo) • Improved medical diagnostics and early detection of pandemics through AI systems (e.g., IBM Watson) • Increased public security by means of AI-based video surveillance and pattern recognition (e.g., ivisX) • ...	• Moral dilemmas of autonomous AI applications • Discrimination of people by AI algorithms • Lack of compatibility between mechanical and human value judgment • AI-based rule-setting for human behavior without a normative-ethical basis • Global technological arms race, especially in the military sector (e.g., AI-based autonomous weapons) • ...
Legal & Regulatory	• Improved legal case analysis through AI-based e-discovery software (e.g., Exterro) • Prediction of judgments with high accuracy by AI systems (e.g., case crunch) • Improved risk assessment of the likelihood of recidivism of offenders through AI systems and reduction of the prison population • ...	• Technology obedience and loss of control due to lack of governance of autonomous intelligent systems • Threat to cybersecurity and data protection through AI cyberattacks • Unclear responsibility and liability for decisions and actions of AI systems • ...

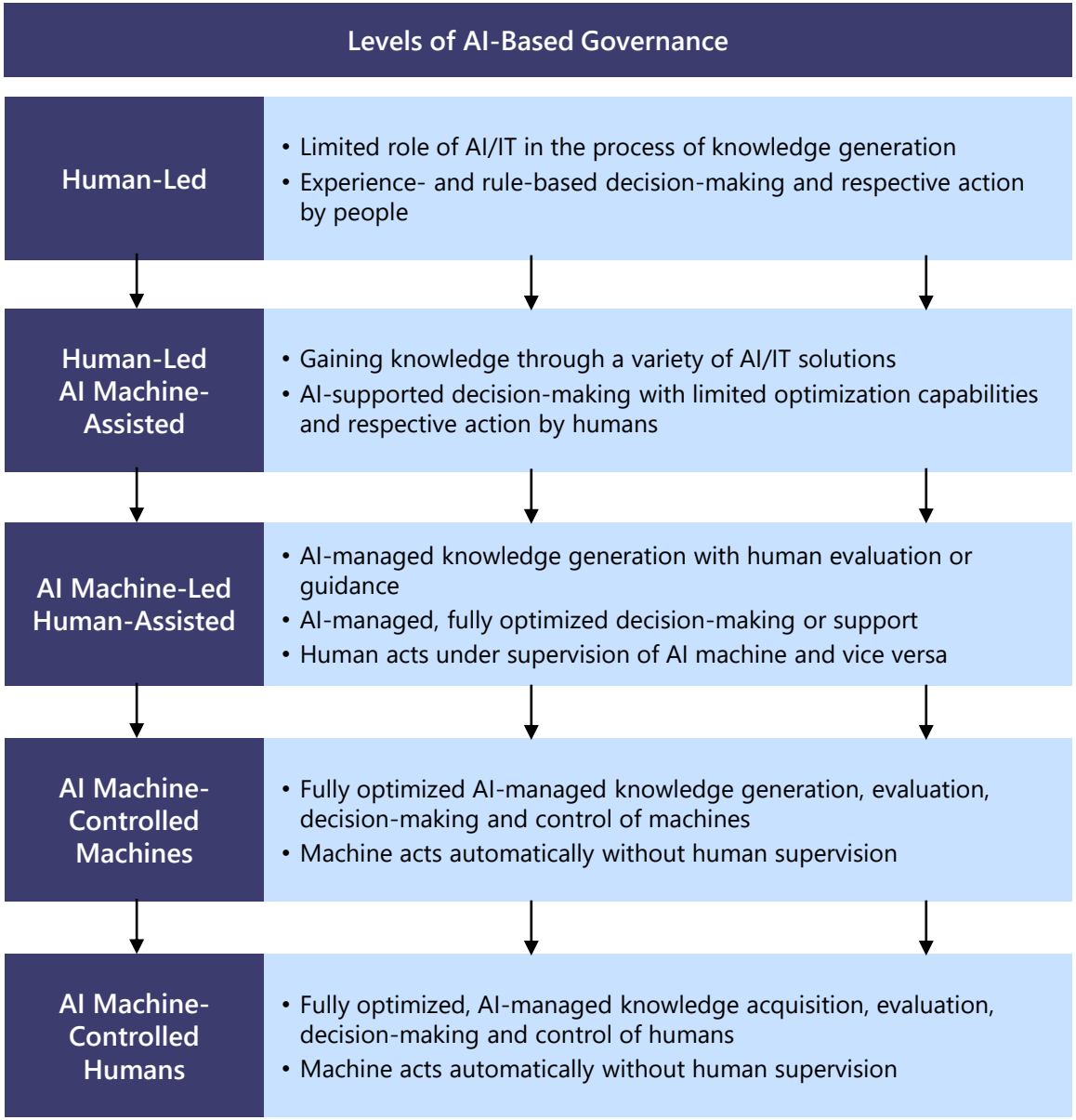
Source: Wirtz (2020b, 2021)

Table 7.4 Opportunities and risks of AI II

Dimensions	Opportunities	Risks
Technological & Implementation-Oriented	• Improved AI-based data and information processing enables efficient and sustainable resource allocation • Higher IT security through improved AI-based behavior pattern recognition • Faster and easier access to the Internet and digital services using AI-based personal assistants (e.g., Amazon Alexa, Google Assistant and Duplex, Siri from Apple, or Microsoft's Cortana) • ...	• Loss of control over technologically autonomous AI systems • Security problems and failure of the AI system in mission-critical and life-critical situations due to immaturity of the AI-technology and lack of experience • Lack of specialization and expertise as well as a lack of skilled workers • High entry, transition and implementation costs • ...
Economic	• Free up work capacity and increase productivity by automating repetitive tasks using AI-based process automation systems and virtual agents • Rationalization and process optimization through AI systems • Considerable efficiency advantages through AI-based IoT applications • Improved AI-based data analysis and improved financial and sales forecasting creates significant efficiencies and better management decisions • ...	• Social resistance of workers to the introduction of AI systems • Loss of management and control of business processes due to transformation of human-machine and machine-machine interaction and increased autonomous AI automation • Lack of social and customer-related acceptance and low trust into AI systems and manufacturer through AI failures • Substitution and transformation of the labor market and unemployment, especially in production and manufacturing industry • ...

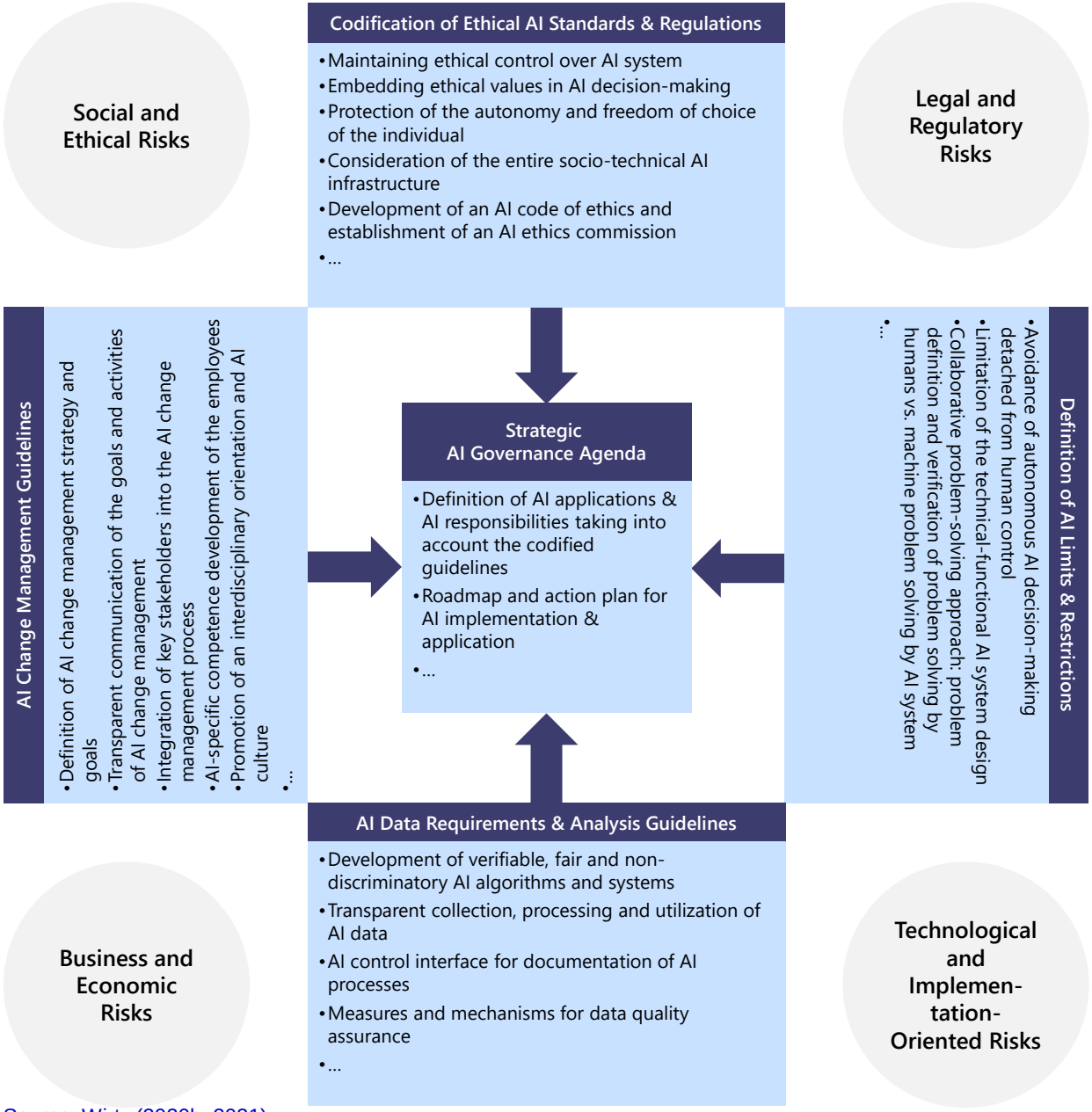
Source: Wirtz (2020b, 2021)

Fig. 7.7 7 Levels of AI-based governance



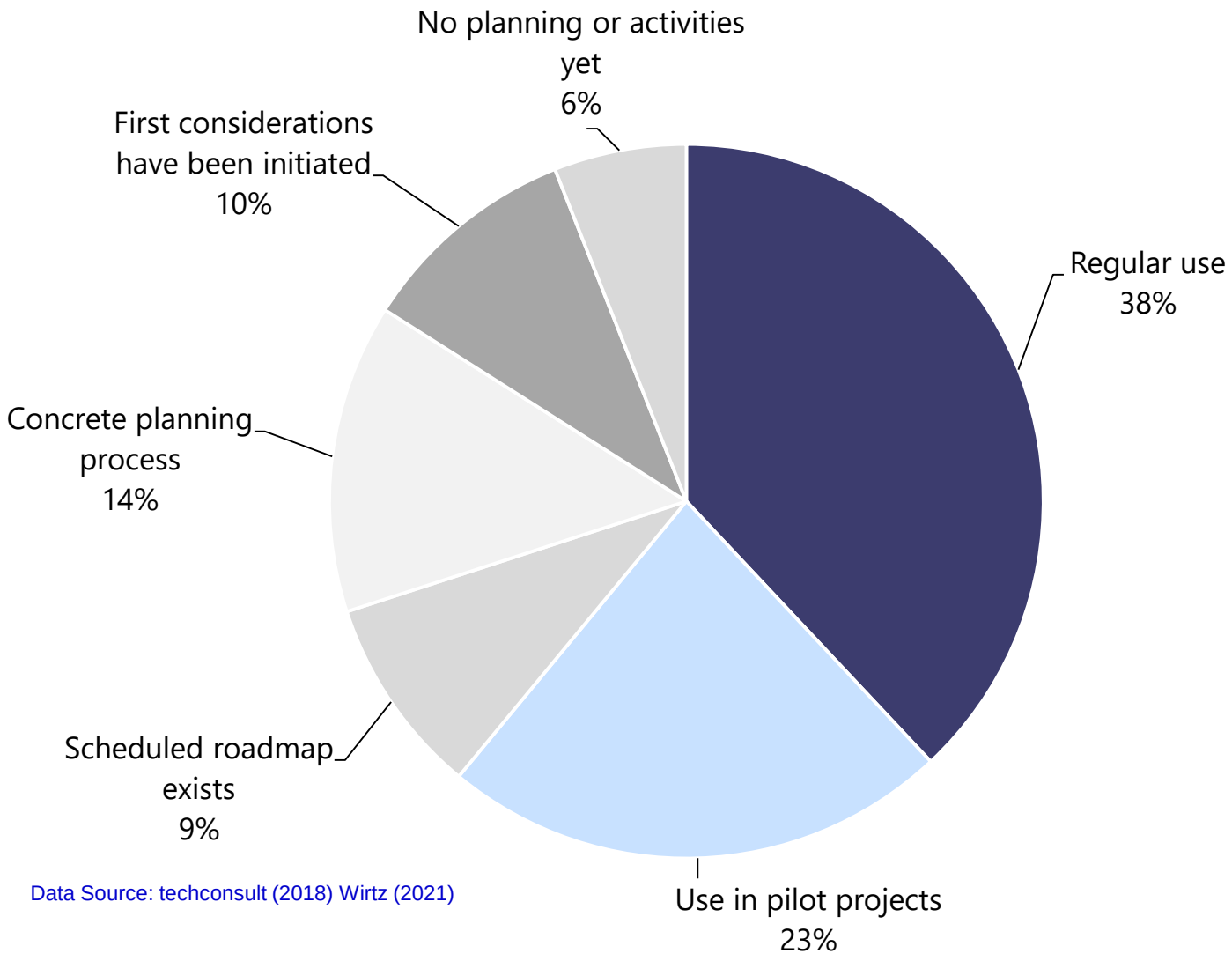
Source: Wirtz (2020b, 2021)

Fig. 7.8 Strategic four AI governance model



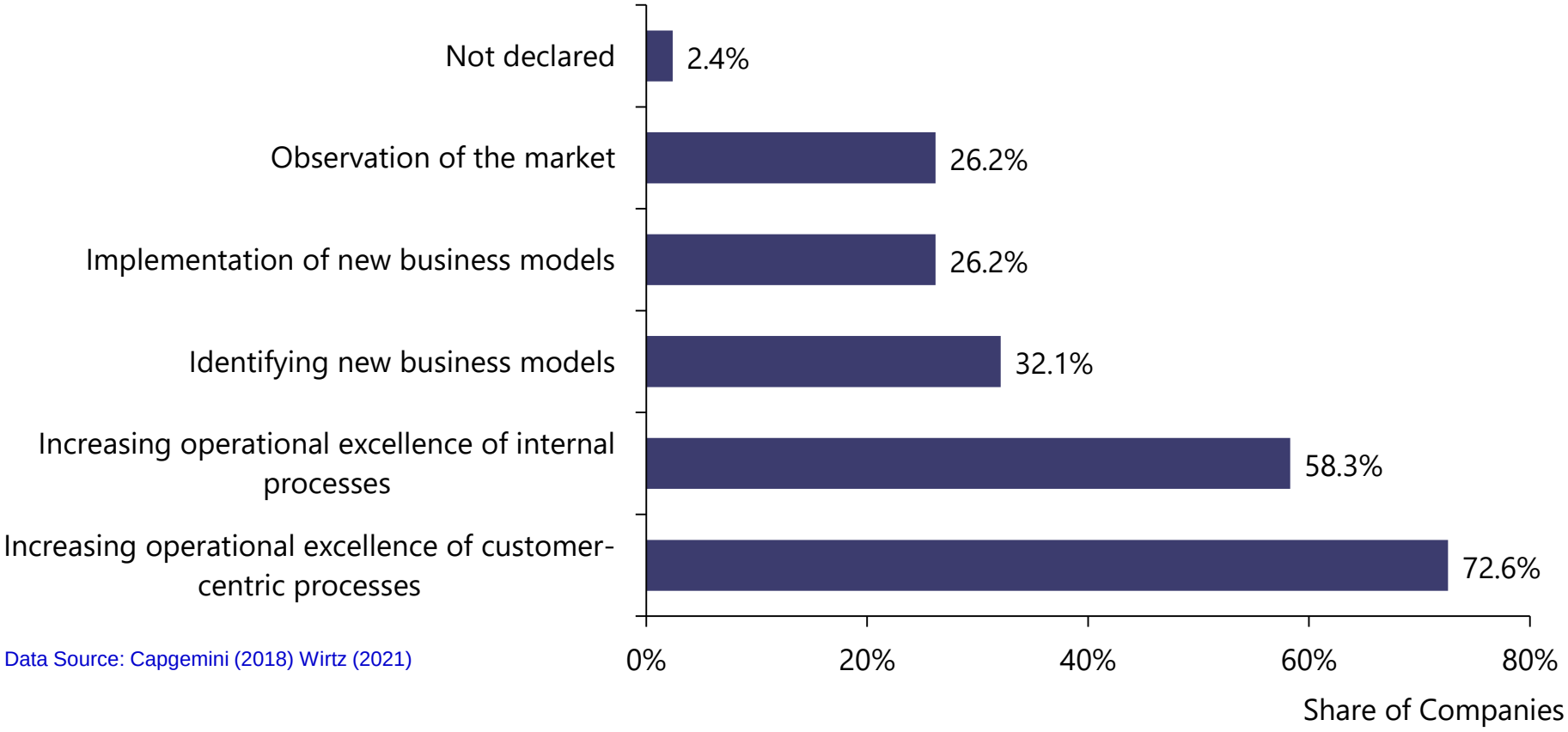
Source: Wirtz (2020b, 2021)

Fig. 7.9 Application of big data analytics in business practice



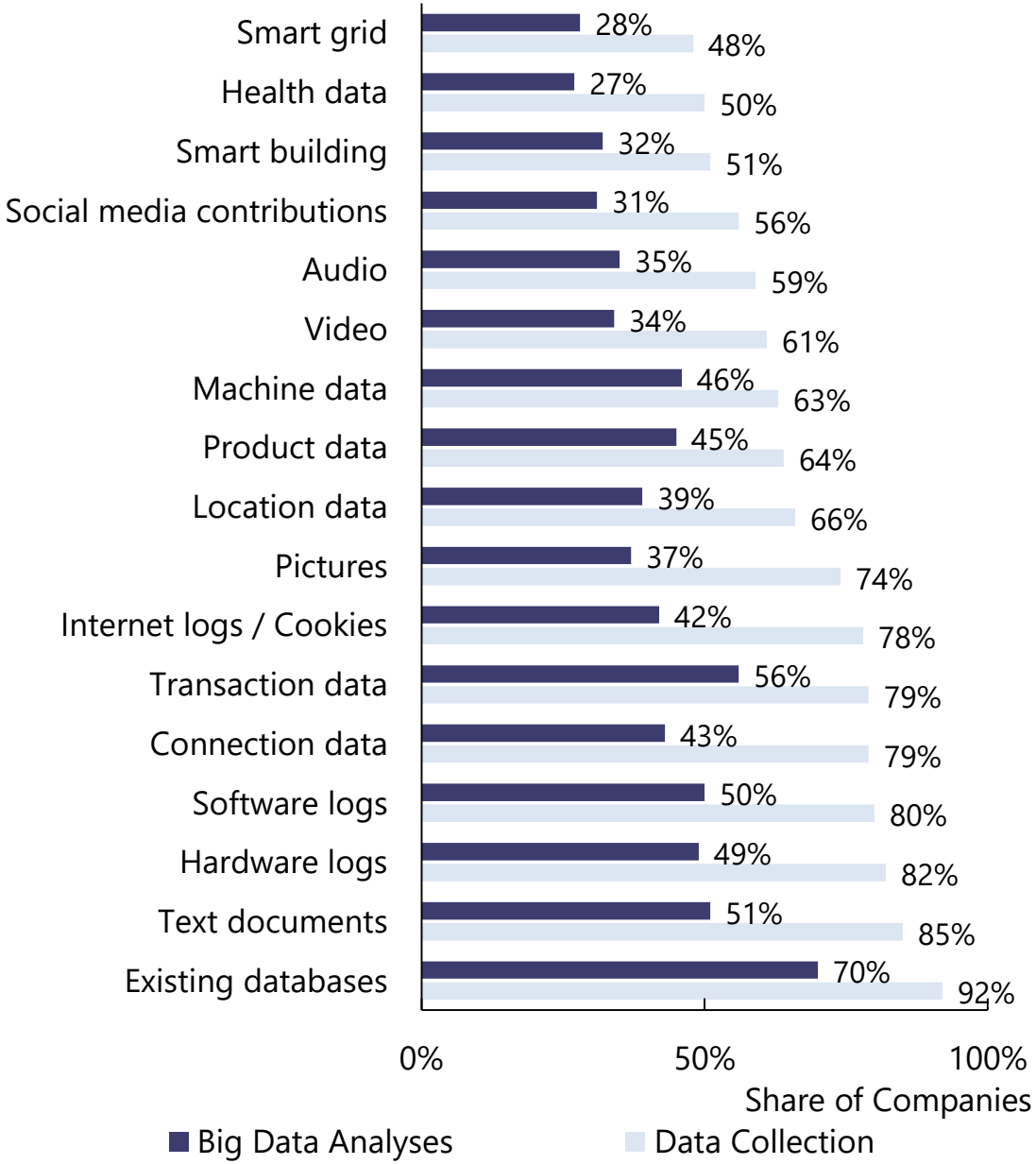
Data Source: techconsult (2018) Wirtz (2021)

Fig. 7.10 Areas of application for big data in companies



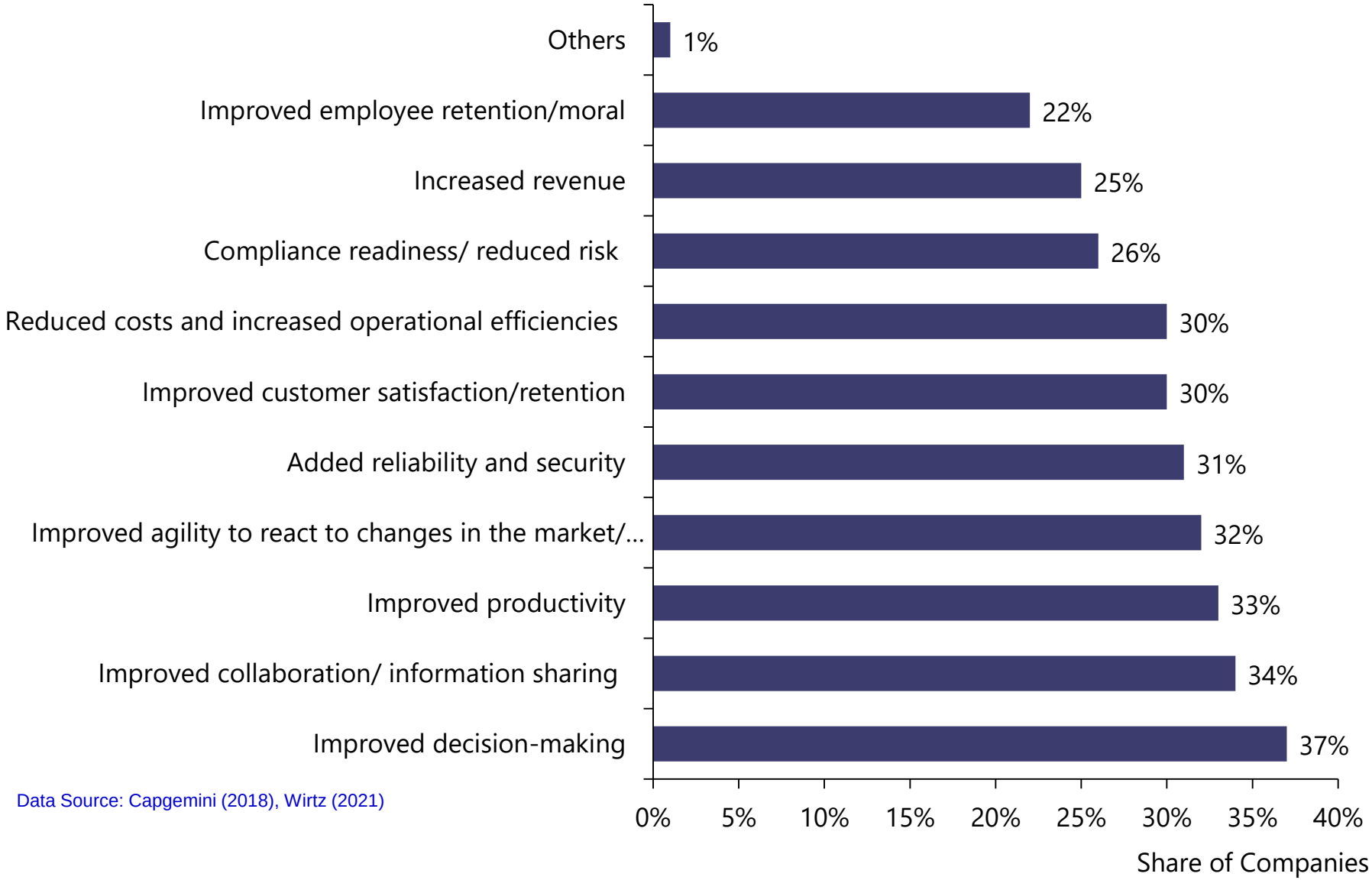
Data Source: Capgemini (2018) Wirtz (2021)

Fig. 7.11 Data processed by companies in big data analyses



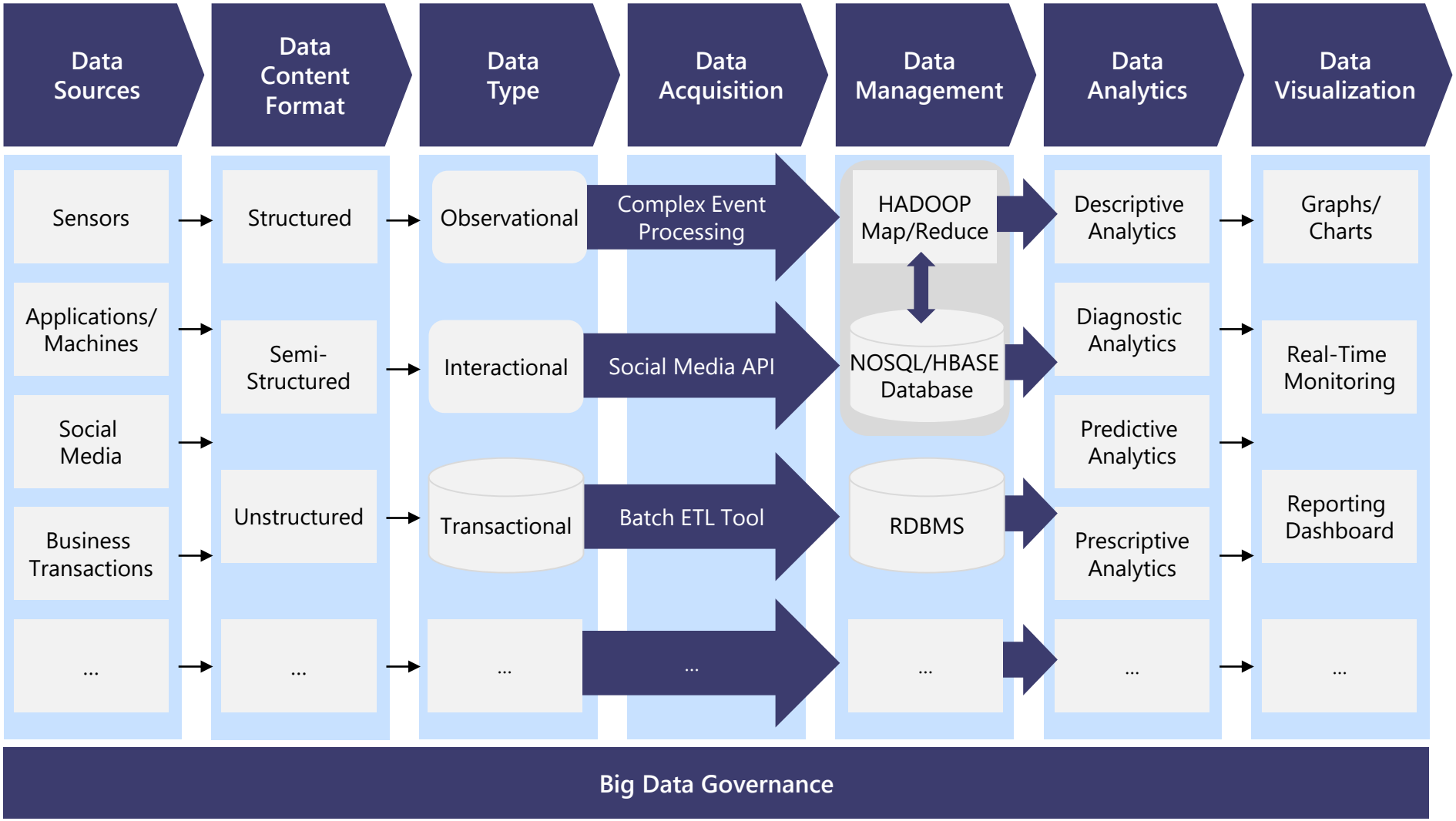
Data Source: techconsult (2018) Wirtz (2021)

Fig. 7.12 Advantages of using big data from a company perspective



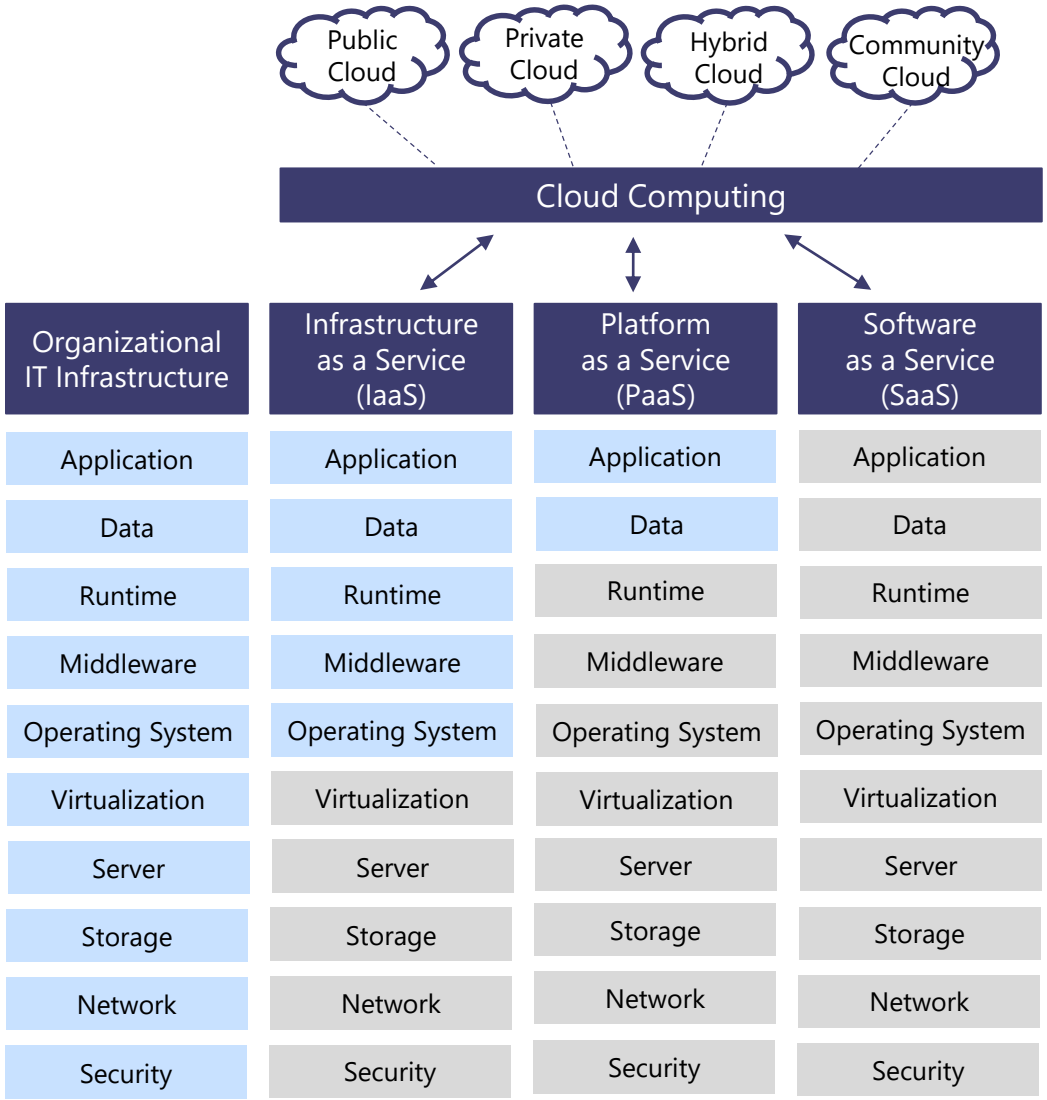
Data Source: Capgemini (2018), Wirtz (2021)

Fig. 7.13 Exemplary illustration of a big data architecture



Source: Wirtz (2018b, 2020b, 2021)

Fig. 7.14 Provision and service models of cloud computing



Source: Wirtz (2016b, 2020b, 2021)

Chapter 7. Questions and topics for discussion

Chapter 7
Questions and topics for discussion

Review questions

1. Present the different stages and functionalities of AI.
2. Explain the AI framework.
3. Describe AI application areas and give examples of AI use cases.
4. Explain the seven layers of a big data architecture and which aspects are addressed by big data governance in this context.
5. Describe the different types of provision and service models of cloud computing and explain differences in terms of the organizational IT infrastructure.

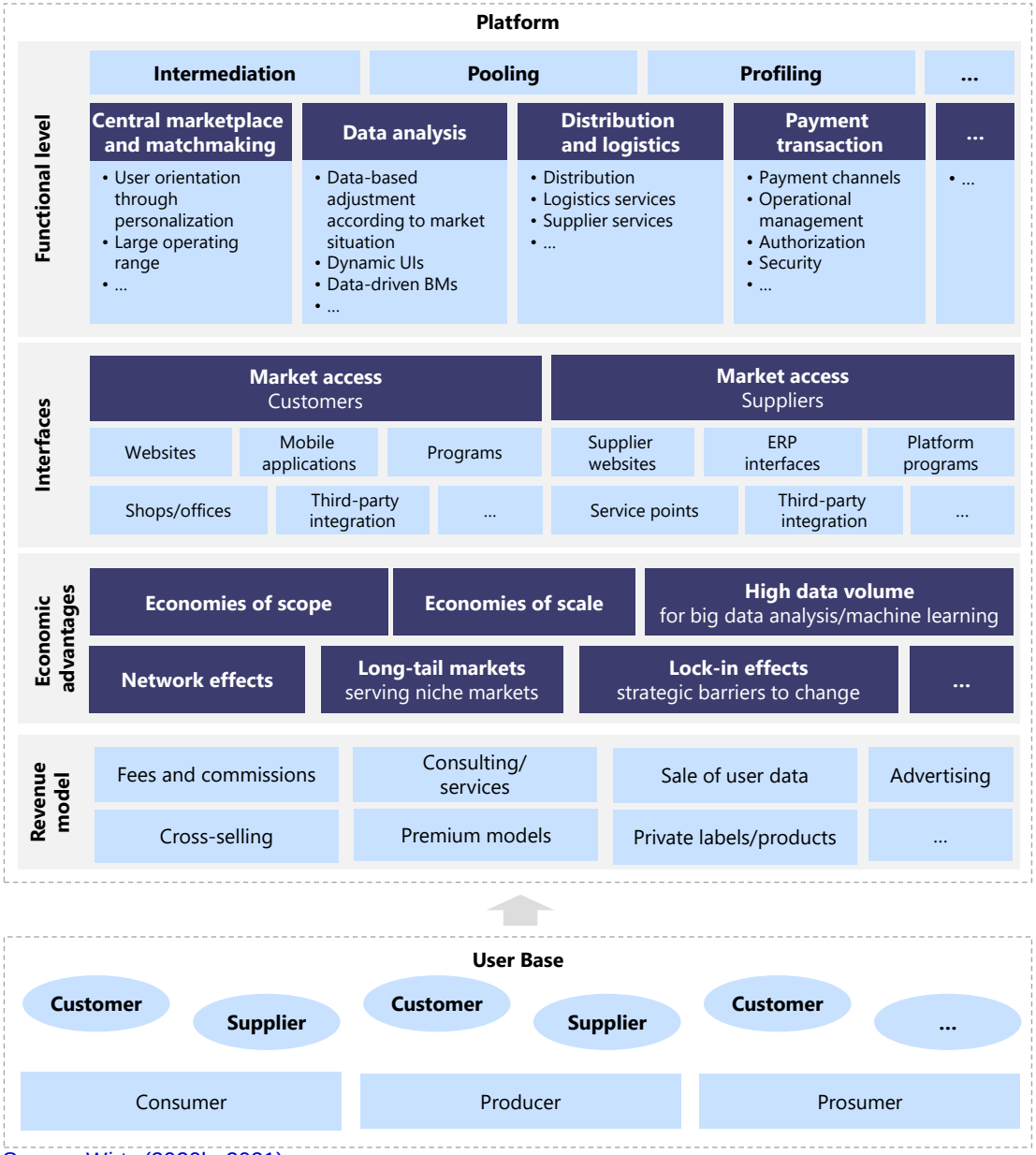
Topics for classroom discussion and team debates

1. In a not too distant future, there will be AI machines that are superior to human work in many areas and will replace it to a large extent. Discuss the ethical aspects of such a situation and in particular the impact on the labor market and possible mass unemployment.
2. Discuss on the basis of the levels of AI-based governance how socially desirable it is to have AI machines control humans.
3. Discuss the opportunities and risks of cloud services in class. Are the risks reasonable in relation to the advantages of cloud services?

Source: Wirtz (2021)

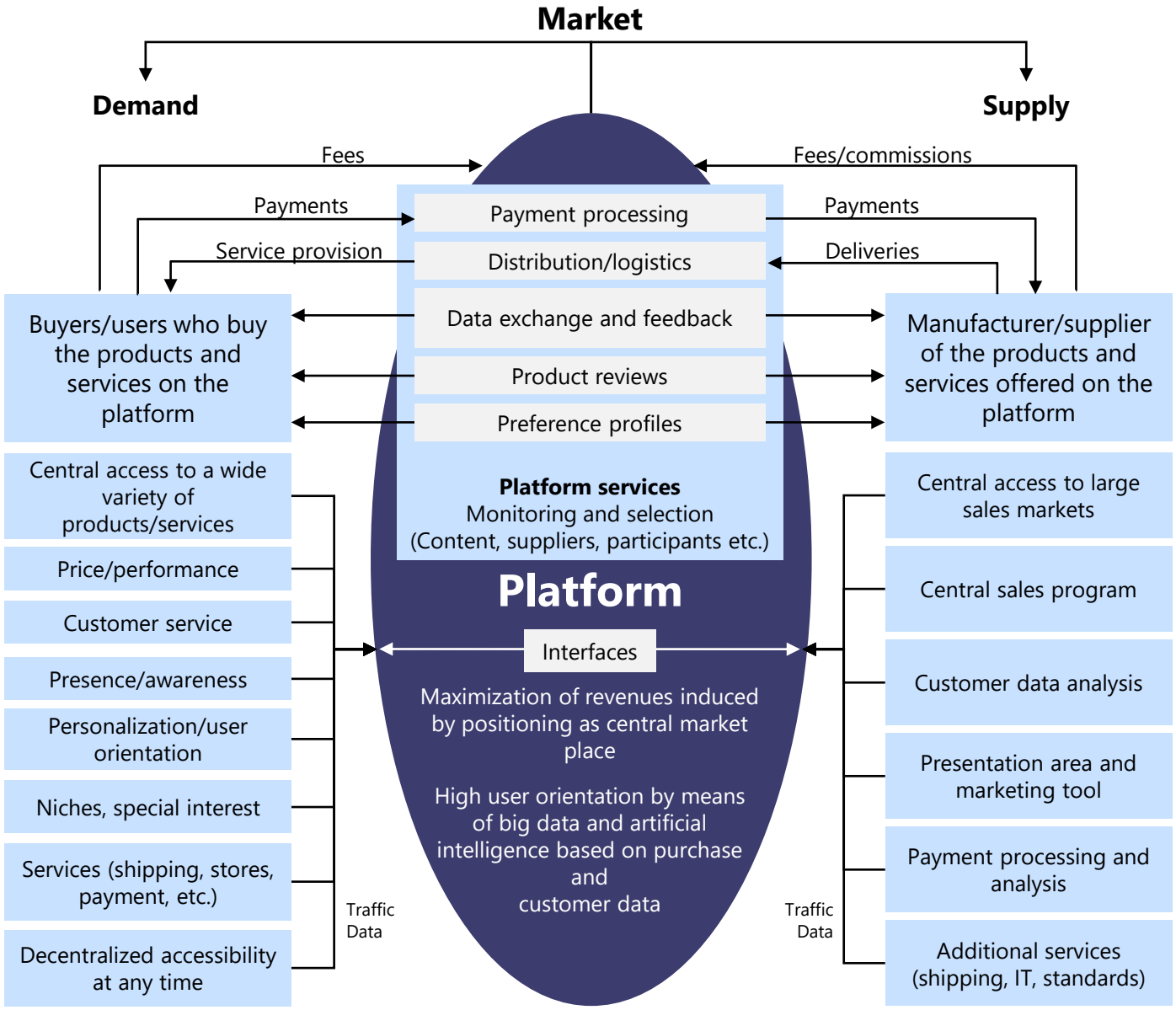
Chapter 8: Digital Platforms, Sharing Economy and Crowd Strategies

Fig. 8.1 Key elements of a platform environment



Source: Wirtz (2020b, 2021)

Fig. 8.2 Interactions on a platform environment



Source: Wirtz (2020b, 2021)

Table 8.1 Comparison of platform providers I

	Uber	Airbnb	Amazon	eBay
Value Proposition	Supplier • Opportunity to generate additional income • No immediate superior • Set flexible driving times themselves • Easy participation/ registration as a driver • ...	Supplier • Opportunity to generate additional rental income • Insurance protection through booking via the platform • Flexible and short-term commitments and cancellations for own requirements • ...	Supplier • Wide reach • Large number of customers (independent of location and time) • Numerous additional service offers (logistics, payments, etc.) • ...	Supplier • Wide reach • Large number of customers (independent of location and time) • Numerous additional service offers (logistics, payments, etc.) • ...
	User • Exact pickup and destination locations • Low waiting times • Available at any time/mobile availability • Comparatively cheap (in contrast to taxi costs) • ...	User • Lower costs than a hotel • Mostly fullequipped apartments • Authentic and individual accommodation • Transparent evaluation system • ...	User • Comparatively low prices • Short waiting times, fast delivery • Available at any time/mobile availability (1-ClickBuy) • Large number of products, plenty of choice • ...	User • Available at any time/ mobile availability • Different purchase options (bid, immediate purchase) • Large number of products, plenty of choice • ...

Source: Wirtz (2020b, 2021)

Table 8.1 Comparison of platform providers II

	Uber	Airbnb	Amazon	eBay
Functionality of Integration	• Intermediation of individual private driving services via an app within a digital network • Increasing the capacity utilization of vehicles • ...	• 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 • ...	• Digital marketplace with a wide variety of products including streaming services for video and music • ...	• Digital marketplace and auction house with a large variety of products • ...
Strategies	• 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 • ...	• Use of private housing as a resource in tourism and for business travelers • Central and global brand for short-term rentals • ...	• Positioning as primary search engine and seller • 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 • ...	• Online marketplace for retail customers and business and private sellers • Full-service provider • ...

Source: Wirtz (2020b, 2021)

Table 8.1 Comparison of platform providers III

	Uber	Airbnb	Amazon	eBay
Economies of Scale/ Economies of Scope	• 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 • …	• 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 • …	• 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.) • …	• 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 • …

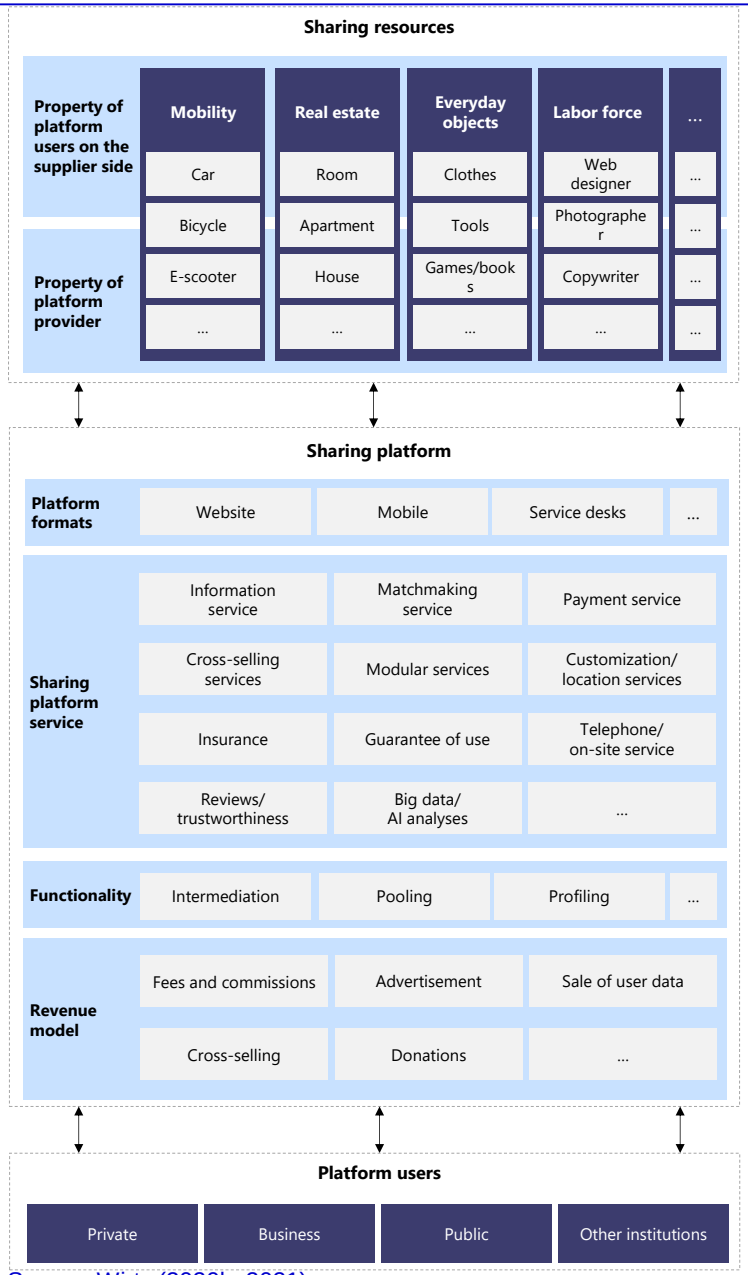
Source: Wirtz (2020b, 2021)

Fig. 8.3 Summary of the terms possession and ownership in the shareconomy

	Possession	Ownership
Characteristics	• Actual control of a thing • Access to a thing to enjoy and dispose • Rented (and stolen) things are being possessed • …	• Legal dominion of a thing • Based on property rights • Complete right of dominion, i.e. absolute power to enjoy and dispose • Right of disposal can be granted to someone else, e.g. rental • …
Examples	• 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 • …	• 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 (2020b, 2021)

Fig. 8.4 SSU sharing platform model



Source: Wirtz (2020b, 2021)

Table 8.2 Applications of the shareconomy I

Sector	Applications	Customer Benefits	Examples
Real Estate	• Short-term rental of real estate • Accommodation places as exchange offers • …	• High flexibility • Comparatively inexpensive • No term of contract • No capital commitment • …	• Airbnb • Couchsurfing • …
	• Short-term rental • Sharing of workplaces • …	• High flexibility • Working atmosphere and equipment • No term of contract • No capital commitment • …	• WeWork • betahaus • …
Mobility	• Driving service agency/rental incl. driver in private cars • …	• Comparatively inexpensive • Elimination of fixed costs • High availability • …	• Uber • Free Now • …
	• Bike-sharing/shortterm rental of bicycles • …	• High flexibility • Modular mobility • No effort and costs for maintenance • …	• Hangzhou Public Bicycle • Vélib' • …
	• Car-sharing/short-term rental of vehicles • …	• No term of contract • No capital commitment • …	• Zipcar • Share Now • WeShare • …

Source: Wirtz (2020b, 2021)

Table 8.2 Applications of the shareconomy II

Sector	Applications	Customer Benefits	Examples
Everyday Objects	• Short-term rental and sharing of home appliances • …	• No capital commitment • No effort and costs for maintenance • Sustainability aspects • Social and societal motivation • …	• Streetbank • Peerby • TradeMade • …
	• Exchange clothes • …	• Great variety • Comparatively cheap • Sustainability aspects • Social and societal motivation • …	• Swap.com • Swancy • Vinted • …
	• Exchange and sale of used books and films • …	• Great variety • Comparatively cheap • Sustainability aspects • Social and societal motivation • …	• BookCrossing • BookSwap • Informal street book exchange • …
	• Rental of toys …	• Great variety • Comparatively cheap • No maintenance costs • Sustainability aspects • Social and societal motivation • …	• Toy Box Club • Toycycle • …

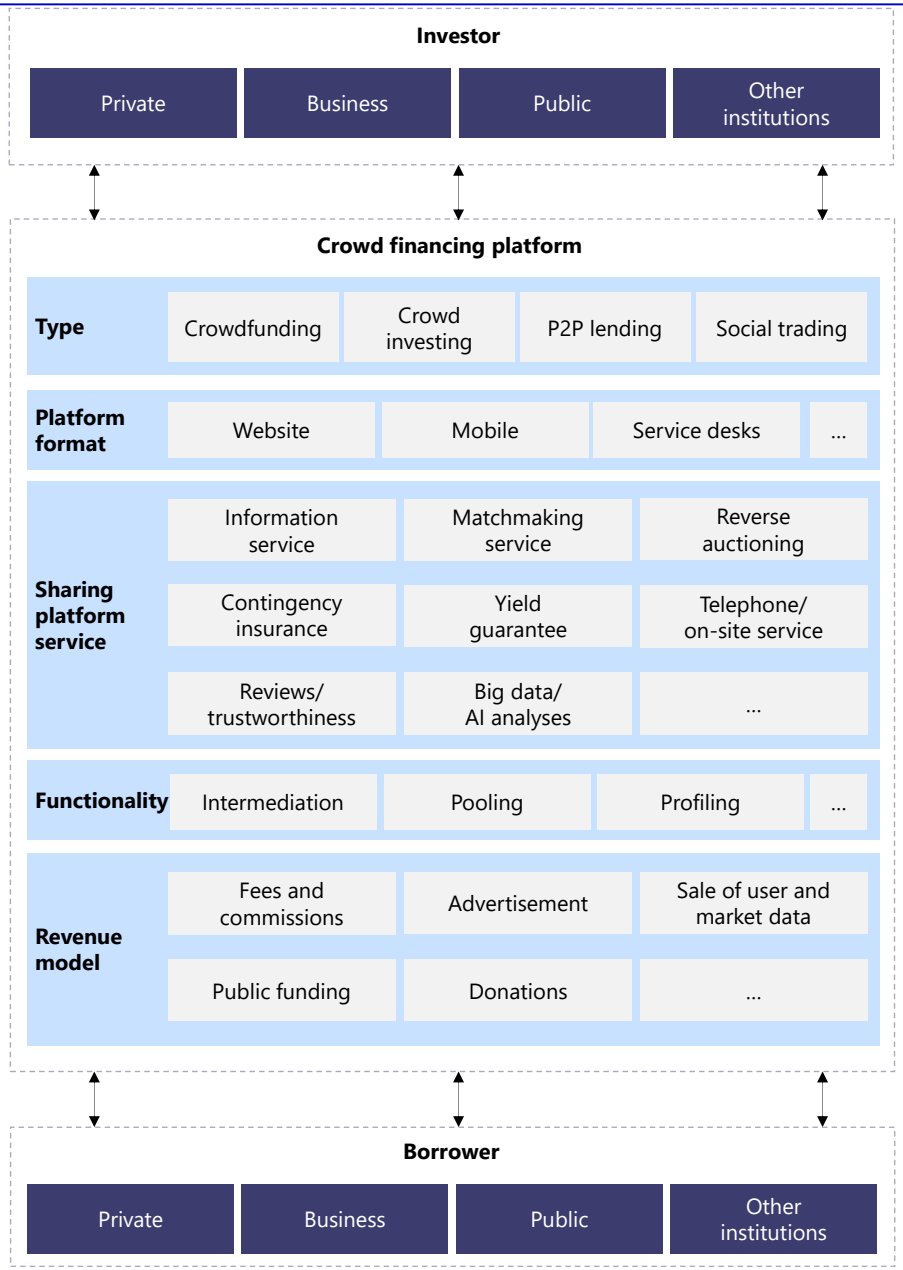
Source: Wirtz (2020b, 2021)

Table 8.2 Applications of the shareconomy III

Sector	Applications	Customer Benefits	Examples
Labor Forces/ Services	• Platforms for booking project staff and freelancers • …	• High flexibility • Comparatively cheap • No term of contract • …	• Fiverr • Upwork • Gulp • …
	• Booking of journalistic services • …	• High flexibility • Comparatively cheap • No term of contract • …	• JournalismJobs.com • All Freelance Writing • …
	• Short-term booking of IT and design services	• High flexibility • Comparatively cheap • No term of contract • …	• Envato • DesignCrowd • …

Source: Wirtz (2020b, 2021)

Fig. 8.5 ICB crowdfunding platform model



Source: Wirtz (2020b, 2021)

Table 8.3 Categories and application examples of finance-related crowdsourcing services

Crowdsourcing Type	Description	Customer Benefits	Examples
Crowdfunding	• A mostly idealistic financial support of a project for a nonmonetary report • ...	• Large public/premarketing • Easy access to capital • Mobilization of stakeholders • Hardly any expenses • ...	• Kickstarter.com • Indiegogo.com • ...
Crowd Investing	• A small financial investment in a project that is characterized by profit sharing • ...	• Large public/premarketing • Easy access to capital • Access to investors • ...	• Seedinvest.com • Wefunder.com • MicroVentures.com • ...
P2P Lending (borrow and lend privately)	• An online-based personal loan method where there are no intermediaries besides the platform • ...	• Risk transformation • Lot size transformation • Cheap way to raise capital • Comparatively high returns • ...	• LendingClub.com • Zopa.com • Bondora.com • ...
Social Trading	• Investment decisions are discussed and made in the Internet community (copy and mirror trading) • ...	• Exchange of expertise • Cooperation based on skills • Performance compensation • ...	• eToro.com • Dukascopy.com • ...

Source: Wirtz (2020b, 2021)

Chapter 8. Questions and topics for discussion

Chapter 8
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.

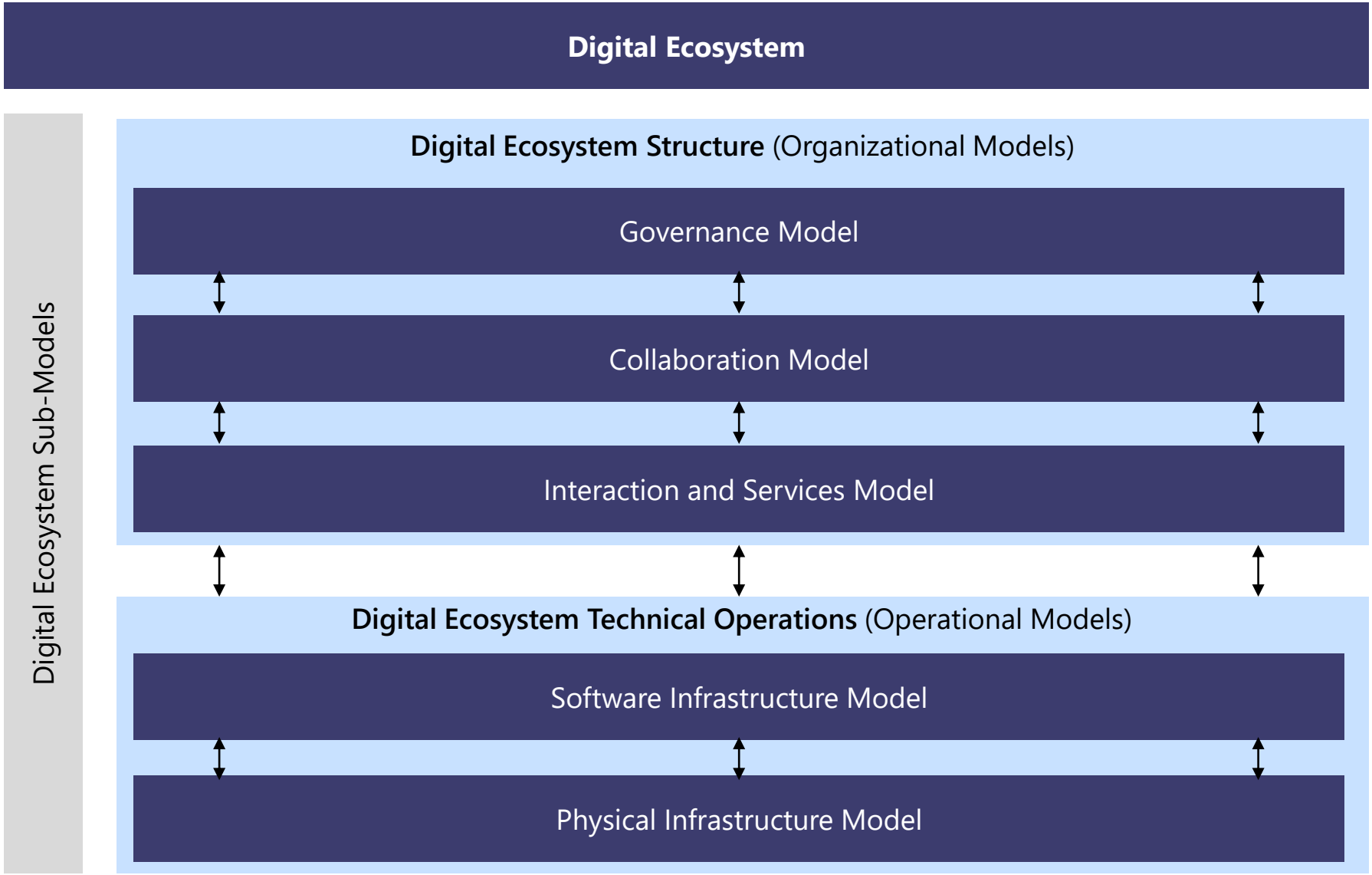
Topics for classroom discussion and team debates

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).

Source: Wirtz (2021)

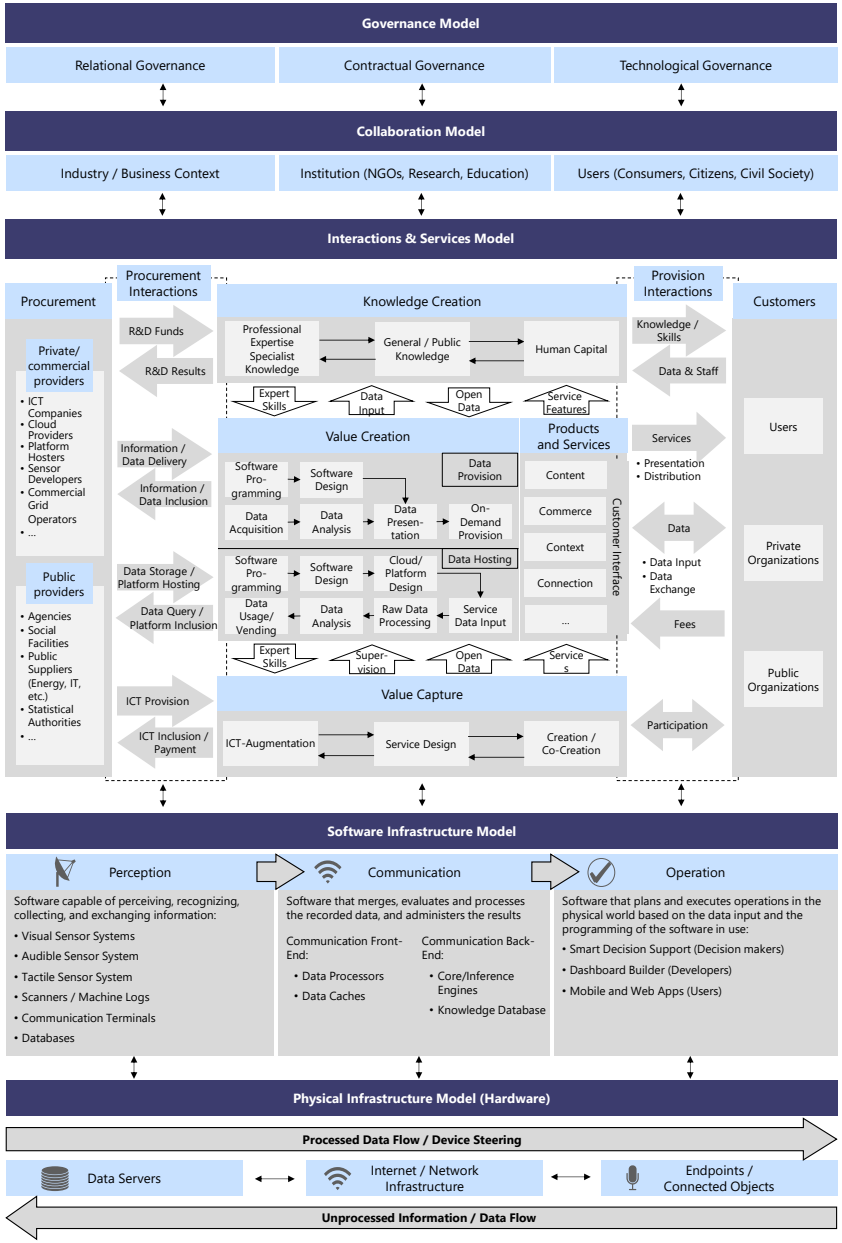
Chapter 9: Digital Ecosystem, Disintermediation and Disruption

Fig. 9.1 Sub-models within a digital ecosystem



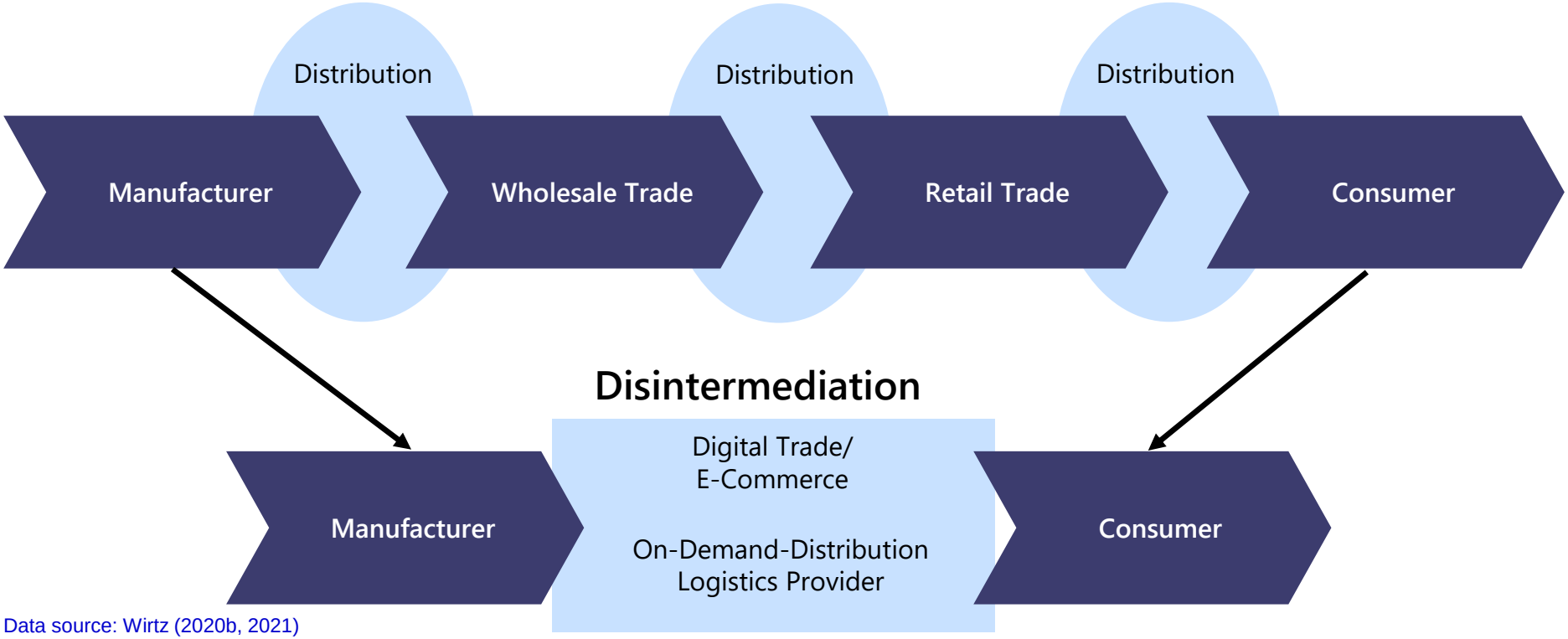
Source: Wirtz (2021)

Fig. 9.2 Digital ecosystem framework



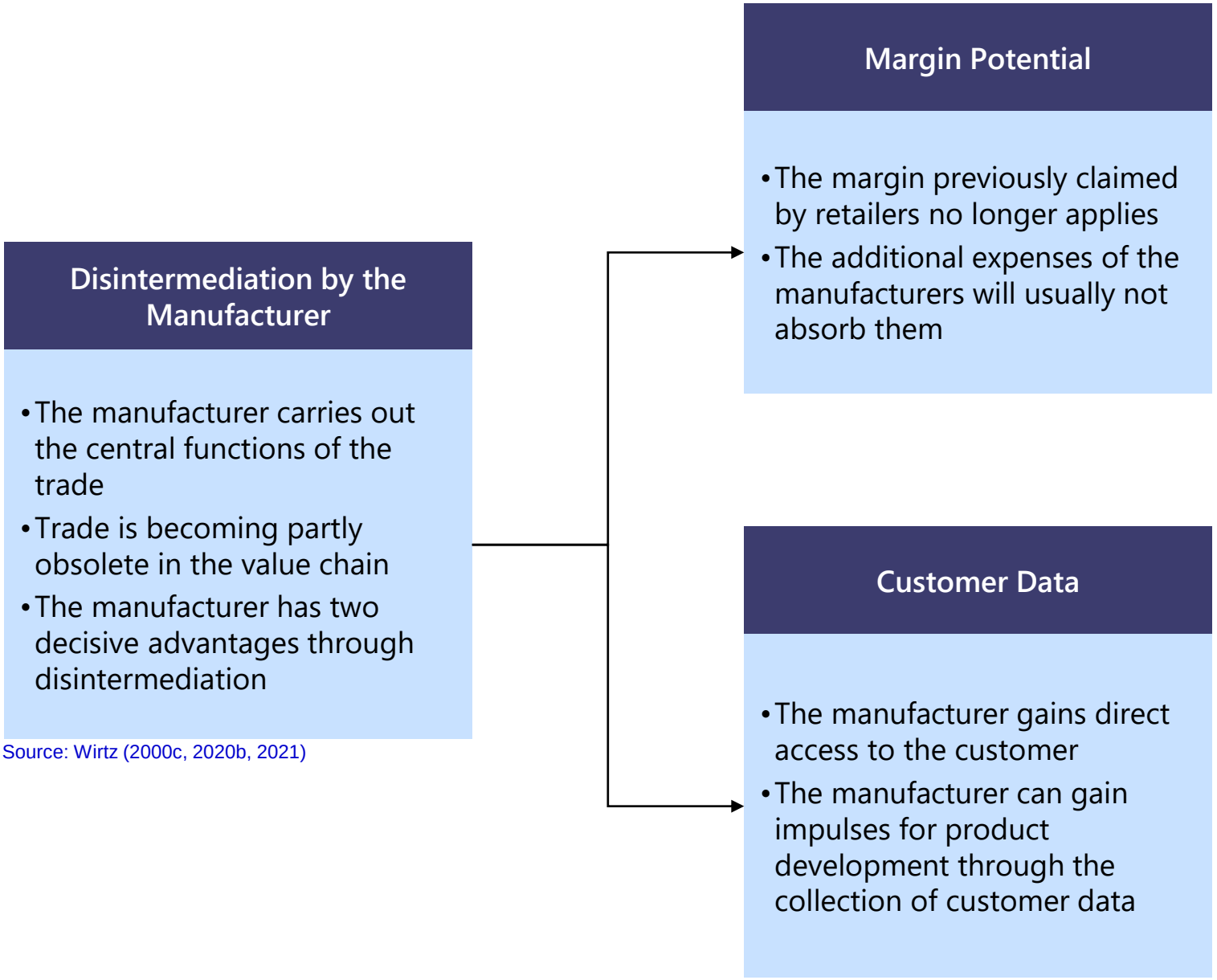
Source: Wirtz (2021)

Fig. 9.3 Disintermediation



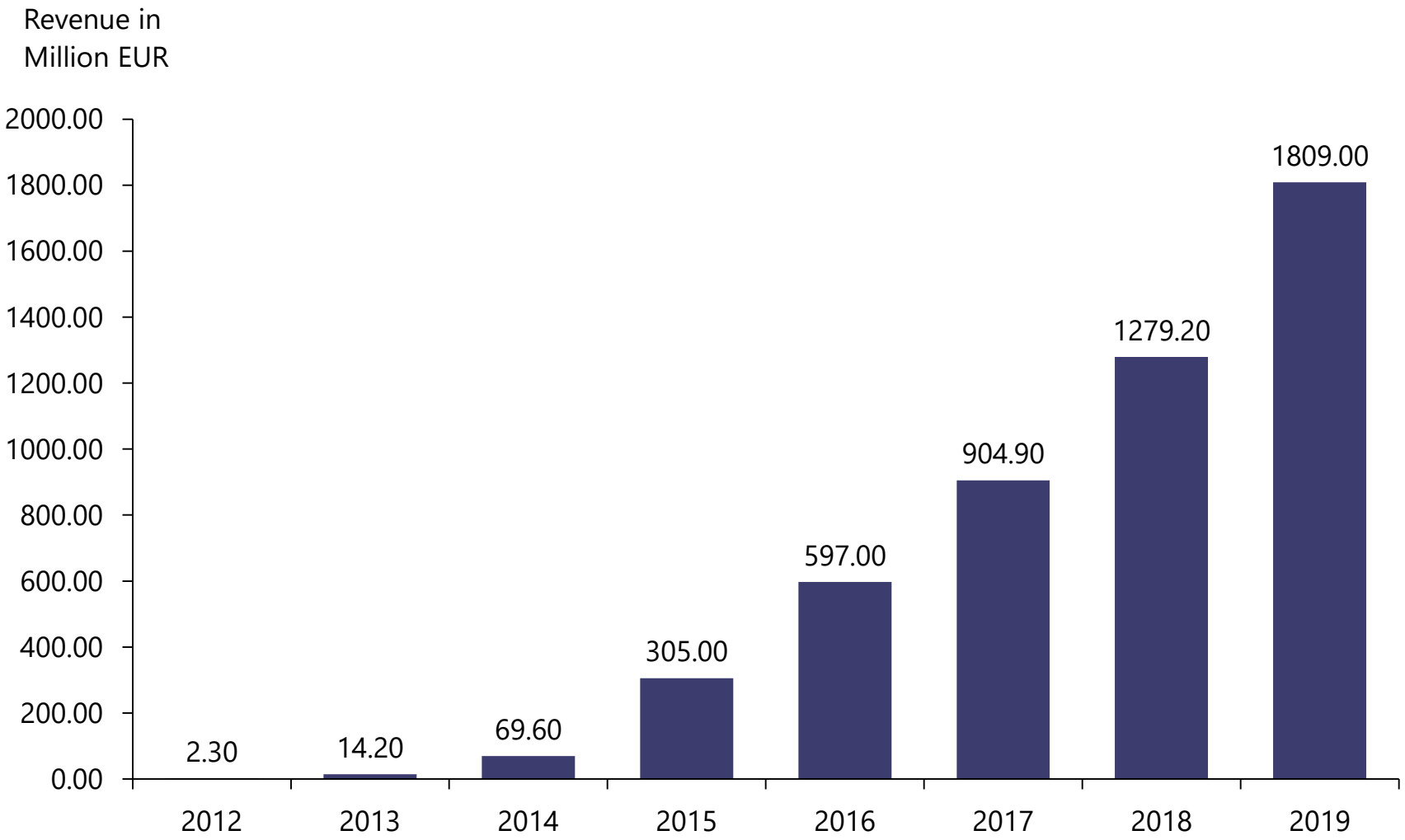
Data source: Wirtz (2020b, 2021)

Fig. 9.4 Advantages of disintermediation for the manufacturer



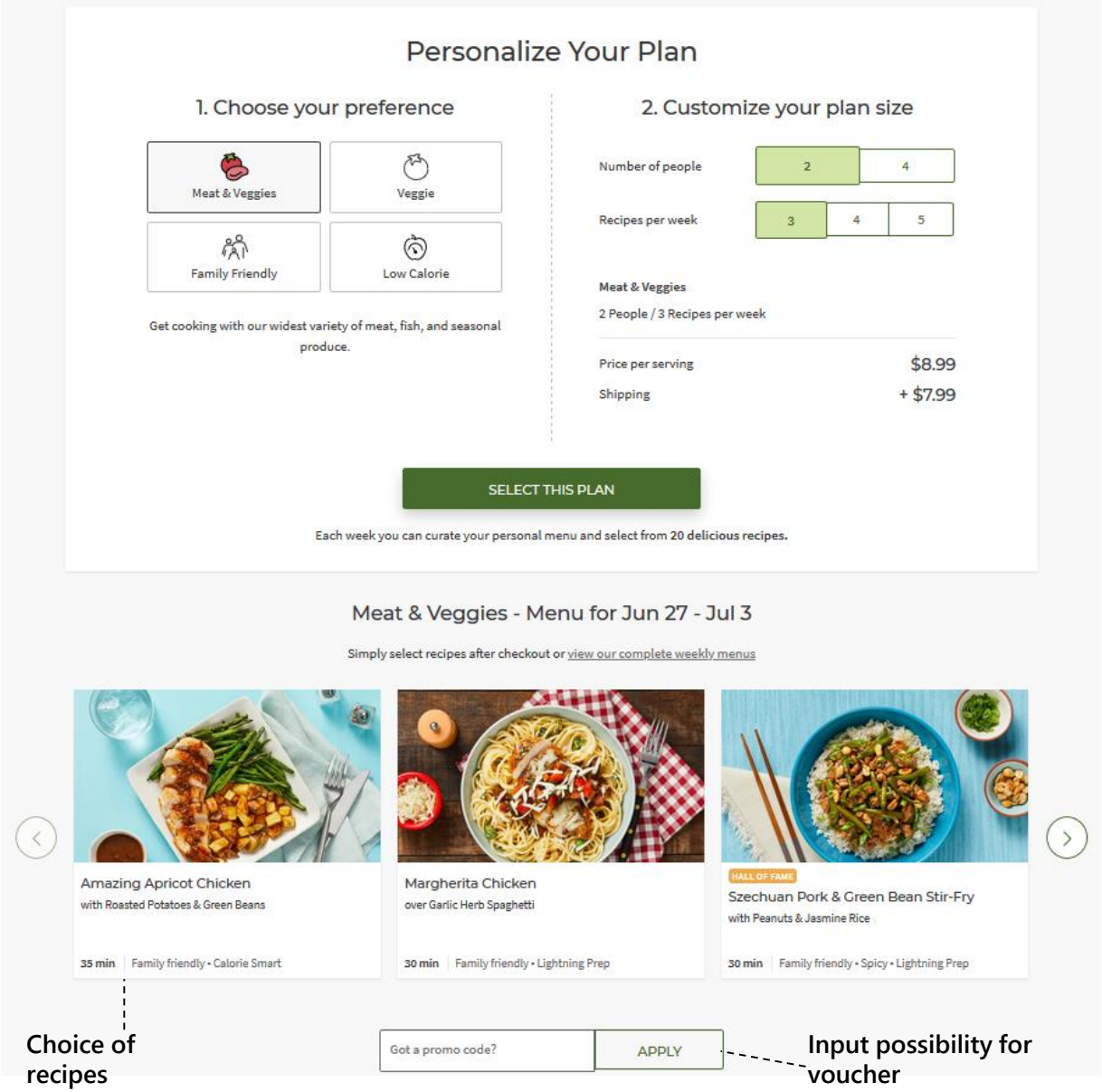
Source: Wirtz (2000c, 2020b, 2021)

Table 9.5 Development of revenues of HelloFresh



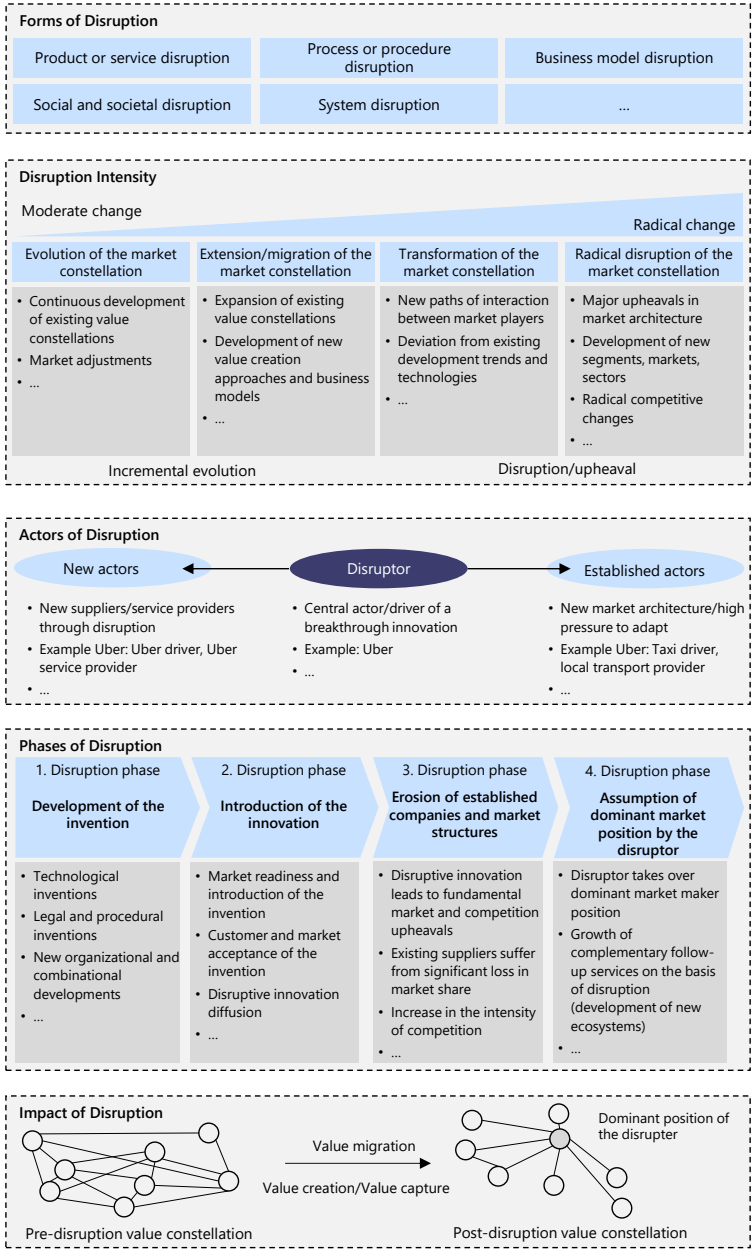
Data Source: HelloFresh SE (2020a, 2020b), and Wirtz (2021)

Fig. 9.6 Website HelloFresh



Source: HelloFresh SE (2020c), and Wirtz (2021)

Fig. 9.7 The five-level model of digital disruption



Source: Wirtz (2020b, 2021)

Table 8.2 Applications of the shareconomy I

Sector \ Aspects	Disruptor Strategy	Disruptor Business Model	Disruptor Value Proposition	Market Impact
Tesla (Electric Cars)	• First-to-market • Revenue market leader in the electric car industry • Market leader in the field of autonomous driving • Assistance strategy • Global economies of scale and scope • Focus strategy variations • ...	• Direct sales/no dealers • 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 • ...	• 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 • ...	• 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)	• Creating a global streaming platform for audivisual media • Market leadership of quality films and customer preferenceoriented in-house productions • Global economies of scale and scope • Displacement of linear television • ...	• Collection, selection, compilation of audiovisual content • Initiation, negotiation and processing of transactions in the form of paid subscriptions • Possibility of personalized ondemand online offers in contrast to cinema, film distribution and television • Direct sales and access to customers • Global presence • Audience big dataoriented film and series production • ...	• Self-designed entertainment with a wide and deep range of offers • Personalized ondemand offer • Device-independence (smartphone, Internet TV, laptop, etc.) • Flexible • No commercial interruptions • Variety of different offers • Internationality • ...	• 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 • ...

Source: Wirtz (2020b, 2021)

Table 8.2 Applications of the shareconomy II

Sector \ Aspects	Disruptor Strategy	Disruptor Business Model	Disruptor Value Proposition	Market Impact
Airbnb (Private Rentals)	• Global offer of new/additional housing travellers • Creation of new market segments • Global economies of scale and scope • Information technology market dominance • …	• 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 • …	• 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 • …	• 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)	• 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, deviceindependent, independent of time and place • …	• 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 • …	• High breadth and depth of product offer (product variety) • Customer-centric individual commerce offers Reliable service and fast delivery • Value for money • …	• 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 • …

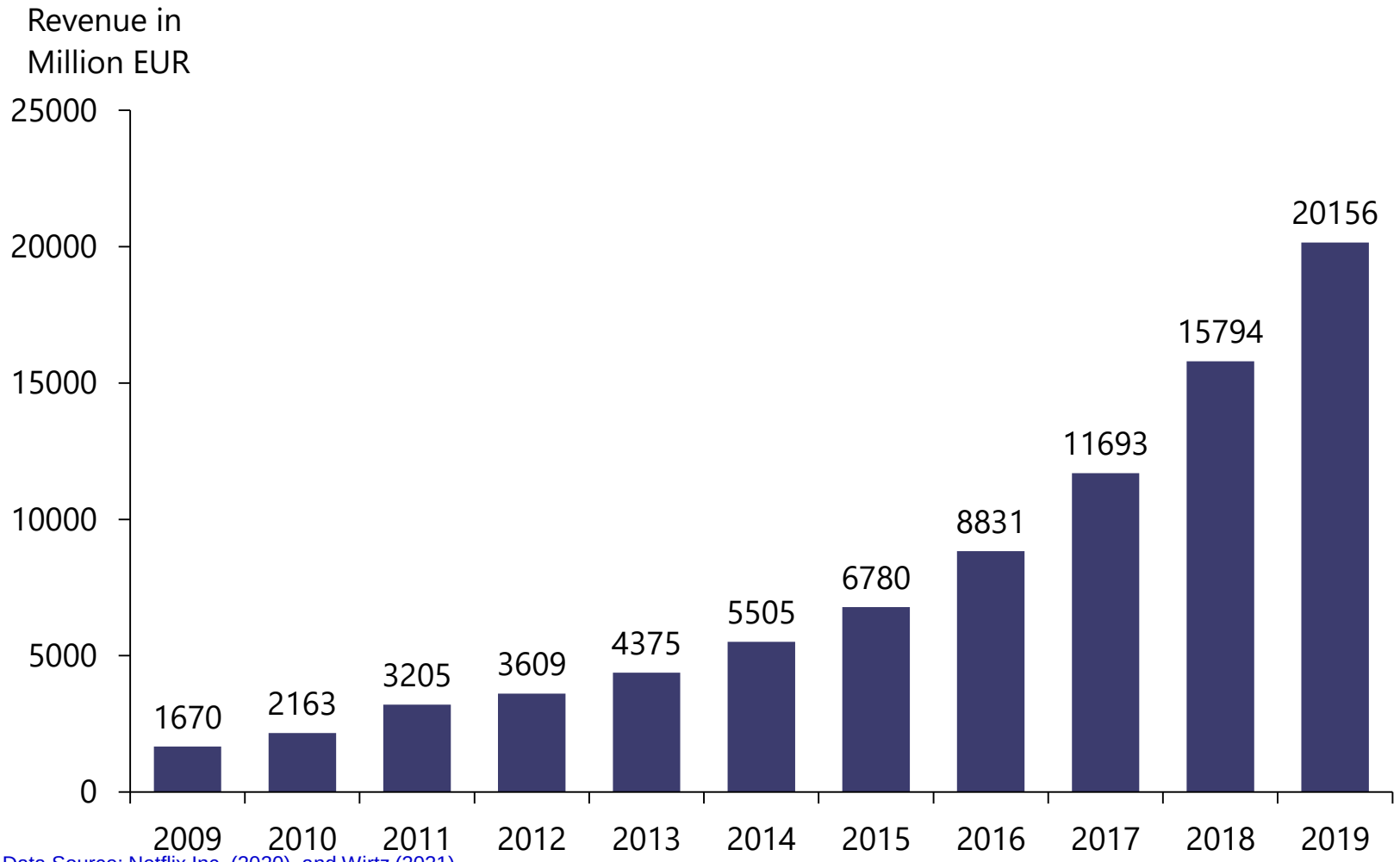
Source: Wirtz (2020b, 2021)

Table 8.2 Applications of the shareconomy III

Sector \ Aspects	Disruptor Strategy	Disruptor Business Model	Disruptor Value Proposition	Market Impact
Apple iPhone (Smart-phones)	• Establishment of a novel universal mobile media device • Digital and technological market dominance • Strategic establishment of a device-related ecosystem (new software and architecture) • ...	• 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 • ...	• 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 • ...	• Abandonment of the conventional mobile phone • Erosion of established mobile phone manufacturers • Building of a new ecosystem (Apple world) • Development of new market segment Creation of complementary follow-up services based on the disruption • ...
Uber (RideSharing)	• 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 • ...	• 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 • ...	• 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) • ...	• 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)

Fig. 9.8 Development of Netflix revenue



Data Source: Netflix Inc. (2020), and Wirtz (2021)

Chapter 9. Questions and topics for discussion

Chapter 9
Questions and topics for discussion

Review questions

1. Define a digital ecosystem.
2. Describe the structure, actors and interactions of a digital ecosystem.
3. Explain relevant aspects of the disintermediation value chain.
4. Explain corporate models of digital disruption (e.g. Airbnb, Amazon, Apple) based on the value proposition and the strategy pursued.
5. Describe the structure of the five-level model of digital disruption.

Topics for classroom discussion and team debates

1. Discuss to what extent a digital ecosystem represents all relevant actors, factors and interactions. Is this a way to show real companies like Apple how value creation works?
2. Disintermediation has fundamentally changed the value creation of non-material products in recent years. Discuss the winners and losers of this process from an economic, ecological and social point of view.
3. Discuss, on the basis of the disruptor Netflix , what opportunities and threats arise from digital disruption in relation to traditional media, on the one hand, and the new media, on the other. Consider whether the new value creation structure created is economically and socially desirable. Does the radical disruption in the digital sector ultimately lead to market monopolies?

Source: Wirtz (2021)

Chapter 10: Digital B2C Business Models

Definition of business model

Definition of Business Model (Wirtz 2011a, 2020b)

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 (2021)

Fig. 10.1 Partial models of the integrated digital business model

Partial Models of the Integrated Digital Business Model

Strategic component	**Strategy model** • Company mission • Strategic positions and development paths • Value proposition	**Resources model** • Core competencies • Core assets	**Network model** • Business model networks • Business model partners
Customer demand component	**Customer model** • Customer relation-ships/target groups • Channel configuration • Customer touchpoint	**Market offer model** • Competitors • Demand structure • Value offering/ products and services	**Revenue model** • Commissions • Service charge streams
Value creation component	**Value creation model** • Service development • Value generation	**Procurement model** • Resourcing • Information analysis • Resource monitoring and controlling	**Finance model** • Capital structure • Cost structure model • Cash flow model

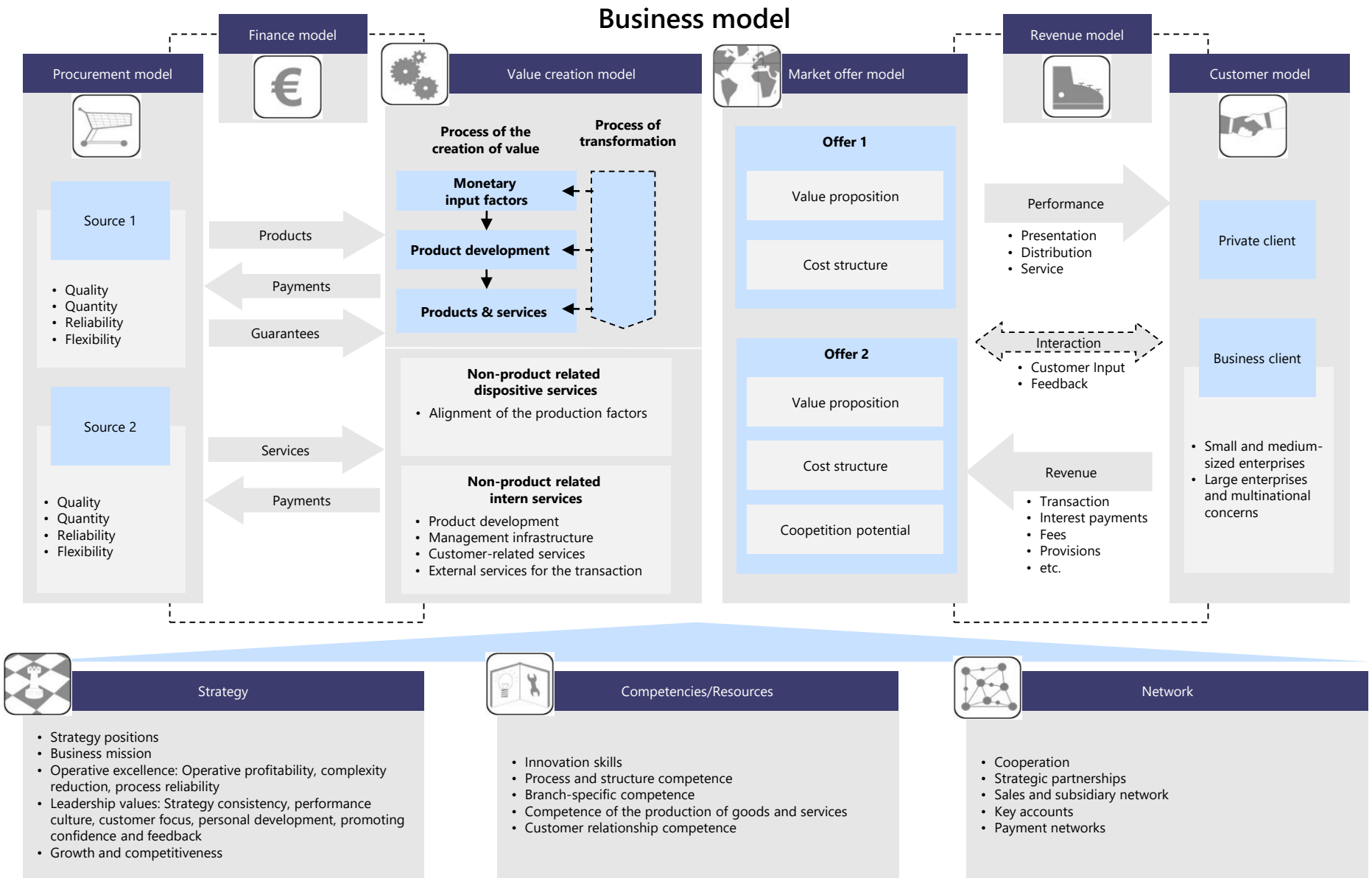
Source: Wirtz (2010c, 2020b, 2021)

Fig. 10.2 Revenue scheme of digital business companies

	Direct revenue generation	Indirect revenue generation
Transaction-based	• Transaction revenues in the narrow sense • Usage fees	• Commissions
Transaction-independent	• Setup fees • Basic fees	• Big data/data mining revenues • Ad sales • Sponsorship

Source: Wirtz (2000c, 2020b, 2021)

Fig. 10.3 Interactions of the partial models of the business models



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

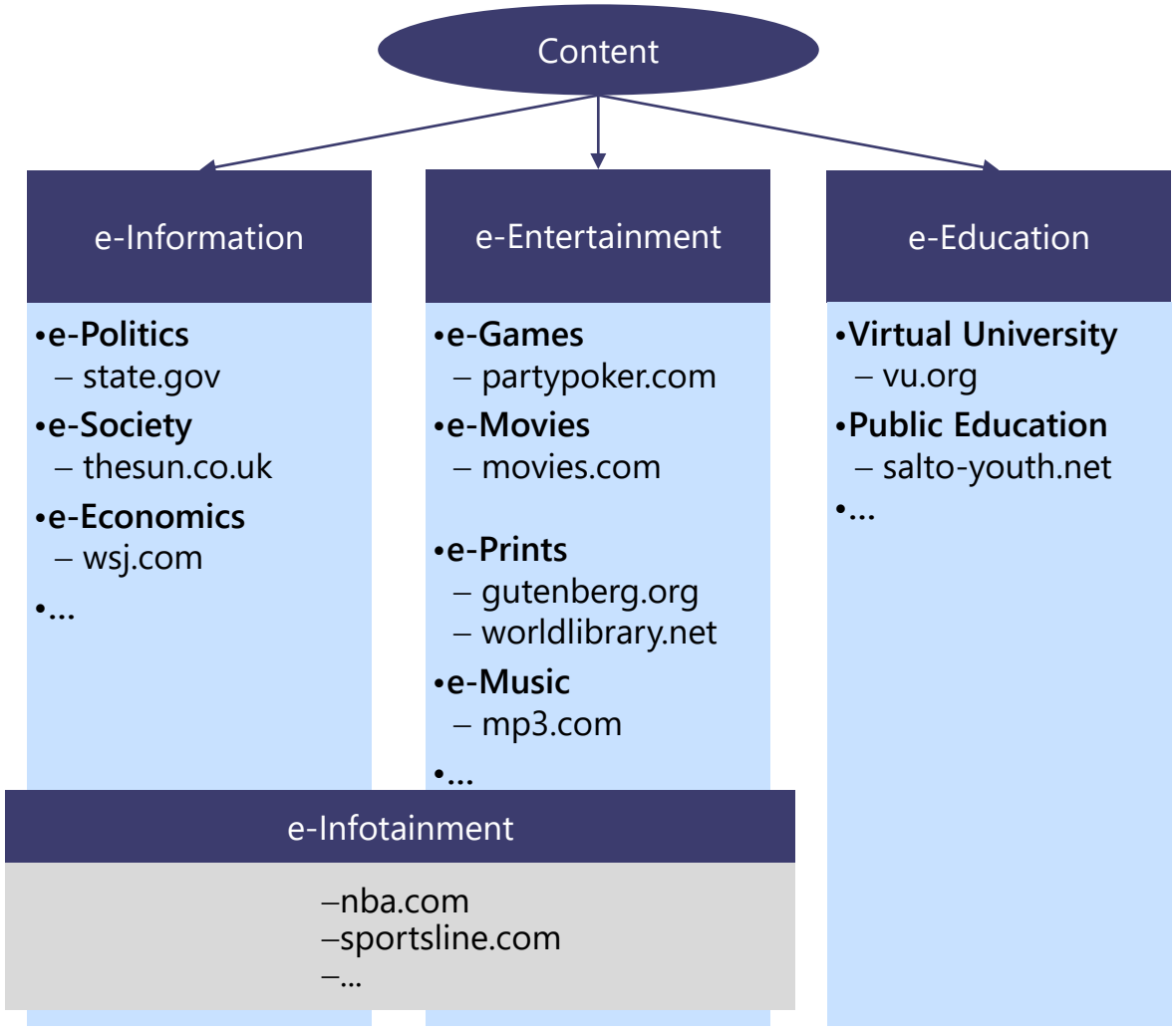
Fig. 10.4 4C-net business model

Content	Commerce
• Compilation (packaging) • Presentation and provision of content on a domestic platform	• Initiation and/or settlement of business transactions
Context	**Connection**
• Classification and systematization of information available on the Internet	• Creation of the possibility to exchange information in networks

Source: Wirtz (2000c, 2020, 2021)

Fig. 10.5 The content business model

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



Source: Wirtz (2001a, 2020b, 2021)

Fig. 10.6 Aggregated value chain of the content business model

Conception	Content Development/ Production	Acquisition & Placement of Advertising	Technical Distribution	Marketing & Distribution	Billing
• Content selection • Service selection • Design • Determination of the target group	• Content procurement (content sourcing) • Content creation • User-generated content	• Standardized banner advertising • Integration of individualized advertising • Sponsoring	• Pull (i.e., download) • Push (i.e., RSS-feed)	• Cross-medial marketing • Coordination of the sales channels • Price and conditions strategy • Communication strategy	• Payment processing • Receivables management

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

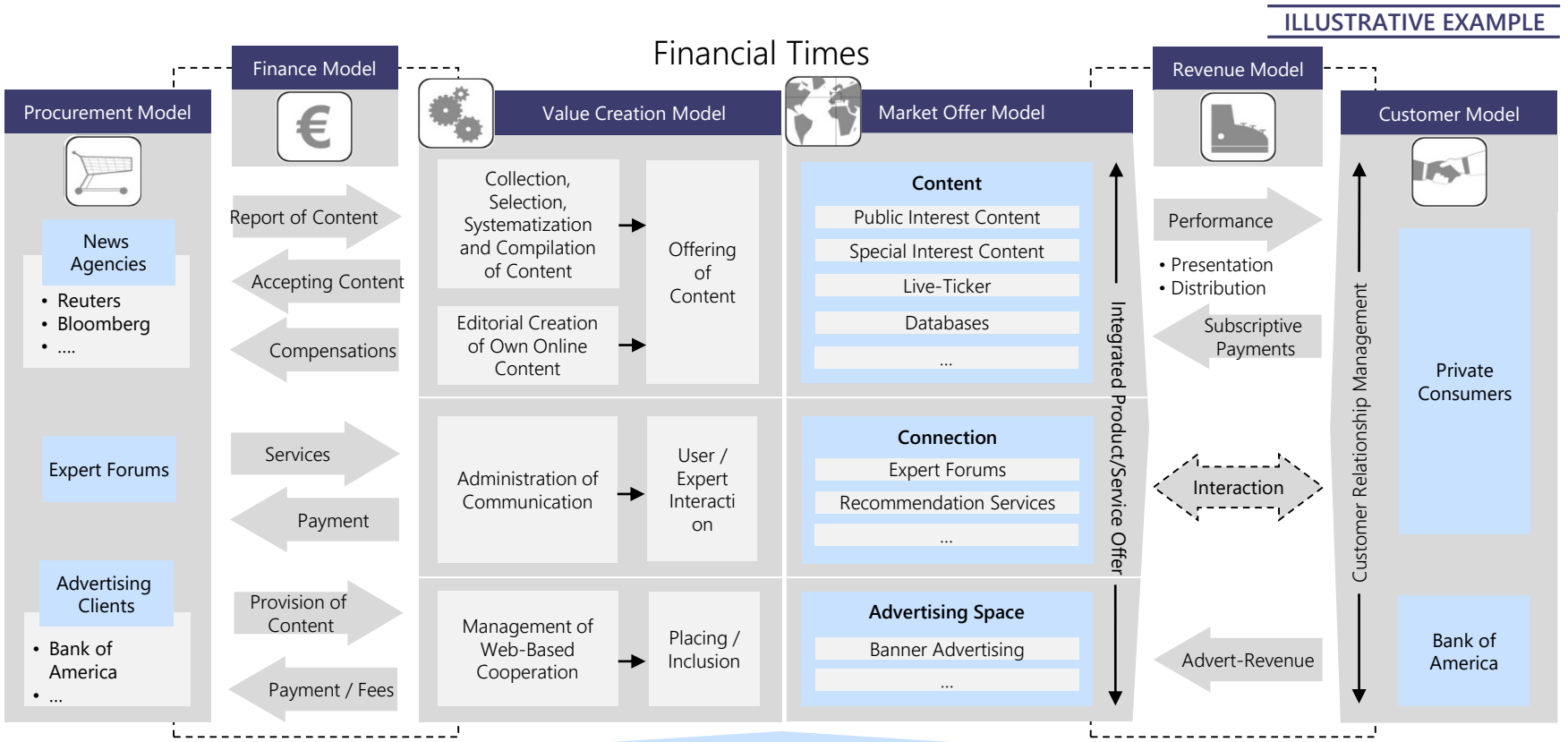
Fig. 10.7 Core assets and competencies of the content provider

- Content, exploitation rights
- Brand
- Employees
- Networks

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

- Content sourcing competence
- Content creation competence
- Product development competence
- Distribution competence

Fig. 10.8 The business model of the Financial Times



Strategy Model

- The Financial Times (FT) is one of the world's leading business news and information organizations that provides extensive news, comment, data and analysis to the global business community

Competencies/Resources Model

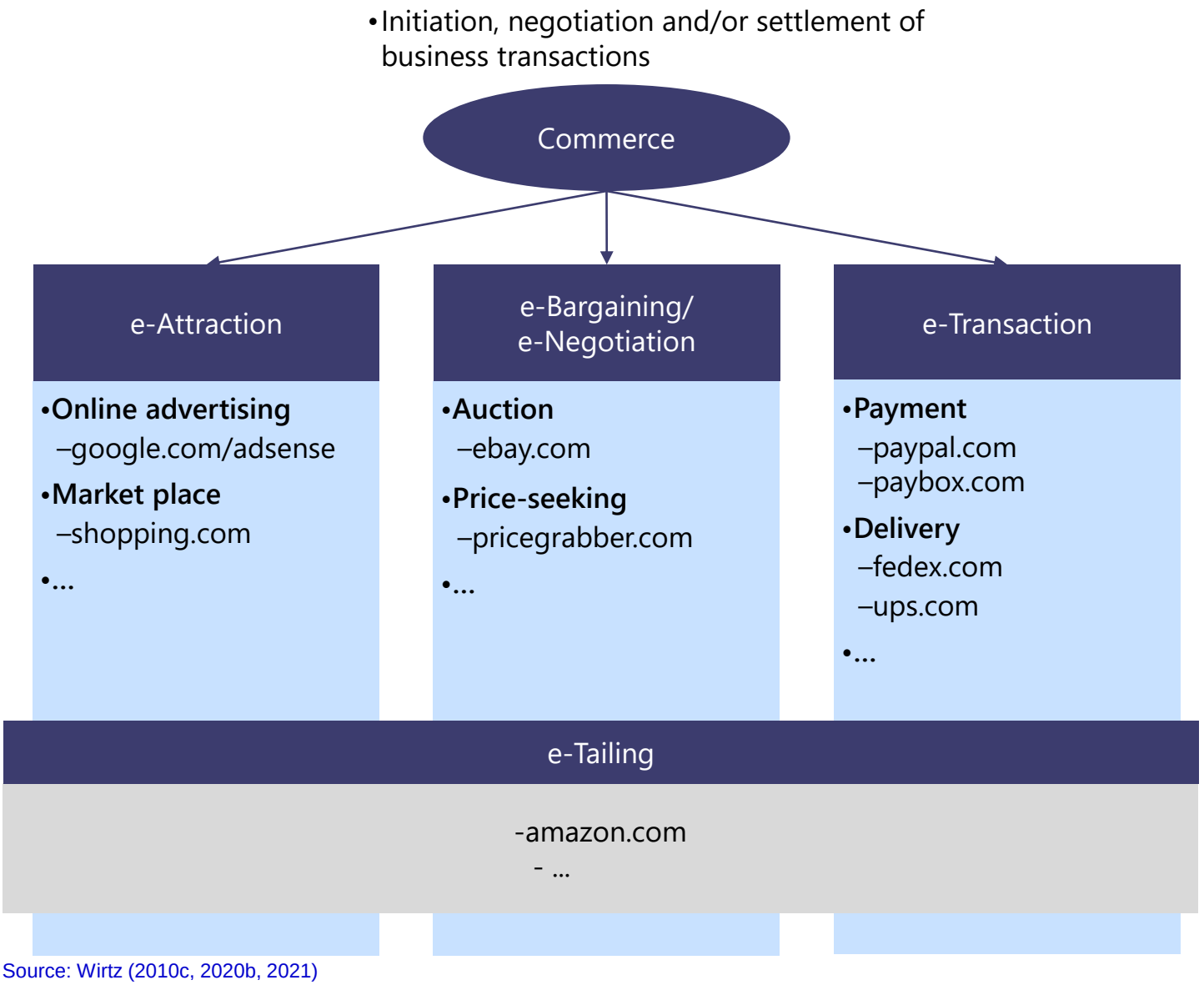
- Access experts and correspondents
- Large and global customer base
- Preparation, systematizing, collection and provision of data,
- Strong brand, deonymization
- Contextualizing competence
- Technological competence
- Content creation competence
- Competence of promoting advertising efforts

Network Model

- Formal and informal to news agencies
- Access to key informants
- Network to professional freelance correspondents and journalists
- Member of key research and investigation consortiums
- Access to rights and proprietary databases

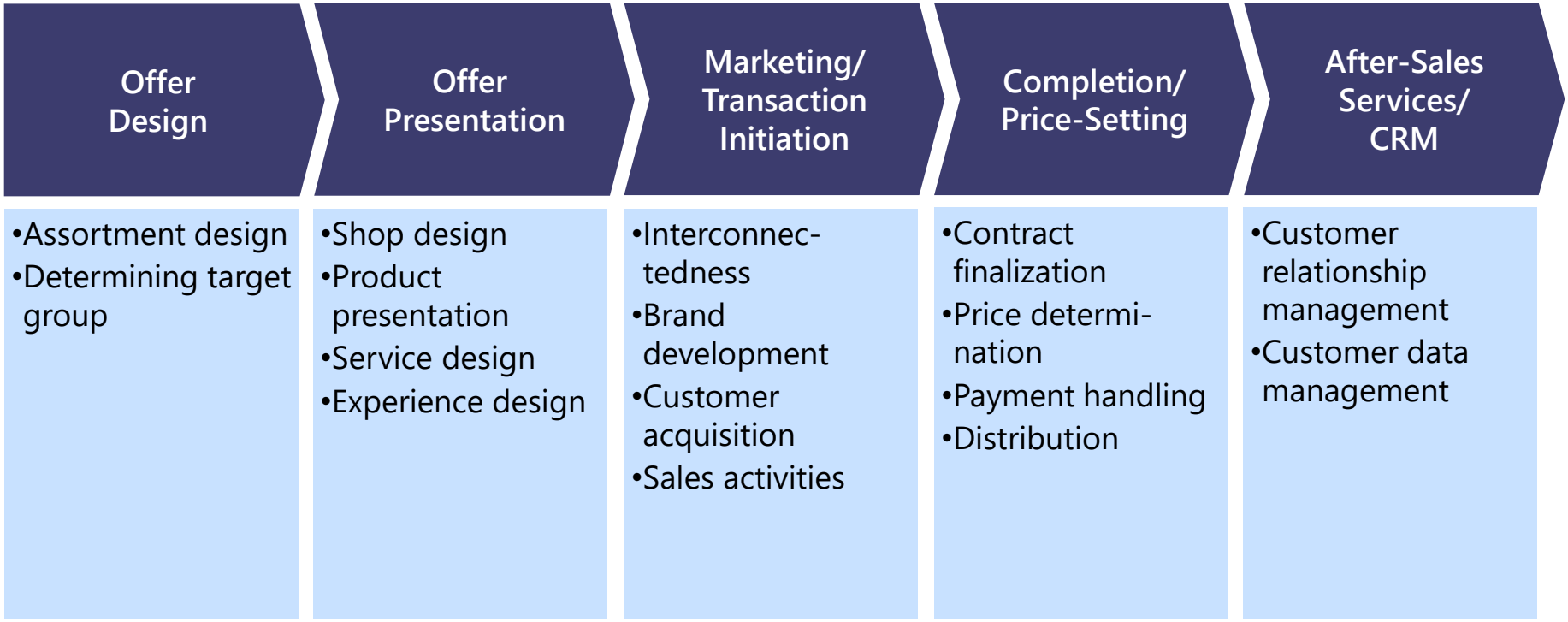
Source: Wirtz (2019, 2021)

Fig. 10.9 The commerce business model



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

Fig. 10.10 Aggregated value chain of the commerce business model



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

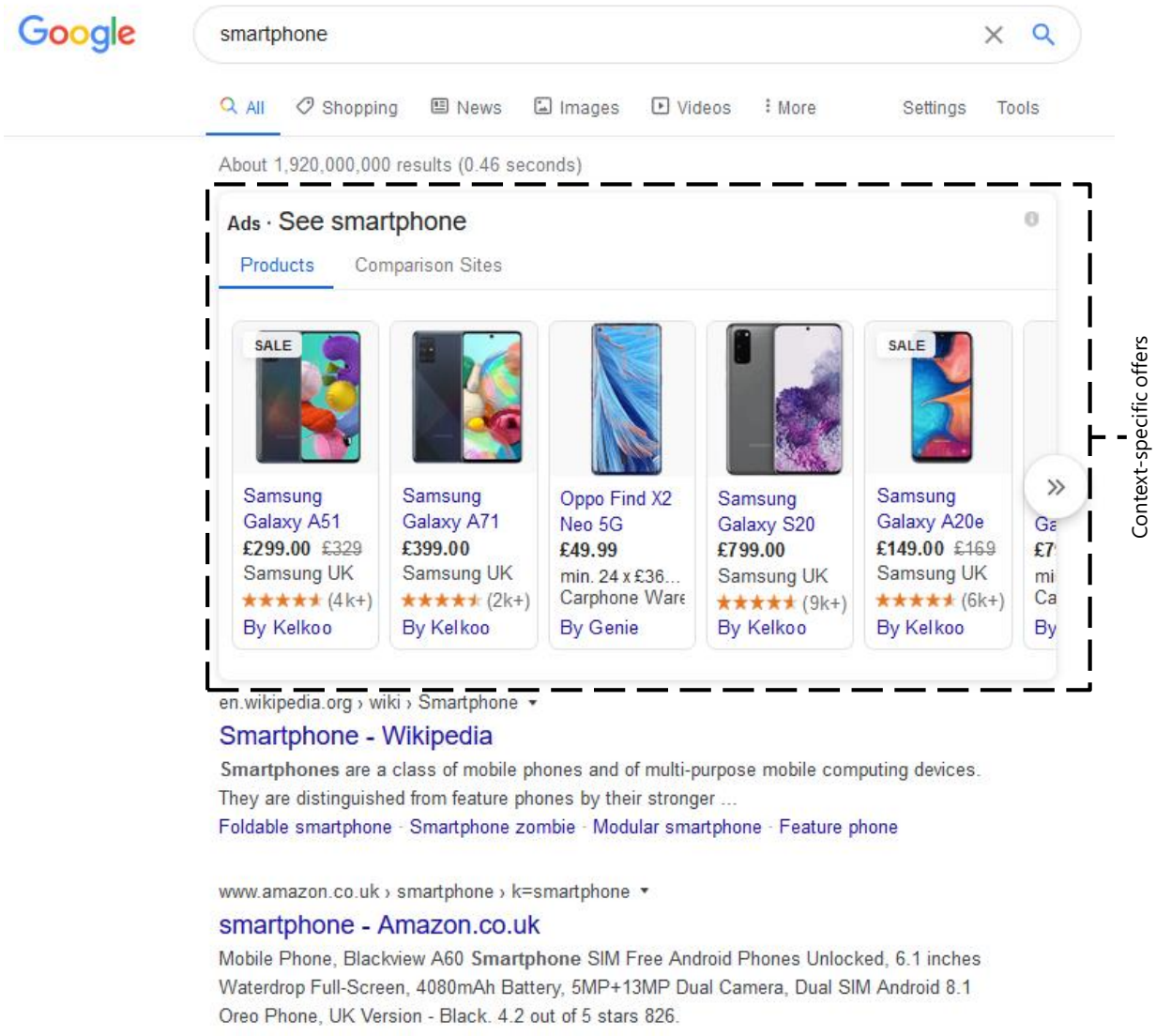
Fig. 10.11 Core assets and competencies of the commerce model

- Customer base
- Customer network
- Customer data
- Sales structure
- Technical infrastructure

- Assortment selection
- Bundling competence
- Experience design
- Sales structure
- Technical infrastructure

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

Fig. 10.12 Example of context-specific advertising of Google



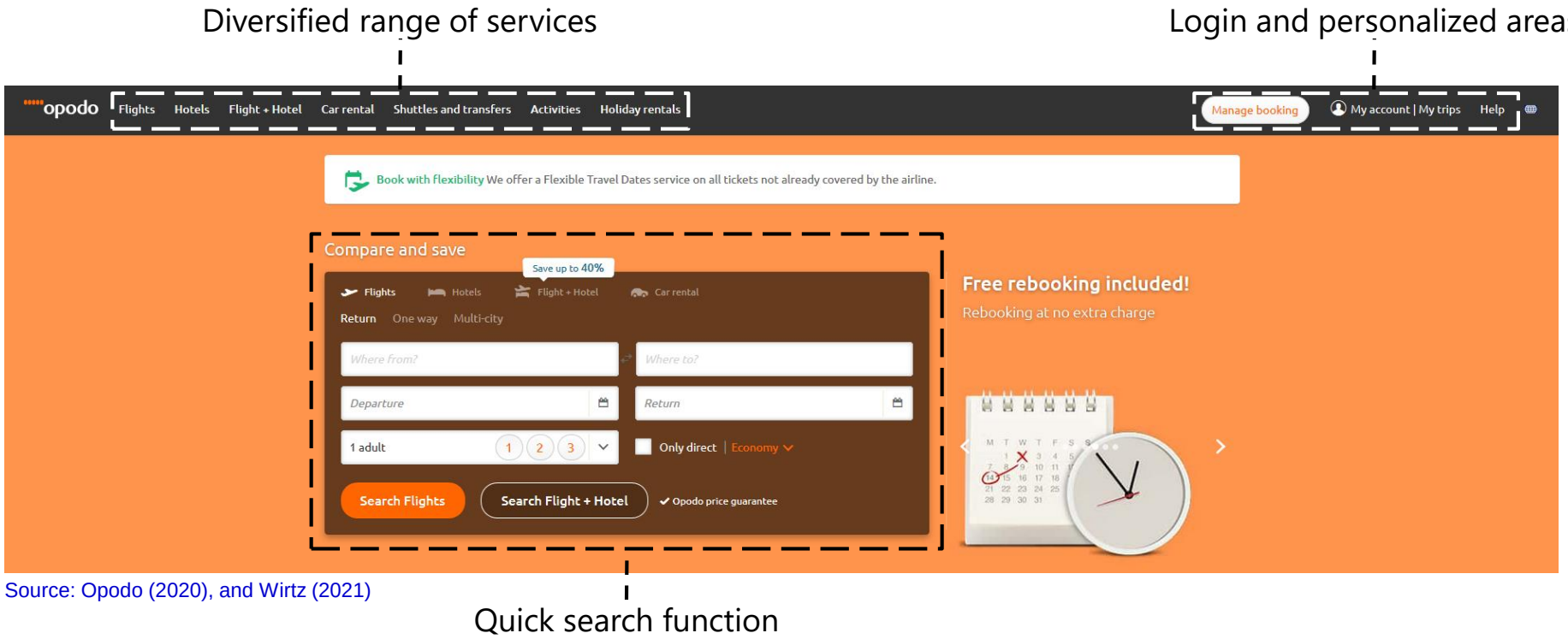
Source: Google (2020c), and Wirtz (2021)

Fig. 10.13 Types of auctions

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

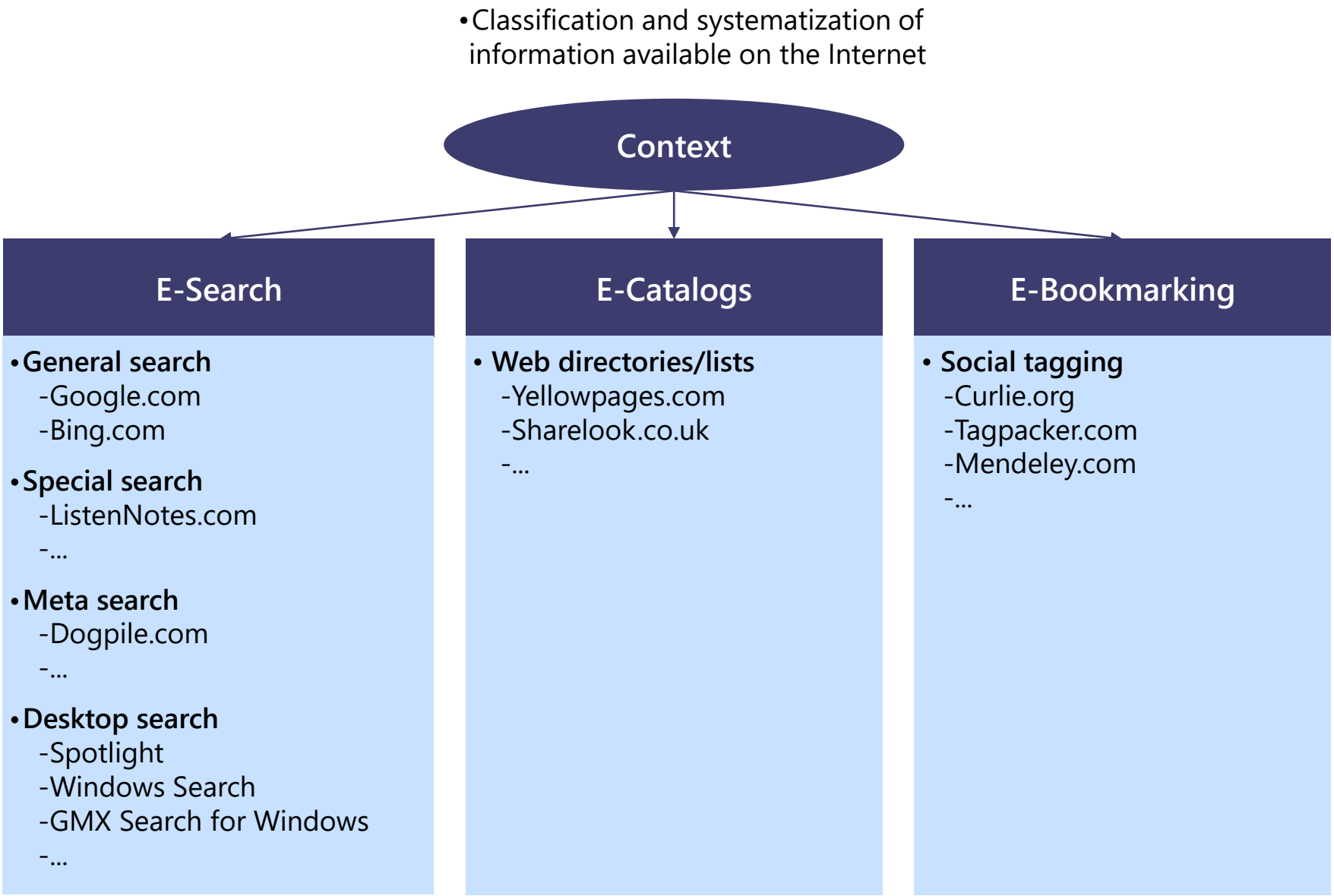
Source: Wirtz (2010c, 2020b, 2021)

Fig. 10.14 Services of Opodo.com



Source: Opodo (2020), and Wirtz (2021)

Fig. 10.15 The context business model



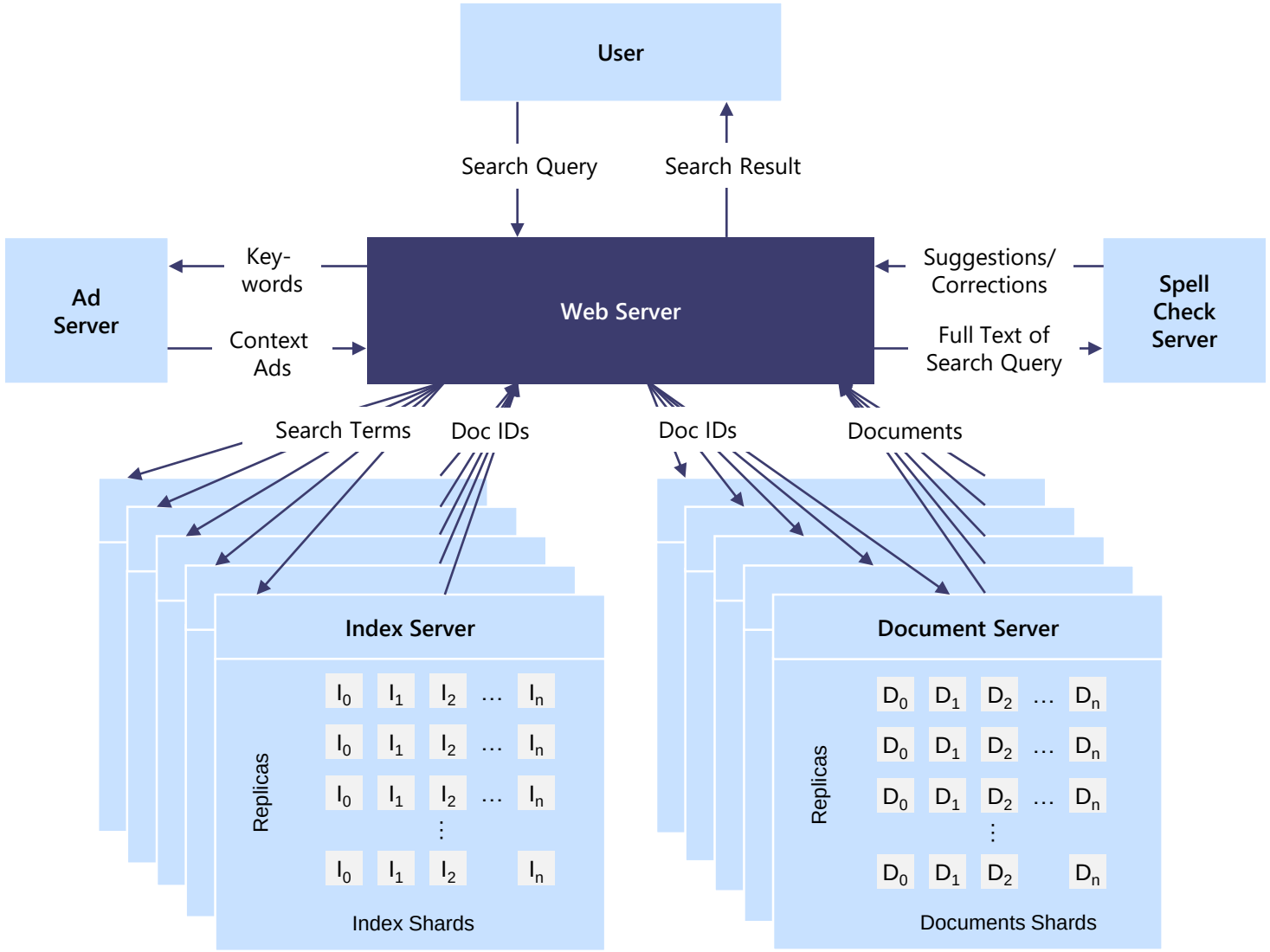
Source: Wirtz (2001a, 2020b, 2021)

Fig. 10.16 Aggregated value chain of the context business model

Operation of Server	Search Software/ Algorithm	Sale of Advertising Forms	Presentation/ Contextualization	Marketing/ Billing
• Hardware • Software	• Reliability of search results • Amount of data included • Differentiation/ objective	• Keyword advertising • placement	• Relevance • Integration of advertising • Cross-linking	• Data mining • Cross-selling • Cost per click/ performance • After sales

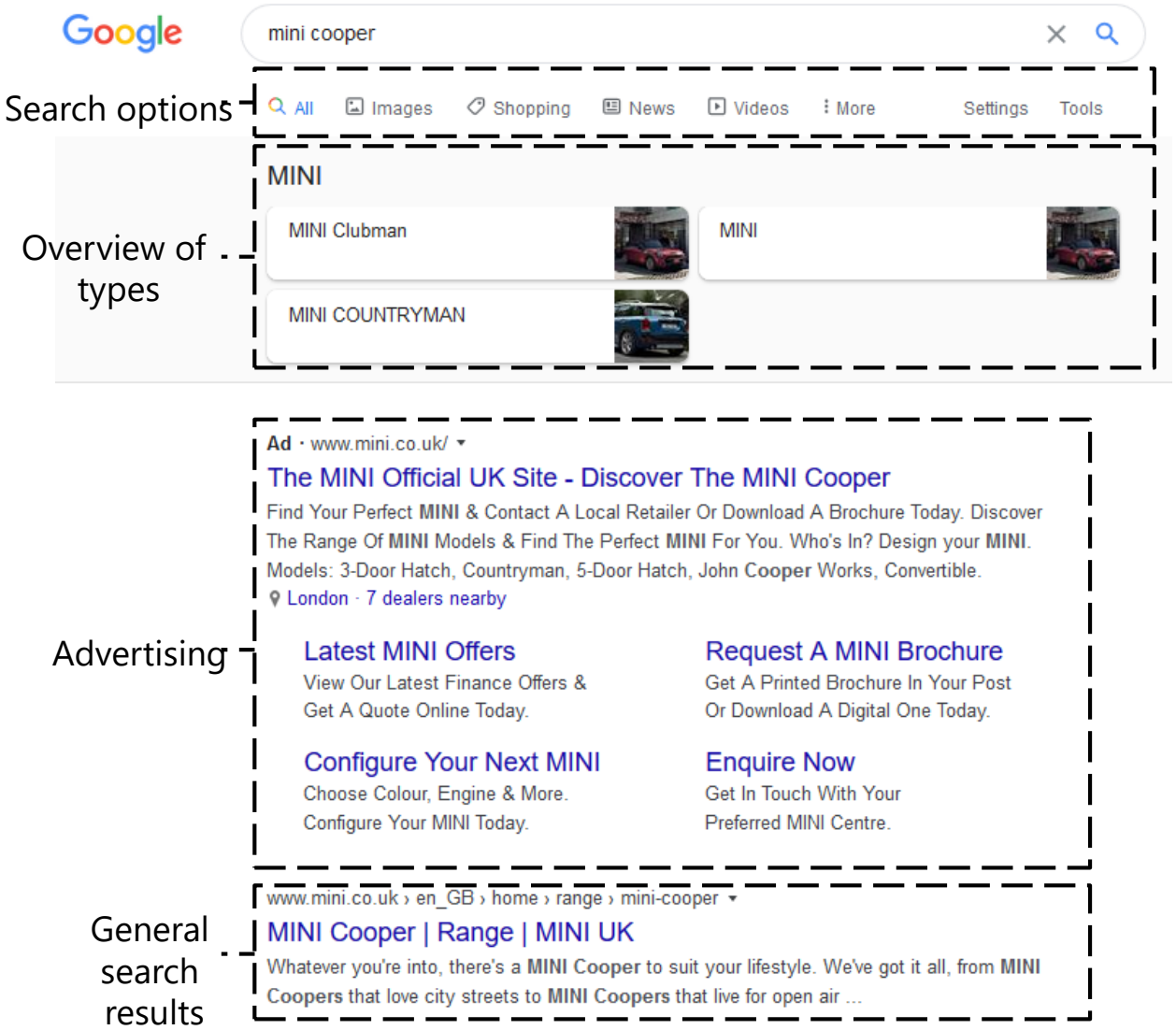
Source: Wirtz (2001a, 2020b, 2021)

Fig. 10.17 Server structure and interaction for a search query



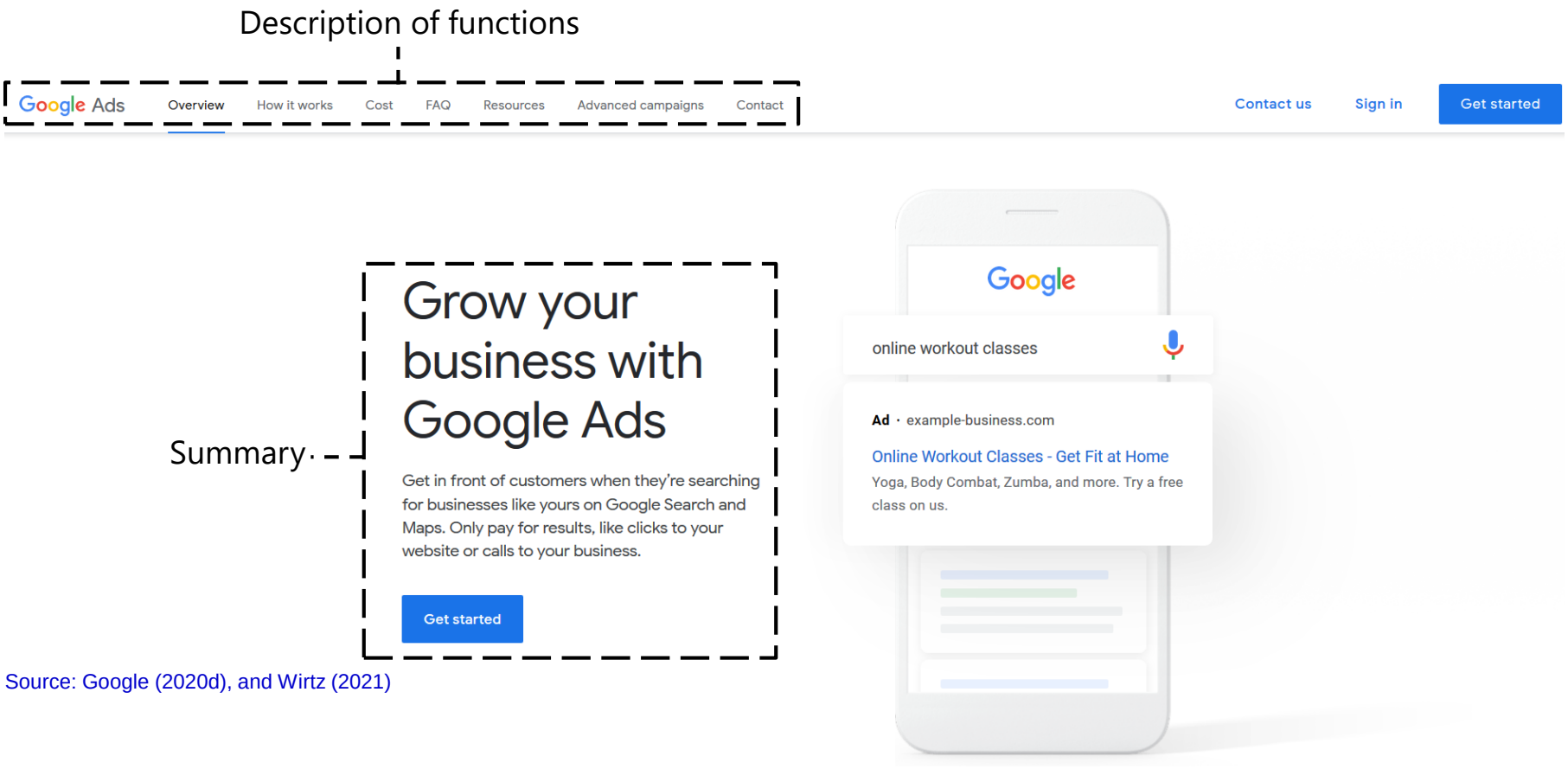
Source: Wirtz (2001a, 2020b, 2021)

Fig. 10.18 Integrated search result of the search engine Google



Source: Google (2020b), and Wirtz (2021)

Fig. 10.19 AdWords and cross-selling on Google

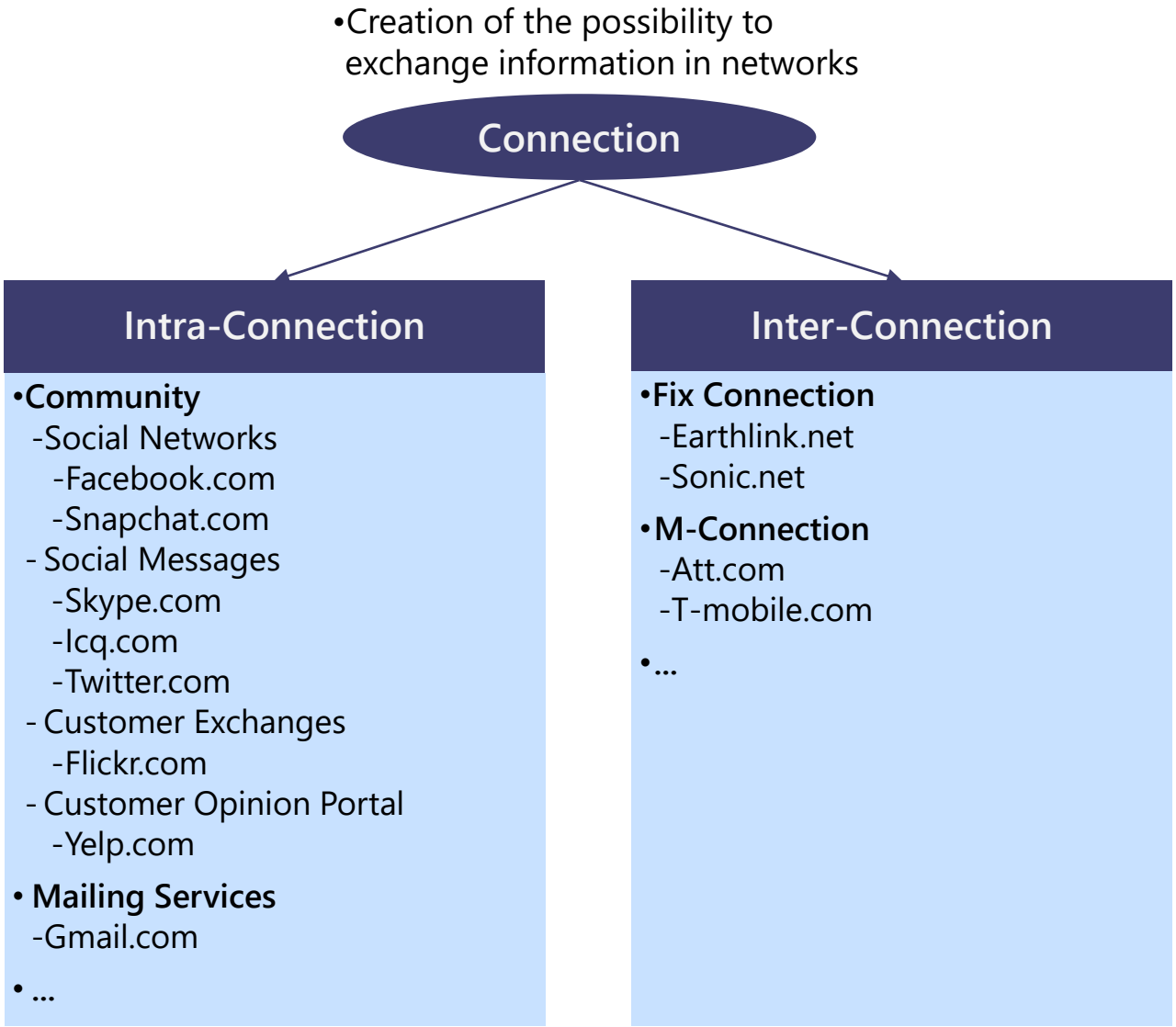


Source: Google (2020d), and Wirtz (2021)

Fig. 10.20 Google Street View

Source: Google (2020g), Wirtz (2021)

Fig. 10.21 The connection business model



Source: Wirtz (2001a, 2020b, 2021)

Fig. 10.22 Aggregated value chain of the connection business model

Server Operations	Network Infrastructure	Marketing/ Sales	Billing	After-Sales Services/ CRM
•Software •Hardware	•Extension and maintenance of the network infrastructure •Implementation of new hardware standards (LTE, G5) •Cooperation with infrastructure partners (e.g., backbone networks)	•Management of physical distribution •Continuous increase of brand awareness and brand extension •Up-selling of own rate structure to premium rates	•Extension of payment functions •Payment processing •Receivables management •Development and implementation of innovative payment methods	•Customer relationship management •Relief of after-sales services through easy-to-use services (e.g., FAQ, chatbots)

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

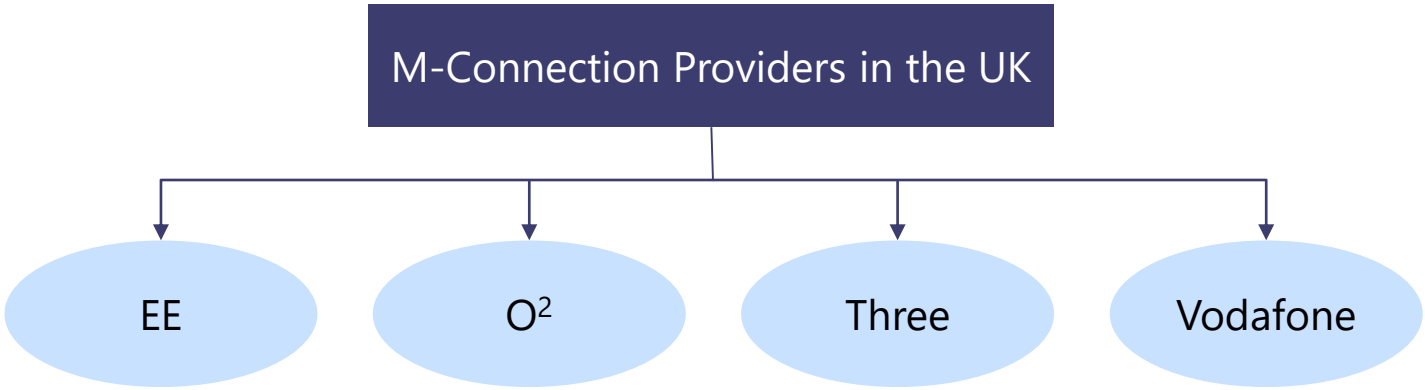
Fig. 10.23 Core assets and competencies of a connection provider

- Network infrastructure
- IT platform
- Employees
- Sales structure
- Brands
- Customer or user base and respective data

- Technology competence
- Integration competence
- Customer acquisition
- Customer loyalty

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

Fig. 10.24 M-connection providers in the UK



- 1pMobile
- Anywhere Sim
- Asda Mobile
- Auracall Travel Talk
- Axis Telecom
- BT
- CTExcel
- Ecotalk
- Jump
- Pebble Mobile
- Virgin Mobile
- White Calling
- …

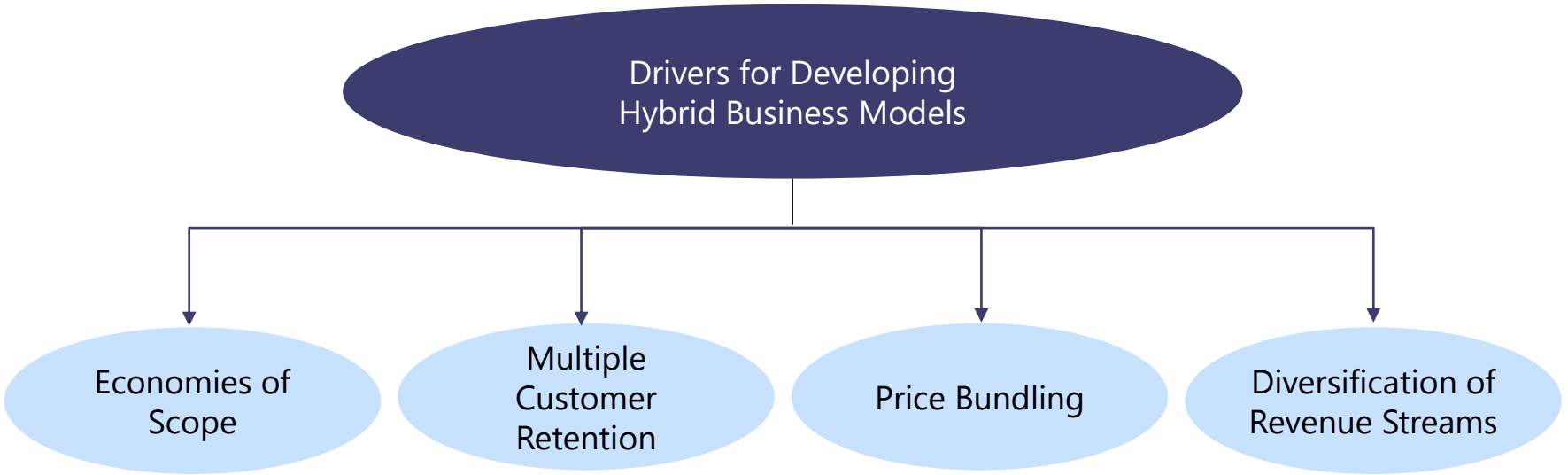
- Anywhere Sim
- Champions Mobile
- Fonome Mobile
- giffgaff
- Jump
- KC Mobile
- Lycamobile
- Pebble Mobile
- Tesco Mobile
- Truphone
- …

- Anywhere Sim
- FreedomPop
- Gamma Telecom
- iD Mobile
- Jump
- Pebble Mobile
- Rok Mobile
- RWG Mobile
- Shebang (PG Mobile)
- Telfoni
- …

- Anywhere Care Ownfone
- Anywhere Sim
- Jump
- Lebara Mobile
- Pebble Mobile
- Talkmobile
- …

Source: Wirtz (2019, 2021)

Fig. 10.25 Reasons for the development of hybrid business model



Source: Wirtz (2001a, 2020b, 2021)

Chapter 10. Questions and topics for discussion

Chapter 10
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. Describe the connection business model, differentiating between intra-connection and interconnection.

Topics for classroom discussion and team debates

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?

Source: Wirtz (2021)

Chapter 11: Digital B2B Business Models

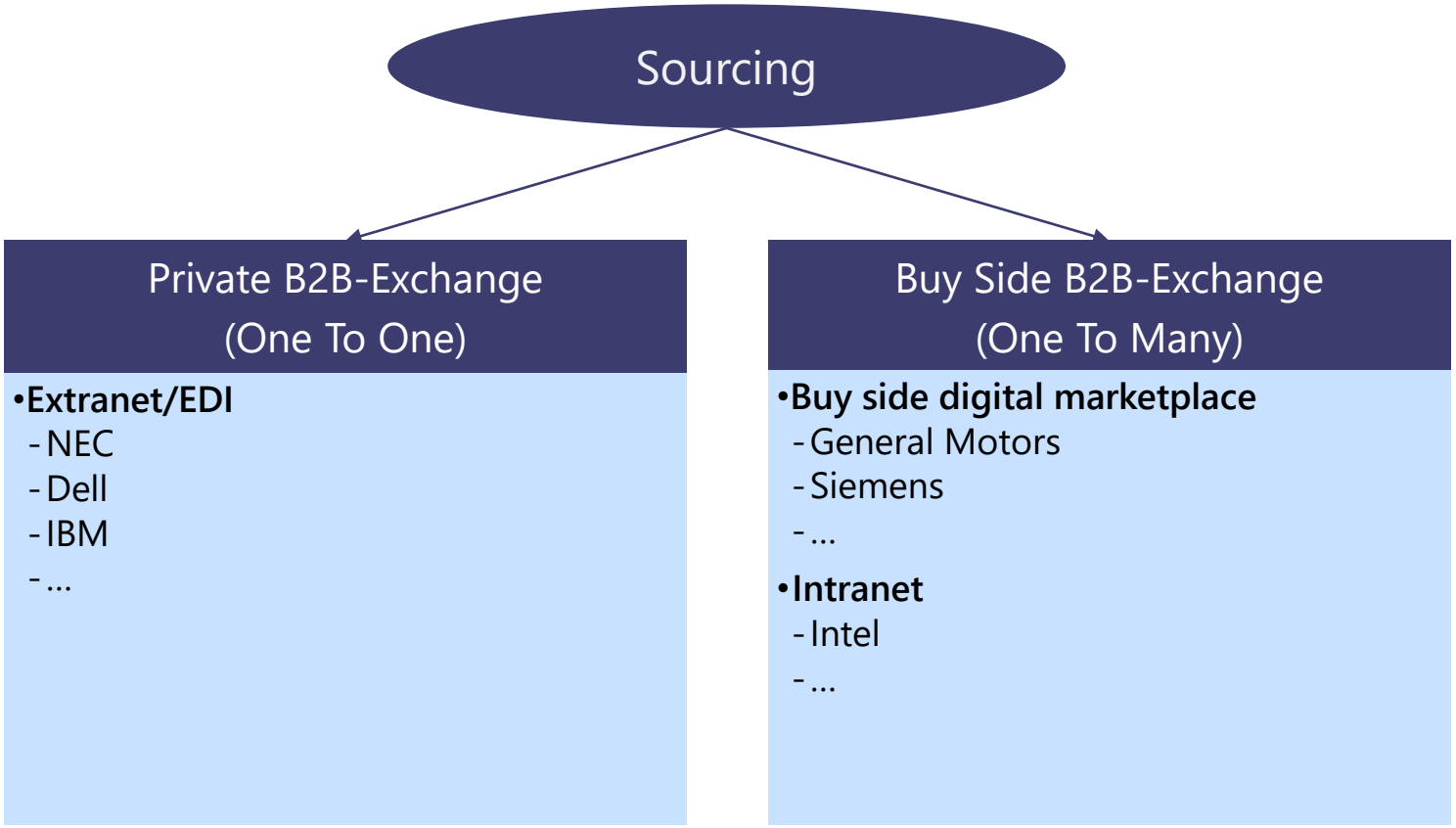
Fig. 11.1 4S-net business model

Sourcing	Sales
• Initiation and/or • Settlement of direct B2B business transactions from buyer to seller	• Initiation and/or • Settlement of business transactions from seller to buyer
Supportive Collaboration	**Service Broker**
• Supporting collaborative value generation • Collaborative research and development • Collaborative production • Collaborative sale	• Support of B2B business transactions • Providing information and marketplaces of third parties

Source: Wirtz (2010c, 2021)

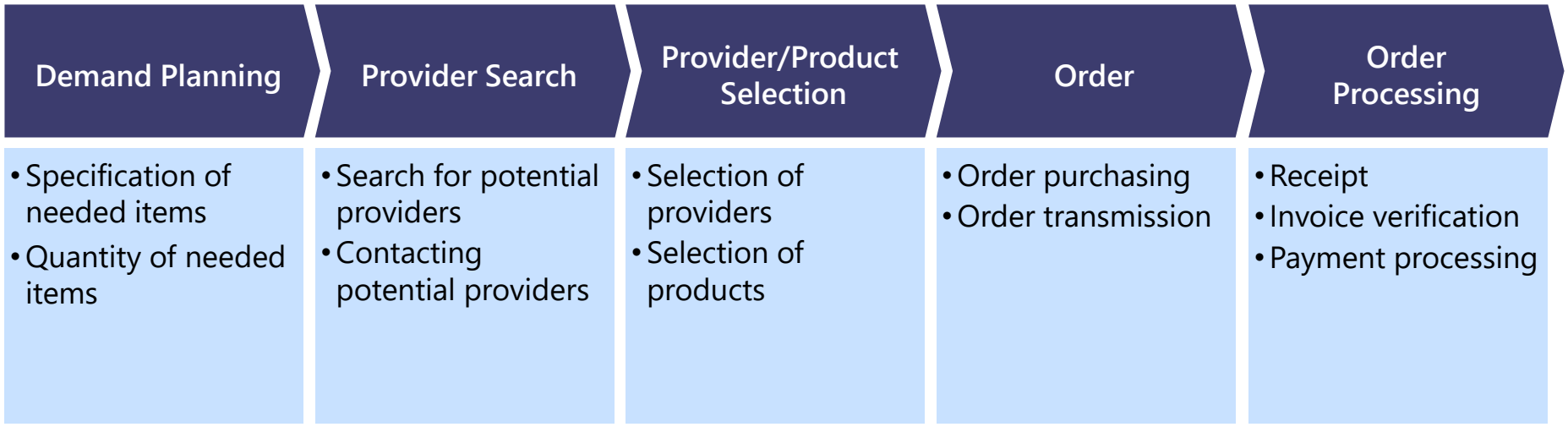
Fig. 11.2 B2B sourcing business model

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



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

Fig. 11.3 Aggregated value chain of the sourcing business model



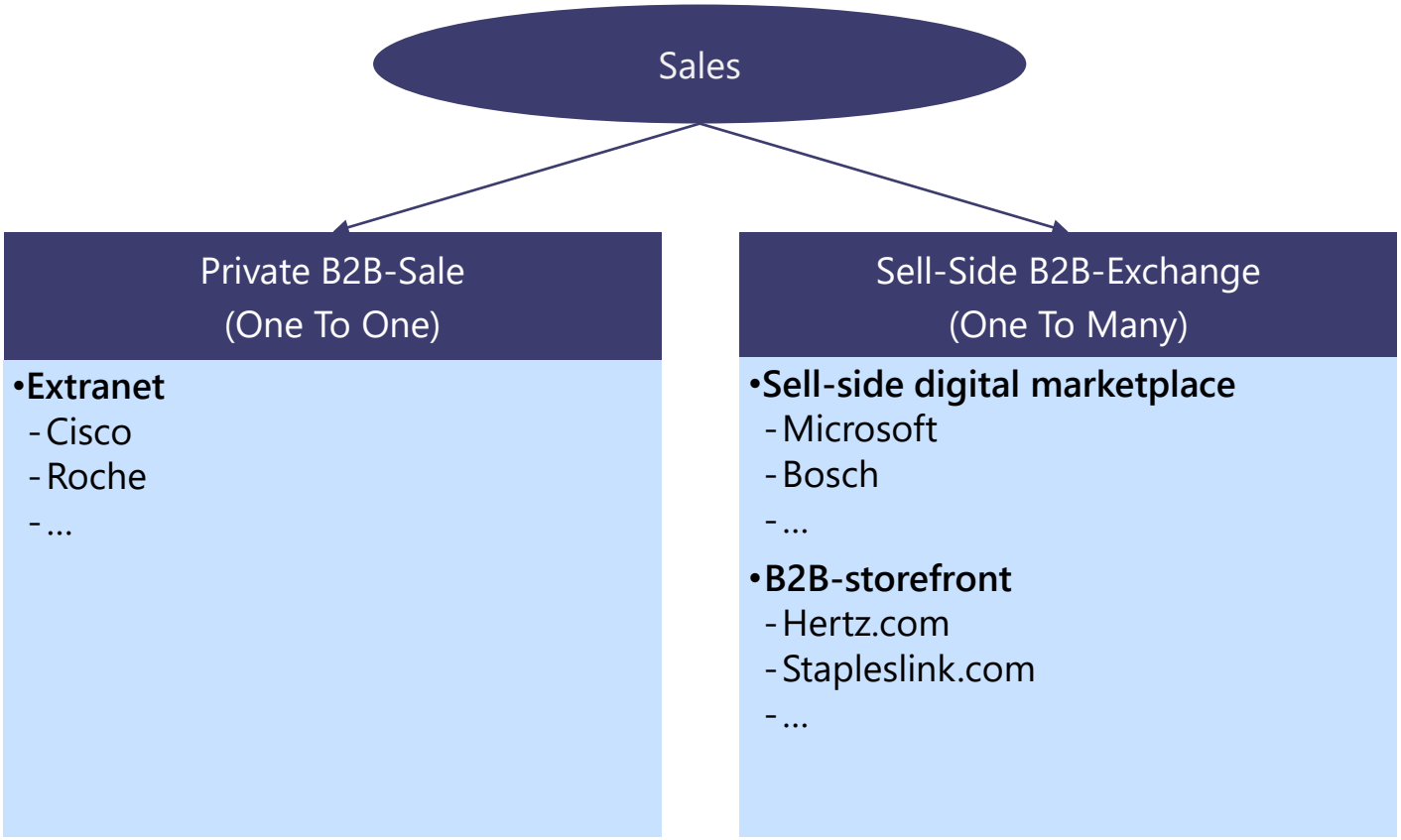
Source: Wirtz (2010c, 2020, 2021)

Fig. 11.4 Core assets and core competencies of the sourcing business model

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

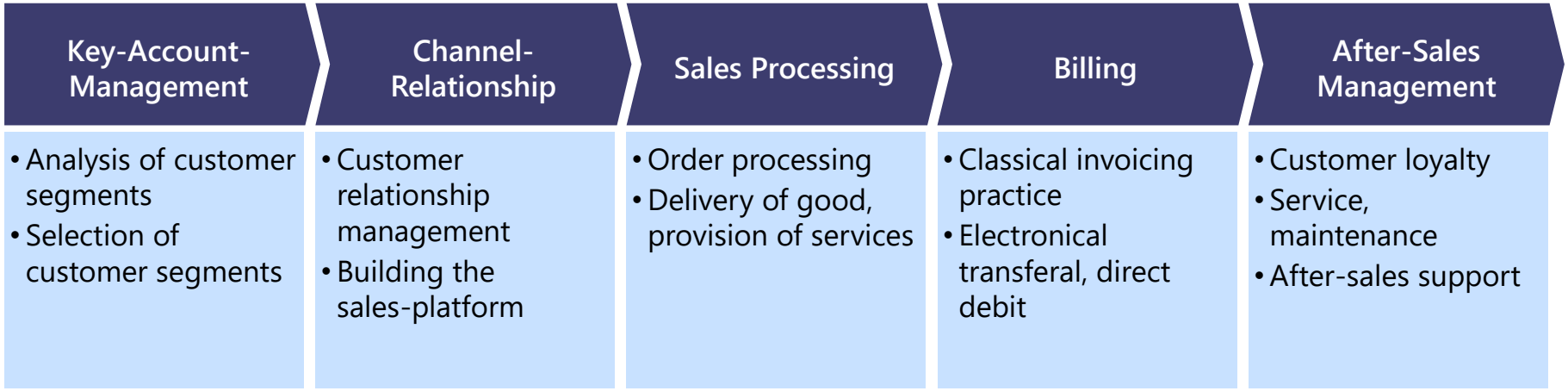
Fig. 11.5 B2B sales business model

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



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

Fig. 11.6 Aggregated value chain of the sales business model



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

Fig. 11.7 Core assets and core competencies of the sales business model

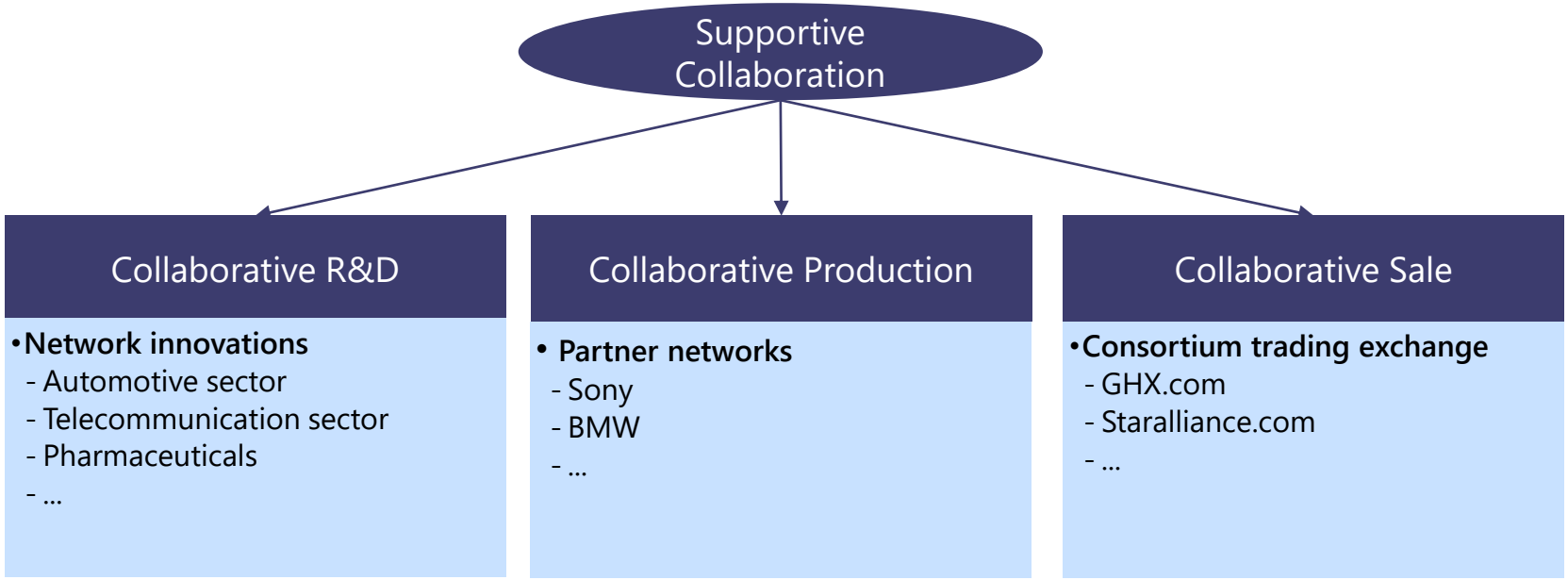
- Customer base
- Key account network
- Branding
- Distribution structure
- IT platform

- Negotiation skills
- Pricing skills
- Installation and establishment of technical infrastructure

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

Fig. 11.8 B2B supportive collaboration business model

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



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

Fig. 11.9 Aggregated value chain of the supportive collaboration business model

Collaboration Planning	Collaboration Partnering	Collaboration Scheduling	Collaboration Fulfillment	Collaboration Audit
• Analysis of value chain regarding collaboration potential	• Identification and selection of potential collaboration partners • Contacting and contract negotations	• Negotiation of contact conditions • Definition of distribution-of-business plan • Conclusion of collaboration contract	• Collaboration contract fulfillment • Execution of defined collaboration • Setup of IT-platform	• Examination of collaboratioin fulfillment • Performance-measurement of collaboration and initiation of improvement measures

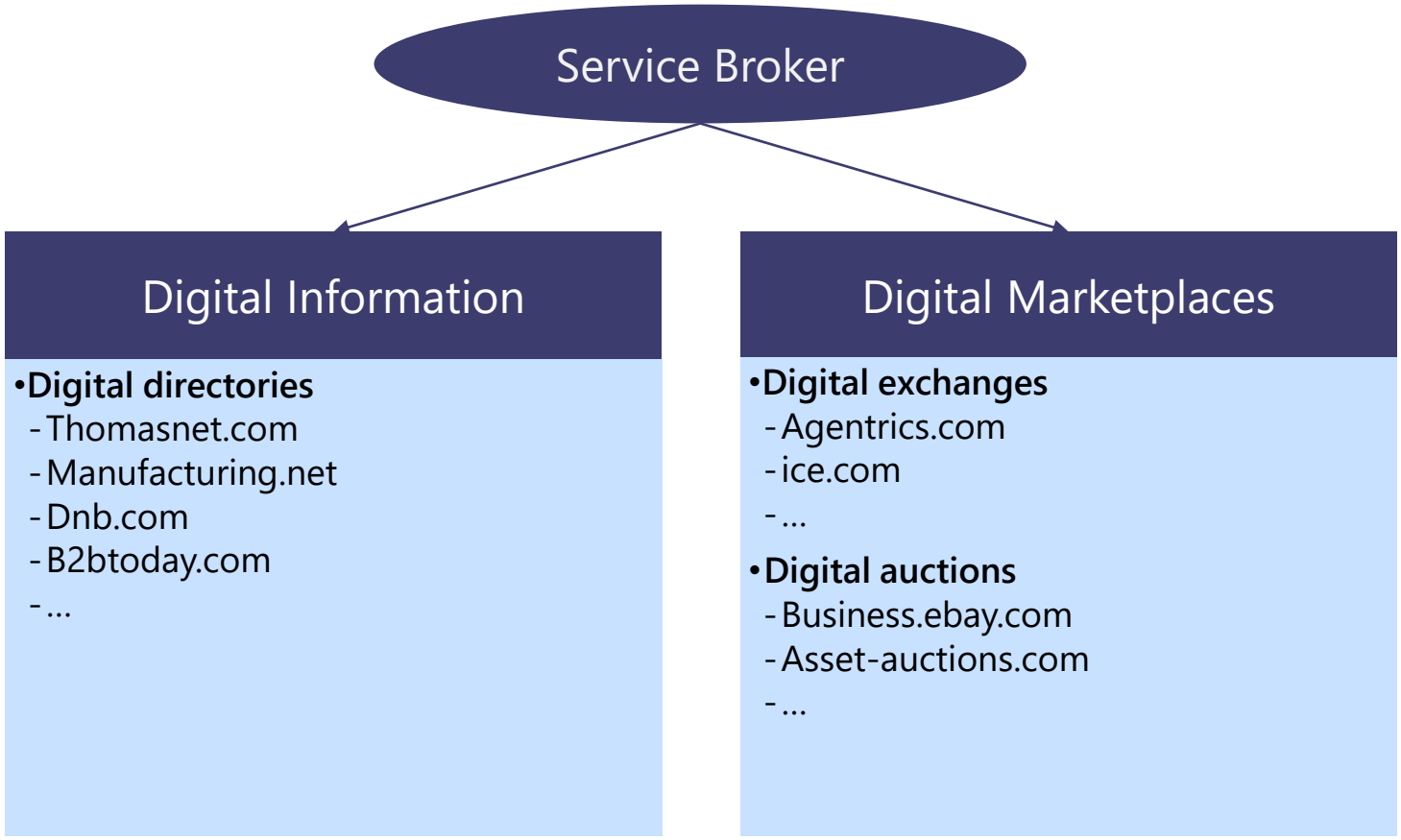
Source: Wirtz (2010c, 2020b, 2021)

Fig. 11.10 Core assets and core competencies of the supportive collaboration business model

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

Fig. 11.11 B2B service broker business model

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



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

Fig. 11.12 Aggregated value chain of the service broker business model

Conception/Design	Content Acquistion and Platform Setup	Marketing/ Distribution	Billing	After-Sales Service
• Service determination • Target group definition	• Collection of information, acquisition of offers • Coding and setup of IT-platform	• Customer acquisition • Target group specific marketing • Service provision	• Payment handling • Receivables management	• Customer relationship management • Customer data management

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

Fig. 11.13 Core assets and core competencies of the service broker business model

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

Chapter 11. Questions and topics for discussion

Chapter 11
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 classroom discussion and team debates

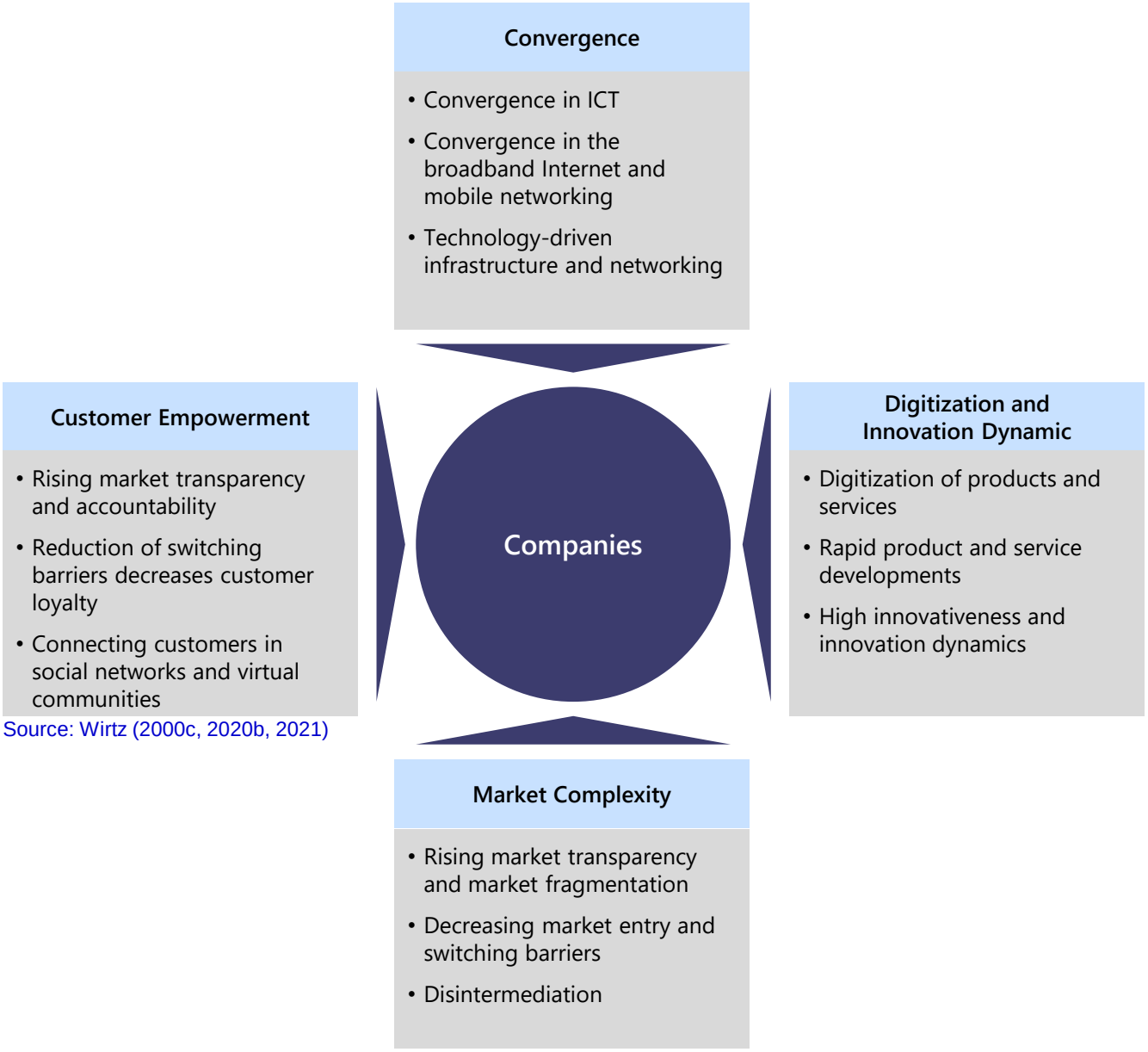
1. Discuss the relevance of digital business models in the B2B sector, especially with regard to the digital transformation of the economy in view of the shift from offline to online business.
2. Discuss the main differences between the 4C- and 4S-Net Business Model. Explain where the B2B and B2C relationships 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.

Source: Wirtz (2021)

Part III – Digital Strategy, Digital Digital Organization and E-commerce

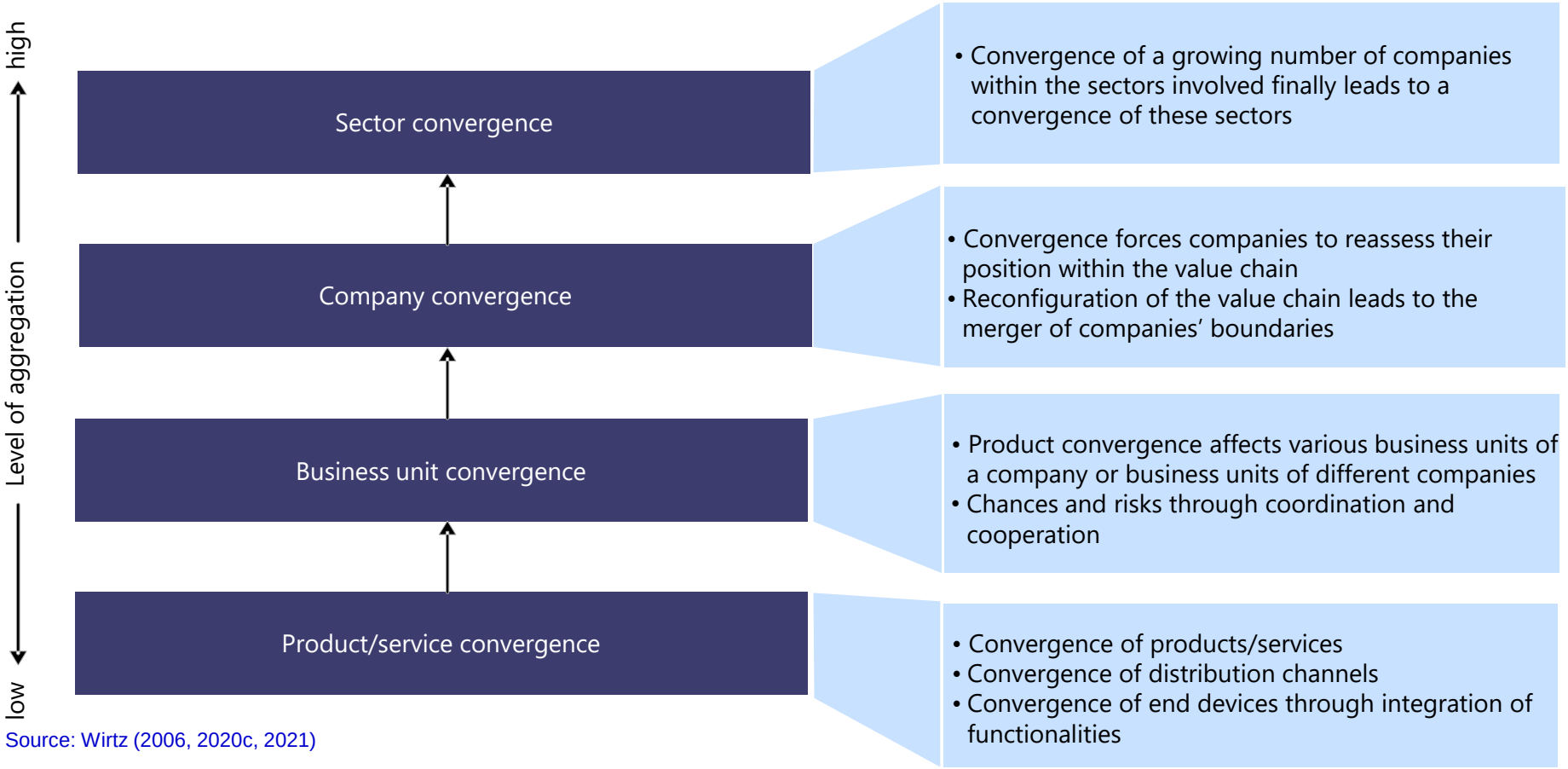
Chapter 12: Digital Business Strategy

Fig. 12.1 4-forces model of digital busines



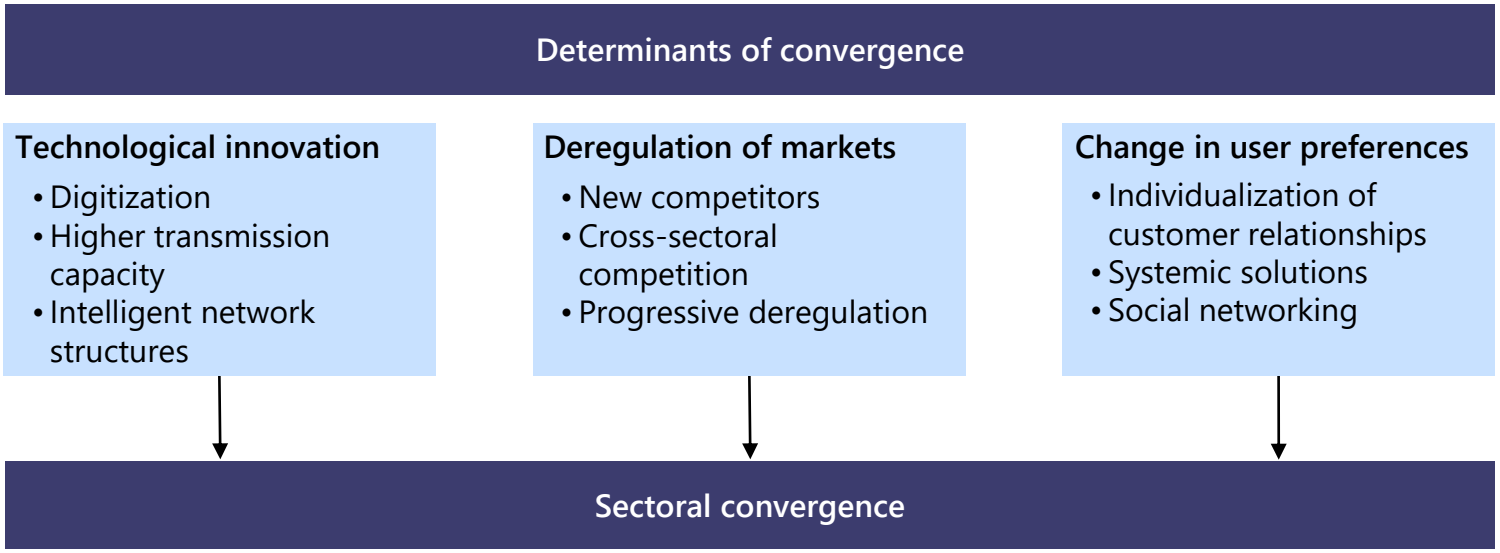
Source: Wirtz (2000c, 2020b, 2021)

Fig. 12.2 4-level convergence model



Source: Wirtz (2006, 2020c, 2021)

Fig. 12.3 Determinants of convergence



Source: Wirtz (2020b, 2021)

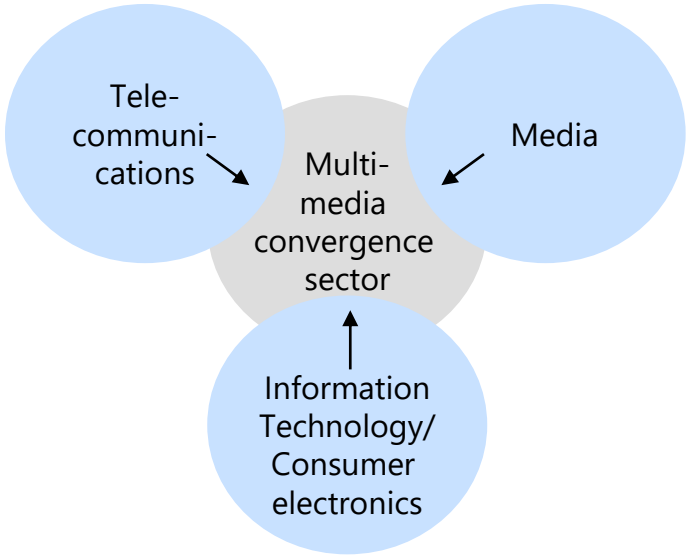
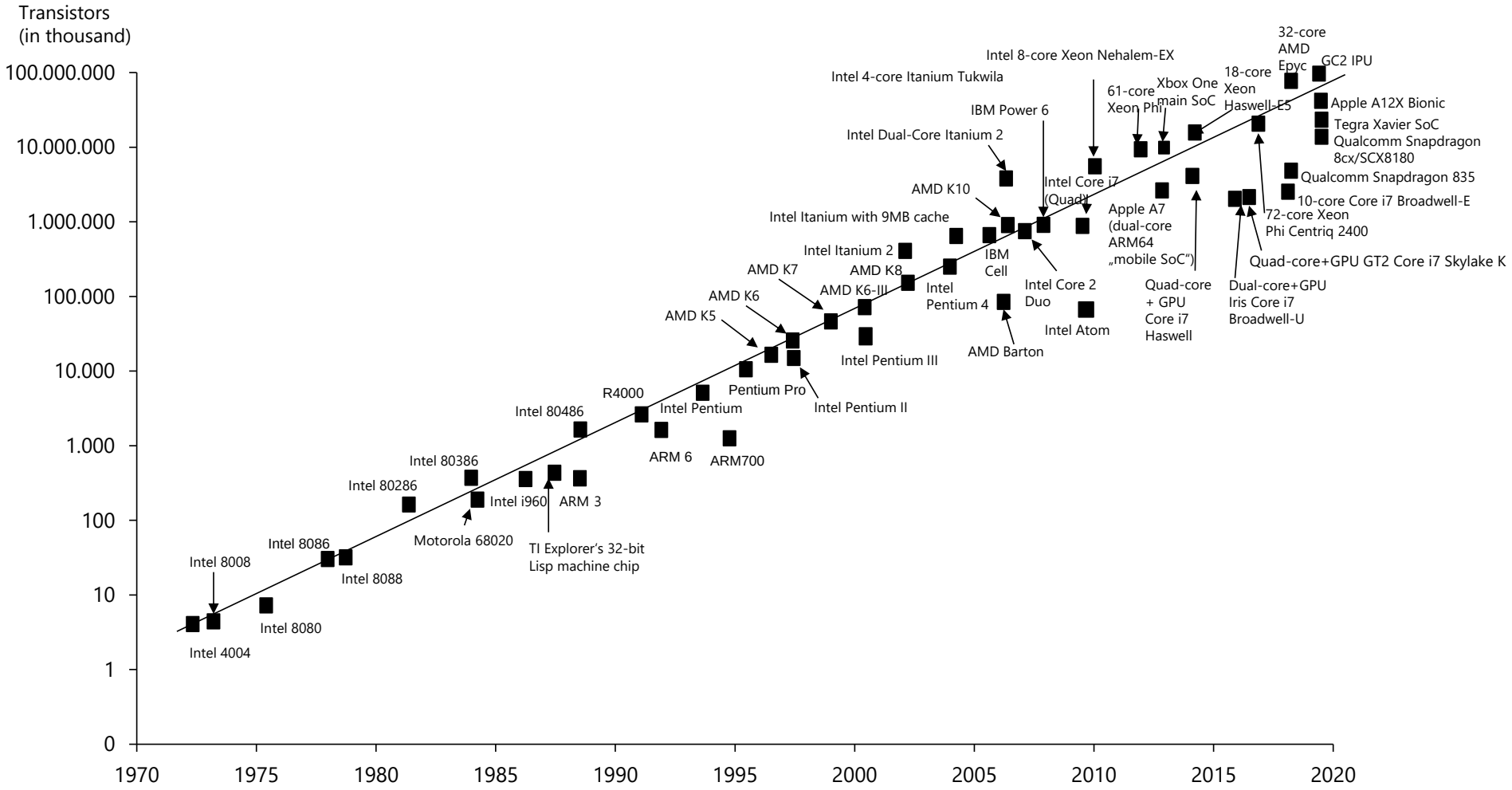
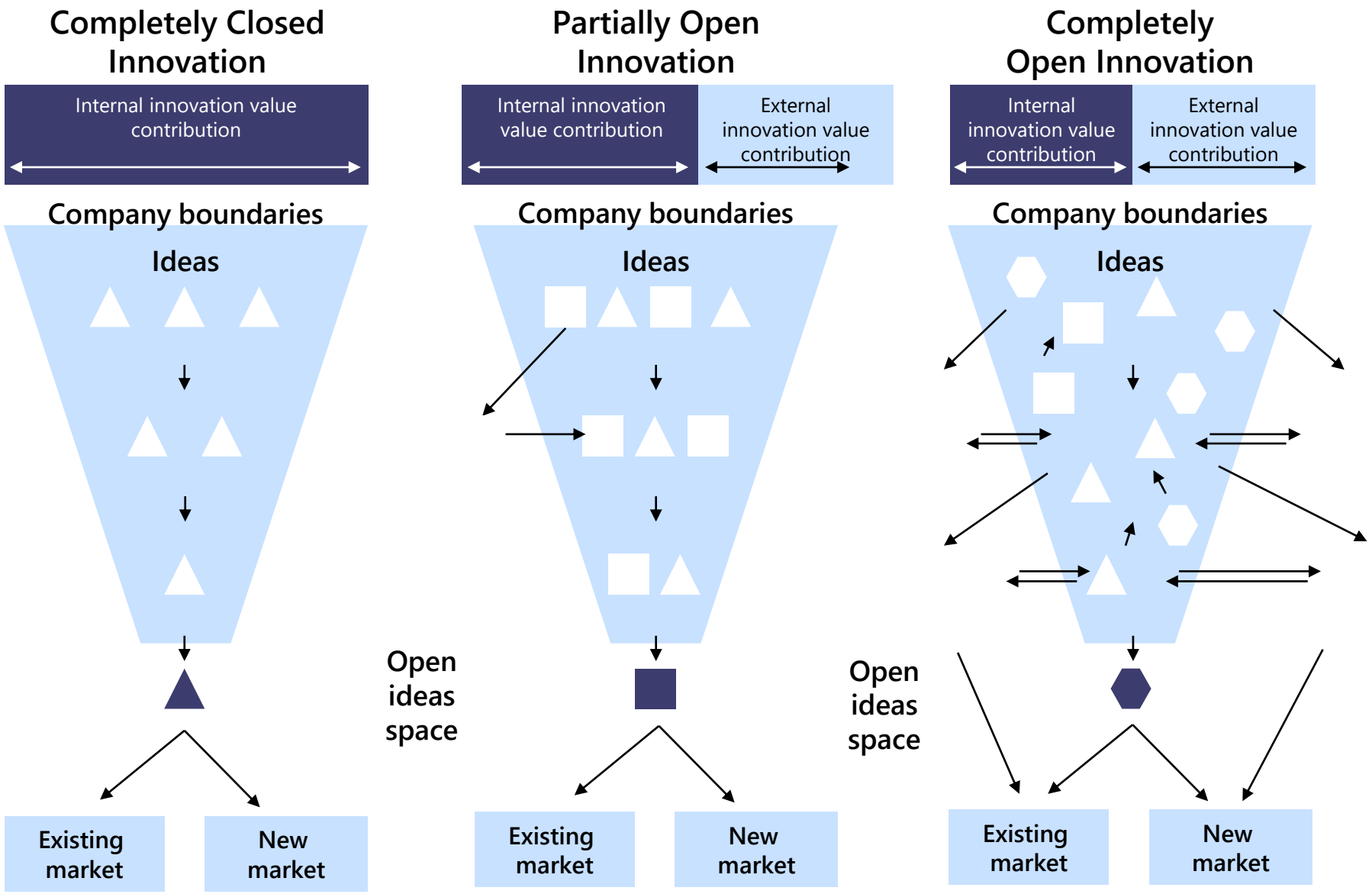


Fig. 12.4 Performance of microprocessors



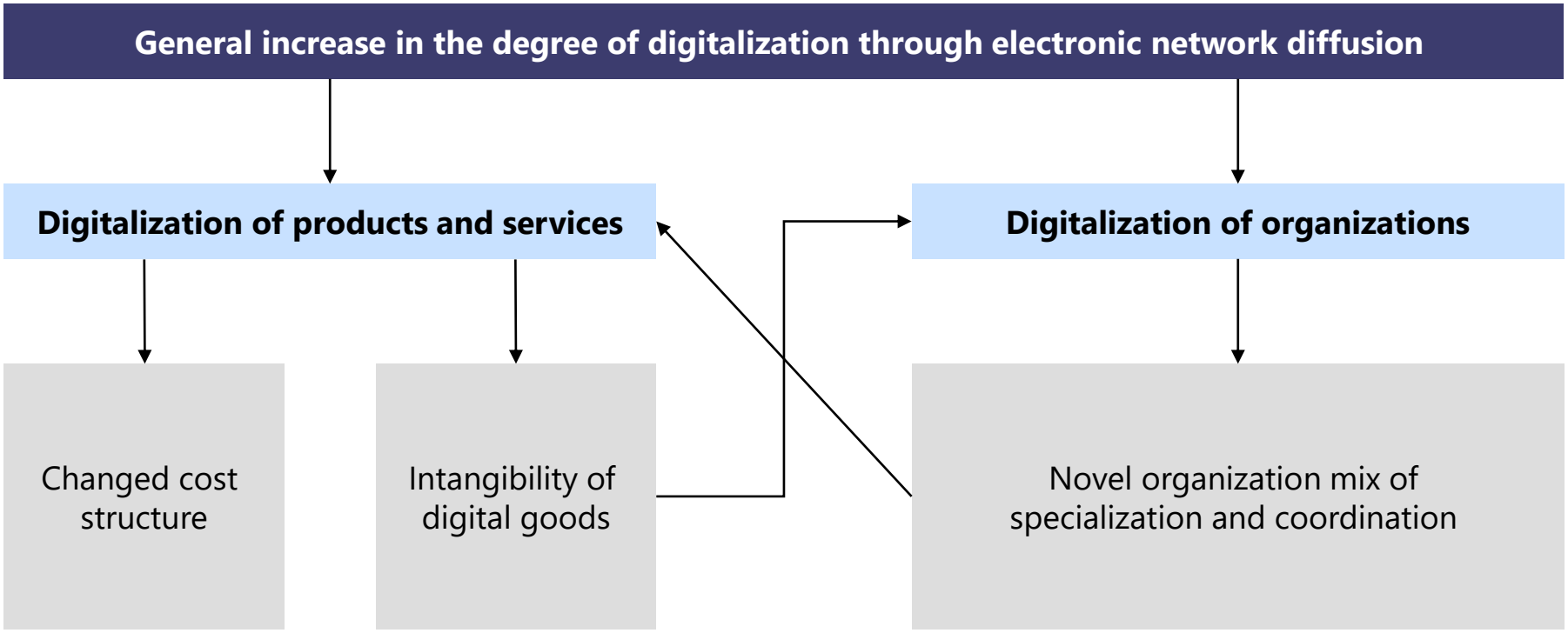
Source: Wirtz (2013a, 2020b, 2021)

Fig. 12.5 Forms of open innovation



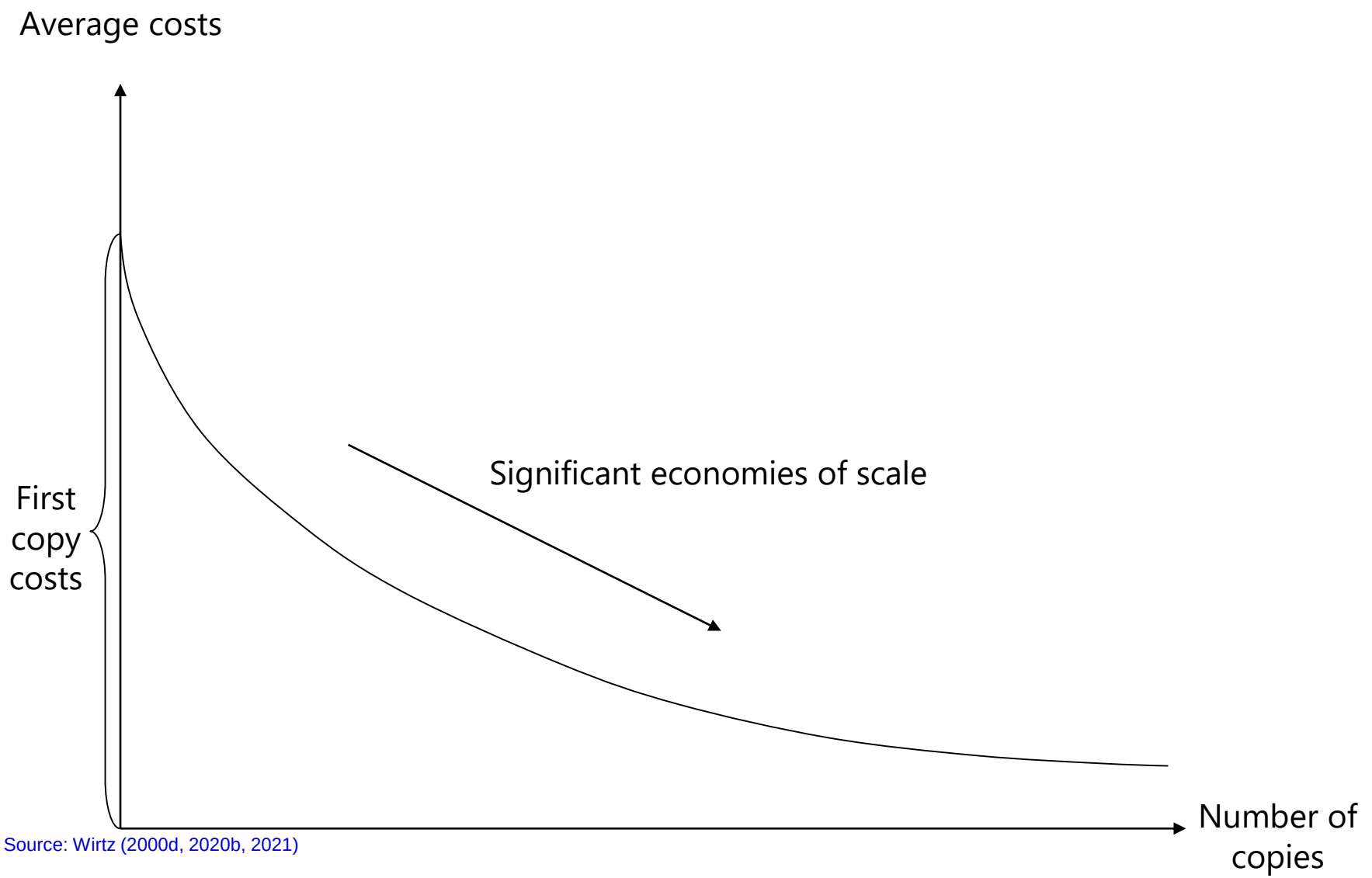
Source: Wirtz (2020b, 2021)

Fig. 12.6 Effects of digitization



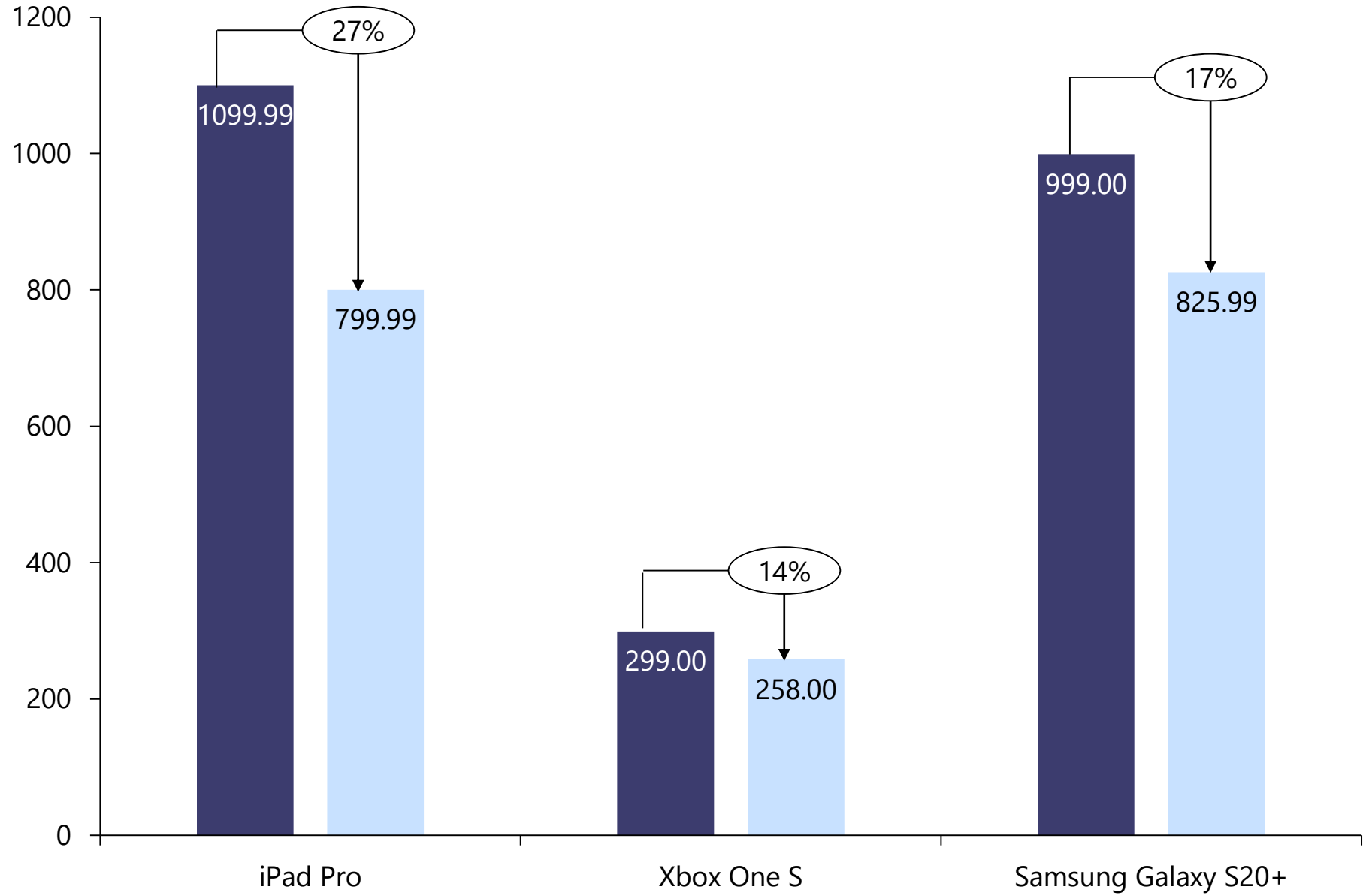
Source: Wirtz (2000c, 2020c, 2021)

Fig. 12.7 Decrease of the average copy costs with increasing output quantity



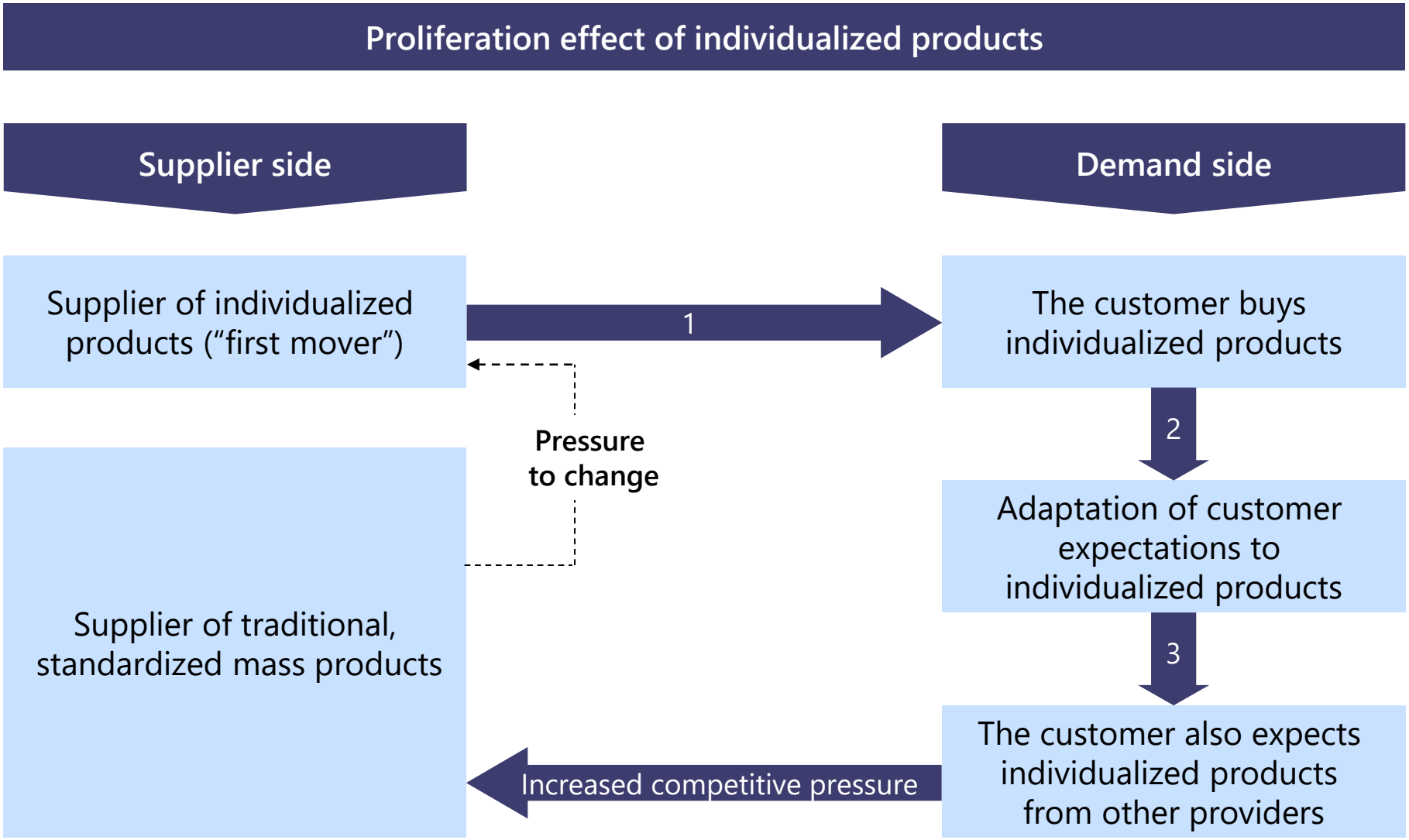
Source: Wirtz (2000d, 2020b, 2021)

Fig. 12.8 Exemplary illustration of the price differences among different providers by shopping.com



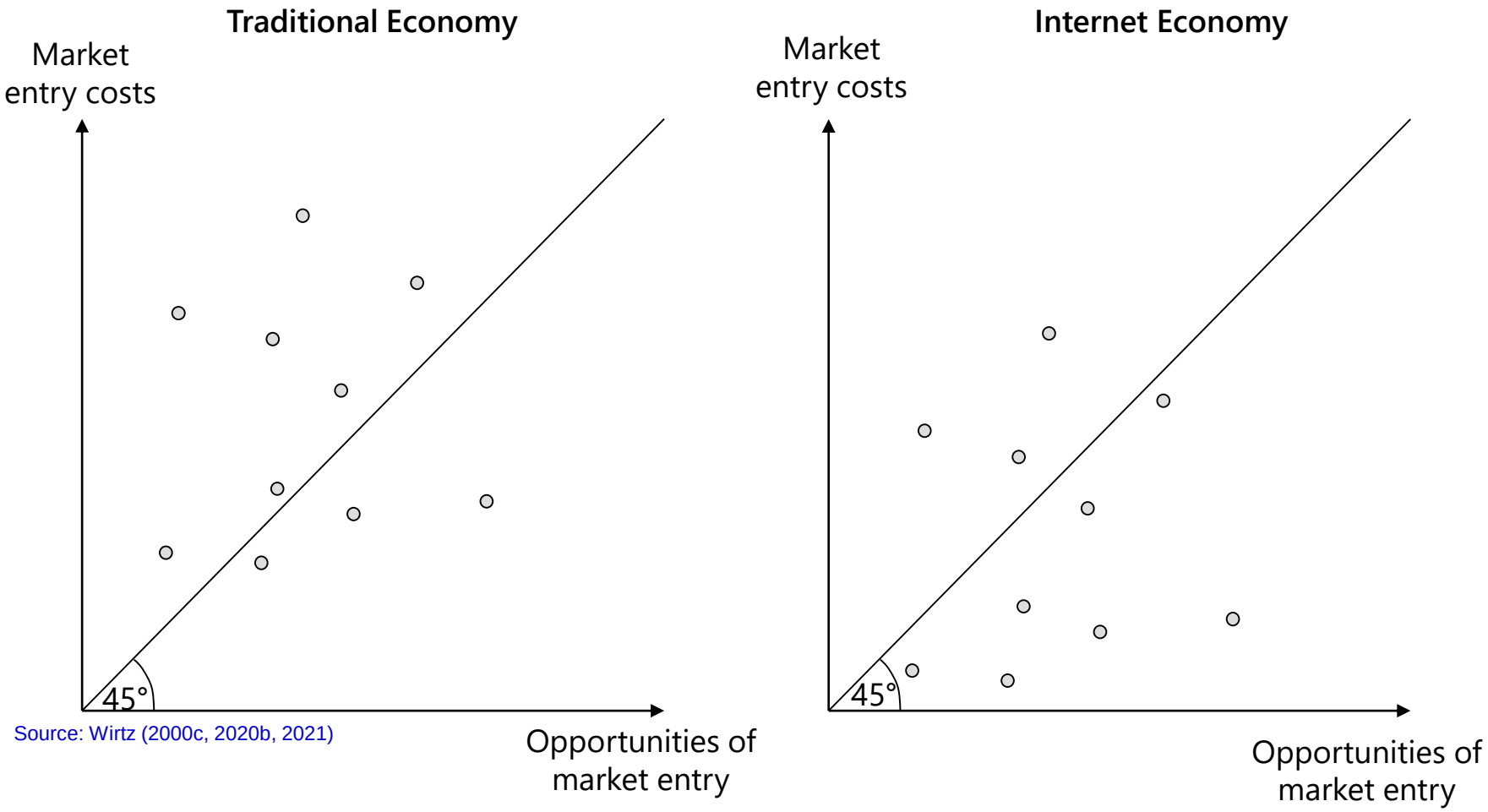
Data Source: shopping.com (2020), and Wirtz (2021)

Fig. 12.9 The proliferation effect of individualized products



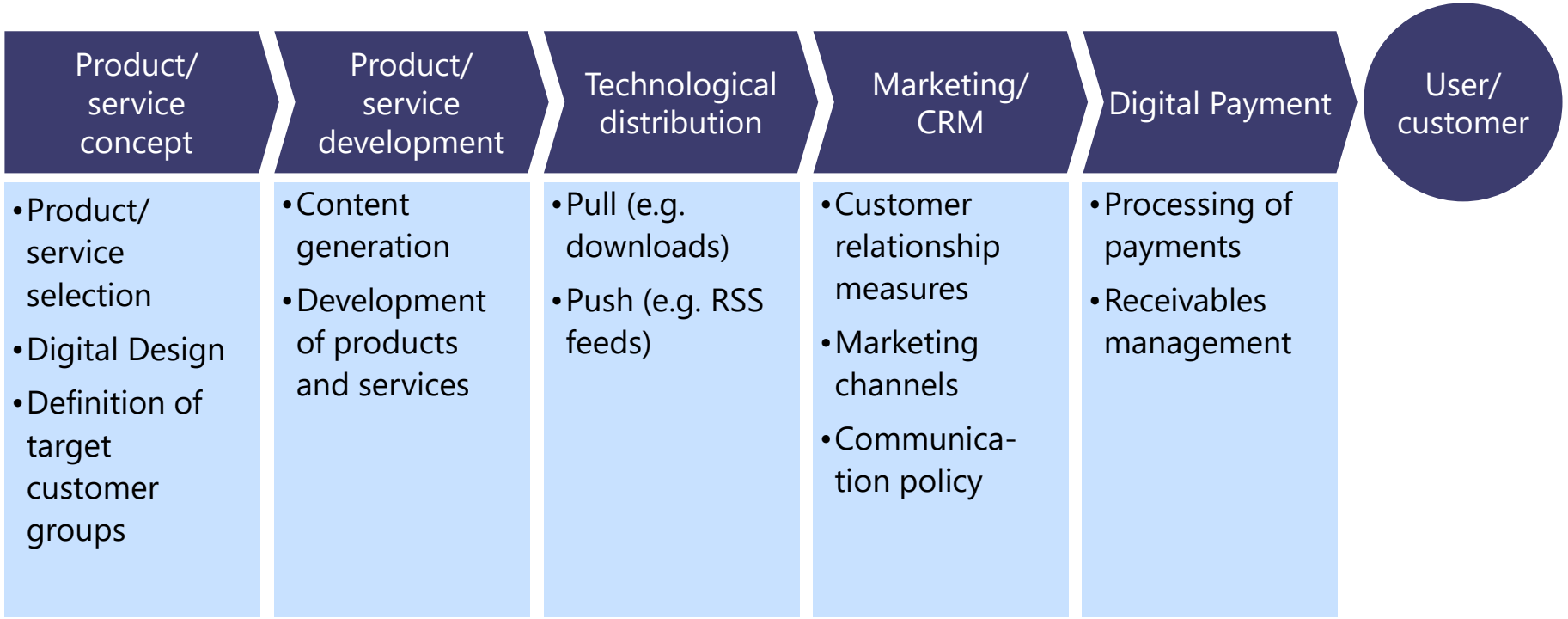
Source: Wirtz (2000c, 2020b, 2021)

Fig. 12.10 Changed cost/opportunity ratio of market entry



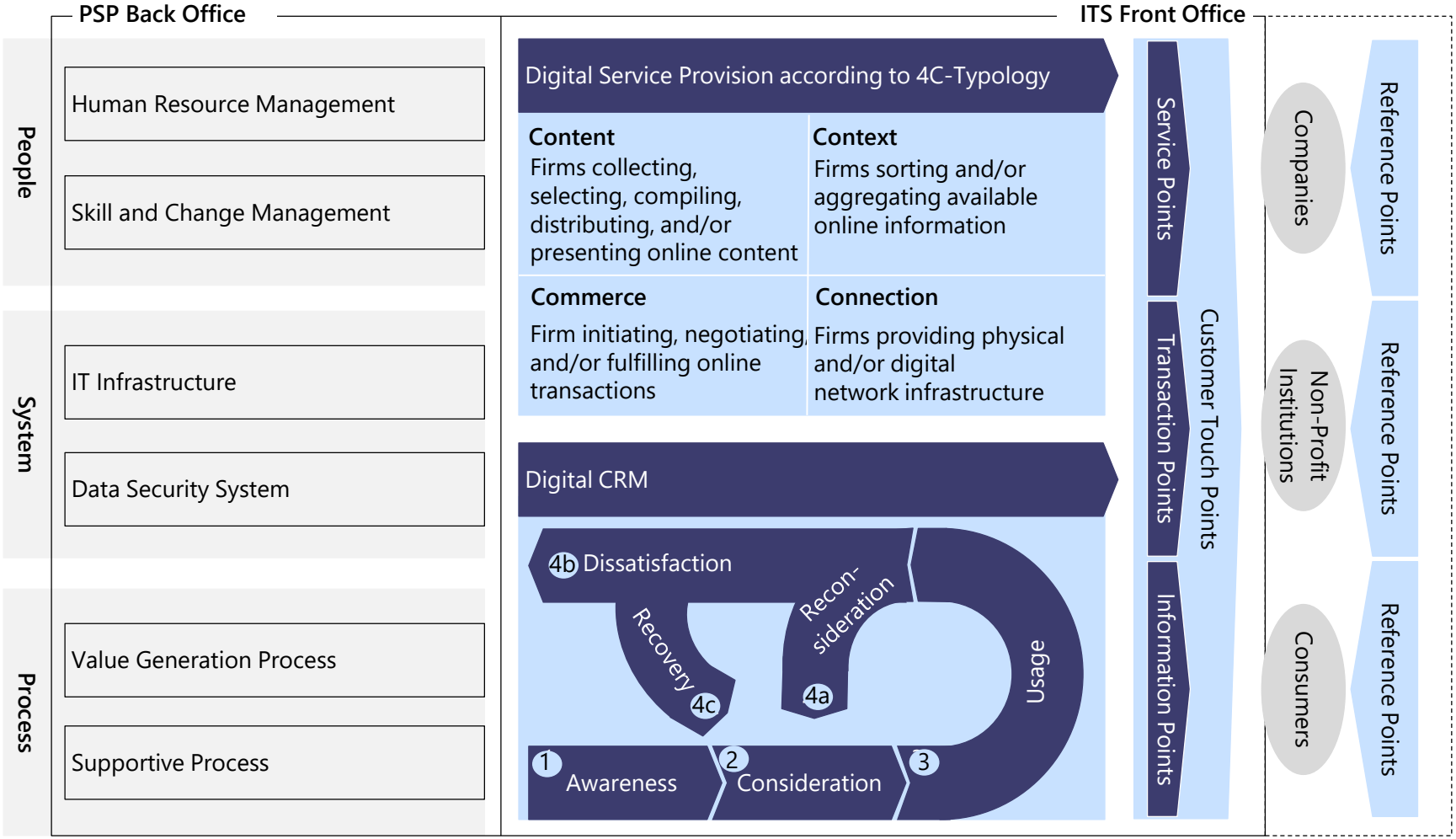
Source: Wirtz (2000c, 2020b, 2021)

Fig. 12.11 Digital business value chain



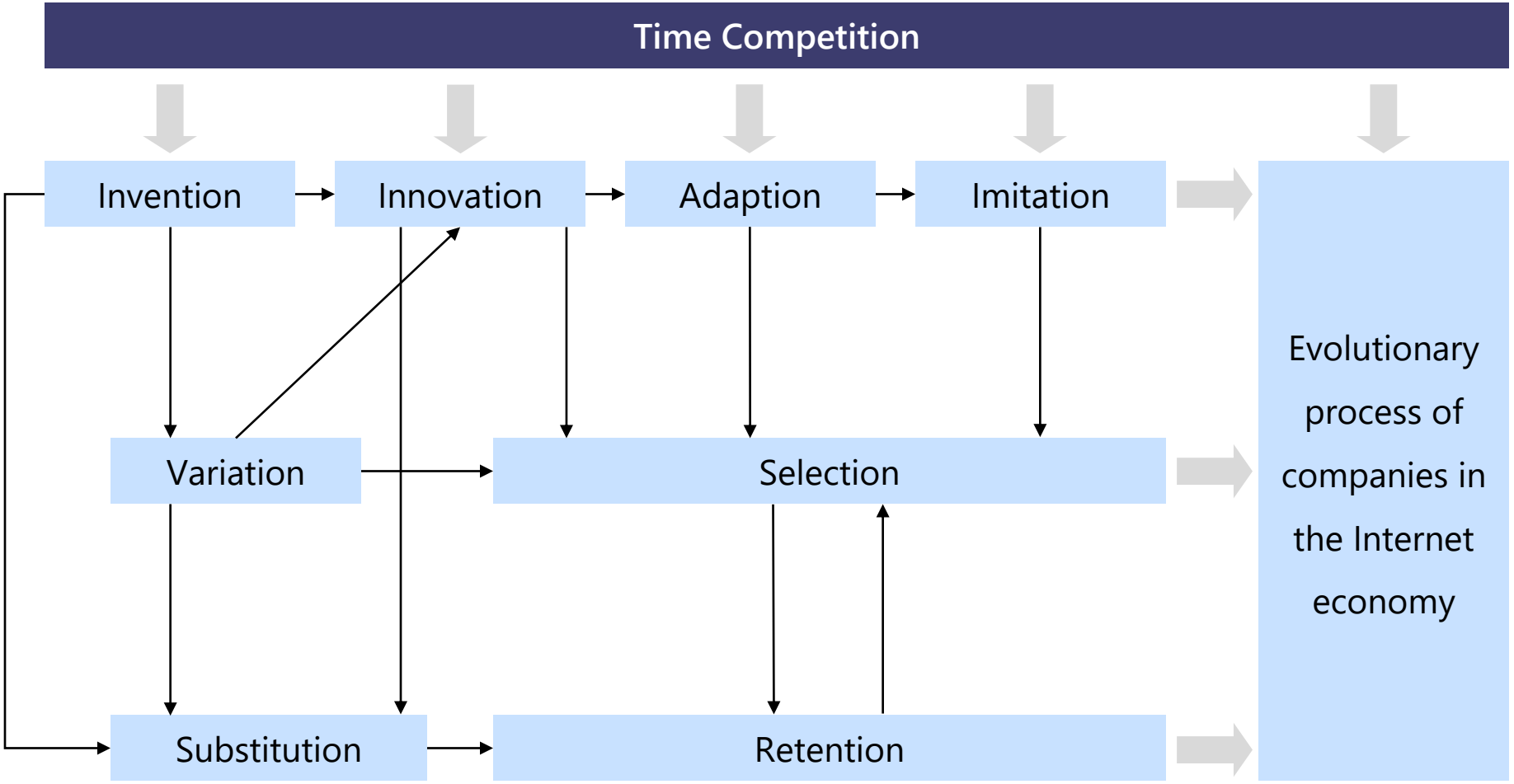
Source: Wirtz (2000c, 2020b, 2021)

Fig. 12.12 Model of digital business value activity system (dVAS)



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

Fig. 12.13 Scheme of evolution and change processes in the Internet economy



Source: Wirtz (2000c, 2020b, 2021)

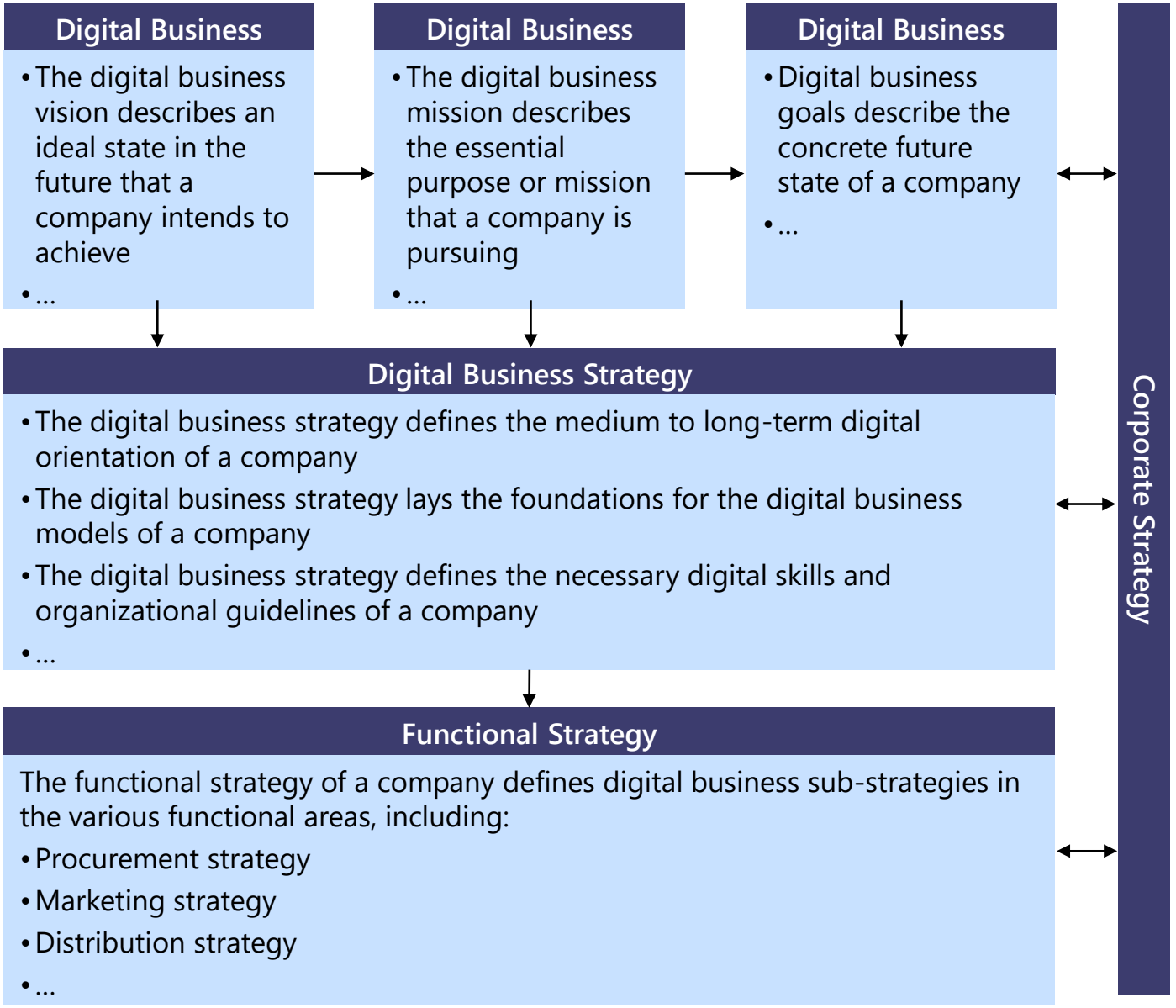
Definition of Digital Business Strategy

Definition of Digital Business Strategy (Wirtz 2001a, 2020b)

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 (2021)

Fig. 12.14 Classification of the digital business strategy in the corporate context



Source: Wirtz (2020b, 2021)

Fig. 12.15 Taxonomy of digital business strategy development

Digital business target plan	Digital business situational analysis	Digital business strategy formulation	Digital business strategy implementation	Digital business strategy audit
• Vision • Mission • Targets	• Assessment of internal factors • Assessment of external factors	• Derivation and assessment of strategic options • Digital business strategy selection and determination	• Implementation/ realization plan • Resource allocation to initiatives • Change management	• Performance control • Strategic control

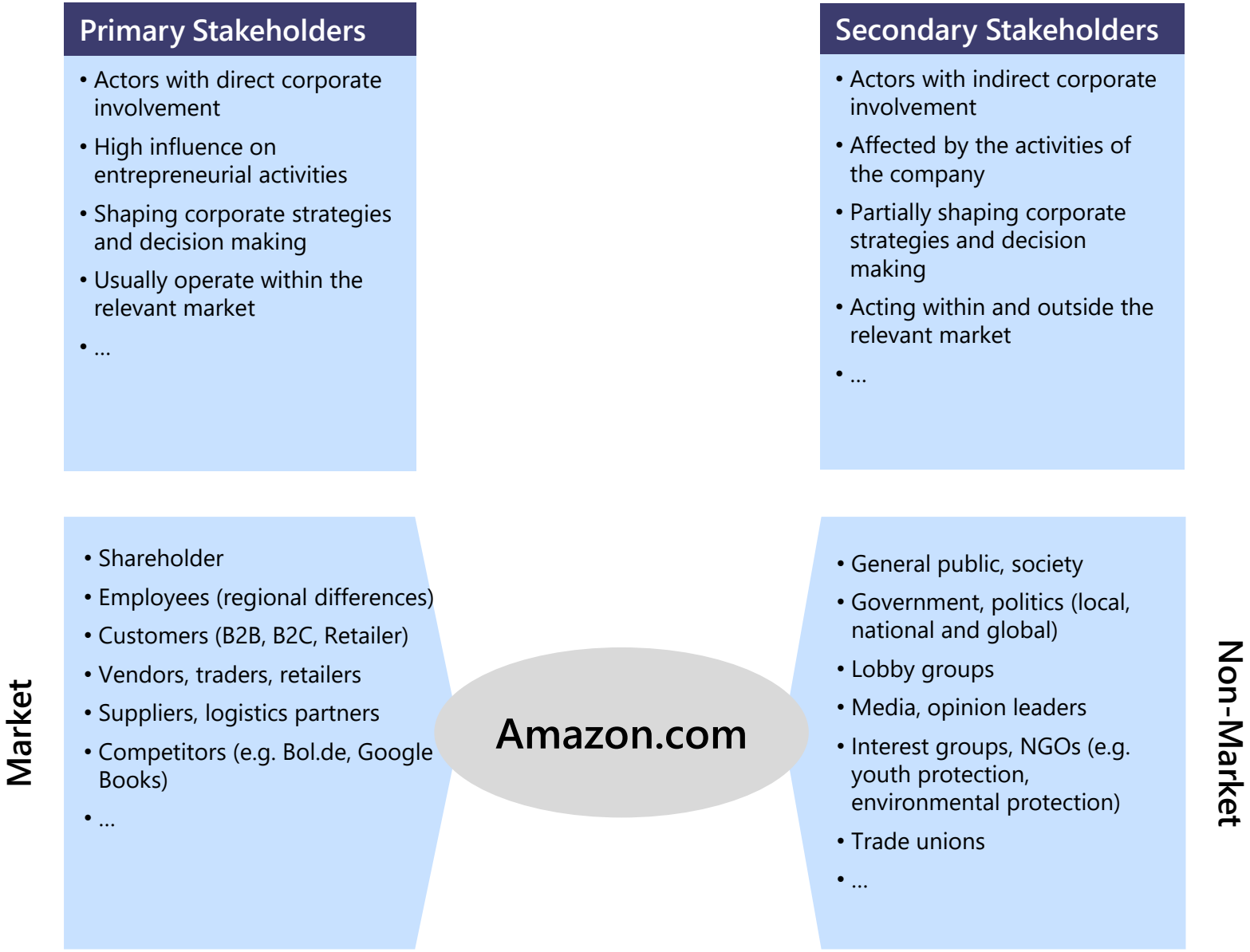
Source: Wirtz (2010c, 2020b, 2021)

Fig. 12.16 Digital business vision

Meaningful	Motivating	Guide to action
• Complexity reduction • Guidance • Influencing the operation logic	• Presentation of a desirable picture of the future • Creation of enthusiasm and motivation	• Derivation of collectively coordinated actions • Setting priorities for action

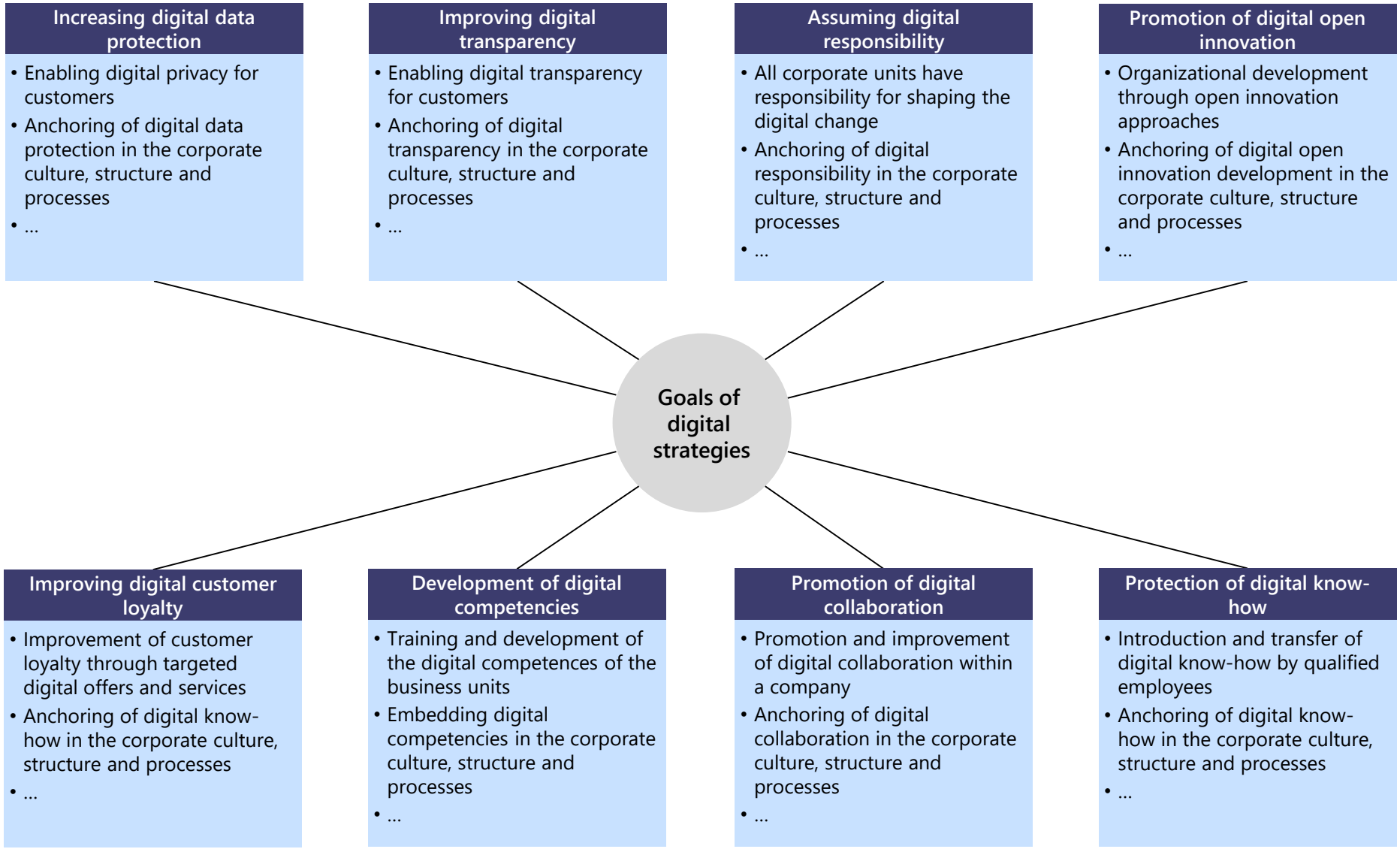
Source: Wirtz (2010c, 2020b, 2021)

Fig. 12.17 Primary and secondary stakeholders of Amazon



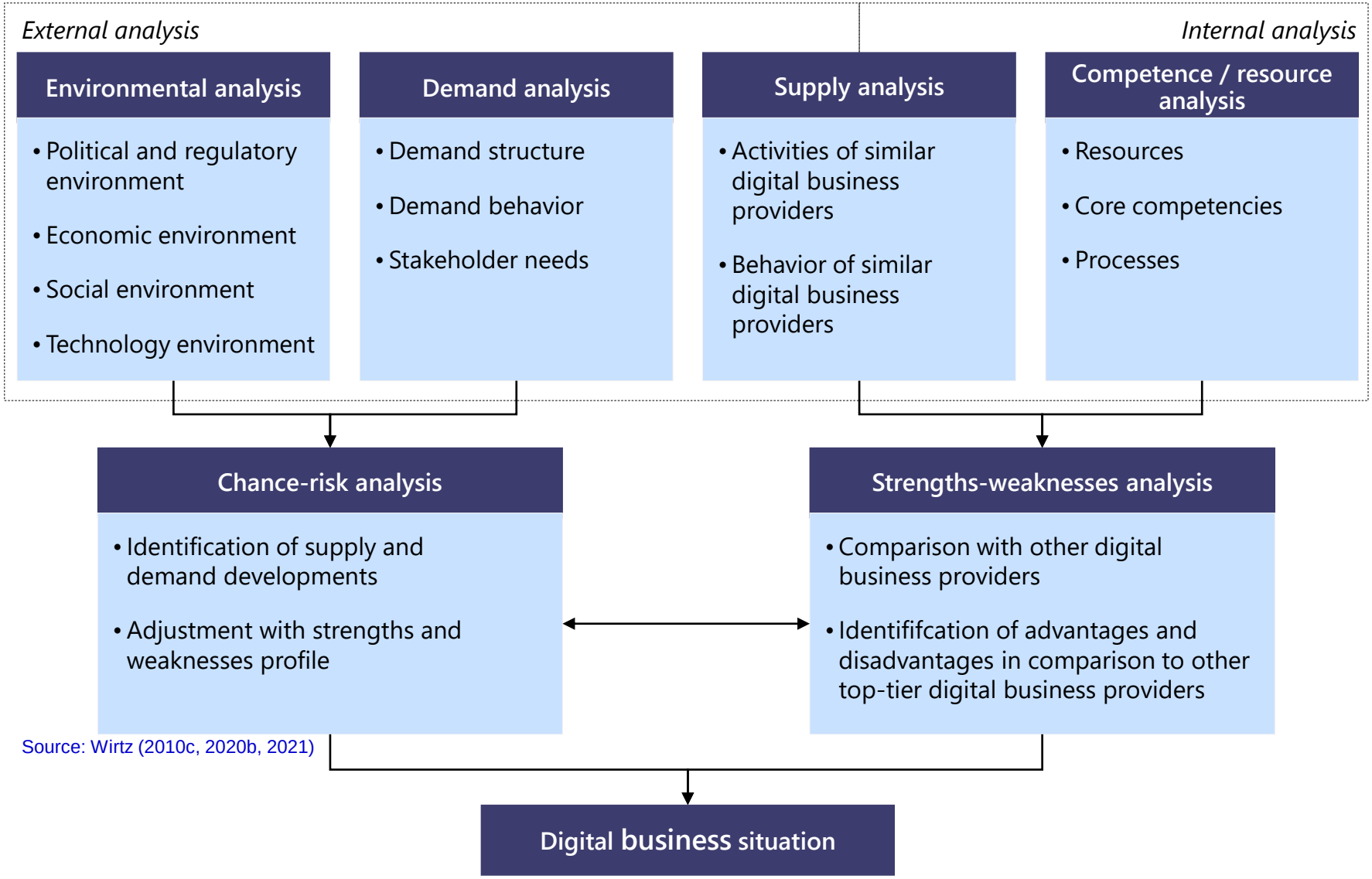
Source: Wirtz (2020b, 2021)

Fig. 12.18 Goals of digital strategies



Source: Wirtz (2020b, 2021)

Fig. 12.19 Elements of the situational digital business analysis



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

Table 12.1 Criteria for customer segmentation I

Type of Criterion	Differentiation Criteria for the Digital Business Consumer Goods Market
Sociodemographic Criteria	• Gender • Age • Family status • Profession • Education • Income • Household size / number of children • Lifestyle • Religion • Nationality • ...
Psychographic Criteria	• Personal characteristics • Attitude • Behavior • Expected benefits • Usage rate • Usage status • Risk appetite • ...

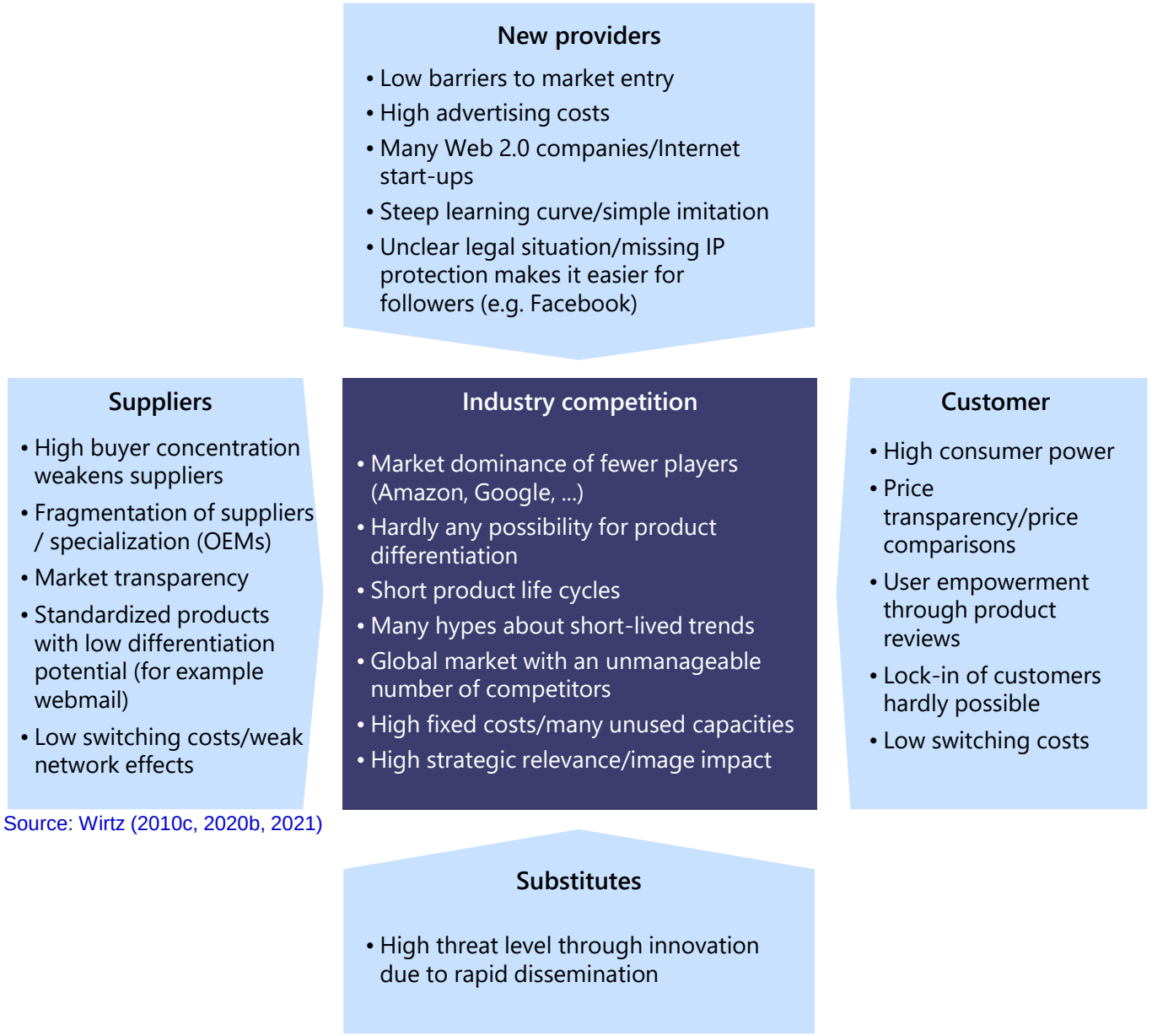
Source: Wirtz (2020b, 2021)

Table 12.1 Criteria for customer segmentation II

Type of Criterion	Differentiation Criteria for the Digital Business Consumer Goods Market
Behavior-Based Criteria	• Usage rate • Usage status • Price behavior • Media behavour • Brand loyalty • ...
Geographical Criteria	• State • Federal state • Place of residence • Administrative district • Purchasing power district • Function room • Catchment area • ...

Source: Wirtz (2020b, 2021)

Fig. 12.20 Competitive forces in digital business



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

Fig. 12.21 SWOT analysis for Amazon

Strengths	Weaknesses
• Profitable company • Excellent customer relationship management • Reliable IT infrastructure • Global brand	• Risk of brand dilution due to broad product range • Pure mail order business causes high shipping costs • Dependence on supply services
Opportunities	**Threats**
• Potential for cooperation (for example with Toys "R "Us) • Market opportunities in Asia and Eastern Europe	• Many competitors • Threat from Google Books, Google Shopping etc.

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

Table 12.2 Competitive strategies in digital business I

Strategy	Key Aspects	Revenue Generation	Success Factors	Examples
Service Leader	• Very high customer focus / customer orientation • Reliable service provision • Service orientation as a core competence • User-oriented breadth and depth of the offer • ...	• Direct revenues • through value-added services • Pay-for performance • User fees • Setup fees • Basic fees • ...	• Service reliability • Service expertise • Understanding of the service provider • Service responsiveness • ...	• Sharenow.com • Deliveroo.com • ...
Quality Leader	• 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 • ...	• Transaction revenues • Connection fees • User fees • Setup fees • Basic fees • Ad Sales • Big Data / data mining- revenues • ...	• Realization of premium prices through performance advantages • Customer-oriented quality development and planning • Continuous quality improvement • Quality-oriented organizational practices • ...	• Google.com • Sap.com • ...
Price Leader	• Scale and alliance-oriented business model • Differentiation via the lowest / best price • Coincidence with cost leadership • Focus on cost reduction • No-frills concepts • ...	• Transaction revenues • Connection fees • User fees • Setup fees • Basic fees • ...	• Consistent exploitation of cost reduction • High market shares • Efficient use of cost degression effects due to large quantities • ...	• Mintmobile.com • Xfinity.com • ...

Source: Wirtz (2020b, 2021)

Table 12.2 Competitive strategies in digital business II

Strategy	Key Aspects	Revenue Generation	Success Factors	Examples
Assortment Leader	• Focus on the most diversified range of products and services in order to address a large number of different target groups • „Long tail" effect • ...	• Transaction revenues • User fees • Basic fees • Ad sales • ...	• Broad and deep product range • Consideration of the needs of different (also smaller) target groups / customer segments • Variable and multifaceted customer • approach • ...	• Amazon.com • Spotify.com • Netflix.com • ...
Personali-zation Leader	• Distinguished by a high degree of user-defined and customizable offers • Individual customer approach and orientation • Individual / group data mining • ...	• Transaction revenues (individual prices) • ...	• Provision of customeroriented product / service configurators • Effective exploitation of technological opportunities in the configuration of products and services • ...	• Mymuesli.com • Nike.com/nikeby-you • ...
Information Leader	• Dominant position with regard to the completeness, relevance and credibility of the information provided • Focus on accessibility, security and usability of information • ...	• User fees (in the form of pay-per-use) • Basic fees (in the form of subscriptions) • Ad Sales • ...	• Effective and efficient provision of informative content • Customer-centered/personalized information offer • Use of different distribution media (multichannel) • ...	• Reuters.com • Dpa.com • ...

Source: Wirtz (2020b, 2021)

Table 12.2 Competitive strategies in digital business III

Strategy	Key Aspects	Revenue Generation	Success Factors	Examples
Communi-cation Leader	• Focus on the communication with customer / stakeholder groups • Communication touchpoints • Customer / user interface forms • ...	• Ad Sales • Big Data / data mining-revenues • ...	• User-oriented design of the graphical user interface • Multiple communication • Guarantee of data security • High communication responsiveness • ...	• Twitter.com • Youtube.com • ...
Interaction Leader	• 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 • ...	• Commissions • ...	• 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 • ...	• Uber.com • Airbnb.com • ...
Cooperation / Network Leader	• Control and mediation competence in cooperative networks • Focus on interorganizational relationships • Creating the opportunity of informational exchange in cross-organizational networks • ...	• Ad Sales • Big Data / data mining-revenues • Basic fees (for premium users/professional users) • ...	• Demand-oriented provision and development of effective and efficient cooperation platforms • Design of the cooperation interfaces • Ensuring the accessibility and security of the network • ...	• Dropbox.com • Google.com/drive • ...

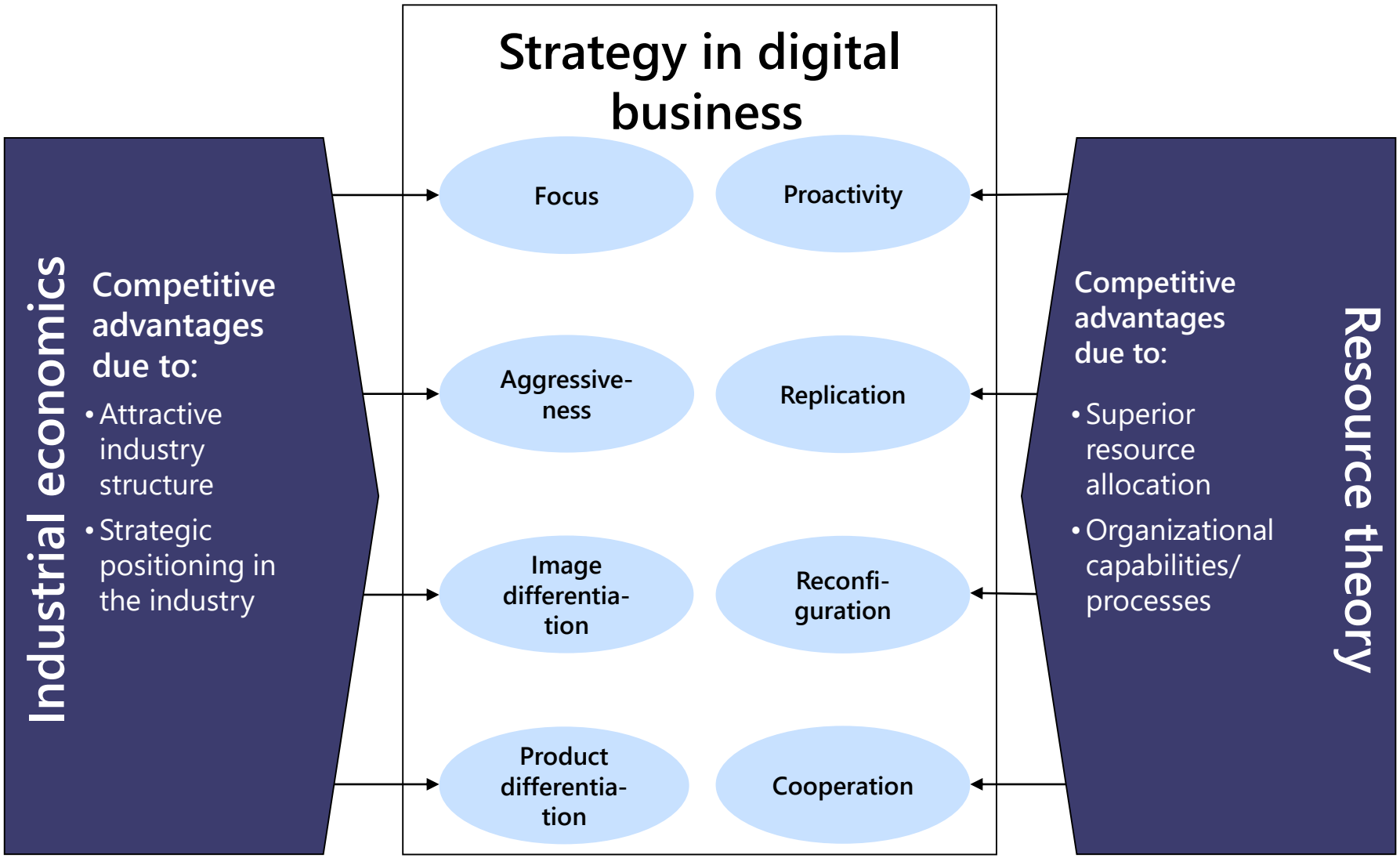
Source: Wirtz (2020b, 2021)

Table 12.2 Competitive strategies in digital business IV

Strategy	Key Aspects	Revenue Generation	Success Factors	Examples
Scale Leader	• Mass market focus • High degree of automation in services and production • High economies of scale and scope • Production volume increases faster than production costs • ...	• Transaction revenues • Basic fees • License fees • ...	• Consistent exploitation of cost reduction potentials • High market shares • Efficient use of cost degression effects due to large quantities • Broad and deep product range • ...	• Microsoft.com/en-us/windows/ • Sap.com/services/cloud • ...
Innovation Leader	• High degree of creativity and innovative power • Innovation advantages • First-to-market strategy • First-mover advantage • ...	• Transaction revenues • User fees • Patent / licence fees • ...	• Innovation-oriented organizational practices • Customer-oriented innovations • Promotion of innovation • High R&D share • Innovation cooperations • ...	• Apple.com • Tesla.com • ...

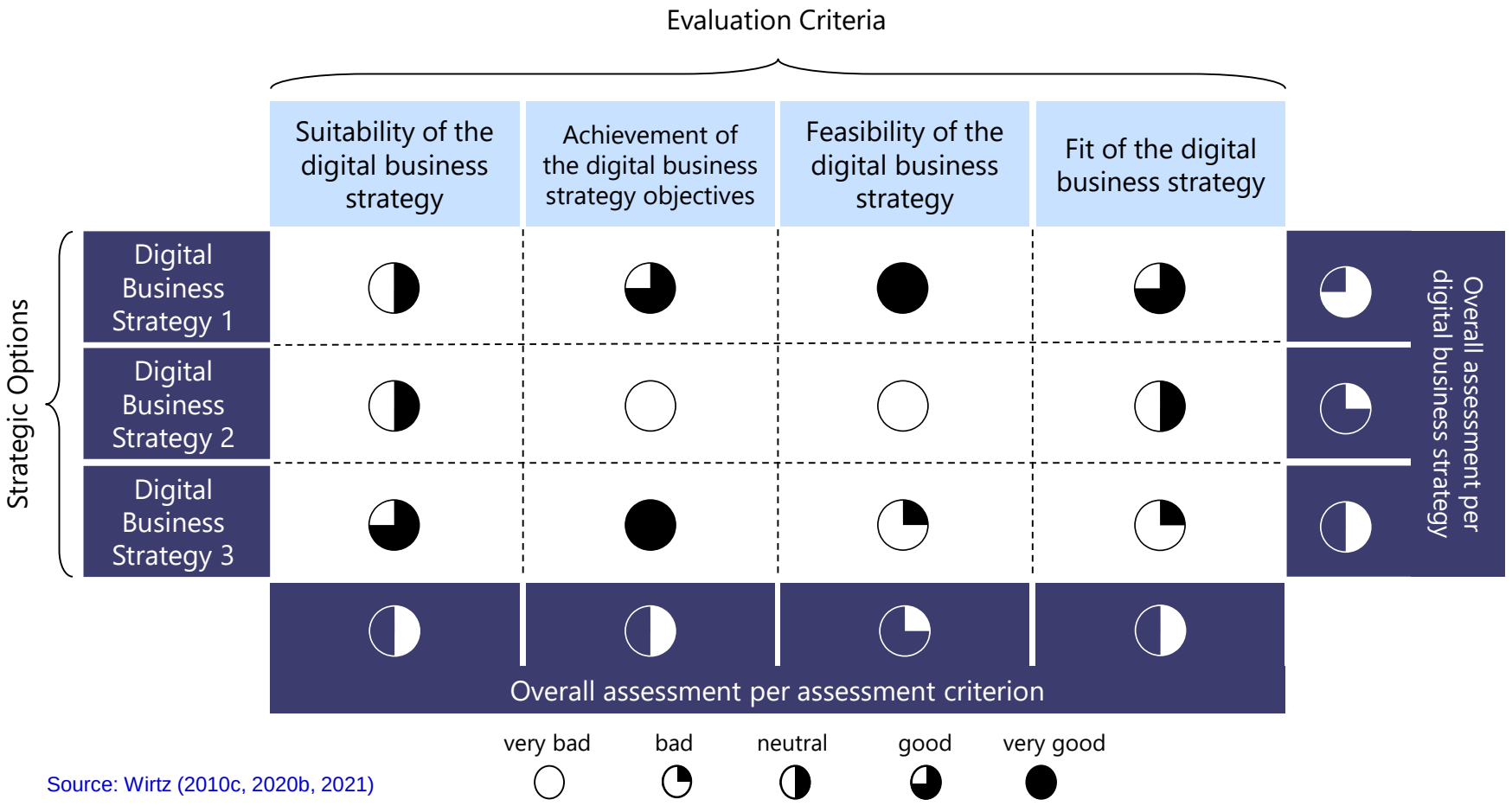
Source: Wirtz (2020b, 2021)

Fig. 12.20 Strategy in digital business



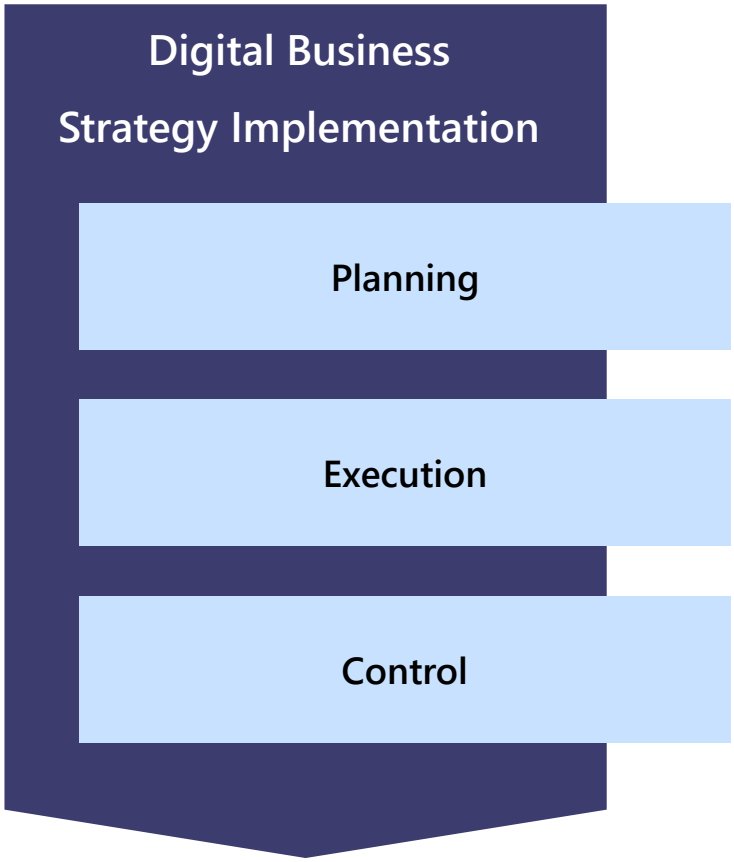
Source: Wirtz (2020b, 2021)

Fig. 12.23 Digital business strategy evaluation matrix



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

Fig. 12.24 Digital business implementation phases



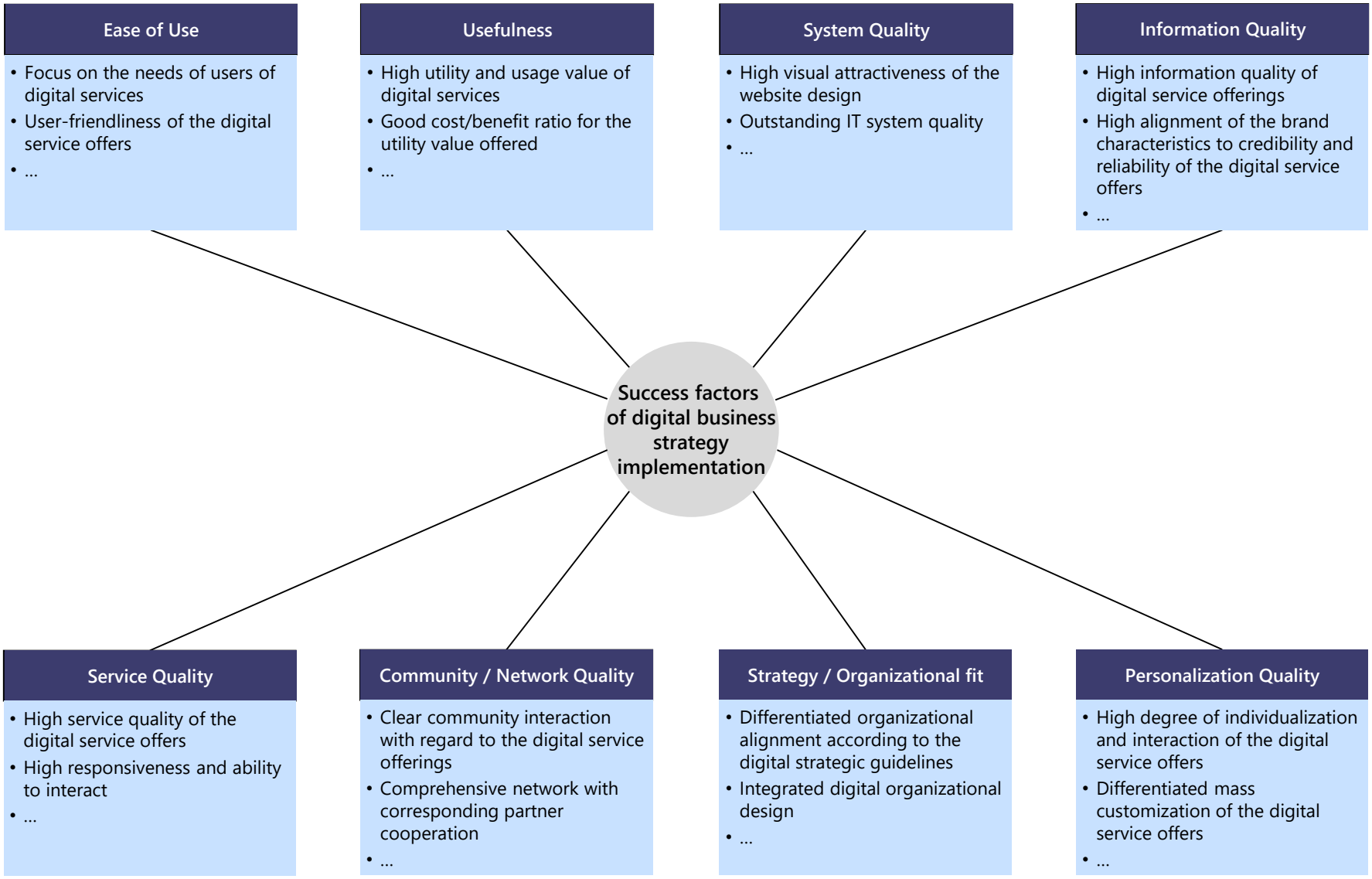
- Definition of digital business implementation targets
- Definition of activities, deadlines, delivery dates and budgets

- Communication of the defined digital business implementation targets
- Setup of a web team
- Realization of the digital business strategy

- Performance analysis to monitor and assess target attainment
- Determine causes of discrepancies and introduction of adjustment measures

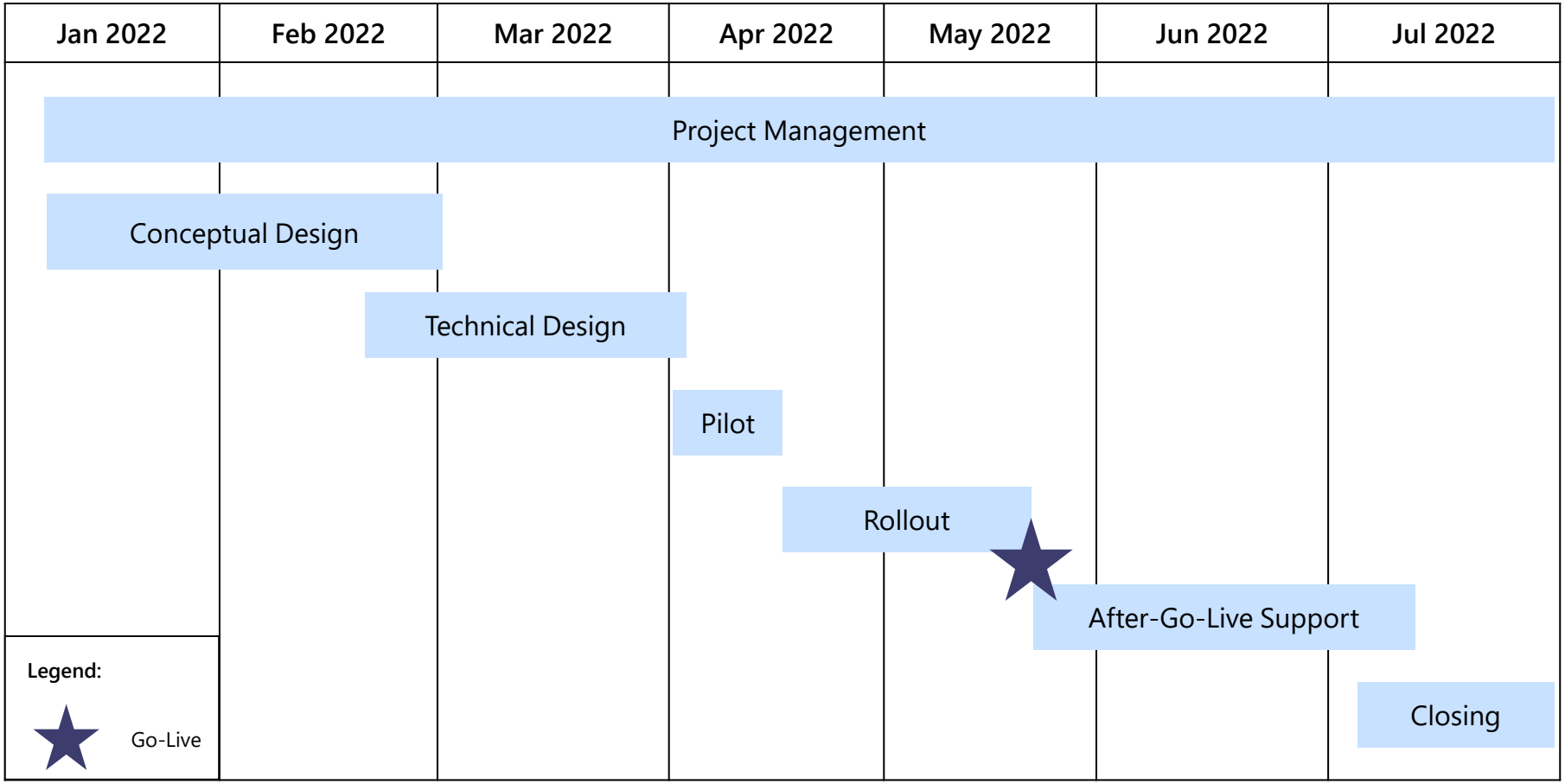
Source: Wirtz (2010b, 2020b, 2021)

Fig. 12.25 Success factors of digital business strategy implementation



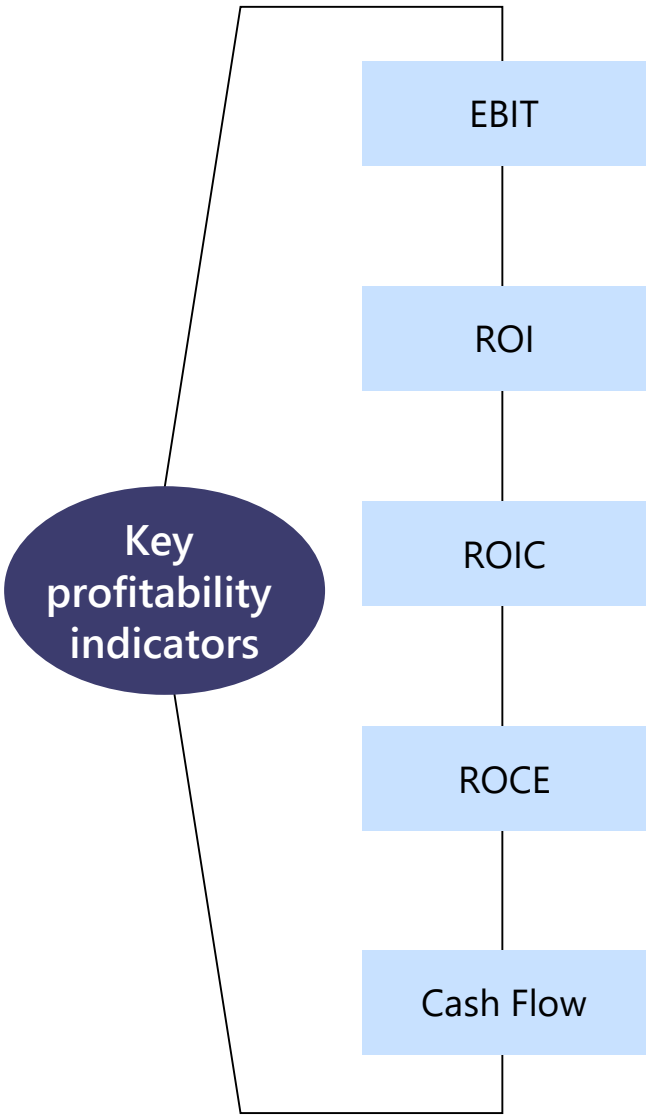
Source: Wirtz (2020b, 2021)

Fig. 12.26 Ideal digital business strategy implementation plan



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

Fig. 12.27 Digital business key profitability indicators



Calculation	Significance
Annual net profit +/- Taxes +/- Interests	• Earnings before interest and tax, Operating profit irrespective of tax and interest • Basis of further key profitability figures
Profit/ Total capital (equity + debt)	• Calculation of the return/efficiency of the total capital employed • Basis of further key profitability indicators
NOPAT/ Invested capital	• Calculation of the return on adjusted capital invested • Basis: NOPAT (net operating profit after tax)
EBIT/ Invested capital	• Calculation of the profitability of the total capital • Basis: EBIT (earnings before interest and tax)
Annual net profit +/- Non-cash inflows/outflows	• Cash surplus that is freely available for investments, debt repayments, creation of reserves or dividend payments

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

Chapter 12. Questions and topic for discussion

Chapter 12
Questions and topics for discussion

Review questions

1. Describe the four forces of digital business strategy and explain how they shape the digital strategy of companies.
2. Explain the determinants of convergence development.
3. Explain the digital business value activity system.
4. Explain the goals and targets of a digital business strategy by means of examples.
5. Name the success factors of digital business strategy implementation.

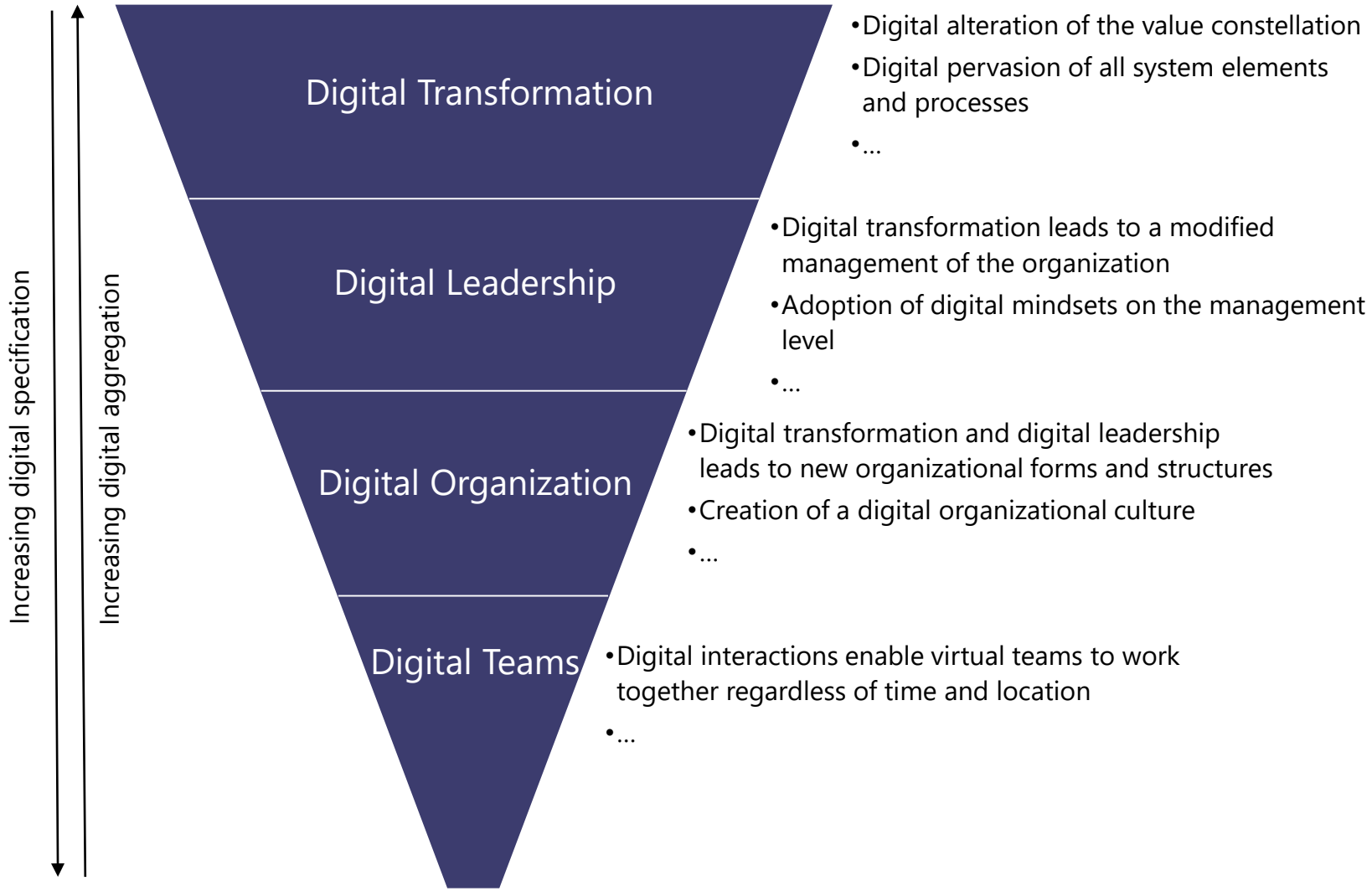
Topics for classroom discussion and team debates

1. Discuss on the basis of the four forces which force is the most important one. Should customer empowerment on the Internet be applied more extensively by users in order to make Internet companies aware of their preferences?
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.

Source: Wirtz (2021)

Chapter 13: Digital Transformation and Digital Organization

Fig. 13.1 Digital transformation pyramid



Source: Wirtz (2020b, 2021)

Table 13.1. 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.
Koffer (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.

Source: Wirtz (2020b, 2021)

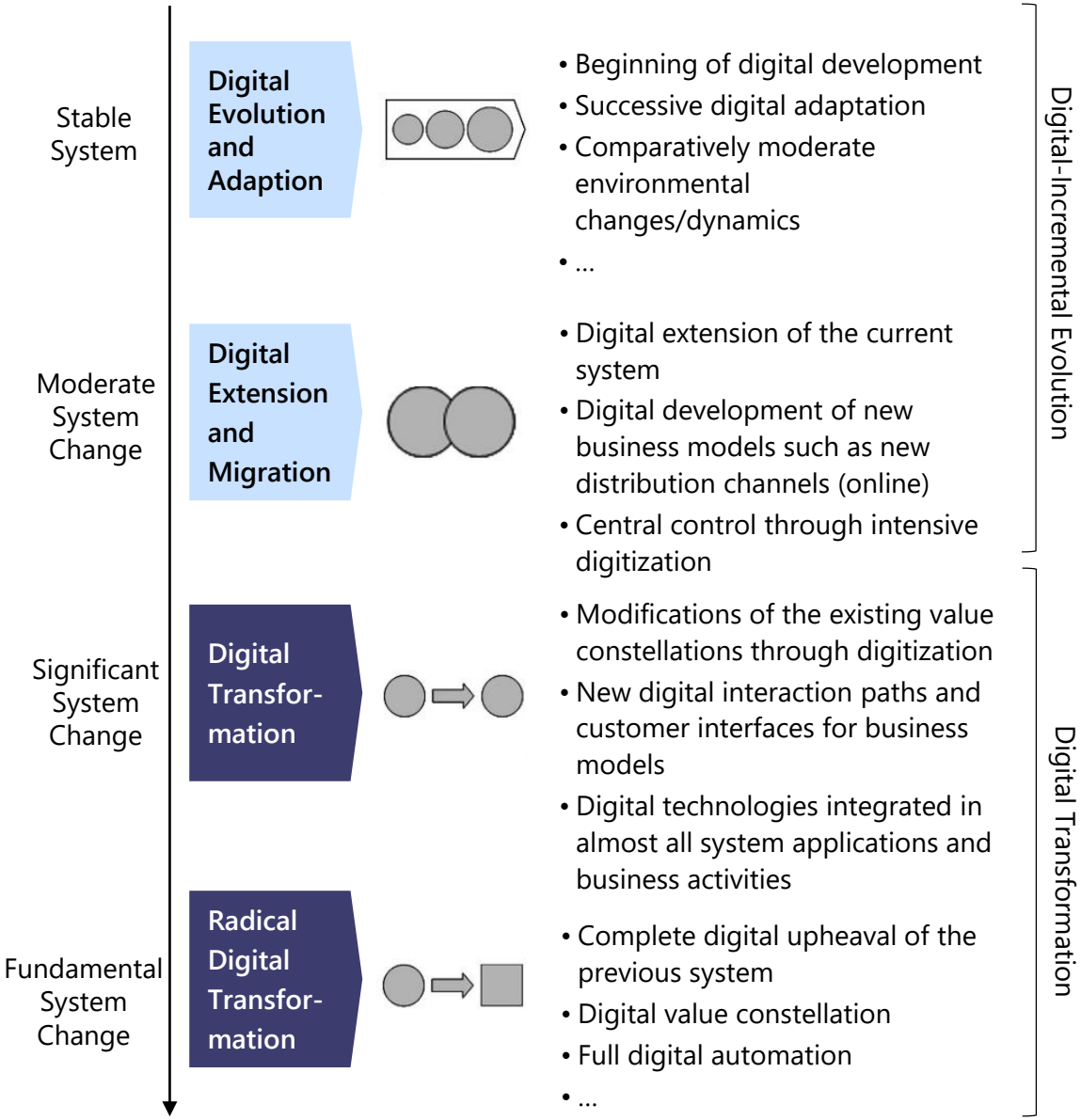
Definition of Digital Transformation

Definition of Digital Transformation (Wirtz 2020b)

The 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 efficiency and effectiveness at a higher level of welfare.

Source: Wirtz (2021)

Fig. 13.2 Phases of digital development and transformation



Source: Wirtz (2020b, 2021)

Table 13.2 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.

Source: Wirtz (2020b, 2021)

Definition of Digital Leadership

Definition of Digital Leadership (Wirtz 2020b)

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 (2020b, 2021)

Fig. 13.3 Traditional leadership vs. digital leadership

Traditional Leadership	Digital Leadership
• Conventional leadership style • No affinity for digital technologies • Analog mindset • Distant use of digital technologies • Formal vertical communication with employees • Leadership and management in the sense of instruction and supervision • Reactive decision-making • …	• Agile and flexible leadership style • Strong affinity towards digital technologies • Digital competencies • Openness to technology • High participation and integration of digital employee skills • Leaders set visions for the use of digital technologies within organizations • Creation of a digital culture • Digital communication of meaning • Open and informal self-organized teams • …

Source: Wirtz (2020b, 2021)

Table 13.3 Selected definitions of digital/virtual organization

Author(s)	Definition
Wirtz (1995c)	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.

Source: Wirtz (2020b, 2021)

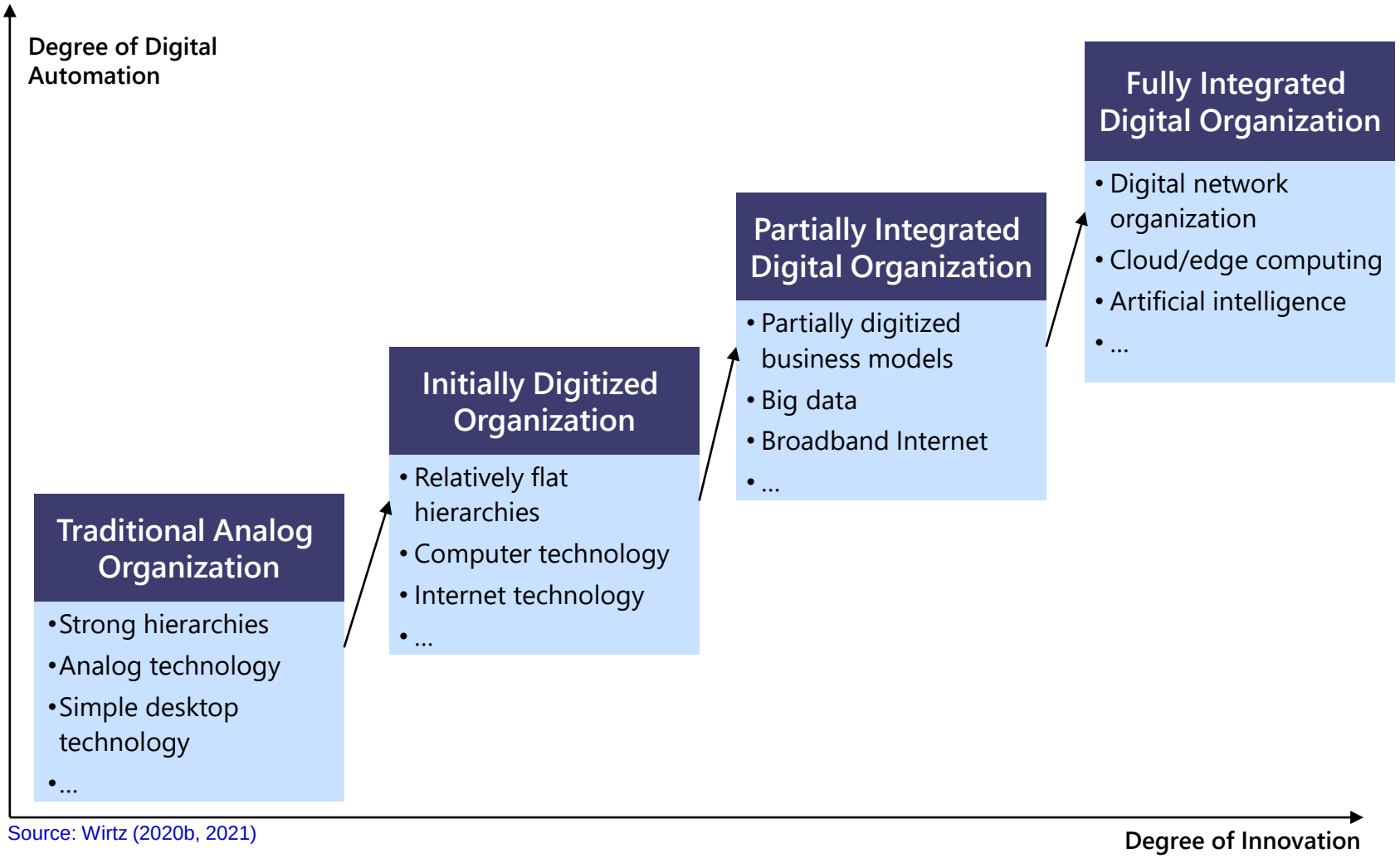
Definition of Digital Organization

Definition of Digital Organization (Wirtz 2020b)

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 (2020b, 2021)

Fig. 13.4 Development stages of digital organizations



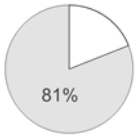
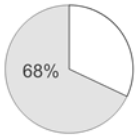
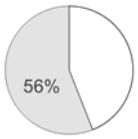
Source: Wirtz (2020b, 2021)

Fig. 13.5 Organizational and technological characteristics of the different development stages of digital organizations

	Traditional Analog Organization	Initially Digitized Organization	Partially Integrated Digital Organization	Fully Integrated Digital Organization
Organizational Characteristics	• 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 • ...	• Secondary organization that completes/ transcends hierarchies • Rod line 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 • ...	• 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 • ...	• 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 • ...
Technological Characteristics	• Analog data • Analog technology • Analog signal transmission • Simple desktop technology • Fax • Telephone • Printer • ...	• Electronic data processing • Data centers • Computer • Internet • Email • Floppy disks • CDs • ...	• Big data • Predictive analytics • Computer-computer connection/cross communication (peer-to-peer-architecture) • In-memory-computing • Electronic collaboration Tools (Cisco Webex) • Videotelephony • Broadband Internet • ...	• 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 • ...

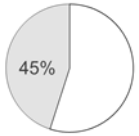
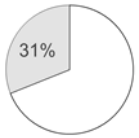
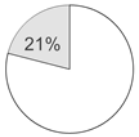
Source: Wirtz (2020b, 2021)

Table 13.4 Digital technologies, instruments and methods in digital organizations I

Digital Technologies, Instruments and Methods	Description	Percentage of Use in Successful Digital Organizations
 Conventional Web Technologies	• Active use of websites or online applications • Provision of websites and online applications • HTML • JavaScript • ...	
 Cloud-based Services	• 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	• 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	• Effective and efficient analysis and processing of large, complex and partly unstructured data sets • Data-based decision making • ...	

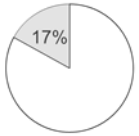
Data Source: McKinsey & Company (2018), and Wirtz (2021)

Table 13.4 Digital technologies, instruments and methods in digital organizations II

Digital Technologies, Instruments and Methods	Description	Percentage of Use in Successful Digital Organizations
 Internet of Things	• Interconnectedness of different physical and virtual objects via the Internet • The objects can communicate and interact autonomously via the Internet • ...	
 Design Thinking	• Method for solving complex problems • Application of creative techniques and technological tools • ...	
 AI Applications	• 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 • ...	
 Robotics	• 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 • ...	

Data Source: McKinsey & Company (2018), and Wirtz (2021)

Table 13.4 Digital technologies, instruments and methods in digital organizations III

Digital Technologies, Instruments and Methods	Description	Percentage of Use in Successful Digital Organizations
 Advanced Neural Machine Learning (Deep Learning)	• 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 • ...	
 Augmented Reality	• Virtual extension of human perception • Fictional extension of the environment through digital information and symbols • ...	
 Additive Manufacturing (3D Printing)	• Computer-controlled successive generation of three-dimensional products • E.g., 3D printing • ...	

Data Source: McKinsey & Company (2018), and Wirtz (2021)

Table 13.5 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, video 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 (2020b, 2021)

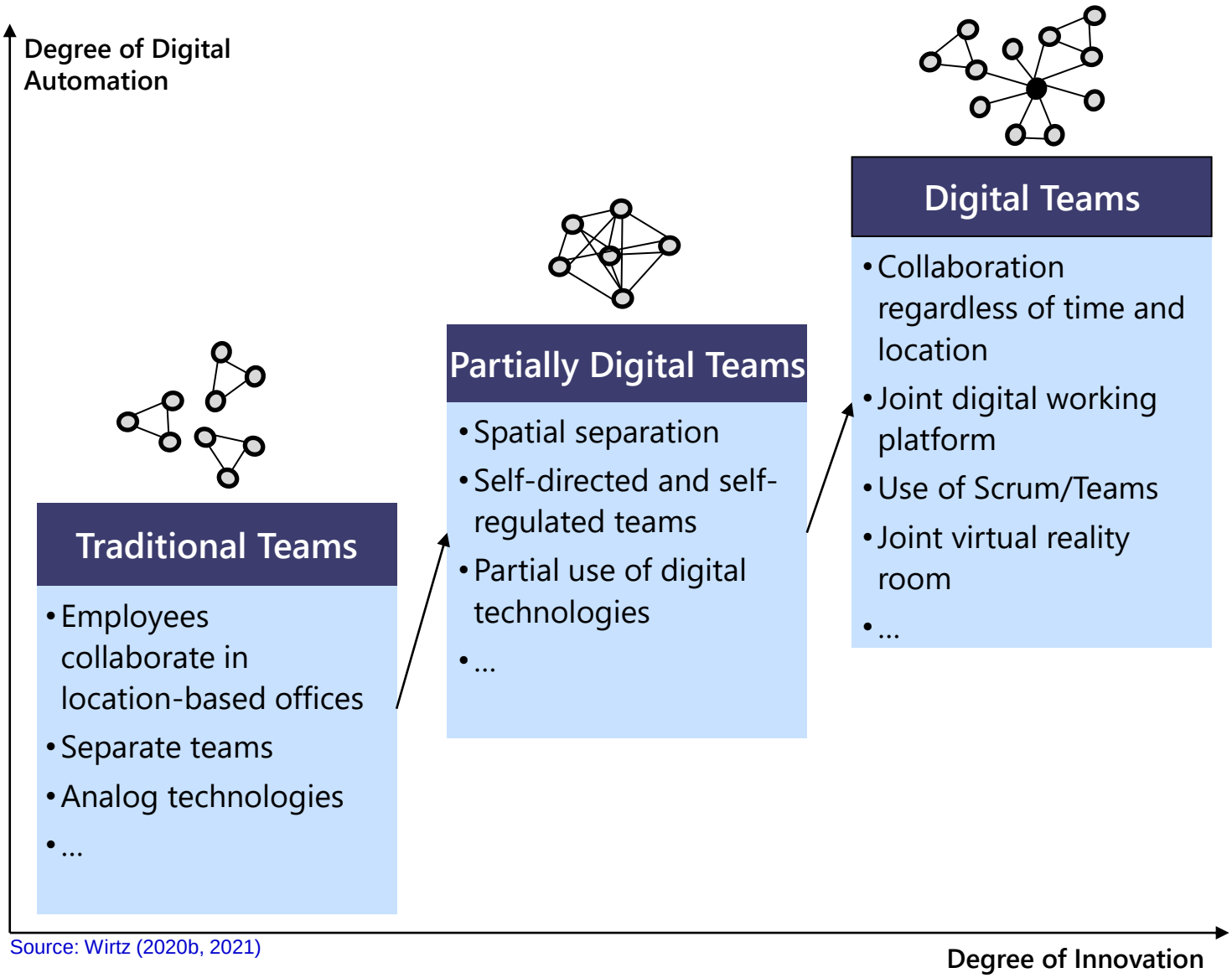
Definition of Digital Teams

Definition of Digital Teams (Wirtz 2020b)

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 (2020b, 2021)

Fig. 13.6. Development stages of digital teams



Source: Wirtz (2020b, 2021)

Chapter 13. Questions and topics for discussion

Chapter 13
Questions and topics for discussion

Review questions

1. Describe the digital transformation pyramid.
2. Describe the phases of digital development and transformation.
3. Distinguish digital leadership from traditional leadership.
4. Describe the development stages of digital organizations and name the technological and organizational characteristics of each stage.
5. Define digital teams and describe their essential aspects.

Topics for classroom discussion and team debates

1. Discuss the socio-economic effects of digital transformation for your city.
2. Discuss the advantages and disadvantages of digital leadership in an open and democratic society against the background of traditional leadership.
3. Debate: 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?

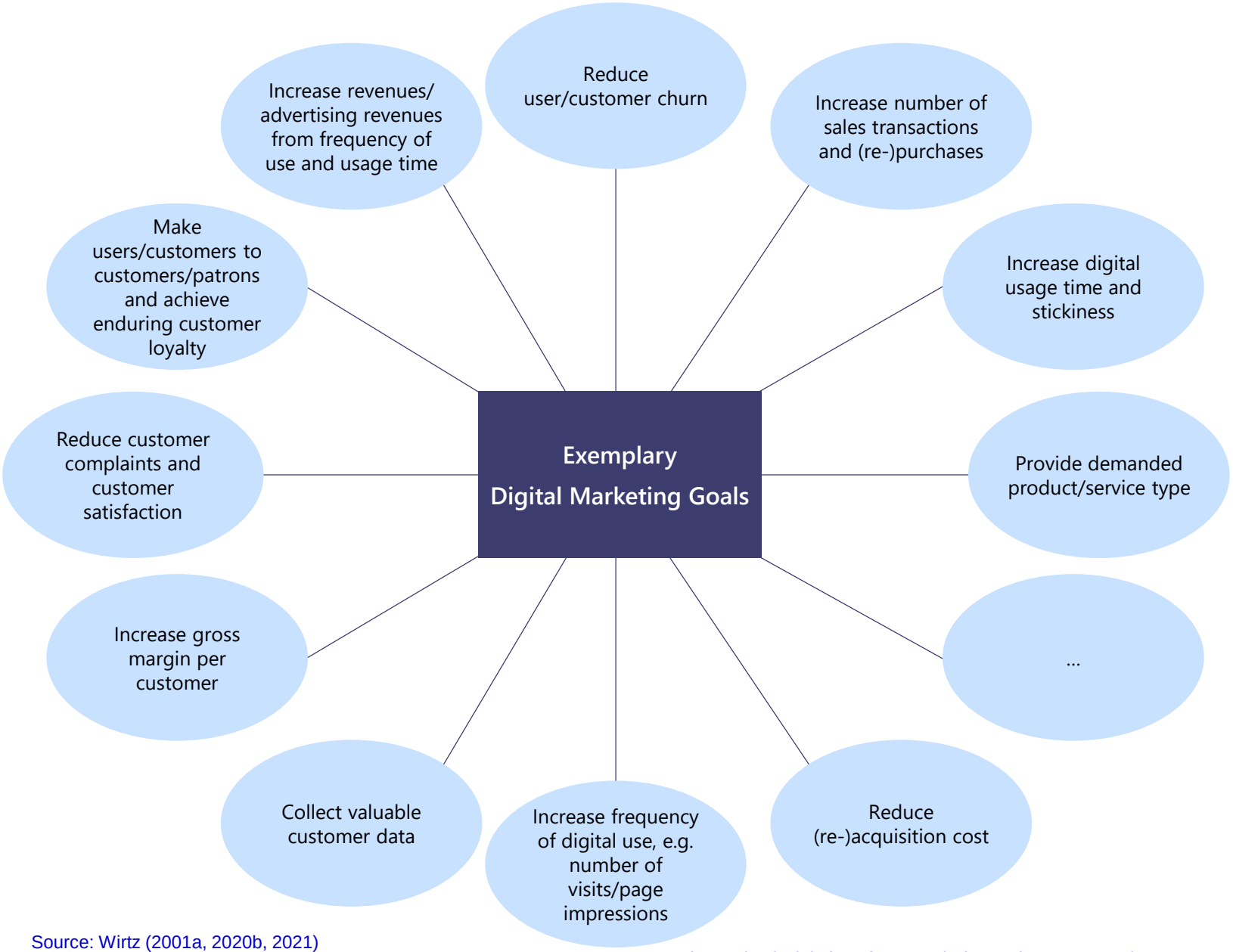
Source: Wirtz (2021)

Chapter 14: Digital Marketing and Electronic Commerce

Fig. 14.1 Core aspects of digital marketing strategy development

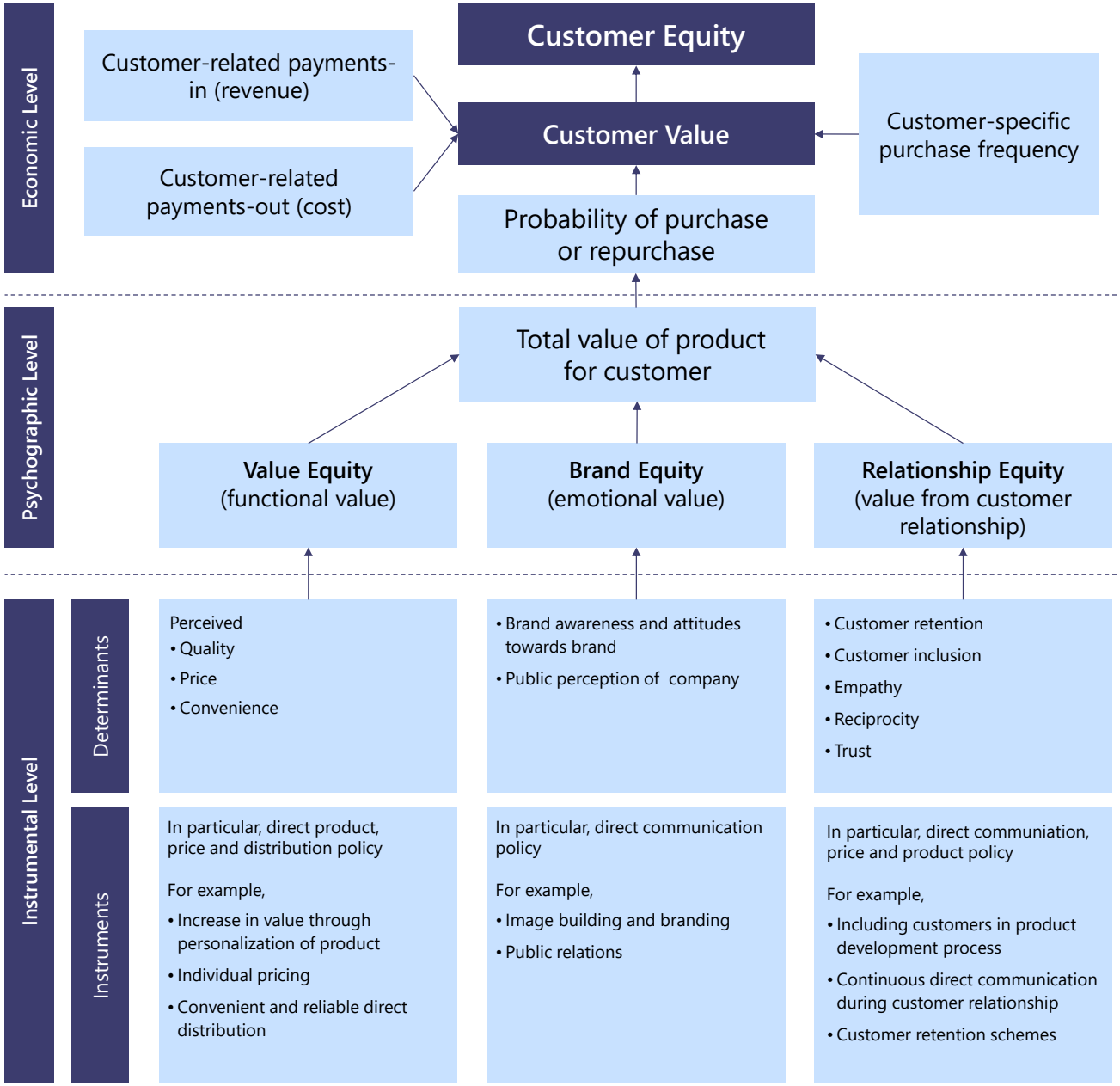
Source: Wirtz (2008, 2013c)

Fig. 14.2 Exemplary digital marketing goals



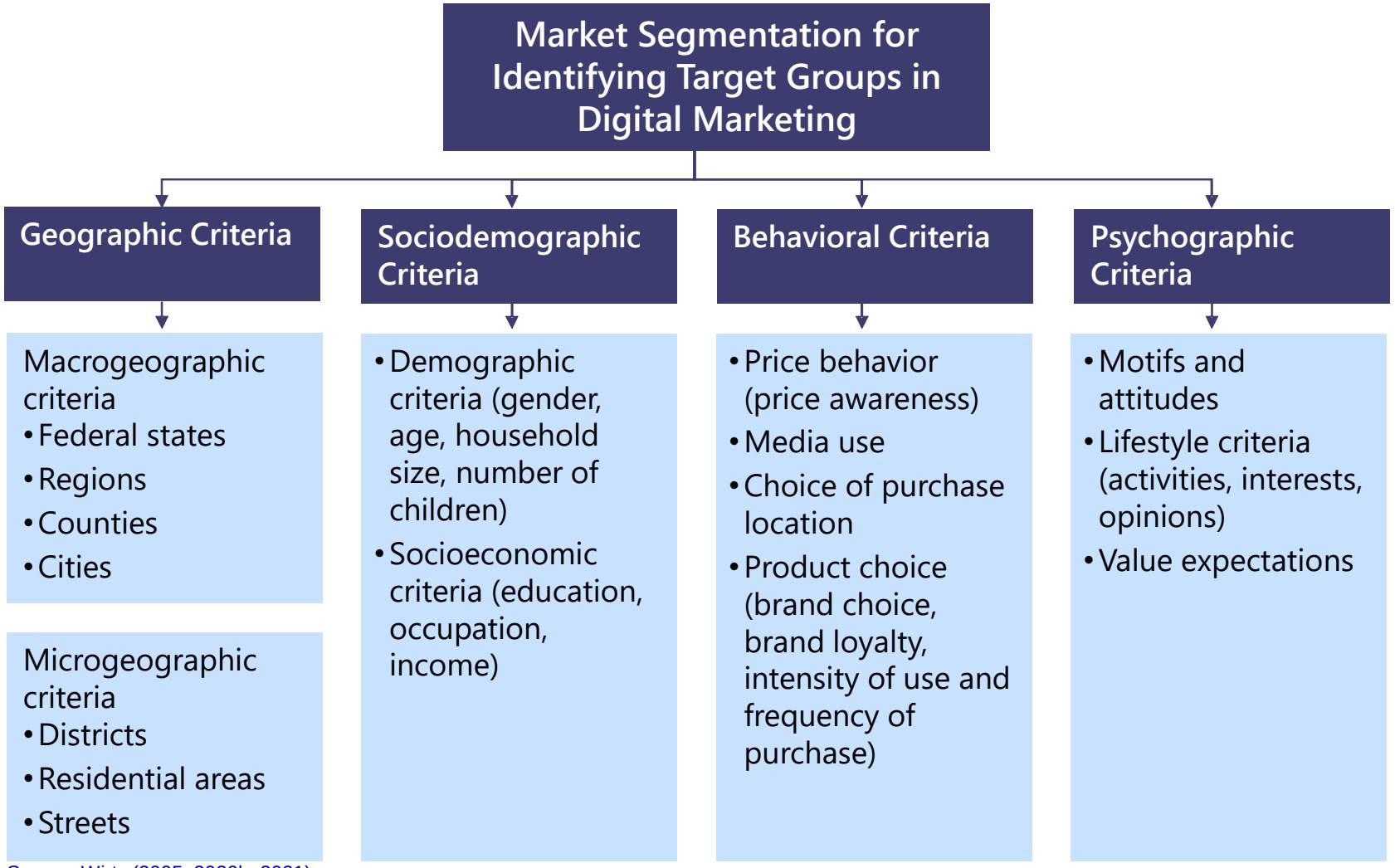
Source: Wirtz (2001a, 2020b, 2021)

Fig. 14.3 Customer model of determinants of customer value



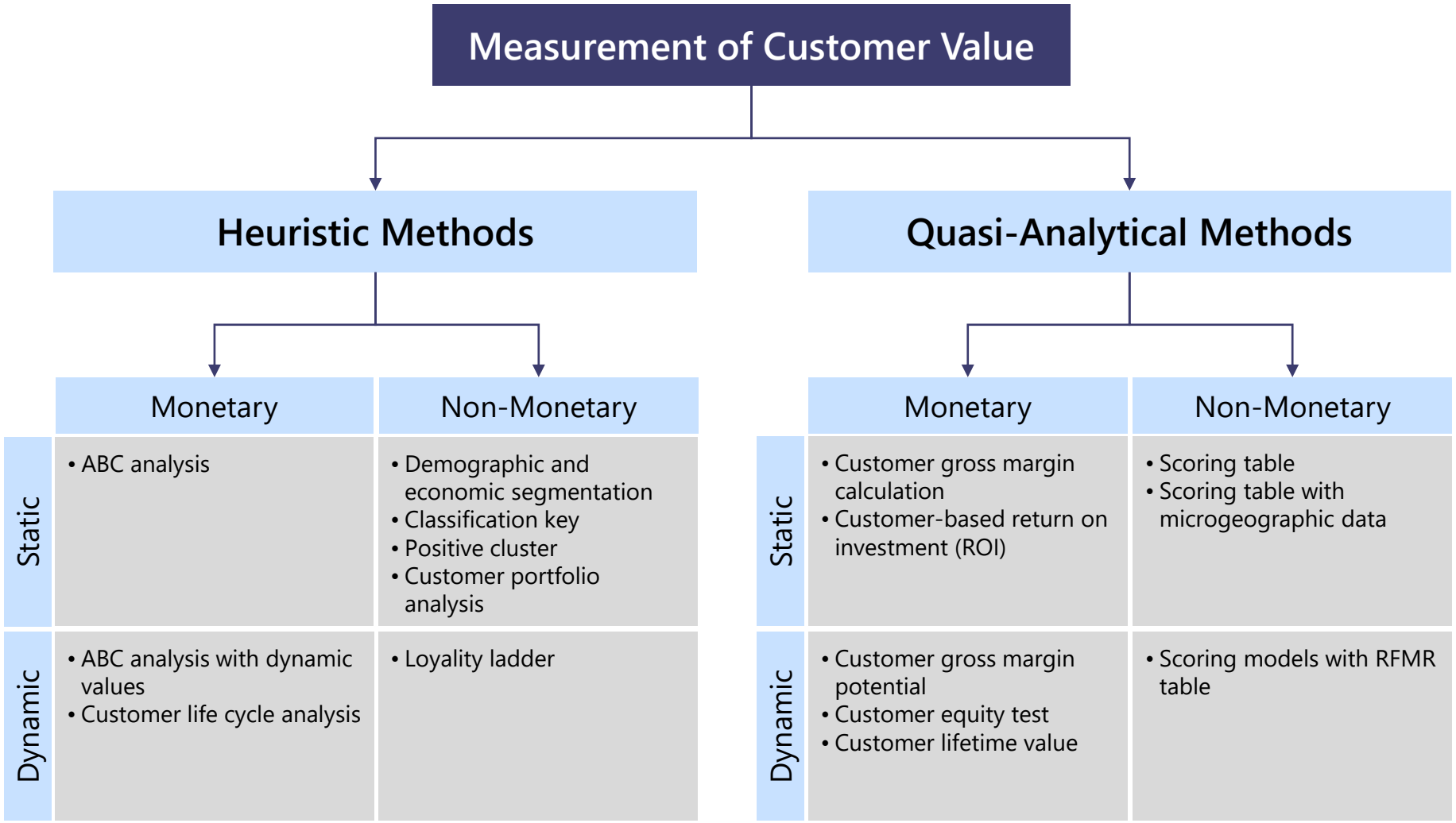
Source: Wirtz (2005, 2016a, 2021)

Fig. 14.4 Potential market segementation criteria



Source: Wirtz (2005, 2020b, 2021)

Fig. 14.5 Measurement of customer value



Source: Wirtz (2005, 2016a, 2021)

Fig. 14.6 Digital marketing strategies

Definition and Types of Market Development Strategies	Definition of Competitive and Customer-Focused Strategies
•Undifferentiated market development strategy •Differentiated market development strategy •Concentrated market development strategy	•Competitive strategy •Customer-focused strategy

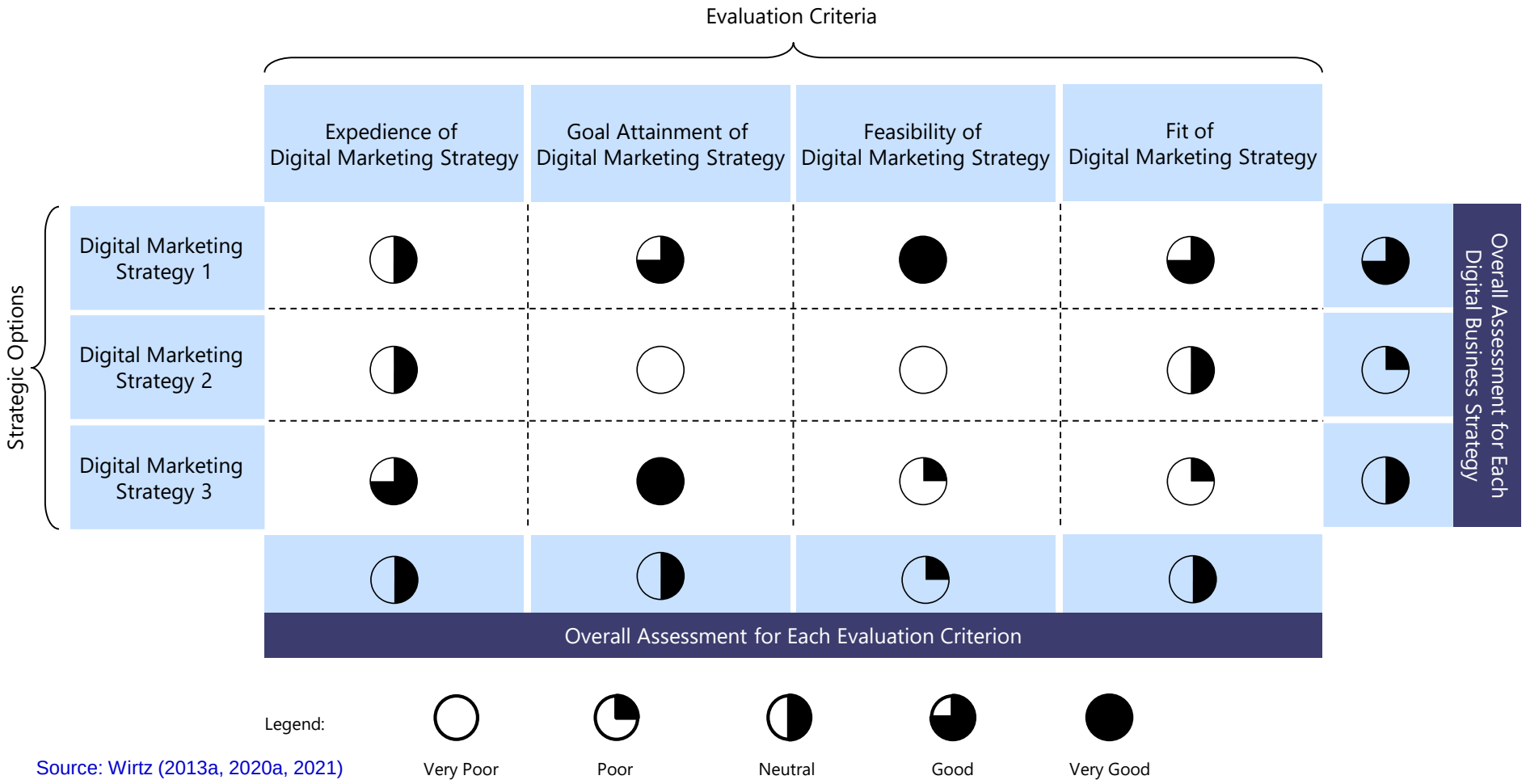
Source: Wirtz (2008, 2013c, 2021)

Fig. 14.7 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, 2016a, 2021)

Fig. 14.8 Digital marketing evaluation matrix



Source: Wirtz (2013a, 2020a, 2021)

Definition of Digital Distribution

Definition of Digital Distribution (Wirtz 2001a, 2020b)

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.

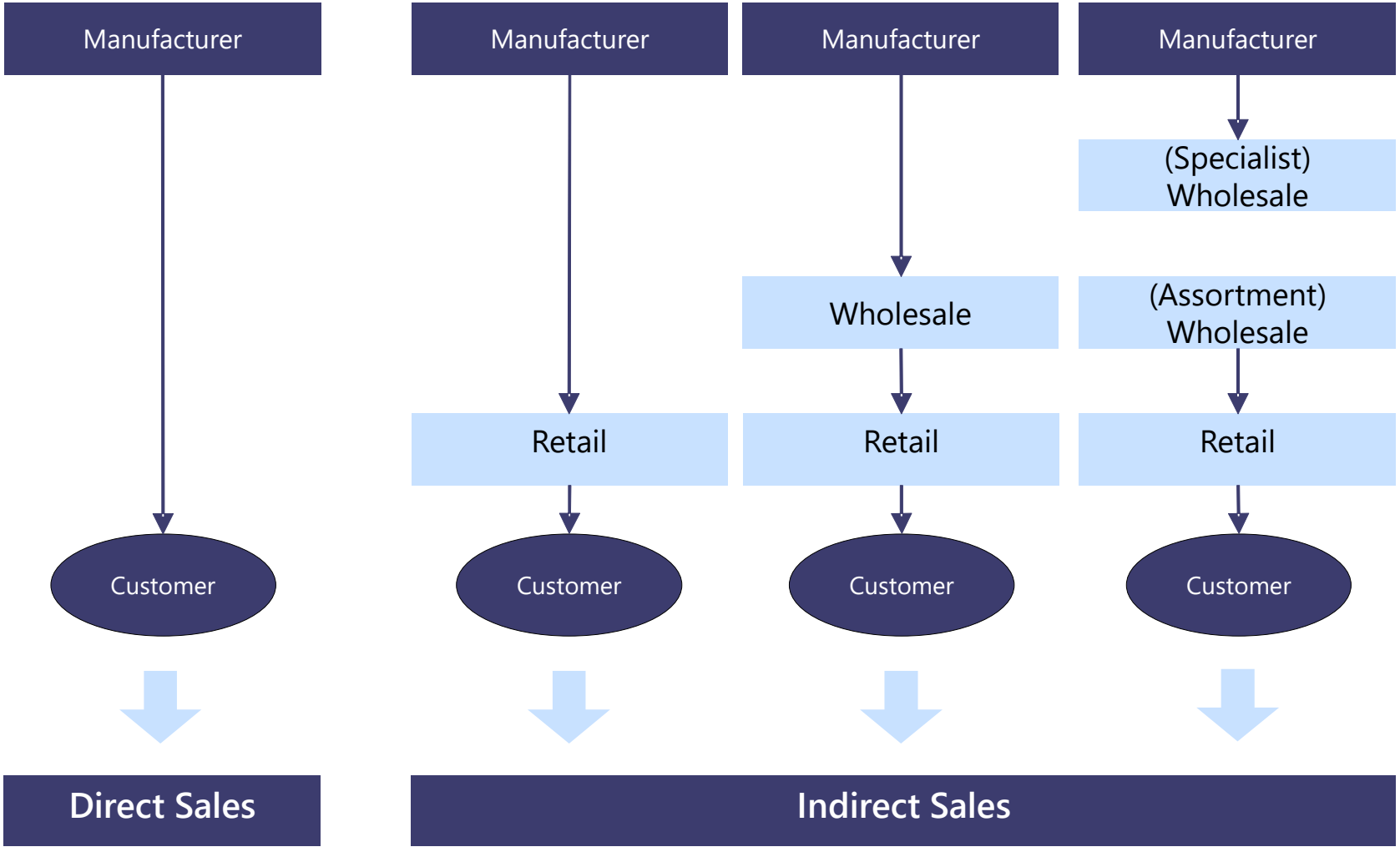
Source: Wirtz (2021)

Fig. 14.9 Value chain of distribution

Sales Presentation	Information and Communication	Product Provision	Financing and Payment	Consulting and Service
Core tasks • Presentation of products and its equipment features	• Provision of purchase-relevant information to customers	• Provision of products that meet customer needs	• Handling of product financing and payment transaction	• Tailored customer consulting and support
Actors • Manufacturer (via catalogs and online presentation) • Stationary retail • Mail order business	• Manufacturer • Commercial enterprises	• Manufacturer • Stationary retail • Logistics providers	• Manufacturer • Retail • Financial service providers	• Manufacturer • Retail • Service providers
Examples • Electronic catalog products • Individual e-shops	• Search engines • Faq • Email • Avatars • Related links	• Order tracking service • Delivery services	• Realtime information • 24/7 service	• Newsletter • Bulletin boards • Email • Avatars

Source: Wirtz (2020b, 2021)

Fig. 14.10 Direct and indirect sales



Source: Wirtz (2020b, 2021)

Fig. 14.11 Multichannel strategy of IKEA

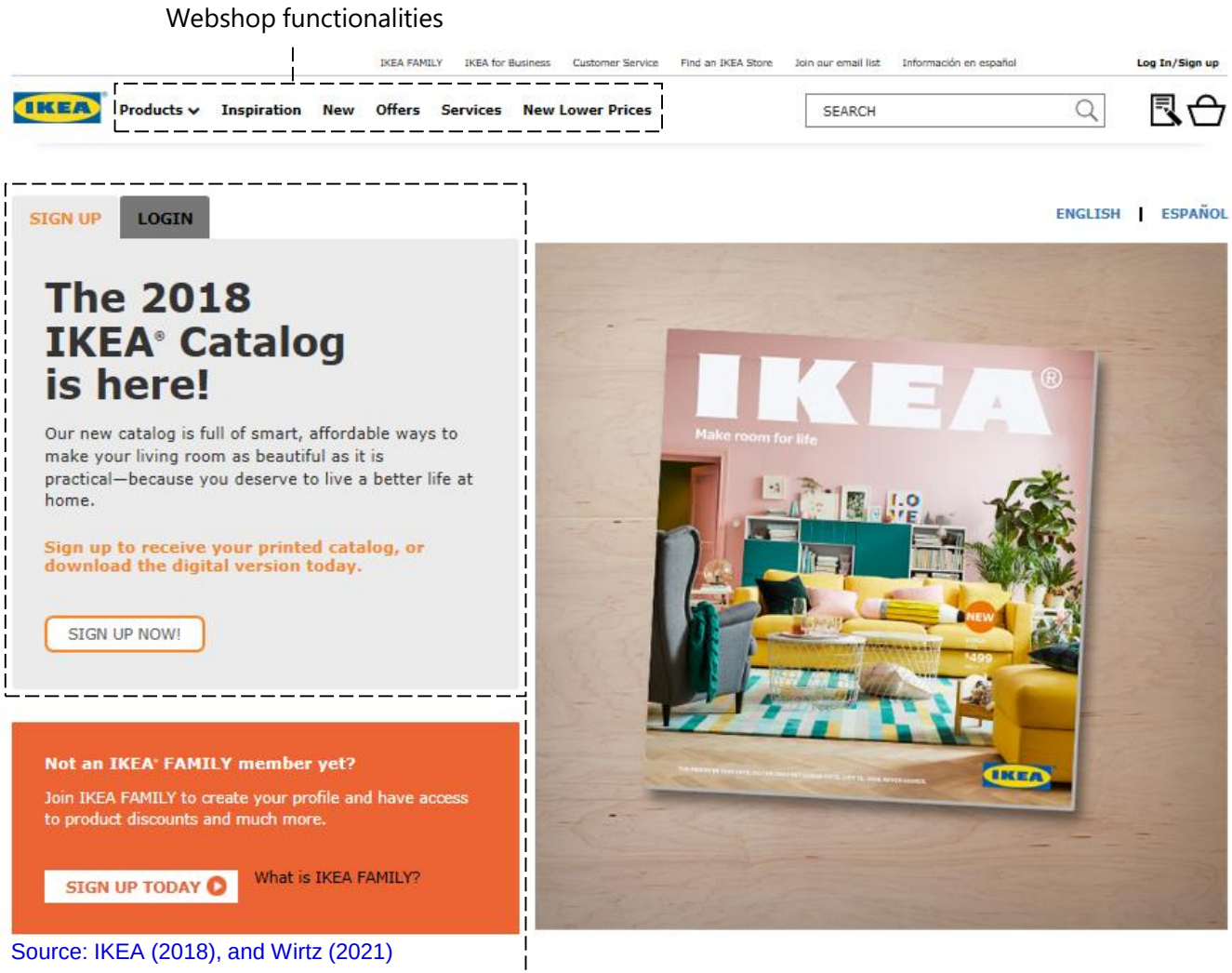
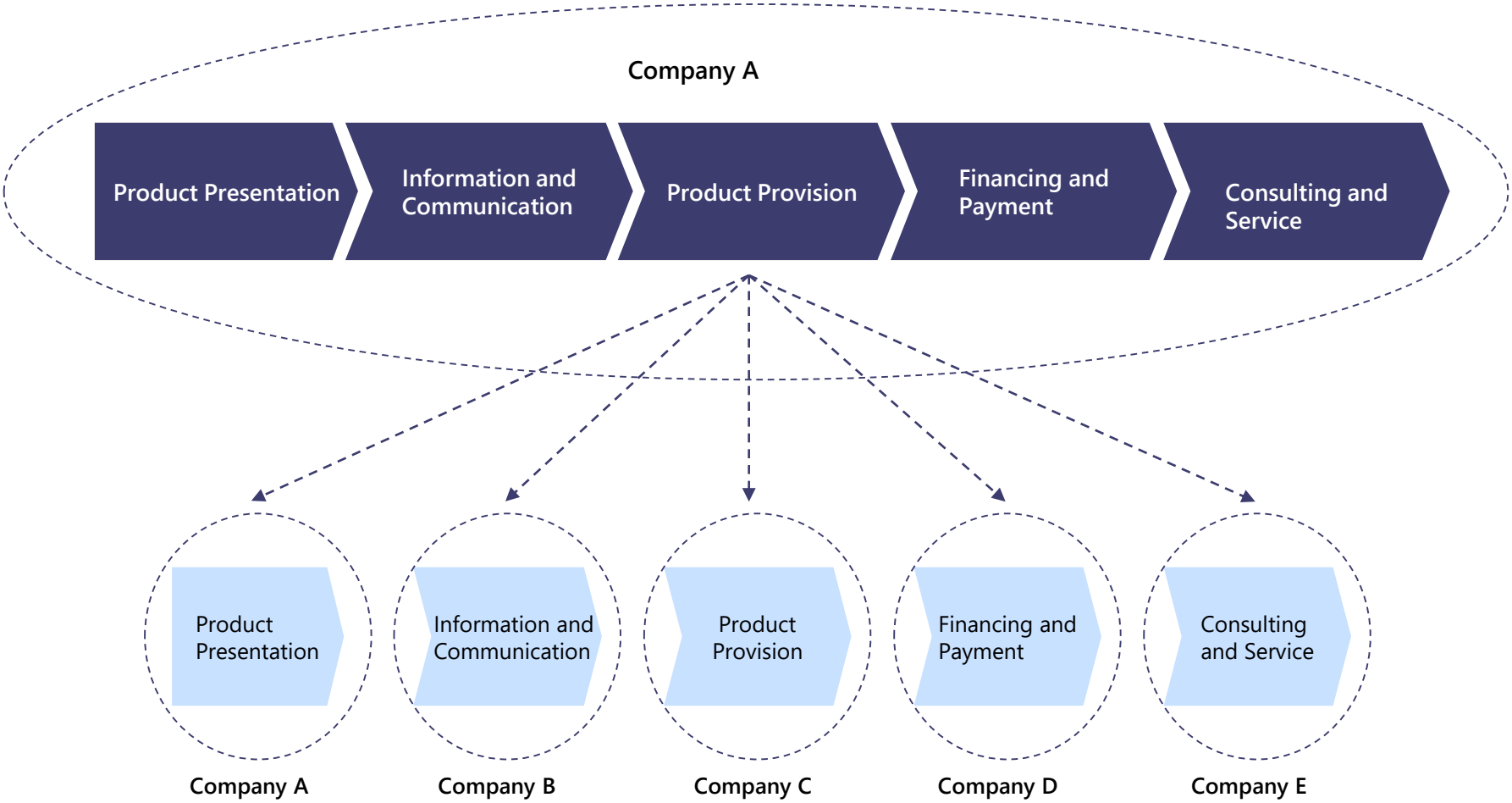
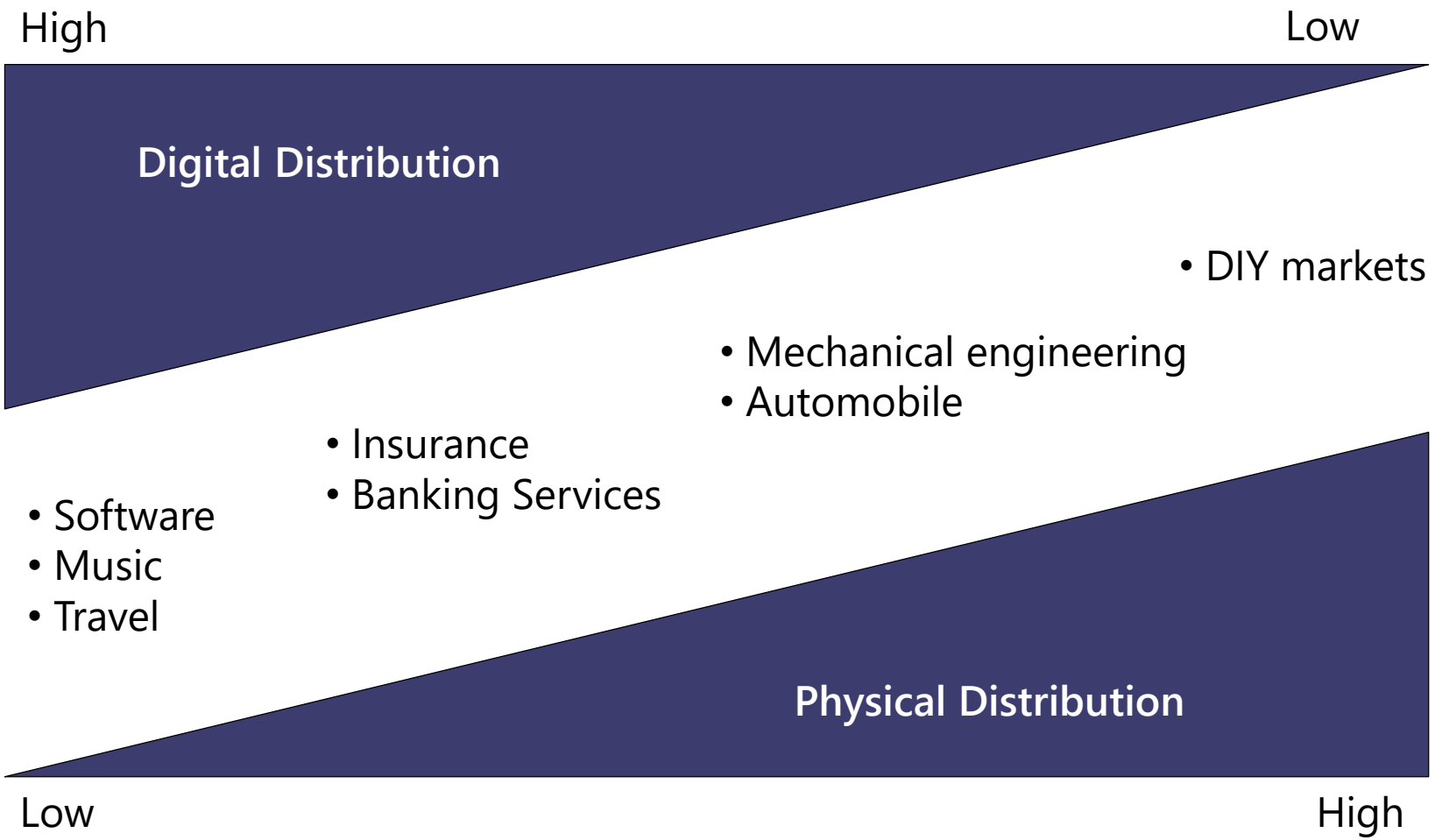


Fig. 14.12 Development trend of intermediation



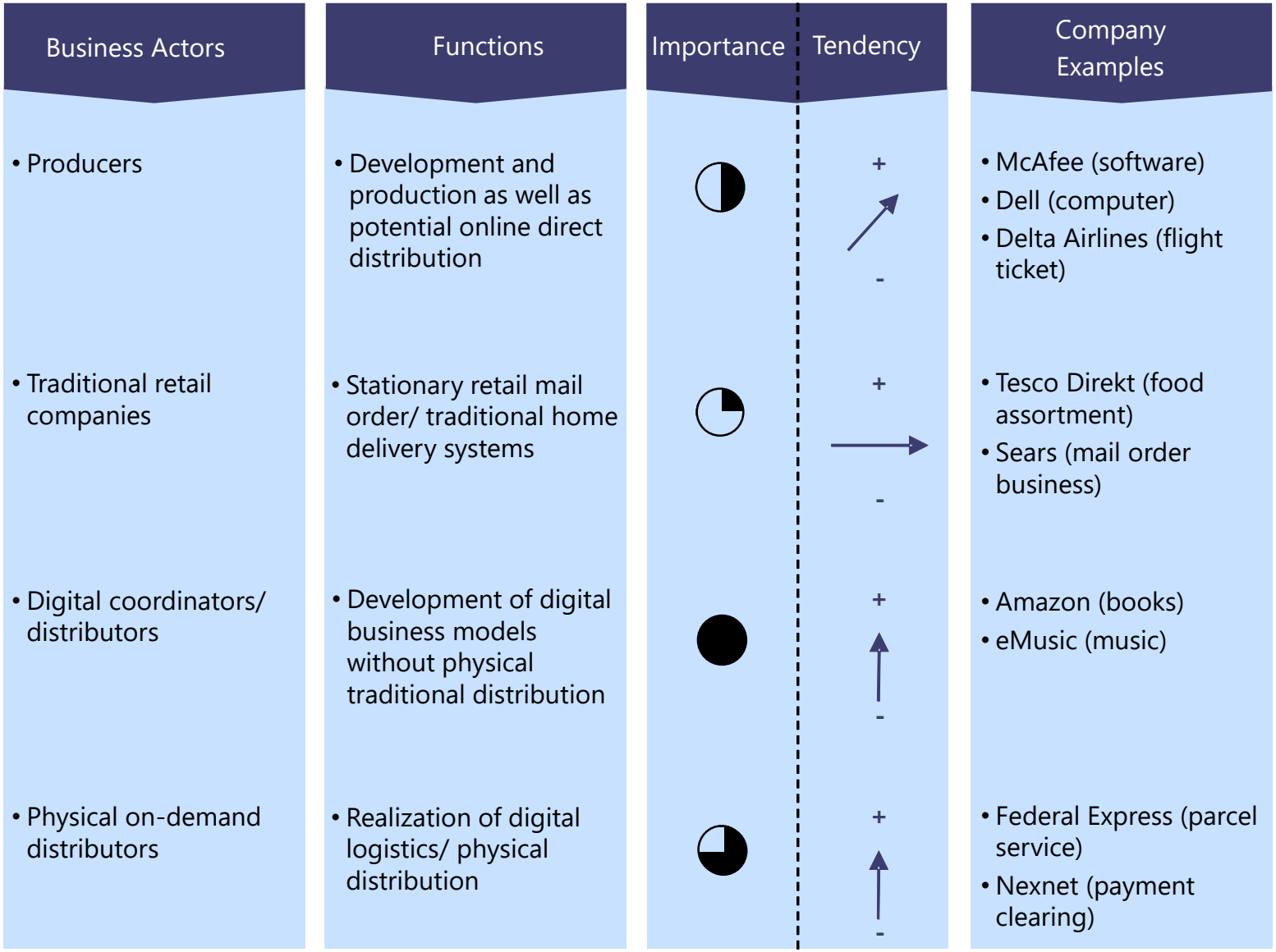
Source: Wirtz (2020a, 2021)

Fig. 14.13 Substitution relationship between physical and digital distribution



Source: Wirtz (2020b, 2021)

Fig. 14.14 Business actors of digital distribution



Source: Wirtz (2020b, 2021)

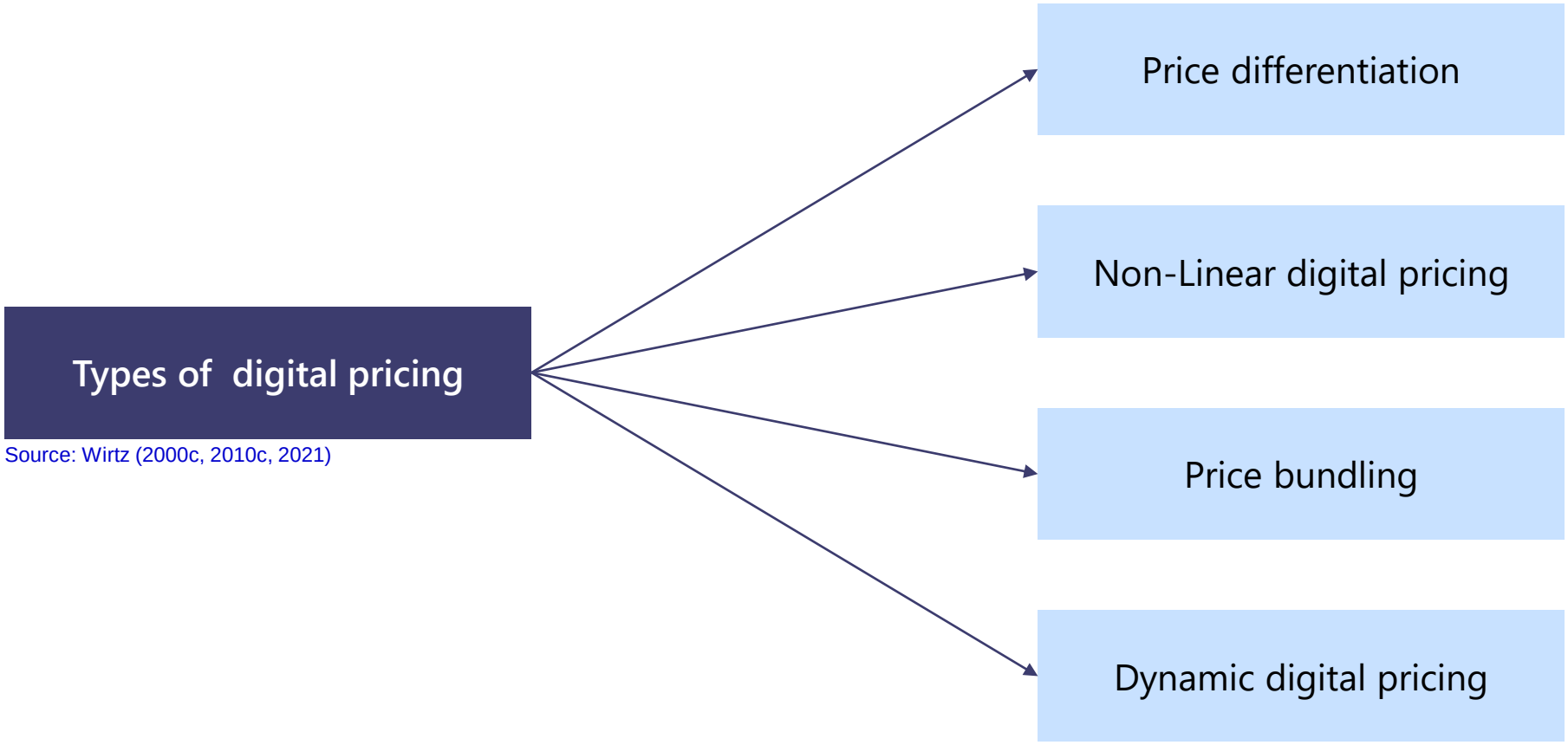
Definition of Digital Pricing

Definition of Digital Pricing (Wirtz 2010c, 2020b)

Digital pricing refers to the deliberate setting and continuous management of prices within digital markets. Pricing has been updated and advanced in the context of the Internet economy.

Source: Wirtz (2021)

Fig. 14.15 Types of digital pricing



Source: Wirtz (2000c, 2010c, 2021)

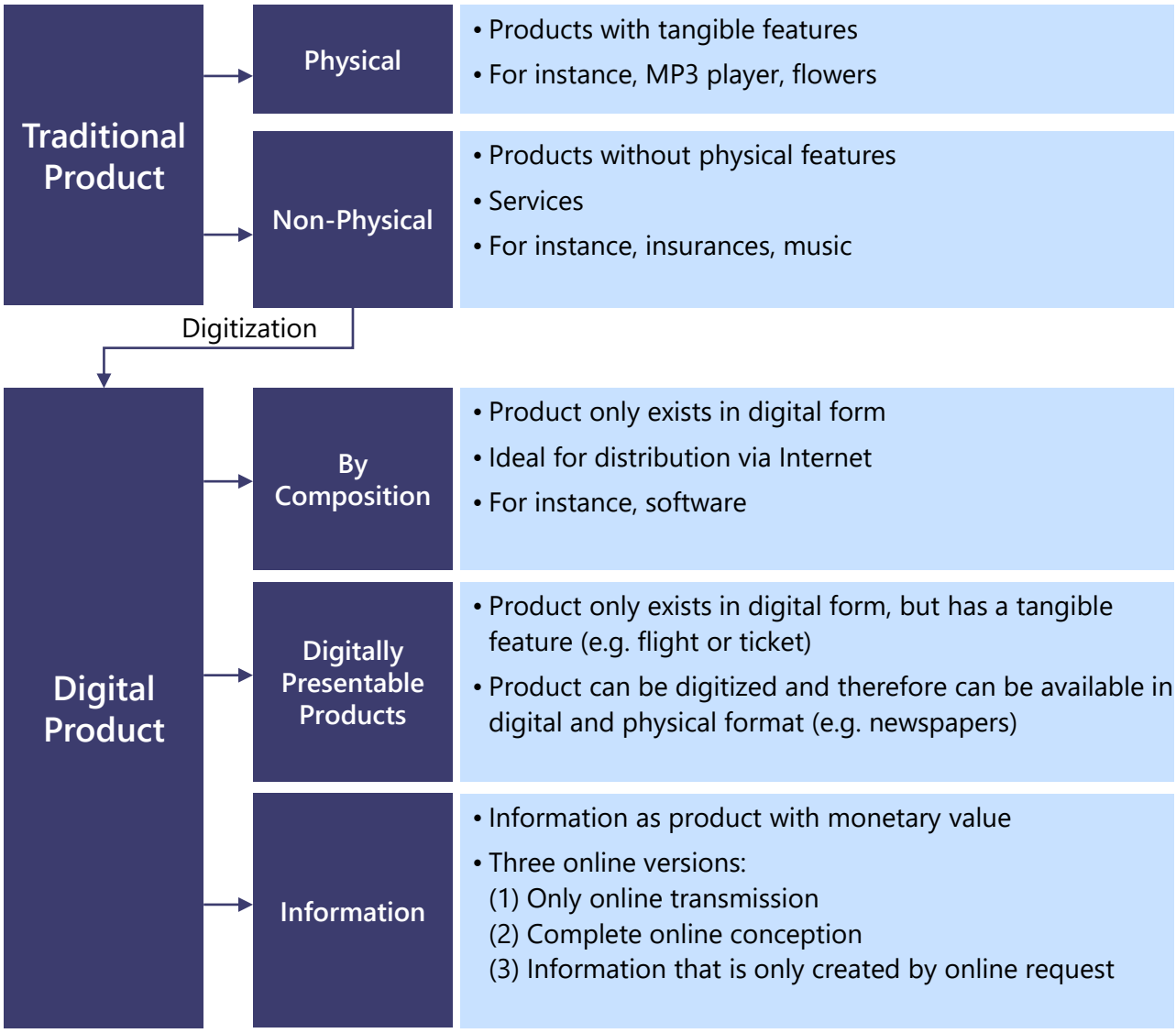
Definition of Digital Product and Program Policy

Definition of Digital Product and Program Policy (Wirtz 2001a, 2020b)

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 (2021)

Fig. 14.16 Categorization of product and services in digital business



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

Fig. 14.17 Value-added service

	Value-Added Services	Stand-Alone Services
No Variable Costs	• Stock price information and business news of online broker (e.g. Merill Edge, WellsTrade) • FAQs • Trouble-shooting guides • Standardized newsletters • ...	• Search engines (e.g. Google, Bing) • Financial information (e.g. Bloomberg, MarketWatch) • Price comparisons (e.g. PriceGrabber) • ...
Variable Costs	• Individual product trainings • ...	• Insurance comparisons (e.g. The Zebra, GasBuddy) • Product-independent individual training offers • ...

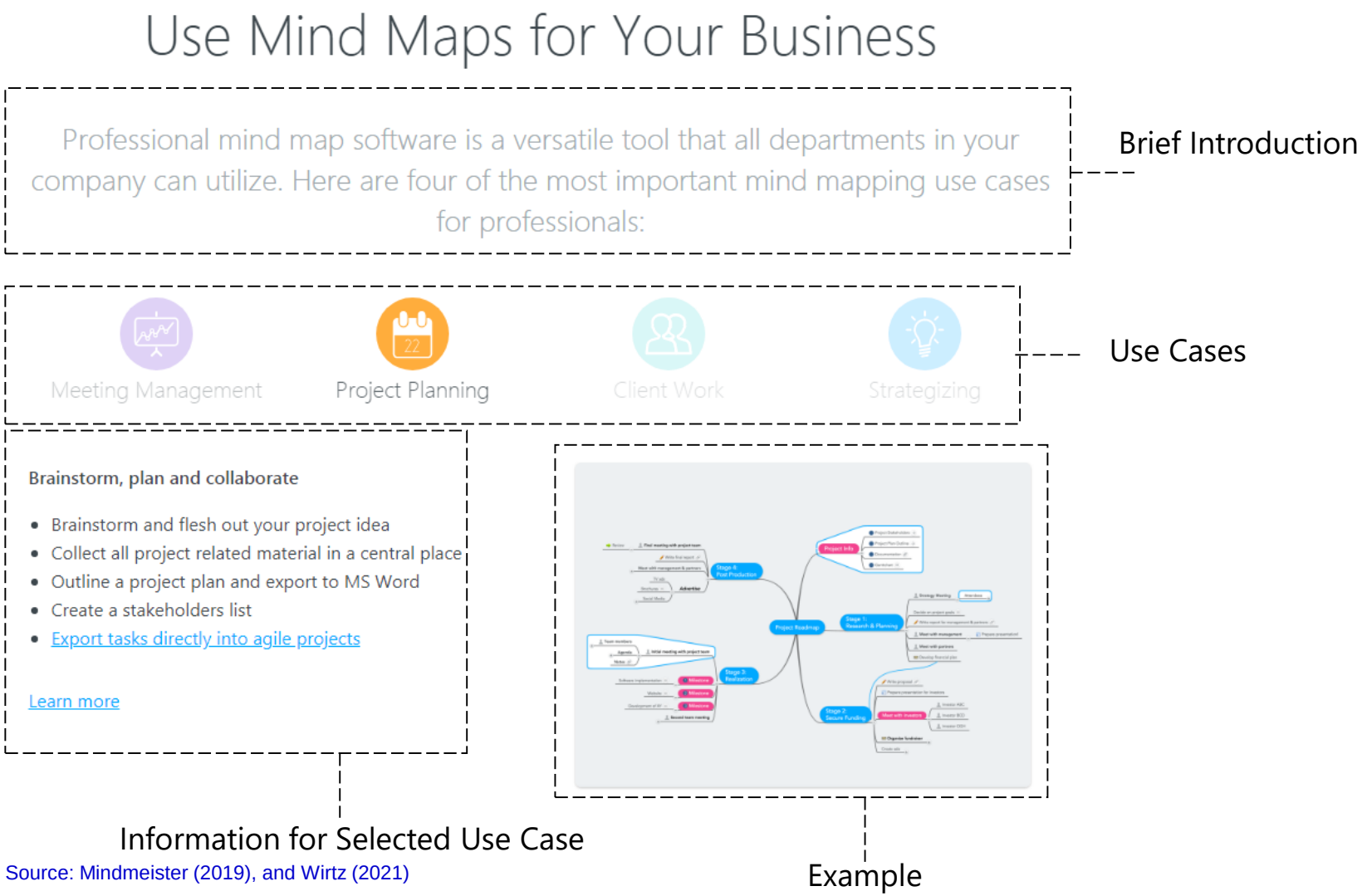
Source: Wirtz (2020b, 2021)

Fig. 14.18 Action parameters of the product and program policy

Product Innovation	Product Variation	Product Differentiation	Product Elimination
• 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	• Preservation of product in its basic conception • Substitution of previous product by modified product • Adaptation of products to changing consumer needs	• Preservation of product in its basic conception • Supplementation of product line with modified products • Adaptation of products to specific demands of different target groups	• Removal of products from product line • Allocation of scarce resources to succesful products

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

Fig. 14.19 Creativity techniques in digital busines



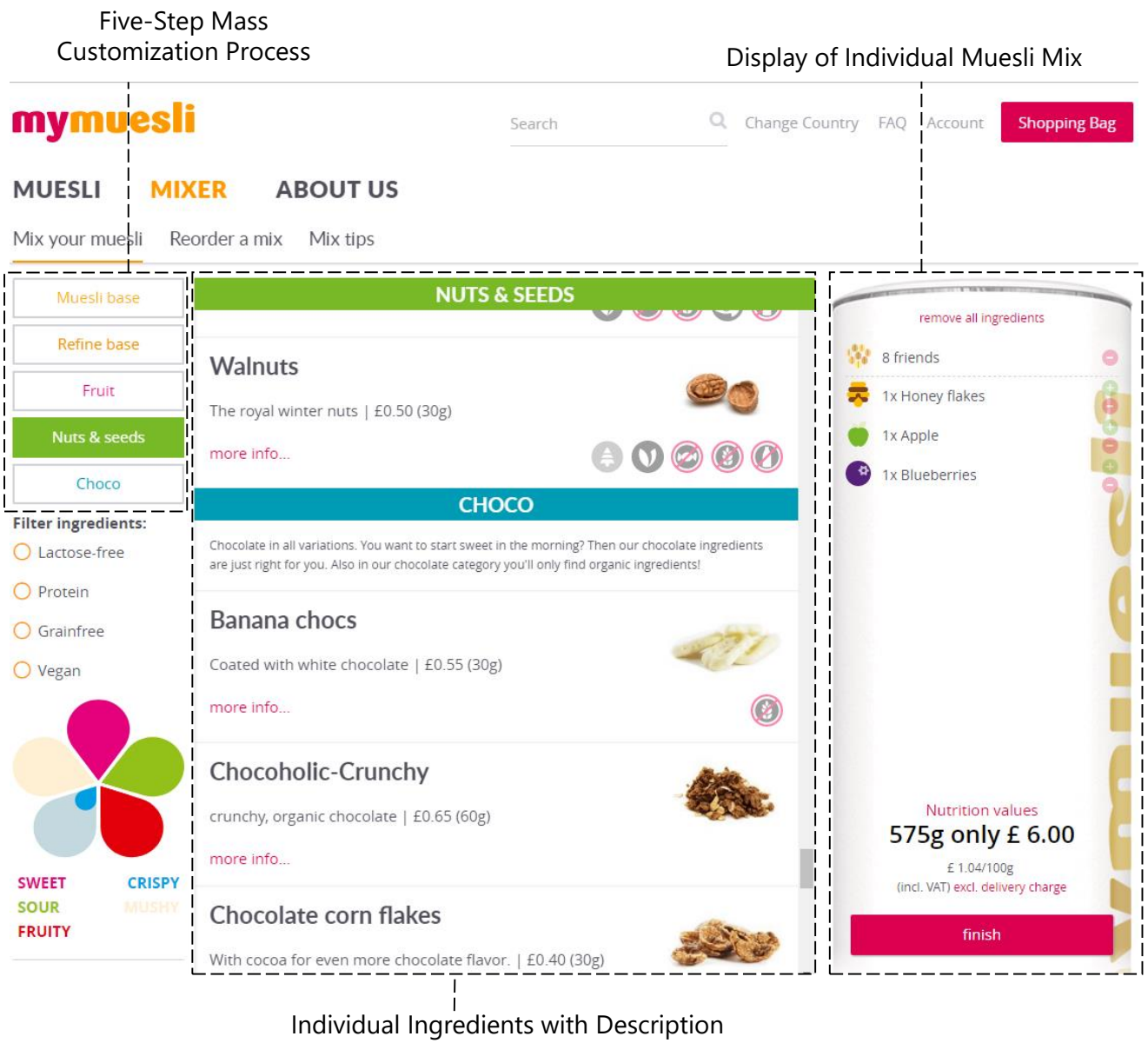
Source: Mindmeister (2019), and Wirtz (2021)

Fig. 14.20 Selected versioning possibilities of digital products

Features	• Differing product scope (e.g. Microsoft Windows and Windows Professional)
User Interface	• Different interfaces for different user groups (e.g. Photoshop Essentials/ Professional)
Delay	• Same information is presented to different user groups time-delayed (e.g. market information)
Manipulation	• Provides user groups with different rights for processing information (e.g. Acrobat Reader and Writer)
Convenience	• Certain user groups receive more convenient/privileged terms of use (e.g. Availability at peak times)
Support	• Improved support for certain user groups (e.g. improved support for subscribers)

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

Fig. 14.21 Mass customization in digital business



Source: Mymuesli GmbH (2019), Wirtz (2021)

Fig. 14.22 Internet-based mass customization

Company Website	Product Configuration	Order	Customer Dialog
• Company presentation • Product presentation • Initiation of transactions	• Existing customers: Configuration proposal based on previous orders • New customers: Detailed instruction and assistance • Digital presentation of individual products and customization opportunities • Collection of order data	• Automatic data transfer to internal application systems • Order tracking system as value-added service	• Maintenance of customer dialog in the after-sales phase • Update and improvement of customer profiles • Generation of repurchases

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

Definition of Digital Communication

Definition of Digital Communication (Wirtz 2001a, 2020b)

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

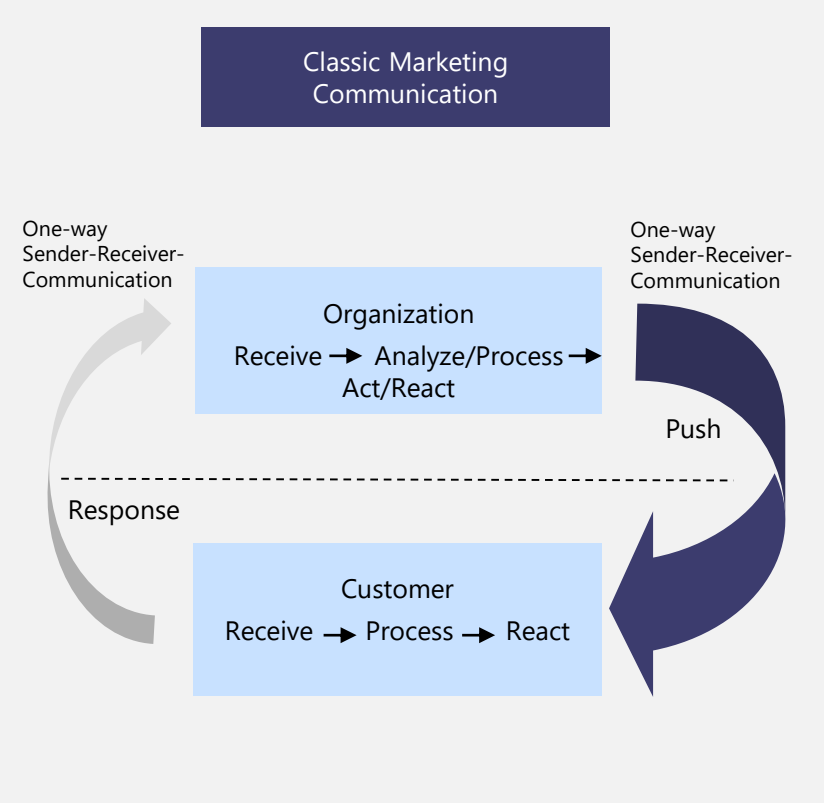
Source: Wirtz (2021)

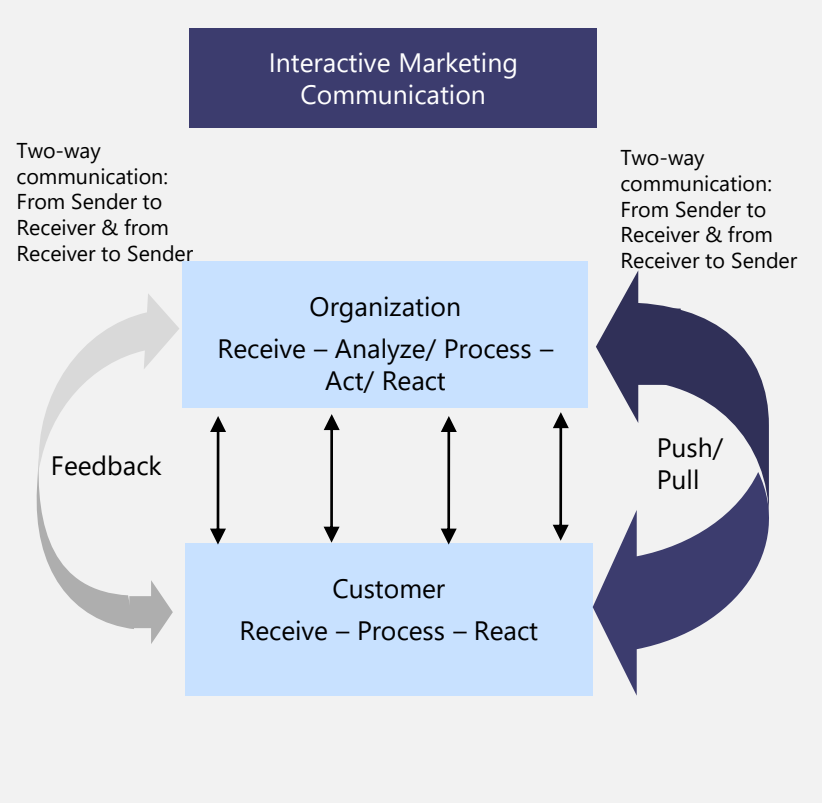
Fig. 14.23 Characteristics of digital communication

Application-Oriented Factors	Individualization	• Segment- or customer-specific communication (e.g., recommender systems, email)
	Intelligence	• The Internet enables convenient and cost-effective market research to adjust communication (e.g., online survey, weblogs)
	Interactivity	• Electronic communication channels allow for mutual information exchange (e.g., user feedback)
Strategic Factors	Integration	• Digital communication can be integrated well into existing communication (e.g., online response to print advertisement)
	Industry Restructuring	• Changed industry structures, for instance, through dis-/ intermediation open up new communication channels (e.g., advertisement on websites of intermediaries)
	Independence	• Communication can be location- and time-independent (e.g., international live chat)

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

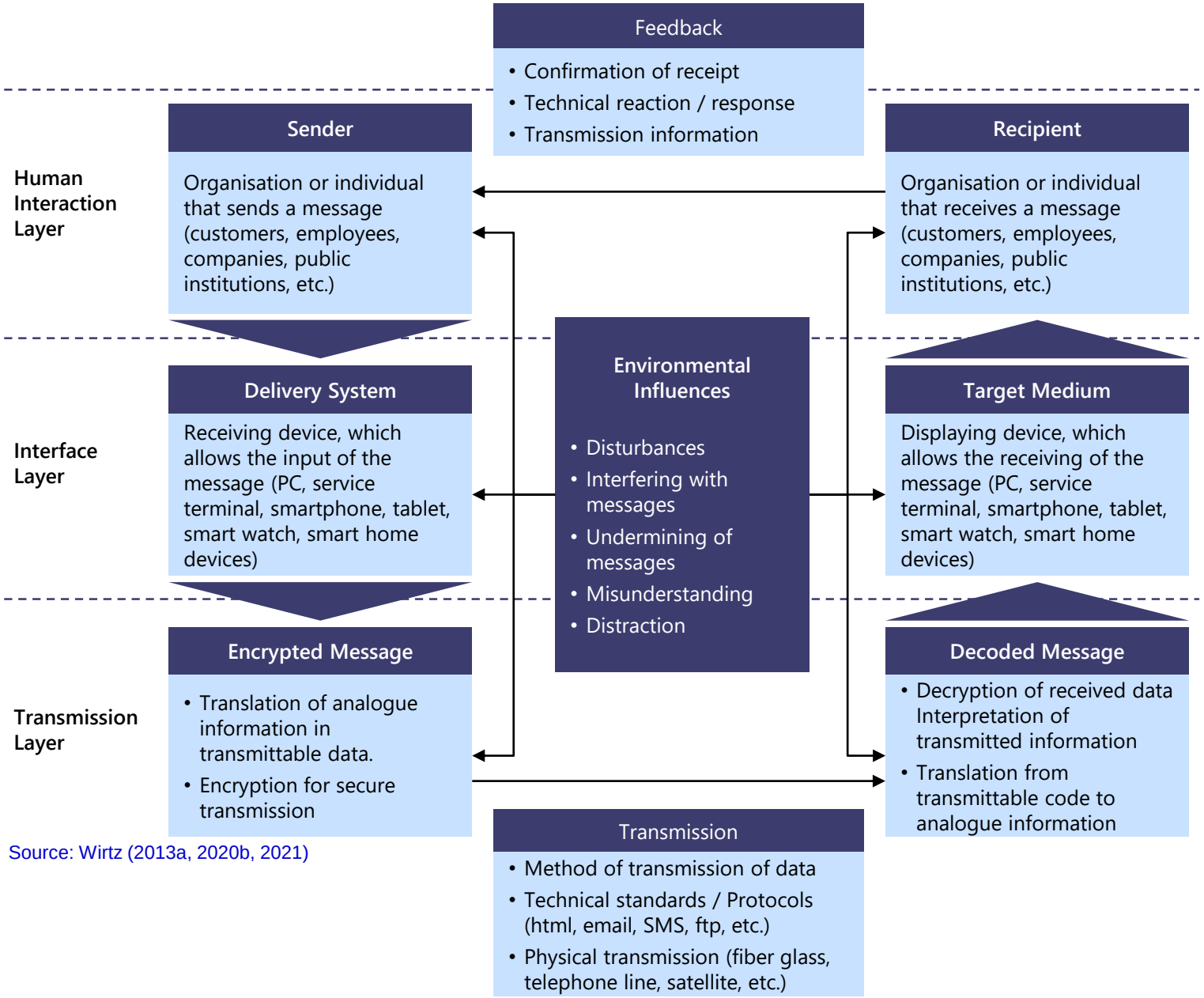
Fig. 14.24 Comparison of traditional and interactive communication





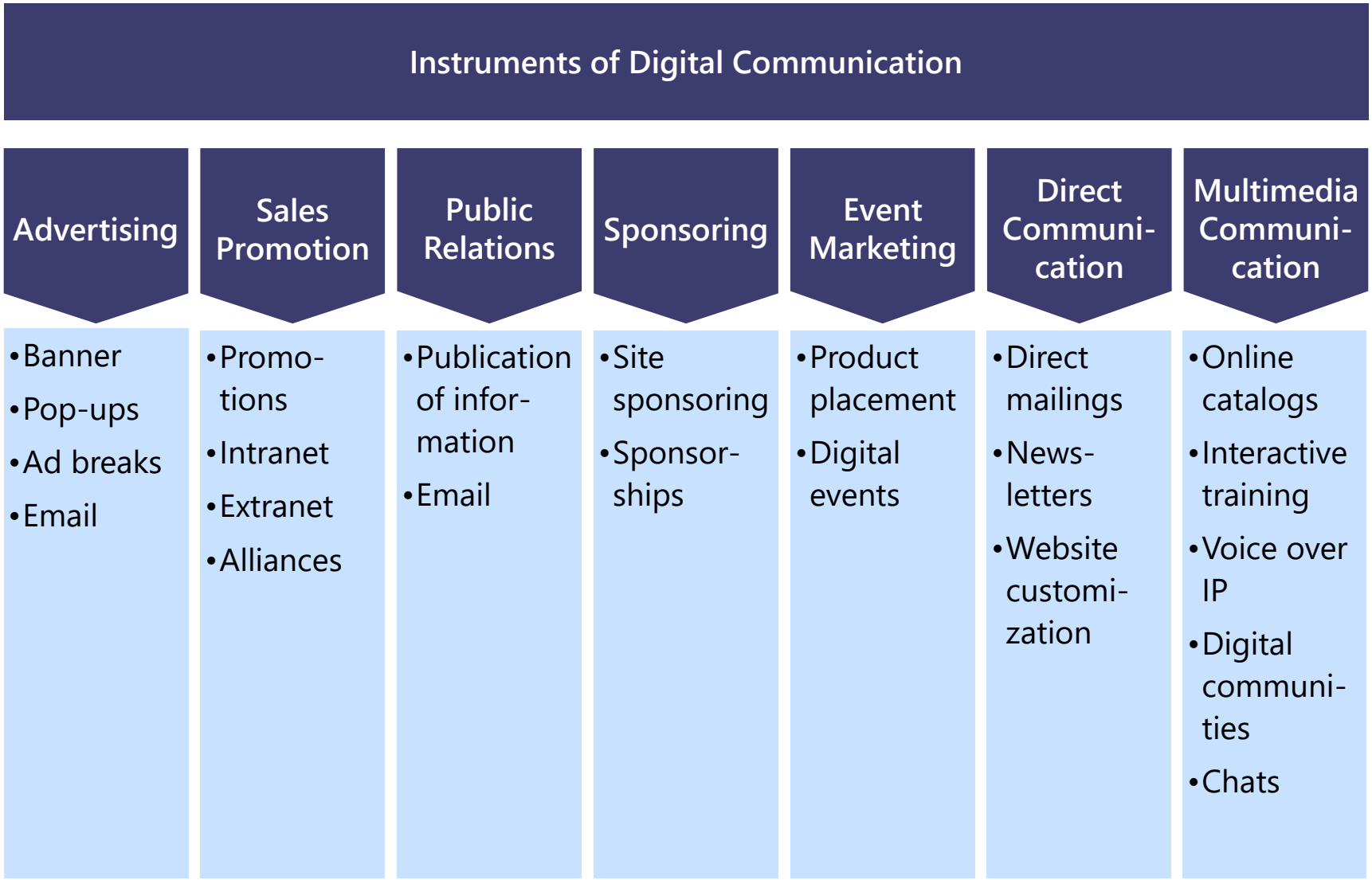
Source: Wirtz (2013a, 2020b, 2021)

Fig. 14.25 Communication process in digital communication



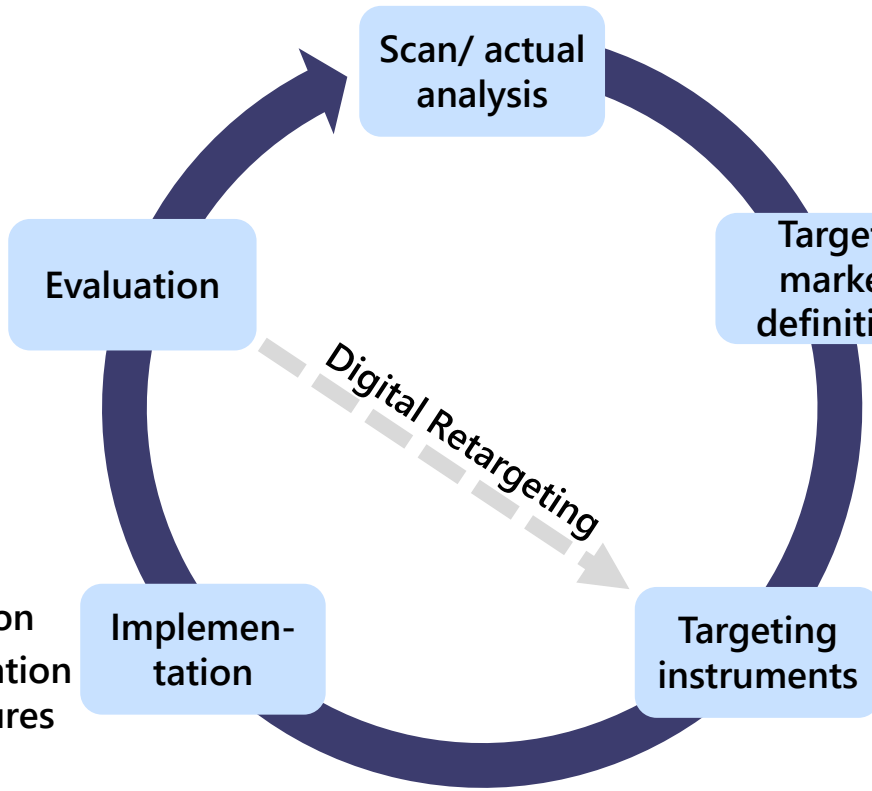
Source: Wirtz (2013a, 2020b, 2021)

Fig. 14.26 Instruments of digital communication



Source: Wirtz (2001a, 2020b, 2021)

Fig. 14.27 Targeting process



- Situation Analysis
- Capacity analysis
- ...

- Target market localization
- Target market segmentation
- ...

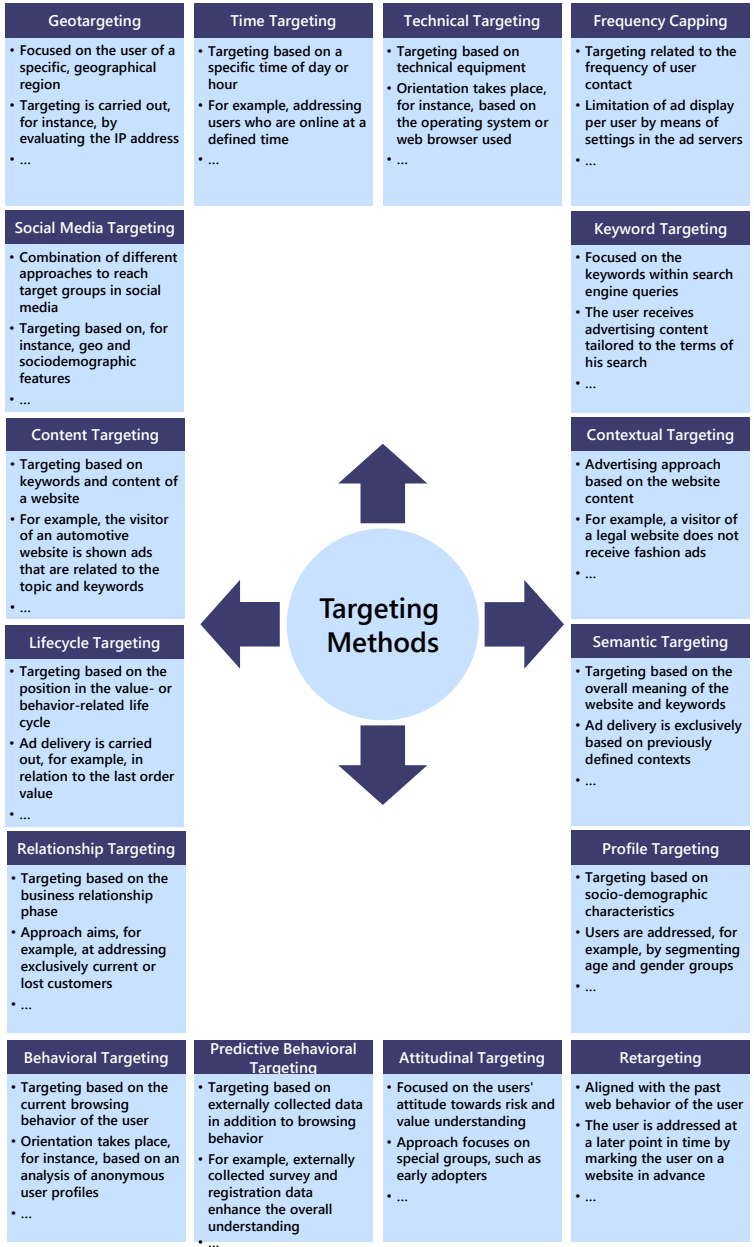
- Definition of targeting framework/ measures
- Determination of targeting methods
- ...

- Methodolical adaptation
- Concerted implementation of the targeting measures
- ...

- Segmentation of results
- Performance measurement
- ...

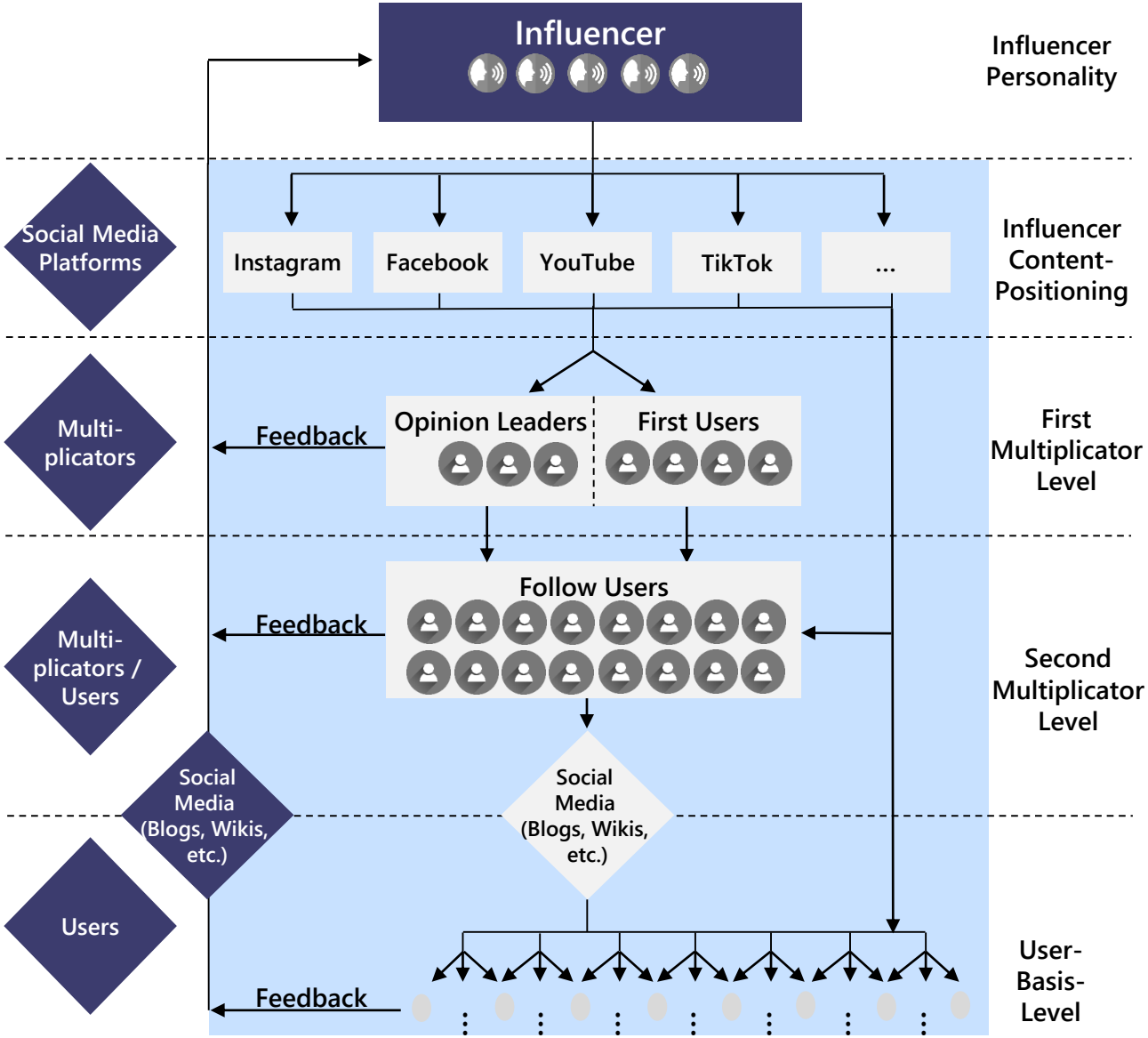
Source: Wirtz (2020b, 2021)

Fig. 14.28 Targeting methods



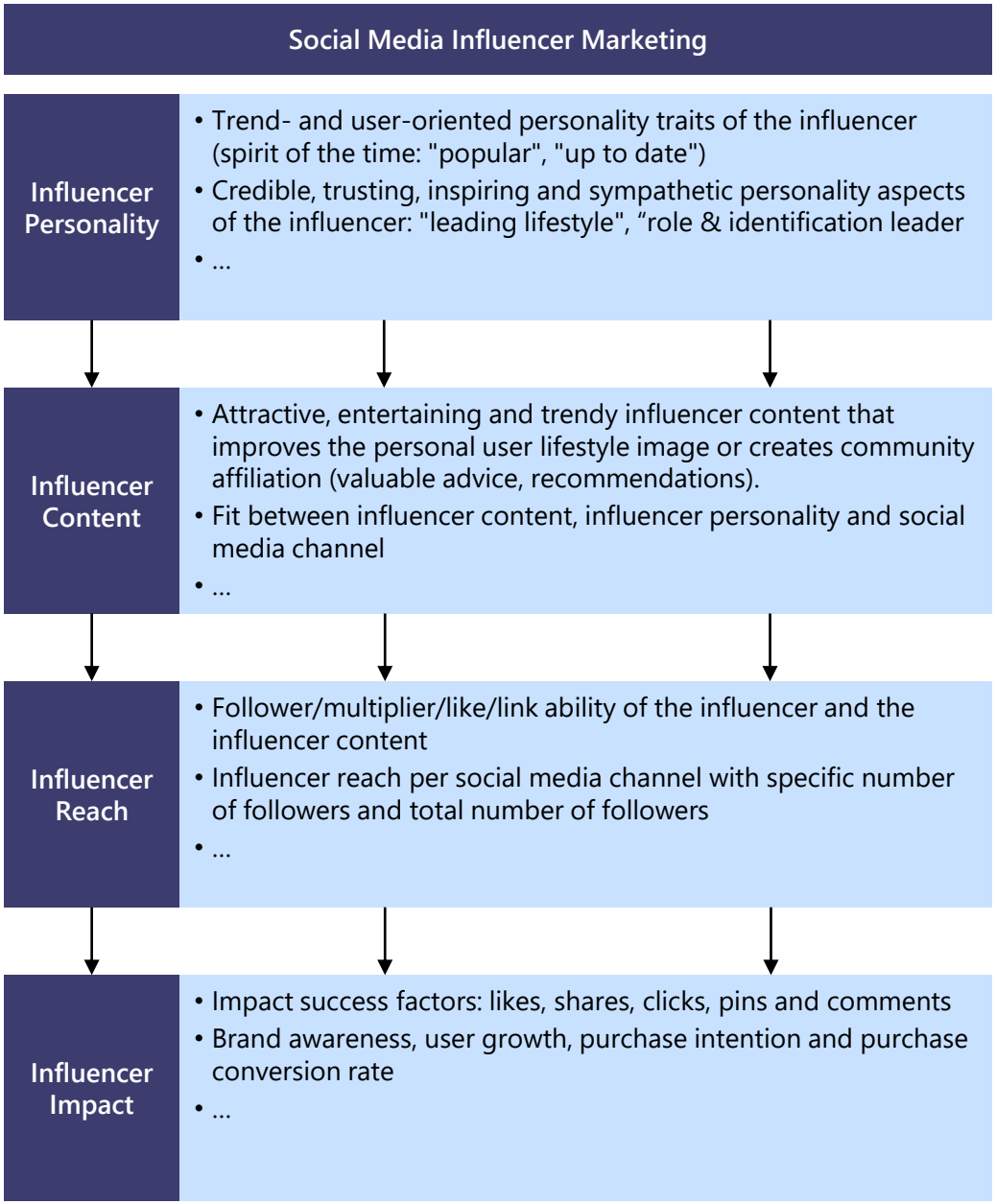
Source: Wirtz (2020b, 2021)

Fig. 14.29 Influencer-communication-follower (ICF) model



Source: Wirtz (2020b, 2021)

Fig. 14.30 PCRI model of influencer marketing



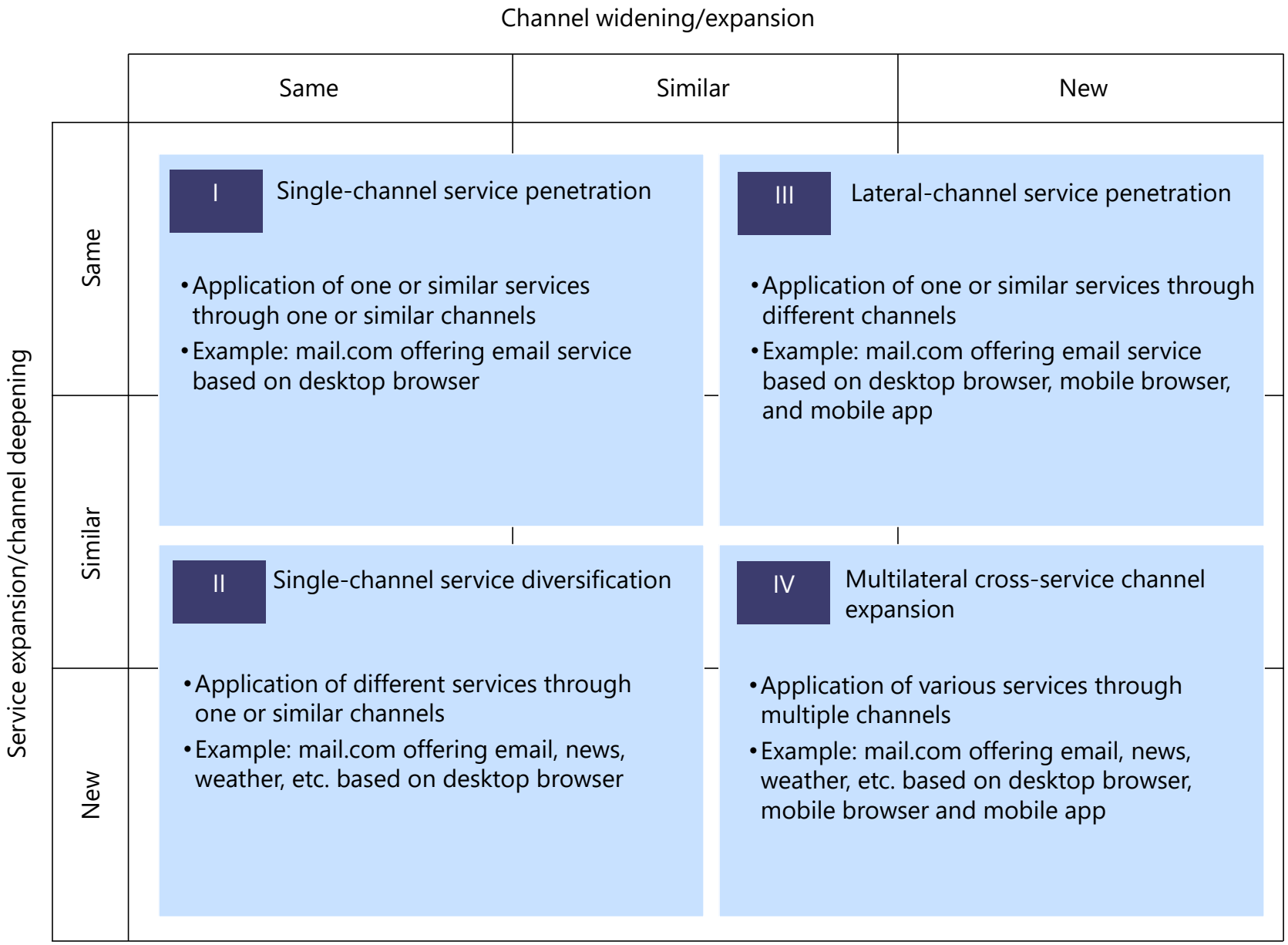
Source: Wirtz (2020b, 2021)

Fig. 14.31 Central brand management strategies in digital business

Frame of Reference for Branding Strategies in Digital Business				
Basic Conditions	Increased competition	Increasing digitization	Increasing complexity	Dynamic customer behavior
Initial Situation	No existing brand	Existing brand in the offline world		Existence of various independent brands
Type of Strategy	(A) Online strategy for new brands	(B) Offline/online brand adaptation strategy	(C) Offline/online transfer of regular brand	(D) Online brand alliance
Characteristics	• Distinct, independent digital business-specific brand	• Adaptation/ combination of existing elements of traditional offline brand • Supplementation by new Internet-affine components	• Complete transfer of traditional offline brand to the Internet	• New brand emerging from brand alliance • Partial transfer of regular brand of cooperating brands
Examples	• eBay • Spotify • Airbnb	• Nationwide • Greyhound • New York Times	• Washington Post • Walmart	• Verizon

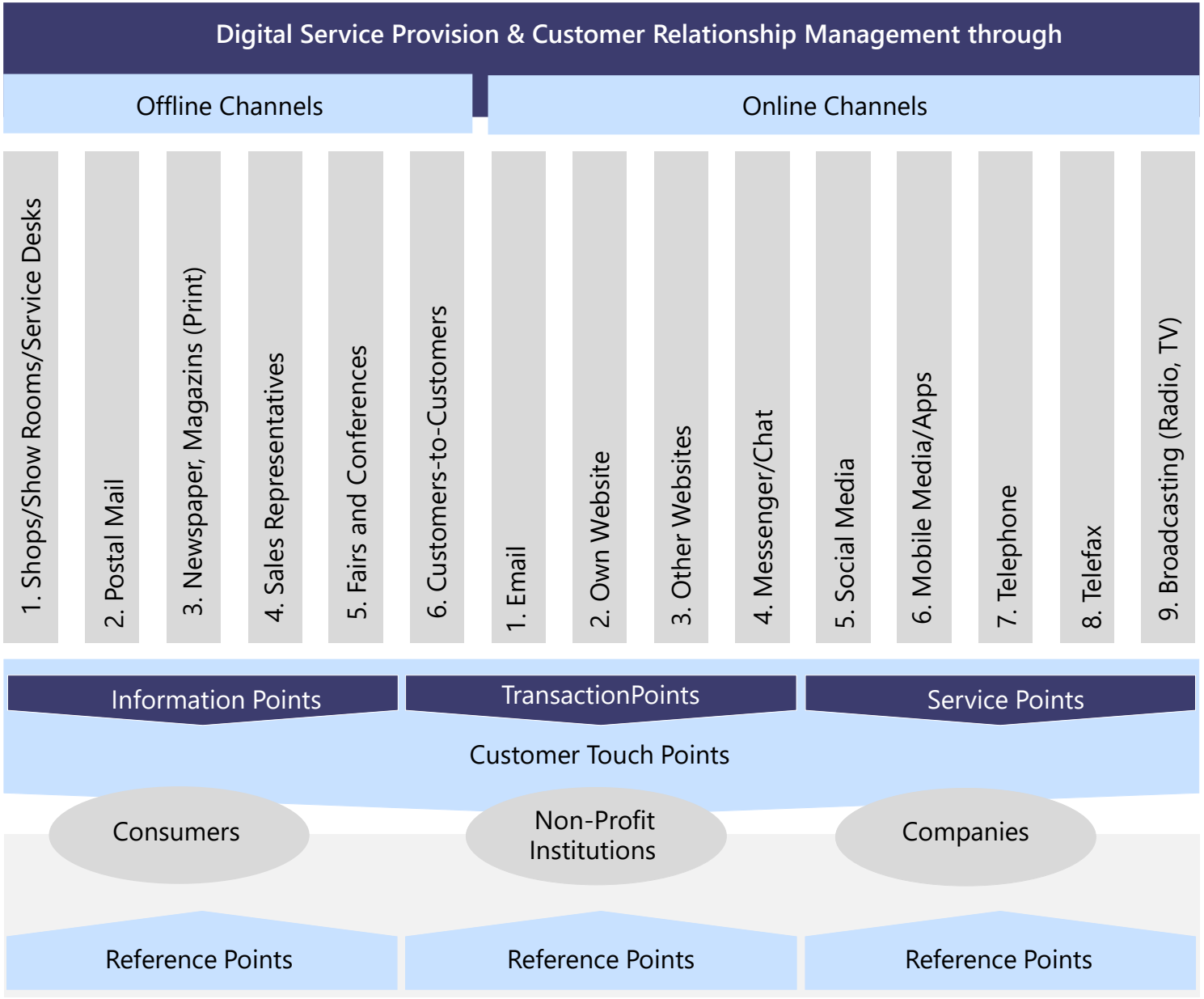
Source: Wirtz (2020b, 2021)

Fig. 14.32 Service-channel diversification model (SCD model)



Source: Wirtz (2006, 2020c, 2021)

Fig. 14.33 Channel characteristics of digital delivery



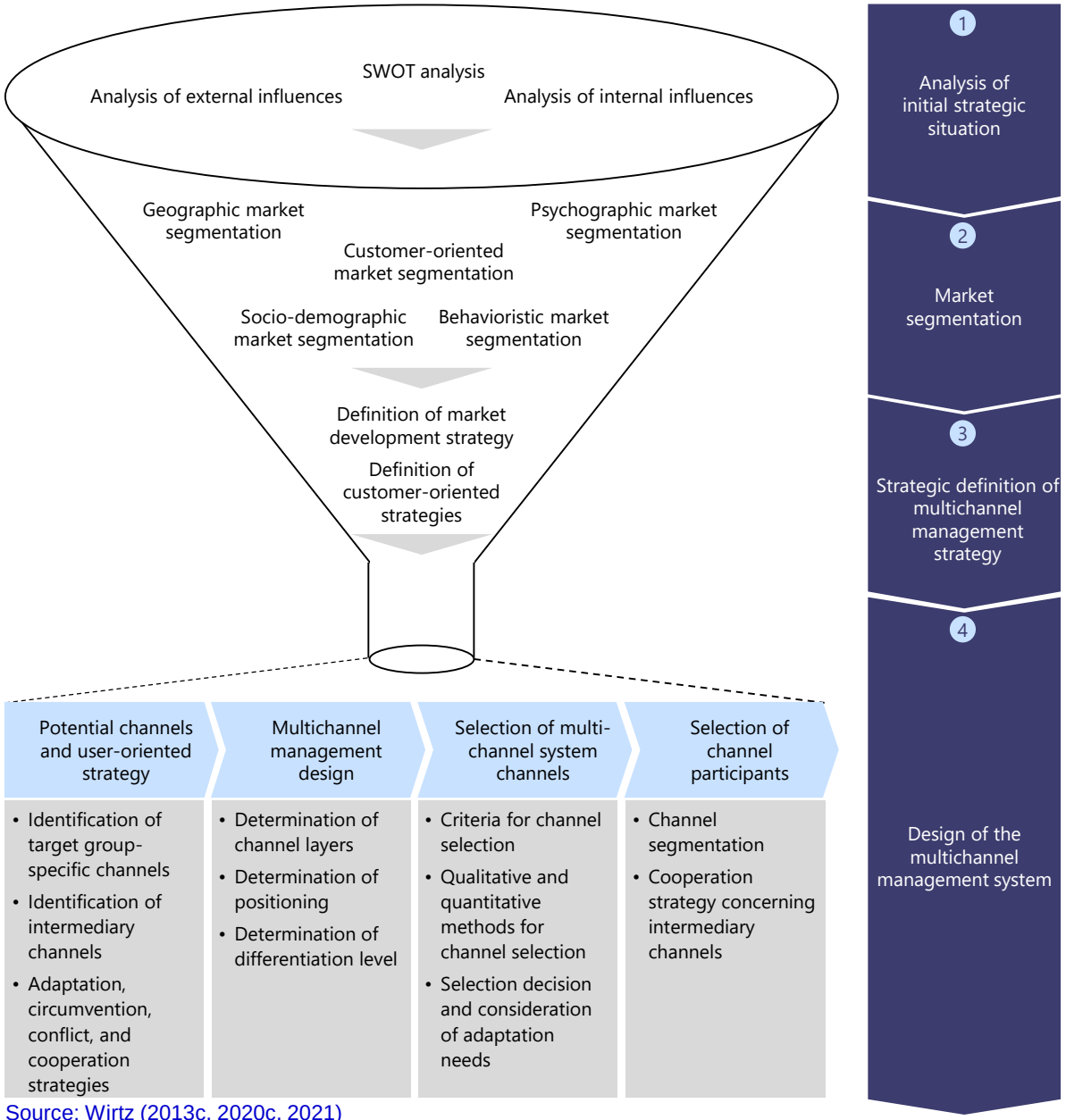
Source: Wirtz (2016a, 2021)

Fig. 14.34 Digital business multichannel strategy framework

Aspects \ Approach	Isolated Channel Strategy	Combined Channel Strategy	Integrated Channel Strategy
Coordination	• Uncoordinated channels/ channel-inherent management • Closed channel structure • Channel competition	• Partially coordinated channels/channel-inherent management • Loosely linked channel structure • Channel competition	• Completely coordinated channels/comprehensive channel management • Interdependent channel structure • No competition between channels
Formation	• Lead channel structure • Channel-specific management	• Mostly lead channel structure • Comprehensive channel management	• Multichannel structure • Centralized overall channel management
Organization	• High individual responsibility • Low coordination • High decentralization		• High interdependence • High coordination • High centralization

Source: Wirtz (2012b, 2020c, 2021)

Fig. 14.35 Strategic multichannel management process



Source: Wirtz (2013c, 2020c, 2021)

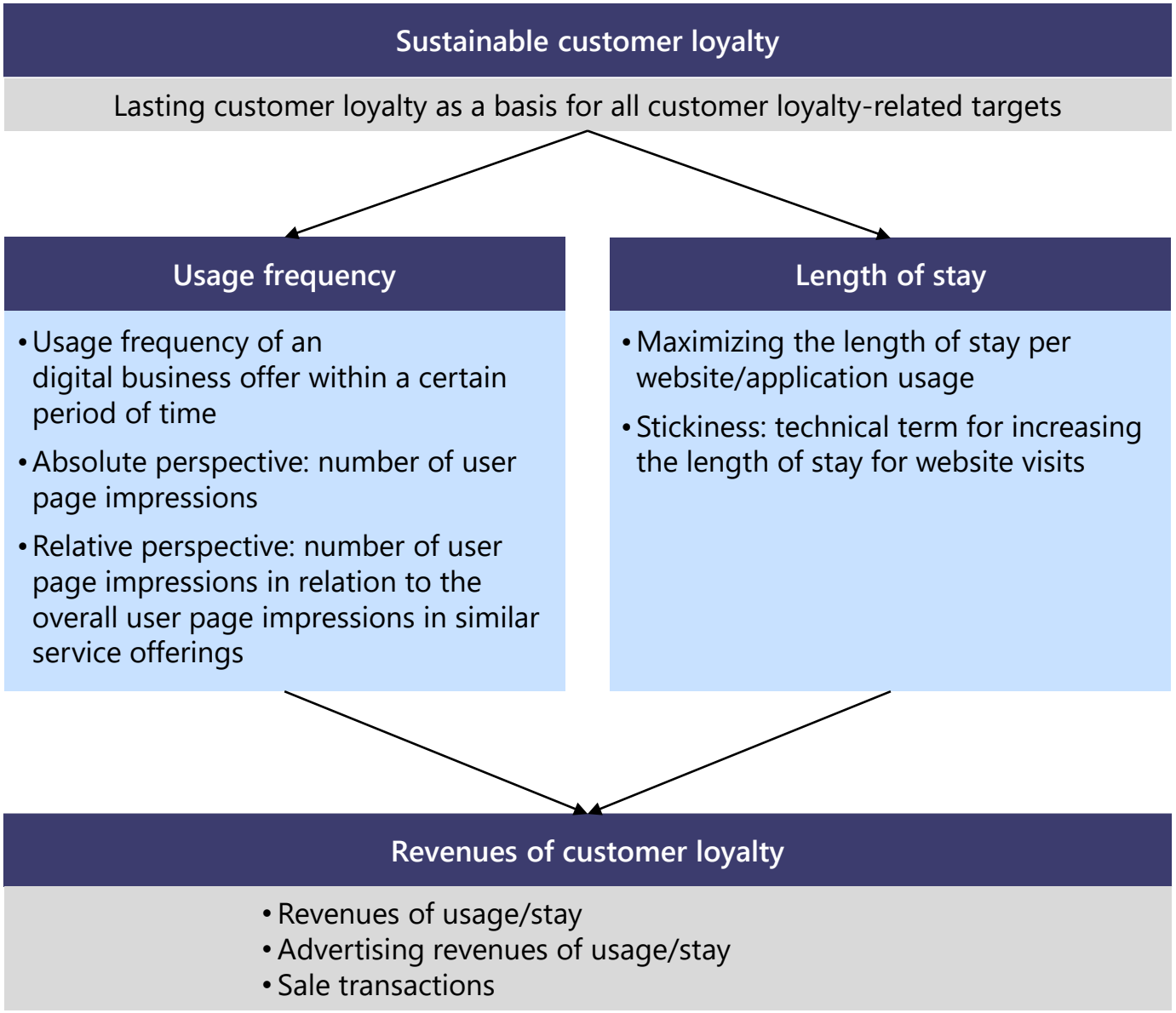
Definition of Digital Business-Related Customer Relationship Management

Definition of Digital Business-Related Customer Relationship Management (Wirtz 2003, 2020a)

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 (2021)

Fig. 14.36 Target dimensions of customer/user loyalty

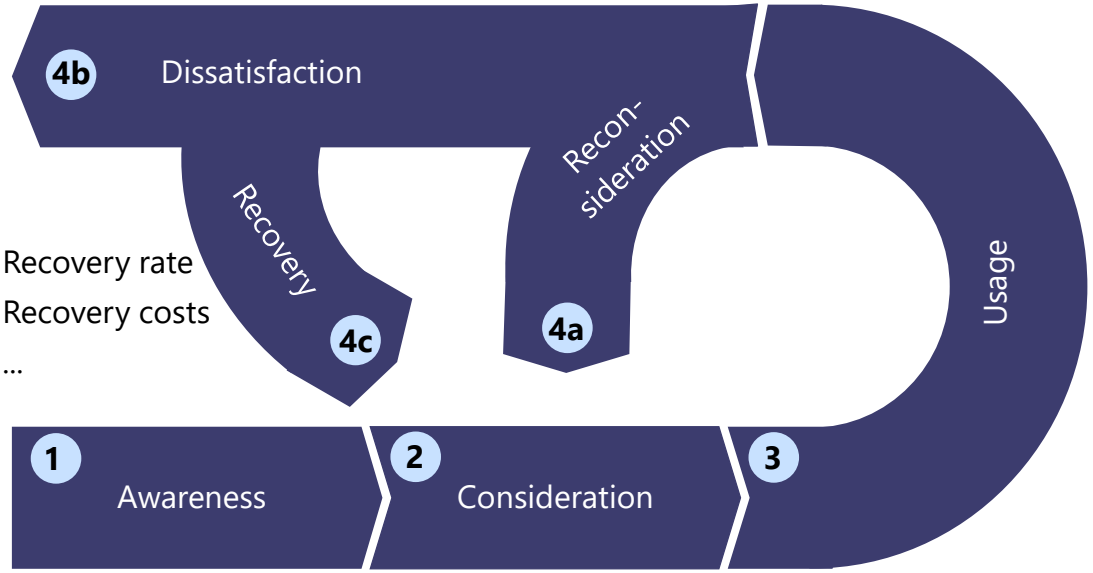


Source: Wirtz (2003, 2020a, 2021)

Fig. 14.37 Digital business customer relationship management process

- Churn rate
- Traffic loss through customer churn
- ...

- Conversion rate of customers to regular customers
- Loss rate of regular customers
- Marginal return of regular customer
- ...



- Recovery rate
- Recovery costs
- ...

- Number of page impressions
- Growth rate of application users or visitor base of website
- Acquisition cost for a unique customer/user
- ...

- Conversion rate of visitors to customers
- Acquisition cost for a new customer/user
- Usage frequency
- ...

- Monitoring demanded service types
- Usage frequency of services
- Complaints/ satisfaction with services
- ...

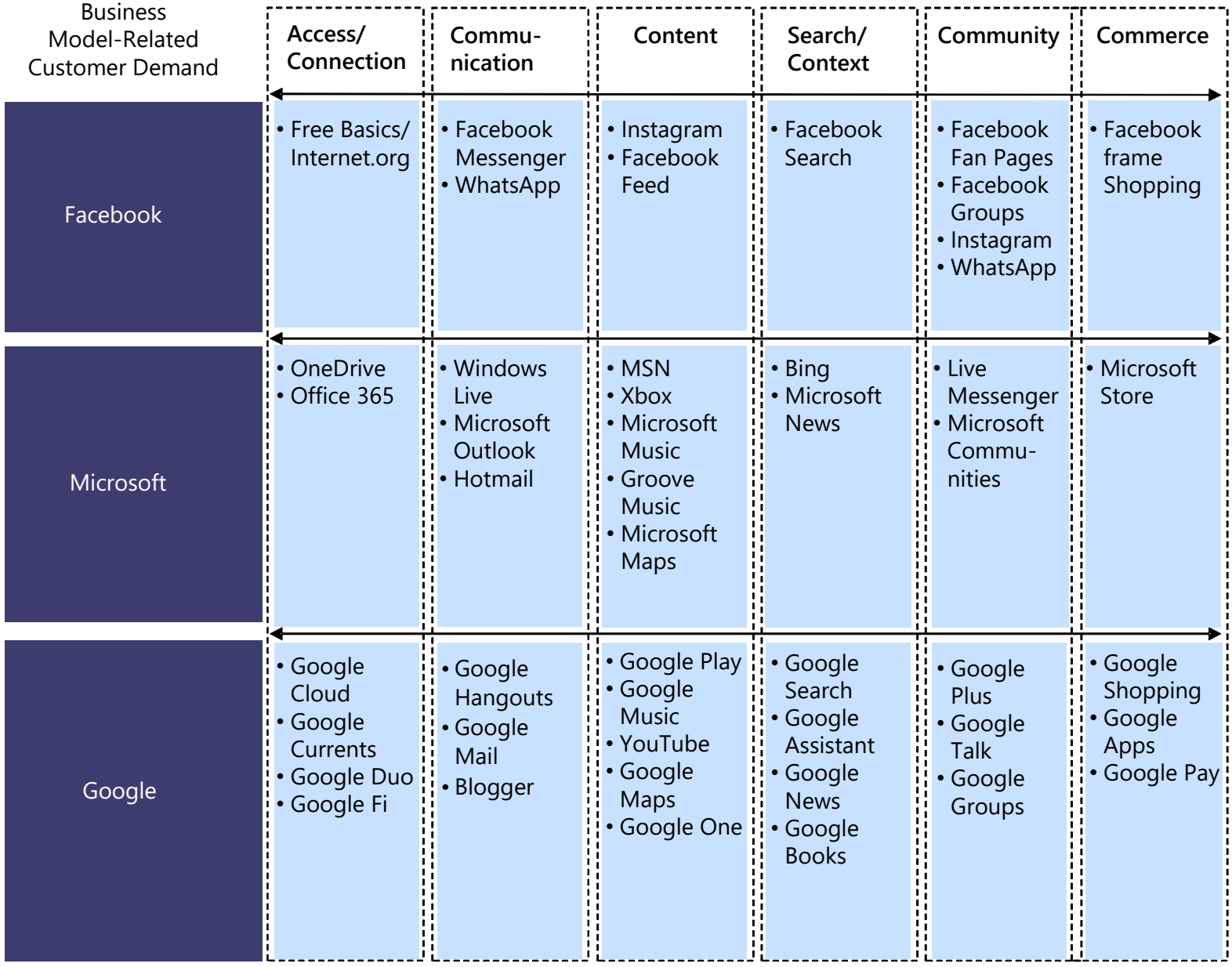
Source: Wirtz (2003, 2020a, 2021)

Fig. 14.38 Measures and instruments of digital CRM

Contact process Awareness	Acquisition process Consideration	Purchase process Purchase	Usage process Consumption	Reacquisition process Reconsideration	Customer churn process Dissatisfaction	Recovery process Reconsideration
Tasks/Challenges						
• Creation of product/brand awareness • Market positioning of the product • Identifying potential customers	• Generating preferences • Presenting product advantages • Recognizing interested users/ consumers	• Recognizing time of purchase • Preparing a quotation • Product provision	• Avoiding cognitive dissonance • Service performance • Generating satisfaction	• Getting insight to preferences • Information on product improvements • Recognizing time of purchase • Product provision	• Avoiding customer churn • Analysis of customer churn • Optimizing complaint management • Improvement of performance gaps	• Selecting customer recovery targets • Restoring customer trust • Targeted/personalized service optimization • Allowing recovery incentives (discount, warranty)
Digital business fields of instruments						
• Big data analysis/data mining/cloud services • Online advertising • Virtual communities/ social media websites • Sponsorship discussion forums	• Big data analysis/ data mining/ cloud services • Online forms for data collection • Email information • Virtual communities/ social media websites	• Big data analysis/data mining/cloud services • Email information • Digital offer • Direct distribution (disinter-mediation) • Integrated supply chain	• Service website • Digital customer forum • Virtual communities/ social media websites • Digital product provision (e.g. software)	• Big data analysis/data mining/cloud services • Web forms • Digital offers • Digital test markets	• Customer history analysis/ thorough data base • Digital customer forum • Virtual Communities/ social media websites	• Big data analysis/ data mining/cloud services • Digital customer dialog • Digital customer forum • Service website • Digital incentive system • Virtual communities/social media websites

Source: Wirtz (2003, 2020a, 2021)

Fig. 14.39 Integrated digital business customer relationship management



Source: Wirtz (2013a, 2020b, 2021)

Chapter 14. Topics and Questions for discussion

Chapter 14
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 management process.
5. Describe the digital CRM process and the respective tasks and challenges.

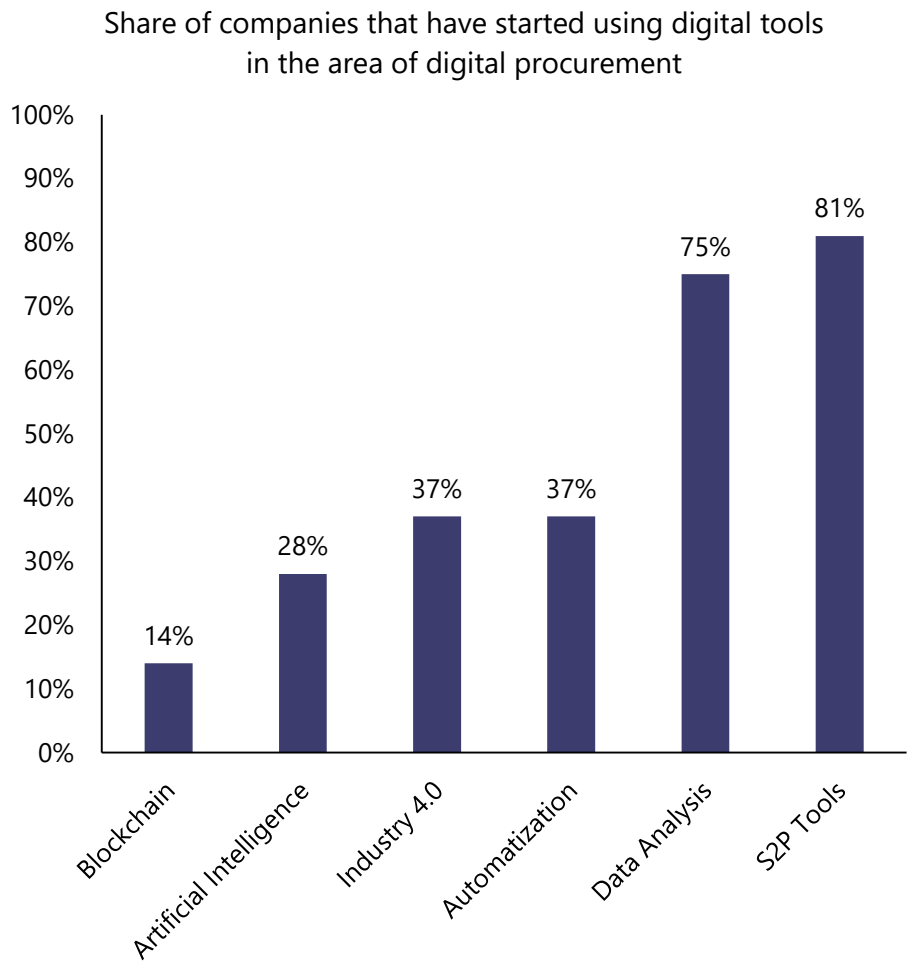
Topics for classroom discussion and team debates

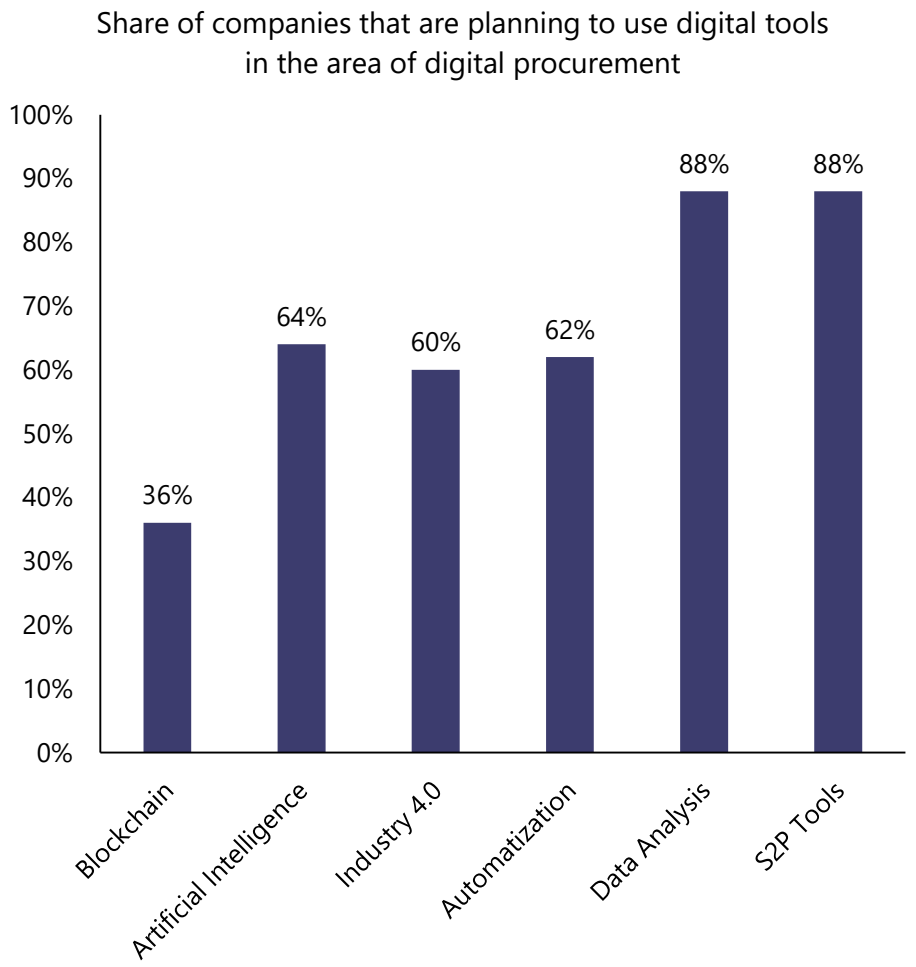
1. Discuss the advantages and disadvantages of digital marketing with regard to the identification and use of your personal data based on the different targeting methods. Which socially critical and legally problematic aspects are of particular relevance here?
2. Discuss the importance of influencer 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".

Source: Wirtz (2021)

Chapter 15: Digital Procurement

Fig. 15.1 Use of digital technologies in digital procurement





Data Source: PwC (2019), and Wirtz (2020)

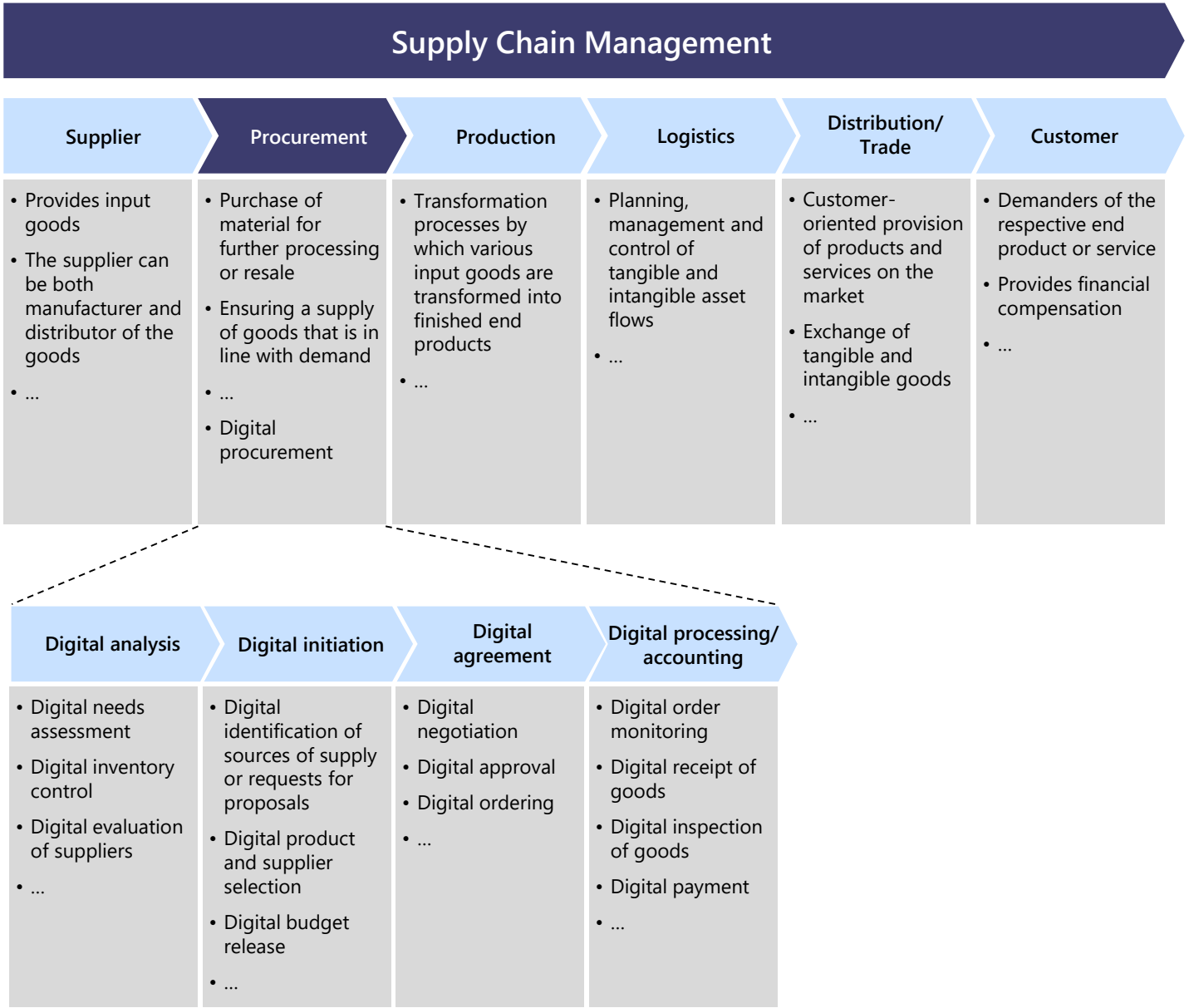
Definition Procurement

Definition of Procurement (Wirtz 2010c; 2020b)

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 (2021)

Fig. 15.2 Intertwining and differentiation of digital procurement and SCM



Source: Wirtz (2020b, 2021)

Table 15.1 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 Kleinecken (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.

Source: Wirtz (2001a, 2020b, 2021)

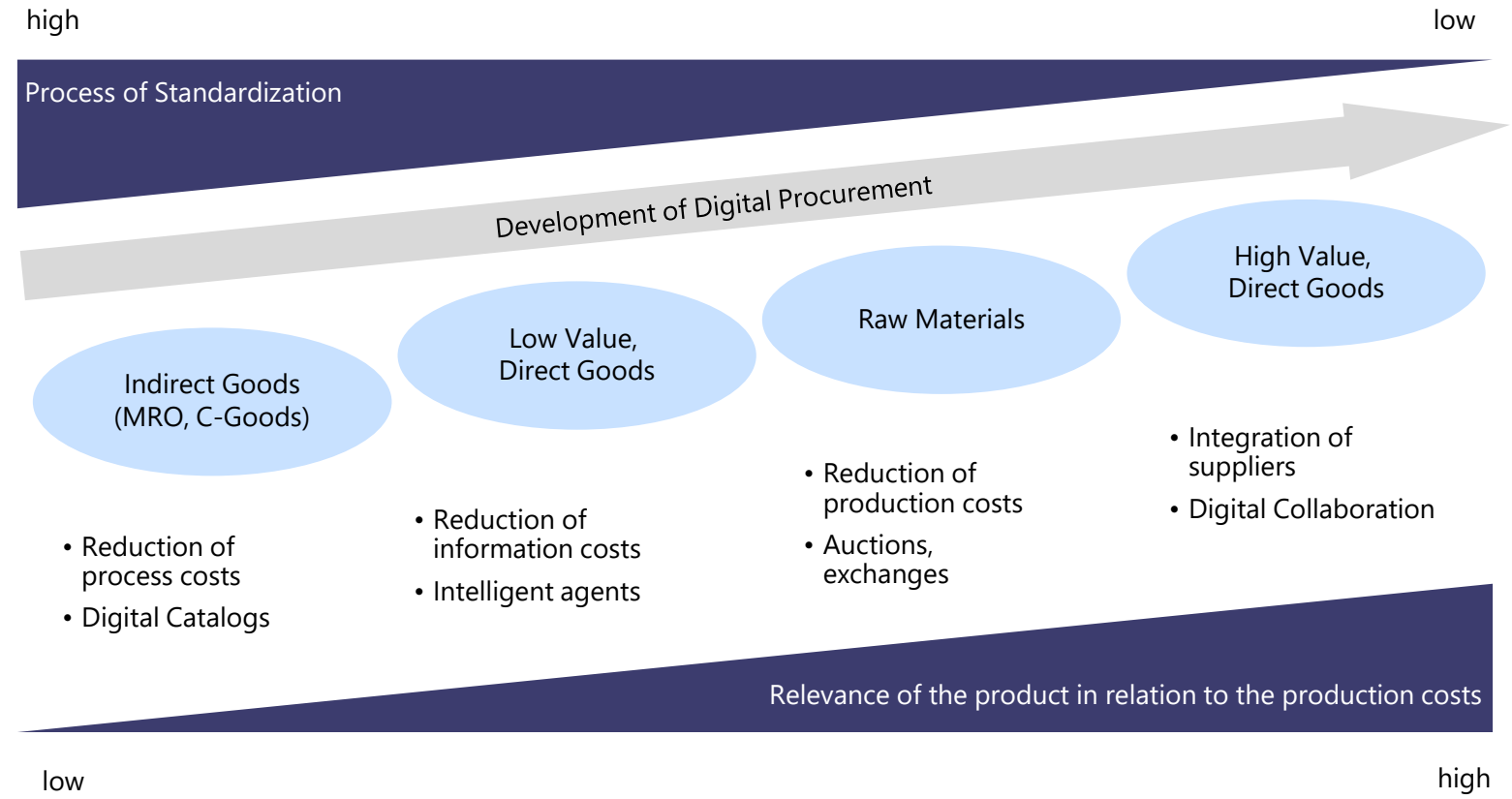
Definition Digital Procurement

Definition of Digital Procurement (Wirtz 2001a; 2020b)

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.

Source: Wirtz (2021)

Fig. 15.3 Development of digital procurement

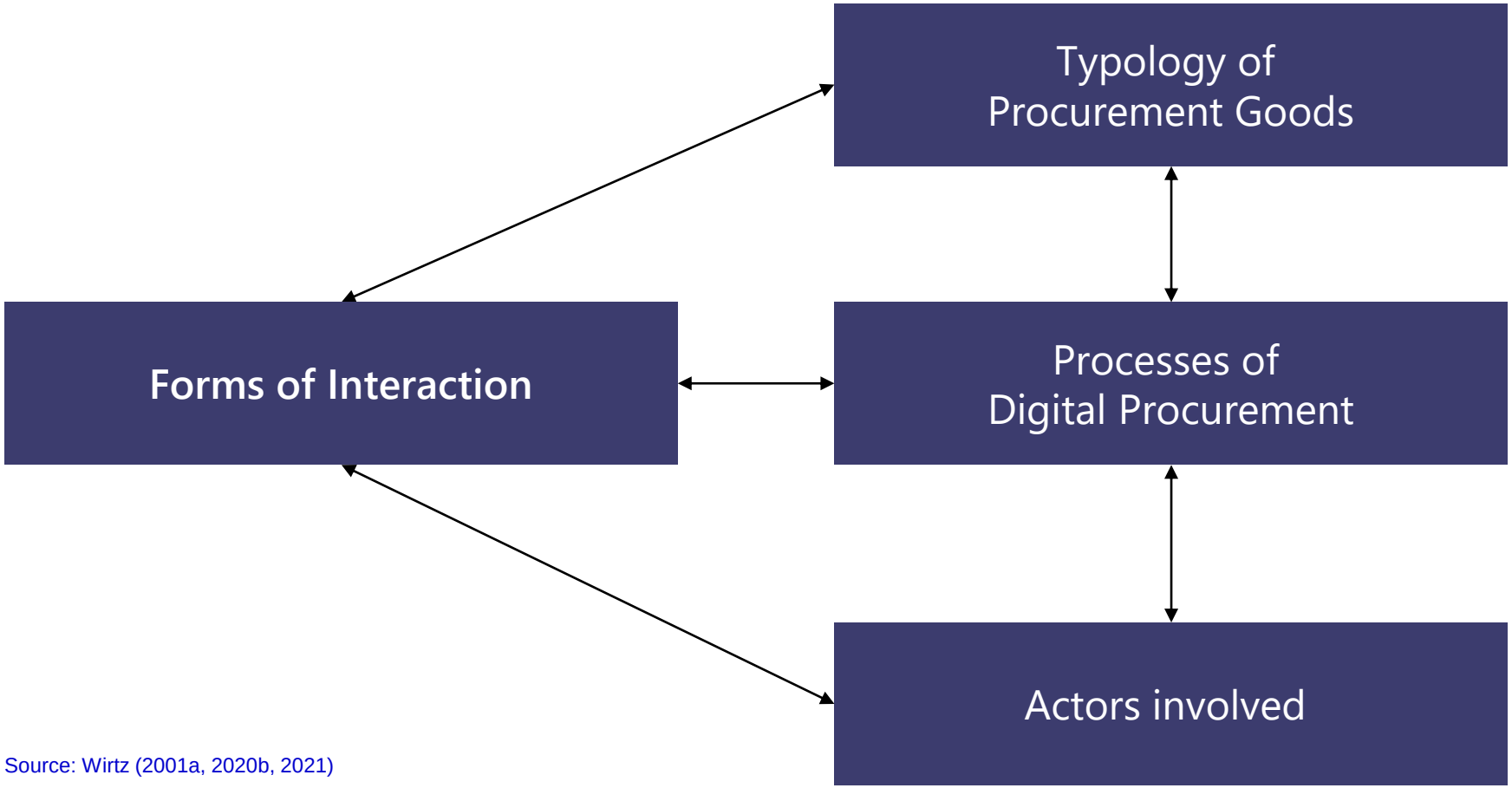


Digital Procure-ment Potential	●	◕	◑	◔

Legend: ○ Very low ◔ Low ◑ Medium ◕ High ● Very High

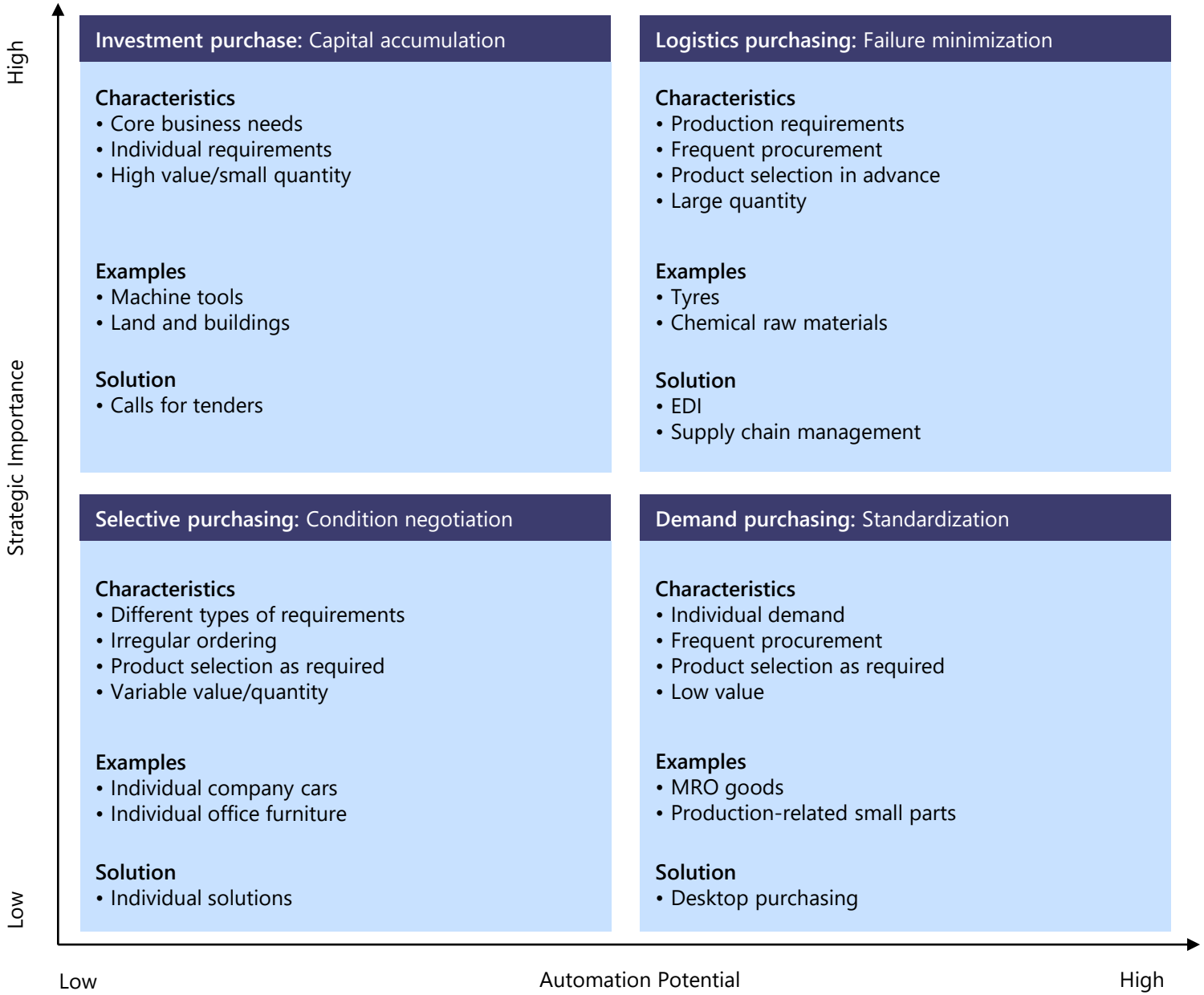
Source: Wirtz (2001a, 2020b)

Fig 15.4 Structural framework of digital procurement



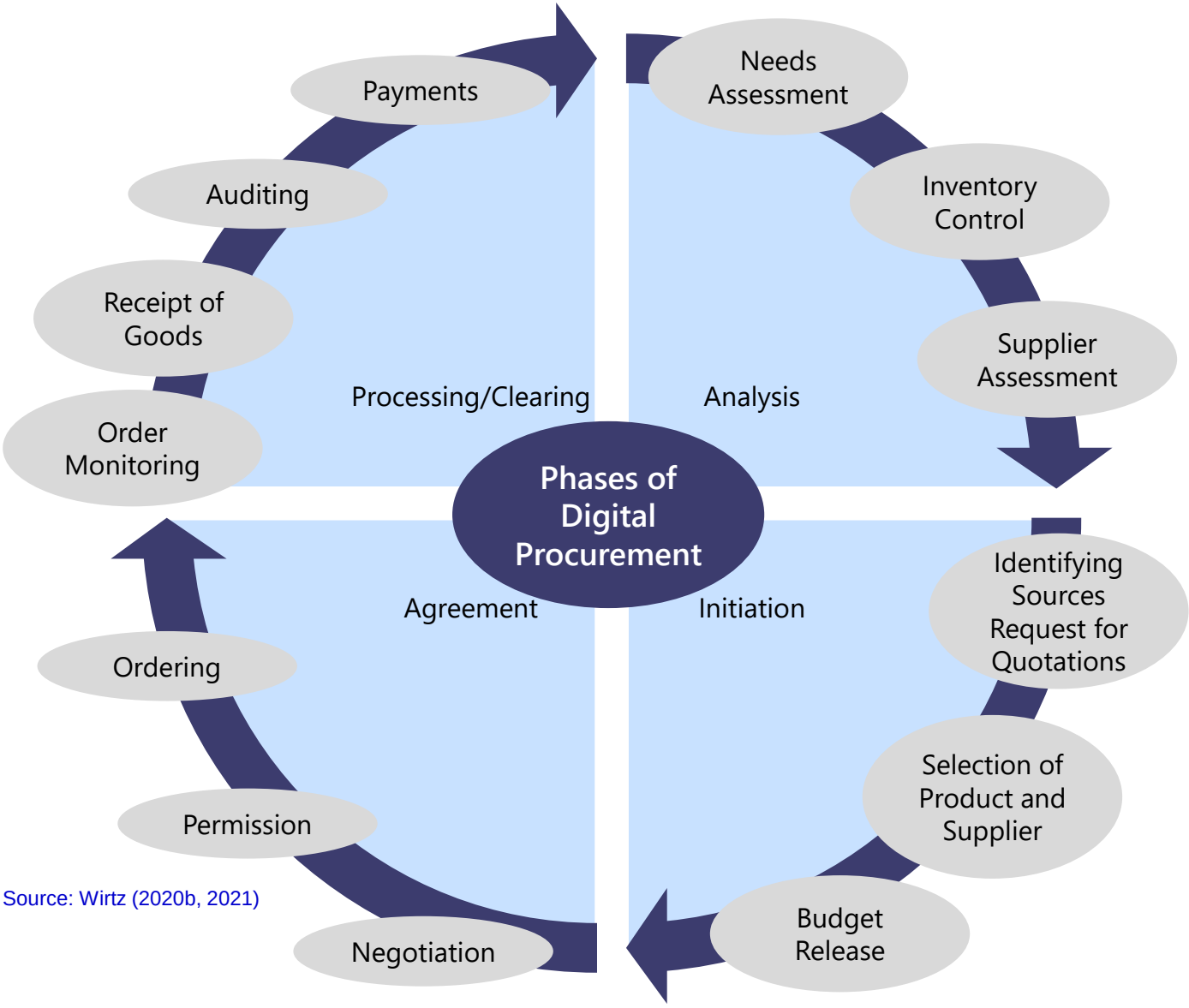
Source: Wirtz (2001a, 2020b, 2021)

Fig. 15.5 Strategy/automation potential matrix



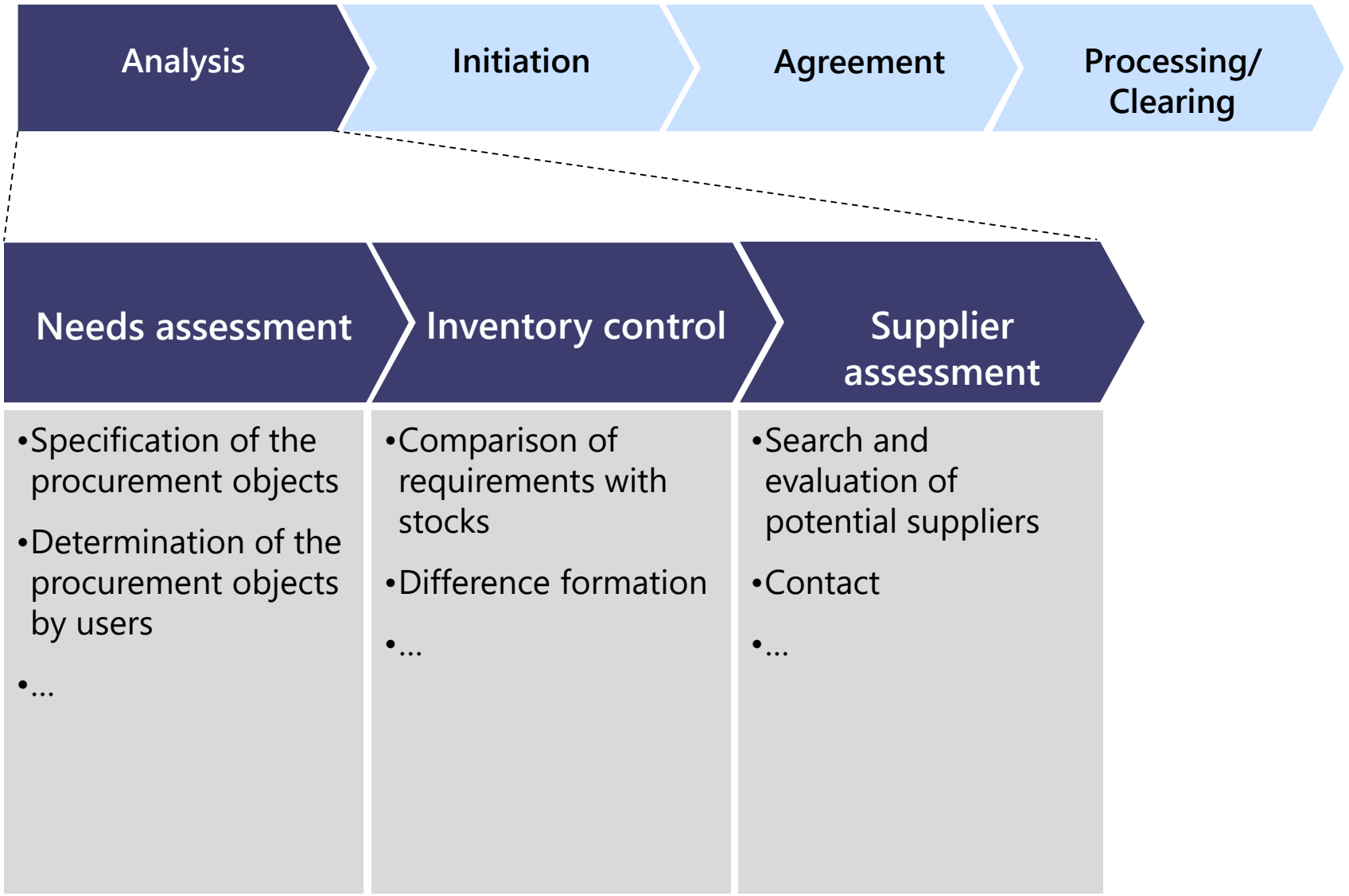
Source: Nenninger and Lawrenz (2002), and Wirtz (2021)

Fig. 15.6 Phases of digital procurement



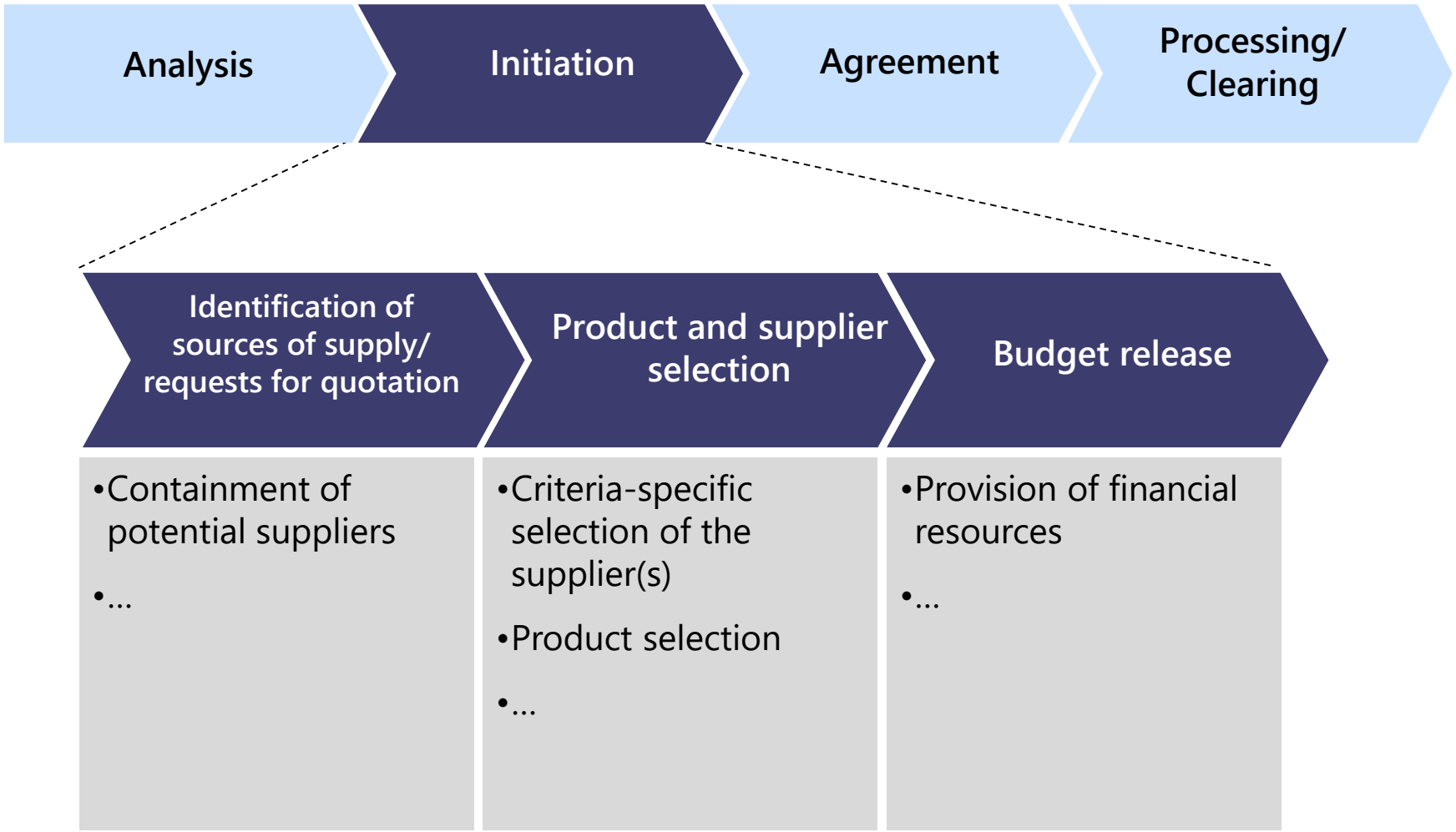
Source: Wirtz (2020b, 2021)

Fig. 15.7 Analysis phase of digital procurement



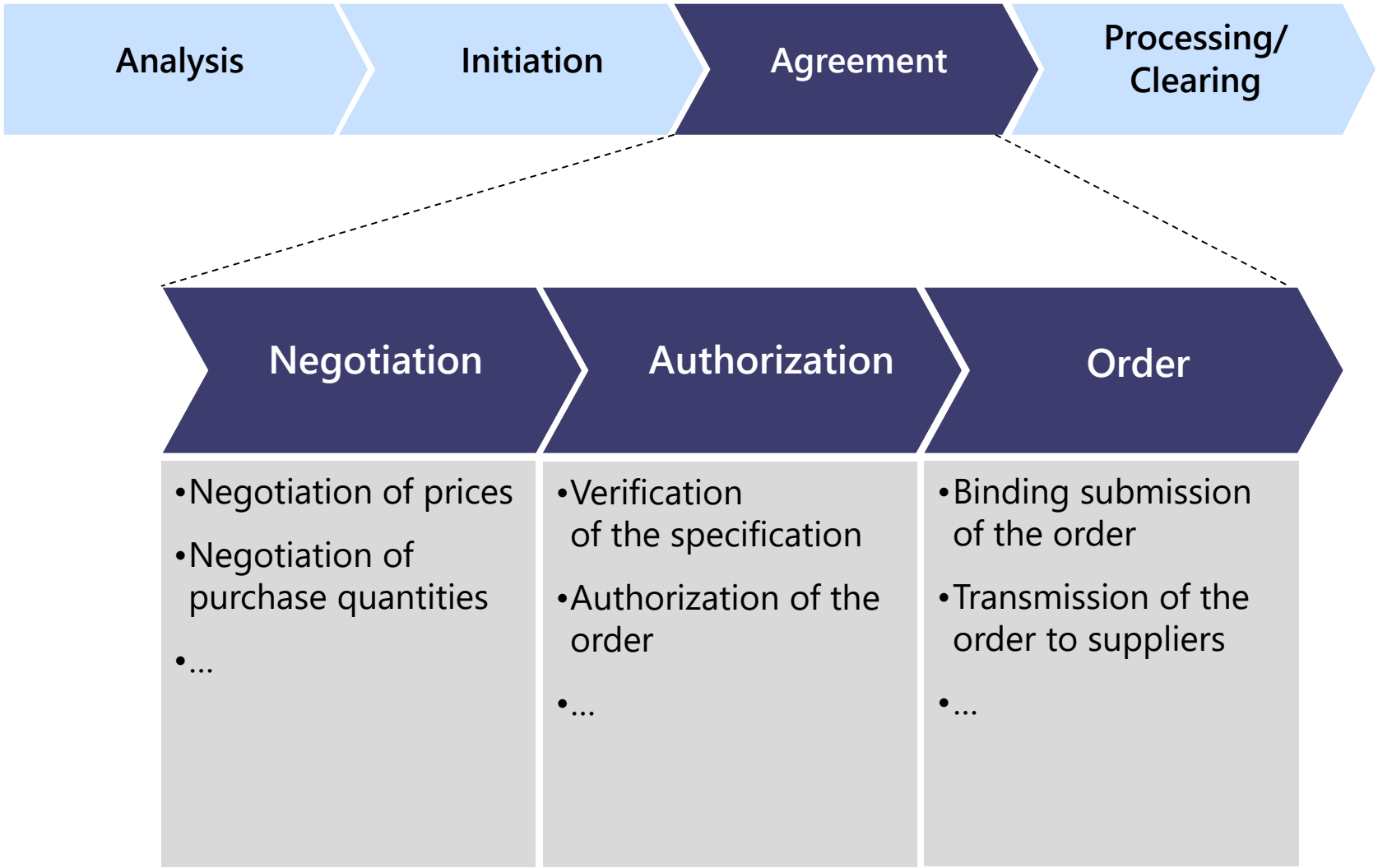
Source: Wirtz (2020b, 2021)

Fig. 15.8 Initiation phase of digital procurement



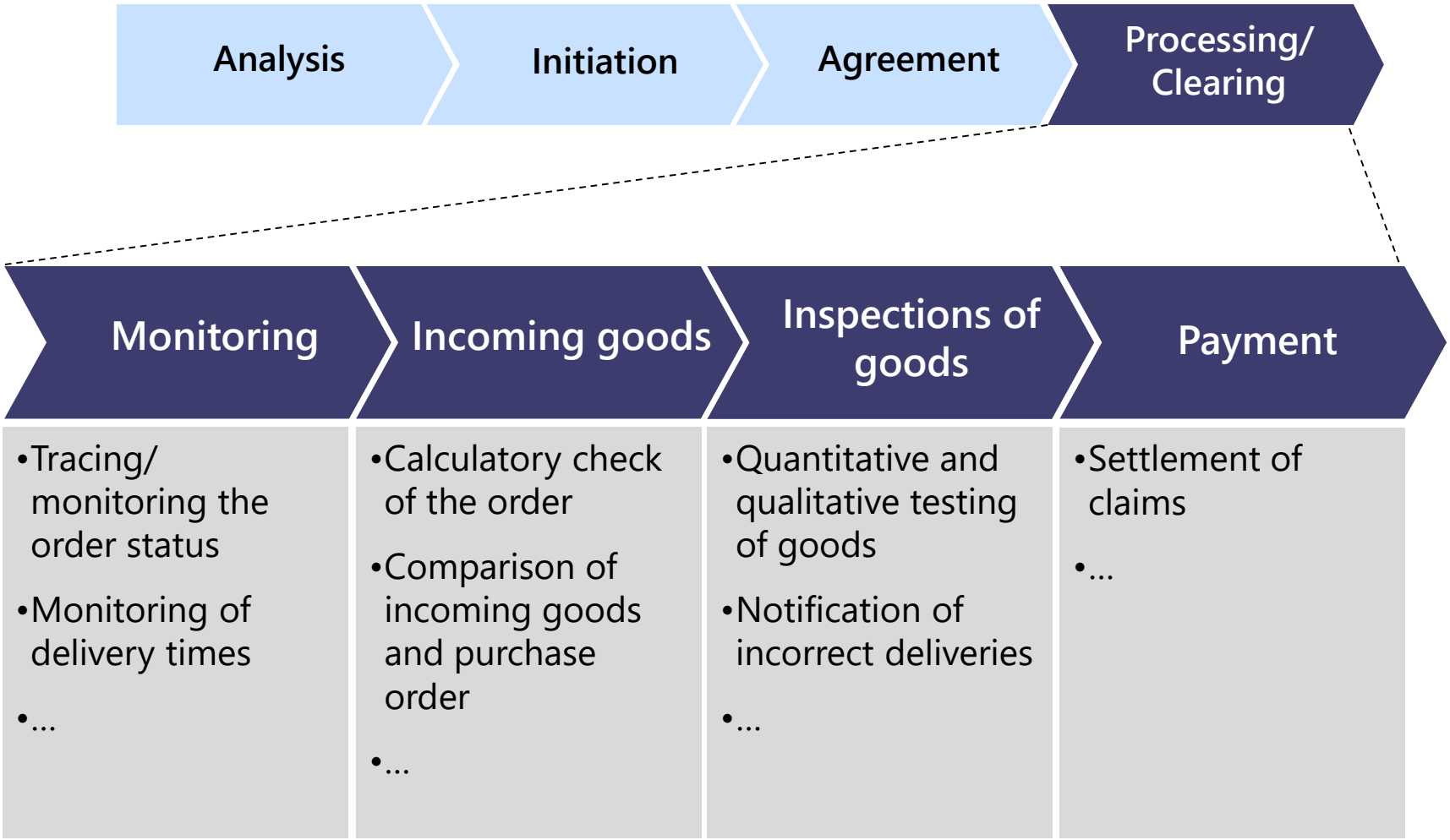
Source: Wirtz (2020b, 2021)

Fig. 15.9 Agreement phase of digital procurement



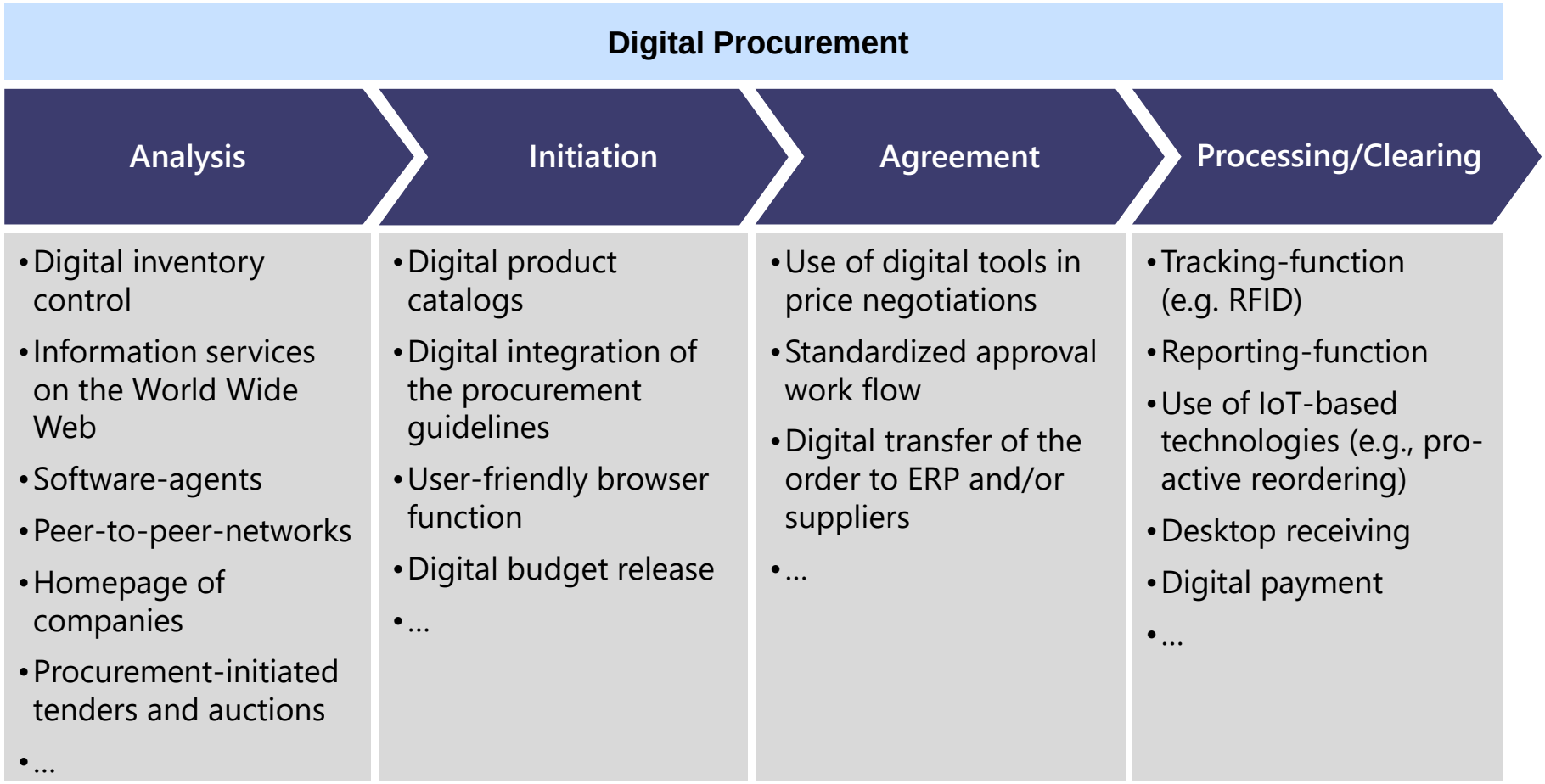
Source: Wirtz (2020b, 2021)

Fig. 15.10 Processing and clearing phase of digital procurement



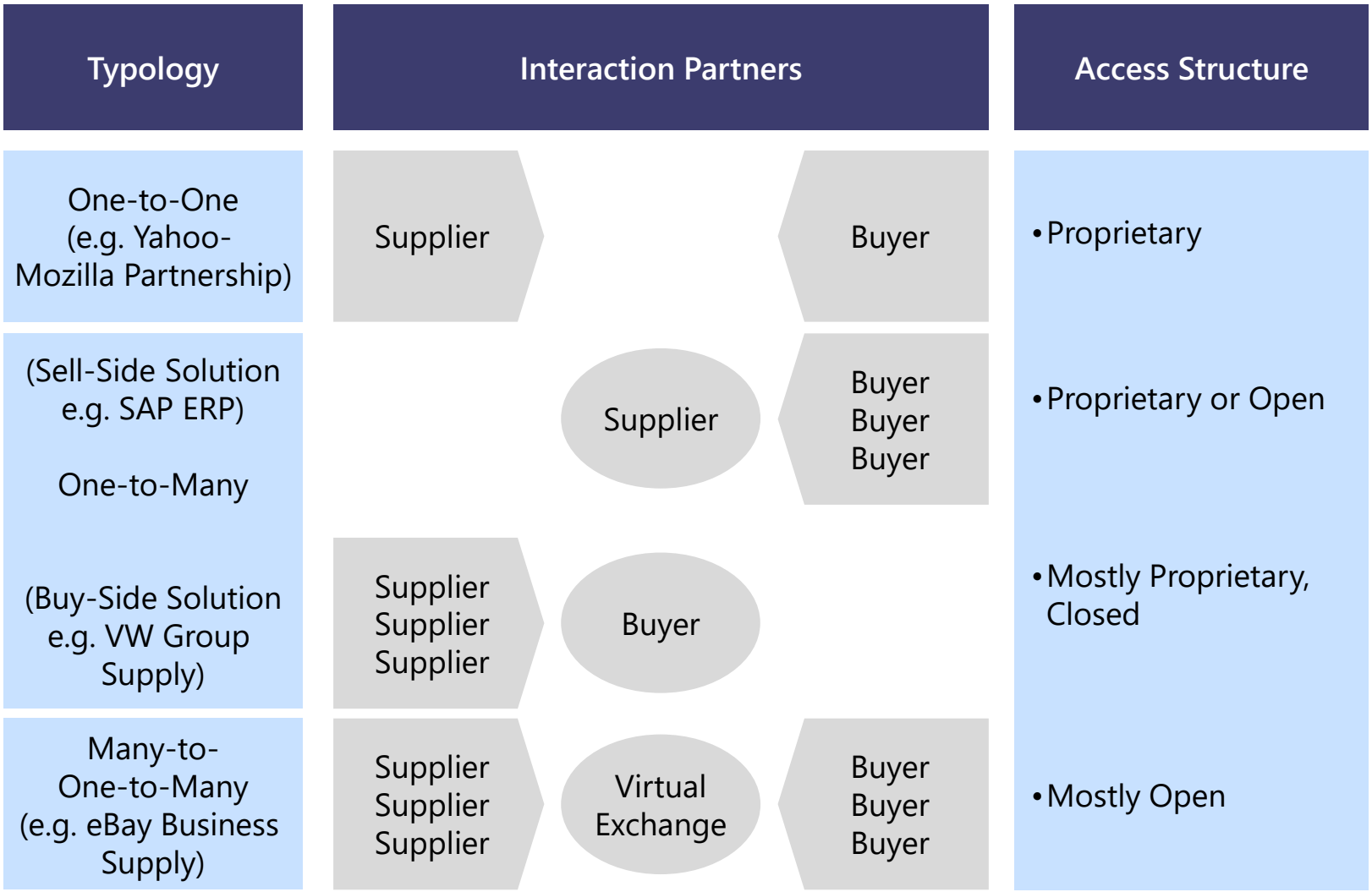
Source: Wirtz (2020b, 2021)

Fig. 15.11 Procurement applications and supportive information and communication technology



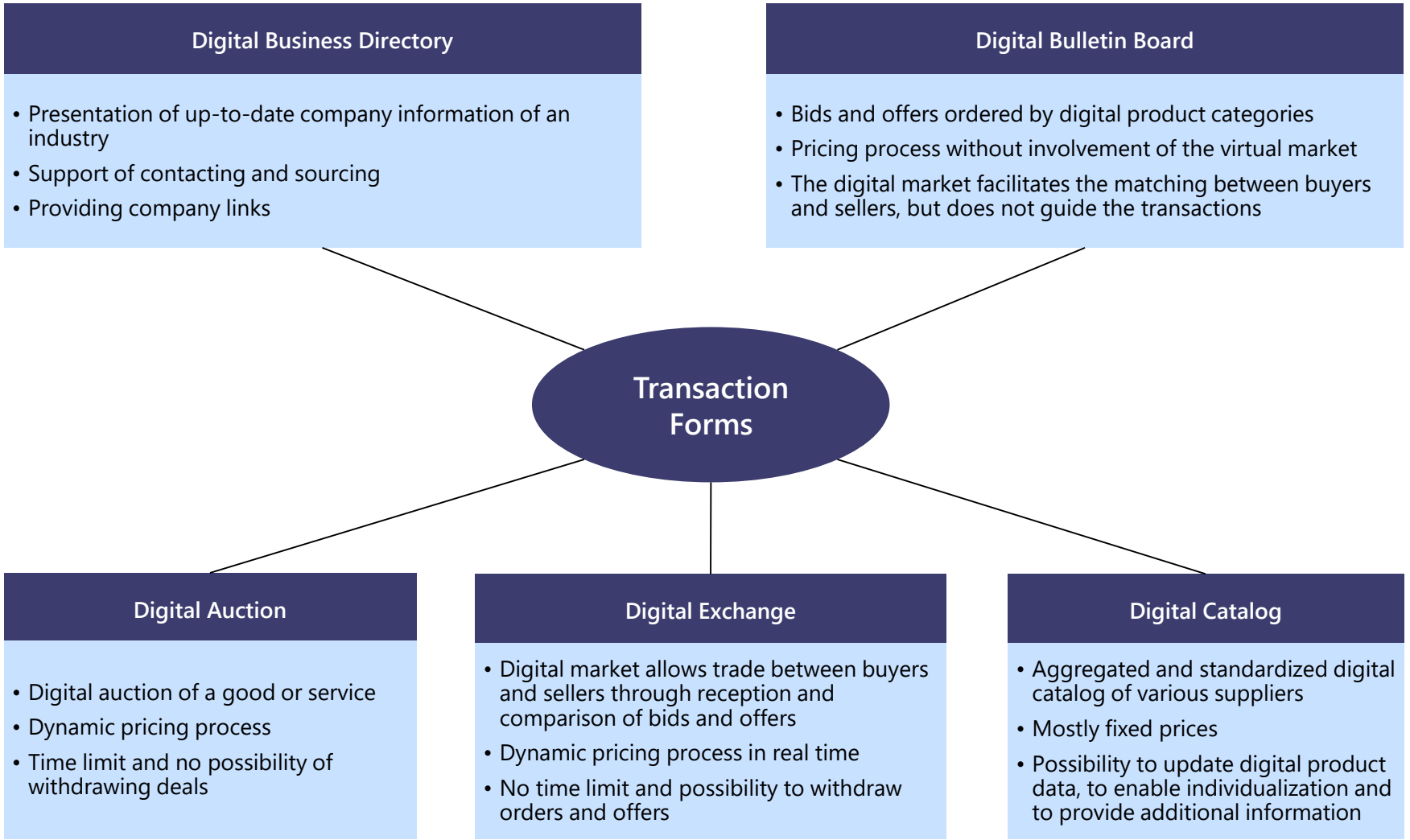
Source: Wirtz (2020b, 2021)

Fig. 15.12 Interaction typology of digital procurement



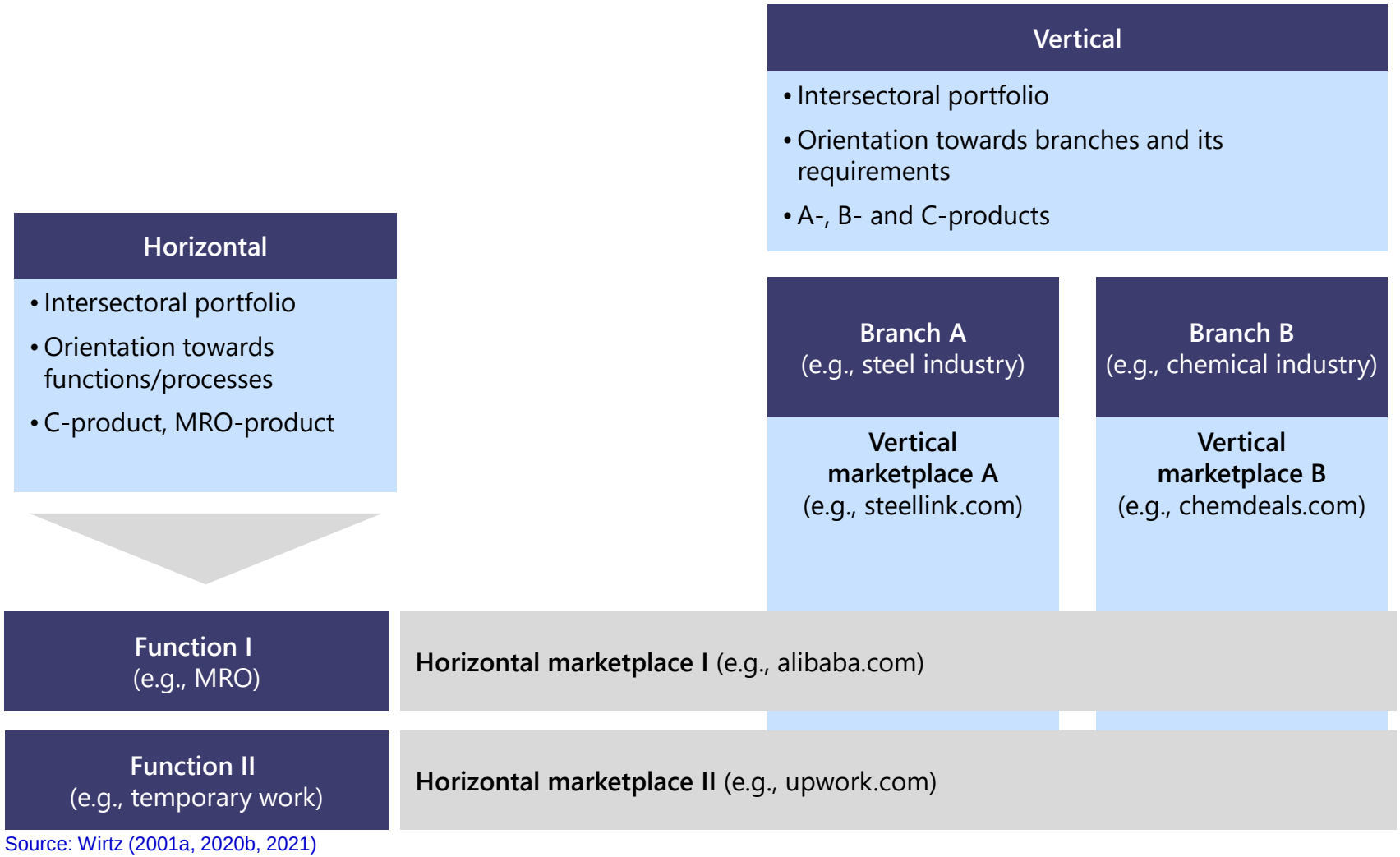
Source: Wirtz (2001a, 2020b, 2021)

Fig. 15.13 Transaction forms of digital marketplaces



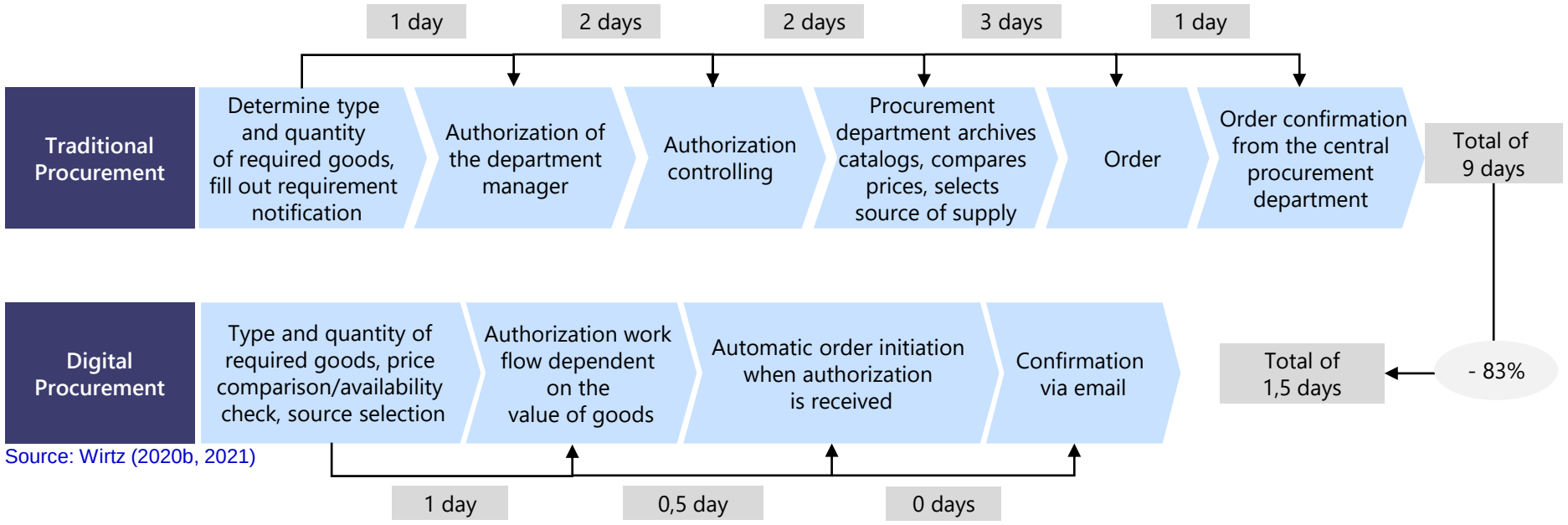
Source: Wirtz (2001a, 2020b, 2021)

Fig. 15.14 Orientation of digital marketplaces



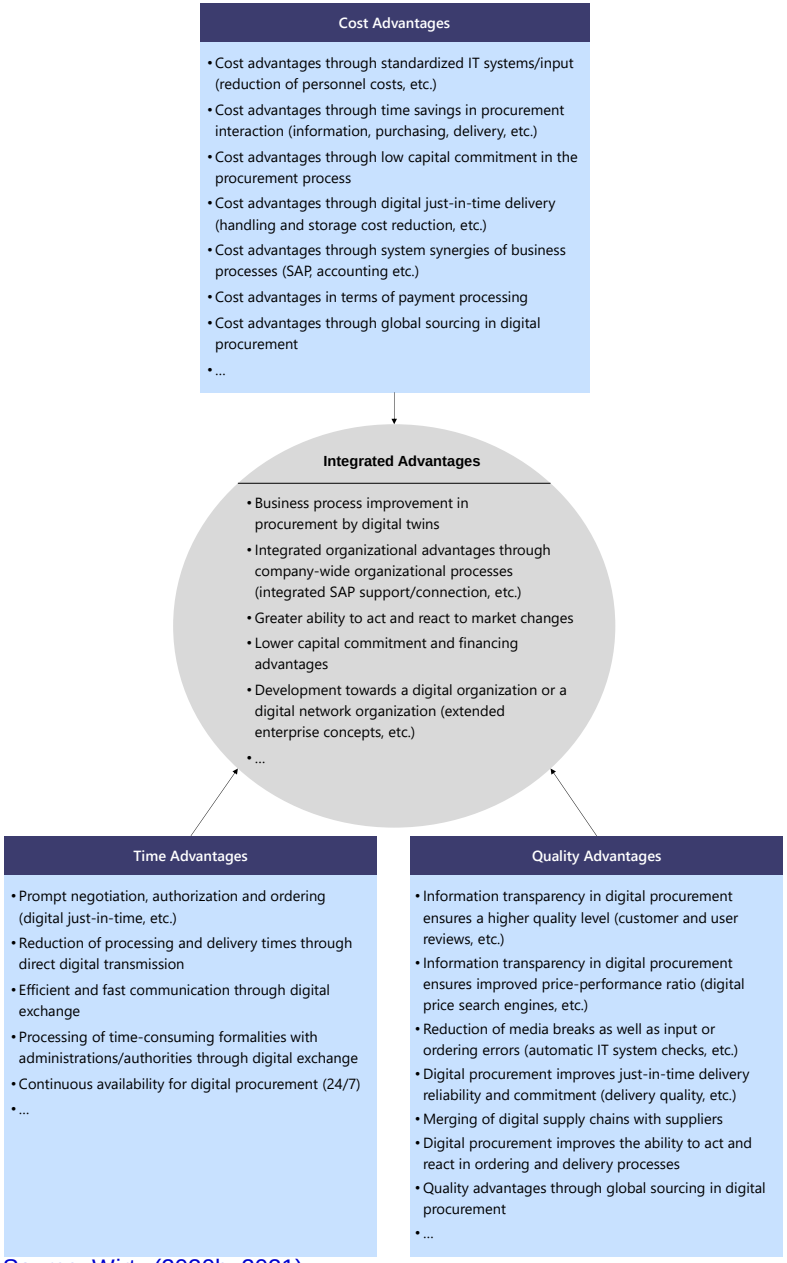
Source: Wirtz (2001a, 2020b, 2021)

Fig. 15.15 Procurement process optimization through digital procurement



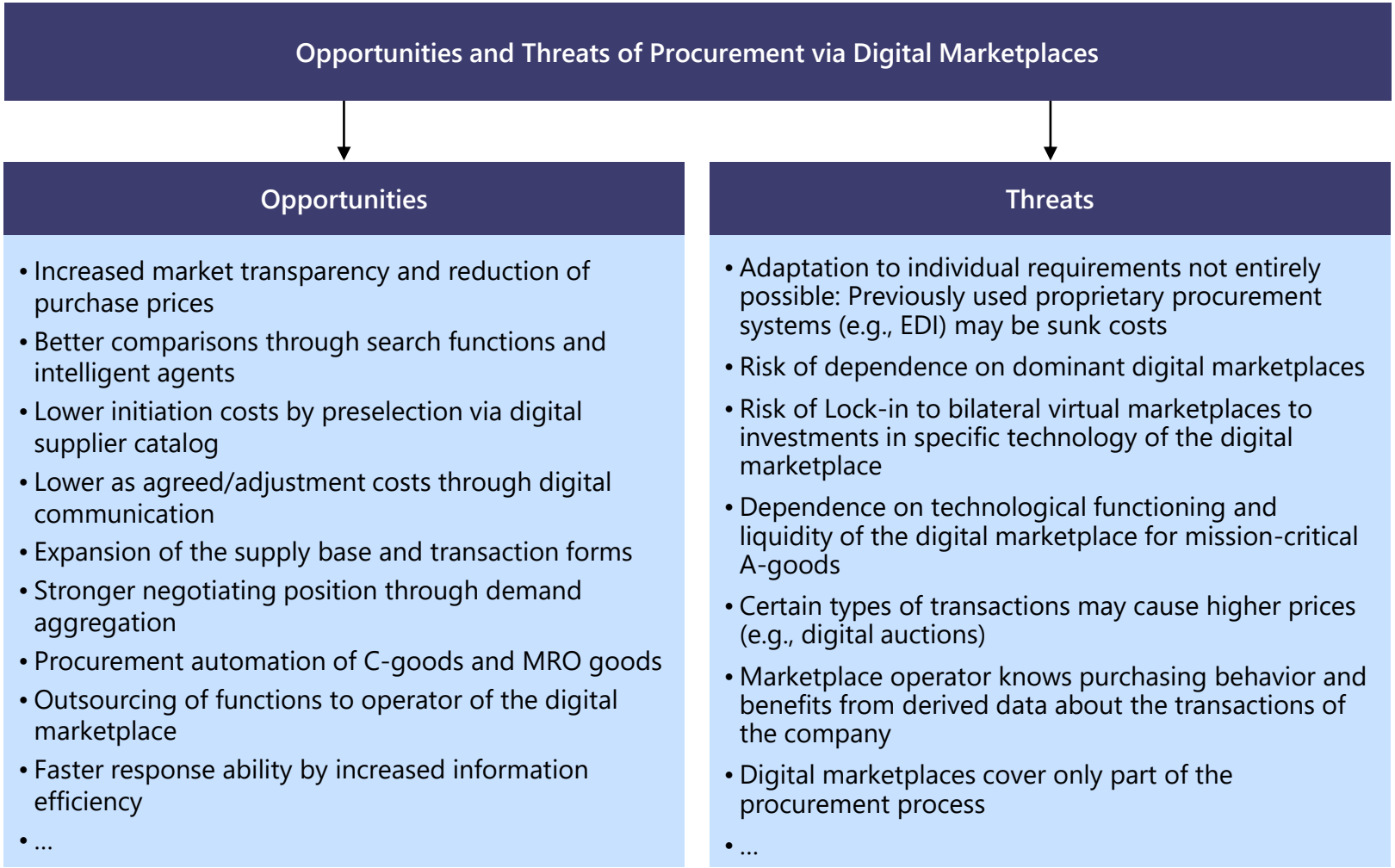
Source: Wirtz (2020b, 2021)

Fig. 15.16 Advantages of digital procurement



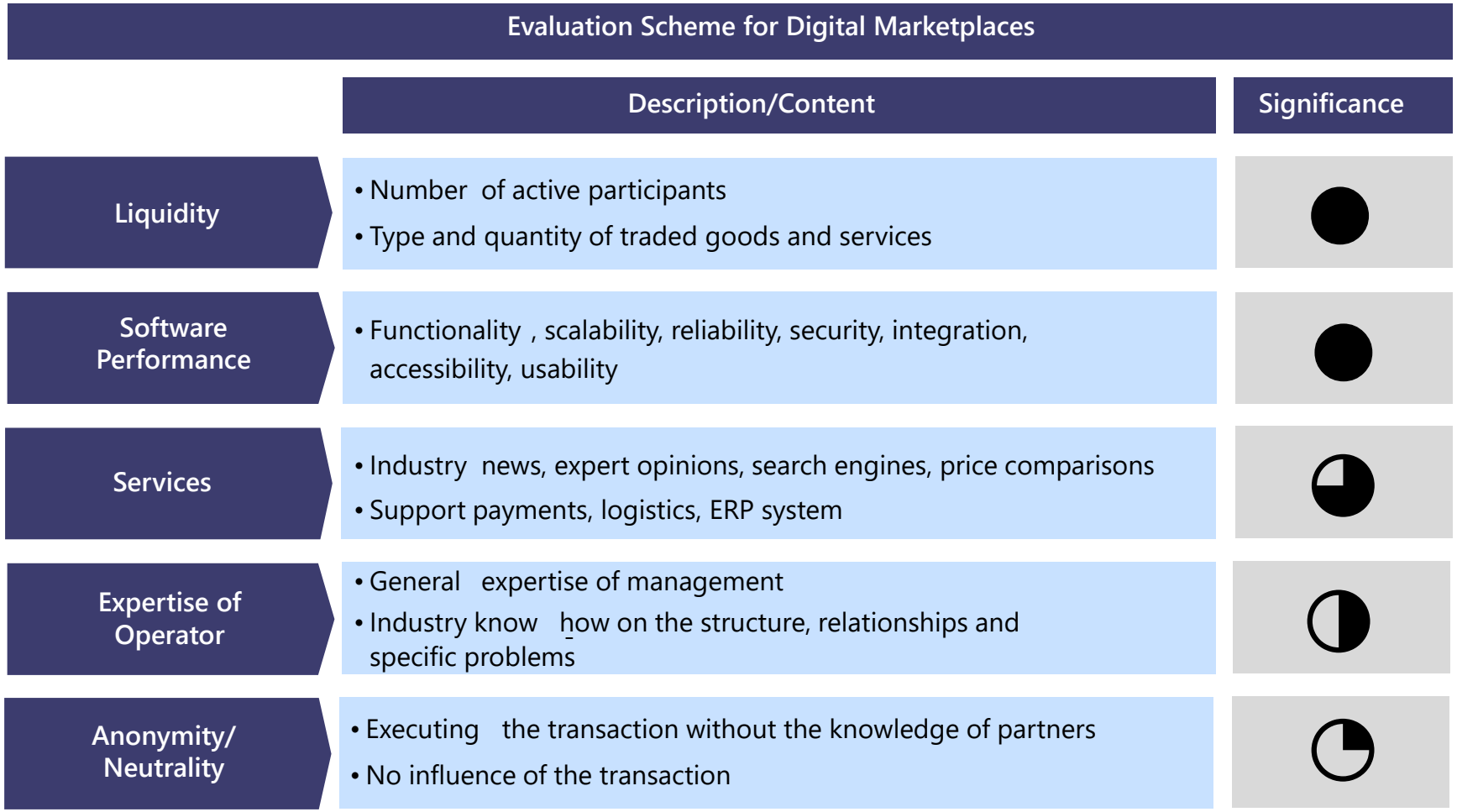
Source: Wirtz (2020b, 2021)

Fig. 15.17 Opportunities and threats of procurement via digital marketplaces



Source: Wirtz (2001a, 2020b, 2021)

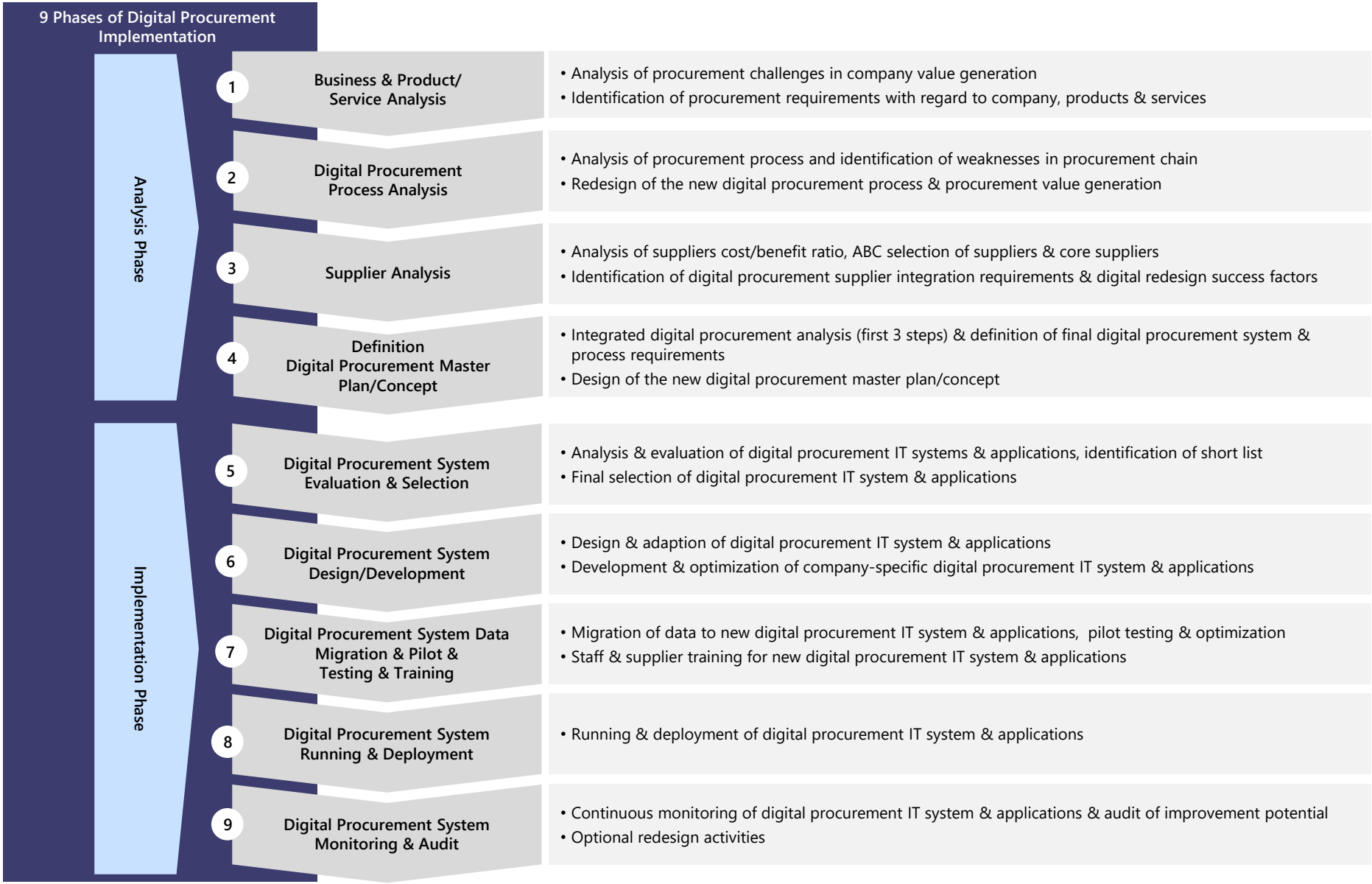
Fig. 15.18 Evaluation scheme for digital marketplaces



Legend: ○ Very low ◔ Low ◑ Medium ◕ High ● Very High

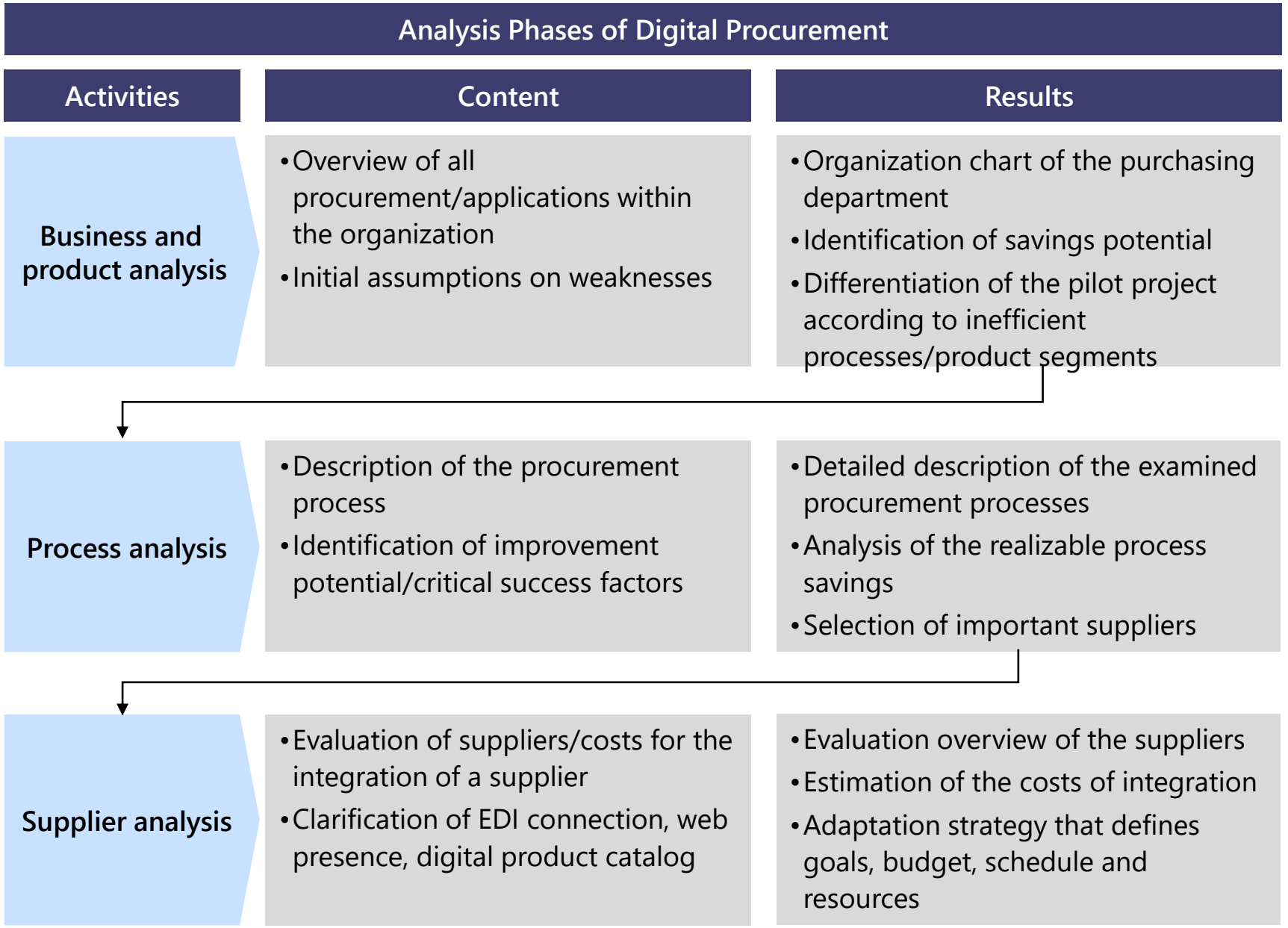
Source: Wirtz (2001a, 2020b, 2021)

Fig. 15.19 Scheme of digital procurement implementation



Source: Wirtz (2018b, 2020b, 2021)

Fig. 15.20 Analysis phases of digital procurement



Source: Wirtz (2001a, 2020b, 2021)

Fig. 15.21 Digital support systems for the procurement process

Needs Assessment/ Order Authorization	Order Placement/ Order Execution	Goods Delivery/ Receipt of Incoming Goods	Order Payment
Tasks			
• Determination of needs • Comparison of purchase possibilities • Identification of ordering options • ...	• Placing of orders • Execution of orders • ...	• Delivery of goods • Receipt of goods • Goods receipt inspection • Forwarding of incoming goods • ...	• Execution of the financial transaction • Optimization of the payment management • ...
Potential Applications of Information Systems			
• Integrated digital procurement or ERP system • Stock management catalog • Web catalog • Email/workflow system • ...	• Integrated digital procurement or ERP system • Email/workflow system • Order entry on the website • Digital reservation system • ...	• Integrated digital procurement or ERP system • Email/workflow system • Digital reservation system • Digital provision of the product (e.g. software) • ...	• Integrated digital procurement or ERP system • Digital accounting system • ...

Source: Wirtz (2020b, 2021)

Chapter 15. Questions and topics for discussion

Chapter 15
Questions and topics for discussion

Review questions

1. Describe the characteristics of supply chain management and digital procurement and identify commonalities.
2. Outline the suitability of digital procurement by taking into account the strategic importance and the automation potential of various goods.
3. What are the transaction mechanisms of digital marketplaces?
4. Analyze the potential benefits of digital procurement. Then briefly identify potential risks and challenges.
5. Describe the individual phases of the digital procurement implementation process.

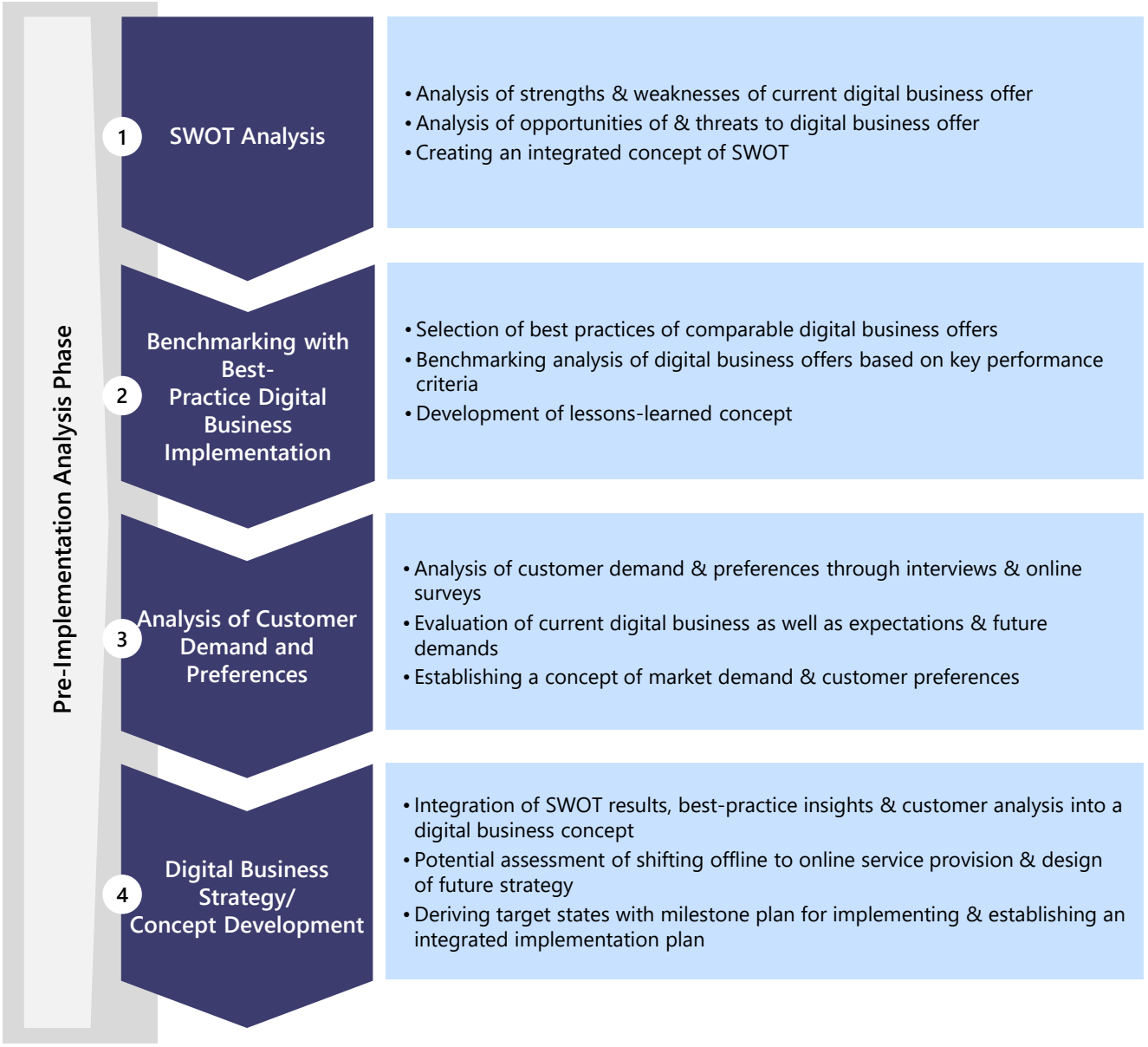
Topics for classroom discussion and team debates

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.

Source: Wirtz (2020b, 2021)

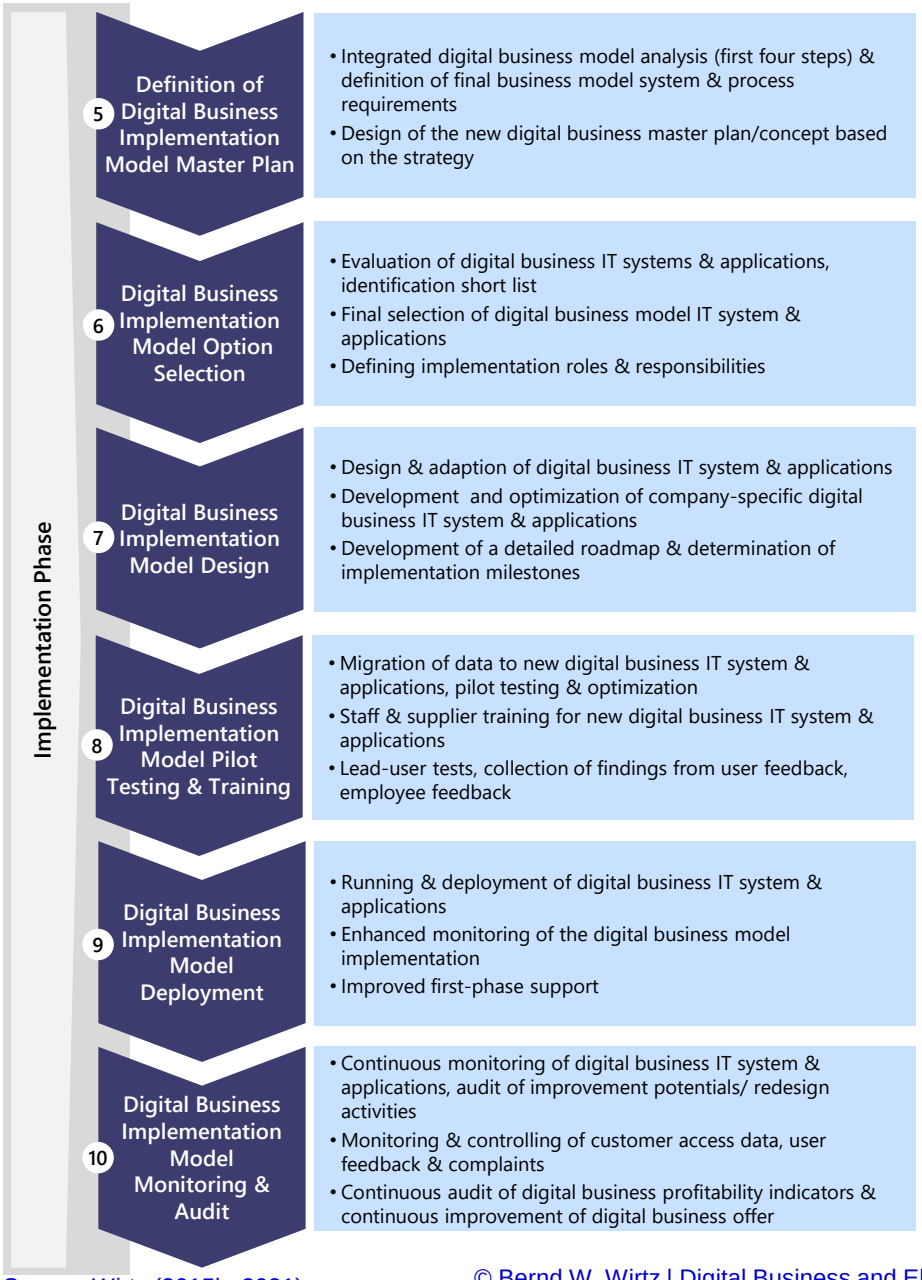
Chapter 16: Digital Business Implementation

Fig. 16.1 Pre-implementation analysis phase



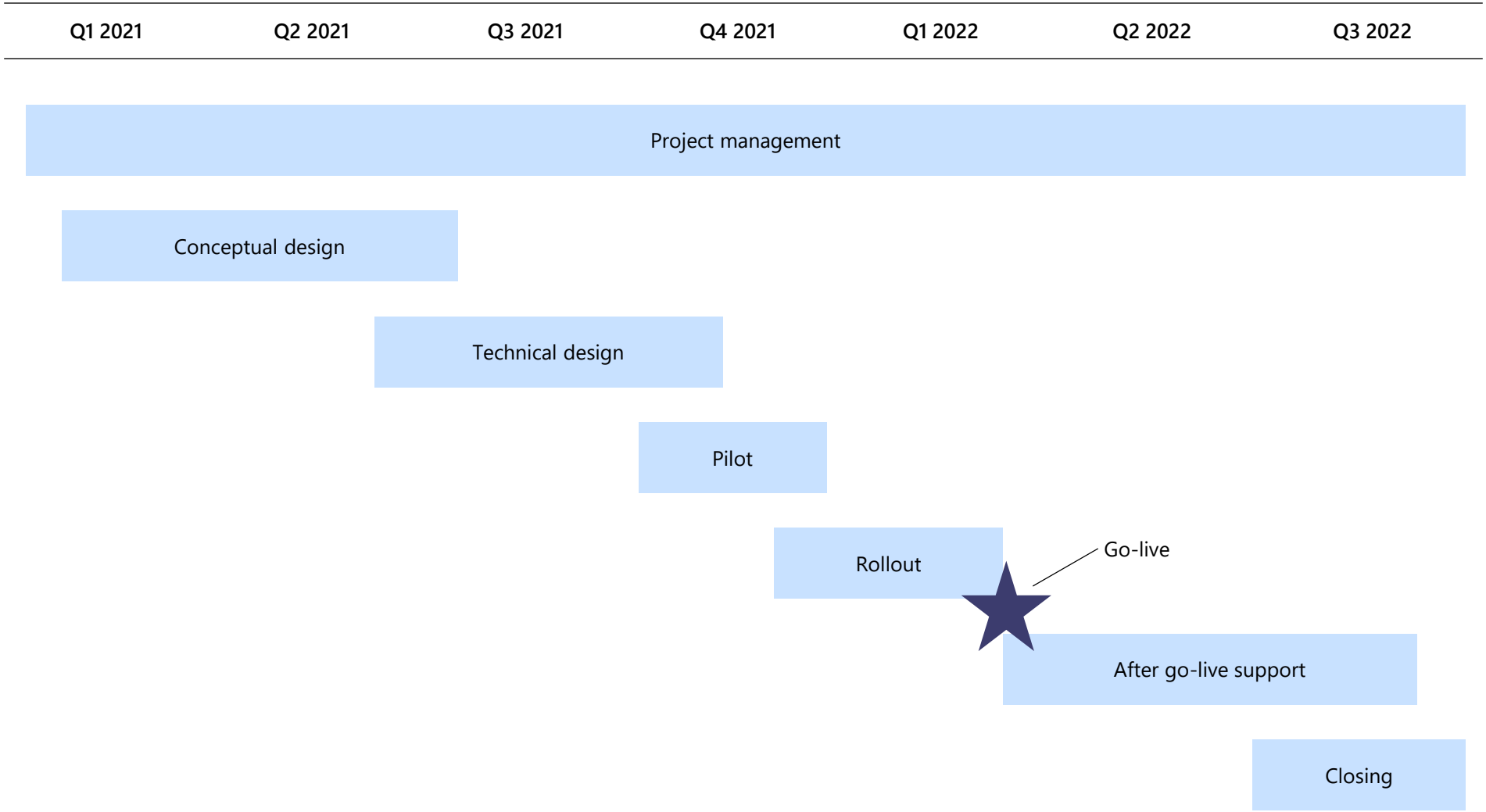
Source: Wirtz (2015b, 2021)

Fig. 16.2 Implementation phase



Source: Wirtz (2015b, 2021)

Fig. 16.3 Exemplary digital business implementation plan

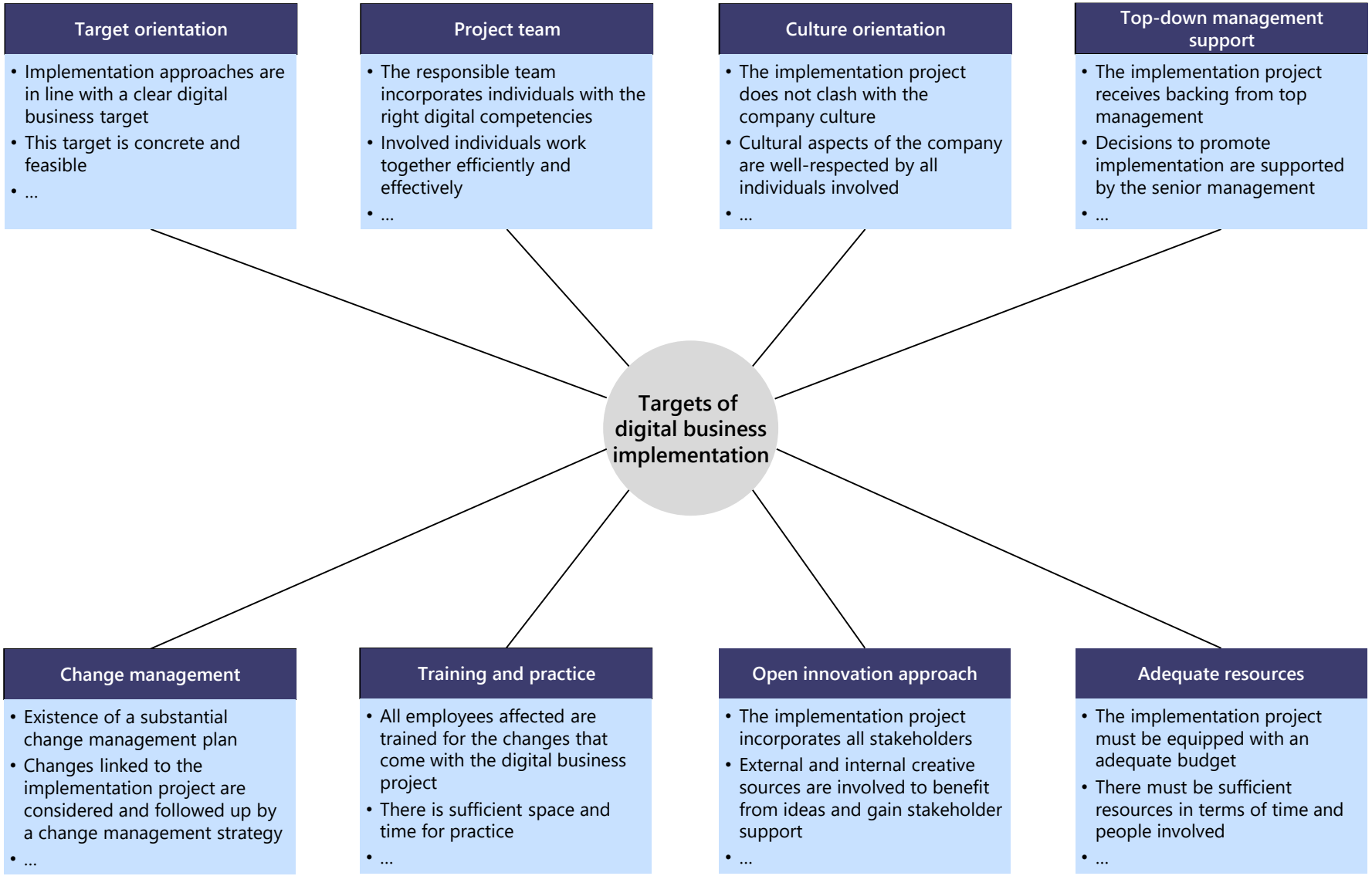


Source: Wirtz (2013a, 2020b, 2021)

Fig. 16.4 10-steps of the digital business implementation roadmap

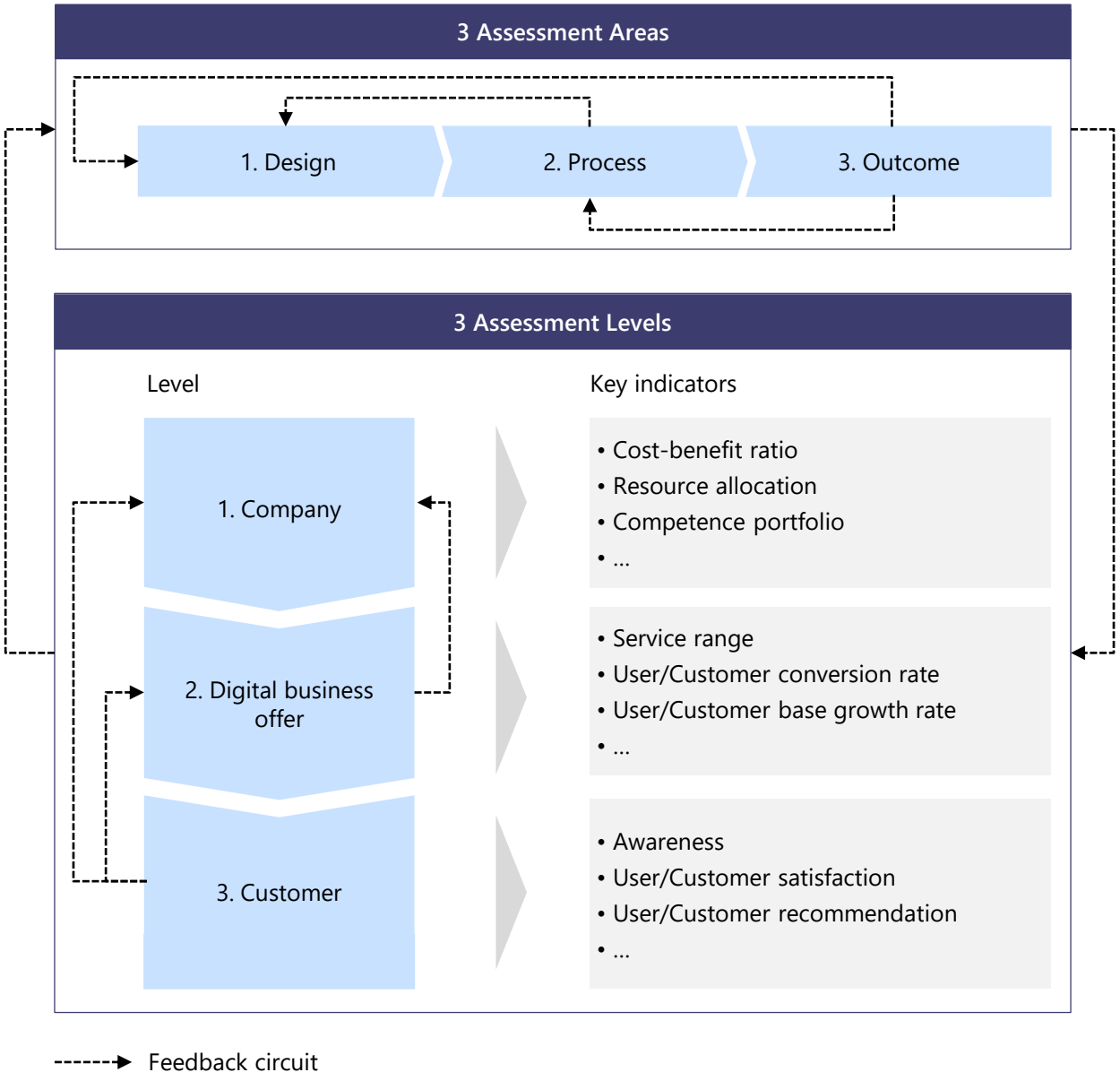
Source: Wirtz (2015b, 2018b, 2021)

Fig. 16.5 Targets of digital business implementation



Source: Wirtz (2021)

Fig. 16.6 Digital business 3+3 audit and evaluation system



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

Chapter 16. Topics and Questions for discussion

Chapter 16
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 the associated feedback loops.
5. Explain the three levels of assessment and identify relevant key indicators.

Topics for classroom discussion and team debates

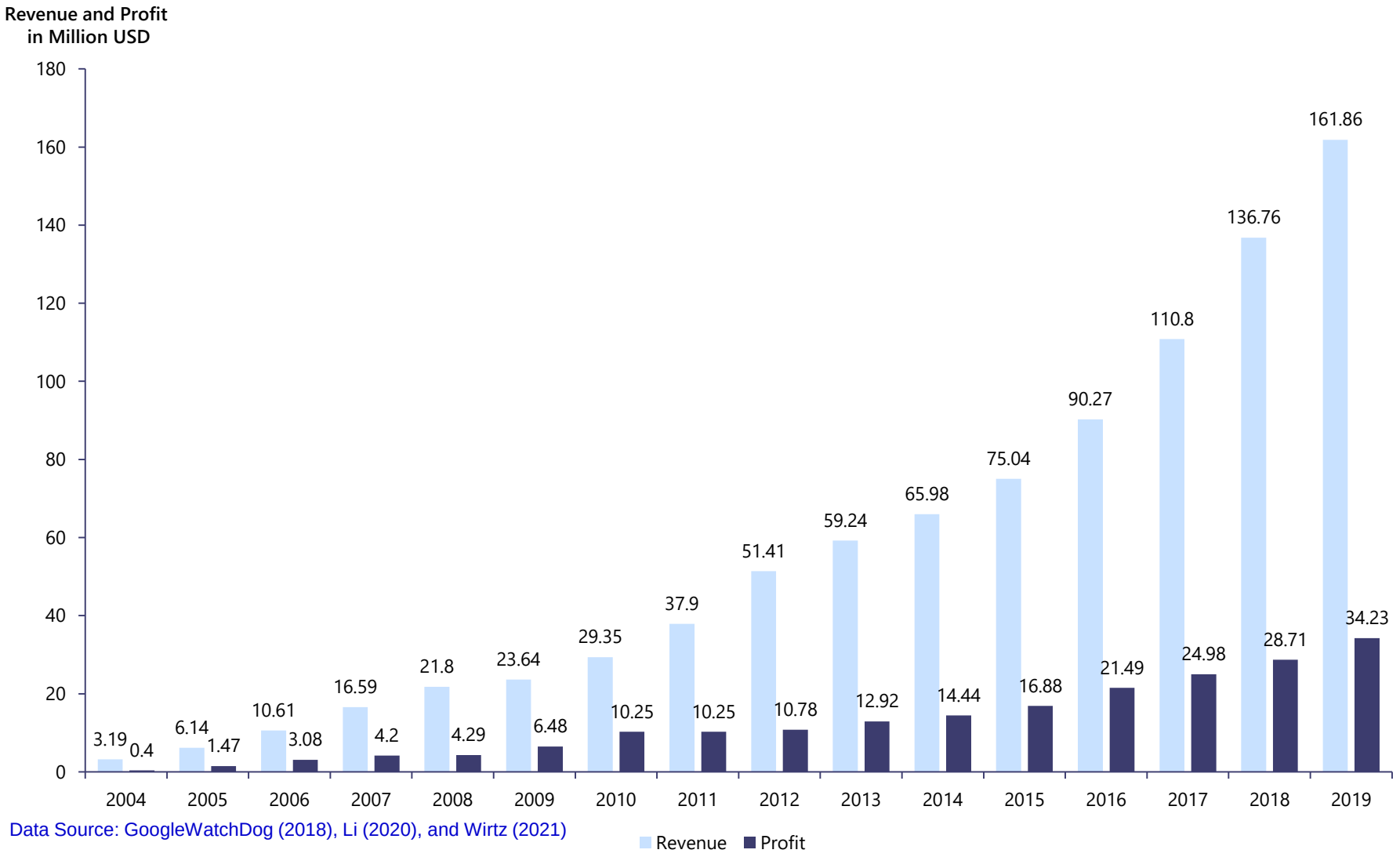
1. Discuss whether an implementation phase always requires a pre-implementation analysis phase. What are the advantages and disadvantages of a pre-implementation analysis phase for successful implementation?
2. Discuss whether the five phases of implementation must necessarily be carried out in the described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

Source: Wirtz (2021)

Part IV – Digital Case Studies

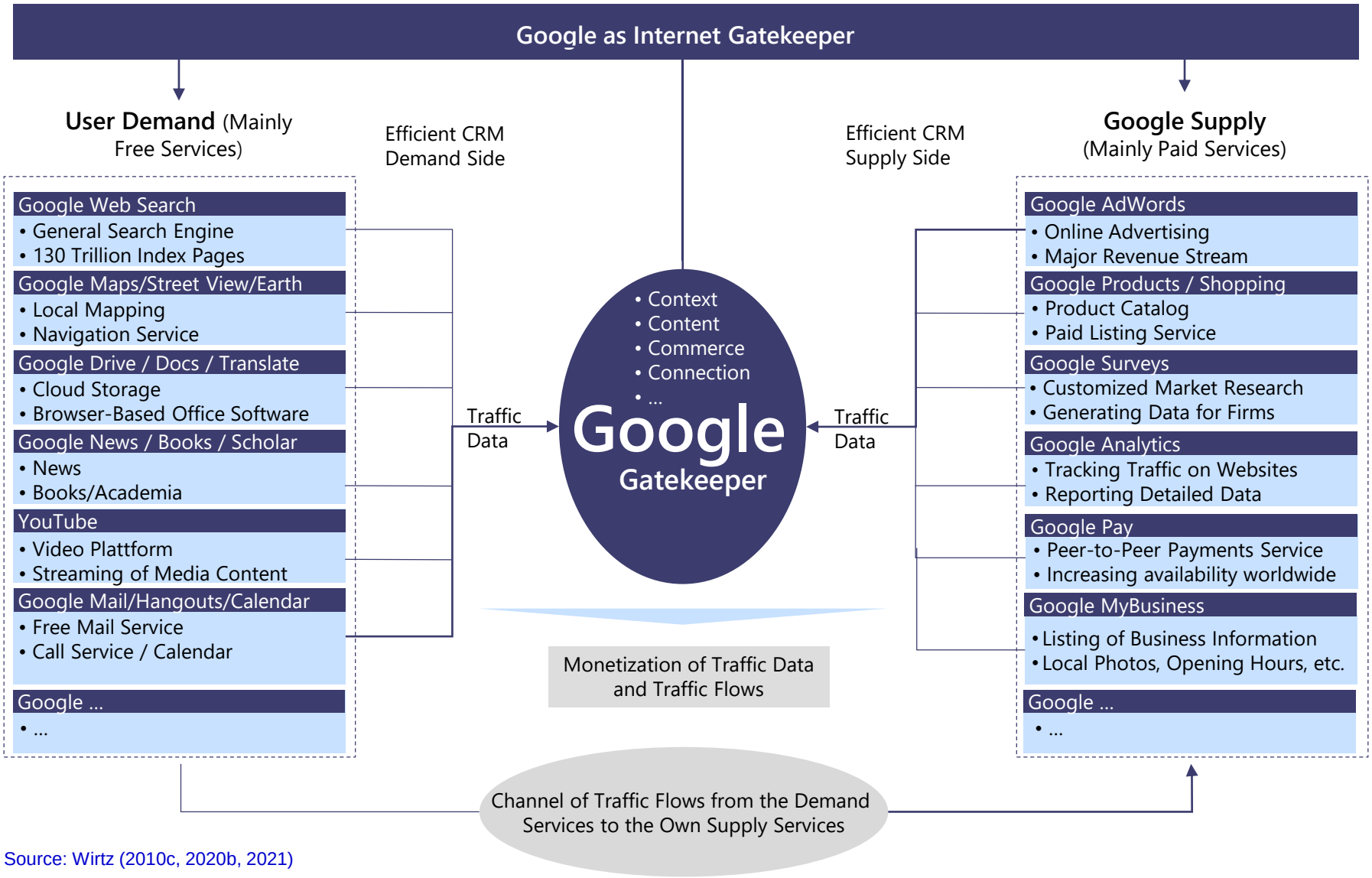
Chapter 17: Google/Alphabet Case Study

Fig. 17.1 Development of Google/Alphabet's revenue from 2004 to 2019



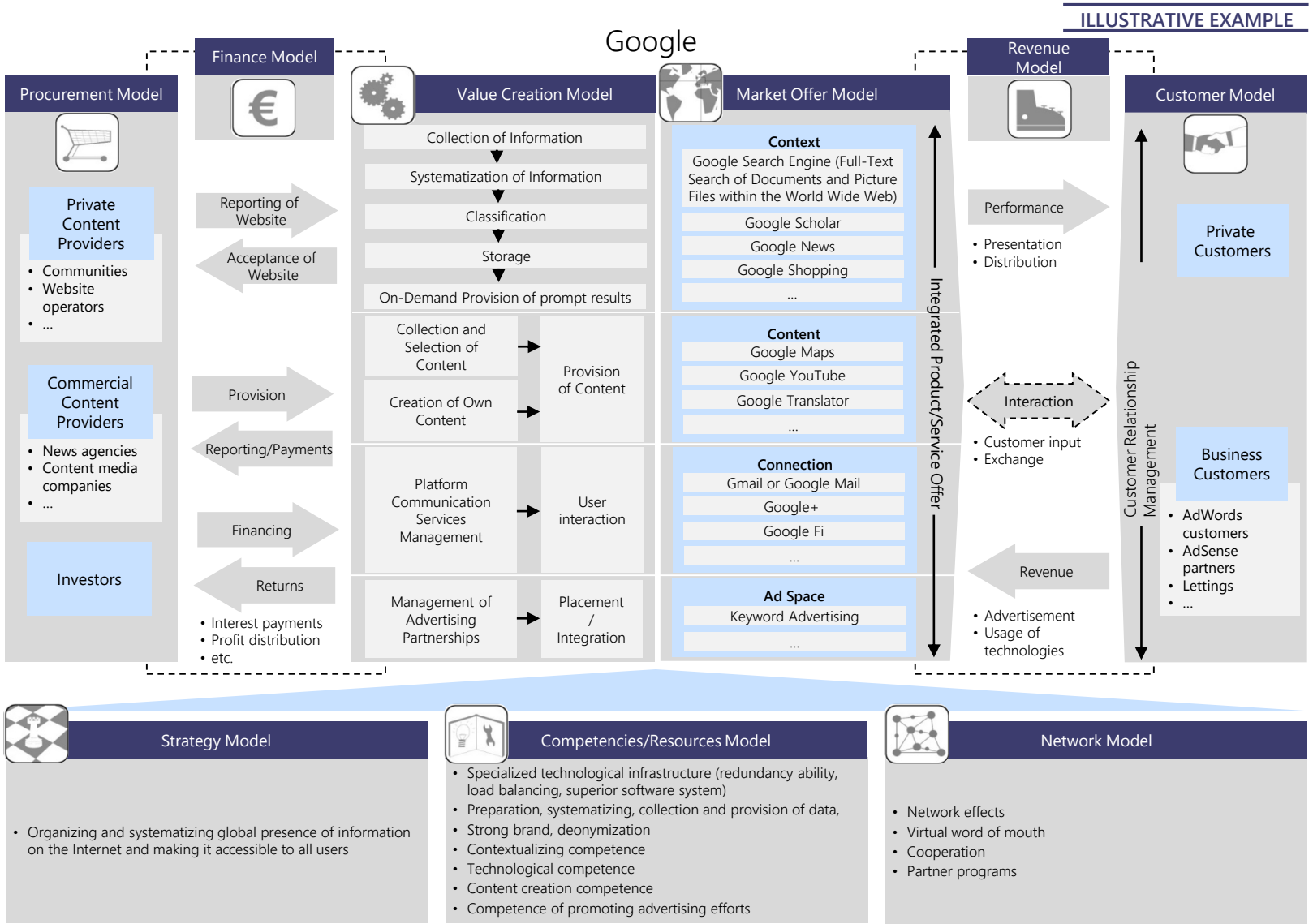
Data Source: GoogleWatchDog (2018), Li (2020), and Wirtz (2021)

Fig. 17.2 Google as Internet gatekeeper of information



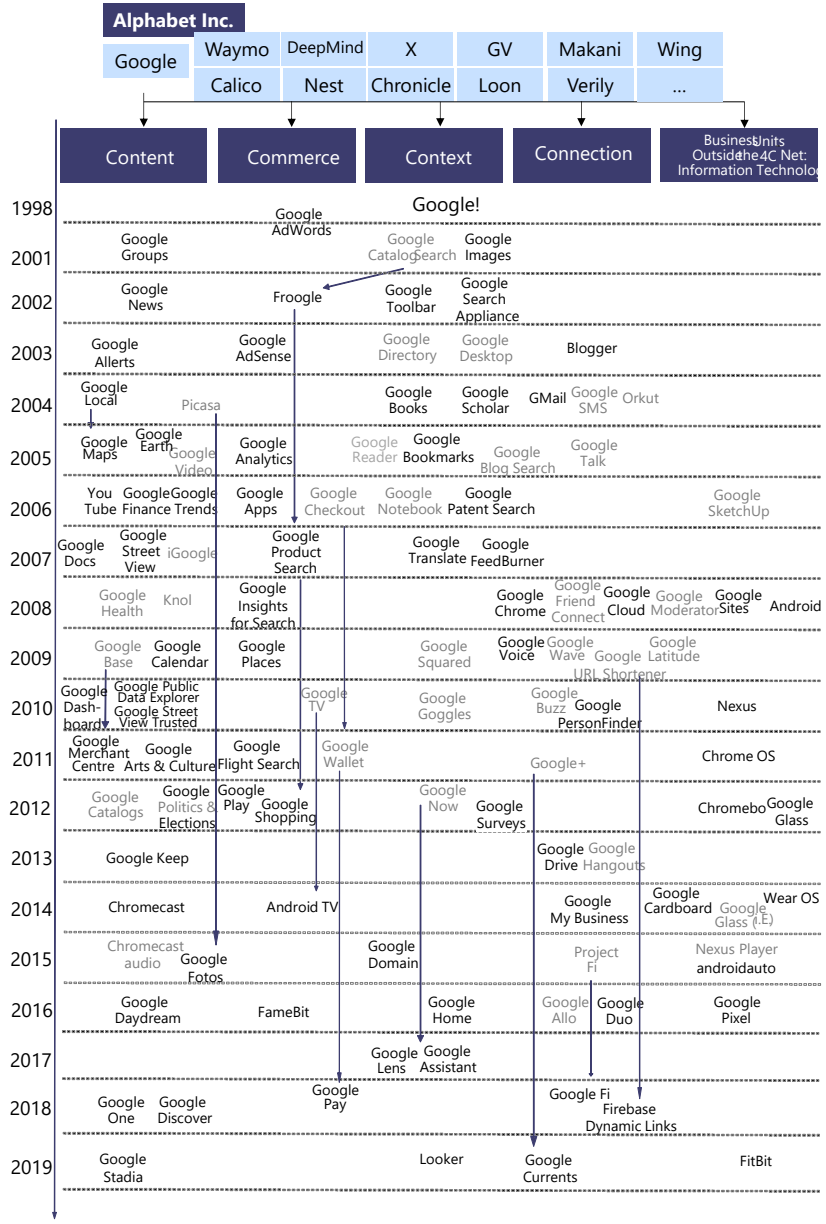
Source: Wirtz (2010c, 2020b, 2021)

Fig. 17.3 Google's business model



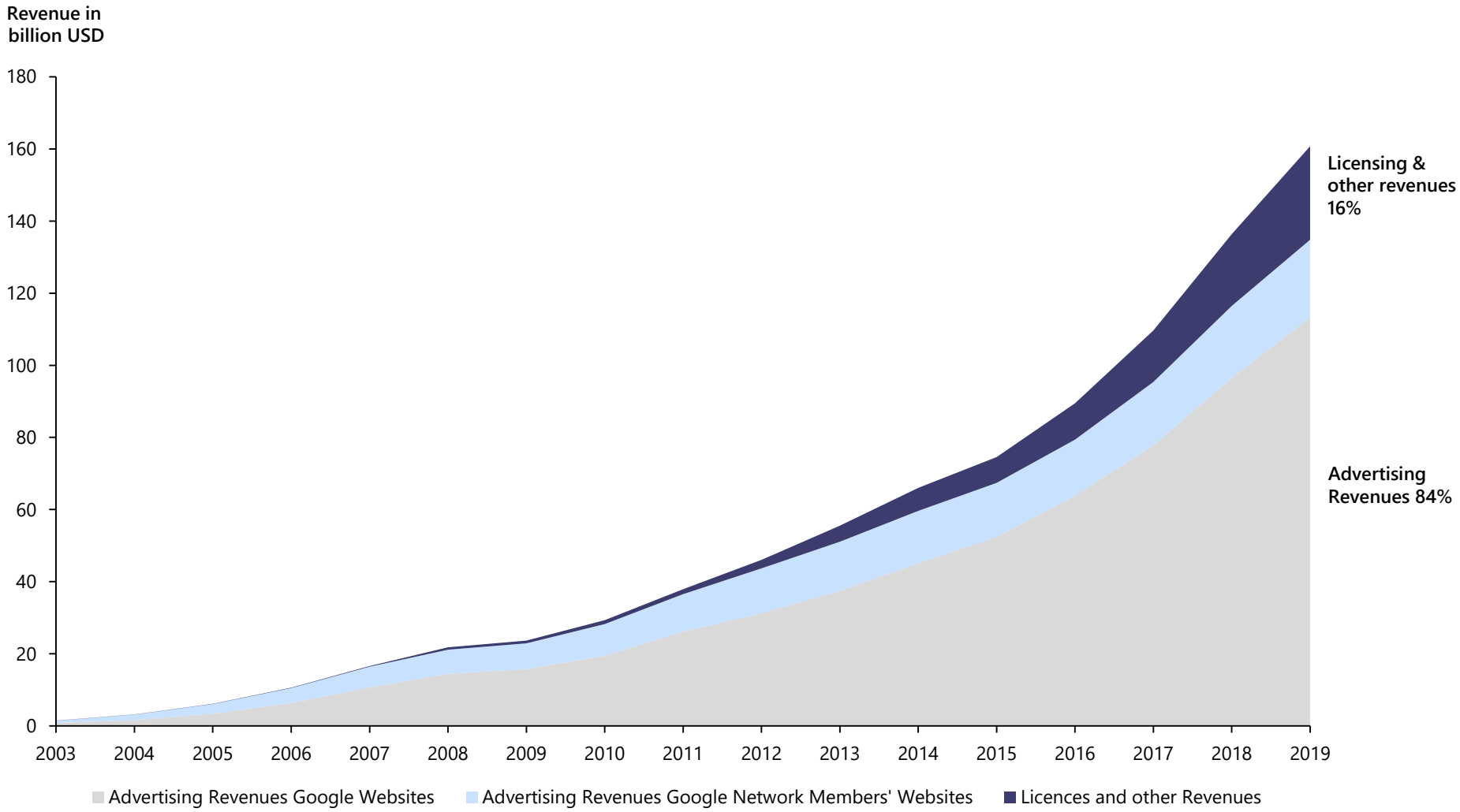
Source: Wirtz (2010c, 2020b, 2021)

Fig. 17.4 Development of Goolgle's hybrid business model



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

Fig. 17.5 Development of Google/ Alphabet's revenue



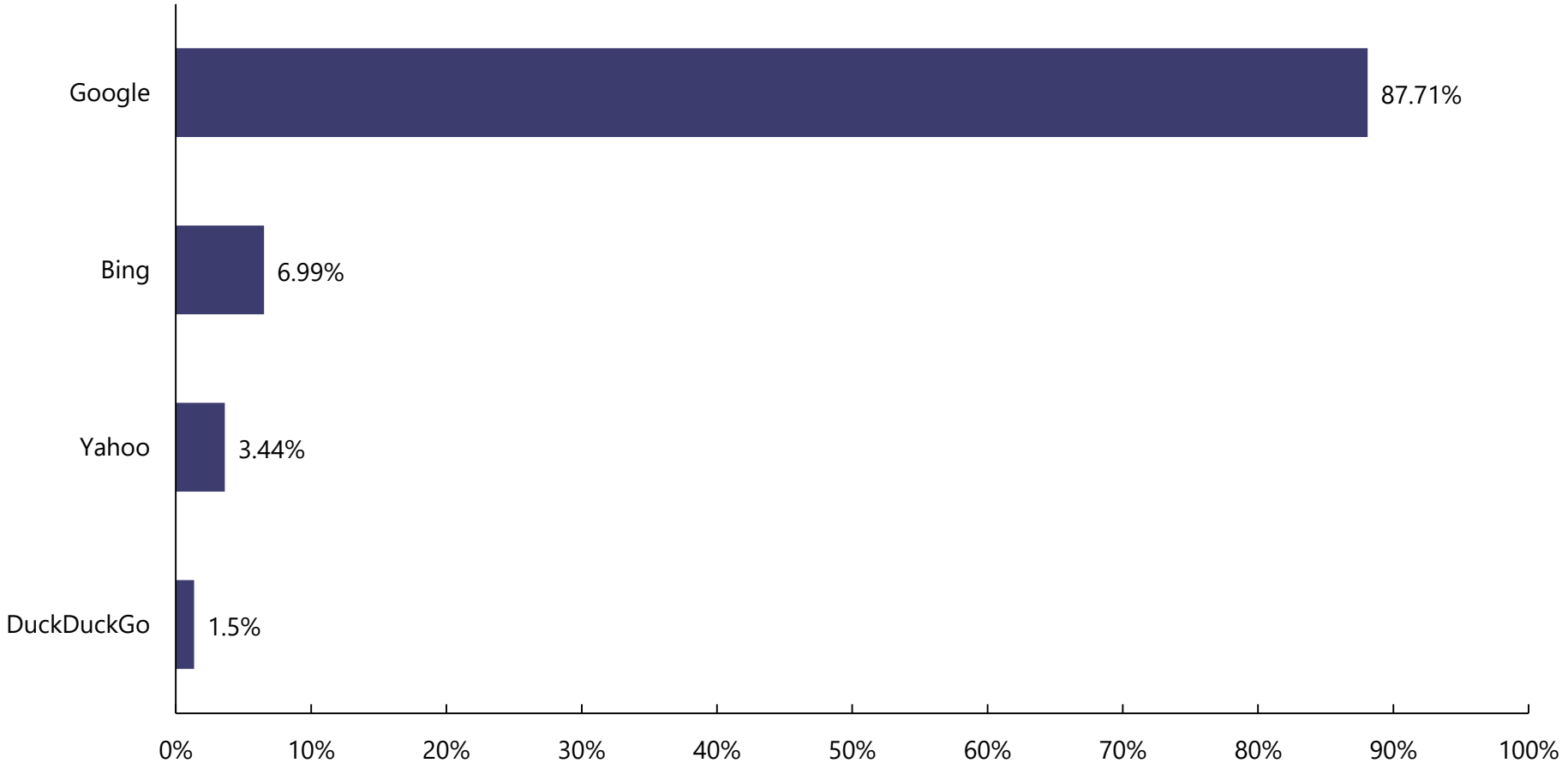
Data Source: Alphabet Inc. (2017, 2020), Wirtz (2021)

Fig. 17.6 Google's revenue structure

	Direct Revenue Generation	Indirect Revenue Generation
Transaction-Based	• Hardware sales • Transaction charges on the Android apps' market: PlayStore	• Cost per click – Keyword advertising • Cost per view – YouTube video ads
Transaction-Independent	• Royalties, for example, fees for using extended program packages • AdWords activation fee	• YouTube custom brand channel

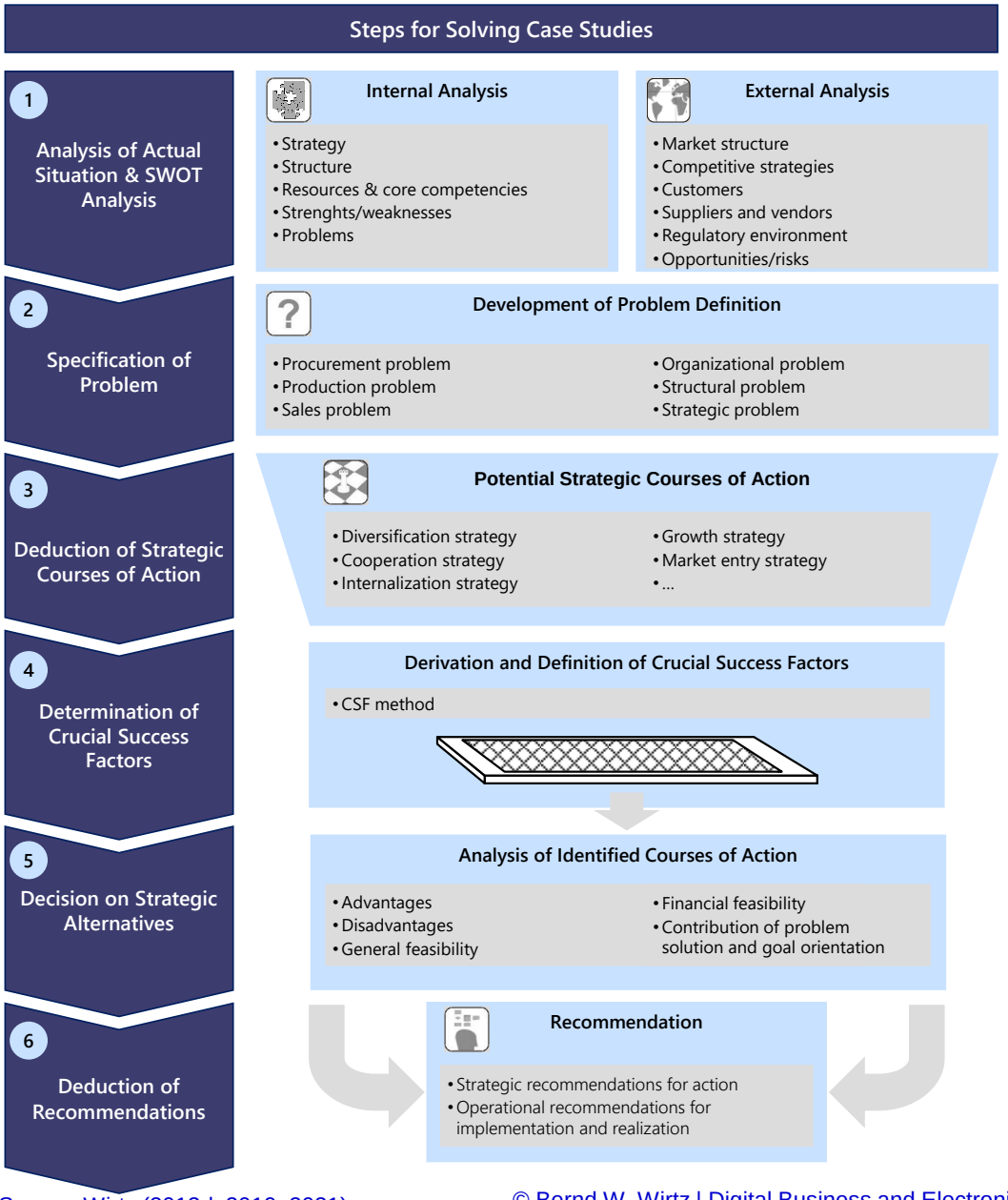
Source: Wirtz (2000c, 2019, 2021)

Fig. 17.7 Market share of search engines in the US in July 2020



Data Source: StatCounter (2020c), and Wirtz (2021)

Fig. 17.8 Solution method of case studies



Source: Wirtz (2013d, 2019, 2021)

Fig. 17.9 Key aspects, tasks and hints for solution in the Google case study

Steps	Key Aspects	Tasks	Hints for Solution
Current situation	•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)	•TASK: SWOT analysis focusing on the present revenue situation	•Focus on market offer model and revenue model •Consideration of current market situation
Specification of problem statement	•The low diversification of revenue streams is a central problem	•TASK: Which alternative revenue streams can be further exploited?	
Deduction of strategic alternatives for action	•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	•TASK: Identification of strategic alternatives of action	•Analysis of different revenue forms and sources •Awareness of most important competitors
Illustration of critical success actors	•Google has numerous core competencies that are suitable for revenue differentiation •Google's core business must not be influenced	•TASK: Identification of essential success factors	•Inclusion of strategy model and resource model
Decision about strategic alternatives	•Google remains unchallenged in its core business but has to diversify its revenue streams in order to diminish potential risks	•TASK: Development and explanation of diverse diversification strategies	•Analysis of market and competitive situation •Market-based differentiation
Deduction of recommen-dations for action	•Google is already active on distinct future markets •Revenue generation needs to be optimized	•TASK: Recommendations for action and their justification	

Source: Wirtz (2019, 2021)

Fig. 17.10 Analysis of Google's strengths, weaknesses, opportunities and threats

External Dimensions / Internal Dimensions	**Opportunities** • Introduction of new revenue streams for the current service spectrum • Introduction of new or extension of current revenue streams on growing markets, particularly the social media (Google Currents), mobile (Android Marketplace, Google Pixel, Google Duo), Internet of things and automation (smart home devices like Google Home, acquisition of Nest Labs), augmented reality and virtual reality (Google Cardboard), artificial intelligence, machine learning and big data markets • Expansion of market leadership in online marketing	**Threats** • Vulnerable revenue monoculture -> high risk through a decrease in advertising revenue (customer turnover to Facebook), recession-driven decline or replacement through other search engine providers (e.g., Bing's increase in market share) • Brand dilution through too many unsuccessful services
Strengths • Dominant position in the online and mobile advertising market (particularly through search engine advertising) • Strong position as online and mobile content provider • Broad advertising network • Very broad range of online services • Technological leadership	**SO Strategies** (Strengths-Opportunities Combination)	**ST Strategies** (Strengths-Threats Combination)
Weaknesses • Missing revenue differentiation (around 85% of revenue comes from advertising) • Unclear range of services • Numerous services without clear revenue purpose or unexploited revenue opportunities • Varyingly strong positions in different geographic markets • Social media position	**WO Strategies** (Weaknesses-Opportunities Combination)	**WT Strategies** (Weaknesses-Threats Combination)

Source: Wirtz (2019, 2021)

Fig. 17.11 Strategic options for Google based on a SWOT analysis

External Dimensions / Internal Dimensions	Opportunities	Threats
Strengths	**Taking advantage of existing opportunities through own strengths** • Use of existing service range for revenue differentiation • Extension of the mobile business (e.g. Google Nexus, Google Pixel, Google Duo), social media (e.g. Google Currents), Internet of things and automation business (e.g. Google Home, acquisition of Nest Labs), augmented reality and virtual reality business (e.g., Google Cardboard), artificial intelligence, machine learning and big data in order to establish new forms of revenue and to extend existing ones • Monetization of broad range of services (especially of content services)	**Using own strengths to avert existing threats** • 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
Weaknesses	**Eliminating own weaknesses to take advantage of opportunities** • 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	**Eliminating own weaknesses to take advantage of opportunities** • 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

Source: Wirtz (2019, 2021)

Fig. 17.12 Opportunities for differentiation with regard to revenue generation I

	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	Low due to technological leadership and moderate competition	●
	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	◑

○ Not suitable ◔ Less suitable ◑ Moderately suitable ◕ Highly suitable ● Very highly suitable

Source: Wirtz (2019, 2021)

Fig. 17.12 Opportunities for differentiation with regard to revenue generation II

Indirect Transaction-Dependent	Commission fees as e-commerce intermediary (e.g. through Google Product Search, 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 (see Google Earth Plus), 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 Trans-action-Inde-pendent	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	◑

○ Not suitable ◔ Less suitable ◑ Moderately suitable ◕ Highly suitable ● Very highly suitable

Source: Wirtz (2019, 2021)

Chapter 17
Topics for discussion

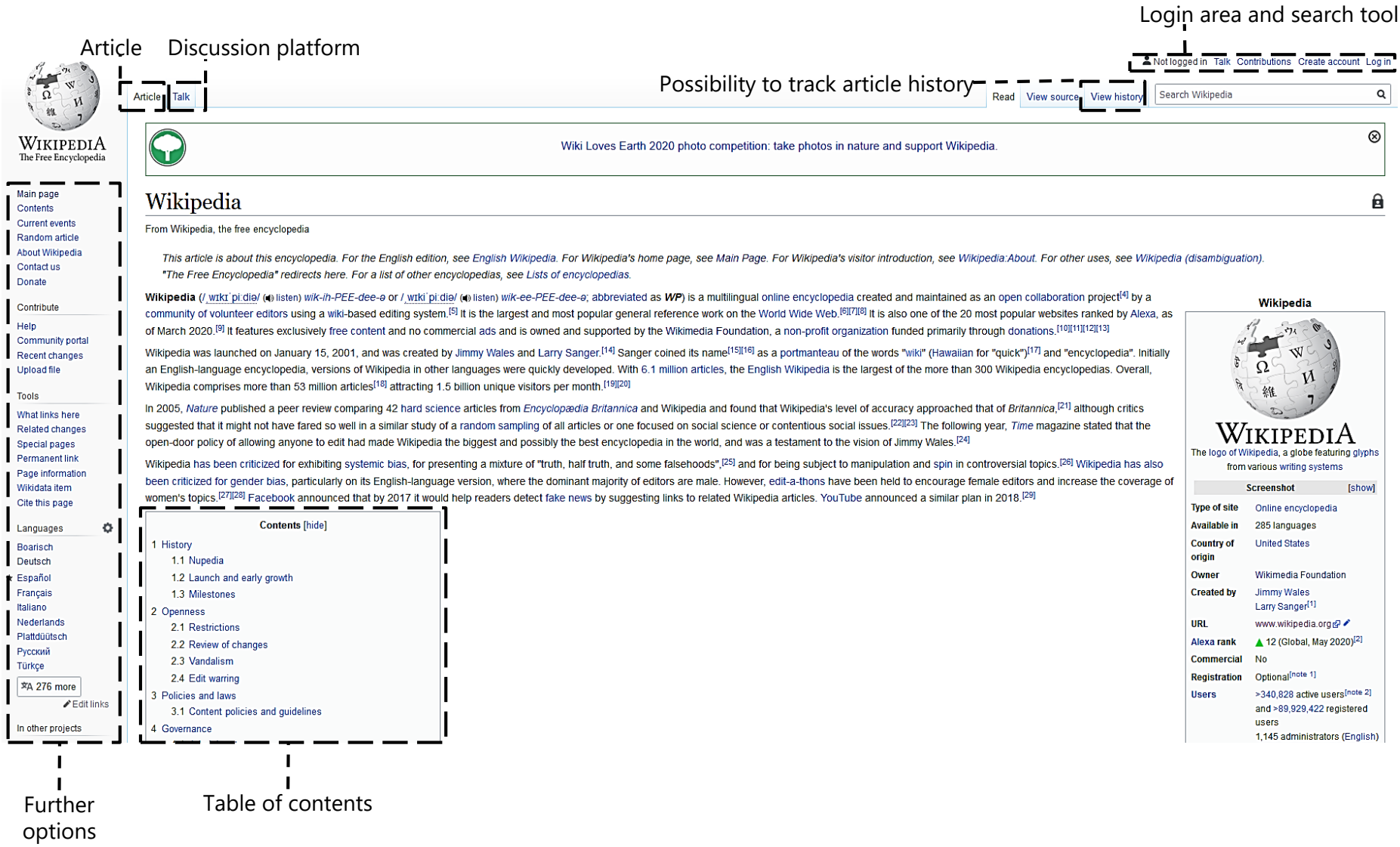
Topics for classroom discussion and team debates

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 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.

Source: Wirtz (2021)

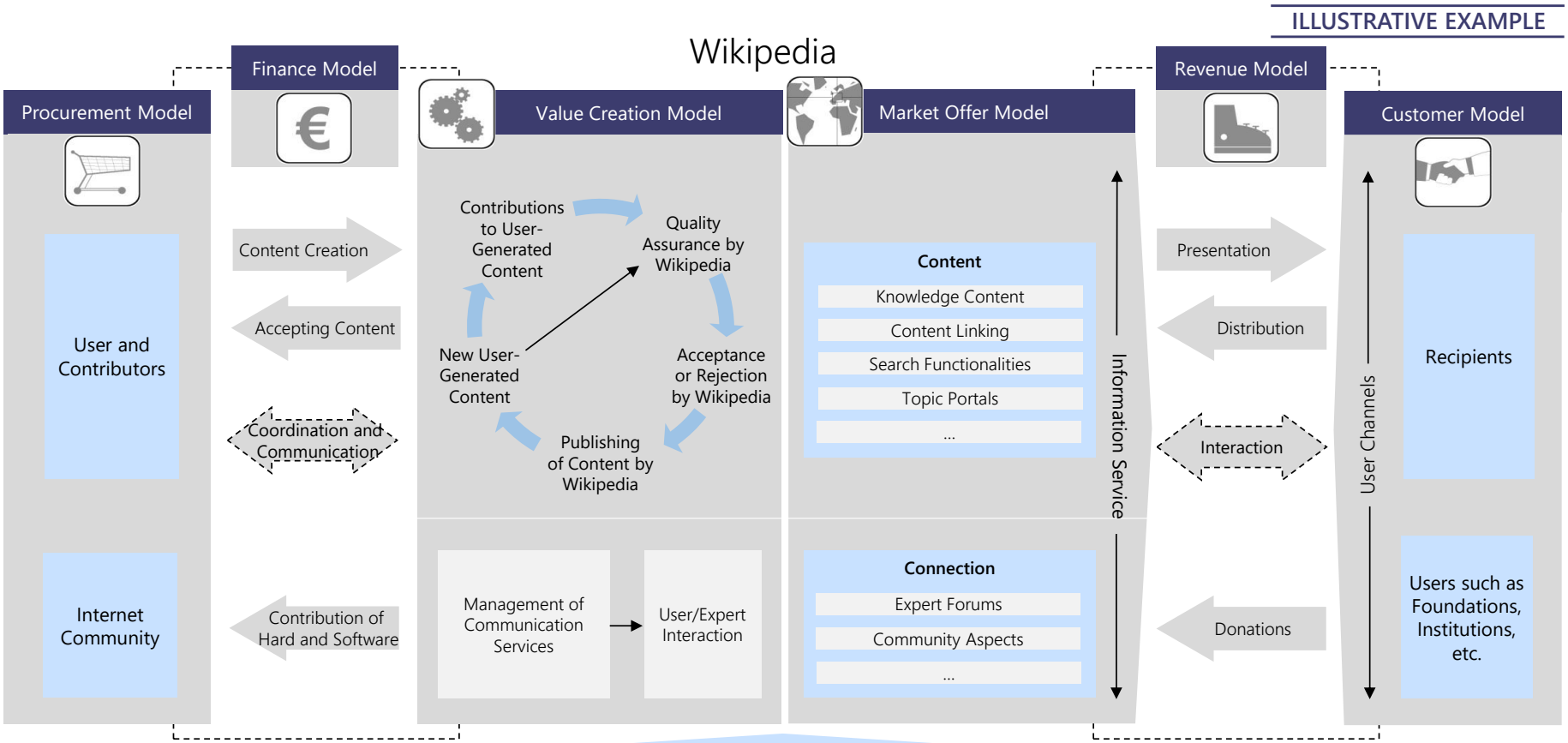
Chapter 18: Selected Digital Case Studies

Fig. 18.1 Homepage Wikipedia



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

Fig. 18.2 Business model of Wikipedia



Strategy Model

Wikipedia's five pillars strategy:

- Wikipedia is an encyclopedia
- Wikipedia is written from a neutral point of view
- Wikipedia is free content that anyone can use, edit and distribute
- Editors should treat each other with respect and civility
- Wikipedia has no firm rules

Competencies/Resources Model

- Content sourcing competence
- Quality management competence
- Content development competence
- Distribution competence
- Brand
- Employees
- Networks
- IT infrastructure

Network Model

- Network of anonymous volunteers
- Donation community
- Information linkage
- Access to rights and databases

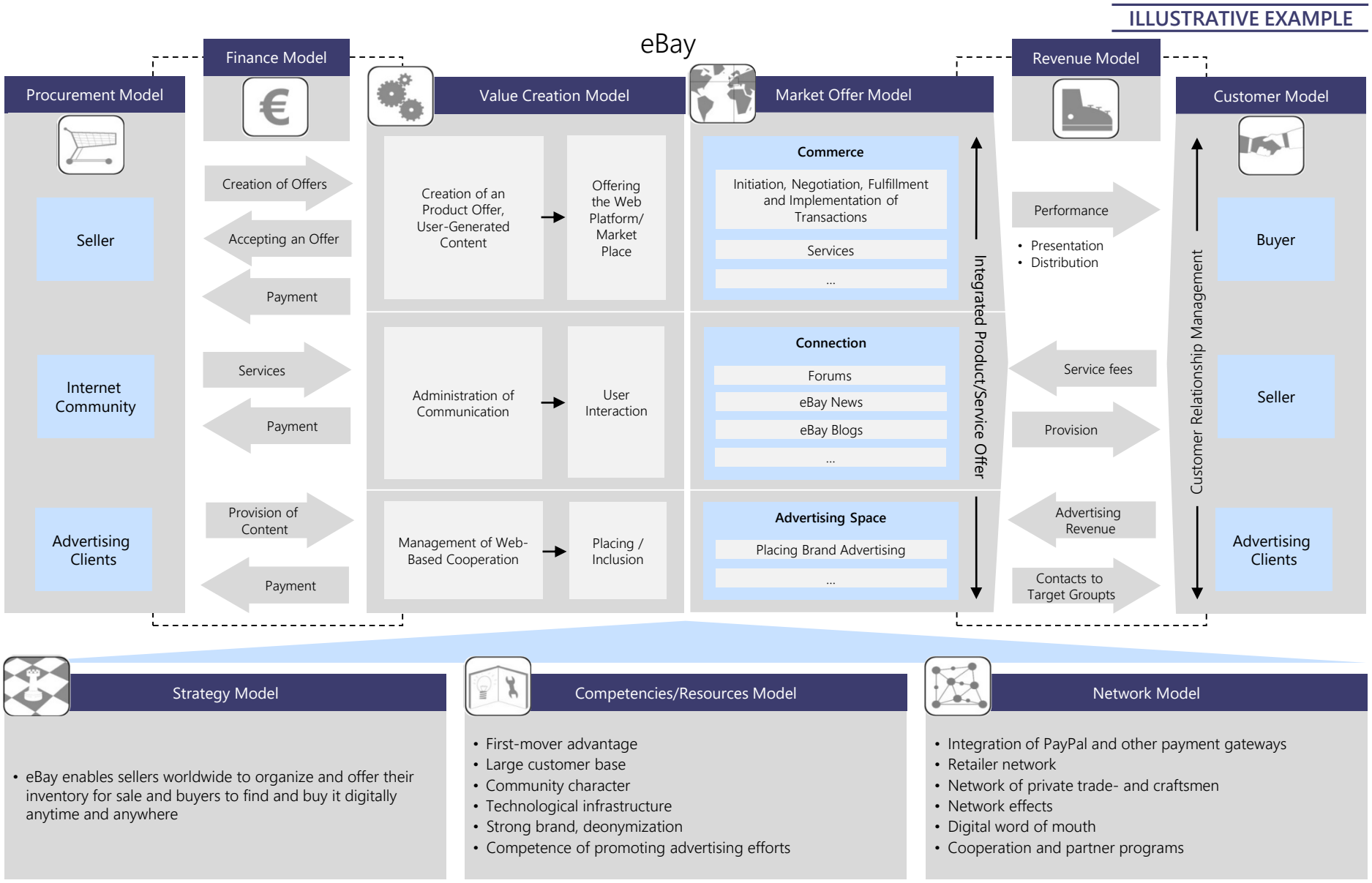
Source: Wirtz (2010c, 2020b, 2021)

Fig. 18.3 Strategic orientation of Wikipedia

	Aspects
Strategy	• Provision of free online content in the area of online encyclopedias • Information leadership in the knowledge sector
Business Model	• 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
Service Offer	• Extensive pool of knowledge • Extended content through other Wiki-tools • Integration with other Wiki-tools • Community Features
Success Factors	• 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 • Community aspect • Collected knowledge of a worldwide collective authorship

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

Fig. 18.4 Business model of eBay



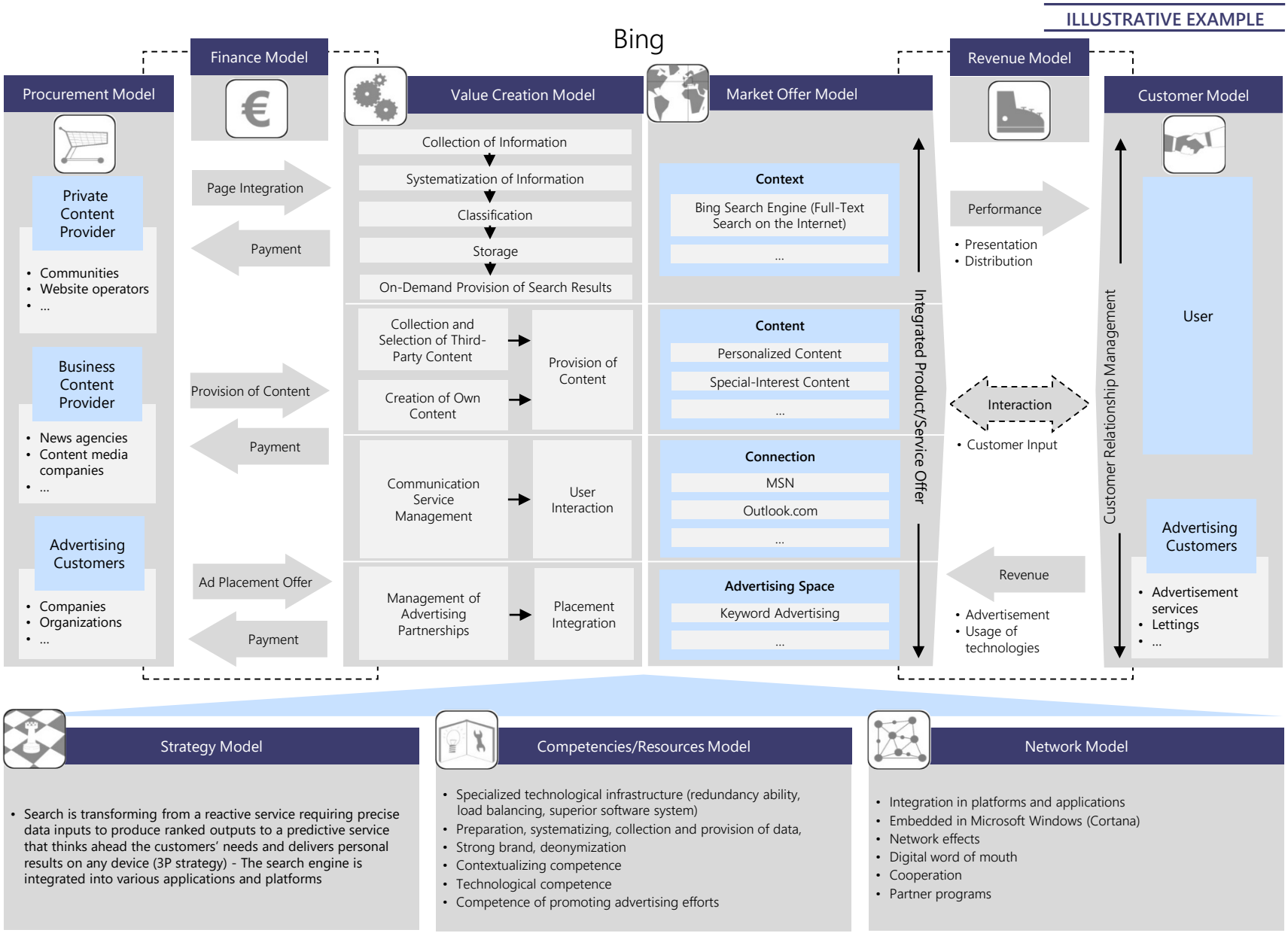
Source: Wirtz (2010c, 2020b, 2021)

Fig. 18.5 Strategic Orientation of eBay

	Aspects
Strategy	• Provision of online auction plattform 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	• Commerce aspect: initiation, negotiation and processing of business transactions • Business model types: digital bargaining/digital negotiation
Service Offer	• Provision of a simple online plattform 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	• First-mover advantage, well-known brand • Large customer base, high number of users • Community aspect • Worldwide market leader in online auctions

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

Fig. 18.6 Business Model of Bing



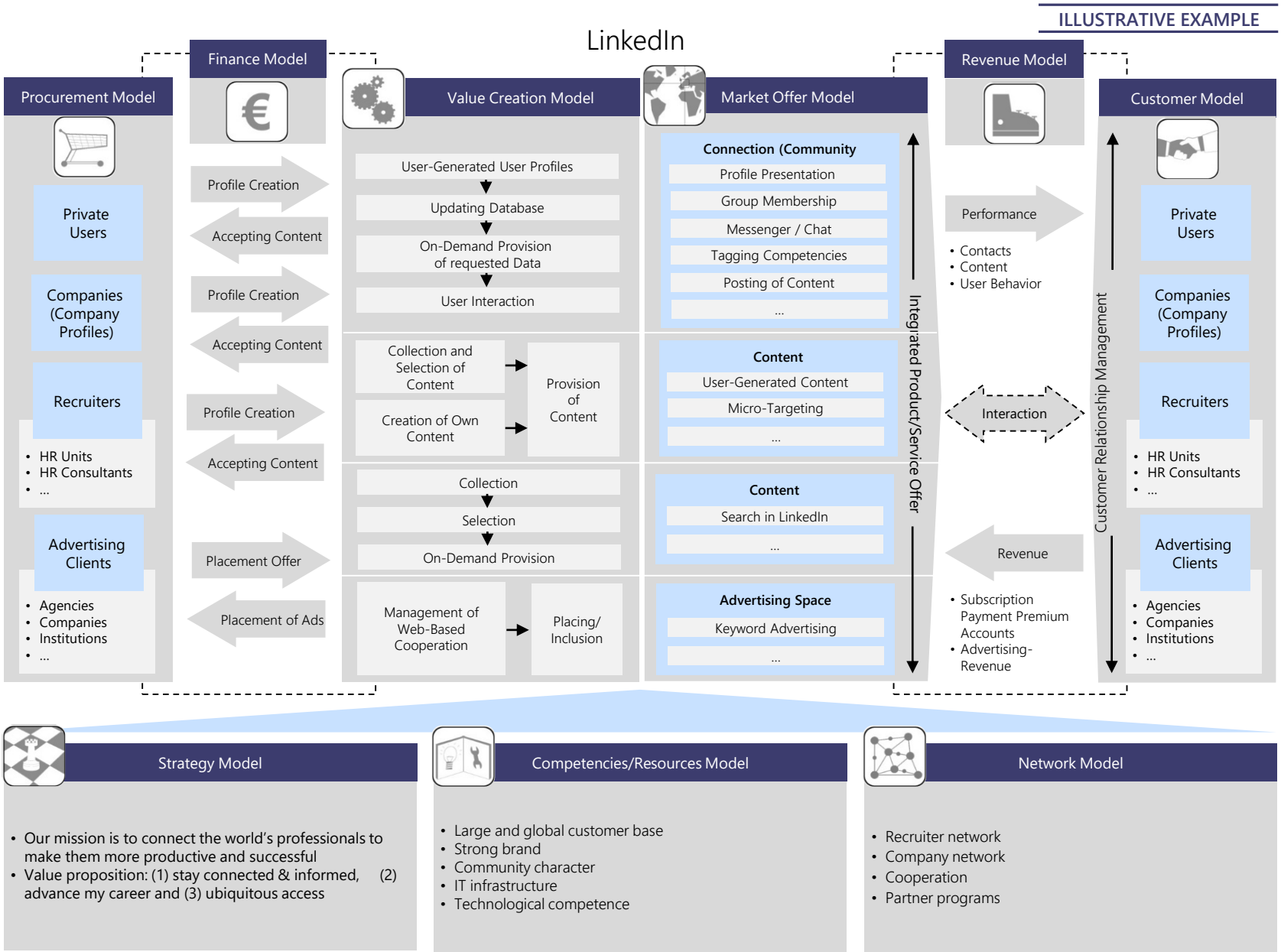
Source: Wirtz (2010c, 2020b, 2021)

Fig. 18.7 Strategic Orientation of Bing

	Aspects
Strategy	• Organize and systematize global presence of information on the Internet and provide it to users by means of a user-friendly interface
Business Model	• Context aspect: classification und systematization of information available on the Internet • Business model type: digital search classified as general search • Partial content aspect: collection, selection, systematization, compilation (packaging) and provision of own content and third-party content • Partial connection-aspect: opportunity to exchange information by means of social web applications, integration of Microsoft's services
Service Offer	• Free search engine • Integration of other Microsoft services such as MSN and • Outlook.com • User-friendly interface
Success Factors	• Brand awareness of Microsoft as parent company behind the search engine Bing • Network effects/economies of scale • Cooperation and partner programs

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

Fig. 18.8 Business model of LinkedIn



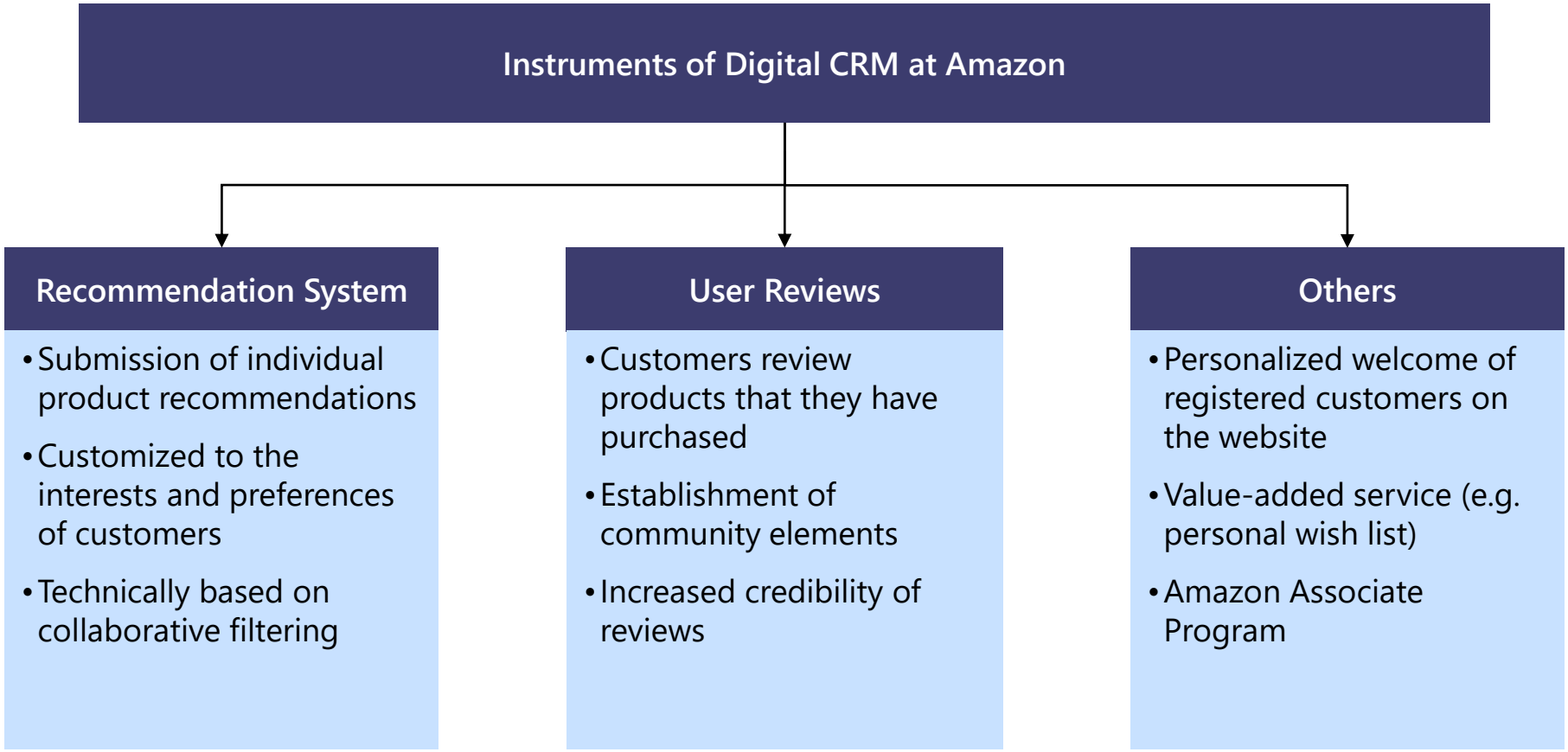
Source: Wirtz (2010c, 2020b, 2021)

Fig. 18.9 Strategic focus of LinkedIn

	Aspects
Strategy	• LinkedIn's mission is to connect the world's professionals to make them more productive and successful
Business Model	• 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	• Provision of professional and company profiles and placement of contacts • Provision of personalized advertising • Provision of analysis services
Success Factors	• Brand awareness of the company and high number of users • Global presence and pronounced scale and network effects • Comprehensive and differentiated recruiting services

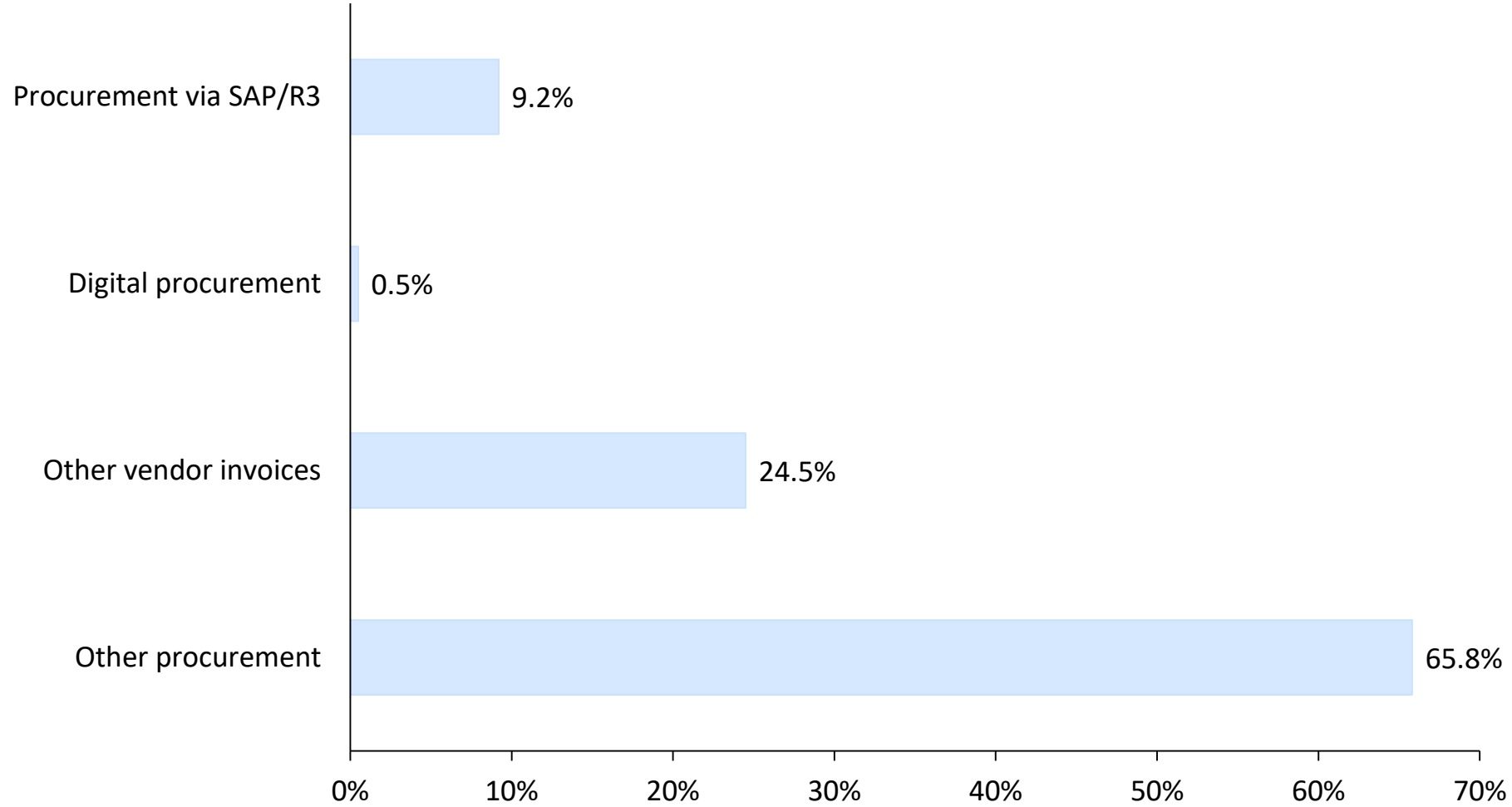
Source: Wirtz (2010c, 2020b, 2021)

Fig. 18.10 Digital CRM at Amazon



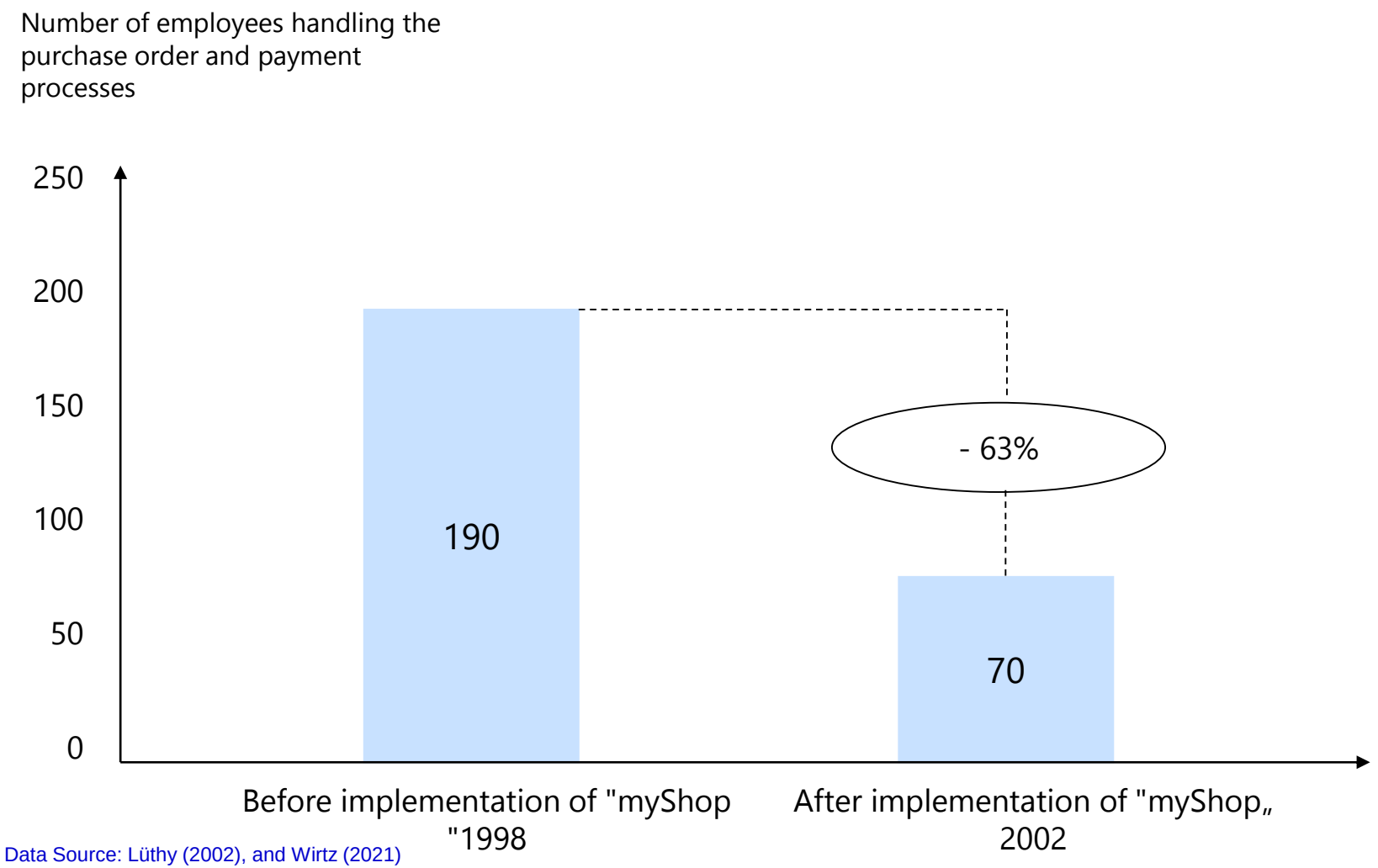
Source: Wirtz (2010c, 2021)

Fig. 18.11 Procurement situation of UBS in 2001



Data Source: Lüthy (2002), and Wirtz (2021)

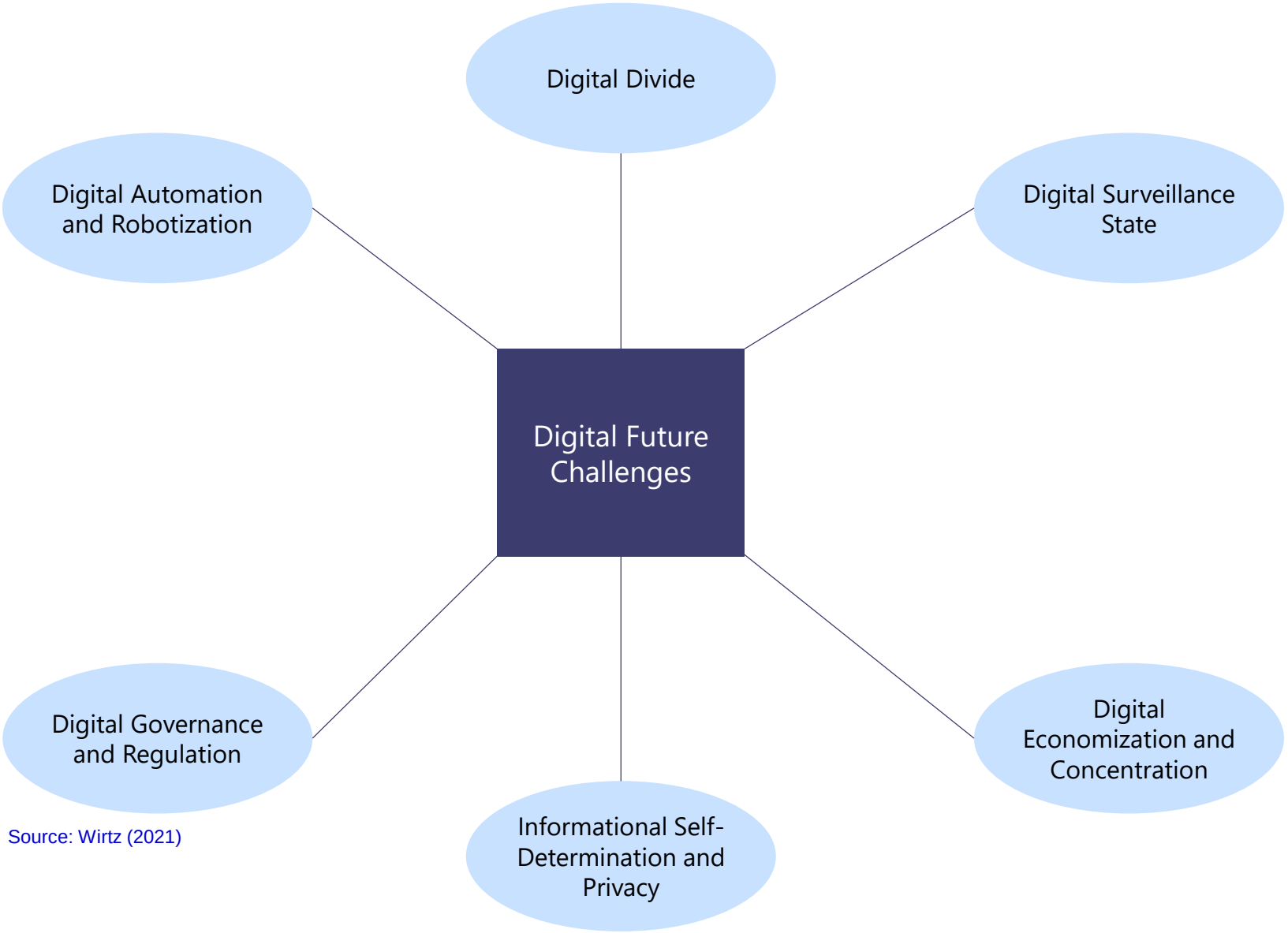
Fig. 18.12 UBS procurement employees before and after the introduction of digital procurement



Data Source: Lüthy (2002), and Wirtz (2021)

Chapter 19: The Digital Future: A Brief Outlook

Fig. 19.1 Digital future challenges



Source: Wirtz (2021)