Chapter 3
Digital Business

Digital or e-business is one of the most significant fields of application of digital information and communication technologies. The following sections systematically describe the development and basics of digital business, its forces and the success factors of digital business. Section 3.1 gives an overview of the development of digital business. After presenting the basics of digital business in Sects. 3.2 and 3.3 outlines the forces of the digital development. Finally, Sect. 3.4 describes business models in digital markets.[1]

3.1 Development of Digital Business

For some time, there has been an essential change within the economy and society induced by information technology. This change is mainly caused by increasing digitalization: "With the beginning of the 'digital age', also called 'digital revolution', which evolved throughout the development of the multimedia market, there will be a fundamental change of existing structures in the telecommunication, computing, entertainment and media industries" (Denger and Wirtz 1995b). This assessment in 1995 aptly illustrates the impact of digitalization.

Network Internet applications represent a sustainable simplification and individualization of communication and information brokerage. Already in the year 1970, the Harvard sociologist Daniel Bell has coined the term "postindustrial society" describing the, at that time, anticipated change due to technology. In this society, the secondary sector in the economy loses importance because of an economic system that is primary rather coined by information technologies than by production.

Already in the beginning of the 1980s, Bell's academic and abstract phrasing has been specified by using the term "information society". The sociological term describes the transfer of human labor and macroeconomic impact to the tertiary sector

[1]See also for the following chapter Wirtz (2018b).

B. W. Wirtz, *Digital Business Models*, Progress in IS,
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of a higher industrialized society. The delineated change is particularly characterized by technological development dynamics. The underlying principal of this development can be explained by Kondratieff's theory of long cycles showed in Fig. 3.1.

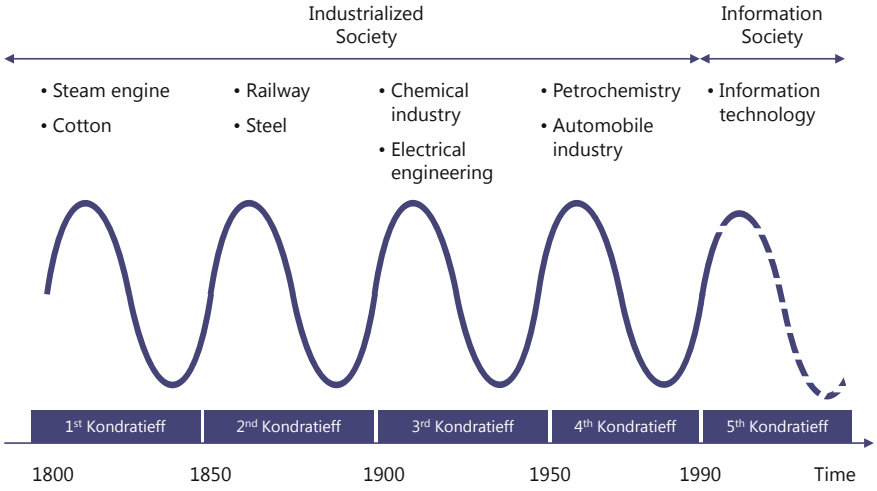

Fig. 3.1 Kondratieff-cycle. *Source* Nefiodow (1999)

According to Kondratieff, technological innovations essentially determine the status of societal development through sinusoidal innovation phases (Schumpeter 1939). This change, currently induced by the dynamics of development of information and communication technology, is an important driver of the development towards an information society.

In the course of the societal change from the postmodern industrial society to the information society, the quantity and quality of information enter entirely new dimensions. Information has never been available that extensive and at the same time concentrated before. Particularly the Internet is the focal point in this context, enabling time and location-independent, as well as accurate access to a previously unimagined extent of knowledge.

In the postmodern industrial society, knowledge was available solely dispersed. Through the dynamic development of information and communication technologies access to information has become inexpensive or even free of charge. The ubiquity of information and knowledge has become the main identifying characteristic of the information society. Figure 3.2 illustrates this multidimensional phenomenon.

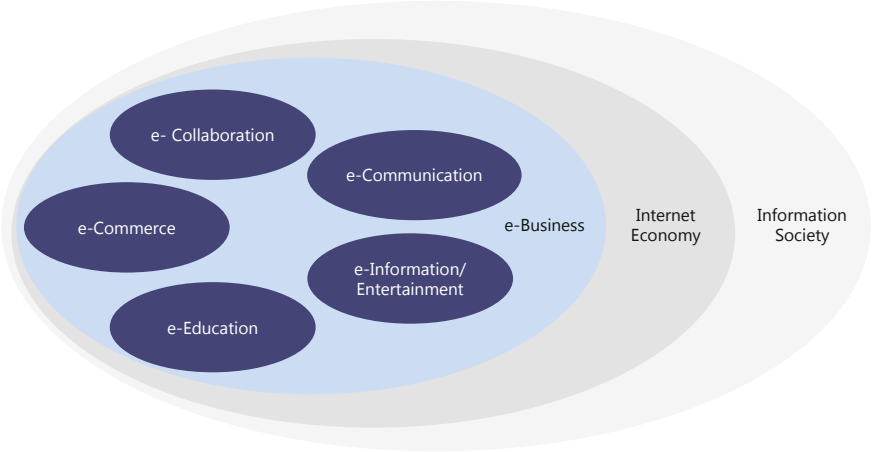

Fig. 3.2 Dimensions of the information society. *Source* Wirtz (2000c, 2018b)

In this context, the Internet economy and e-business represent the two main dimensions that constitute today's information society. E-business includes e-commerce, e-communication, e-information/entertainment, e-collaboration and e-education. This shows that sociopolitical, economic and managerial areas are increasingly affected within information society. The Internet economy strongly changes existing structures and interdependencies through the rapid diffusion of information and communication technologies (Webster 2014).

The rapid development of new Internet hosts and the growing Internet usage reflects the continuously increasing importance of information and communication technologies for the information society. The influence of the Internet as a global networking and communication system is ubiquitous. Its rapid spread on a worldwide level connecting state, economy, society and individuals also across national borders made it an unprecedented medium. Figure 3.3 illustrates the development of worldwide Internet hosts, namely domain names that are assigned to an IP address.

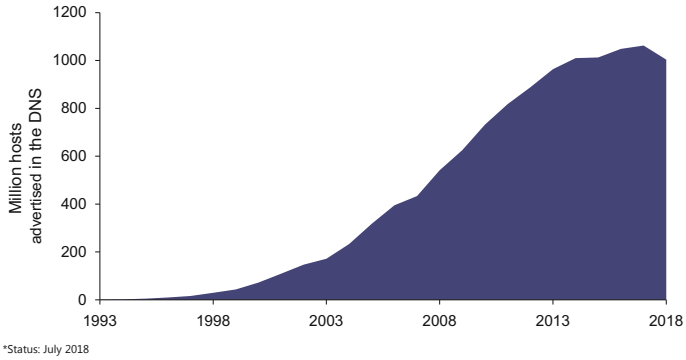

Fig. 3.3 Development of the number of Internet hosts since 1993. *Datasource* ISC (2018)

Along with the rising number of Internet hosts, the Internet usage increases steadily among the populations around the world. In 2017, the Internet already had more than 3.7 billion users. This means that already four out of ten people worldwide use the Internet, representing a growth of 933.8% since the year 2000 (Internet World Stats 2017). The respective development and diffusion of modern information and communication technologies, as well as the respective repositioning and use of these technologies were key drivers of the shift from an industrial to an information society. Table 3.1 reflects this development by showing recent worldwide Internet usage and population statistics.

Table 3.1 Worldwide Internet usage and population statistics

Regions	Population (2017 Est.)	www users (31 Dec 2000)	www users (31 Mar 2017)	Pop. in %	Growth (2000–2017) (%)	Users in %
Africa	1,246,504,865	4,514,400	345,676,501	27.7	7557.2	9.3
Asia	4,148,177,672	114,304,000	1,873,856,654	45.2	1539.4	50.2
Europe	822,710,362	105,096,093	636,971,824	77.4	506.1	17.1
Latin America/ Caribbean	647,604,645	3,284,800	385,919,382	59.6	2035.8	10.3
Middle East	250,327,574	108,096,800	141,931,765	56.7	4220.9	3.8
North America	363,224,006	18,068,919	320,068,243	88.1	196.1	8.6
Oceania/ Australia	40,479,846	7,620,480	27,549,054	68.1	261.5	0.7
World total	**7,519,028,970**	**360,985,492**	**3,731,973,423**	**49.6**	**933.8**	**100.0**

Datasource Internet World Stats (2017)

In view of the above-mentioned developments, digital business and the information society have significantly gained importance. The following section presents the basics of digital business.

3.2 Basics of Digital Business

Digital business is one of the most significant fields of application of the new digital information and communication technologies. The following section systematically describes the basics of e-business. In doing so, it first illuminates the historical development of information and communication applications and then defines and classifies the term e-business. On this basis, the following deliberations address the actors, interaction patterns and service exchange in the field of digital business.

- Development of Information and Communication Applications

The development of information and communication applications looks back on a long history (see for the following Wirtz 2016b). The basics preconditions for today's information and communication applications have been created back in ancient times and the Middle Ages. About 250 B.C., the first algorithm to determine prime numbers was introduced, known as "Sieve of Eratosthenes". This algorithm defines a rule that consists of a finite number of steps and serves to solve problems. Algorithms represent the theoretical foundation of calculation by means of a computer. In 1623, the astronomer and mathematician Wilhelm Schickard invents the first four-function calculator for the addition and subtraction of numbers. Approximately 50 years later, in the year 1672, Gottfried Leibnitz creates the first mechanical calculating machine that is capable of the four standard calculation methods.

In the year 1854, George Boole publishes the "Boolean algebra" for the portrayal of logical operators and set theory, which form the theoretical foundation of electronic technology. In the course of developing technological communication infrastructures, Alexander Graham Bell puts the first telephone into operation in the year 1854 based on the fundamental research of Philipp Reis. After a patent for wireless energy transfer, Nikola Tesla patents electrical circuits in the year 1903. These achievements laid the groundwork for radio technology and thus the wireless transmission of signals via electro-magnetic waves. 33 years later, a decisive starting point for the theoretical informatics has been set. With the Turing machine, Alan M. Turing develops a model for calculating functions for the solution of different decision problems.

In 1941, the construction engineer Konrad Ernst Otto Zuse builds the first fully automated, program-controlled and freely programmable computer in the world, which primarily served for processing numbers. Only a few years later, in the year 1946, the first mobile network worldwide goes into operation in the U.S. as an extension of radio technology. The increasing digitalization of information and communication technologies is characterized by the further support of new communication tools and improved information transmission. In the year 1948, William Bradford Shockley patents the transistor that serves for switching and amplifying electrical signals. In the year 1953, color television is introduced in the U.S. and in the year 1956, IBM introduces the magnetic hard drive (IBM 350) for storing data. This technical improvement not only enabled a quicker access time and greater storage capacity but also laid the foundation for secure data storage. Figure 3.4 illustrates the development of information and communication applications until 1956.

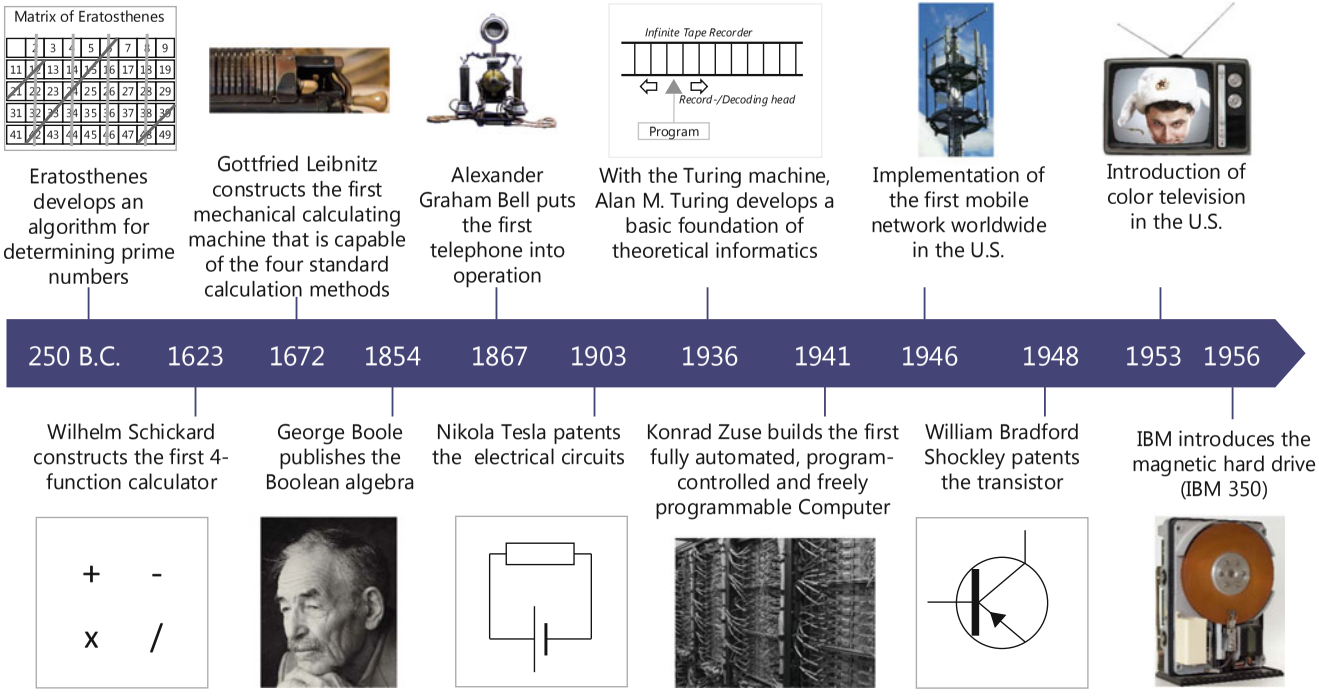

Fig. 3.4 Development of information and communication applications. *Source* Wirtz (2013c, 2017) and updates

The Disk Operating System/360 (DOS) introduced in 1966 has been provided as operating system for IBM mainframes. Therefore, the potential of the magnetic hard drive IBM 350 could be fully exploited for the first time. DOS facilitated a quasi-parallel diffusion of computer operations based on the directly addressable magnetic discs storage media.

As a precursor of today's Internet, Paul Baran and Donald Watts Davies create the cross-linked decentral network ARPANET in the year 1969. In the year 1971, Intel launches the first microprocessor 4004 that is produced in series for the first time. Ten years later, in the year 1981, IBM introduces the first personal computer and opens up new possibilities for developing information and communication applications.

In 1983, Motorola introduces the world's first commercial mobile phone Dynatac 8000x. Soon after, Microsoft releases Windows 1.0 for a simplified use of different devices. In the year 1985, Steve Case founds the online service Quantum Computer Services, which is renamed to AOL three years later.

With the establishment of the World Wide Web in 1989, the Internet increasingly influences the media and initiates a trend towards digital technologies that persists until today. An advancement of the enterprise software became necessary, leading SAP to offer its ERP software SAP R/3. Since that time, companies are able to connect different business areas by means of this software. In the same year, Toshiba introduces the first tablet PC DynaPad T100X. In the year 1994, Jeff Bezos founds the Internet shopping platform Amazon revolutionizing the global online trade in goods.

One year after the introduction of Amazon, Pierre Omidyar founds the Internet auction house eBay Inc., which quickly becomes the world's largest online marketplace for private and commercial distributors. At this point, information and communication applications may be subsumed under a generic term for a variety of services in the fields of electronics, electrical engineering, information technology and informatics. These fields are frequently characterized by a digitalization of their components and the possibility of interactive use (Wirtz 1995b). Figure 3.5 depicts the development of information and communication applications from 1966 until 1994.

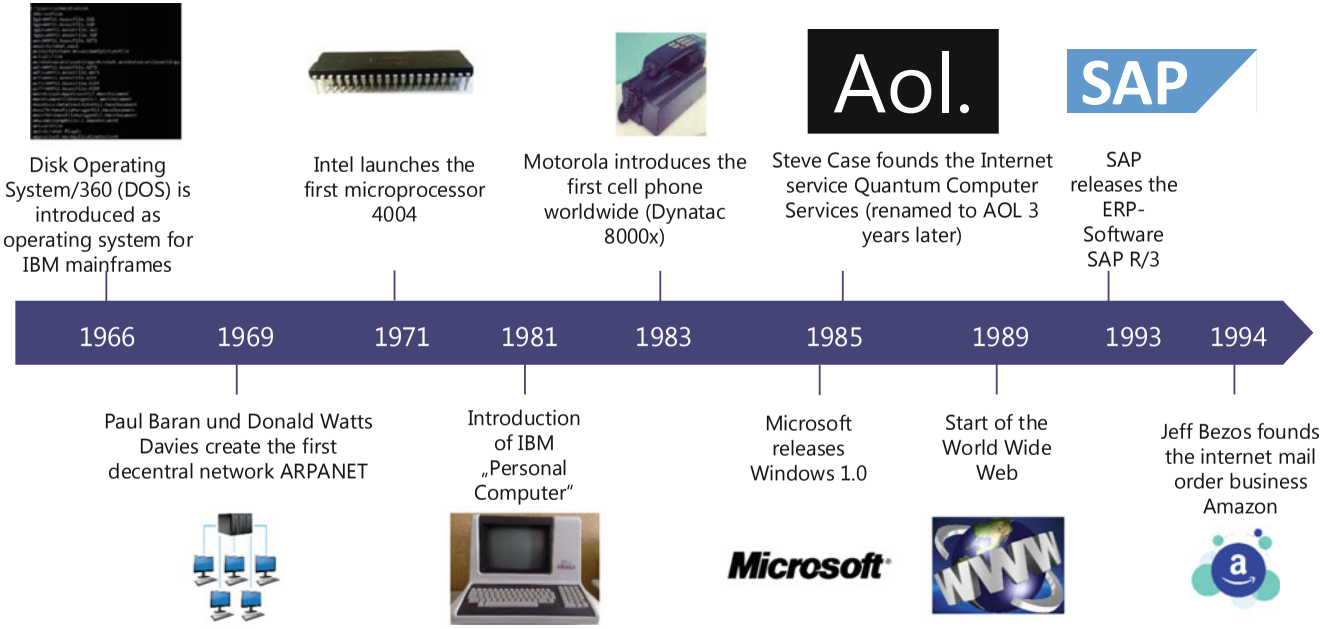

Fig. 3.5 Development of information and communication applications (1966 until 1994). *Source* Wirtz (2013c, 2017) and updates

The information society is in a dynamic stage of development, which places high demands on the operating companies with regard to their innovative power and flexibility. An important trend regarding the development of information and communication technologies begins with the introduction of the first smartphone, developed and distributed by Nokia in 1996.

While at the beginning of the smartphone era, the phones were rarely dispersed, they are now a mobile companion and very important for everyday life. In the year 1998, Lawrence Edward Page and Sergei Brin found the Internet service provider Google Inc. and offer a far-reaching search engine with the same name. In 1999, AT&T starts to market broadband in the U.S. and thus enables high data transmission rates. The company launches its service including digital subscriber line (DSL), cable modem and wireless Internet access for corporate customers. Since the end of the 1990s, the information society has significantly gained in importance, particularly due to the development of the Internet economy.

Therefore, changes in the competitive marketplace and economic conditions resulted in numerous foundations of dotcom companies since the year 1998. This trend has been supported by the further development of mobile networks and the ubiquitous diffusion of the Internet. For instance, the implementation of the first UMTS network at the Isle of Man by the local company Manx Telecom in 2001 is an essential milestone for the mobile information and communication technologies. This development increasingly facilities new Internet services. For example, the Internet has emerged as a further distribution channel for the music industry. In this context, Apple's introduction of iTunes in the year 2001 represents an important cornerstone. In the year 2004, Marc Zuckerberg founds the social network Facebook.

The boom of the Web 2.0 and social media applications continues in the year 2005. Internet platforms like Facebook and Twitter reflect the emerging networked growth of the Internet. Today, social media has become an integral part of the information society. In the year 2006, AT&T launch their brand U-verse, offering triple-play telecommunications services in 21 states of the United States and using the FTTP, VDSL and ADSL communication protocols. Already in the year 2009, the Swedish company TeliaSonera puts the first commercial LTE network in Stockholm and Oslo into operation. Finally, in 2016, Samsung launches the latest version of its successful smartphone Samsung S7 in combination with its virtual reality headset Samsung Gear VR. Figure 3.6 shows the development of information and communication applications from 1995 until 2016.

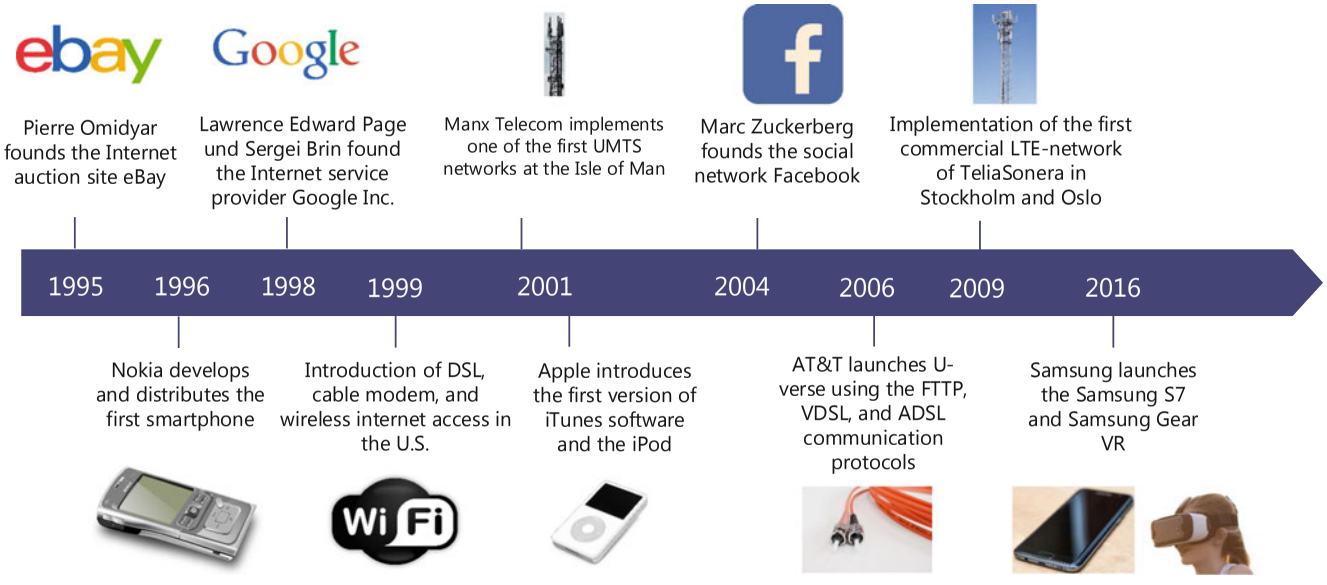

Fig. 3.6 Development of information and communication applications (1995 until 2016). *Source* Wirtz (2013c, 2017) and updates

- Definition and Classification of e-Business

In the context of the Internet economy, there are various terms and definitions. In general, the current literature has a heterogeneous understanding of the term e-business. Furthermore, the existing definitions frequently overlap to some extent, which is exemplary for the terminological inconsistency of the term's application. Table 3.2 presents some important definitions of e-business.

Table 3.2 Definitions of e-business

Author(s)	Definition
IBM (1997)	A secure, flexible and integrated approach to delivering differentiated business value by combining the systems and processes that run core business operations with the simplicity and reach made possible by Internet technology
PriceWaterhouceCoopers (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)	[…] 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 electronical based intra- or inter-organizational activities that facilitates such exchange
Jelassi and Enders (2004)	The use of electronic means to conduct an organization's business internally and/or externally
Chen (2005)	Business that is conducted using electronic networks or electronic media. Sometimes used synonymously with e-commerce and sometimes used more widely to include other business activities in addition to buying and selling
Papazoglou and Ribbers (2006)	e-business can be defined as the conduct of automated business transactions by means of electronic communications networks (e.g., via the Internet and/or possibly private networks) end-to-end
Chaffey (2009)	All electronically mediated information exchanges, both within an organization and with external stakeholders supporting the range of business processes
Laudon and Traver (2014)	[…] is the use of Internet, the World Wide Web (Web) and mobile apps to transact business
Schneider (2017)	The term electronic commerce or (e-commerce) […] includes all business activities that use Internet technologies. Internet technologies include the Internet, the World Wide Web and other technologies such as wireless transmissions on mobile telephone networks

To systematically deduce a definition of the term e-business, it is necessary to subdivide these definitions into subject-related, functional and teleological aspects. While subject-related aspects deal with the subject and structure of the respective content of the term, functional aspects refer to its effectiveness and teleological aspects to its aim and purpose.

In the context of subject-related definitions, the consistency of some characteristics are predominant. Most definitions consider the creation of business processes and transactions as the focus of e-business. Several definitions refer to the usage of innovative information technologies.

For instance, IBM (1997) used the term of "Internet technology" in their original definition of e-business, which has been unified to "information technology" or "information and communication technology" in several subsequent definitions. In addition, the expressions "use of electronic means" as well as "by means of electronic communication networks" have been used synonymously for electronic information technology (Jelassi and Enders 2004).

In general, there is a clear consensus with regard to the creation of business processes and transactions through the usage of innovative information technology (Zhu and Kraemer 2005). The latest subject-related definitions involve the application of e-business via emerging technologies, such as wireless transmissions on mobile telephone networks and applications.

In contrast, when looking at the functional aspects, there is a lack of clarity regarding the extent and the intensity of certain aspects. For instance, some definitions restrict the number of actors involved by constraining e-business to the interorganizational business domain. This results in a narrow comprehension of the term. Other definitions expand the circle of actors by including intraorganizational and customer-related perspectives. Furthermore, there is no clear consensus regarding the extent of business processes in e-business. The spectrum of definitions ranges from solely supporting activities via electronic networks to electronic implementation and execution of all business activities. Regarding the teleological aspects, the definitions show a certain heterogeneity.

PriceWaterhouceCoopers (1999), for example, emphasizes the support of buying and selling processes of products, services and information. In contrast, Wirtz (2000c) offers a more specific definition. The author extends the teleological aspects by involving the initiation, negotiation and/or transaction of a business regarding the aim and purpose of e-business.

Definition of e-Business (Wirtz 2000c, 2018b)
E-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).

In this context, service exchange processes refer to those processes, in which tangible and intangible goods and services are transferred in exchange for

compensatory consideration. In the case of electronic networks, it is the combination and agglomeration of physical and mobile connections through which electronic data are transferred. Based on the above-deduced definition, the following chapters presents a systematization and classification of e-business by observing actors and interaction patterns, service exchange, activities and success factors.

- Actors, Interaction Patterns and Service Exchange

Actors of digital business include all providers and recipients of electronic-based or electronic-induced service exchange processes. Consequently, business, administration and customer act as actors that interact with each other and hence form the matrix of interaction patterns, which may be complemented by an intra-level. The intra-level represents the service exchange within a single group of actors. Figure 3.7 presents the respective matrix.

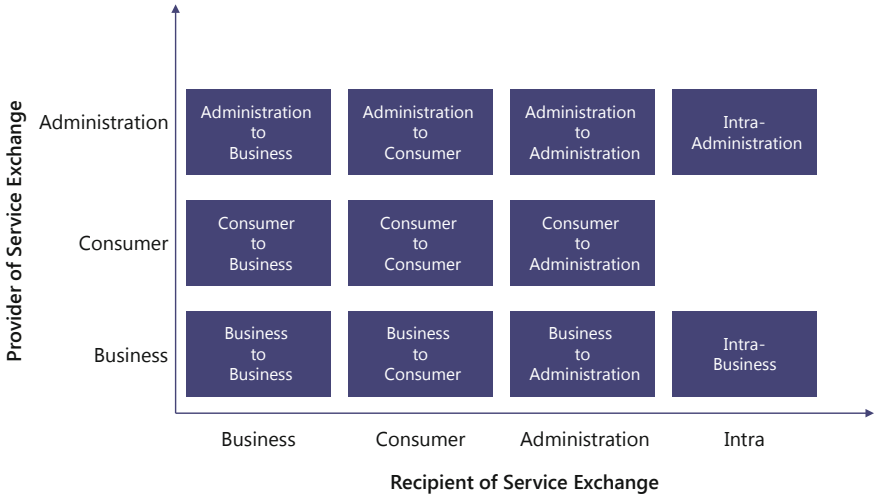

Fig. 3.7 Matrix of interaction patterns in digital business. *Source* Wirtz (2000c, 2018b)

The providers of service exchange processes facilitate a service exchange within electronic networks. They provide goods and services that recipients use on their own initiative or request. In practice, the B2B and B2C sector are most important. The B2B sector summarizes the electronic service exchange between several companies. Thereby, the company may take the role of both the buyer and the seller. Business activity opportunities in the context of B2B are diverse, ranging from online shops to B2B marketplaces and integration of customers and suppliers (Timmers 1998).

Regarding the value creation in the B2C segment, there are companies on the supply side and customers on the demand side. The service exchange may involve

physical goods, digital goods or services. An example of a service exchange with regard to physical goods is the purchase of textiles through an online shop. For digital goods, the service exchange, for instance, may include the provision of a voice-over-IP call and the additional sale of paid content. Services, in contrast, could be consulting services, purchase recommendations or processing of user comments, for instance.

In the context of e-business, B2A refers to the performance of administrative processes between businesses and public entities via electronic information and communication media. These include, for example, transactions with government bodies, such as the processing of companies' tax matters (e.g., VAT, income tax). Intra-business refers to internal e-business applications of a company. An example in this context may be the offer of a network-based, intraorganizational advanced training. For instance, employees of Volkswagen can visit e-learning centers to improve their foreign language skills.

The C2B constellation is mainly characterized by the individuals' voluntary exchange or disclosure of data to a company. This, for example, may happen by means of databases for job applications, such as monster.com or craigslist.org, through which individuals offer their manpower to companies.

Transactions between private individuals in the e-business domain refer to C2C. These transactions are not necessarily only direct purchase-sale processes, like eBay transactions, they also capture the exchange of digital goods. The Web 2.0 or social media are particularly relevant in this context. For example, a digital exchange of goods between individuals takes place on the video portal YouTube that allows its users to upload free video clips and to watch videos of other users. In general, the Internet is increasingly influenced by the interaction and networking of the users (Wirtz et al. 2014).

In the area of C2A, government is the recipient of a service exchange. The customers, who in this case represent citizens, use electronic networked resources in order to transmit information to government institutions. An example is the electronic tax return (efile) of income tax. Especially in this area, the acceptance of C2A has increased steadily in recent years. Within the year 2015, more than 128 million tax returns have been submitted electronically in the United States (AMS 2000).

Transactions in the A2C area are rather non-commercial. A supplier of customer services in A2C is the Federal Labor Office, for instance. It offers a job exchange as well as supports and manages the interaction between the applicants and employers regarding job vacancies online. Nevertheless, in A2C there are also fee-based offers, for instance, customer information regarding specific products or companies.

The A2A area in e-business refers to the electronic handling of certain information tasks between national and international authorities. Some public authorities, for example, are service providers for other authorities. Individual public authorities are also increasingly interconnected internationally. For example, national police forces are working under the direction of Europol and mutually exchange information electronically.

The intra-administration constellation refers to internal activities of public authorities, such as network-based, intraorganizational training opportunities for

administrative staff. The role of the provider and recipient of the service exchange process is not determined a priori. In particular, the emergence of Web 2.0 or social media applications leads to an abandonment of traditional business structures. While formerly customers were solely recipients on the Internet, they are now able to be service providers by providing problem-solving information in the course of customer integration. Since e-business affects all areas of the value chain, its actors may be both provider and recipient of the service exchange at the same time.

The integration of digital business in organizations and institutions includes four stages of development that particularly differ with regard to their complexity and added value. In its simplest form, a digital business solution is limited to a purely organizational and product/service presentation, as well as to the publication of information for relevant target groups, such as potential customers or investors. In a further stage of development, the Internet service is personalized, like in the case of commercial companies that add pre and after sales activities to their business offers.

These include customer inquiries, communication via email, general offers or sending information. In a third stage, there is further the possibility of completing transactions online. Finally, at the fourth stage of development, there is the possibility of electronically integrating transaction partners in the value-added processes. Figure 3.8 illustrates the various stages of development of digital business.

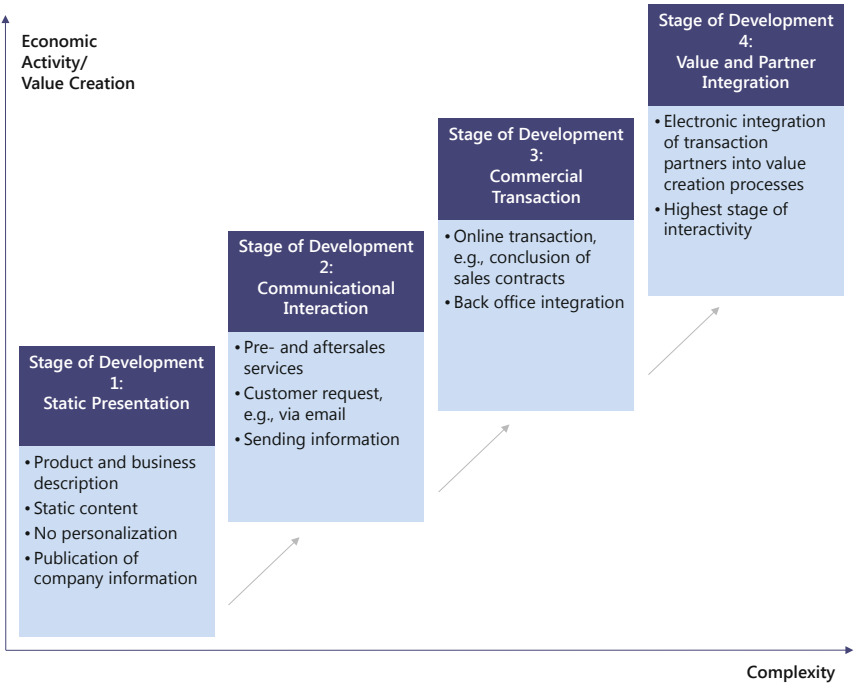

Fig. 3.8 Stages of digital business development. *Source* Wirtz (2000b, 2018b)

In addition to the specific attributes of service exchange processes and the development stages of digital business, there are also fundamental changes in the process structure compared to traditional economy (Chesher et al. 2013). Figure 3.9 shows a highly simplified service exchange process. The digital marketplace is at the center of e-business transactions and the place where supply and demand merge, just like in the traditional economy. The market access in the digital business domain, in contrast, partly differs from the one of traditional business.

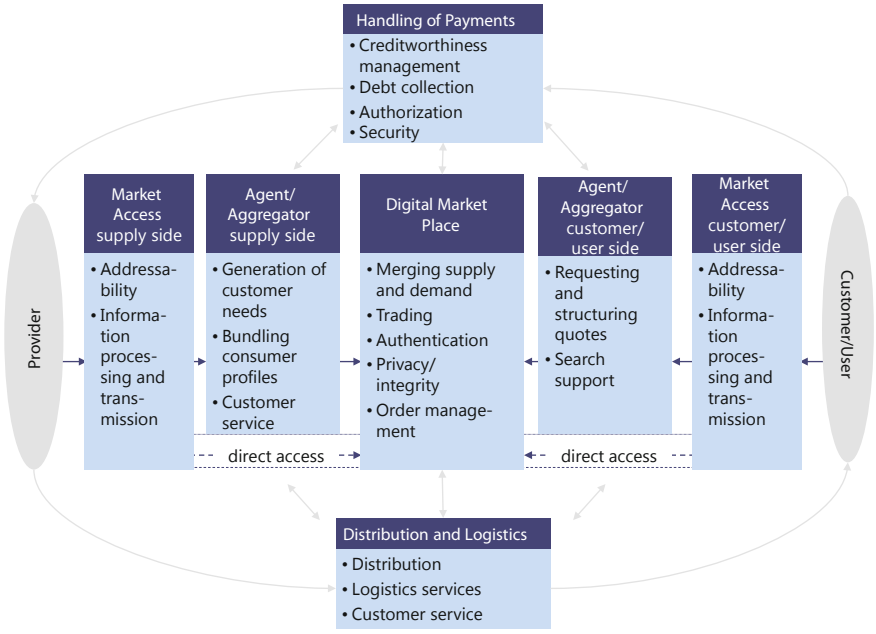

Fig. 3.9 Service exchange model of Internet economy. *Source* Wirtz (2000c, 2018b)

On the one hand, suppliers of products and services require market access in order to interact in the digital marketplace. Here, particularly technical aspects are important. Product-specific information has to be processed in a manner that makes them transferable to the market. This requires special hardware and software. If these conditions are met, the supplier may choose between a direct market entry, an intermediary agent or aggregator in order to operate in the digital market. In the former case, the supplier itself has to create customer needs, bundle customer profiles or offer customer service. In the latter case, the agent or aggregator is responsible for these tasks.

On the other hand, customers require market access as well. In this context, there are several service providers, who offer Internet access to individuals. For customers, it is also important to transmit information such as product needs into the market. Just like the supply side, they also have the choice between different opportunities of market access (Papazoglou and Ribbers 2011).

The intermediary agent or aggregator undertakes the task of collecting and structuring offers, as well as supporting the customers in their product and service search. Payment processing and distribution require third-party involvement to some extent. Distributors such as FedEx deliver the ordered products to the customers. Payment processing includes creditworthiness management, debt collection authorization and security. Credit card companies and online payment services such as PayPal or Amazon Payments undertake these tasks. Having described the development of information and communication applications and having systematically deduced an e-business definition, the next section presents the activities of the actors involved as well as particular success factors of digital business.

- Activities of Digital Business

Activities of digital business systematize the concept in functional respects. According to this, digital business consists of the activities e-commerce, e-collaboration, e-communication, e-education and e-information/entertainment. This functional division results from the divergent characteristics and intentions of the respective activities. Figure 3.10 combines these activities with the actors of digital business.

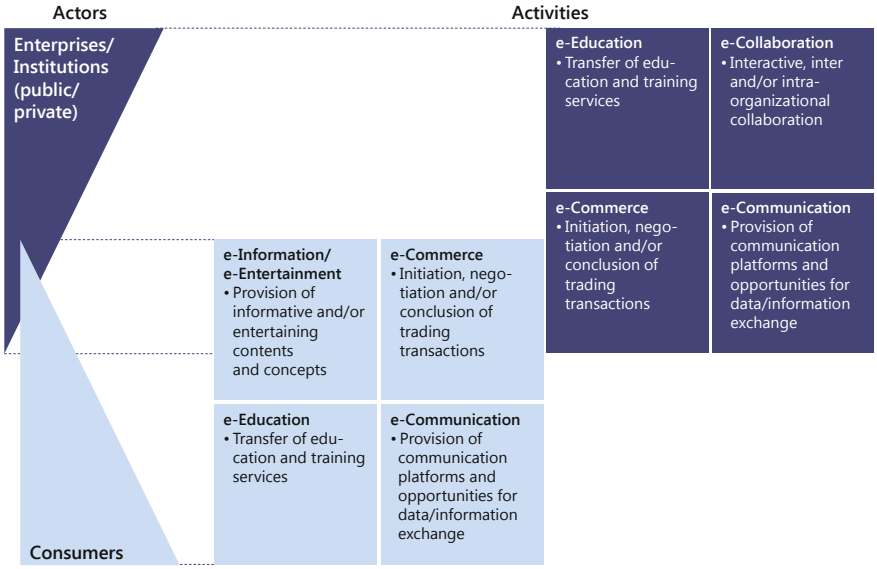

Fig. 3.10 Actors and activities of digital business. *Source* Wirtz (2000c, 2018b)

E-commerce includes the service exchange processes of initiation, negotiation and conclusion of trading transactions between economic agents by means of electronic networks. The actors use the opportunities of information and communication technologies to sell goods and services, as well as to simultaneously avoid

the costs of physical presence (Turban et al. 2015). The aim of e-commerce is to realize efficiency gains, potentials of cost reduction and convenience benefits during a (trading) transaction (Hsu et al. 2006). This does not only apply to the intra- and interorganizational field, but also pertains to the efficient arrangement of company-to-end customer relationships.

E-commerce activities, for example, refer to electronic price negotiations or signing supplier invoices by means of digital signatures. E-commerce involves the electronic support of activities that are directly related to the purchase and sale of products or services through electronic networks. E-collaboration refers to electronic, network-based, interactive and intra- or interorganizational cooperation. E-collaboration enables time and distance-independent cooperation by supporting processes of cooperation and adapting them to business activities (Wirtz and Vogt 2003). Furthermore, the possibility of intermediate storage allows to coordinate the results of cooperation and to transfer information-based components.

E-communication refers to the paid and non-paid provision and use of network-based and electronic communication platforms. E-communication aims at providing communication opportunities for task-related or interest-based understanding. The possibility of intermediate storage allows to coordinate communication and make it more flexible. Communication may not only occur at the intra- and interorganizational level but also at the retail level. The one or two-way communication process takes place by means of information and communication technologies, such as email, video conferencing and the new opportunities of social media.

E-education refers to the transfer of education and training services to third parties by means of electronic networks. The aim of e-education is the resource-efficient delivery of educational services via location and time-independent application of electronic networks. Here, the company itself or third parties outside the company can offer network-based education. With regard to the recipients of education and training services, one can distinguish between individual concepts of education and training, as well as concepts designed for a mass audience.

E-information/entertainment refers to the provision of informational and/or entertaining content and concepts for third parties by means of electronic networks. E-information/entertainment uses information and communication applications to facilitate access for recipients to decision-relevant, time-sensitive or stimulating and entertaining content. Due to its attributes, this content is an intangible good that is not consumed even when it is used multiple times. When producing, reproducing and distributing content, efficiency and cost advantages can be realized that result from the characteristics of the Internet economy.

The above-mentioned definitions delineate the digital business activities from one another and describe their “pure forms”. Thus, the demarcation of e-commerce, e-collaboration, e-communication, e-education and e-information/entertainment reflects the phenomenon of digital business from a theoretical and conceptual perspective. However, companies usually apply these activities in combination in the corporate practice. Moreover, a clear distinction is rarely possible, so that overlaps may occur.

- Success Factors of Digital Business

Through the development of innovative information and communication technologies, fundamental new business approaches have emerged on the Internet (Onetti et al. 2012). Numerous factors affect the development and success of digital business (Wirtz et al. 2003). On the one hand, these factors are prerequisites for the formation and development of digital business. On the other hand, some factors possess catalytic attributes that further accelerate the current development of digital business (Laudon and Traver 2017).

The digital business environment that is strongly influenced by technological innovations demands the dynamic capabilities and resources of a company (Zhu et al. 2006). The definition and implementation of an digital business strategy significantly contributes to success and can ensure a company's long-term success under these ever-changing conditions (Beheshti and Salehi-Sangari 2007). Such strategy especially demands four dynamic abilities: digital innovativeness, strategic and organizational flexibility, networking and integration capability, as well as ease of use.

The variety of technological innovations in information and communication technology forces companies to follow closely the market and assess the opportunities and risks of these innovations. The mere ability to innovate does not secure long-term market success. The product and process design in digital business rather requires to take into account a combination of pricing strategy, customer benefits and tradability of goods (Chen et al. 2004). In this context, not only physical but also digital goods or content need to be considered. This is crucial for the success of digital business.

Providers of interesting content will be able to win customers easier, if the latter perceive the content as attractive and novel. Since the usage intensity is frequently decisive for success, e-businesses need to set themselves apart from the content offered by the World Wide Web as a whole. Therefore, they also need to differentiate themselves from traditional distribution channels, for example, by designing an innovative, experience-oriented shopping offer (Park et al. 2012; Azam 2015).

The strategic and organizational flexibility is a further key success factor for companies in the context of digital business (Camra-Fierro et al. 2012). While in the traditional economy, companies were often surrounded by a relatively rigid environment, they now face a continuous change in the Internet economy. Accordingly, the corporate processes and organization structures need to take account of this in order to meet the market demands as quickly as possible. Thus, companies should increasingly focus on the customer.

The possibilities of digital business are much more than an additional distribution channel for traditional products. On the one hand, the digitalized world provides the potential to develop and sell new offers. On the other hand, the value of physical or traditional products increases by means of digital value-added services through which a company can generate competitive advantage. Furthermore, digital business has the potential to offer numerous product variants in mass markets (Chaffey 2015).

In this context, a company's flexibility to be able to react to current trends is a crucial success factor of digital business. The efficient integration of information, services, products and processes represents a basic idea of digital business. Electronic networks allow to avoid media disruptions and connect numerous users. Accordingly, the networking and integration ability is a critical component of doing digital business.

Companies need to customize an offer at the technological and content level that combines functionally relevant information and processes, which generate an added value compared to traditional business. Here, interconnectedness, for instance, in terms of network effects may serve as a driver of digital business process development or may also be applied through platform-specific lock-in effects as a customer loyalty instrument.

An example of a network effect is the increasing diffusion of the instant messaging client WhatsApp. Given that the value of a product or service is dependent on the number of others using it, the growing number of connected users increases the benefit for each individual because they can reach a higher number of users. However, the number of users needs to reach a certain critical mass in order for them to reap the benefits of their network (positive network effect).

Customers or users using products or services that are reliant on the reach of a critical mass are frequently locked-in. This so-called lock-in effect refers to the situation where the customers or users can only consume the aftermarket goods produced by original equipment manufacturers, because the compatibility between primary and aftermarket goods is associated with switching costs with regard to the original equipment.

A lock-in effect, for example, can be seen in Apple's mobile platform AppStore for the iPhone or iPod Touch. The platform-internal interconnection of clients creates the basis for a market of third parties that offer additional functionality for devices. As a result, the attractiveness of devices increases, leading to the effect that more customers choose to use the Apple platform. In addition, it binds customers permanently to the platform.

The ease of use of digital business applications is another key success factor. In this context, the design of business processes and navigational interfaces are considered under the aspects of efficiency and general accessibility. Since digital business applications aim to simplify economic transactions, the design of their electronic processing should not replace old problems by new ones.

For instance, it is reasonable to maintain the basic logic of individual business processes in digital business. The digital shopping cart used by online stores is a good example in this context. From offline transactions, customers are used to collect single shopping items until leaving the store in order to pay at the end of their purchase. Therefore, customers or users also expect this functionality in online transactions. Overall, companies need to focus on customer or user needs when it comes to ease of use. Figure 3.11 presents a summary of the four key success factors.

Digital Innovation Capability	Strategic and Organizational Flexibility
• Market analysis/customer needs • Evaluation of risks and opportunities of a 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

Fig. 3.11 Success factors of digital business. *Source* Wirtz (2010b, 2018b)

3.3 Forces of Digital Development

Along with innovations in the area of information and communication technologies, digital business has gained significant importance (Zhu et al. 2006). With boosting processing power and transmission, enhanced capacities of computers and networks, as well as increasing demand for electronically provided information and services from customers and businesses, the first electronic service offers began to run in the mid-1990s.

As a technology-enabled part of the business model, digital business quickly became a powerful innovation that can provide manifold benefits, since it allows unattended customer access to information and services, improves B2C and B2B interaction, fosters efficiency and effectiveness and forms the basis for e-markets from a technological point of view (Schneider 2017). Furthermore, its digital platform character for B2B and B2C interaction promotes standardization and thus reflects the demand of customers for more transparency and accountability.

Today, digital business is an inherent part of the market worldwide because it is highly relevant in addressing customers' desires and requirements. In this context, implementing digital business is especially relevant to the economy since the availability of online services is an important factor within global competition (Chaffey 2015). The Four-Forces Model of digital business explains the driving forces behind this situation that requires change for businesses by aggregating relevant drivers to four key developments: convergence and technology, digitalization and innovation dynamic, market complexity and customer empowerment (see Fig. 3.12).

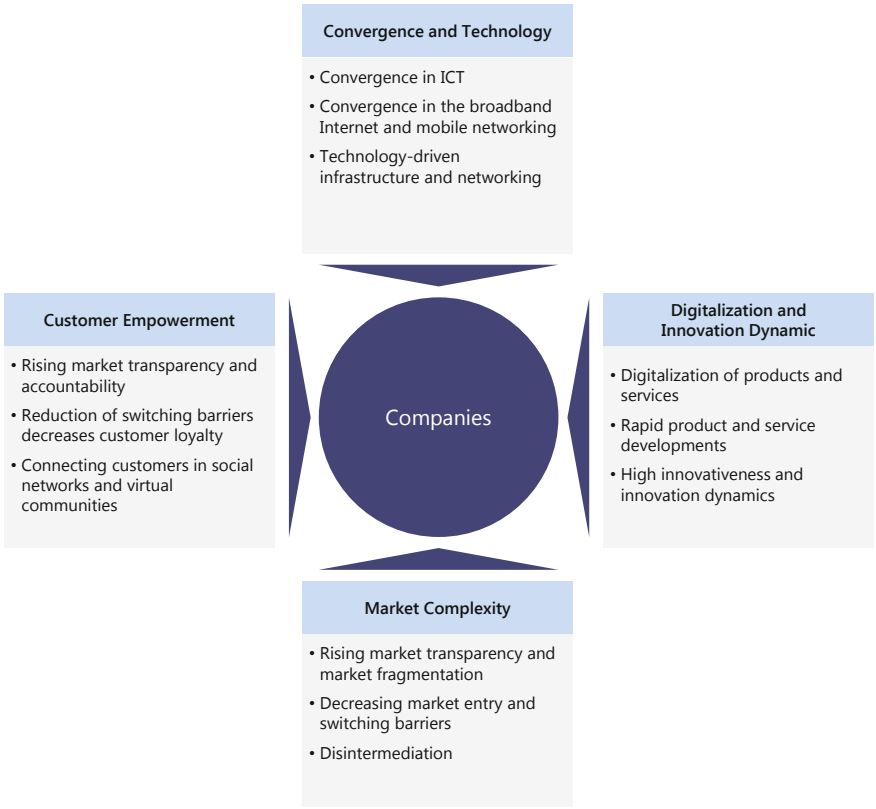

Fig. 3.12 Four-forces model of digital business. *Source* Wirtz (2000c, 2018b)

- Convergence and Technology

The first force of the digital business model is convergence and technology. Although all of these developments are crucial, this is the most significant one, since it covers the fundamental breakthrough of making e-business technologically possible. Convergence describes the approximation of underlying technologies, diminishing boundaries between sectors, networking of different areas of value creation and finally the integration of sectors, business units, organizations, products and services (Denger and Wirtz 1995a). Depending on the respective level of aggregation, convergence can be divided into different types (see Wirtz 2000d, 2015a):

(1) Sector level: convergence of a growing number of companies within related sectors leads to the convergence of the corresponding sector. (2) Company level: convergence forces companies to reposition their value chains and core activities, which results in modified institutional boundaries. (3) Business unit level: convergence relates to various units of the company. (4) Product/service level: convergence

of products/services (e.g., convergence through integration of functionalities) or distribution channels. Figure 3.13 illustrates the respective Four-Level Convergence Model by presenting the different convergence types and showing the level of aggregation.

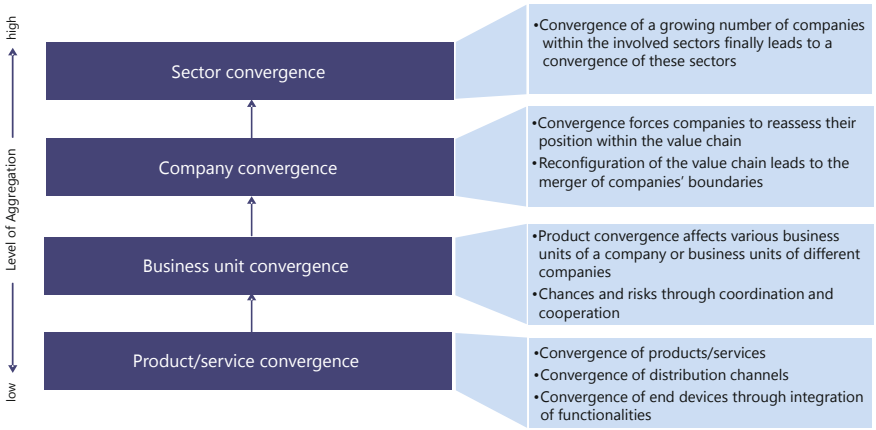

Fig. 3.13 Four-level convergence model. *Source* Wirtz (2006, 2017)

Several drivers such as digitalization of services and technology-driven networking have initiated this ongoing trend, causing a paramount strategic and operative change in all forms of digital business, which is by no means over yet. The already existing powerful and continuously developing broadband and mobile networking infrastructure constantly drives new networking applications and innovation.

- Digitalization and Innovation Dynamic

The second force is digitalization and dynamics in innovation. The key drivers are the increasing digitalization of products and services, the rapidity of product and service developments and the high innovativeness and innovative dynamics. Innovation is one of the key figures of the Internet economy and digital business. The dynamic changes in the business environment in the Internet economy lead to innovations that occur increasingly shorter and at discontinuous intervals. Therefore, companies need to have a considerable adaptability in the marketplace.

The initial starting point of this increasing pace of innovation is technological progress, especially due to the high speed at which the available hardware and software is developing and the increasing use of electronic networks. This technological development leads to completely new forms and possibilities of information processing that allow to capture, store and process larger quantities of data.

The increasing digitalization of products and services in the Internet economy refers to two dimensions: The cost structure of digital goods and their general

intangible structure. The latter has implications for the distribution and production processes, which in turn affects the organization structure of companies.

Besides the influence of new product structures on the organizational design and structure of companies, there is a further important influencing factor: The changed coordination possibilities of corporate processes induced by information and communication applications considerably change the optimum ratio of specialization and coordination. Figure 3.14 presents these relationships.

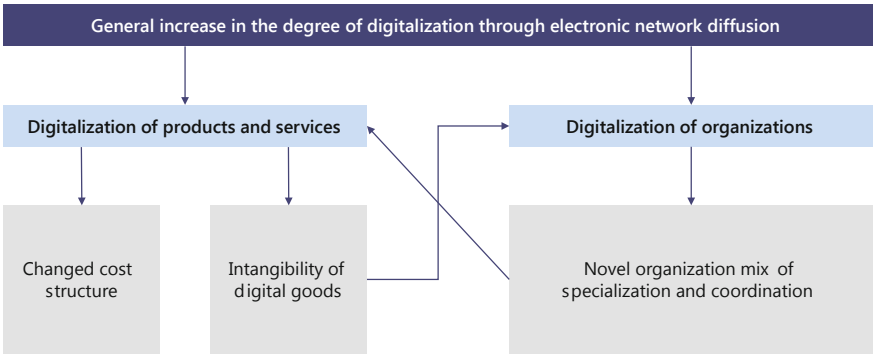

Fig. 3.14 Impacts of digitalization. *Source* Wirtz (2000c, 2018b)

- Market Complexity

The third force is market complexity. Its key drivers are rising market transparency, increasing fragmentation of markets, decreasing market entry and switching barriers (particularly with regard to the e-service sector) and disintermediation. In traditional economics, markets are usually characterized by a low to medium level of market transparency and there is generally an information asymmetry between buyers and sellers. Due to their superior market position, sellers may exploit their information advantage by mostly skimming customers' surplus by means of price discrimination (Mukhopadhyay and Setoputro 2004). In the Internet economy, this situation has changed fundamentally due to the largely free flow of information.

Consequently, market transparency increases in the digital business environment because the products traded are more manageable. By providing easy access to information, these markets bring along a better comparability of products and services than traditional markets (Jelassi and Enders 2004).

The characteristics of computer networks are the driving force behind a high market transparency, which enables customers to retrieve any information at any time from any location. This means that market penetration is easier and particularly less expensive and time-consuming. The search costs of market participants for observing and analyzing the market are hence very low.

In contrast to the traditional economy, where product-based information rests upon the seller's consultation, electronic markets allow customers to collect information without much effort by using, for example, price comparisons, digital communities or test reports of online products. The customers are able to adjust their level of information to that of the seller and are no longer dependent on filtered information. This phenomenon is known as reverse markets. However, market transparency also results in a vast amount of information that is difficult for customers to manage and structure. This so-called information overload partly undermines the advantages of transparency.

Besides product information, customers can also easily search for price information in electronic networks, so that price comparisons are sustainably facilitated. Shopping robots or shopbots catalyze this development. These are companies specializing in price research and comparison on the Internet. The user may extend the search to various auction websites. After a few seconds, the user receives a list containing the online shops that offer the product and the respective prices. One of the most popular price comparison websites is pricegrabber.com, for instance.

Fragmentation of markets refers to the individualization of market participants and their consumption preferences, which has particularly taken place since the emergence and development of the Internet economy. Consumer behavior is increasingly individualized to the effect that customers and users demand products that they perceive as unique or that are tailored to their individual preferences. These tendencies towards individualization in companies have far-reaching implications for marketing, product development and design.

An important marketing tool with respect to customer individualization is one-to-one marketing. Instead of addressing customer groups or masses of customers, here the individual relationship to the customer is at the center stage of marketing activities (Wirtz 1995a). However, one-to-one marketing not only refers to an individual customer, but also particularly to individualized product development and design, which is known under the apparently contradictory keyword mass customization (Wehrli and Wirtz 1997). Companies seek to exploit the cost advantages of mass production by means of mass customization and try to give their products an individual character. An example of mass customization is NIKEiD that enables customers to configure their individual and personalized sneakers.

Another aspect of market complexity are decreasing market entry barriers for digital business companies. Decreasing market entry barriers lead to an increase in the number of competitors and thus in a higher competition intensity. The access to international markets and the sourcing of services worldwide enables companies to easily become active in the Internet. Low entry barriers pose risks to established businesses. Moreover, the supply chain demands less intermediation. The incorporation of other companies such as retailers can be omitted through the Internet since e-commerce enables companies to sell directly to customers.

Market entry barriers are characteristics of a market or a market segment, which tend to be suitable to discourage new competitors from entering the market or at least to impede them in doing so. Baumol et al. (1988) define a barrier to market entry as "[…] anything that requires an expenditure by a new entrant into an

industry, but imposes no equivalent cost upon an incumbent". Market entry barriers comprehensively reduce the attractiveness of the market for potential newcomers.

The final aspect of market complexity is disintermediation, which can be explained by means of the value chain concept. A value chain describes all steps that a product undergoes from the manufacturer to the end customer (Porter and Millar 1985; Rayport and Sviokla 1996) and comprises three steps: (1) subcontracting (production of components), (2) production (aggregation of components to a marketable product) and (3) retail (provision of the product to the customers). The role of retailers is very important within the value chain since they act as mediators between manufacturers and customers (Prajogo and Olhager 2012).

Retailers perform four essential distribution tasks that the manufacturer is not able to perform efficiently, in particular, the spatial, temporal, quantitative and qualitative transformation of products. In the context of spatial transformation, retail companies provide the products at the point of demand, so that the manufacturers do not need to establish their own distribution chain. The retail companies render a temporal transformation in terms of their warehouses since they store large quantities in order to continuously provide products to customers.

The quantitative transformation is a particularly relevant distribution task as it provides the products demand-oriented and in small quantities to the customers. Finally, the qualitative transformation is important in terms of convenience benefits for the customers since retailers bundle or unbundle products and create different assortments. Hence, retailers are able to supply the customer with products and act as a single transaction partner.

Traditionally, retailers have much power over manufacturers due to the access to the customers of the manufacturers. This relationship is known as intermediation. However, because of increased market transparency and the declining market entry barriers the Internet economy undermines the power of retailers. Manufacturers have created new opportunities themselves to carry out the distribution and its value creation process. Since the intermediaries are eliminated in this case, this phenomenon is called disintermediation, which is illustrated in Fig. 3.15.

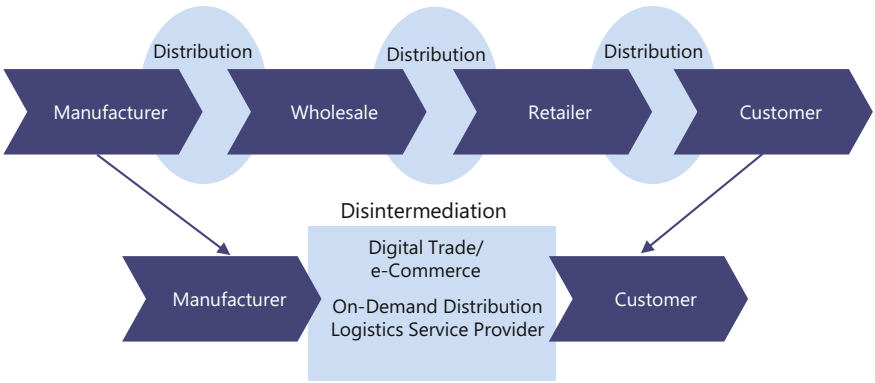

Fig. 3.15 Disintermediation. *Source* Wirtz (1995b, 2018b)

Disintermediation means that the intermediary role of trade between manufacturers and customers is threatened, as manufacturers may have direct access to their customers by means of information networks such as the Internet (Wirtz 1995b). Therefore, manufacturers have the ability to completely take over the intermediary function of trade. Particularly the Internet can help manufacturers to comply with the four basic tasks of trade by means of direct distribution (Rayport and Sviokla 1996).

- Customer Empowerment

The fourth force driving the digital business development is customer empowerment. This change in the business environment mainly concerns the customers themselves. The rising transparency and accountability of actions and the possibility that customers can exchange their desires and opinions and unite in social networks and communities all became possible due to modern information and communication technologies. Customers not only particularly claim more participation in production and design, but also a renewed B2C interaction. Here, companies have to act, for instance, by providing a more transparent form of production, management and development by integrating customers.

Another challenge of digital business companies is decreasing customer loyalty that results from declining switching costs and switching barriers (Hsu et al. 2013). The already described increase in general market transparency and accountability enables customers to make competent and informed purchasing decisions. Although companies also have access to this comprehensive information, an opposite development partially offsets the benefits. Thus, while the increasing diffusion of digital business offers the opportunity to create an overview of the market, the complexity of the markets in the Internet economy are steadily rising at the same time.

Reducing switching barriers for customers in the Internet economy is closely related to the increase in market transparency. Switching barriers refer to factors generated by companies or incurred by features inherent in the system of markets or industries, binding customers to specific suppliers and preventing change to another provider without friction. In the Internet economy, switching barriers consist of three main categories: (1) technological switching barriers, (2) qualification-related switching barriers and (3) psychological switching barriers. Technological switching barriers arise when customers are bound to other products available on the market due to the lack of technological compatibility.

This is the case when, for example, product components of different companies cannot be used jointly or across systems. A popular example are the products of Apple Inc. All products of Apple are compatible with each other and mostly incompatible with products and systems of other producers. Therefore, Apple bound their customers to the brand by creating a lock-in effect.

In the Internet economy, the importance of technological switching barriers has significantly changed because users and customers may recognize a lock-in situation a priori and may therefore avoid it for the sake of comprehensive information

access. Consequently, the increase in market transparency mentioned earlier reduces switching costs due to the decrease in search costs.

Qualification-related switching barriers rest on investments in system-specific training. This not only represents the knowledge acquired in the context of training courses, but especially the experience gained in terms of system use. These barriers have the same effect like learning effects known from production management, since they enable steady increases in efficiency when using the system. When changing the system, both the acquired knowledge and the gained experiences partly get lost since these are usually not at all or only to a small degree transferable.

The development of the Internet economy has a degenerative impact on the qualification-related switching barriers, since the information society is not only characterized by a much wider diffusion of knowledge, but also by a generally higher level of staff education with regard to information and communication technology. In addition to these objectively measurable switching barriers based on technology and training costs, there is a third type of switching barriers that does not belong to the main group of value-based barriers. This type refers to psychological barriers such as the commitment to a brand or company for the purposes of identification (Wirtz 2000a).

In the Internet economy, the psychological barriers begin to erode, especially the traditional switching barriers such as loyalty and commitment to a retailer (Toufaily et al. 2013). This is mainly a result of increasing homogenization of product offer in the markets, an improved objective comparison of products and the anonymity of customer/supplier relationships. A customer therefore usually chooses the product with the best price-performance ratio. Due to the homogenization of product offers, the price has become the primary selection criterion in the Internet economy (Shapiro and Varian 1999). The resulting decrease in customer loyalty and the associated issues of customer retention in the Internet economy represent the core task of marketing and customer relationship management in digital business (Timmers 1999).

The main objective of marketing is therefore to build strong brand identities and to identify new psychological switching barriers to compensate for decreasing customer loyalty and to connect the customers' switch to competitors with significant switching costs. The possibility of exchanging their desires and opinions and unite in social networks and digital communities (including newsgroups and chat forums) is another aspect that empowers customers. Consequently, customers become smart customers and their general market power increases (Wang et al. 2015).

Most online communities are based on websites that are visited on the members' own initiative to participate in discussions and chat forums. The members contribute to the community by providing information in terms of own experiences and knowledge. Hence, they jointly produce a large pool of information that significantly increases with the rising number of memberships.

Digital communities relating to a product, a product category or a brand are particularly relevant for digital business companies. Information about a product or provider spread quickly, so that positive and negative experiences considerably influence the position of the supplier or the product. Digital communities are thus able to change service concepts or even marketing strategies of a provider through their collective feedback (Goh et al. 2013).

In light of the aforementioned four driving forces of digital business, the next section outlines the essential business models that are foundation models of Chaps. 4–9.

3.4 Business Models in Digital Markets

In order to analyze business models consistently and gain an understanding of their respective characteristics, this section outlines a coordinated typology of digital business models particularly designed for the B2C (4C-Net Business Model) and B2B (4S-Net Business Model) area. This typology provides a sufficient orientation, differentiation and classification based on rigid distinction criteria from a conceptual perspective. It may happen that a company indeed has a core business model but has some overlap with the other business model groups. The business models of the Internet industry in the business-to-consumer sector can be classified based on the 4C-Net Business Model into the following segments: content, commerce, context and connection (see Fig. 3.16).

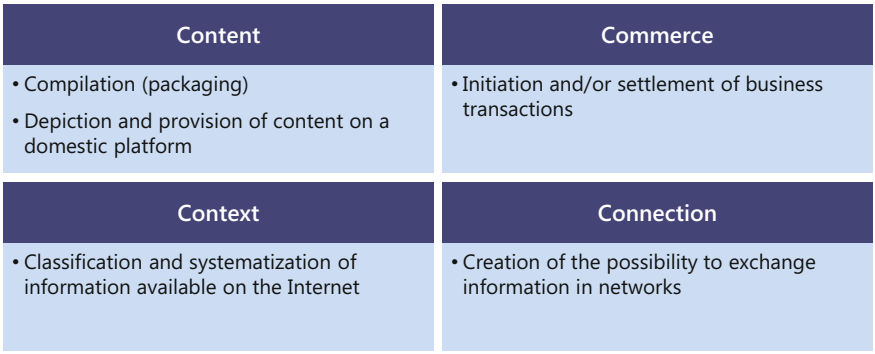

Fig. 3.16 4C-Net Business Model. *Source* Wirtz (2000c, 2016a)

The content business model consists of the collection, selection, systemization, compilation (packaging) and delivery of content on a domestic platform. The aim of this business model approach is to make content accessible to the user over the Internet in an easy, convenient and visually appealing form. The commerce business model entails the initiation, negotiation and/or settlement of transactions via the Internet. In this connection, auction houses (e.g., eBay) and e-commerce platforms (e.g., Amazon) have gained considerable attention.

The context business model focuses on classifying and systematizing information available on the Internet. Context providers in the digital business sector can be further distinguished in that they primarily do not offer their own content, but rather offer navigation aids and increasingly take on the role of an aggregator on the

Internet. In addition to providing essential navigation aids, complexity reduction is also a major task of the context provider. The context provider compiles information according to specific criteria and clearly presents it to the user in a context-specific manner. The objective is to improve market transparency and to continuously enhance the obtained search results.

The connection business model addresses the establishment of options for information exchange in networks. Thus, the services of the connection business model often enable interaction between actors in digital networks, which would not be possible in the physical world due to the prohibitively high transaction costs or communication barriers. Over the last decade, a trend to an integrated business model across all 4Cs has emerged because of the convergence within this industrial sector (see Google/Alphabet case study in Chap. 11).

For example, AOL started out as a pure Internet service provider (connection), Google as a pure search engine (context) and Amazon as a pure bookseller (commerce). The interactive edition "The Wall Street Journal" initially offered exclusively content (content). In contrast to pure play offers, there has been a development towards hybrid digital business models (Weill and Vitale 2013). A former pure player, whose web directory offer originally focused only on the context segment, is Google. Meanwhile, Google also offers different products that can be linked to the other 3Cs.

Business models are highly relevant not only in the B2C area, but also in the B2B sector (Timmers 1998, 1999). The main difference lies in the underlying relationship. While B2C business models are based on a range of services to private end users (private clients), B2B business models focus exclusively on transactions between companies (Kian et al. 2010). The 4S-Net Business Model typology presents an overview of the most relevant B2B business models on the Internet. However, in this context it is important to consider that a rigid and clear separation is not always possible, as companies often choose strategies that follow several models at once. It may happen that a company indeed has a core business model, however with some overlap with other B2B business model groups. Figure 3.17 outlines the 4S-Net Business Model framework.

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

Fig. 3.17 4S-Net Business Model. *Source* Wirtz (2010b, 2018b), Wirtz and Bronnenmayer (2011)

The B2B business model of sourcing consists of the initiation and/or settlement of B2B business transactions from buyer to seller. The aim of this business model is to handle business transactions of procurement management by using the Internet (Camarinha-Matos et al. 2013). A direct service relationship between buyer and seller is required. The B2B business model sales involves the initiation and the settlement of direct B2B business transactions from the seller to the buyer. The aim of this business model is to handle transactions of sales through the Internet but initiated by the seller. Unlike the source model, here the selling entity initiates the direct relationship between buyers and sellers (Rayport and Sviokla 1995).

The B2B business model of supportive collaboration consists of collaborative value generation and comprises the areas of collaborative R&D, production and sale. Thus, the focus of attention is the cooperation and more precisely the joint effort of several companies in the areas of research and development, production and sale. Such approach demands a most direct relationship of the parties involved. An intermediary is usually not involved. The B2B business model of service broker supports B2B business transactions by providing information and marketplaces (Weill and Vitale 2013). Unlike the rest of the 4S-Net Business Model, this model involves third-party providers or intermediaries. Thus, there is no direct relationship between the companies that eventually make deals and conduct transactions, but only via the corresponding intermediary.

The next four chapters outline the different B2C digital business models according to the 4C-Net approach in more detail. Following this, Chap. 8 describes hybrid B2C business model approaches. Against this background, Chap. 9 refers to the B2B digital business models of the 4S-Net approach.